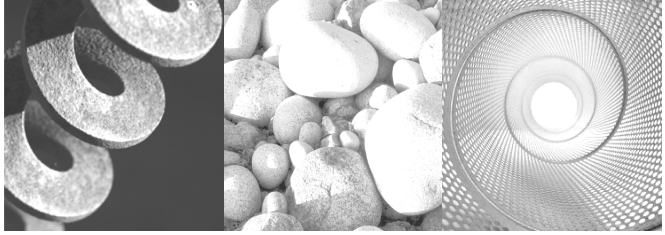

GEI Consultants

Consulting
Engineers and
Scientists

Geotechnical Report

Astoria Cove Development

Buildings 3A/3B, 4 & 5
Queens Block 906, Lots 1 & 5 | Block 908, Lot 12 | Block 909 Lot 35
Astoria, Queens County, New York

Submitted to:
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Executive Summary

GEI Consultants, Inc., P.C. prepared this report to present the results of a subsurface exploration program and recommendations for the design of foundation supports for the design of Phase 1 of a redevelopment project in the Astoria neighborhood of Queens, New York. Phase 1 of the redevelopment project consists of four new mixed-use buildings between 6 and 26 stories high with cellar/basement footprints between 14,630 ft^2 and 37,700 ft^2, designated as Building 3A/3B, Building 4, and Building 5.

The top of the cellar/basement slab elevations for Buildings 3A/3B, Building 4, and Building 5 are at El. 6.00, El. 8.46, and El. 22.50, respectively. Localized top of mat for elevator and mechanical pits are called out as El. 2.46 in Building 4 and either El. 22.00 or El. 12.50 in Building 5. General excavations between 11 to 16 feet, 12 to 35 feet, and 2 to 28 feet will be required for Building 3A/3B, Building 4, and Building 5, respectively.

The geotechnical exploration program consisted of 27 geotechnical test borings advanced between about 55 and 102 feet below the ground surface. Subsurface conditions encountered in the borings were generally medium dense to dense miscellaneous granular fill, over discontinuous loose sand, over discontinuous stiff silt/clay, over medium dense sand, over very dense glacial till, over very dense soil-like weathered/decomposed rock, over metamorphic gneiss bedrock. Till soils were generally between 49 and 64 feet thick.

We recommend that the proposed buildings be supported on either a mat foundation or spread and continuous wall footings bearing on the Stratum III dense glacial till soils (Class 3a) or the overlying Stratum IIc sandy soils (Class 3b) or compacted Crushed Stone extending to Stratum III soils or compacted Structural Fill extending to Stratum IIc soils. The maximum allowable design bearing pressures that are recommended range from 3 to 8 tons/ft^2 as discussed in greater detail in this report. We recommend a unit value for the modulus of vertical subgrade reaction (for a 1-foot loaded area) of 300 tons/ft^3 and 130 tons/ft^3 for mat foundations bearing in Stratum III and Stratum IIc soils, respectively.

Alternatively, drilled pressure-grouted micropiles also can be considered to support the tower or podium cores for Building 3A/3B deriving support capacity in the dense glacial till soils. Micropiles can be designed to achieve 200-ton compression and 100-ton tension capacity and could also be used as tiedown anchors for the tower core for tension capacity if shallow foundations are used for the entire building footprint.

Groundwater levels were generally observed between El. 1.1 and El. 4 for wells located near Building 3A/3B, between El. 2.9 and El. 4.8 for wells located near Building 4, and between

El. 3.5 and El. 6.2 for wells located near Building 5. Therefore, for the design of the floor slabs and foundation walls, we recommend design groundwater elevations for Building 3A/3B, Building 4, and Building 5 as El. 5, El. 6, and El. 7, respectively. Additionally, well point or sump pit dewatering may be required during construction if excavations are performed to reach bearing strata.

We recommend using Site Class D (Stiff Soil Profile) for seismic design purposes, in accordance with Building Code § 1613.5.2. Based on the site geology, topography and subsurface investigations reported herein, it is our opinion that the proposed buildings are not susceptible to damage from liquefaction, slope instability, lateral spreading, or surface rupture due to faulting.

1. Introduction

GEI Consultants, Inc., P.C. prepared this report to present the results of a subsurface exploration program and foundation recommendations for the design of Phase 1 of a redevelopment project in the Astoria neighborhood of Queens, New York (Fig. 1). Phase 1 of the redevelopment project consists of four new mixed-use buildings, designated Building 3A/3B, Building 4, and Building 5. Slim Astoria 2468 LLC of Brookyln, New York engaged GEI to provide geotechnical services for this project.

1.1 Scope of Services

GEI completed the following scope of services for this report. These services were performed to investigate the subsurface conditions at the site.

- Reviewed site plans and preliminary building layout drawings.
- Engaged a test boring contractor to drill 27 geotechnical test borings and install six observation wells in the support of Building 3A/3B, Building 4, Building 5 for geotechnical design.
- Performed split spoon sampling and cumulatively collected about 68 feet of rock cores.
- Evaluated soil and rock samples recovered from the test borings and prepared test boring logs.
- Performed geotechnical index testing on soil samples from the test borings.
- Evaluated the data obtained and prepared this Geotechnical Report.

We performed these services in general accordance with the 2014 edition of the New York City Building Code (Building Code), which is an adaptation of the 2009 International Building Code.

1.2 Authorization

Our work was performed in general accordance with our revised proposal dated November 6, 2023, executed and authorized by Mr. Dov Strohli of Slim Astoria 2468 LLC.

1.3 Elevation Datum and Horizontal Coordinate System

Elevations provided in this report are in feet and are referenced to the North American Vertical Datum of 1988 (NAVD88). Horizontal coordinates (northing and easting) are U.S. State Plane coordinates in U.S. survey feet and are referenced to the North American Datum of 1983 (NAD83), New York State Plane Long Island Zone (3104).

1.4 Site Description

The site is currently used by various contractors to store equipment and materials and is irregularly shaped. Two vacant 1-story buildings are present on the northern portion of the site. The site is bounded to the north by the East River, to the west by one open lot and three buildings between 1- and 13-stories high (13-story building under construction), to the south by a 4-story building with three cellar levels and 27th Avenue beyond, and to the east by 9th Street, and eight buildings between 3- and 6-stories high.

Existing ground surface elevations vary between about El. -3 near the East River and up to El. 55 near the south portions of the site. An approximately 3H:2V slope exists from the East River to the vacant 1-story buildings and another approximately 2H:1V slope existing from south of 26th Avenue to north end of 8th Street. Fig. 2 depicts the general elevations at the site.

A Phase I Environmental Site Assessment (ESA) for the site indicates that the two vacant buildings were constructed in 1935 and 1943. Historical Sanborn Fire Insurance Maps for the site included in the Phase I ESA indicate that in 1898, 1915, and 1928, as many as 20 structures were once located at the site. It is likely that the foundations for many of those structures remain buried at the site after the demolition of the buildings.

1.5 FEMA Flood Mapping

The Federal Emergency Management Agency's (FEMA) Effective Flood Insurance Rate Map (FIRM), number 3404970093F dated September 5, 2007, shows that the site is predominantly outside the Special Flood Hazard Area (SFHA) and the Area of Minimal Flood Hazard (Zone X). There is a portion of the site closer to the East River that is identified as the 1 percent annual chance flood Zone AE (base flood elevation for inundation at El. 12). Properties to the west of the site are also in the SFHA designated as Zone AE (base flood elevation for inundation at El. 12) and Zone X.

From the New York City Department of City Planning updated flood maps (based on preliminary updated FIRMs, number 3604970093G, from FEMA in 2013), the site is in an Area of Minimal Flood Hazard (Prelim Shaded Zone X) with a 0.2 percent annual chance of

flooding (moderate flood hazard). There is a portion of the site closer to the East River that is identified as the 1 percent annual chance flood Zone AE (base flood elevation for inundation at El. 14) with a limited area for Moderate Waver Action. Properties to the west of the site are also in the SFHA designated as Zone AE (base flood elevation for inundation at El. 12) and Zone X.

The site is classified as Flood Design Class 2 per ASCE 24. However, none of the proposed structures are in the flood zone and not subject to Appendix G of the 2014 Building Code. Regardless, if ownership decides to design buildings for design flood elevations, any structures located below the base flood elevation should be floodproofed in accordance with the Building Code, New York State Building Code, ASCE 24, and all other agency requirements having jurisdiction. At a minimum, 1 foot of free board must be provided above the controlling base flood elevation.

1.6 Project Description

The proposed Phase 1 redevelopment involves construction of four new mixed-use buildings, designated Building 3A/3B, Building 4, and Building 5. Buildings 3A/3B will be located on Block 906 and Lots 1 (08-01 26th Avenue) and 5 (08-51 26th Avenue); Building 4 will be located on Block 909 and Lot 35 (4-34 26th Avenue); and Building 5 is location on Block 908 and Lot 12 (26-10 9th Avenue).

Buildings 3A/3B – Buildings 3A/3B will include a 26-story tower in the northwest corner of the building and an 8- to 9-story building podium with a full cellar. Buildings 3A/3B cellar footprint is approximately 37,700 ft^2 in area. Top of slab elevation for proposed the basement/cellar is at El. 6.00. The cellar will be used for parking, possible residential amenities, and mechanical rooms; the 1st floor will be used for parking, commercial retail space, and residential space; and floors 4 through 26 will be used for residential space and amenities.

The excavation for the cellar will extend down to approximately El. 6, which is approximately 7 to 15 feet below the existing ground surface.

The project Structural Engineer, Desimone Consulting Engineers, has provided the following preliminary service loads:

- Building 3A
  - Podium West Core: 3,000 kips Dead / 600 kips Live
  - Podium East Core: 3,000 kips Dead / 600 kips Live
  - Typical Podium Column: 600 kips Dead / 220 kips Live

  - East Wall: 1,600 kips Dead / 400 kips Live
- Building 3B:
  - Tower Core: 13,000 kips Dead / 600 kips Live
  - Typical Tower Interior Column: 1,150 kips Dead / 450 kips Live
  - Podium East Core: 2,100 kips Dead / 450 kips Live
  - Typical Podium Column: 600 kips Dead / 220 kips Live
  - West Wall: 3,800 kips Dead / 800 kips Live

Building 4 – Building 4 will consist of an 8-story building with a full cellar (about 21,192 ft^2 in area) below most of the building footprint. Building 4 has a footprint area of approximately 23,650 ft^2. Top of mat elevation for the proposed cellar is at El. 8.46 with a localized elevator pit top of mat at El. 2.46. The cellar will be used for parking and mechanical rooms; the 1st floor will be used for mechanical rooms, commercial retail space, and residential space; and floors 2 through 8 will be used for residential space.

The excavation for the cellar will extend down to approximately El. 8.5, which is approximately 12.5 to 39 feet below the existing ground surface.

Desimone Consulting Engineers has provided the following preliminary service loads:

- Building 4:
  - Tower Core: 3,600 kips Dead / 450 kips Live
  - Typical Tower Interior Column: 550 kips Dead / 110 kips Live
  - Podium Core: 800 kips Dead / 100 kips
  - Typical Tower Perimeter Column: 250 kips Dead / 50 kips Live
  - Typical Interior Column: 400 kips Dead / 800 kips Live
  - Typical Podium Perimeter Column: 200 kips Dead / 30 kips Live

Building 5 – Building 5 will consist of a 6-story building (with penthouse) with a walk-out basement at grade in the northern portion of the building and extending to the southern portion of the building as a full cellar approximately 28.5 feet below the existing ground surface, due to the rise in elevation on the southern portion of the site. Building 5 will have a footprint of approximately 14,630 ft^2. Top of slab elevation for the proposed basement/cellar is at El. 22.50 with a localized elevator pit top of mat at El. 22.00 and a mechanical pit top of mat at El. 12.50. There will be a mechanical pit in the northeast corner of the building with an approximate footprint of 820 ft^2. The cellar/basement will be used for mechanical rooms

and residential space, and floors one through six and the penthouse will be used for residential space.

The excavation for the basement/cellar will extend to approximately El. 21.5 for the majority of the building except for the mechanical pit where an excavation to about El. 11.5 will be required, which is approximately 3 to 27.5 feet below the existing ground surface.

Desimone Consulting Engineers has provided the following preliminary services reactions:

- Building 5:
  - Tower Core: 2,000 kips Dead / 250 kips Live
  - Typical Tower Interior Column: 250 kips Dead / 50 kips Live
  - Podium Core: 600 kips Dead / 50 kips
  - Typical Tower Perimeter Column: 200 kips Dead / 25 kips Live
  - Typical Interior Column: 550 kips Dead / 100 kips Live
  - Typical Podium Perimeter Column: 120 kips Dead / 25 kips Live

The anticipated foundation supports for Buildings 3A/3B, Building 4, and Building 5 are shallow foundations under most of the footprint with deep foundation element supports under the 26-story tower at Building 3B.

2. Subsurface Explorations

2.1 Exploration Program

The geotechnical exploration program consisted of 27 test boring that were performed in two mobilizations. Geotechnical test borings B1 through B23, B29, and B53 (B000-series borings) were drilled by Craig Geotechnical Drilling Co., Inc. of Mays Landing, New Jersey between March 2 and June 12, 2020. Geotechnical test borings B101 and B102 (B100-series borings) also were drilled by Craig Drilling on November 23 and 24, 2021.

The borings were drilled to depths between 55 and 102 feet below the existing ground surface, which translates to between El. -53.2 to El. -81.9. Approximate exploration locations are depicted in Fig. 2 and the exploration program is summarized in Table 1. Test boring logs as well as GEI's visual-manual description guide are included in Appendix A.

The test borings were advanced using either a CME 75 truck-mounted drilling rig or a CME 55LC track-mounted drilling rig with mud rotary drilling (bentonite-based), and 4-inch I.D. casing used to support the borehole.

A GEI geotechnical field representative observed and documented the geotechnical drilling and sample collection.

Standard Penetration Testing (SPT) and split-spoon sampling, in accordance with ASTM D1586, were generally performed continuously in the upper 12 feet of each boring and at 5-foot intervals, thereafter, using an automatic hammer.

Representative samples of the soils obtained from the borings were classified in accordance with ASTM D2488. Rock coring was performed using NX barrels in boreholes B8, B10, B11, B14, B15, B20, B23, and B101. Split-spoon samples were placed in appropriately identified sealed glass jars and rock cores were placed in wood core boxes. All samples were stored on-site.

Six groundwater observation wells were installed in completed borings B5, B8, B16, B29, B48 (off site well), and B53. Well construction details are presented in Appendix B.

An additional eight monitoring wells were installed in subsequent environmental investigations conducted in 2020 and are shown in Fig. 2. Well construction details are presented in Appendix B.

As-drilled boring locations were documented based on taped off measurements from existing site features. Approximate ground surface elevations at the exploration locations were estimated from the contours provided on Survey Number 44888-6 titled, "Survey of City of New York, County Queens, Tax Blocks as Shown," prepared by Montrose Surveying Co., LLP and revised October 27, 2023.

The boreholes were backfilled with drill cuttings and grout, with excess cuttings spread at the surface in the vicinity of the borehole.

3. Subsurface Conditions

3.1 Subsurface Conditions

Seven generalized strata were encountered in the test borings we performed and are described below, starting from the ground surface, and summarized in Table 1. Subsurface profiles based on the exploration information are presented in Figs. 3 through 6.

The drilling contractor used either a safety hammer with rope and cathead lifting system or an automatic hammer to perform the SPTs to measure the N-values in the field (termed N_m), which resulted in a variation in the efficiency of delivering the theoretical energy of a 140-pound weight freefalling 30 inches.

To use the data set in design, the N_m values for the automatic hammer were normalized to 60 percent of the theoretical energy delivered in the SPT (termed N_{60}), assuming that the automatic hammer was conservatively 80 percent efficient. The corrected "design" N-values are provided in Table 2. Since the N_m values obtained from a safety hammer with rope and cathead lifting system are typically 60 percent of the theoretical energy delivered in the SPT, no corrections were made on those SPTs.

The soil conditions are known only at the exploration locations. Conditions between exploration locations may vary significantly from the descriptions given below. The Building Code Material Classifications are given for each layer in paratheses.

- Stratum I – Fill (Class 7)
- Stratum IIa – Loose Sand (Class 6)
- Stratum IIb – Silt/Clay (Class 4b/5b)
- Stratum IIc – Sand (Class 3b)
- Stratum III – Till (Class 3a)
- Stratum IV – Decomposed/Weathered Rock (Class 1d)
- Stratum V – Bedrock (Class 1b/1c)

Stratum I – Fill (Class 7) – Fill soils were encountered at all exploration location below up to 8 inches of asphalt or 12 inches of concrete. The thickness of the fill ranged from about 6 inches to 23.5 feet, but was generally 2 to 10 feet thick. The fill generally consisted of brown silty sand with varying amounts of glass, wood, bricks, and other construction debris.

SPT N_{60}-values ranged from 3 blows per foot to split spoon refusal, but were generally between 16 and 41 blows per foot, and averaged approximately 34 blows per foot, indicating generally dense soil conditions.

Stratum IIa – Loose Sand (Class 6) – Loose sand deposits were encountered in 10 of the 25 test borings performed below the fill and were observed to be between about 4 and 11.5 feet thick at the boring locations. The loose sand deposits consist primarily of narrowly and widely graded sand with up to about 10 percent nonplastic fines and up to 10 percent fine gravel. In B21, we observed that the loose sand layer contained up to 20 percent low plasticity clayey fines and up to about 30 percent gravel.

SPT N_{60}-values ranged from 3 to 24 blows per foot, but were generally between 7 and 11 blows per foot, and averaged approximately 9 blows per foot, indicating generally loose soil conditions.

Stratum IIb – Silt/Clay (Class 4b/5b) – Silt and clay deposits were encountered in B5, B9, and B21 below the fill and loose sand and were observed to be 9.5, 2, and 5 feet thick at the respective boring locations. The silt deposit observed at B5 consists of light brown nonplastic fines with up to 40 percent fine sand and included about a 3-foot-thick silty sand interlayer containing up to 40 percent nonplastic fines. The clay deposit observed at B21 consists of medium plasticity black fat clay with up to 10 percent gravel and up to 5 percent fine sand.

This stratum is likely discontinuous since the silt deposit encountered in B5 at about El. 21 and the clay deposit was encountered in B21 at about El. -14.5.

SPT N_{60}-values ranged from 9 to 25 blows per foot, but were generally between 13 and 19 blows per foot, and averaged approximately 16 blows per foot, indicating generally stiff to very stiff soil conditions.

Stratum IIc – Sand (Class 3b) – Sand deposits were encountered in all but four test borings performed below the fill and were observed to be between about 4 and 11.5 feet thick at the boring locations. Stratum IIc generally consists of orange-brown to tan narrowly graded sand with up to 40 percent nonplastic fines and up to 30 percent fine gravel. We observed the sand grade towards a silt before transitioning to Till in B3 and B5.

The top of sand contour plan presented in Fig. 7 depicts the estimated sand stratum surface as the top of sand drops in elevation towards the north portions of the site.

SPT N_{60}-values ranged from 7 blows per foot to split spoon refusal, but were generally between 14 and 21 blows per foot, and averaged approximately 20 blows per foot, indicating generally medium dense soil conditions.

Stratum III – Till (Class 3a) – Below the Stratum II deposit, a layer of dense glacial till was encountered at depths between 8 and 33.5 feet below grade corresponding to between El. -19.5 and El. 37.4. The top of till contour plan presented in Fig. 8 depicts the estimated till stratum surface as the top of till drops in elevation towards the north and northeast portions of the site.

Stratum III generally consists of brown silty sand, narrowly graded sand, widely graded sand, and narrowly graded gravel with up to 45 percent nonplastic to low plasticity fines and up to 60 percent gravel. The till was observed to be between 39 and 87 feet thick, but was generally between 49 and 64 feet thick and averaged 60 feet thick. Eleven test borings (B1, B3, B6, B7, B14, B17, B19 through B22, and B102) were terminated in the till.

Cobbles and boulders were encountered in the till in all test boring locations observed through rock core runs or observation of drilling rig reaction.

Light brown nonplastic silt was encountered in B3, B6, B16 with up to 25 percent sand.

We encountered spilt spoon refusal on a majority of the SPTs performed and assumed that this was due to the cobbles and boulders present in the till. Excluding the SPTs that met split-spoon refusal, SPT N_{60}-values ranged from 17 to over 100 blows per foot, but were generally between 49 and over 100 blows per foot, and averaged approximately 77 blows per foot, indicating very dense soil conditions.

Stratum IV – Decomposed/Weathered Rock (Class 1d) – Decomposed/weathered rock underlies the till layer and was encountered in 14 test borings at depths between 53 and 98 feet below grade corresponding to between El. -30.7 and El. -68.3. The decomposed/weathered rock was observed to be between 8.5 and 30 feet thick. Ten test borings (B2, B4, B5, B8, B9, B12, B13, B16, B18, and B101) were terminated in the decomposed/weathered rock.

The weathered rock primarily consists of rock that has decomposed to silt, sandy silt, silty sand, and narrowly graded sand with silt, all of varying colors (black, white, tan, blue, green, red, orange, brown, and yellow). Some samples contain friable rock, gravel, and clay.

SPT N_{60}-values ranged from 27 blows per foot to split spoon refusal. Most N_{60}-values were over 50 blows per foot, indicating very dense soil-like material. The weathered rock transitions to a more competent gneiss with depth but is defined as rock with Rock Quality

Designations (RQD) values less than or equal to 35 percent. In B15, we collected a 5-foot-long NQ core run with a RQD value of 0 percent, indicating very poor-quality rock.

Stratum V – Bedrock (Class 1b/1c) – Metamorphic gneiss bedrock was encountered in five borings (B8, B10, B11, B15, and B23) at 75 to 85 feet below the ground surface, corresponding to between El. -53.1 and El. -70.1. The gneiss was gray, black, and white, banded, medium to fine grained, hard with slight to moderate weathering. We collected eight 5-foot-long NQ cores, with recoveries that ranged from 63 to 100 percent, and averaged about 91 percent. RQD values ranged from 38 to 100 percent and averaged 75 percent, indicating fair to good-quality rock.

3.2 Groundwater Conditions

Groundwater levels were gauged in six observation wells installed in geotechnical test borings in March 2020 as identified in Fig. 2 as B5(OW), B8(OW), B16(OW), B29(OW), and B53(OW), with one of the wells, B48(OW), located about 400 feet northwest of B29(OW).

On a November 15, 2023 site visit, we could not find B16(OW), B29(OW), and B53(OW), and are assumed destroyed; B5(OW) and B8(OW) were found damaged and without surface casing; B48(OW) was found undamaged and was gauged. Historical groundwater data from these six observation wells are presented in Table 3.

Groundwater levels were also gauged on February 1 and February 2, 2022 at eight temporary monitoring wells installed on January 25 and January 26, 2022, as identified in Fig. 2 as MW-1 through MW-6, MW-11, and MW-12. Groundwater data from these eight monitoring wells are presented in Table 4.

Recommended design groundwater elevations are provided in the table below:

Building	Observed Elevation Range in Wells	Top of Floor Slab Elevation	Recommended Design Groundwater Elevation
Building 3A/3B	1.1 to 4	6.00	5
Building 4	2.9 to 4.8	8.46	6
Building 5	3.5 to 6.2	22.50	7

Groundwater levels are expected to fluctuate with season, precipitation, temperature, construction activity in the area, and other factors. Groundwater at the site also appears to be influenced by tidal fluctuations and we understand that the tidal range in the East River is about 3.6 to 4.7 feet. Groundwater level measurements represent conditions at the times and

locations when the measurements were made. Different groundwater elevations will occur at other times and locations.

3.3 Geotechnical Laboratory Testing

Our laboratory in Woburn Massachusetts performed the following tests on soil samples obtained from the test borings to confirm field classifications and to estimate engineering properties:

- 23 Grain size distribution tests. [ASTM D6913 and D7928]
- 2 Atterberg limits tests. [ASTM D4318]
- 25 moisture content tests. [ASTM 2216]

The results of laboratory testing are provided in Appendix C and have been incorporated into the soil descriptions on the boring logs in Appendix A.

3.4 Sample Storage and Disposition

Representative samples of the soils and cored rock samples were classified by the on-site GEI Field Inspector. Soil and rock samples collected as a result of our explorations are being temporarily stored at the on-site warehouse in Astoria, New York. The samples should be retained by the project until 1 year after the issuance of this report or after installed foundations have been approved by the NYC Department of Buildings, whichever is longer.

Building Code §1802.5.3 requires that:

> *"Soil and rock samples shall be maintained in an accessible location by the permit holder or owner and made available to the engineer responsible for the geotechnical investigation and to the department, until the foundation work has been completed and accepted, or until 1 year after the investigation is complete, whichever is longer."*

4. Geotechnical Recommendations

The following sections of this report present the recommendations for the design of the foundation support for the proposed buildings for Phase 1 of the Astoria Cove development project. We understand that spread footings or mat foundations will be used under the majority of the building footprints, with the possible exception of deep foundations to support the tower at Building 3B.

4.1 Soil Properties

Recommended values of soil properties and design parameters are presented in Table 5. The properties were estimated using data from correlations with SPT N_{60}-values, laboratory testing results, published empirical correlations, and our engineering judgement.

4.2 Foundation Design Selection Approach

Underground program space is proposed for each building and there will be as much as 35 feet of overburden soil removed to reach floor slab subgrades. Based on the subsurface conditions encountered at the boring locations, the planned floor slab subgrades are generally within 2 feet, vertically, of Stratum III (Class 3a) soil deposits for most of the building footprint areas. The northern portions of Buildings 3A/3B and Building 5 would need up to about 11 feet and 18 feet, respectively, of overexcavation below the floor slab subgrades to reach the Stratum III deposits. For the northern portions of Building 3A/3B and Building 5, Stratum IIc soils are approximately 4 feet and 11 feet below the proposed floor slab subgrades, respectively.

The proposed buildings can be supported on either a mat foundation or spread and continuous wall footings bearing on the Stratum III soils or Stratum IIc soils or compacted Crushed Stone (refer to Recommended Material Specifications section of this report) extending to Stratum III soils or compacted Structural Fill extending to Stratum IIc soils.

Building Code Table 1804.1 provides the maximum allowable bearing pressure for material class. As stipulated in the Building Code, the allowable bearing pressure may be increased due to foundation embedment greater than 4 feet. As indicated above, construction of cellars/basements at each proposed building will require the removal of overburden soils and the modified allowable bearing pressures are presented for each building below.

4.2.1 Buildings 3A/3B

The foundations for Buildings 3A/3B will require the removal of at least 11 feet and up to approximately 16 feet of overburden soil across the footprint areas of the buildings. Based on the existing topography at the site and approximate cellar floor subgrades, we estimate that the maximum allowable bearing pressure may be increased between 0.7 and 1 ton/ft^2, due to the removal of overburden soils to reach foundation subgrades.

We approximated two allowable bearing pressures zones (Zones 1 and 2) in Fig. 9 for support in the Stratum III soils and, accordingly, we recommend designing the foundations with a maximum allowable bearing pressure of 6.9 and 7 tons/ft^2, as depicted for each zone.

We also approximated two allowable bearing pressures zones (Zones 3 and 4) in Fig. 9 for support in the Stratum IIc soils and, accordingly, we recommend designing the foundations with a maximum allowable bearing pressure of 3.9 and 3.7 tons/ft^2, as depicted for each approximate zone.

Overexcavation below the anticipated floor slab subgrades will be required if shallow foundations are to derive geotechnical capacity from either the Stratum IIc soils (overexcavating up to about 5 feet) or Stratum III soils (overexcavating up to about 11 feet). In the overexcavation areas identified in Fig. 9 compacted Structural Fill extending to Stratum IIc soils or compacted Crushed Stone extending to Stratum III soils would require allowable bearing pressures of 3 tons/ft^2 and 6 tons/ft^2, respectively. No overburden credit can be applied to those foundations bearing on Structural Fill or Crushed Stone (Zone 5).

Alternatively, drilled pressure-grouted micropiles can be used to support the tower or podium cores deriving their load carrying capacity in the till soils. Refer to micropile recommendations section below for additional details.

4.2.2 Building 4

The foundations for Building 4 will require the removal of at least 12.5 feet and up to approximately 35 feet of overburden soil across the footprint area of the building. Based on the existing topography at the site and approximate cellar floor subgrades, we estimate that the maximum allowable bearing pressure may be increased between 0.8 and 2 ton/ft^2, due to the removal of overburden soils to reach foundation subgrades.

We approximated four allowable bearing pressures zones in Fig. 10 for support in the Stratum III soils and, accordingly, we recommend designing the foundations with a maximum allowable bearing pressure between 6.8 and 8 tons/ft^2, as depicted for each zone.

4.2.3 Building 5

The foundations for Building 5 will require the removal of at least 2.5 feet and up to approximately 27.5 feet of overburden soil across the footprint area of the building. Overexcavation below the anticipated floor slab subgrades will be required if shallow foundations will derive geotechnical capacity from either the Stratum IIc soils (11 feet) or Stratum III soils (22 feet).

Based on the existing topography at the site and approximate cellar/basement floor subgrades, we estimate that the maximum allowable bearing pressure may be increased between 0.3 and 1.5 ton/ft^2, due to the removal of overburden soils to reach foundation subgrades.

We approximated one allowable bearing pressures zone (Zone 1) in Fig. 11 for support in the Stratum III soils and, accordingly, we recommend designing the foundations with a maximum allowable bearing pressure of 7.5 tons/ft^2, as depicted.

We also approximated two allowable bearing pressures zones (Zones 2 and 3) in Fig. 11 for support in the Stratum IIc soils and, accordingly, we recommend designing the foundations with a maximum allowable bearing pressure of 4.3 and 3.5 tons/ft^2, as depicted, for each zone.

Overexcavation below the anticipated floor slab subgrades will be required if shallow foundations are to derive geotechnical capacity from either the Stratum IIc soils (overexcavating up to about 11 feet) or Stratum III soils (overexcavating up to about 22 feet). In the overexcavation areas approximated in Fig. 11, compacted Structural Fill extending to Stratum IIc soils or compacted Crushed Stone extending to Stratum III soils would offer allowable bearing pressures of 3 tons/ft^2 and 6 tons/ft^2, respectively. No overburden credit can be applied to those foundations bearing on Structural Fill or Crushed Stone (Zone 4).

4.3 Settlement

From our experience with similar structures/foundation systems, and assuming subgrades are prepared and inspected as recommended in this report, we estimate total settlement of the structure will be less than 1 inch, with differential settlements less than ½ inch. Most of the expected settlements should occur during construction.

To minimize settlement after construction, we recommend the site grades be excavated to (or raised to) the finished floor elevations and then excavated to build foundations, as necessary. If grades need to be raised, the fill should be left in place 30 to 60 days prior to the construction of the building foundation.

Foundations should be designed and constructed in accordance with Building Code §1805. Shallow foundations should also satisfy the requirements contained in Building Code §1809.

We recommend that all fill placed below buildings meet the gradation and compaction requirements for Crushed Stone or Structural Fill provided in the Recommended Material Specifications Section.

4.4 Modulus of Subgrade Reaction for Foundation Mats

Terzaghi (1955) presents the following recommended values for modulus of vertical subgrade reaction, in tons/ft^3, for a 1-foot loaded area (1-ft^2 or 1-foot-wide strip) bearing on sand.

Relative Density of Sand	Loose	Medium	Dense
Dry or moist sand	40	130	500
Submerged sand	25	80	300

The values for dense submerged sand are appropriate for Stratum III soils, so the recommended unit value for modulus of vertical subgrade reaction (for a 1-foot loaded area) is 300 tons/ft^3.

The values for medium dense dry or moist sand are appropriate for Stratum IIc soils, so the recommended unit value for modulus of vertical subgrade reaction (for a 1-foot loaded area) is 130 tons/ft^3.

The modulus of vertical subgrade reaction decreases as the size of the loaded area increases. The above unit value for a 1-foot loaded area must be adjusted based on the actual size of the loaded area. For a loaded area of width B (in feet), the unit value should be multiplied by a reduction factor of $[(B+1)/2B]^2$ per Terzaghi (1955). For a loaded area 10 feet wide, the reduction value is 0.30. For a loaded area of infinite width, the reduction factor is 0.25.

For a mat foundation, the effective loaded area is a function of the area of the loading applied to the mat and the mat stiffness (which distributes the load to the soil over a larger area). Foundation mats are typically designed as a relatively stiff reinforced concrete slab. For a

conservative value, we recommend using a reduction factor of 0.25. This gives a conservative area-adjusted modulus of vertical subgrade reaction of:

$$0.25 \times 300 \text{ tons/ft}^3 = 75 \text{ tons/ft}^3 = 87 \text{ lb/in}^3.$$

4.5 Footings and Floor Slab

We understand that portions of the cellar/basement floor may be designed as a framed slab or slab-on-grade over spread and continuous footings.

Footings on soil should be at least 3 feet wide. Foundations should bear at least 48 inches below the adjacent grade for frost protection, in accordance with Building Code §1809.3.1. Interior footings bearing on the Stratum III deposit or Structural Fill should bear at least 18 inches below the bottom of the floor slab.

We recommend that contraction joints be incorporated between the slab-on-grade and the columns and perimeter walls of the proposed buildings.

The floor slab should not rest directly on boulders. Protruding boulders should be removed and backfilled as needed to allow a minimum 9-inch-thick compacted Structural Fill or Crushed Stone "cushion" to be placed below the slab. Eliminating protruding boulders will reduce cracking of the slab that may result from stress concentrations.

We recommend that, at a minimum, a vapor retarder be installed below the slab-on-grade and to consult with the manufacturer of the proposed flooring system regarding vapor transmission and vapor retarder/waterproofing requirements.

4.6 Micropile Foundation Recommendations

Driven piles may prove difficult to install in the dense Stratum III (Class 3a) soil deposits and it may be difficult to achieve 200-ton compression and 100-ton tension capacity with driven piles. Therefore, we recommend that the northern portions of the Building 3B area, inclusive of the tower footprint, be supported by pressure-grouted micropiles bearing in Stratum III soils.

During installation, these micropiles are drilled with steel-casing to the design tip-elevation. The soil socket is achieved by filling the entire casing with grout, by a tremie pipe, and extracting the amount of casing needed for the length of the soil socket as measured from the bottom of the pile. As casing is extracted, the grout is pressurized to about 50 lb/in^2, or as determined by the pile designer. Micropiles should be designed by a professional engineer licensed in the State of New York with experience on similar projects.

We recommend a preliminary micropile design consisting of:

- 50 kips/in^2 (ksi) steel casing with the dimensions of 13.375 inches outer diameter and ½ inch in thickness.
- Two 75 ksi #18 steel-reinforcing-bars for the whole length of the pile.
- 5,000 lb/in^2 compressive strength grout.
- Minimum soil socket of 35 feet in length installed entirely in Stratum III.
- 3 feet minimum center-to-center spacing of piles.

Drilled pressure-grouted micropiles can be used to achieve the 200-ton compression and 100-ton tension capacity and could also be used as tiedown anchors for the towner core for tension capacity if shallow foundations are used for the entire building footprint.

A minimum of two compression load tests will be required for the micropiles. To substantiate loads larger than the allowable loads of deep foundations listed in the Building Code, the piles will either need to be instrumented using strain gauges or be subject to cyclical loading per ASTM D1143. Additionally, the final load increment will need to be held for a minimum period of 24 hours. A minimum of two uplift load tests are recommended. The number of uplift load tests will be determined by the professional engineer of record. Lateral load testing is required per the Building Code if the design lateral load exceeds 1 ton.

Micropiles should be installed under full-time Special Inspection in accordance with the Building Code. Use of air hammers should be prohibited for drilling through the overburden soils. Internal flushing of drilling fluids should be required and a positive head shall be always maintained within the casing. Observation of the soil cutting quantity in the wash water should be closely monitored during installation.

4.7 Seismic Design

We initially recommend using Site Class D (Stiff Soil Profile) for seismic design purposes, in accordance with Building Code §1613.5.2, based on the N_{60}-values and the subsurface profile encountered at the site. The site is borderline Site Class C (Very Dense Soil and Soft Rock Profile), which can be further refined and proven out by performing geophysical shear wave velocity studies of the subsurface to evaluate whether Site Class C can be assigned to this site. Using the seismic design values associated with Site Class C, the project design tea

m may be able to find cost savings relative to seismic reinforcement requirements compared with Site Class D recommendations.

Corresponding spectral response design parameters are as follows:

Building Code Seismic Design Values		
Site Class	C	D
Risk Category	II	II
S_S	0.279 g	0.279 g
S_1	0.072 g	0.072 g
S_{DS}	0.223 g	0.293 g
S_{D1}	0.082 g	0.115 g
PGA_M	0.20 g	0.24 g
Seismic Design Category	B	B

We calculated the spectral response parameters for the Site using general procedures outlined in Building Code §1613.5. Peak ground acceleration (PGA_M) is adjusted for Site Class effects, per ASCE 7-10 §11.4.7, and were selected from Building Code Table 1813.2.1.

Based on a Site Class D and Risk Category II for the proposed building, and in accordance with Building Code Tables 1613.5.6(1) and (2), Seismic Design Category B should be assigned to the structure for design.

Based on the site geology, topography and subsurface investigations reported herein, it is our opinion that the proposed building is not susceptible to damage from liquefaction, slope instability, lateral spreading, or surface rupture due to faulting.

4.8 Waterproofing and Dampproofing

Groundwater levels observed in wells were in close proximity to the proposed cellar floor slab elevation in Building 3A/3B. In addition, groundwater levels could temporarily rise during flood conditions. Therefore, we recommend that all floors and walls of the cellar should be waterproofed in accordance with Building Code §1807.

A vapor retarder consisting of polyethylene membrane should also be installed below all moisture sensitive slabs (i.e. occupied interior spaces). The installed vapor retarder should be sealed at the foundation walls, columns, and utility penetrations, and panels should be overlapped and joints sealed. We also recommend that waterstops be provided at all joints in the concrete basement walls and floor slab, and that the cellar/basement walls be waterproofed/dampproofed.

We recommend that isolated structures that extend below the slab and near or below the design groundwater elevation in any of the four buildings, such as elevator pits and sump pits, be waterproofed in accordance with Building Code §1807 and designed for hydrostatic uplift pressures.

4.9 Permanent Below Grade Walls

We recommend that cellar/basement walls be designed for the lateral pressures shown in Fig. 12.

Below grade walls used for this project should be designed for at-rest earth pressures of 60 lb/ft^2 per foot of depth above the groundwater level. Based on the groundwater conditions observed at the site, we do not expect hydrostatic pressures will act on cellar/basement wall. Although hydrostatic pressures are not expected, the cellar/basement walls should be waterproofed. Rainwater and water falling on impermeable surfaces should be tied to subgrade stormwater sewers and directed away from cellar/basement walls.

An earthquake pressure of 10.8 lb/ft^2 per foot of depth should be applied to the walls and be distributed as an inverse triangle over the height of the wall.

In addition to the lateral loads exerted by the soil against the walls, allowance should be included for lateral stresses imposed by any temporary or long-term surcharge loads, such as cars or trucks adjacent to the walls. The wall design shall also include any surcharge loads that may develop within a 45º slope from the toe of the wall using 50 percent of the adjacent surcharge load over the height of the wall. Design of cellar walls should not incorporate the lateral support provided by temporary shoring works that are used to facilitate excavation to the cellar level.

4.10 Temporary Support of Excavation (SOE)

Permanent cellar/basement walls and temporary Support of Excavation (SOE) walls will be required to construct the proposed below-grade space at all four building sites. Temporary SOE might be required to perform the undercut to Statum III soils within the footprint of the buildings.

Temporary SOE is required for vertical excavations deeper than 4 feet to support the cut face. Temporary walls should be designed to withstand lateral earth pressures and surcharge loads from construction staging, equipment, stockpiles, and adjacent traffic loads.

Based on the existing grades and the proposed lowest level of the structure, cut heights up to 35 feet are expected. An SOE system consisting of cantilevered soldier piles and lagging is

therefore feasible. Alternatively, a braced SOE system consisting of soldier piles and rakers with heel blocks can be used..

4.11 Site Retaining Wall Designs

All permanent earth retaining structures used on the project across the site should be designed using the following earth pressure parameters:

Parameter	Value
Total Unit Weight of Granular Backfill (γ)	125 lb/ft^3
Angle of Internal Friction (ϕ)	32°
Cohesion (c)	0 lb/ft^2
At-Rest Earth Pressure Coefficient, (K_o)	0.47(1)
Active Earth Pressure Coefficient, (K_a)	0.31(1)
Passive Earth Pressure Coefficient, (K_p)	3.0(1)
Allowable coefficient of friction between rough concrete footing and granular bearing soil	0.50(1)

(1) = Ultimate values, with no Factor of Safety applied

Retaining walls free to rotate at the top should be designed for active earth pressures. In addition to the lateral loads exerted by the soil against the walls, allowance should be included for lateral stresses imposed by any temporary or long-term surcharge loads, such as cars or trucks adjacent to the walls or adjacent footing loads.

The recommended wall design parameters do not consider the development of hydrostatic pressure behind the walls. As such, positive wall drainage must be provided for all earth retaining structures. These drainage systems can be constructed of open-graded washed stone isolated from the soil backfill with a geosynthetic filter fabric and drained by perforated pipe, or several wall drainage products made specifically for this application. Where backfill soils are not drained using an appropriately designed drainage system, the lateral soil pressure on proposed retaining walls must consider hydrostatic forces and submerged soil unit weight.

The earth pressure parameters given in the above table assume placement and compaction of the backfill in accordance with recommendations elsewhere in this report. Compact backfill directly behind walls with light, hand-operated compactors. Heavy compactors and grading equipment should not be allowed to operate within 10 feet of the walls during backfilling to avoid developing excessive temporary or long-term lateral soil pressures.

The soil parameters used in the design of the walls should be based on tests performed on the actual soil materials that will be used to construct the walls.

5. Construction Considerations

5.1 Excavation, Shoring, and Dewatering

Excavations should be made in accordance with Occupational Safety and Health Administration (OSHA) standards and the Building Code pertaining to the protection of property and worker safety. Any excavation greater than 4 feet in depth should be inclined for safety unless shoring is used. Excavations adjacent to the existing structure foundations should not extend below the bottom of the existing foundations without prior underpinning of the existing structure foundations, if required.

Because of the depth of excavation, we recommend that temporary excavation support systems be used for the cellar/basement excavations and foundation construction at each building site. A Professional Engineer licensed in the State of New York and experienced in the design of excavation support systems should design the excavation support.

The excavation support system should be designed to minimize settlement and lateral movement of surrounding structures including buildings and utilities. Vibrations to nearby structures should be limited during installation of the excavation support elements. We recommend monitoring adjacent structures for vibration during installation of excavation support.

Design groundwater elevations for Building 3A/3B, Building 4, and Building 5 are El. 5, El. 6, and El. 7, respectively. We understand that, in general, proposed cellar/basement levels and mechanical pits will be above groundwater levels. In addition, overexcavation to reach target bearing stratum will likely extend below the groundwater table. The contractor will need to design and install groundwater dewatering systems appropriate to lower groundwater levels to maintain stable subgrades.

Localized dewatering of subgrades can be achieved through a temporary dewatering wellpoint system. Groundwater levels shall be a minimum of 2 feet below final subgrade elevations prior to excavation for final subgrade.

The designer of the dewatering systems should consider the effects of drawdown outside the limits of excavation. The temporary dewatering system shall be designed by a Professional Engineer from the State of New York and in compliance with NYCDEP water discharge guidelines.

Site runoff may infiltrate the excavations. Removal of runoff may be accomplished with filtered sumps and pumps. The sumps should consist of a perforated pipe wrapped in Geotextile and surrounded by Pea Stone. The site should be graded to route stormwater runoff away from excavations.

5.2 Subgrade Preparation

Foundations may bear directly on the Stratum IIc or Stratum III soils or compacted Structural Fill extending to Stratum IIc or Stratum III soils. Lean concrete, Controlled Low Strength Material (CLSM), or tamped Crushed Stone wrapped in Geotextile may be substituted for Structural Fill. Any loose or disturbed soil should be removed from the bottom of the excavation, and the subgrade should be proof compacted with a vibratory compactor.

We recommend the following for preparing subgrades below foundations:

1. Remove any loose or disturbed soil from the bottom of the excavation and compact the subgrade with a vibrator compactor weighing at least 200 pounds and imparting an impact load of at least 2.5 tons. Any observed soft or 'pumping' zones in the subgrades should be overexcavated and replaced with either compacted Structural Fill or with Crushed Stone wrapped in Geotextile.
2. If encountered, uncontrolled fill is not suitable for structural support and should be excavated from below all foundations and replaced with compacted Structural Fill.
3. Concrete for foundations may be placed directly on the soil subgrade. Bearing surfaces should be free of standing water, frost, loose soil, and soil softened by water intrusion before placement of reinforcing steel and concrete. Areas of the subgrade disturbed by traffic or surface water should be re-compacted.
4. A 6-inch layer of compacted crushed stone over geotextile fabric or a 3- to 4-inch-thick lean concrete mud slab may be required to stabilize foundation subgrades, protect subgrades against weather, and provide a working platform.

We recommend that a GEI engineer observe the final preparation of subgrades prior to foundation construction. The subgrade compaction should be observed continuously by a qualified Special Inspector, a service that GEI can provide.

5.3 Freezing Conditions

The soils at the site are frost susceptible. Therefore, if construction is performed during freezing weather, special precautions will be required to prevent the subgrade soils from freezing.

All subgrades should be free of frost before placement of concrete. Frost-susceptible soils that have frozen should be removed and replaced with compacted Structural Fill.

Soil placed as fill should be free of frost, as should the ground on which it is placed.

If mud slabs or the foundation mat are built and left exposed during the winter, precautions should be taken to prevent freezing of the underlying soil. Freezing of the soil beneath the foundation during construction may result in subsequent settlement of the structure.

5.4 Backfilling and Compaction

Any fill placed within the building limits should meet the gradation and compaction requirements for Structural Fill. Lean concrete, CLSM, or Crushed Stone wrapped in Geotextile may be substituted for Structural Fill. Fill outside the structure limits should meet the gradation and compaction requirements for Ordinary Fill. Ordinary Fill may be susceptible to frost heave. The potential for frost heave can be reduced by grading outside areas for proper drainage and by using Structural Fill rather than Ordinary Fill for the top 1 to 2 feet.

The lateral pressures given in Fig. 12 assume placement and compaction of the backfill in accordance with recommendations in this report. Compact backfill directly behind walls with light, hand-operated compactors. Heavy compactors and grading equipment should not be allowed to operate within 10 feet of the walls during backfilling to avoid developing excessive temporary or long-term lateral soil pressures.

5.5 Adjacent Structures

In accordance with Building Code §107.7.1, we recommend indicating foundation elevations of adjacent structures on any structural foundation plans. We understand that underpinning of adjacent structures will not be required on this project.

We recommend that the ownership team retain an instrumentation consultant, independent of the construction contractor, to perform optical survey monitoring of the support of excavation systems and any existing adjacent structures that might be affected by the excavations. GEI can provide these services, if requested.

5.6 Site Disturbance

Project specifications should require the contractor to maintain stable site conditions at all times. Specific measures to stabilize equipment traffic areas could include compacted aggregate placed over a Geotextile, temporary drainage, or other appropriate measures.

5.7 Wet Site Conditions

The contractor should be prepared to handle excessively over-optimum (wet) soil moisture conditions during earthwork activities in the winter or spring as well as during or following periods of rain. Site soils could easily become disturbed, and the ground surface could become excessively muddy and unstable due to traffic by construction equipment. Colder months of the year generally provide fewer opportunities to dry soils that have become wet. Wet soil subgrades or fill can make proper compaction difficult or impossible. Possible mitigating measures for wet soil conditions are as follows:

1. Frequent spreading and mixing during warm dry weather.
2. Mixing with drier materials.
3. Mixing with a lime, lime-fly ash, or cement product.
4. Stabilizing with aggregate, geotextile stabilization fabric, or both.

Options 3 and 4 should be evaluated and approved by the Geotechnical Engineer prior to implementation.

6. Limitations

This report was prepared for the exclusive use of Slim Astoria 2468 LLC and the design team. Our recommendations are based on the project information provided to us at the time of this report and may require modification if there are any changes in the nature, design, or location of the proposed structure. We cannot accept responsibility for designs based on our recommendations unless we are engaged to review the final plans and specifications to assess whether any changes in the project affect the validity of our recommendations and whether our recommendations have been properly implemented in the design.

The recommendations in this report are based in part on the data obtained from the subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations from the anticipated conditions are encountered, it may be necessary to revise the recommendations in this report. We, therefore, recommend that GEI be engaged to make site visits during construction to: a) check that the subsurface conditions exposed during construction are in general conformance with our design assumptions, and b) ascertain that, in general, the work is being performed in compliance with the contract documents.

Our professional services for this project have been performed in accordance with generally accepted engineering practices; no warranty, express or implied, is made. This report should be, per Building Code §1802.6, submitted to the building official by any permit applicant at the time of permit application.

Recommended Material Specifications

Structural Fill and Ordinary Fill shall consist of hard, durable sand and gravel, free of clay, organic matter, surface coatings, and other deleterious materials. Soil finer than the No. 200 sieve (the "fines") should be nonplastic. On-site material can be re-used as Structural Fill or Ordinary Fill, provided they can meet the appropriate gradation and compaction requirements indicated below and do not contain deleterious materials. Soils to be used as fill imported from off site should also meet the gradation requirements given below.

Structural Fill

Structural Fill shall meet the following gradation requirements:

Sieve Size	Percent Passing by Weight
3 inches	100
0.5 inch	50 to 100
No. 4	35 to 85
No. 16	20 to 65
No. 50	5 to 40
No. 200 (fines)	0 to 8

Structural Fill shall be compacted in maximum 9-inch-thick, loose lifts to at least 95 percent of the maximum dry density determined in accordance with ASTM D1557 (Modified AASHTO Compaction). The moisture content should be held to within ±3 percent of optimum moisture content (as determined by ASTM D1557).

Ordinary Fill

Ordinary Fill shall meet the following gradation requirements:

Sieve Size	Percent Passing by Weight
6 inches	100
3 inches	80 to 100
No. 4	20 to 100
No. 200 (fines)	0 to 20

Ordinary Fill shall be compacted in maximum 12-inch-thick, loose lifts to at least 92 percent of the maximum dry density determined in accordance with ASTM D1557 (Modified AASHTO Compaction). The moisture content should be held to within ±3 percent of optimum moisture content (as determined by ASTM D1557).

Crushed Stone

Crushed Stone shall consist of clean, durable, sharp-angled fragments of gravel free from surface coatings and shall conform to the requirements of material designation 703-0201 No. 1 Crushed Stone in the May 1, 2020 Standard Specifications prepared by New York State Department of Transportation (NYSDOT). Materials that break up when alternatively, frozen and thawed or wetted and dried shall not be used. Crushed Stone shall meet the following gradation requirements or approved equal:

Sieve Size	Percent Passing by Weight
1 inch	100
0.5 inch	90 to 100
0.25 inch	0 to 15
No. 200 (fines)	0 to 1.0

Crushed Stone should be compacted with at least four passes of a static vibratory compactor.

Pea Stone

Pea Stone shall be screened gravel conforming to the requirements of ASTM D 448 for stone size No. 8 and shall consist of durable, inert rounded stone, free from loam or clay, surface coatings, and deleterious materials. Pea Stone shall meet the following gradation requirements:

Sieve Size	Percent Passing by Weight
0.5 inch	100
0.375 inch	85 to 100
No. 4	10 to 30
No. 8	0 to 10
No. 16	0 to 5

Controlled Low Strength Material

Controlled Low Strength Material (CLSM) shall conform to material designation 733-01 Type 1/2 in the May 1, 2020 Standard Specifications prepared by the NYSDOT.

Geotextile

Geotextile should be a non-woven fabric, consisting of Mirafi 140N or an approved equal product.

Tables

Table 1. Subsurface Exploration Data
Geotechnical Report
Astoria Cove Development
Astoria, Queens, New York

Exploration ID	Building ID	Northing[1] (feet)	Easting[1] (feet)	Ground Surface Elevation[2] (feet)	Total Depth of Exploration (feet)	Bottom of Exploration Elevation (feet)	Approximate Top of Layer[2,3,4] (feet)													
							Stratum I Fill (Class 7)		Stratum IIa Loose Sand (Class 6)		Stratum IIb Silt/Clay (Class 4b/5b)		Stratum IIc Sand (Class 3b)		Stratum III Till (Class 3a)		Stratum IV Decomposed/Weathered Rock (Class 1d)		Stratum V Bedrock (Class 1b/1c)	
							Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.
B1	Bldg. 5	221,653	1,003,263	48.8	102.0	-53.2	0.0	48.8	2.0	46.8	--	--	8.0	40.8	28.5	20.3	--	--	--	--
B2	Bldg. 5	221,695	1,003,280	48.4	102.0	-53.6	0.0	48.4	--	--	--	--	7.0	41.4	11.0	37.4	97.7	-49.3	--	--
B3	Bldg. 5	221,718	1,003,305	46.0	102.0	-56.0	0.0	46.0	--	--	--	--	10.0	36.0	28.5	17.5	--	--	--	--
B4	Bldg. 5	221,775	1,003,310	24.7	102.0	-77.3	0.0	24.7	--	--	--	--	2.0	22.7	10.0	14.7	93.0	-68.3	--	--
B5(OW)	Bldg. 5	221,770	1,003,343	24.8	102.0	-77.2	0.0	24.8	--	--	4.0	20.8	13.5	11.3	24.0	0.8	85.6	-60.8	--	--
B6	Bldg. 4	221,715	1,003,183	46.2	102.0	-55.8	0.0	46.2	10.0	36.2	--	--	16.0	30.2	28.5	17.7	--	--	--	--
B7	Bldg. 4	221,766	1,003,203	40.1	102.0	-61.9	0.0	40.1	--	--	--	--	18.5	21.6	33.5	6.6	--	--	--	--
B8(OW)	Bldg. 4	221,825	1,003,207	23.6	85.0	-61.4	0.0	23.6	--	--	--	--	8.0	15.6	17.0	6.6	76.1	-52.5	80.0	-56.4
B9	Bldg. 4	221,855	1,003,277	22.3	102.0	-79.7	0.0	22.3	0.7	21.7	6.0	16.3	8.0	14.3	10.5	11.8	88.5	-66.2	--	--
B10	Bldg. 4	221,877	1,003,222	21.9	85.0	-63.1	0.0	21.9	2.0	19.9	--	--	--	--	13.5	8.4	62.7	-40.8	75.0	-53.1
B11	Bldg. 4	221,898	1,003,171	21.7	90.0	-68.3	0.0	21.7	4.0	17.7	--	--	10.0	11.7	13.5	8.2	71.5	-49.8	80.0	-58.3
B12	Bldg. 3A/3B	222,043	1,003,593	14.8	77.0	-62.2	0.0	14.8	--	--	--	--	13.0	1.8	23.5	-8.7	67.7	-52.9	--	--
B13	Bldg. 3A/3B	221,884	1,003,427	23.5	102.0	-78.5	0.0	23.5	6.0	17.5	--	--	10.0	13.5	18.5	5.0	82.7	-59.2	--	--
B14	Bldg. 3A/3B	221,930	1,003,368	21.8	77.0	-55.2	0.0	21.8	4.0	17.8	--	--	10.0	11.8	13.5	8.3	--	--	--	--
B15	Bldg. 3A/3B	221,889	1,003,534	21.9	93.0	-71.1	0.0	21.9	2.0	19.9	--	--	6.0	15.9	13.5	8.4	52.6	-30.7	83.0	-61.1
B16(OW)	Bldg. 3A/3B	221,903	1,003,499	21.9	102.0	-80.1	0.0	21.9	--	--	--	--	4.0	17.9	10.0	11.9	73.5	-51.6	--	--
B17	Bldg. 3A/3B	221,948	1,003,379	21.5	75.3	-53.8	0.0	21.5	--	--	--	--	1.0	20.5	13.5	8.0	--	--	--	--
B18	Bldg. 3A/3B	221,937	1,003,535	20.6	100.2	-79.6	0.0	20.6	--	--	--	--	2.0	18.6	23.5	-2.9	68.5	-47.9	--	--
B19	Bldg. 3A/3B	221,997	1,003,398	21.4	75.4	-54.0	0.0	21.4	--	--	--	--	8.0	13.4	13.5	7.9	--	--	--	--
B20	Bldg. 3A/3B	222,066	1,003,426	20.2	75.1	-54.9	0.0	20.2	--	--	--	--	--	--	8.0	12.2	--	--	--	--
B21	Bldg. 3A/3B	222,090	1,003,573	14.0	72.0	-58.0	0.0	14.0	18.5	-4.5	28.5	-14.5	--	--	33.5	-19.5	--	--	--	--
B22	Bldg. 3A/3B	222,064	1,003,531	17.5	75.1	-57.6	0.0	17.5	--	--	--	--	10.0	7.5	18.5	-1.0	--	--	--	--
B23	Bldg. 3A/3B	222,133	1,003,480	15.0	90.1	-75.1	0.0	15.0	--	--	--	--	--	--	23.5	-8.5	73.5	-58.5	85.1	-70.1
B29(OW)	N/A	222,066	1,003,320	21.9	85.0	-63.1	0.0	21.9	--	--	--	--	8.0	13.9	23.5	-1.6	67.0	-45.1	80.0	-58.1
B53(OW)	N/A	221,759	1,003,421	29.4	55.0	-25.6	1.0	28.4	--	--	--	--	4.0	25.4	13.5	15.9	38.5	-9.1	45.0	-15.6
B101	Bldg. 3A/3B	222,057	1,003,490	20.1	102.0	-81.9	0.0	20.1	8.0	12.1	--	--	19.0	1.1	23.5	-3.4	87.0	-66.9	--	--
B102	Bldg. 3A/3B	221,943	1,003,439	21.4	86.8	-65.4	0.0	21.4	--	--	--	--	13.5	7.9	18.5	2.9	--	--	--	--

Footnotes:

1. Horizontal Coordinates are U.S. State Plane Coordinates in U.S. Survey feet and are referenced to the North American Datum of 1983 (NAD83).
2. Elevations are referenced to the North American Vertical Datum of 1988 (NAVD88) and estimated from topographic plan prepared by Montrose Surveying.
3. "--" indicates that layer was not encountered.

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Boring ID	Building Package	Sample ID	Field Measured N-value, N_m (blows/foot)	Equivalent N-value, N_{60} (blows/foot)
B1	Bldg. 5	S1	33	44
	Bldg. 5	S2	12	16
	Bldg. 5	S3	7	9
	Bldg. 5	S4	7	9
	Bldg. 5	S5	13	17
	Bldg. 5	S6	11	15
	Bldg. 5	S7	12	16
	Bldg. 5	S8	13	17
	Bldg. 5	S9	25	33
	Bldg. 5	S10	33	44
	Bldg. 5	S11	48	64
	Bldg. 5	S12	160/9"	60
	Bldg. 5	S13	25	33
	Bldg. 5	S14	106/3"	100
	Bldg. 5	S15	117	100
	Bldg. 5	S16	100/5"	100
	Bldg. 5	S17	101/5"	100
	Bldg. 5	S18	100/5"	100
	Bldg. 5	S19	102/2"	100
	Bldg. 5	S20	101/4"	100
	Bldg. 5	S21	178/10"	100
	Bldg. 5	S22	102/5"	100
	Bldg. 5	S23	104/2"	100
	Bldg. 5	S24	111	100
B2	Bldg. 5	S1	19	25
	Bldg. 5	S2	9	12
	Bldg. 5	S3	7	9
	Bldg. 5	S4	11	15
	Bldg. 5	S5	20	27
	Bldg. 5	S6	45	60
	Bldg. 5	S7	13	17
	Bldg. 5	S8	31	41
	Bldg. 5	S9	41	55
	Bldg. 5	S10	115	100
	Bldg. 5	S11	150	100
	Bldg. 5	S12	76	100
	Bldg. 5	S13	86	100
	Bldg. 5	S14	103/5"	100
	Bldg. 5	S15	103/5"	100
	Bldg. 5	S16	104/5"	100
	Bldg. 5	S17	62/0"	100
	Bldg. 5	S18	179/10"	100
	Bldg. 5	S19	101/2"	100
	Bldg. 5	S20	104/5"	100
	Bldg. 5	S21	101/3"	100
	Bldg. 5	S22	189/11"	100
	Bldg. 5	S23	102/5"	100
	Bldg. 5	S24	71	95

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Boring ID	Building Package	Sample ID	Field Measured N-value, N_m (blows/foot)	Equivalent N-value, N_{60} (blows/foot)
B3	Bldg. 5	S1	17	23
	Bldg. 5	S2	11	15
	Bldg. 5	S3	4	5
	Bldg. 5	S4	2	3
	Bldg. 5	S5	14	19
	Bldg. 5	S6	13	17
	Bldg. 5	S7	7	9
	Bldg. 5	S8	18	24
	Bldg. 5	S9	14	19
	Bldg. 5	S10	27	36
	Bldg. 5	S11	80	100
	Bldg. 5	S12	111	100
	Bldg. 5	S13	78	100
	Bldg. 5	S14	101/3"	100
	Bldg. 5	S15	100/3"	100
	Bldg. 5	S16	100/3"	100
	Bldg. 5	S17	124/5"	100
	Bldg. 5	S18	102/5"	100
	Bldg. 5	S19	103/5"	100
	Bldg. 5	S20	55/0"	100
	Bldg. 5	S21	178	100
	Bldg. 5	S22	100/4"	100
	Bldg. 5	S23	100/2"	100
	Bldg. 5	S24	173	100
B4	Bldg. 5	S1	21	28
	Bldg. 5	S2	9	12
	Bldg. 5	S3	9	12
	Bldg. 5	S4	8	11
	Bldg. 5	S5	9	12
	Bldg. 5	S6	47	63
	Bldg. 5	S7	107/3"	100
	Bldg. 5	S8	101/3"	100
	Bldg. 5	S9	39	52
	Bldg. 5	S10	100/5"	100
	Bldg. 5	S11	125	100
	Bldg. 5	S12	108	100
	Bldg. 5	S13	106/5"	100
	Bldg. 5	S14	97	100
	Bldg. 5	S15	101/2"	100
	Bldg. 5	S16	92	100
	Bldg. 5	S17	100/5"	100
	Bldg. 5	S18	107/4"	100
	Bldg. 5	S19	100/2"	100
	Bldg. 5	S20	126/3"	100
	Bldg. 5	S21	100/2"	100
	Bldg. 5	S22	102/5"	100
	Bldg. 5	S23	41	55
	Bldg. 5	S24	23	31

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Boring ID	Building Package	Sample ID	Field Measured N-value, N_m (blows/foot)	Equivalent N-value, N_{60} (blows/foot)
B5	Bldg. 5	S1	24	32
	Bldg. 5	S2	14	19
	Bldg. 5	S3	15	20
	Bldg. 5	S4	19	25
	Bldg. 5	S5	13	17
	Bldg. 5	S6	10	13
	Bldg. 5	S7	7	9
	Bldg. 5	S8	18	24
	Bldg. 5	S9	13	17
	Bldg. 5	S10	32	43
	Bldg. 5	S11	75	100
	Bldg. 5	S12	100/4"	100
	Bldg. 5	S13	77	100
	Bldg. 5	S14	102	100
	Bldg. 5	S15	101	100
	Bldg. 5	S16	101/1"	100
	Bldg. 5	S17	106/1"	100
	Bldg. 5	S18	72	96
	Bldg. 5	S19	154/10"	100
	Bldg. 5	S20	107/5"	100
	Bldg. 5	S21	108/3"	100
	Bldg. 5	S22	53	100
	Bldg. 5	S23	34	45
	Bldg. 5	S24	34	45
	Bldg. 5	S25	30	40
B6	Bldg. 4	S1	18	24
	Bldg. 4	S2	9	12
	Bldg. 4	S3	15	20
	Bldg. 4	S4	7	9
	Bldg. 4	S5	5	7
	Bldg. 4	S6	5	7
	Bldg. 4	S7	14	19
	Bldg. 4	S8	15	20
	Bldg. 4	S9	15	20
	Bldg. 4	S10	23	31
	Bldg. 4	S11	28	37
	Bldg. 4	S12	27	36
	Bldg. 4	S13	51	68
	Bldg. 4	S14	81	100
	Bldg. 4	S15	100/4"	100
	Bldg. 4	S16	101/4"	100
	Bldg. 4	S17	102/5"	100
	Bldg. 4	S18	100/3"	100
	Bldg. 4	S19	107/4"	100
	Bldg. 4	S20	108/4"	100
	Bldg. 4	S21	100/2"	100
	Bldg. 4	S22	100/3"	100
	Bldg. 4	S23	100/4"	100
	Bldg. 4	S24	103/5"	100

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Boring ID	Building Package	Sample ID	Field Measured N-value, N_m (blows/foot)	Equivalent N-value, N_{60} (blows/foot)
B7	Bldg. 4	S1	45	60
	Bldg. 4	S2	15	20
	Bldg. 4	S3	27	36
	Bldg. 4	S4	18	24
	Bldg. 4	S5	22	29
	Bldg. 4	S6	18	24
	Bldg. 4	S7	77	100
	Bldg. 4	S8	11	15
	Bldg. 4	S9	15	20
	Bldg. 4	S10	12	16
	Bldg. 4	S11	32	43
	Bldg. 4	S12	38	51
	Bldg. 4	S13	101/5"	60
	Bldg. 4	S14	30	40
	Bldg. 4	S15	100/3"	100
	Bldg. 4	S16	57/0"	100
	Bldg. 4	S17	193/10"	100
	Bldg. 4	S18	138	100
	Bldg. 4	S19	102/1"	100
	Bldg. 4	S20	100/5"	100
	Bldg. 4	S21	101/4"	100
	Bldg. 4	S22	57/0"	100
	Bldg. 4	S23	100/5"	100
	Bldg. 4	S24	100/3"	100
B8	Bldg. 4	S1	24	32
	Bldg. 4	S2	55	73
	Bldg. 4	S3	24	32
	Bldg. 4	S4	24	32
	Bldg. 4	S5	8	11
	Bldg. 4	S6	9	12
	Bldg. 4	S7	11	15
	Bldg. 4	S8	61	81
	Bldg. 4	S9	69	92
	Bldg. 4	S10	64	85
	Bldg. 4	S11	105/5"	100
	Bldg. 4	S12	143	100
	Bldg. 4	S13	102/3"	100
	Bldg. 4	S14	100/4"	100
	Bldg. 4	S15	101/3"	100
	Bldg. 4	S16	100/2"	100
	Bldg. 4	S17	111/3"	100
	Bldg. 4	S18	156/11"	100
	Bldg. 4	S19	167/8"	100
	Bldg. 4	S20	65/0"	100

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Boring ID	Building Package	Sample ID	Field Measured N-value, N_m (blows/foot)	Equivalent N-value, N_{60} (blows/foot)
B9	Bldg. 4	S1	13	17
	Bldg. 4	S2	6	8
	Bldg. 4	S3	8	11
	Bldg. 4	S4	7	9
	Bldg. 4	S5	9	12
	Bldg. 4	S6	56	75
	Bldg. 4	S7	38	51
	Bldg. 4	S8	114/4"	100
	Bldg. 4	S9	144	100
	Bldg. 4	S10	127	100
	Bldg. 4	S11	165/9"	100
	Bldg. 4	S12	139	100
	Bldg. 4	S13	216/9"	100
	Bldg. 4	S14	103/3"	100
	Bldg. 4	S15	115/3"	100
	Bldg. 4	S16	111/4"	100
	Bldg. 4	S17	121/4"	100
	Bldg. 4	S18	120/5"	100
	Bldg. 4	S19	100/5"	100
	Bldg. 4	S20	191/11"	100
	Bldg. 4	S21	82	100
	Bldg. 4	S22	21	28
	Bldg. 4	S23	20	27
	Bldg. 4	S24	40	53
B10	Bldg. 4	S1	26	35
	Bldg. 4	S2	13	17
	Bldg. 4	S3	8	11
	Bldg. 4	S4	5	7
	Bldg. 4	S5	7	9
	Bldg. 4	S6	8	11
	Bldg. 4	S7	44	59
	Bldg. 4	S8	50/0"	60
	Bldg. 4	S9	67	89
	Bldg. 4	S10	128	100
	Bldg. 4	S11	100/3"	100
	Bldg. 4	S12	110/5"	100
	Bldg. 4	S13	100/3"	100
	Bldg. 4	S14	100/4"	100
	Bldg. 4	S15	110/3"	100
	Bldg. 4	S16	125/4"	100
	Bldg. 4	S17	111/3"	100
	Bldg. 4	S18	102/1"	100

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Boring ID	Building Package	Sample ID	Field Measured N-value, N_m (blows/foot)	Equivalent N-value, N_{60} (blows/foot)
B11	Bldg. 4	S1	14	19
	Bldg. 4	S2	72	96
	Bldg. 4	S3	8	11
	Bldg. 4	S4	5	7
	Bldg. 4	S5	6	8
	Bldg. 4	S6	12	16
	Bldg. 4	S7	37	49
	Bldg. 4	S8	42	56
	Bldg. 4	S9	61	81
	Bldg. 4	S10	100/3"	100
	Bldg. 4	S11	102/5"	100
	Bldg. 4	S12	107/5"	100
	Bldg. 4	S13	102/4"	100
	Bldg. 4	S14	145/10"	100
	Bldg. 4	S15	62/0"	100
	Bldg. 4	S16	100/5"	100
	Bldg. 4	S17	100/3"	100
	Bldg. 4	S18	122	100
	Bldg. 4	S19	100/1"	100
B12	Bldg. 3A/3B	S1	10	13
	Bldg. 3A/3B	S2	50/3"	60
	Bldg. 3A/3B	S3	40	53
	Bldg. 3A/3B	S4	14	19
	Bldg. 3A/3B	S5	4	5
	Bldg. 3A/3B	S6	8	11
	Bldg. 3A/3B	S7	20	27
	Bldg. 3A/3B	S8	43	57
	Bldg. 3A/3B	S9	83	100
	Bldg. 3A/3B	S10	86	100
	Bldg. 3A/3B	S11	100/2"	100
	Bldg. 3A/3B	S12	100	100
	Bldg. 3A/3B	S13	171/11"	100
	Bldg. 3A/3B	S14	100/5"	100
	Bldg. 3A/3B	S15	120	100
	Bldg. 3A/3B	S16	101/5"	100
	Bldg. 3A/3B	S17	103/3"	100
	Bldg. 3A/3B	S18	58	77

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B13	Bldg. 3A/3B	S1	15	20
	Bldg. 3A/3B	S2	7	9
	Bldg. 3A/3B	S3	12	16
	Bldg. 3A/3B	S4	4	5
	Bldg. 3A/3B	S5	5	7
	Bldg. 3A/3B	S6	10	13
	Bldg. 3A/3B	S7	16	21
	Bldg. 3A/3B	S8	60	80
	Bldg. 3A/3B	S9	36	48
	Bldg. 3A/3B	S10	37	49
	Bldg. 3A/3B	S11	116	100
	Bldg. 3A/3B	S12	47	63
	Bldg. 3A/3B	S13	196	100
	Bldg. 3A/3B	S14	105	100
	Bldg. 3A/3B	S15	170/11"	100
	Bldg. 3A/3B	S16	101/4"	100
	Bldg. 3A/3B	S17	108/4"	100
	Bldg. 3A/3B	S18	104/3"	100
	Bldg. 3A/3B	S19	107/5"	100
	Bldg. 3A/3B	S20	100/4"	100
	Bldg. 3A/3B	S21	36	48
	Bldg. 3A/3B	S22	27	36
	Bldg. 3A/3B	S23	30	40
	Bldg. 3A/3B	S24	31	41
B14	Bldg. 3A/3B	S1	32	43
	Bldg. 3A/3B	S2	17	23
	Bldg. 3A/3B	S3	7	9
	Bldg. 3A/3B	S4	13	17
	Bldg. 3A/3B	S5	4	5
	Bldg. 3A/3B	S6	15	20
	Bldg. 3A/3B	S7	24	32
	Bldg. 3A/3B	S8	35	47
	Bldg. 3A/3B	S9	85	100
	Bldg. 3A/3B	S10	20/1"	100
	Bldg. 3A/3B	S11	100/4"	100
	Bldg. 3A/3B	S12	50/2"	100
	Bldg. 3A/3B	S13	100/5"	100
	Bldg. 3A/3B	S14	50/4"	100
	Bldg. 3A/3B	S15	150/9"	100
	Bldg. 3A/3B	S16	100/5"	100
	Bldg. 3A/3B	S17	100/3"	100
	Bldg. 3A/3B	S18	169/9"	100
	Bldg. 3A/3B	S19	100/2"	100

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B15	Bldg. 3A/3B	S1	19	25
	Bldg. 3A/3B	S2	9	12
	Bldg. 3A/3B	S3	5	7
	Bldg. 3A/3B	S4	16	21
	Bldg. 3A/3B	S5	13	17
	Bldg. 3A/3B	S6	10	13
	Bldg. 3A/3B	S7	32	43
	Bldg. 3A/3B	S8	27	36
	Bldg. 3A/3B	S9	36	48
	Bldg. 3A/3B	S10	129	100
	Bldg. 3A/3B	S11	80	100
	Bldg. 3A/3B	S12	120/5"	100
	Bldg. 3A/3B	S13	100/1"	100
	Bldg. 3A/3B	S14	100/2"	100
	Bldg. 3A/3B	S15	100/5"	100
	Bldg. 3A/3B	S16	49	65
	Bldg. 3A/3B	S17	100/1"	100
	Bldg. 3A/3B	S18	103/0"	100
	Bldg. 3A/3B	S19	36/0"	100
B16	Bldg. 3A/3B	S1	44/3"	60
	Bldg. 3A/3B	S2	23	31
	Bldg. 3A/3B	S3	8	11
	Bldg. 3A/3B	S4	11	15
	Bldg. 3A/3B	S5	13	17
	Bldg. 3A/3B	S6	69	92
	Bldg. 3A/3B	S7	54	72
	Bldg. 3A/3B	S8	28	37
	Bldg. 3A/3B	S9	32	43
	Bldg. 3A/3B	S10	134	100
	Bldg. 3A/3B	S11	150/11"	100
	Bldg. 3A/3B	S12	106/5"	100
	Bldg. 3A/3B	S13	134	100
	Bldg. 3A/3B	S14	111	100
	Bldg. 3A/3B	S15	117	100
	Bldg. 3A/3B	S16	104/5"	100
	Bldg. 3A/3B	S17	79	100
	Bldg. 3A/3B	S18	113	100
	Bldg. 3A/3B	S19	87	100
	Bldg. 3A/3B	S20	62	83
	Bldg. 3A/3B	S21	48	64
	Bldg. 3A/3B	S22	35	47
	Bldg. 3A/3B	S23	56	75
	Bldg. 3A/3B	S24	40	53

Table 2. Equivalent SPT N-Values
Geotechnical Report
Astoria Cove Development
Astoria, Queens, New York

Boring ID	Building Package	Sample ID	Field Measured N-value, N_m (blows/foot)	Equivalent N-value, N_{60} (blows/foot)
B17	Bldg. 3A/3B	S1	16/6"	60
	Bldg. 3A/3B	S2	16	21
	Bldg. 3A/3B	S3	12	16
	Bldg. 3A/3B	S4	28	37
	Bldg. 3A/3B	S5	11	15
	Bldg. 3A/3B	S6	20	27
	Bldg. 3A/3B	S7	72	96
	Bldg. 3A/3B	S8	32	43
	Bldg. 3A/3B	S9	30	40
	Bldg. 3A/3B	S10	50/3"	100
	Bldg. 3A/3B	S11	100/5"	100
	Bldg. 3A/3B	S13	50/3"	100
	Bldg. 3A/3B	S14	47/4"	100
	Bldg. 3A/3B	S15	100/5"	100
	Bldg. 3A/3B	S16	100/3"	100
	Bldg. 3A/3B	S17	100/5"	100
	Bldg. 3A/3B	S18	100/4"	100
B18	Bldg. 3A/3B	S1	5	7
	Bldg. 3A/3B	S2	12	16
	Bldg. 3A/3B	S3	15	20
	Bldg. 3A/3B	S4	25	33
	Bldg. 3A/3B	S5	20	27
	Bldg. 3A/3B	S6	20	27
	Bldg. 3A/3B	S7	100/4"	60
	Bldg. 3A/3B	S8	13	17
	Bldg. 3A/3B	S9	94	100
	Bldg. 3A/3B	S10	100/1"	100
	Bldg. 3A/3B	S11	65	87
	Bldg. 3A/3B	S12	100/2"	100
	Bldg. 3A/3B	S13	100	100
	Bldg. 3A/3B	S14	177/8"	100
	Bldg. 3A/3B	S15	111/4"	100
	Bldg. 3A/3B	S16	100/5"	100
	Bldg. 3A/3B	S17	100	100
	Bldg. 3A/3B	S18	143	100
	Bldg. 3A/3B	S19	69	92
	Bldg. 3A/3B	S20	100/3"	100
	Bldg. 3A/3B	S21	114/3"	100
	Bldg. 3A/3B	S22	101/2"	100
	Bldg. 3A/3B	S23	100/2"	100
	Bldg. 3A/3B	S24	101/2"	100

Table 2. Equivalent SPT N-Values
Geotechnical Report
Astoria Cove Development
Astoria, Queens, New York

Boring ID	Building Package	Sample ID	Field Measured N-value, N_m (blows/foot)	Equivalent N-value, N_{60} (blows/foot)
B19	Bldg. 3A/3B	S1	50/3"	60
	Bldg. 3A/3B	S2	100/5"	60
	Bldg. 3A/3B	S3	10	13
	Bldg. 3A/3B	S4	16	21
	Bldg. 3A/3B	S5	20	27
	Bldg. 3A/3B	S6	28	37
	Bldg. 3A/3B	S7	67	89
	Bldg. 3A/3B	S8	47	63
	Bldg. 3A/3B	S9	100/5"	100
	Bldg. 3A/3B	S10	50/1"	100
	Bldg. 3A/3B	S11	50/3"	100
	Bldg. 3A/3B	S12	100/4"	100
	Bldg. 3A/3B	S13	100/4"	100
	Bldg. 3A/3B	S14	100/5"	100
	Bldg. 3A/3B	S15	100/5"	100
	Bldg. 3A/3B	S16	50/2"	100
	Bldg. 3A/3B	S17	100/5"	100
B20	Bldg. 3A/3B	S1	35	47
	Bldg. 3A/3B	S2	57	76
	Bldg. 3A/3B	S3	32	43
	Bldg. 3A/3B	S4	18	24
	Bldg. 3A/3B	S5	42	56
	Bldg. 3A/3B	S6	29	39
	Bldg. 3A/3B	S7	37	49
	Bldg. 3A/3B	S8	71	95
	Bldg. 3A/3B	S9	42	56
	Bldg. 3A/3B	S10	51/4"	100
	Bldg. 3A/3B	S11	100/4"	100
	Bldg. 3A/3B	S12	100/5"	100
	Bldg. 3A/3B	S13	100/3"	100
	Bldg. 3A/3B	S14	100/4"	100
	Bldg. 3A/3B	S15	100/5"	100
	Bldg. 3A/3B	S16	100/4"	100
	Bldg. 3A/3B	S17	50/3"	100
	Bldg. 3A/3B	S18	100/1"	100

Table 2. Equivalent SPT N-Values
Geotechnical Report
Astoria Cove Development
Astoria, Queens, New York

Boring ID	Building Package	Sample ID	Field Measured N-value, N_m (blows/foot)	Equivalent N-value, N_{60} (blows/foot)
B21	Bldg. 3A/3B	S1	25	33
	Bldg. 3A/3B	S2	32	43
	Bldg. 3A/3B	S3	30	40
	Bldg. 3A/3B	S4	23	31
	Bldg. 3A/3B	S5	54	72
	Bldg. 3A/3B	S6	100/5"	60
	Bldg. 3A/3B	S7	13	17
	Bldg. 3A/3B	S8	2	3
	Bldg. 3A/3B	S9	18	24
	Bldg. 3A/3B	S10	10	13
	Bldg. 3A/3B	S11	32	43
	Bldg. 3A/3B	S12	45	60
	Bldg. 3A/3B	S13	52	69
	Bldg. 3A/3B	S14	192/8"	100
	Bldg. 3A/3B	S15	100/5"	100
	Bldg. 3A/3B	S16	134/11"	100
	Bldg. 3A/3B	S17	100/3"	100
	Bldg. 3A/3B	S18	165/11"	100
B22	Bldg. 3A/3B	S1	21	28
	Bldg. 3A/3B	S2	25	33
	Bldg. 3A/3B	S3	25	33
	Bldg. 3A/3B	S4	6	8
	Bldg. 3A/3B	S5	22	29
	Bldg. 3A/3B	S6	5	7
	Bldg. 3A/3B	S7	7	9
	Bldg. 3A/3B	S8	100/5"	100
	Bldg. 3A/3B	S9	89	100
	Bldg. 3A/3B	S10	156/11"	100
	Bldg. 3A/3B	S11	164/10"	100
	Bldg. 3A/3B	S12	113/5"	100
	Bldg. 3A/3B	S13	102/4"	100
	Bldg. 3A/3B	S14	101/4"	100
	Bldg. 3A/3B	S15	100/3"	100
	Bldg. 3A/3B	S16	100/5"	100
	Bldg. 3A/3B	S17	100/1"	100
	Bldg. 3A/3B	S18	102/3"	100
	Bldg. 3A/3B	S19	100/1"	100

Table 2. Equivalent SPT N-Values
Geotechnical Report
Astoria Cove Development
Astoria, Queens, New York

Boring ID	Building Package	Sample ID	Field Measured N-value, N_m (blows/foot)	Equivalent N-value, N_{60} (blows/foot)
B23	Bldg. 3A/3B	S1	63	84
	Bldg. 3A/3B	S2	70	93
	Bldg. 3A/3B	S3	30	40
	Bldg. 3A/3B	S4	7	9
	Bldg. 3A/3B	S5	14	19
	Bldg. 3A/3B	S6	8	11
	Bldg. 3A/3B	S7	13	17
	Bldg. 3A/3B	S8	5	7
	Bldg. 3A/3B	S9	27	36
	Bldg. 3A/3B	S10	14	19
	Bldg. 3A/3B	S11	69	92
	Bldg. 3A/3B	S12	102/1"	100
	Bldg. 3A/3B	S13	127	100
	Bldg. 3A/3B	S14	125	100
	Bldg. 3A/3B	S15	102/3"	100
	Bldg. 3A/3B	S16	104/2"	100
	Bldg. 3A/3B	S17	79	100
	Bldg. 3A/3B	S18	145	100
	Bldg. 3A/3B	S19	50	67
	Bldg. 3A/3B	S20	105/1"	100
B29	N/A	S1	9	12
	N/A	S2	30	40
	N/A	S3	39	52
	N/A	S4	17	23
	N/A	S5	34	45
	N/A	S6	16	21
	N/A	S7	9	12
	N/A	S8	17	23
	N/A	S9	42	56
	N/A	S10	104/3"	100
	N/A	S11	101/3"	100
	N/A	S12	148	100
	N/A	S13	102/2"	100
	N/A	S14	199/10"	100
	N/A	S15	110/5"	100
	N/A	S16	102/2"	100
	N/A	S17	105/1"	100
	N/A	S18	100/4"	100
	N/A	S19	45/0"	100

Table 2. Equivalent SPT N-Values
Geotechnical Report
Astoria Cove Development
Astoria, Queens, New York

Boring ID	Building Package	Sample ID	Field Measured N-value, N_m (blows/foot)	Equivalent N-value, N_{60} (blows/foot)
B53	N/A	S1	11	15
	N/A	S2	13	17
	N/A	S3	11	15
	N/A	S4	6	8
	N/A	S5	10	13
	N/A	S6	14	19
	N/A	S7	25	33
	N/A	S8	93	100
	N/A	S9	73	97
	N/A	S10	48	64
	N/A	S11	105	100
	N/A	S12	100/4"	100
	N/A	S13	53/0"	100
B101	Bldg. 3A/3B	S1	13	17
	Bldg. 3A/3B	S2	24	32
	Bldg. 3A/3B	S3	30	40
	Bldg. 3A/3B	S4	13	17
	Bldg. 3A/3B	S5	5	7
	Bldg. 3A/3B	S6	3	4
	Bldg. 3A/3B	S7	2	3
	Bldg. 3A/3B	S8	2	3
	Bldg. 3A/3B	S9	51	68
	Bldg. 3A/3B	S10	29	39
	Bldg. 3A/3B	S11	65	87
	Bldg. 3A/3B	S12	123	100
	Bldg. 3A/3B	S13	100/5"	100
	Bldg. 3A/3B	S14	122	100
	Bldg. 3A/3B	S15	101/4"	100
	Bldg. 3A/3B	S16	100/4"	100
	Bldg. 3A/3B	S17	100/5"	100
	Bldg. 3A/3B	S18	50/0"	100
	Bldg. 3A/3B	S19	51/4"	100
	Bldg. 3A/3B	S20	69	92
	Bldg. 3A/3B	S21	69	92
	Bldg. 3A/3B	S22	41	55
	Bldg. 3A/3B	S23	22	29
	Bldg. 3A/3B	S24	27	36

Table 2. Equivalent SPT N-Values
Geotechnical Report
Astoria Cove Development
Astoria, Queens, New York

Boring ID	Building Package	Sample ID	Field Measured N-value, N_m (blows/foot)	Equivalent N-value, N_{60} (blows/foot)
B102	Bldg. 3A/3B	S1	12	16
	Bldg. 3A/3B	S2	10	13
	Bldg. 3A/3B	S3	7	9
	Bldg. 3A/3B	S4	7	9
	Bldg. 3A/3B	S5	84	100
	Bldg. 3A/3B	S6	19	25
	Bldg. 3A/3B	S7	35	47
	Bldg. 3A/3B	S8	36	48
	Bldg. 3A/3B	S9	109	100
	Bldg. 3A/3B	S10	93	100
	Bldg. 3A/3B	S11	100/5"	100
	Bldg. 3A/3B	S12	50/0"	100
	Bldg. 3A/3B	S13	184/9"	100
	Bldg. 3A/3B	S14	173/11"	100
	Bldg. 3A/3B	S15	100/3"	100
	Bldg. 3A/3B	S16	100/2"	100
	Bldg. 3A/3B	S17	101/5"	100
	Bldg. 3A/3B	S18	100/3"	100
	Bldg. 3A/3B	S19	100/3"	100
	Bldg. 3A/3B	S20	165	100

Table 3. Groundwater Level Data in Observation Wells
Geotechnical Report
Astoria Cove Development
Astoria, Queens, New York

Well ID	Building ID	Location1		Approximate Ground Surface Elevation[2] (feet)	Depth to Top of PVC (feet)	Top of PVC Elev. (feet)	Screen Interval		Depth of Boring (feet)	Date of Well Development	Water Level Reading #1				Water Level Reading #2				Water Level Reading #3			
		Northing	Easting				Top Depth (feet)	Bottom Depth (feet)			Date	Depth (feet)	Elevation (feet)	Notes	Date	Depth (feet)	Elevation (feet)	Notes	Date	Depth (feet)	Elevation (feet)	Notes
B5(OW)	Bldg. 5	221,770	1,003,343	25.0	0.00	25.0	15.0	25.0	102.0	Note 3	03/10/20	18.8	6.2	-	-	-	-	-	11/14/23	Dry	Dry	5
B8(OW)	Bldg. 4	221,825	1,003,207	23.2	0.30	22.9	20.0	30.0	85.0	Note 3	03/05/20	18.3	4.6	-	03/09/20	18.1	4.8	-	11/14/23	17.0	Uncertain	5
B16(OW)	Bldg. 3A/3B	221,903	1,003,499	21.9	0.61	21.3	3.0	13.0	14.0	Note 3	03/05/20	17.3	4.0	-	03/10/20	17.3	4.0	-	-	-	-	6
B29(OW)	N/A	222,066	1,003,320	21.9	0.35	21.6	3.0	13.0	21.0	Note 3	03/18/20	16.9	5.0	-	-	-	-	-	-	-	-	6
B48(OW)	N/A	222,448	1,003,170	12.9	0.33	12.5	4.0	13.7	14.0	Note 3	05/21/20	11.1	1.4	-	-	-	-	-	11/14/23	10.8	2.1	-
B53(OW)	N/A	221,759	1,003,421	29.4	0.33	29.1	4.0	13.7	28.1	Note 3	05/15/20	23.5	5.6	-	-	-	-	-	-	-	-	6

Notes:

1. Coordinates for boring locations are taken from taped off distances frm survey site features and are referenced to NAD83.
2. Ground surface elevations are estimated from topographic data and are referenced to NAVD88.
3. Well development not required in observation wells.
4. Water level measured in casing at the completion of drilling.
5. Surface casing damaged/missing with PVC riser exposed; debris had fallen into well. Measurements made from exposed PVC casing are likely erroneous.
6. Well not located.

Table 4. Groundwater Level Data in Monitoring Wells
Geotechnical Report
Astoria Cove Development
Astoria, Queens, New York

Monitoring Wells	Building ID	Date	Approx. Screen Interval Depth, (feet)	Top of Casing Elevation, (feet)	Depth to Water, (feet)	Depth to Bottom, (feet)	Groundwater Elevation, (feet)
MW-1	Bldg. 3A/3B	2/1/2022	15 to 25	19.1	17.2	23.1	2.0
MW-2	Bldg. 3A/3B	2/2/2022	10 to 20	12.4	11.3	19.4	1.1
MW-3	Bldg. 3A/3B	2/2/2022	10 to 20	14.1	12.8	19.6	1.4
MW-4	Bldg. 3A/3B	2/1/2022	20 to 30	19.6	17.6	28.6	2.0
MW-5	Bldg. 4	2/2/2022	15 to 25	21.9	18.8	24.4	3.1
MW-6	Bldg. 4	2/2/2022	15 to 25	23.4	18.9	29.7	4.5
MW-11	Bldg. 5	2/1/2022	15 to 25	25.5	21.6	28.5	3.9
MW-12	Bldg. 5	2/1/2022	20 to 30	24.6	21.7	30.1	2.9

Notes:

1. Ground surface elevations are estimated from topographic data and are referenced to NAVD88.

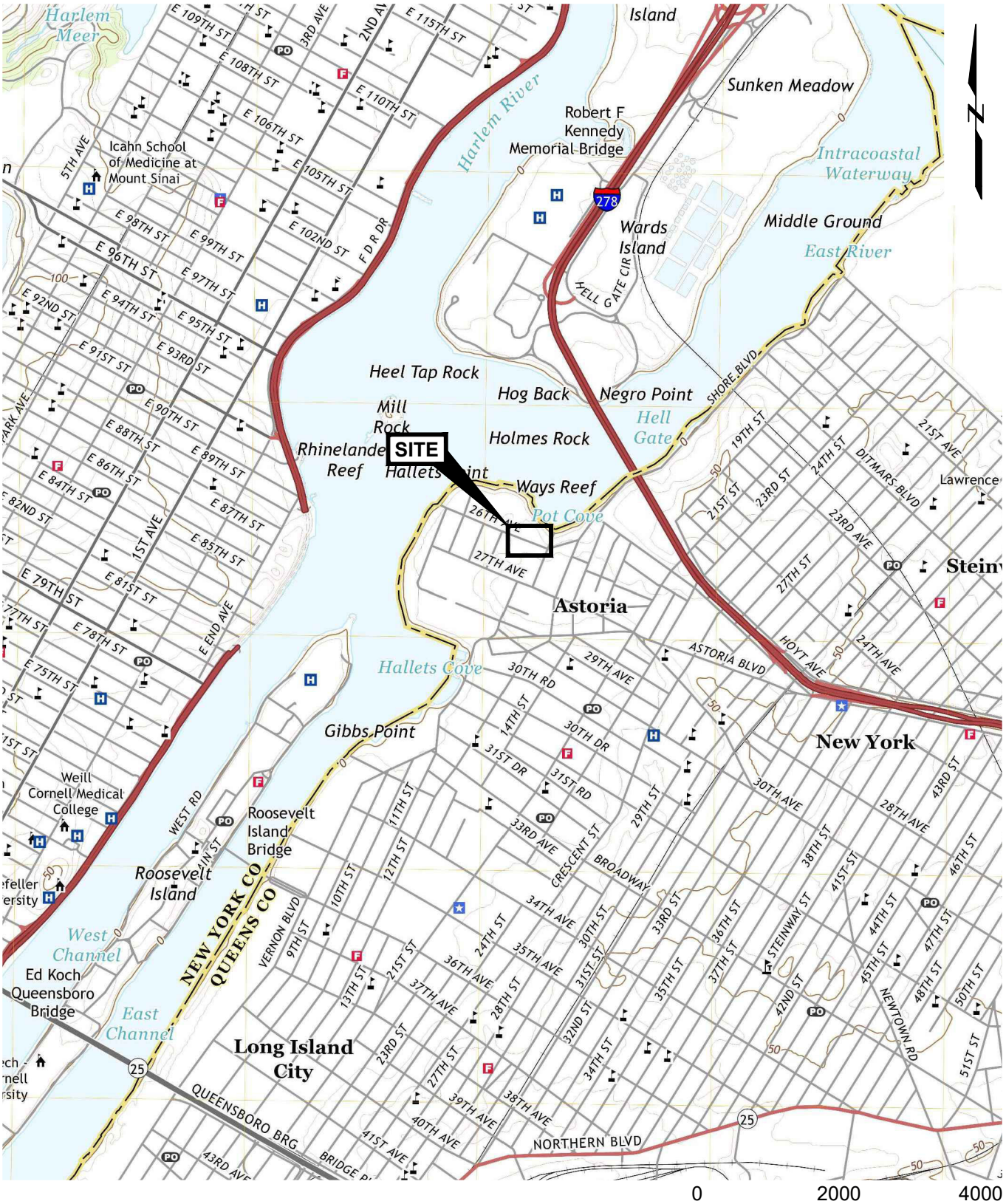
Table 5. Recommended Geotechnical Design Parameters
Geotechnical Report
Astoria Cove Development
Astoria, Queens, New York

Soil Material[1]	Total Unit Weight		Drained Parameters				
	Above Water Table	Below Water Table	Drained Friction Angle	Effective Cohesion	Earth Pressure Coefficients[2]		
	γ_t (pcf)	γ_{sat} (pcf)	ϕ' (degrees)	C' (ksf)	K_o	K_a	K_p
Stratum I -Fill (Class 7)	120	122	34	0	0.44	0.28	3.5
Stratum IIa - Loose Sand (Class 6)	115	118	30	0	0.50	0.33	3.0
Stratum IIb - Silt/Clay (Class 4b/5b)	115	118	30	1	0.50	0.33	3.0
Stratum IIc - Sand (Class 3b)	120	122	34	0	0.44	0.28	3.5
Stratum III - Till (Class 3a)	130	135	40	0	0.36	0.22	4.6
Stratum IV - Decomposed/Weathered Rock (Class 1d)	130	135	40	0	0.36	0.22	4.6
Stratum V - Bedrock (Class 1b/1c)	150	150	---	---	---	---	---
Ordinary Fill (92% Compaction)[3]	120	125	32	0	0.47	0.31	3.3
Structural Fill (95% Compaction)[4]	120	125	35	0	0.43	0.27	3.7

Footnotes:

1. The values of soil/rock properties in this table are based on site-specific field test results (where available), empirical correlations using the results of standard penetration tests and laboratory index tests, and engineering judgement.
2. Parameters to be used for footings and structures:
   K_o = Coefficient of Earth Pressure at Rest (Rankine Method)
   K_a = Active Earth Pressure Coefficient (Rankine Method)
   K_p = Passive Earth Pressure Coefficient (Rankine)
3. For material compacted to ~92% of Modified Proctor maximum dry density in accordance with ASTM D1557.
4. For material compacted to ~95% of Modified Proctor maximum dry density in accordance with ASTM D1557.

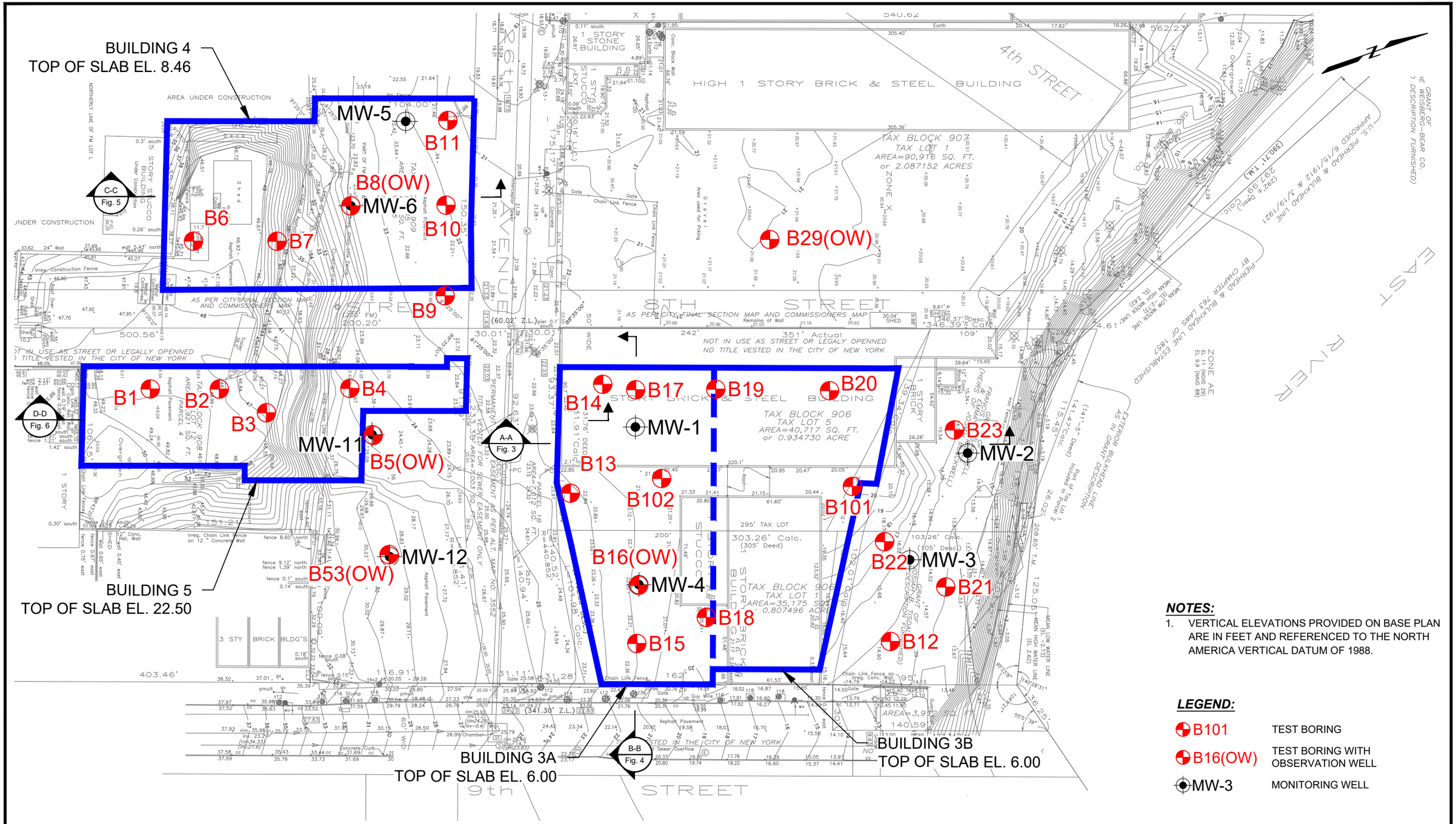
Figures



SOURCE: USGS TOPOGRAPHICAL MAP OF CENTRAL PARK, NY, NJ 2019
(www.ngmdb.usgs.gov/topoview)

Geotechnical Report Astoria Cove Development Astoria, Queens, New York	GEI Consultants	SITE LOCATION MAP
Slim Astoria 2468 LLC New York, New York	Project 2305370	December 2023 Fig. 1

DIBARTOLO, SEAN B:\Working\CAD3 CONSTR AND DEVELOP\2305370 SLIM Astoria 2468 Ph1 Geotech\00_CAD\Figures\GTR\2305370-02 GTR-SLM.dwg - 12/8/2023



NOTES:

1. VERTICAL ELEVATIONS PROVIDED ON BASE PLAN ARE IN FEET AND REFERENCED TO THE NORTH AMERICA VERTICAL DATUM OF 1988.

LEGEND:

B101	TEST BORING
B16(OW)	TEST BORING WITH OBSERVATION WELL
MW-3	MONITORING WELL

SOURCE:

1. PLAN BASED ON ELECTRONIC DRAWING FILE NAMED, "44888-6EMAIL.dwg" PREPARED BY MONTROSE SURVEYING CO., LLP. AND RECEIVED ON NOVEMBER 9, 2023.

0 60 120

SCALE: 1" = 60'

Geotechnical Report
Astoria Cove Development
Astoria, Queens, New York

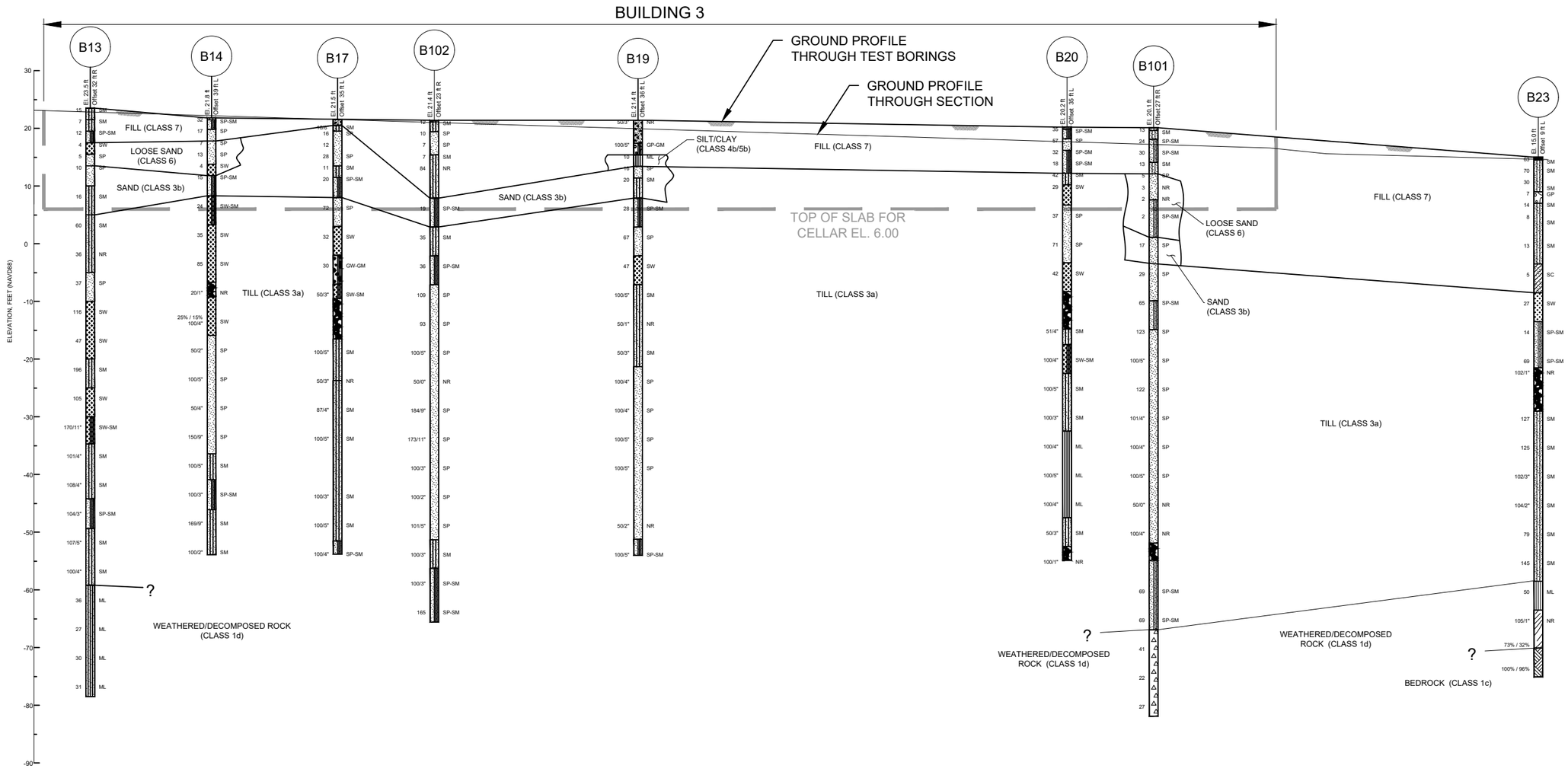
Slim Astoria 2468 LLC
New York, New York

GEI Consultants

EXPLORATION LOCATION PLAN

Project 2305370 | December 2023 | Fig. 2

\\bos-pzcc-1\ B:\Working\CAD3 CONSTR AND DEVELOP\2305370 SLIM Astoria 2468 Ph1 Geotech\00_CAD\Figures\GTR\2305370-01 EXPLOC.dwg - 12/19/2023



LEGEND:

- BB-5 — BORING NUMBER
- EL. 42 / 55' E — ELEVATION OF GROUND SURFACE AND OFFSET OF BORING FROM PROFILE LINE
- EXISTING GROUND SURFACE
- GROUNDWATER LEVEL MEASURED AT COMPLETION OF DRILLING
- STRATUM BOUNDARY
- 107 — UNCORRECTED N-VALUE FROM STANDARD PENETRATION TEST, BLOWS PER FOOT
- 93%/40% — ROCK CORE RECOVERY/ROCK QUALITY DESIGNATION (RQD)

USCS SYMBOLS:

- FILL
- CONCRETE
- ASPHALT
- WEATHERED/ DECOMPOSED ROCK
- BOULDER/COBBLE
- BEDROCK
- SP
- SW
- SM
- ML
- CL

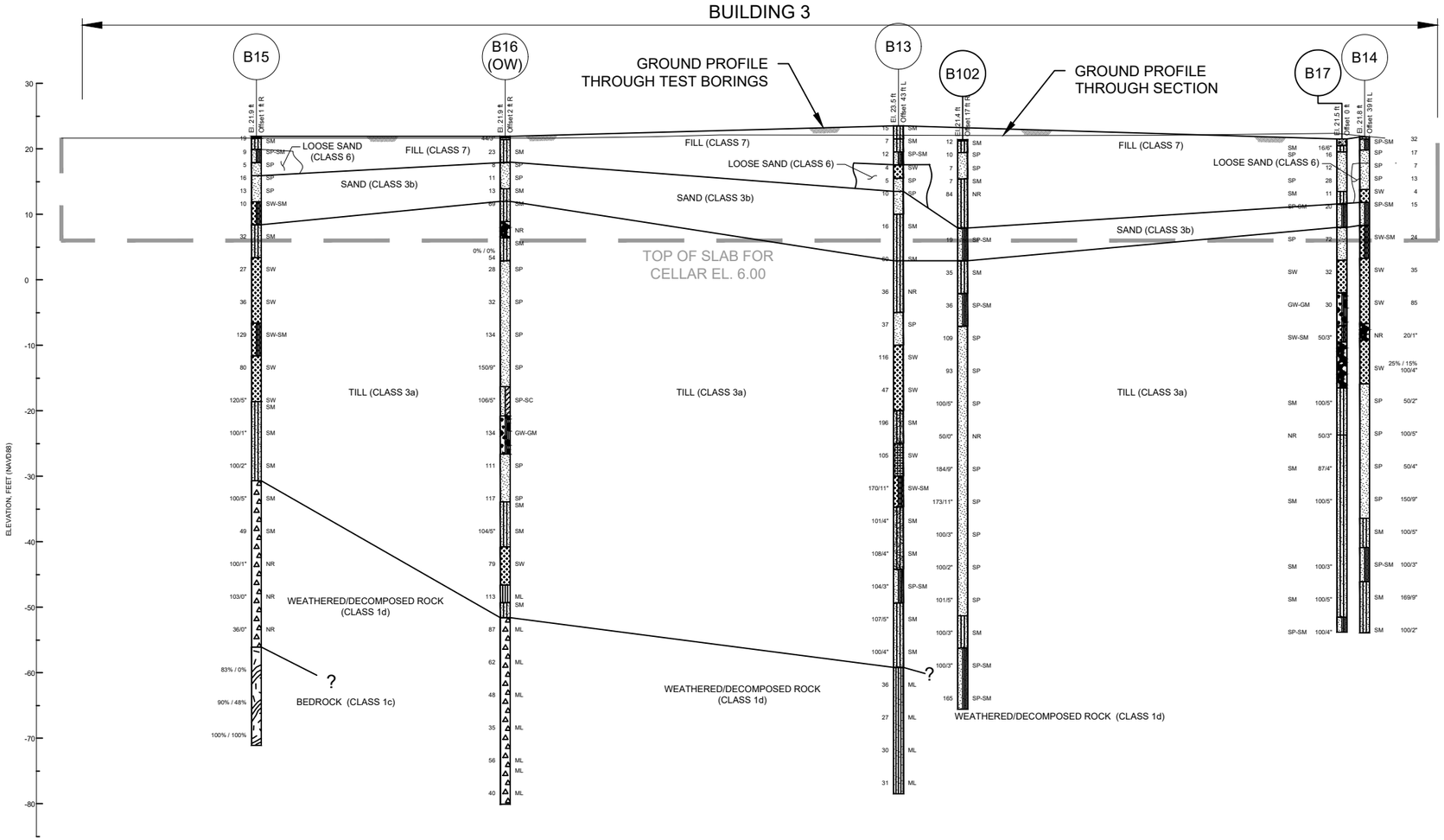
0 20 40

SCALE: 1" = 20'

NOTES

1. BORING LOCATIONS ARE SHOWN IN FIG. 2.
2. GROUNDWATER LEVELS MAY VARY AT OTHER LOCATIONS AND AT OTHER TIMES OF THE YEAR. LEVELS MEASURED AT THE COMPLETION OF DRILLING MAY NOT REFLECT THE STABILIZED GROUNDWATER LEVEL.
3. THE BOUNDARIES BETWEEN SOIL STRATA MAY BE TRANSITIONAL. THE STRATA BOUNDARIES BETWEEN BORINGS MAY VARY SIGNIFICANTLY FROM THE INTERPOLATIONS SHOWN.
4. AUTOMATIC HAMMER USED FOR ALL STANDARD PENETRATION TESTS.

Geotechnical Report Astoria Cove Development Astoria, Queens, New York	GEI Consultants	SUBSURFACE PROFILE A-A
Slim Astoria 2468 LLC New York, New York	Project 2305370	December 2023 Fig. 3



LEGEND:

- BB-5 — BORING NUMBER
- EL. 42 / 55' E — ELEVATION OF GROUND SURFACE AND OFFSET OF BORING FROM PROFILE LINE
- EXISTING GROUND SURFACE
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- 107 — UNCORRECTED N-VALUE FROM STANDARD PENETRATION TEST, BLOWS PER FOOT
- 93%/40% — ROCK CORE RECOVERY/ROCK QUALITY DESIGNATION (RQD)

USCS SYMBOLS:

- FILL
- CONCRETE
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- WEATHERED/ DECOMPOSED ROCK
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- SP
- SW
- SM
- ML
- CL

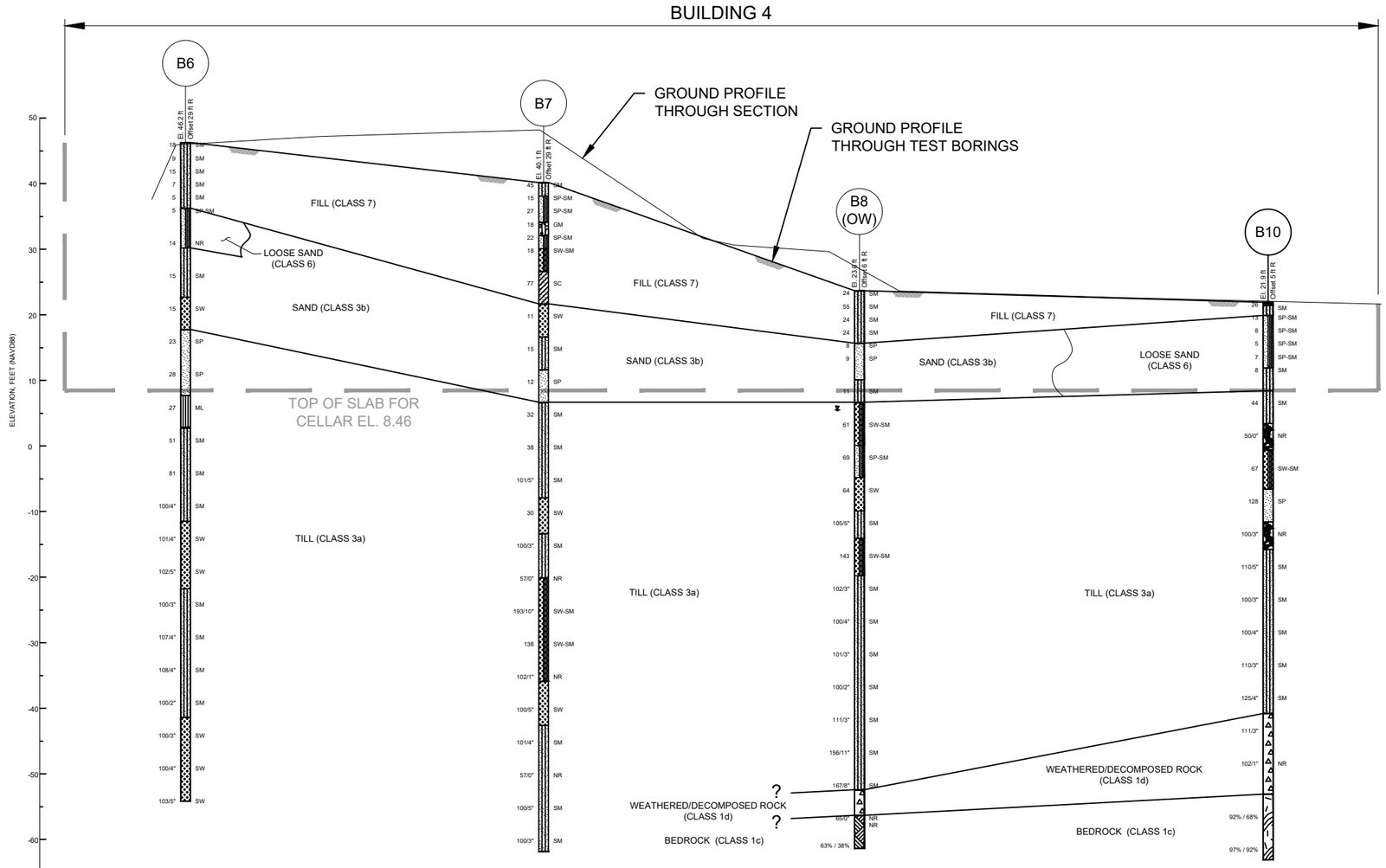
0 20 40

SCALE: 1" = 20'

NOTES

1. BORING LOCATIONS ARE SHOWN IN FIG. 2.
2. GROUNDWATER LEVELS MAY VARY AT OTHER LOCATIONS AND AT OTHER TIMES OF THE YEAR. LEVELS MEASURED AT THE COMPLETION OF DRILLING MAY NOT REFLECT THE STABILIZED GROUNDWATER LEVEL.
3. THE BOUNDARIES BETWEEN SOIL STRATA MAY BE TRANSITIONAL. THE STRATA BOUNDARIES BETWEEN BORINGS MAY VARY SIGNIFICANTLY FROM THE INTERPOLATIONS SHOWN.
4. AUTOMATIC HAMMER USED FOR ALL STANDARD PENETRATION TESTS.

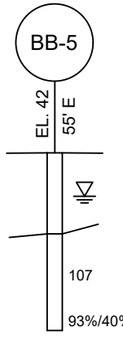
Geotechnical Report Astoria Cove Development Astoria, Queens, New York	GEI Consultants	SUBSURFACE PROFILE B-B
Slim Astoria 2468 LLC New York, New York	Project 2305370	December 2023 Fig. 4



USCS SYMBOLS:

- FILL
- CONCRETE
- ASPHALT
- WEATHERED/ DECOMPOSED ROCK
- BOULDER/COBBLE
- BEDROCK
- SP
- SW
- SM
- ML
- CL

LEGEND:



- BB-5 — BORING NUMBER
- EL. 42, 55' E — ELEVATION OF GROUND SURFACE AND OFFSET OF BORING FROM PROFILE LINE
- EXISTING GROUND SURFACE
- GROUNDWATER LEVEL MEASURED AT COMPLETION OF DRILLING
- STRATUM BOUNDARY
- 107 — UNCORRECTED N-VALUE FROM STANDARD PENETRATION TEST, BLOWS PER FOOT
- 93%/40% — ROCK CORE RECOVERY/ROCK QUALITY DESIGNATION (RQD)

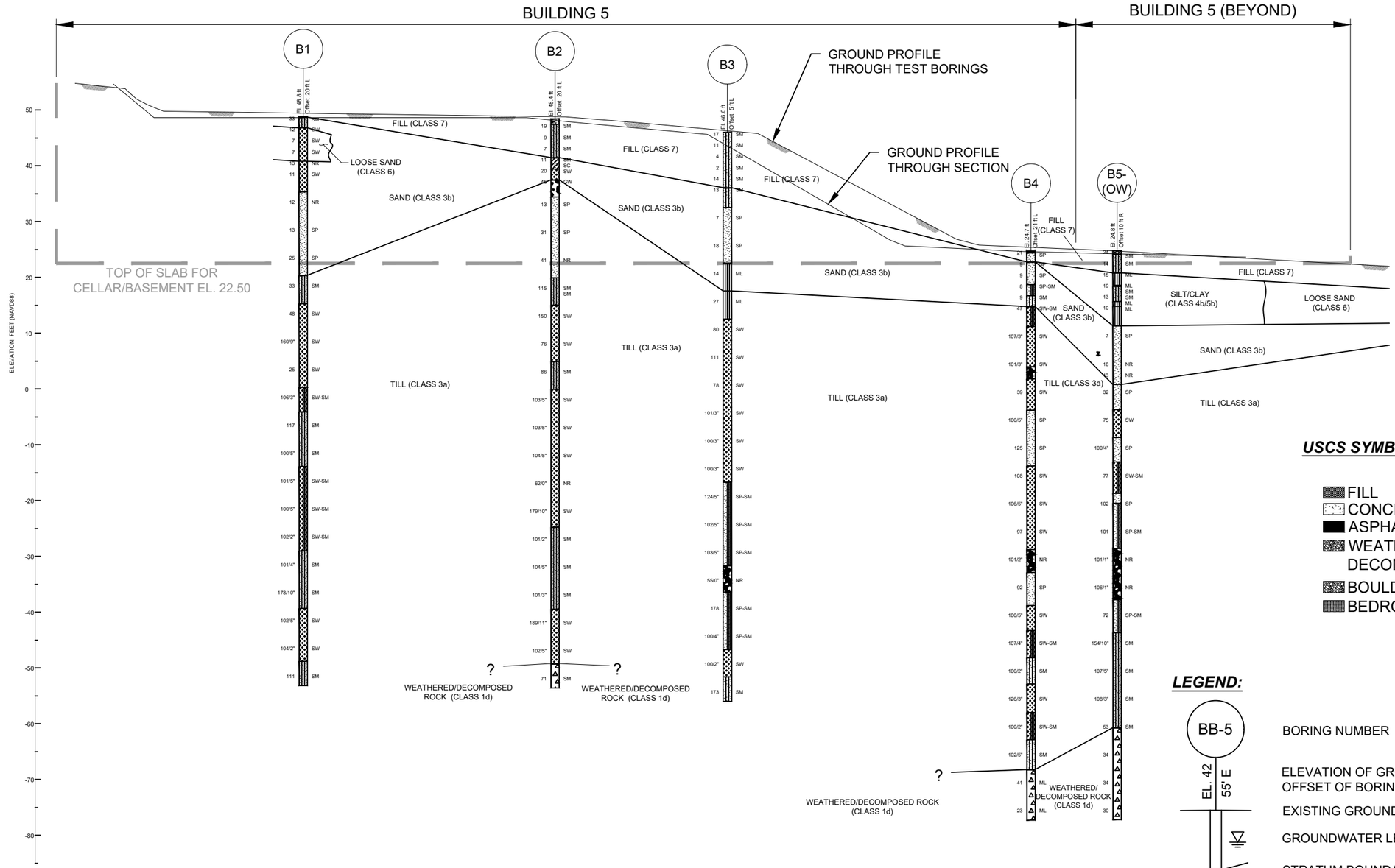
0 20 40

SCALE: 1" = 20'

NOTES

1. BORING LOCATIONS ARE SHOWN IN FIG. 2.
2. GROUNDWATER LEVELS MAY VARY AT OTHER LOCATIONS AND AT OTHER TIMES OF THE YEAR. LEVELS MEASURED AT THE COMPLETION OF DRILLING MAY NOT REFLECT THE STABILIZED GROUNDWATER LEVEL.
3. THE BOUNDARIES BETWEEN SOIL STRATA MAY BE TRANSITIONAL. THE STRATA BOUNDARIES BETWEEN BORINGS MAY VARY SIGNIFICANTLY FROM THE INTERPOLATIONS SHOWN.
4. AUTOMATIC HAMMER USED FOR ALL STANDARD PENETRATION TESTS.

Geotechnical Report Astoria Cove Development Astoria, Queens, New York	GEI Consultants	SUBSURFACE PROFILE C-C
Slim Astoria 2468 LLC New York, New York	Project 2305370	December 2023 Fig. 5



USCS SYMBOLS:

- FILL
- CONCRETE
- ASPHALT
- WEATHERED/ DECOMPOSED ROCK
- BOULDER/COBBLE
- BEDROCK
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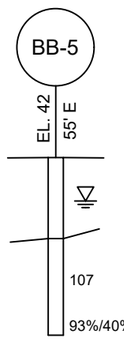
- SW
- SM
- ML
- CL

LEGEND:



BORING NUMBER

ELEVATION OF GROUND SURFACE AND OFFSET OF BORING FROM PROFILE LINE

EXISTING GROUND SURFACE

GROUNDWATER LEVEL MEASURED AT COMPLETION OF DRILLING

STRATUM BOUNDARY

UNCORRECTED N-VALUE FROM STANDARD PENETRATION TEST, BLOWS PER FOOT

ROCK CORE RECOVERY/ROCK QUALITY DESIGNATION (RQD)

NOTES

1. BORING LOCATIONS ARE SHOWN IN FIGURE 2.
2. GROUNDWATER LEVELS MAY VARY AT OTHER LOCATIONS AND AT OTHER TIMES OF THE YEAR. LEVELS MEASURED AT THE COMPLETION OF DRILLING MAY NOT REFLECT THE STABILIZED GROUNDWATER LEVEL.
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4. AUTOMATIC HAMMER USED FOR ALL STANDARD PENETRATION TESTS.

0 25 50

SCALE: 1" = 25'

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Slim Astoria 2468 LLC
New York, New York

GEI Consultants

SUBSURFACE PROFILE
D-D

Project 2305370

December 2023 Fig. 6

\\bos-pzcc-1\ B:\Working\CAD3 CONSTR AND DEVELOP\2305370 SLIM Astoria 2468 Ph1 Geotech\00_CAD\Figures\GTR\2305370-03 Cross Sections.dwg - 12/8/2023

BUILDING 4
TOP OF SLAB EL. 8.46

BUILDING 5
TOP OF SLAB EL. 22.50

BUILDING 3A
TOP OF SLAB EL. 6.00

BUILDING 3B
TOP OF SLAB EL. 6.00

B1 40.8
B2 41.4
B3 36
B4 22.7
B5(OW) 11.3
B6 30.2
B7 21.6
B8(OW) 15.6
B9 14.3
B10 N.E.
B11 11.7
B12 1.8
B13 13.5
B14 11.8
B15 15.9
B16(OW) 17.9
B17 20.5
B18 18.6
B19 18.6
B20 N.E.
B21 N.E.
B22 7.5
B23 N.E.
B29(OW) 13.9
B53(OW) 25.4
B101 1.1
B102 7.9

C-C Fig. 5
D-D Fig. 6
A-A Fig. 3
B-B Fig. 4

4th STREET
8TH STREET (STEVENS STREET)
9th (WARDELL STREET) STREET
EAST RIVER
ZONE X
ZONE AE EL 11 (NGVD 29) EL 9.9 (NAVD 88)

HIGH 1 STORY BRICK & STEEL BUILDING
1 STORY STONE BUILDING
1 STY. STUCCO BUILDING
5 STORY STUCCO BUILDING
1 STORY BRICK BLDG
3 STY BRICK BLDG'S
1 STORY BRICK & STEEL BUILDING
1 STORY BRICK & CONCRETE BUILDING

TAX BLOCK 907
TAX LOT 1
AREA=90,916 SQ. FT.
or 2.087152 ACRES

TAX BLOCK 906
TAX LOT 5
AREA=40,717 SQ. FT.
or 0.934730 ACRE

TAX BLOCK 906
TAX LOT 1
AREA=35,175 SQ. FT.
or 0.807498 ACRE

AREA UNDER CONSTRUCTION

NOT IN USE AS STREET OR LEGALLY OPENNED
NO TITLE VESTED IN THE CITY OF NEW YORK

AS PER CITY PLANT SECTION MAP AND COMMISSIONERS MAP

0 60 120
SCALE: 1" = 60'

NOTES:

1. VERTICAL ELEVATIONS PROVIDED ON BASE PLAN ARE IN FEET AND REFERENCED TO THE NORTH AMERICA VERTICAL DATUM OF 1988.

LEGEND:

B101	TEST BORING
— — —	TOP OF SAND 1-FOOT CONTOUR
13.5	TOP OF SAND ELEVATION
N.E.	SAND STRATUM NOT ENCOUNTERED

SOURCE:

1. PLAN BASED ON ELECTRONIC DRAWING FILE NAMED, "44888-6EMAIL.dwg" PREPARED BY MONTROSE SURVEYING CO., LLP. AND RECEIVED ON NOVEMBER 9, 2023.

Geotechnical Report
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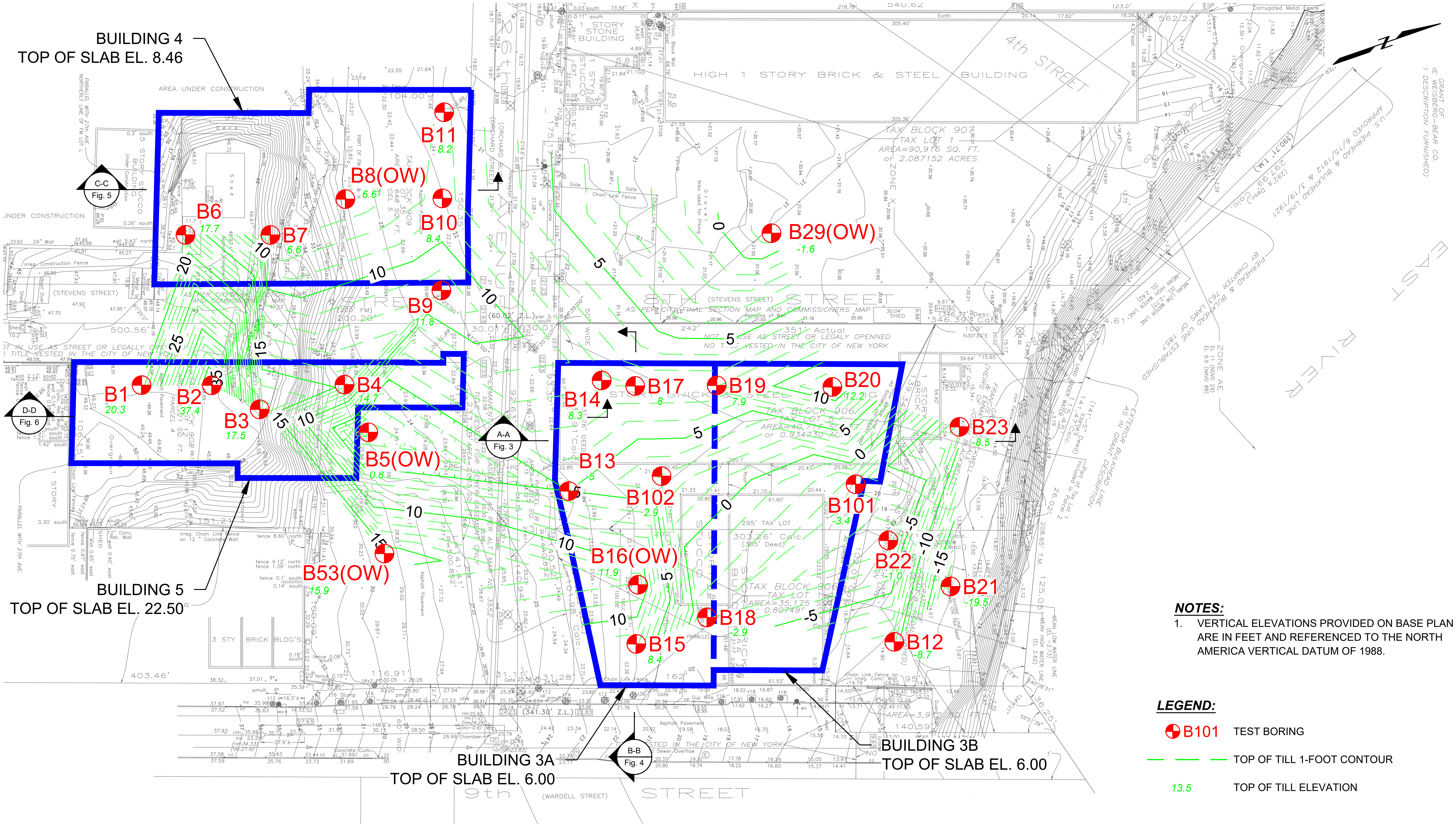
Slim Astoria 2468 LLC
New York, New York

GEI Consultants

ESTIMATED TOP OF SAND CONTOUR PLAN

Project 2305370 | December 2023 | Fig. 8

\\bos-pzcc-1\ B:\Working\CAD3 CONSTR AND DEVELOP\2305370 SLIM Astoria 2468 Ph1 Geotech\00_CAD\Figures\GTR\2305370-01 EXPLOC.dwg - 12/19/2023



NOTES:

1. VERTICAL ELEVATIONS PROVIDED ON BASE PLAN ARE IN FEET AND REFERENCED TO THE NORTH AMERICA VERTICAL DATUM OF 1988.

LEGEND:

B101	TEST BORING
— — —	TOP OF TILL 1-FOOT CONTOUR
13.5	TOP OF TILL ELEVATION

SOURCE:

1. PLAN BASED ON ELECTRONIC DRAWING FILE NAMED, "44888-6EMAIL.dwg" PREPARED BY MONTROSE SURVEYING CO., LLP. AND RECEIVED ON NOVEMBER 9, 2023.

0 60 120

SCALE: 1" = 60'

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Astoria Cove Development
Astoria, Queens, New York

Slim Astoria 2468 LLC
New York, New York

GEI Consultants

Project 2305370

ESTIMATED TOP OF TILL CONTOUR PLAN

December 2023 Fig. 8

\\bos-pzcc-1\ B:\Working\CAD3 CONSTR AND DEVELOP\2305370 SLIM Astoria 2468 Ph1 Geotech\00_CAD\Figures\GTR\2305370-01 EXPLOC.dwg - 12/19/2023

Zone 1
Till (Class 3a) = 6 tsf plus 1.0 tsf for additional embedment and overburden credit
Total = 7.0 tsf bearing capacity

Zone 2
Till (Class 3a) = 6 tsf plus 0.8 tsf for additional embedment and overburden credit
Total = 6.9 tsf bearing capacity

Zone 5
No overburden credit allowed if foundation supported directly on Controlled Fill (Class 7) material.

Approximate footprint (blue polygon) where overexcavation below El. 5 to reach Stratum IIc Sand (Class 3b) material will be required.

If backfilled with Structural Fill allowable bearing pressure is 3 tsf.

Refer to top of sand contour plan in Fig. 8.

Zone 4
Sand (Class 3b) = 3 tsf plus 0.7 tsf for additional embedment and overburden credit
Total = 3.7 tsf bearing capacity

Apprioximate footprint (green hatching) where overexcavation below El. 5 to reach Stratum III Till (Class 3a) material will be required.

If backfilled with Crushed Stone allowable bearing pressure is 6 tsf.

See top of till contour plan depicted in Fig. 7.

Zone 3
Sand (Class 3b) = 3 tsf plus 0.9 tsf for additional embedment and overburden credit
Total = 3.9 tsf bearing capacity

Building 3A/3B Allowable Bearing Pressure Zones

GEI Fig. 9

1 CELLAR FLOOR PLAN
SCALE: 1/8" = 1'-0"

CLIENT
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BROOKLYN, NY 11218

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FOGARTY | FINGER architecture | interiors
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STRUCTURAL / GEOTECH ENGINEER
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MEP ENGINEER
ETTINGER ENGINEERING ASSOCIATES
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NEW YORK, NY 10018

FACADE
SOCOTEC USA
151 WEST 42ND STREET
NEW YORK, NY10036

ELEVATOR
MILLENNIUM ELEVATOR ENTERPRISES
2618 AVENUE Z
BROOKLYN, NEW YORK 11235

CIVIL ENGINEER
PHILIP HABIB & ASSOCIATES
432 PARK AVENUE SOUTH 6TH FLOOR
NEW YORK, NY 10016

LANDSCAPE
KEN SMITH WORKSHOP
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GEOTECH

CODE CONSULTANT / EXPEDITOR
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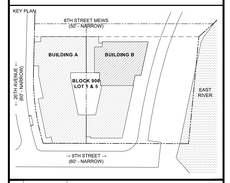
NEW YORK, NY

HPD CONSULTANT
SEIDEN & SCHEIN, P.C.
570 LEXINGTON AVENUE, 14TH FLOOR
NEW YORK, NY 10022

ENVIRONMENTAL ENGINEER

KEY PLAN



No.	DATE	ISSUE

PROJECT:
ASTORIA COVE
ASTORIA, NY 11101

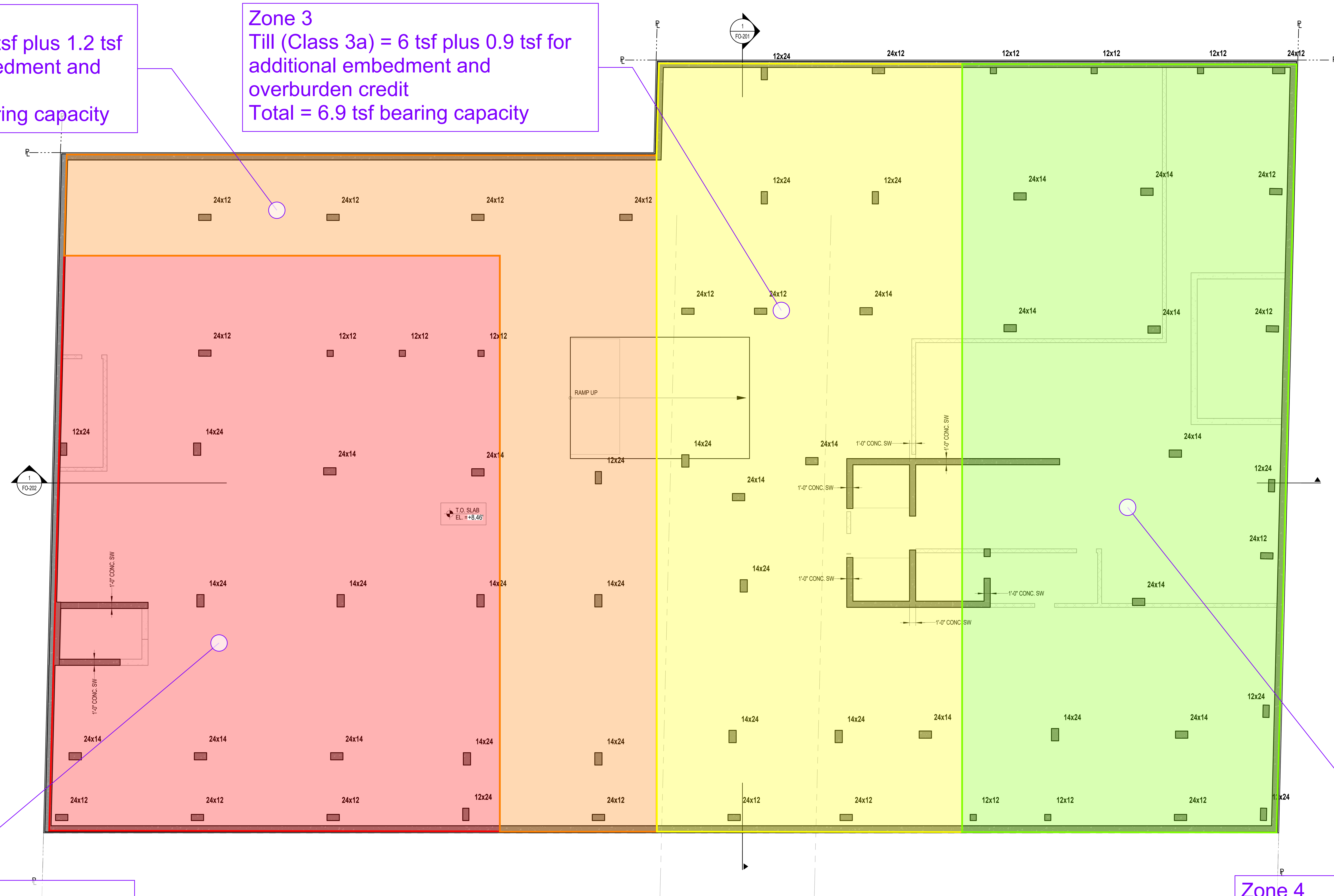
DRAWING TITLE:
CELLAR FLOOR PLAN

SEAL & SIGNATURE

DATE (MM-DD-YY): 10/29/2023
PROJECT No.:
DRAWING BY: FFA
CHK BY: FFA
DRAWING No.: A-100.00
CADD FILE No.:
OF

Zone 2
Till (Class 3a) = 6 tsf plus 1.2 tsf for additional embedment and overburden credit
Total = 7.2 tsf bearing capacity

Zone 3
Till (Class 3a) = 6 tsf plus 0.9 tsf for additional embedment and overburden credit
Total = 6.9 tsf bearing capacity



26TH AVENUE (60' WIDTH - NARROW STREET)

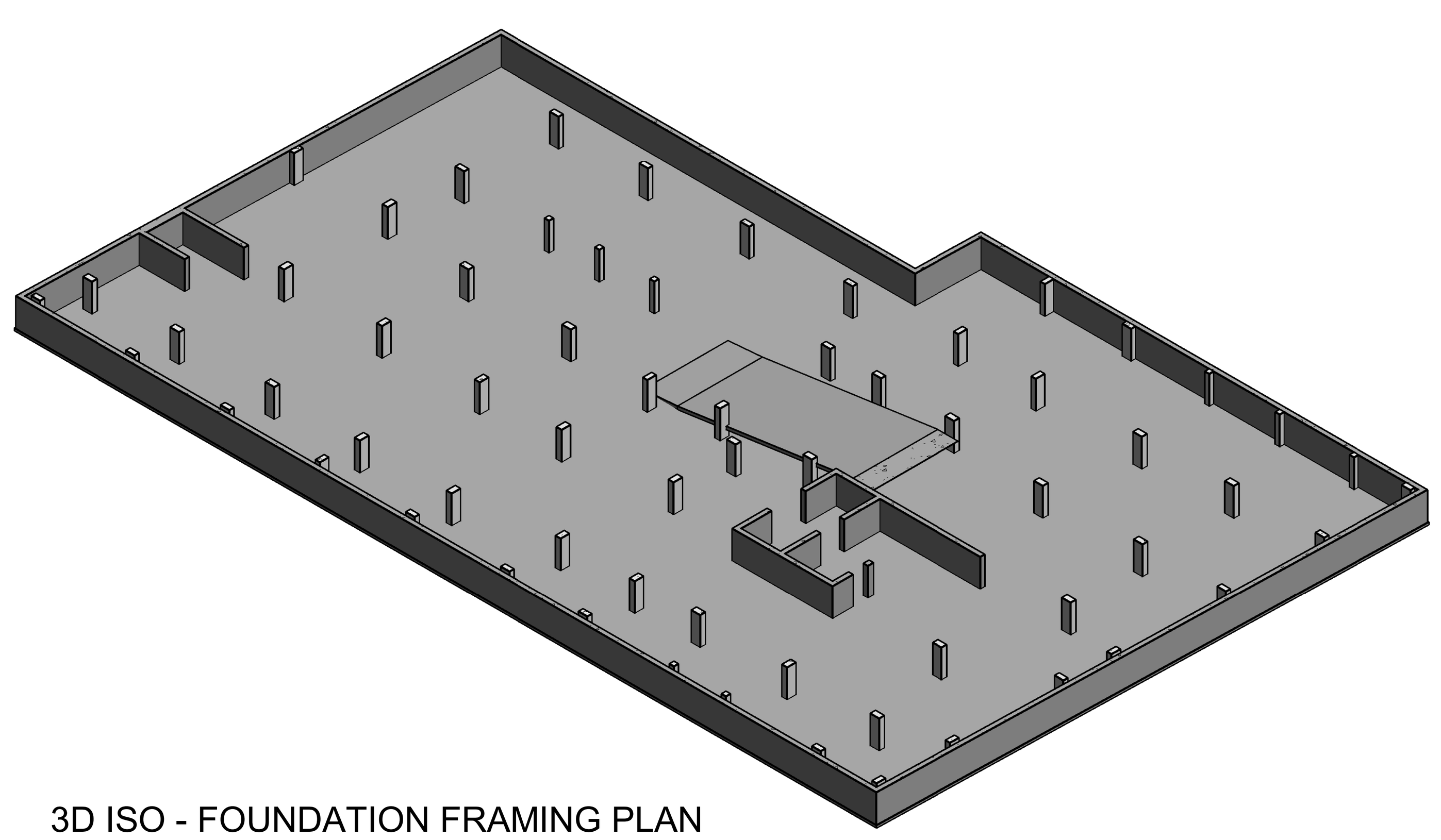
Zone 1
Till (Class 3a) = 6 tsf plus 2 tsf for additional embedment and overburden credit
Total = 8 tsf bearing capacity

Zone 4
Till (Class 3a) = 6 tsf plus 0.8 tsf for additional embedment and overburden credit
Total = 6.8 tsf bearing capacity

8TH STREET MEWS

FOUNDATION ELEMENTS NOT SHOWN PENDING RECEIPT OF GEOTECHNICAL REPORT

CELLAR FRAMING PLAN
SCALE: 1/8" = 1'-0"
NORTH



3D ISO - FOUNDATION FRAMING PLAN
SCALE:

Building 4 Allowable Bearing Pressure Zones

GEI Fig. 10

TOP OF SLAB ELEVATION U.O.N.:	SEE PLAN
SLAB THICKNESS U.O.N.:	PENDING GEOTECH
SLAB CONCRETE STRENGTH:	PENDING GEOTECH
SLAB MIDDLE STRIP TOP BARS U.O.N.:	PENDING GEOTECH
SLAB BASIC BOTTOM BARS U.O.N.:	PENDING GEOTECH

FOUNDATION NOTES:

1. FOR GENERAL NOTES SEE DRAWING S-001.
2. ALL ELEVATIONS ARE PROJECT BASE POINT.
3. OUTER MOST SLAB REINFORCING RUNS N-S.
4. TOP OF GRADE BEAM = TOP OF CAP U.O.N. THUS [_'-_"]. SEE GRADE BEAM SCHEDULE.
5. FOR FOUNDATION DETAILS SEE FO-100 SERIES.
6. FOR COLUMN SCHEDULE SEE S-301.
7. FOR CONCRETE BEAM SCHEDULES SEE PLAN.
8. FOR SHEAR WALL DETAILS SEE S-300 SERIES.
9. FOR SHEAR WALL ELEVATIONS SEE S-300 SERIES.
10. FOR TYPICAL CONCRETE DETAILS SEE S-400 SERIES.
11. REFER TO ARCHITECTURAL DRAWINGS FOR FINISHED FLOOR SLOPES.
12. FOR CMU TYPICAL DETAILS SEE S-600 SERIES.
13. INTERIOR NON-LOAD BEARING CMU WALLS NOT SHOWN ON PLAN, REFER TO TYPICAL CMU DETAILS FOR REINFORCING.
14. SEE ARCHITECTURAL DRAWINGS FOR LOCATION OF CMU WALLS.
15. SEE ARCH/M.E.P. DRAWINGS FOR ALL SLAB PENETRATIONS NOT SHOWN ON STRUCTURAL DRAWINGS.
16. NO CORE DRILLING FOR PIPE PENETRATIONS OR INSTALLATION OF METAL STRUCTURES IS PERMITTED. PLACEMENT OF ALL PIPE SLEEVES, SLOTS AND ANCHORS SHALL BE DIMENSIONED AND COORDINATED W/ ALL TRADES AND APPROVED BY ARCHITECT, MECHANICAL AND STRUCTURAL ENGINEERS PRIOR TO POURING CONCRETE.

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New York, NY 10001
(212) 627-1050

Owner
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C/O Cape Advisor
375 Greenwich St, 3rd Floor
New York, NY 10013

REVISION TABLE		
NUMBER	DATE	DESCRIPTION
	10.27.23	100% SD ISSUANCE

SCHEMATIC DESIGN

FOUNDATION FRAMING PLAN

DOB JOB #	
BIN #	
DATE	9/15/2023
DRAWN BY	Author
SCALE	1/8" = 1'-0"

FO-101

SHEET OF

DOB BSCAN STICKER

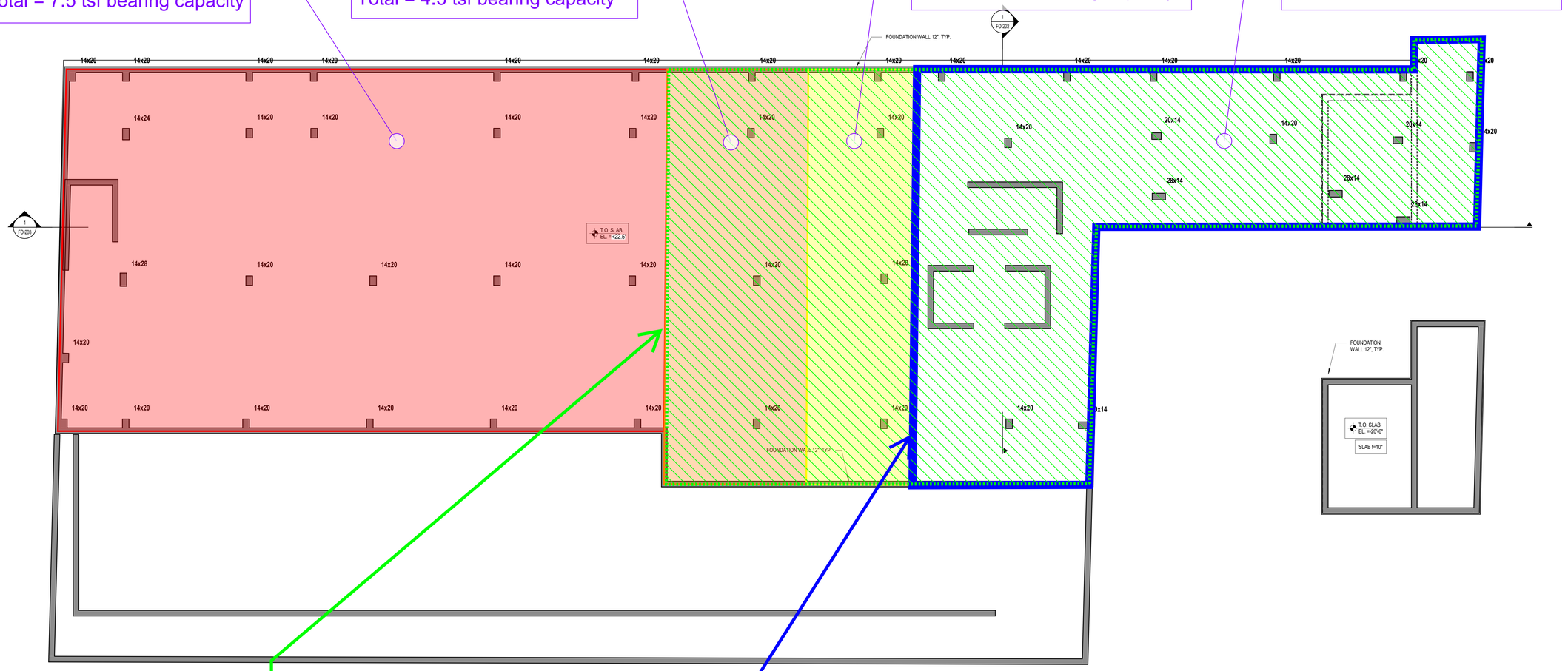
PLUMBING
ELECTRICAL
MECHANICAL
STRUCTURAL
ARCHITECTURAL

Zone 1
Till (Class 3a) = 6 tsf plus 1.5 tsf for additional embedment and overburden credit
Total = 7.5 tsf bearing capacity

Zone 2
Sand (Class 3b) = 3 tsf plus 1.3 tsf for additional embedment and overburden credit
Total = 4.3 tsf bearing capacity

Zone 3
Sand (Class 3b) = 3 tsf plus 0.5 tsf for additional embedment and overburden credit
Total = 3.5 tsf bearing capacity

Zone 4
No overburden credit allowed if foundation supported directly on Controlled Fill (Class 7) material.



Approximate footprint (green hatching) where overexcavation below El. 21.5 to reach Stratum III Till (Class 3a) material will be required.

If backfilled with Crushed Stone allowable bearing pressure is 6 tsf.

See top of till contour plan depicted in Fig. 7.

FOUNDATION ELEMENTS NOT SHOWN PENDING RECEIPT OF GEOTECHNICAL REPORT

FOUNDATION/BASEMENT PLAN
SCALE: 1/8" = 1'-0"
NORTH

Approximate footprint (blue polygon) where overexcavation below El. 21.5 to reach Stratum IIc Sand (Class 3b) material will be required.

If backfilled with Structural Fill allowable bearing pressure is 3 tsf.

Refer to top of sand contour plan in Fig. 8.

Building 5 Allowable Bearing Pressure Zones

GEI Fig. 11

3D ISO - FOUNDATION/BASEMENT PLAN

TOP OF SLAB ELEVATION U.O.N.:	SEE PLAN
SLAB THICKNESS U.O.N.:	PENDING GEOTECH
SLAB CONCRETE STRENGTH:	PENDING GEOTECH
SLAB MIDDLE STRIP TOP BARS U.O.N.:	PENDING GEOTECH
SLAB BASIC BOTTOM BARS U.O.N.:	PENDING GEOTECH

FOUNDATION NOTES:

1. FOR GENERAL NOTES SEE DRAWING S-001.
2. ALL ELEVATIONS ARE PROJECT BASE POINT.
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4. TOP OF GRADE BEAM = TOP OF CAP U.O.N. THUS ['-.-"], SEE GRADE BEAM SCHEDULE.
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6. FOR COLUMN SCHEDULE SEE S-300 SERIES.
7. FOR CONCRETE BEAM SCHEDULE SEE PLAN.
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9. FOR SHEAR WALL ELEVATIONS SEE S-300 SERIES.
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NUMBER	DATE	DESCRIPTION
	10.27.23	100% SD ISSUANCE

SCHEMATIC DESIGN

PLUMBING
ELECTRICAL
MECHANICAL
STRUCTURAL
ARCHITECTURAL

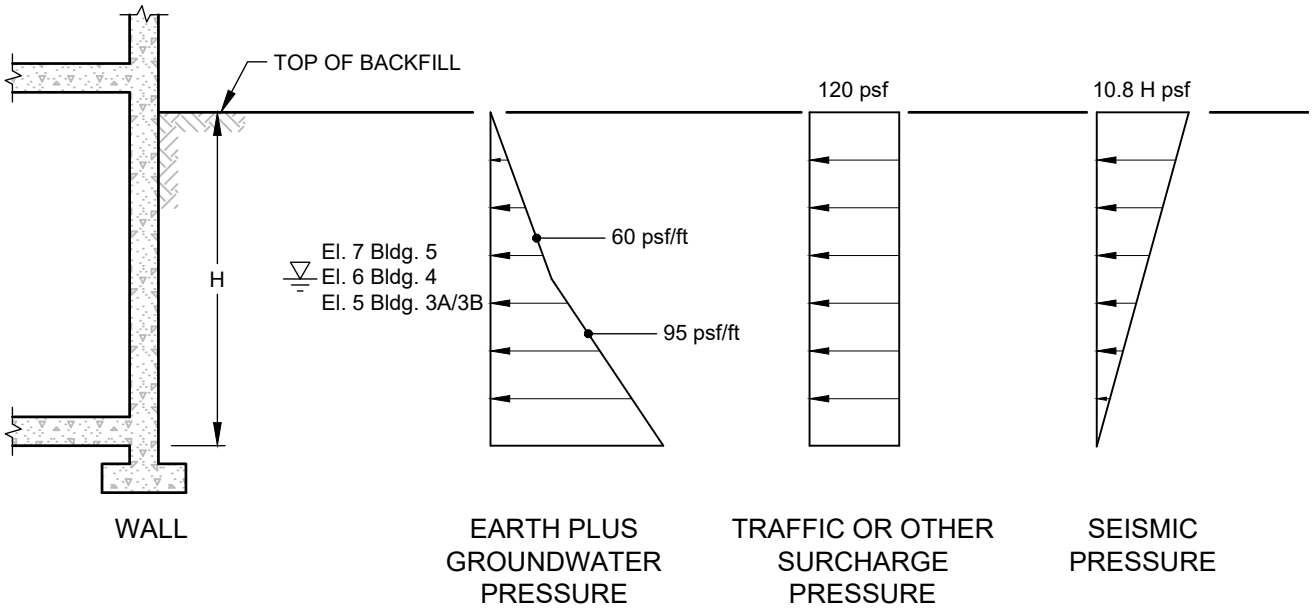
FOUNDATION/BASEMENT PLAN

DOB JOB #	
BIN #	
DATE	xx/xx/xxxx
DRAWN BY	Author
SCALE	1/8" = 1'-0"

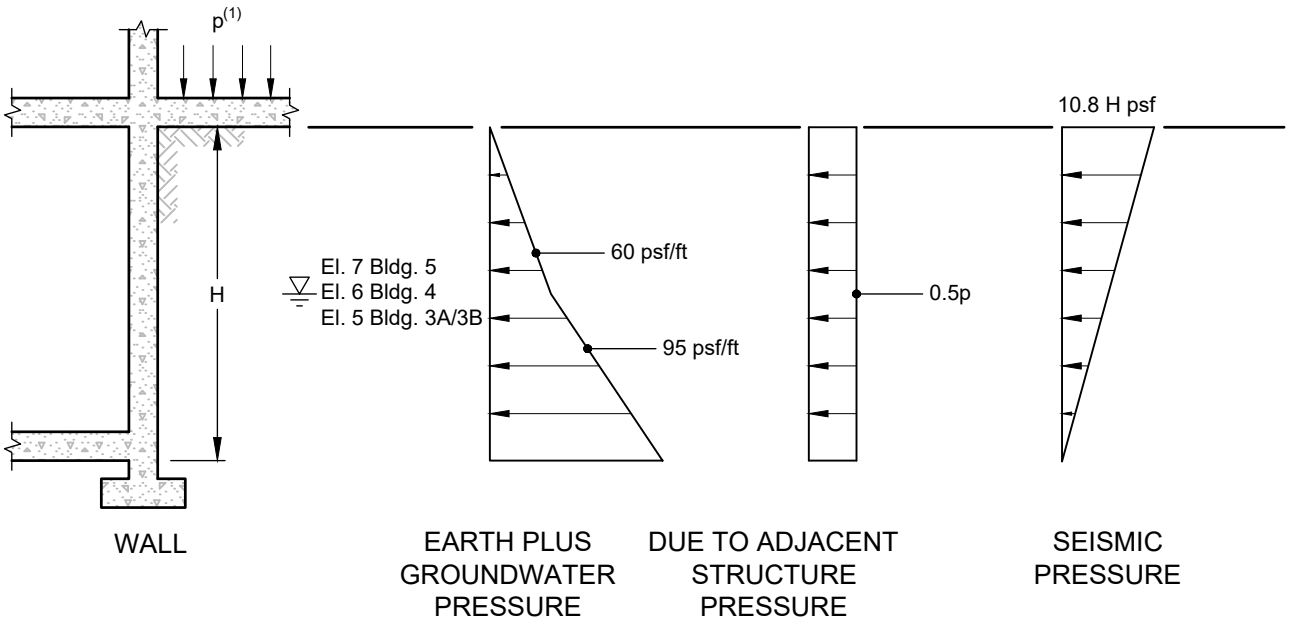
FO-101

SHEET OF

DOB BSCAN STICKER



EXTERIOR WALLS



WALLS BELOW ADJACENT FOOTINGS, SLABS OR MATS

NOTES:

1. p = TOTAL BEARING PRESSURE (psf) FROM ADJACENT SLAB-ON-GRADE INCLUDING STATIC AND SUSTAINED LIVE LOADS.

Geotechnical Report Astoria Cove Development Astoria, Queens, New York	GEI Consultants	RECOMMENDED LATERAL EARTH PRESSURES
Slim Astoria 2468 LLC New York, New York	Project 2305370	December 2023 Fig. 12

Appendix A

Exploration Logs

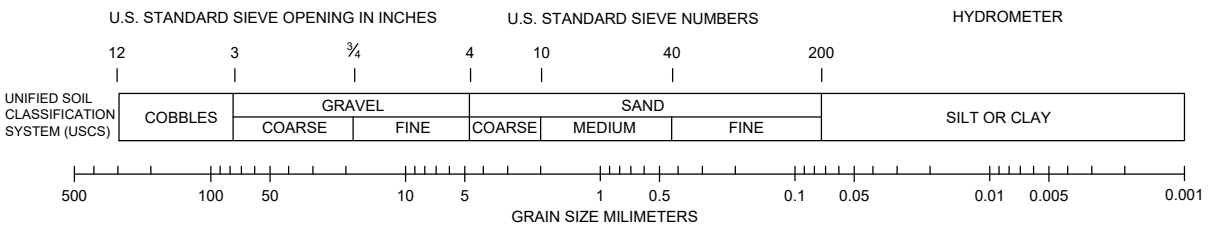
COARSE-GRAINED SOILS
VISUAL-MANUAL DESCRIPTIONS

GEI Consultants

TYPICAL SOIL COLORS

- YELLOW
- OLIVE
- LIGHT BROWN
- BROWN
- REDDISH BROWN
- RED
- GRAY
- BLACK

				GROUP PATTERN & SYMBOL	GROUP NAME
GRAVEL (% Gravel > % Sand)	≤5% Fines	WIDELY GRADED		GW	<15% Sand → WIDELY GRADED GRAVEL; ≥15% Sand → WIDELY GRADED GRAVEL WITH SAND
		NARROWLY GRADED		GP	<15% Sand → NARROWLY GRADED GRAVEL; ≥15% Sand → NARROWLY GRADED GRAVEL WITH SAND
	~10% Fines	WIDELY GRADED	Fines = ML or MH	GW-GM	<15% Sand → WIDELY GRADED GRAVEL WITH SILT; ≥15% Sand → WIDELY GRADED GRAVEL WITH SILT AND SAND
			Fines = CL or CH	GW-GC	<15% Sand → WIDELY GRADED GRAVEL WITH CLAY; ≥15% Sand → WIDELY GRADED GRAVEL WITH CLAY AND SAND
		NARROWLY GRADED	Fines = ML or MH	GP-GM	<15% Sand → NARROWLY GRADED GRAVEL WITH SILT; ≥15% Sand → NARROWLY GRADED GRAVEL WITH SILT AND SAND
			Fines = CL or CH	GP-GC	<15% Sand → NARROWLY GRADED GRAVEL WITH CLAY; ≥15% Sand → NARROWLY GRADED GRAVEL WITH CLAY AND SAND
	≥15% Fines		Fines = ML or MH	GM	<15% Sand → SILTY GRAVEL; ≥15% Sand → SILTY GRAVEL WITH SAND
			Fines = CL or CH	GC	<15% Sand → CLAYEY GRAVEL; ≥15% Sand → CLAYEY GRAVEL WITH SAND
SOILS WITH <50% FINES					
SAND (% Sand ≥ % Gravel)	≤5% Fines	WIDELY GRADED		SW	<15% Gravel → WIDELY GRADED SAND; ≥15% Gravel → WIDELY GRADED SAND WITH GRAVEL
		NARROWLY GRADED		SP	<15% Gravel → NARROWLY GRADED SAND; ≥15% Gravel → NARROWLY GRADED SAND WITH GRAVEL
	~10% Fines	WIDELY GRADED	Fines = ML or MH	SW-SM	<15% Gravel → WIDELY GRADED SAND WITH SILT; ≥15% Gravel → WIDELY GRADED SAND WITH SILT AND GRAVEL
			Fines = CL or CH	SW-SC	<15% Gravel → WIDELY GRADED SAND WITH CLAY; ≥15% Gravel → WIDELY GRADED SAND WITH CLAY AND GRAVEL
		NARROWLY GRADED	Fines = ML or MH	SP-SM	<15% Gravel → NARROWLY GRADED SAND WITH SILT; ≥15% Gravel → NARROWLY GRADED SAND WITH SILT AND GRAVEL
			Fines = CL or CH	SP-SC	<15% Gravel → NARROWLY GRADED SAND WITH CLAY; ≥15% Gravel → NARROWLY GRADED SAND WITH CLAY AND GRAVEL
	≥15% Fines		Fines = ML or MH	SM	<15% Gravel → SILTY SAND; ≥15% Gravel → SILTY SAND WITH GRAVEL
			Fines = CL or CH	SC	<15% Gravel → CLAYEY SAND; ≥15% Gravel → CLAYEY SAND WITH GRAVEL



1. GROUP NAME and (SYMBOL)
2. Structure , if any. (stratified layer thicknesses, lenses, varves, gradational changes)
3. Describe sand, gravel and fines components, with percentages, in order of predominance. Include max gravel size. For test pits give percent cobbles and boulders, by volume, and include max size.
4. Color
5. Moisture: dry, moist, wet
6. Sheen, odor, roots, ash, brick, cementation, reaction with HCL, etc.
7. "Fill," local name or geologic name, if known

GEI Consultants

FINE-GRAINED SOILS
VISUAL-MANUAL DESCRIPTIONS

SOILS WITH ≥50% FINES

GROUP PATTERN & SYMBOL				GROUP NAME
CL	<30% plus No. 200	<15% plus No. 200		LEAN CLAY
		15-25% plus No. 200	% Sand ≥% Gravel	LEAN CLAY WITH SAND
			% Sand <% Gravel	LEAN CLAY WITH GRAVEL
	≥30% plus No. 200	% Sand ≥% of Gravel	<15 % Gravel	SANDY LEAN CLAY
			≥15% Gravel	SANDY LEAN CLAY WITH GRAVEL
		% Sand <% of Gravel	<15 % Sand	GRAVELLY LEAN CLAY
			≥15% Sand	GRAVELLY LEAN CLAY WITH SAND
ML	<30% plus No. 200	<15% plus No. 200		SILT
		15-25% plus No. 200	% Sand ≥% Gravel	SILT WITH SAND
			% Sand <% Gravel	SILT WITH GRAVEL
	≥30% plus No. 200	% Sand ≥% of Gravel	<15 % Gravel	SANDY SILT
			≥15% Gravel	SANDY SILT WITH GRAVEL
		% Sand <% of Gravel	<15 % Sand	GRAVELLY SILT
			≥15% Sand	GRAVELLY SILT WITH SAND
CH	<30% plus No. 200	<15% plus No. 200		FAT CLAY
		15-25% plus No. 200	% Sand ≥% Gravel	FAT CLAY WITH SAND
			% Sand <% Gravel	FAT CLAY WITH GRAVEL
	≥30% plus No. 200	% Sand ≥% of Gravel	<15 % Gravel	SANDY FAT CLAY
			≥15% Gravel	SANDY FAT CLAY WITH GRAVEL
		% Sand <% of Gravel	<15 % Sand	GRAVELLY FAT CLAY
			≥15% Sand	GRAVELLY FAT CLAY WITH SAND
MH	<30% plus No. 200	<15% plus No. 200		ELASTIC SILT
		15-25% plus No. 200	% Sand ≥% Gravel	ELASTIC SILT WITH SAND
			% Sand <% Gravel	ELASTIC SILT WITH GRAVEL
	≥30% plus No. 200	% Sand ≥% of Gravel	<15 % Gravel	SANDY ELASTIC SILT
			≥15% Gravel	SANDY ELASTIC CLAY WITH GRAVEL
		% Sand <% of Gravel	<15 % Sand	GRAVELLY ELASTIC SILT
			≥15% Sand	GRAVELLY ELASTIC SILT WITH SAND
OL/OH	<30% plus No. 200	<15% plus No. 200		ORGANIC SOIL
		15-25% plus No. 200	% Sand ≥% Gravel	ORGANIC SOIL WITH SAND
			% Sand <% Gravel	ORGANIC SOIL WITH GRAVEL
	≥30% plus No. 200	% Sand ≥% of Gravel	<15 % Gravel	SANDY ORGANIC SOIL
			≥15% Gravel	SANDY ORGANIC SOIL WITH GRAVEL
		% Sand <% of Gravel	<15 % Sand	GRAVELLY ORGANIC SOIL
			≥15% Sand	GRAVELLY ORGANIC SOIL WITH SAND

ID OF INORGANIC FINE SOILS FROM MANUAL TESTS

Symbol	Name	Dry Strength	Dilatancy	Toughness*
ML	Silt	None to low	Slow to rapid	Low or thread cannot be formed
CL	Lean Clay	Medium to high	None to slow	Medium
MH	Elastic Silt	Low to medium	None to slow	Low to medium
CH	Fat Clay	High to very high	None	High

1. GROUP NAME and (SYMBOL)
2. Describe fines, sand, and gravel components, in order of predominance. Include plasticity of fines. Include percentages of sand and gravel.
3. Color
4. Moisture: dry, moist, wet
5. Sheen, odor, roots, ash, brick, cementation, torvane and penetrometer results, etc.
6. "Fill," local name or geologic name, if known

PEAT

Peat refers to a sample composed primarily of vegetable matter in varying stages of decomposition. The description should begin: PEAT (PT) and need not include percentages of sand, gravel or fines.

CRITERIA FOR DESCRIBING PLASTICITY

Description	Criteria
Nonplastic ML	A 1/8-in. (3 -mm) thread cannot be rolled at any water content
Low Plasticity ML, MH	The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit *
Medium Plasticity MH, CL	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit
High Plasticity CH	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit

* Toughness refers to the strength of the thread near plastic limit. The lump refers to a lump of soil drier than the plastic, similar to dry strength.

BORING INFORMATION

NORTHING (ft): 221,653 **EASTING (ft):** 1,003,263
GROUND SURFACE EL. (ft): 48.8 **DATE START/END:** 5/1/2020 - 5/1/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 102.0 **DRILLER NAME:** Keith Parent
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING B1

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 48.8
		S1	0 to 2	24/7	23-16-17-8	PID = 0.0ppm @S1		S1 (0-2"): Asphalt. S1 (2"-7"): SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~20% nonplastic fines, ~20% angular gravel up to 1"; brown; dry. Brick, asphalt, red brick and concrete fragments.
								STRATUM IIA - LOOSE SAND (CLASS 6) at ~2 ft / El. 46.8
		S2	2 to 4	24/6	5-6-6-5	PID = 0.0ppm @S2		S2: WIDELY GRADED SAND (SW); ~90% sand, ~10% subangular gravel up to 1.5"; orange-brown to brown; dry.
		S3	4 to 6	24/10	5-4-3-2	PID = 0.0ppm @S3		S3: WIDELY GRADED SAND (SW): Similar to S2.
	5							
		S4	6 to 8	24/12	5-3-4-8	PID = 0.0ppm @S4		S4: WIDELY GRADED SAND (SW): Similar to S2.
								STRATUM IIC - SAND (CLASS 3B) at ~8 ft / El. 40.8
		S5	8 to 10	24/0	5-7-6-6	PID = 0.0ppm @S5		S5: No Recovery.
40								
	10	S6	10 to 12	24/10	5-4-7-13	PID = 0.0ppm @S6		S6: WIDELY GRADED SAND (SW): Similar to S2.
						Drive casing to 14 feet below grade. Roller bit to 15 feet.		
	15	S7	15 to 17	24/0	10-6-6-5			S7: No Recovery. Rock stuck in shoe.
						Roller bit to 20 feet.		
30								

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,653 **EASTING (ft):** 1,003,263
GROUND SURFACE EL. (ft): 48.8 **DATE START/END:** 5/1/2020 - 5/1/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B1

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/17	5-5-8-7	PID = 0.0ppm @S8		S8: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% nonplastic fines; tan-brown; dry.
						Advance casing to 25 feet below grade. Roller bit to 25 feet.		
	25	S9	25 to 27	24/19	11-11-14-12	PID = 0.0ppm @S9		S9: NARROWLY GRADED SAND (SP); Similar to S8.
						Roller bit to 30 feet.		
								STRATUM III - TILL (CLASS 3A) at ~28.5 ft / El. 20.3
20								
	30	S10	30 to 32	24/13	9-15-18-18	PID = 0.0ppm @S10		S10: SILTY SAND (SM); ~60% fine sand, ~40% nonplastic fines; tan; dry.
						Roller bit to 35 feet.		
	35	S11	35 to 37	24/19	22-22-26-20	PID = 0.0ppm @S11		S11: WIDELY GRADED SAND (SW); ~90% sand, ~5% nonplastic fines, ~5% subrounded gravel up to 1.5"; brown; wet.
						Roller bit to 40 feet. Intermittent rig chatter from 35 to 40 feet.		
10								
	40	S12	40 to 41.3	15/11	29-58-102/3"	PID = 0.0ppm @S12		S12: WIDELY GRADED SAND (SW); Similar to S11. Trace mica.
						Roller bit to 45 feet. Rig chatter from 41 to 42 feet.		
	45	S13	45 to 47	24/8	12-11-14-14	PID = 0.0ppm @S13		S13: WIDELY GRADED SAND (SW); Similar to S11.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,653 **EASTING (ft):** 1,003,263
GROUND SURFACE EL. (ft): 48.8 **DATE START/END:** 5/1/2020 - 5/1/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B1

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Rig chatter from 47 to 50 feet.		
0								
	50	S14	50 to 50.8	9/9	62-106/3"	PID = 0.0ppm @S14		S14: WIDELY GRADED SAND WITH SILT (SW-SM); ~80% sand, ~10% nonplastic fines, ~10% subangular gravel up to 1.5"; brown; wet.
						Roller bit to 55 feet.		
	55	S15	55 to 57	24/21	44-33-84-86	PID = 0.0ppm @S15		S15: SILTY SAND (SM); ~70% fine to medium sand, ~25% nonplastic fines, ~5% subangular gravel up to 1"; brown; wet.
						Roller bit to 60 feet. Rig chatter from 58 to 60 feet.		
-10								
	60	S16	60 to 60.4	5/5	100/5"	PID = 0.0ppm @S16		S16: SILTY SAND (SM); Similar S15.
						Roller bit to 65 feet. Rig chatter from 61 to 62 feet and 63 to 65 feet.		
	65	S17	65 to 65.9	11/11	83-101/5"	PID = 0.0ppm @S17		S17: WIDELY GRADED SAND WITH SILT (SW-SM); ~85% sand, ~10% nonplastic fines, ~5% gravel; brown; wet.
						Roller bit to 70 feet. Rig chatter from 68 to 70 feet.		
-20								
	70	S18	70 to 70.4	5/5	100/5"	PID = 0.0ppm @S18		S18: WIDELY GRADED SAND WITH SILT (SW-SM); Similar to S17.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,653 **EASTING (ft):** 1,003,263
GROUND SURFACE EL. (ft): 48.8 **DATE START/END:** 5/1/2020 - 5/1/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B1

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet. Rig chatter around 72 feet and from 74 to 75 feet.		
	75	S19	75 to 75.7	8/8	95-102/2"	PID = 0.0ppm @S19		S19: WIDELY GRADED SAND WITH SILT (SW-SM); Similar to S17.
						Roller bit to 80 feet. Rig chatter from 75 to 80 feet.		
-30								
	80	S20	80 to 80.8	10/10	92-101/4"	PID = 0.0ppm @S20		S20: SILTY SAND (SM); ~75% fine to medium sand, ~20% nonplastic fines, ~5% fine subrounded gravel up to 0.5"; brown to reddish-brown; wet.
						Roller bit to 85 feet. Rig chatter from 81 to 84 feet.		
	85	S21	85 to 86.3	16/15	69-78-100/4"	PID = 0.0ppm @S21		S21: SILTY SAND (SM); Similar to S20.
						Roller bit to 90 feet. Rig chatter from 86 to 88 feet.		
-40								
	90	S22	90 to 90.4	5/5	102/5"	PID = 0.0ppm @S22		S22: WIDELY GRADED SAND (SW); ~90% sand, ~5% nonplastic fines, ~5% gravel up to 0.5"; reddish-brown; wet.
						Roller bit to 95 feet. Rig chatter from 90 to 95 feet.		
	95	S23	95 to 95.2	2/2	104/2"	PID = 0.0ppm @S23		S23: WIDELY GRADED SAND (SW); Similar to S22.
						Roller bit to 100 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,653 **EASTING (ft):** 1,003,263
GROUND SURFACE EL. (ft): 48.8 **DATE START/END:** 5/1/2020 - 5/1/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B1

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
-50	100	S24	100 to 102	24/21	94-56-55-76	PID = 0.0ppm @S24		S24: SILTY SAND (SM); ~50% sand, ~40% nonplastic to low plasticity fines, ~10% gravel; subangular up to 1"; orange-brown; some mica.
								Backfilled with cuttings and hole plug. Bottom of boring at depth 102 ft.
	105							
-60	110							
	115							
-70	120							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,695 **EASTING (ft):** 1,003,280
GROUND SURFACE EL. (ft): 48.4 **DATE START/END:** 4/28/2020 - 4/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 102.0 **DRILLER NAME:** Keith Parent
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING

B2

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 48.4
								S1 (0-1'): Concrete.
		S1	1 to 3	24/15	13-11-8-10	PID = 0.0ppm @S1		S1: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% subangular gravel up to 1.5"; brown; dry. Brick, asphalt; trace mica. Asphalt/concrete fragments.
		S2	3 to 5	24/8	3-6-3-4	PID = 0.0ppm @S2		S2: SILTY SAND (SM); Similar to S1.
	5	S3	5 to 7	24/7	3-3-4-12	PID = 0.0ppm @S3		S3: SILTY SAND (SM); Similar to S1.
								STRATUM IIC - SAND (CLASS 3B) at ~7 ft / El. 41.4
		S4	7 to 9	24/8	19-6-5-6	PID = 0.0ppm @S4		S4: CLAYEY SAND (SC); ~70% sand, ~20% low plasticity fines, ~10% subangular gravel up to 1.5"; brown; dry.
40		S5	9 to 11	24/7	17-9-11-34	PID = 0.0ppm @S5		S5: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~20% subangular gravel up to 1.25", ~5% nonplastic fines; brown; dry; some mica.
	10							S5: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~20% subangular gravel up to 1.25", ~5% nonplastic fines; brown; dry; some mica.
		S6	11 to 13	24/6	19-21-24-12	PID = 0.0ppm @S6 Drive casing to 14 feet below grade. Rollerbit to 15 feet.		**STRATUM III - TILL (CLASS 3A) at ~11 ft / El. 37.4** S6: WIDELY GRADED GRAVEL WITH SAND (GW); ~75% subangular gravel up to 1.5", ~25% sad; brown to black; dry.
	15	S7	15 to 17	24/9	6-5-8-7			S7: NARROWLY GRADED SAND (SP); ~95% fine sand, ~5% nonplastic fines; tan; dry.
30						Roller bit to 20 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,695 **EASTING (ft):** 1,003,280
GROUND SURFACE EL. (ft): 48.4 **DATE START/END:** 4/28/2020 - 4/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B2

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/9	17-18-13-22	PID = 0.0ppm @S8		S8: NARROWLY GRADED SAND (SP); Similar to S7 with fine to medium sand.
						Roller bit to 25 feet.		
	25	S9	25 to 27	24/0	11-16-25-31	PID = 0.0ppm @S9		S9: No Recovery.
						Roller bit to 30 feet.		
20								
	30	S10	30 to 31.8	21/11	9-34-81-100/3"	PID = 0.0ppm @S10		S10 (0-6"): SILTY SAND WITH GRAVEL (SM); ~50% fine to medium sand, ~30% subangular gravel up to 1.5", ~20% nonplastic fines; brown; wet. S10 (6"-11"): SILTY SAND (SM); ~70% fine sand, ~20% nonplastic fines, ~10% subangular gravel up to 1.5"; brown; wet.
						Roller bit to 35 feet. Rig chatter from 33 to 34 feet.		
	35	S11	35 to 37	24/15	68-76-74-102	PID = 0.0ppm @S11		S11: WIDELY GRADED SAND (SW); ~90% sand, ~5% nonplastic fines, ~5% fine gravel up to 1"; tan to light brown; wet.
						Roller bit to 40 feet.		
10								
	40	S12	40 to 42	24/20	26-35-41-48	PID = 0.0ppm @S12		S12: WIDELY GRADED SAND (SW); ~90% sand, ~5% nonplastic fines, ~5% fine gravel up to 0.5"; tan; wet.
						Roller bit to 45 feet.		
	45	S13	45 to 47	24/12	43-51-35-50	PID = 0.0ppm @S13		S13: SILTY SAND (SM); ~60% fine to medium sand, ~30% nonplastic fines, ~10% subangular gravel up to 1.5"; brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,695 **EASTING (ft):** 1,003,280
GROUND SURFACE EL. (ft): 48.4 **DATE START/END:** 4/28/2020 - 4/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B2

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Rig chatter from 45 to 46 feet and 48 to 50 feet.		
0								
	50	S14	50 to 50.9	11/11	78-103/5"	PID = 0.0ppm @S14		S14: WIDELY GRADED SAND (SW); ~85% sand, ~10% subangular gravel up to 1.5", ~5% nonplastic fines; brown; wet.
						Roller bit to 55 feet. Rig chatter ~53 and between 54 and 55 feet.		
	55	S15	55 to 55.9	11/11	71-103/5"	PID = 0.0ppm @S15		S15: WIDELY GRADED SAND (SW): Similar to S14.
-10						Roller bit to 60 feet.		
	60	S16	60 to 60.9	11/10	118-104/5"	PID = 0.0ppm @S16		S16: WIDELY GRADED SAND (SW); Similar to S14.
						Roller bit to 65 feet. Intermittent rig chatter from 60 to 65 feet.		
	65	S17	65 to 65	0/0	62/0"	PID = 0.0ppm @S17		S17: No Recovery.
-20						Roller bit to 70 feet. Rig chatter from 65 to 67 feet.		
	70	S18	70 to 71.3	16/14	68-74-105/4"	PID = 0.0ppm @S18		S18: WIDELY GRADED SAND (SW); Similar to S14.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,695 **EASTING (ft):** 1,003,280
GROUND SURFACE EL. (ft): 48.4 **DATE START/END:** 4/28/2020 - 4/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B2

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet. Rig chatter from 71 to 74 feet.		
	75	S19	75 to 75.7	8/8	125-101/2"	PID = 0.0ppm @S19		S19: SILTY SAND (SM); ~75% fine to medium sand, ~20% nonplastic fines, ~5% subrounded gravel up to 1"; light brown; wet.
-30						Roller bit to 80 feet. Rig chatter from 75 to 80 feet.		
	80	S20	80 to 80.4	5/5	104/5"	PID = 0.0ppm @S20		S20: SILTY SAND WITH GRAVEL (SM); ~50% fine to medium sand, ~30% subangular gravel up to 1.5", ~20% nonplastic fines; light brown; wet.
						Roller bit to 85 feet.		
	85	S21	85 to 85.8	9/9	86-101/3"	PID = 0.0ppm @S21		S21: SILTY SAND WITH GRAVEL (SM); Similar to S20.
-40						Roller bit to 90 feet. Intermittent rig chatter from 85 to 90 feet.		
	90	S22	90 to 91.4	17/13	39-61-128/5"	PID = 0.0ppm @S22		S22: WIDELY GRADED SAND (SW); ~85% sand, ~10% subangular gravel up to 1.5", ~5% nonplastic fines; tan; wet.
						Roller bit to 95 feet.		
	95	S23	95 to 95.4	5/5	102/5"	PID = 0.0ppm @S23		S23: WIDELY GRADED SAND (SW); Similar to S22.
						Roller bit to 100 feet.		**STRATUM IV - DECOMPOSED/WEATHERED BEDROCK (CLASS 1D) at ~97.7 ft / El. -49.3**

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,695 **EASTING (ft):** 1,003,280
GROUND SURFACE EL. (ft): 48.4 **DATE START/END:** 4/28/2020 - 4/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B2

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Intermittent rig chatter from 95 to 100 feet.		
	100	S24	100 to 102	24/14	24-34-37-54	PID = 0.0ppm @S24		S24: SILT WITH SAND (ML); ~80% nonplastic to low plasticity fines, ~20% fine sand; white to black; moist; banded.
								Backfilled with cuttings and hole plug. Bottom of boring at depth 102 ft.
	105							
-60								
	110							
	115							
-70								
	120							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,718 **EASTING (ft):** 1,003,305
GROUND SURFACE EL. (ft): 46.0 **DATE START/END:** 4/27/2020 - 4/27/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 102.0 **DRILLER NAME:** Keith Parent
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING B3

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 46
		S1	0 to 2	24/17	20-9-8-11	PID = 0.0ppm @S1		S1: SILTY SAND WITH GRAVEL (SM); ~60% sand, ~20% nonplastic fines, ~20% subangular gravel up to 1.5"; brown; dry. Brick, asphalt, and concrete fragments. Slight petroleum-like odor.
		S2	2 to 4	24/3	12-6-5-3	PID = 0.0ppm @S2		S2: SILTY SAND WITH GRAVEL (SM); Similar to S1. No petroleum odor.
	5	S3	4 to 6	24/4	3-2-2-3	PID = 0.0ppm @S3		S3: SILTY SAND WITH GRAVEL (SM); Similar to S1. No petroleum odor.
40		S4	6 to 8	24/8	2-1-1-4	PID = 0.0ppm @S4		S4: SILTY SAND WITH GRAVEL (SM); Similar to S1. No petroleum odor.
		S5	8 to 10	24/3	2-6-8-5	PID = 0.0ppm @S5		S5: SILTY SAND WITH GRAVEL (SM); Similar to S1. No petroleum odor.
								STRATUM IIC - SAND (CLASS 3B) at ~10 ft / El. 36
	10	S6	10 to 12	24/10	5-7-6-7	PID = 0.0ppm @S6		S6: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% subangular gravel up to 1"; brown to yellow-brown; dry; trace mica.
						Drive casing to 14 feet below grade. Rollerbit to 15 feet.		
	15	S7	15 to 17	24/8	2-3-4-3			S7: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% nonplastic fines; brown to tan; dry.
30						Roller bit to 20 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,718 **EASTING (ft):** 1,003,305
GROUND SURFACE EL. (ft): 46.0 **DATE START/END:** 4/27/2020 - 4/27/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B3

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/7	3-6-12-15	PID = 0.0ppm @S8		S8: NARROWLY GRADED SAND (SP); Similar to S8.
						Roller bit to 25 feet.		
20	25	S9	25 to 27	24/13	2-4-10-15	PID = 0.0ppm @S9		S9: SILT (ML); 94% nonplastic fines, 6% fine sand; light brown; wet. [GRAIN SIZE TEST PERFORMED].
						Roller bit to 30 feet.		**STRATUM III - TILL (CLASS 3A) at ~28.5 ft / El. 17.5**
	30	S10	30 to 32	24/13	11-13-14-27	PID = 0.0ppm @S10		S10: SILT WITH SAND (ML); 77.6% nonplastic fines, 22.4% fine sand; light brown; moist. [GRAIN SIZE TEST PERFORMED].
						Roller bit to 35 feet. Rig chatter ~32 feet.		
10	35	S11	35 to 37	24/15	20-34-46-56	PID = 0.0ppm @S11		S11: WIDELY GRADED SAND (SW); ~85% sand, ~10% subrounded gravel up to 1.25", ~5% nonplastic fines; brown; wet; some mica.
						Roller bit to 40 feet.		
	40	S12	40 to 42	24/15	29-61-50-47	PID = 0.0ppm @S12		S12: WIDELY GRADED SAND (SW); ~90% sand, ~5% nonplastic fines, ~5% fine gravel; brown to tan; wet.
						Roller bit to 45 feet. Rig chatter ~44 feet.		
0	45	S13	45 to 47	24/10	14-10-68-67	PID = 0.0ppm @S13		S13: WIDELY GRADED SAND (SW); ~85% sand, ~10% subrounded gravel up to 1.5", ~5% nonplastic fines; brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,718 **EASTING (ft):** 1,003,305
GROUND SURFACE EL. (ft): 46.0 **DATE START/END:** 4/27/2020 - 4/27/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B3

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Rig chatter ~46 feet and from 48 to 49 feet.		
	50	S14	50 to 50.8	9/9	83-101/3"	PID = 0.0ppm @S14		S14: WIDELY GRADED SAND (SW); Similar S13.
						Roller bit to 55 feet. Intermittent rig chatter from 51 to 55 feet.		
	55	S15	55 to 55.8	9/9	72-100/3"	PID = 0.0ppm @S15		S15: WIDELY GRADED SAND (SW); Similar S13.
-10								
						Roller bit to 60 feet. Rig chatter from 56 to 59 feet. Slow advancement from 57 to 59 feet.		
	60	S16	60 to 60.3	3/2	100/3"	PID = 0.0ppm @S16		S16: WIDELY GRADED SAND (SW); Similar S13.
						Roller bit to 65 feet.		
	65	S17	65 to 65.4	5/5	124/5"	PID = 0.0ppm @S17		S17: NARROWLY GRADED SAND WITH SILT (SP-SM); ~80% fine to medium sand, ~10% nonplastic fines, ~10% subangular gravel up to 1"; brown; wet.
-20								
						Roller bit to 70 feet. Intermittent rig chatter from 65 to 70 feet.		
	70	S18	70 to 70.4	5/5	102/5"	PID = 0.0ppm @S18		S18: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar S17.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,718 **EASTING (ft):** 1,003,305
GROUND SURFACE EL. (ft): 46.0 **DATE START/END:** 4/27/2020 - 4/27/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B3

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet. Rig chatter from 70 to 75 feet.		
-30	75	S19	75 to 75.4	5/4	103/5"	PID = 0.0ppm @S19		S19: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar S17.
						Roller bit to 80 feet. Intermittent rig chatter from 75 to 80 feet.		
	80	S20	80 to 80	0/0	55/0"	PID = 0.0ppm @S20		S20: No Recovery. (80'-82'): BOULDER / COBBLE.
						Roller bit to 85 feet. Intermittent rig chatter from 80 to 85 feet.		
-40	85	S21	85 to 86.8	22/17	66-70-108-100/4"	PID = 0.0ppm @S21		S21: NARROWLY GRADED SAND WITH SILT (SP-SM); ~80% fine to medium sand, ~10% nonplastic fines, ~10% subangular gravel up to 1"; brown to tan-brown; wet.
						Roller bit to 90 feet. Intermittent rig chatter from 85 to 90 feet.		
	90	S22	90 to 90.3	4/4	100/4"	PID = 0.0ppm @S22		S22: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S21.
						Roller bit to 95 feet. Rig chatter between 90 to 92 feet and 94 to 95 feet.		
-50	95	S23	95 to 95.2	2/2	100/2"	PID = 0.0ppm @S23		S23: WIDELY GRADED SAND WITH GRAVEL (SW); ~80% sand, ~20% subangular gravel up to 1"; brown; wet.
						Roller bit to 100 feet. Rig		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,718 **EASTING (ft):** 1,003,305
GROUND SURFACE EL. (ft): 46.0 **DATE START/END:** 4/27/2020 - 4/27/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B3

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						chatter from 95 to 96 feet and 98 to 100 feet.		
	100	S24	100 to 102	24/13	62-73-100-80	PID = 0.0ppm @S24		S24: SILTY SAND (SM); ~75% sand, ~25% nonplastic fines; orange-brown; wet.
								Backfilled with cuttings and hole plug. Bottom of boring at depth 102 ft.
	105							
-60								
	110							
	115							
-70								
	120							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,775 **EASTING (ft):** 1,003,310
GROUND SURFACE EL. (ft): 24.7 **DATE START/END:** 5/4/2020 - 5/4/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 102.0 **DRILLER NAME:** Keith Parent
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING B4

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 24.7
		S1	0 to 2	24/10	14-13-8-8	PID = 0.0ppm @S1		(0-4"): Asphalt. S1: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, ~5% nonplastic fines, ~5% coarse subangular gravel up to 1.5"; tan; dry.
								STRATUM IIC - SAND (CLASS 3B) at ~2 ft / El. 22.7
		S2	2 to 4	24/16	5-4-5-6	PID = 0.0ppm @S2		S2: NARROWLY GRADED SAND (SP); ~95% fine sand, ~5% nonplastic fines; tan; dry.
20	5	S3	4 to 6	24/10	5-5-4-6	PID = 0.0ppm @S3		S3: NARROWLY GRADED SAND (SP): Similar to S3.
		S4	6 to 8	24/8	4-3-5-5	PID = 0.0ppm @S4		S4: NARROWLY GRADED SAND WITH SILT (SP-SM); ~90% fine sand, ~10% nonplastic fines; light brown; dry.
		S5	8 to 10	24/15	5-3-6-6	PID = 0.0ppm @S5		S5: SILTY SAND (SM); ~80% fine sand, ~20% nonplastic fines; light brown; dry.
								STRATUM III - TILL (CLASS 3A) at ~10 ft / El. 14.7
	10	S6	10 to 12	24/10	15-19-28-63	PID = 0.0ppm @S6		S6: WIDELY GRADED SAND WITH SILT (SW-SM); ~80% sand, ~10% nonplastic fines, ~10% subangular gravel up to 1.5"; white to brown; dry.
						Drive casing to 14 feet below grade. Rollerbit to 15 feet.		
10	15	S7	15 to 15.8	9/9	24-107/3"			S7: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~25% subangular gravel up to 1"; brown; dry.
						Roller bit to 20 feet. Rig chatter from 15 to 18 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,775 **EASTING (ft):** 1,003,310
GROUND SURFACE EL. (ft): 24.7 **DATE START/END:** 5/4/2020 - 5/4/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B4

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 20.8	9/5	19-101/3"	PID = 0.0ppm @S8		S8: WIDELY GRADED SAND WITH GRAVEL (SW); Similar to S7. Possible cobbles and boulders from 20.75' to 22.9'
						Roller bit to 25 feet. Rig chatter from 21 to 24 feet.		
0	25	S9	25 to 27	24/5	31-22-17-13	PID = 0.0ppm @S9		S9: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~20% subangular gravel up to 1.5", ~5% nonplastic fines; brown; wet. Trace mica.
						Roller bit to 30 feet. Rig chatter from 28 to 30 feet.		
	30	S10	30 to 30.9	11/8	60-100/5"	PID = 0.0ppm @S10		S10: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~10% sun-angular gravel up to 1.5", ~5% nonplastic fines; brown; wet.
						Roller bit to 35 feet. Rig chatter from 32 to 35 feet.		
-10	35	S11	35 to 37	24/19	48-67-58-65	PID = 0.0ppm @S11		S11: NARROWLY GRADED SAND (SP): Similar to S10.
						Roller bit to 40 feet. Rig chatter from 36 to 37 feet.		
	40	S12	40 to 42	24/17	41-57-51-59	PID = 0.0ppm @S12		S12: WIDELY GRADED SAND (SW); ~95% sand, ~5% fine gravel up to 0.75"; tan-brown; wet.
						Roller bit to 45 feet.		
-20	45	S13	45 to 45.9	11/10	33-106/5"	PID = 0.0ppm @S13		S13: WIDELY GRADED SAND (SW); ~90% sand, ~5% nonplastic fines, ~5% subrounded gravel up to 1.5"; brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,775 **EASTING (ft):** 1,003,310
GROUND SURFACE EL. (ft): 24.7 **DATE START/END:** 5/4/2020 - 5/4/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B4

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Rig chatter 46 to 47 feet and 48 to 50 feet.		
	50	S14	50 to 52	24/13	35-57-40-27	PID = 0.0ppm @S14		S14: WIDELY GRADED SAND (SW); Similar to S13.
						Roller bit to 55 feet. Rig chatter from 54 to 55 feet.		
-30	55	S15	55 to 55.2	2/0	101/2"	PID = 0.0ppm @S15		S15: No Recovery. Cobble stuck in tip.
						Roller bit to 60 feet. Rig chatter from 55 to 60 feet.		
	60	S16	60 to 62	24/18	44-51-41-46	PID = 0.0ppm @S16		S16: NARROWLY GRADED SAND (SP); ~95% medium to coarse sand, ~5% subrounded gravel up to 1.5"; light brown to orange-brown; wet.
						Roller bit to 65 feet.		
-40	65	S17	65 to 65.9	11/11	110-100/5"	PID = 0.0ppm @S17		S17: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~20% subrounded gravel up to 1.5", ~5% nonplastic fines; brown; wet.
						Roller bit to 70 feet.		
	70	S18	70 to 70.8	10/10	39-107/4"	PID = 0.0ppm @S18		S18: WIDELY GRADED SAND WITH SILT (SW-SM); ~85% sand, ~10% nonplastic fines, ~5% fine gravel; brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,775 **EASTING (ft):** 1,003,310
GROUND SURFACE EL. (ft): 24.7 **DATE START/END:** 5/4/2020 - 5/4/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B4

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet. Rig chatter from 71 to 75 feet.		
-50	75	S19	75 to 75.2	2/2	100/2"	PID = 0.0ppm @S19		S19: SILTY SAND (SM); ~60% sand, ~30% nonplastic to low plasticity fines, ~10% fine gravel; black to white; wet. Trace mica.
						Roller bit to 80 feet. Intermittent rig chatter from 75 to 80 feet.		
	80	S20	80 to 80.3	3/3	126/3"	PID = 0.0ppm @S20		S20: WIDELY GRADED SAND (SW); ~85% sand, ~10% subangular gravel up to 1.25", ~5% nonplastic fines; brown; wet.
						Roller bit to 85 feet. Intermittent rig chatter from 80 to 85 feet.		
-60	85	S21	85 to 85.2	2/2	100/2"	PID = 0.0ppm @S21		S21: WIDELY GRADED SAND WITH SILT (SW-SM): ~85% sand; ~10% nonplastic to low plasticity fines; ~5% subangular gravel up to 0.75"; brown; wet. Trace mica.
						Roller bit to 90 feet. Intermittent rig chatter from 85 to 90 feet. Slow advancement 85 to 87 feet.		
	90	S22	90 to 90.9	11/11	49-102/5"	PID = 0.0ppm @S22		S22: SILTY SAND WITH GRAVEL (SM); ~45% fine sand, ~35% nonplastic fines, ~20% subangular gravel up to 1.5"; brown; wet. Trace mica.
								STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~93 ft / El. -68.3
						Roller bit to 95 feet. Rig chatter between 91 to 93 feet.		
-70	95	S23	95 to 97	24/16	9-17-24-26	PID = 0.0ppm @S23		S23: SANDY SILT (ML); ~75% nonplastic to low plasticity fines, ~25% fine to medium sand; tan to white to pink; moist. Banded and flakey. Decomposed Rock.
						Roller bit to 100 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,775 **EASTING (ft):** 1,003,310
GROUND SURFACE EL. (ft): 24.7 **DATE START/END:** 5/4/2020 - 5/4/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B4

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
	100	S24	100 to 102	24/10	5-10-13-18	PID = 0.0ppm @S24		S24: SANDY SILT (ML); ROCK; Similar to S23. Blue-green. Decomposed Rock.
								Backfilled with cuttings and hole plug. Bottom of boring at depth 102 ft.
-80	105							
	110							
-90	115							
	120							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,770 **EASTING (ft):** 1,003,343
GROUND SURFACE EL. (ft): 24.8 **DATE START/END:** 3/9/2020 - 3/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 102.0 **DRILLER NAME:** Joe Schuster
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING
B5(OW)

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NX Wireline
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** 2.125 inch / 3 inch
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft): ▼ 18.8 3/10/2020 7:00 am in observation well

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 24.8
		S1	0 to 2	24/17	17-14-10-11	PID = 0.0ppm @S1		S1 (0-6"): ASPHALT AND BASE MATERIAL. S1 (6"-17"): SILTY SAND (SM); ~75% fine sand, ~25% nonplastic fines; tan; dry.
		S2	2 to 4	24/17	6-5-9-11	PID = 0.0ppm @S2		S2: SILTY SAND (SM); ~70% low plasticity clay, ~30% fine to medium sand; brown; moist.
								STRATUM IIB - SILT/CLAY (CLASS 4B/5B) at ~4 ft / El. 20.8
20	5	S3	4 to 6	24/12	9-7-8-7	PID = 0.0ppm @S3		S3: SILT WITH SAND (ML); ~60% nonplastic fines, ~40% fine sand; light brown; dry.
		S4	6 to 8	24/13	8-9-10-4	PID = 0.0ppm @S4		S4 (0-3"): SILT WITH SAND (ML); Similar to S3. S4 (3"-13"): SILTY SAND (SM); ~60% fine sand, ~40% nonplastic fines; light brown; dry.
		S5	8 to 10	24/14	10-7-6-8	PID = 0.0ppm @S5 Drive casing to 8 feet below grade.		S5 (0-8"): SILTY SAND (SM); Similar to S4. S5 (8"-14"): SILT WITH SAND (ML); ~60% nonplastic fines, ~40% fine sand; light brown; dry.
	10	S6	10 to 12	24/14	4-4-6-8	PID = 0.0ppm @S6		S6: SILT WITH SAND (ML); 80.6% nonplastic fines; 19.4% fine sand; light brown; dry. [GRAIN SIZE TEST PERFORMED].
								STRATUM IIC - SAND (CLASS 3B) at ~13.5 ft / El. 11.3
10	15	S7	15 to 17	24/5	9-4-3-3	PID = 0.0ppm @S7		S7: NARROWLY GRADED SAND WITH GRAVEL (SP); ~75% fine to medium sand; ~20% subangular gravel up to 1.5"; ~5% nonplastic fines; brown; moist. Trace mica.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,770 **EASTING (ft):** 1,003,343
GROUND SURFACE EL. (ft): 24.8 **DATE START/END:** 3/9/2020 - 3/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B5(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/0	6-9-9-14	PID = 0.0ppm @S8		S8: No Recovery.
		S9	22 to 24	24/0	4-5-8-11			S9: No Recovery.
								STRATUM III - TILL (CLASS 3A) at ~24 ft / El. 0.8
						Rig chatter from 24 to 25 feet.		
0	25	S10	25 to 27	24/14	15-11-21-33	PID = 0.0ppm @S10		S10: NARROWLY GRADED SAND WITH GRAVEL (SP); ~85% fine to medium sand, ~10% subangular gravel up to 1.5", ~5% nonplastic fines; brown; wet.
						Rig chatter from 27 to 30 feet.		
	30	S11	30 to 32	24/18	93-27-48-88	PID = 0.0ppm @S11		S11: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~20% subangular gravel up to 1.5"; ~5% low plasticity fines; brown-black; wet. Some mica.
						Drive casing to 28 feet. Intermittent rig chatter from 30 to 35 feet.		
-10	35	S12	35 to 35.8	10/10	86-100/4"	PID = 0.0ppm @S12		S12: NARROWLY GRADED SAND WITH GRAVEL (SP); ~75% fine to medium sand, ~20% subangular gravel up to 1.5"; ~5% low plasticity fines; brown-black; wet. Some mica.
						Rig chatter from 36 to 37 feet and 38 to 40 feet.		
	40	S13	40 to 42	24/19	23-35-42-96	PID = 0.0ppm @S13		S13: WIDELY GRADED SAND WITH SILT (SW-SM); ~80% sand, ~10% nonplastic fines, ~10% fine subangular gravel up to 0.5"; brown; wet.
						Rig chatter from 40 to 41 feet and ~43 feet.		
-20	45	S14	45 to 47	24/20	31-50-52-63	PID = 0.0ppm @S14		S14 (0-3"): NARROWLY GRADED SAND WITH GRAVEL (SP); ~75% fine to medium sand, ~25% subangular gravel up to 1.5"; ~5% low plasticity fines; brown-black; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,770 **EASTING (ft):** 1,003,343
GROUND SURFACE EL. (ft): 24.8 **DATE START/END:** 3/9/2020 - 3/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B5(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								S14 (3"-20"): NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% sand, ~10% nonplastic fines, ~5% fine subangular gravel up to 1.0"; brown; wet.
	50	S15	50 to 51.8	21/17	29-36-65-100/3"	PID = 0.0ppm @S15		S15: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar S14 (3"-20").
						Rig chatter from 51 to 52 ft and 53 to 55 ft.		
-30	55	S16	55 to 55.1	1/0	100/1"	PID = 0.0ppm @S16		S16: No Recovery. Potential boulders and cobbles.
						Rig chatter from 55 to 57 ft. Faster advancement after 58 ft.		
	60	S17	60 to 60.1	1/0	100/6"	PID = 0.0ppm @S17		S17: No Recovery. Potential boulders and cobbles.
						Rig chatter from 60 to 61 ft.		
-40	65	S18	65 to 67	24/16	58-45-27-32	PID = 0.0ppm @S18		S18: NARROWLY GRADED SAND WITH SILT (SP-SM); ~70% fine to medium sand, ~20% gravel subangular gravel up to 1.5", ~10% nonplastic fines; brown; wet. Some mica.
						Rig chatter ~67 ft and from 69 to 70 ft.		
	70	S19	70 to 71.3	16/15	35-44-110/4"	PID = 0.0ppm @S19		S19: SILTY SAND (SM); ~55% fine to medium sand, ~40% nonplastic fines, ~5% fine subrounded gravel up to 0.5"; brown; wet.
						Rig chatter from 72 to 73 ft.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,770 **EASTING (ft):** 1,003,343
GROUND SURFACE EL. (ft): 24.8 **DATE START/END:** 3/9/2020 - 3/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B5(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
-50	75	S20	75 to 75.4	5	107/5"	PID = 0.0ppm @S20		S20: SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~20% nonplastic fines, ~20% subangular gravel up to 1.25"; brown; wet.
						Rig chatter from 77 to 80 ft.		
	80	S21	80 to 80.3	3/3	108/3"	PID = 0.0ppm @S21		S21: SILTY SAND WITH GRAVEL (SM); Similar to S20.
						Rig chatter from 83 to 84 feet.		
-60	85	S22	85 to 87	24/17	23-23-30-28	PID = 0.0ppm @S22		S22 (0-5"): SILTY SAND (SM); ~75% fine sand, ~20% nonplastic fines, ~5% fine subangular gravel up to 0.5"; orange-brown; wet. **STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~85.6 ft / El. -60.8** S22 (5"-17"): DECOMPOSED/WEATHERED BEDROCK.
	90	S23	90 to 92	24/24	7-15-19-30	PID = 0.0ppm @S23		S23: DECOMPOSED BEDROCK/WEATHERED BEDROCK.
-70	95	S24	95 to 97	24/24	9-15-19-21	PID = 0.0ppm @S24		S24: DECOMPOSED BEDROCK/WEATHERED BEDROCK.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,770 **EASTING (ft):** 1,003,343
GROUND SURFACE EL. (ft): 24.8 **DATE START/END:** 3/9/2020 - 3/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B5(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
	100	S25	100 to 102	24/24	10-12-18-28	PID = 0.0ppm @S25		S25: DECOMPOSED BEDROCK/WEATHERED BEDROCK.
								Backfilled with cuttings and hole plug. Bottom of boring at depth 102 ft.
-80	105							
	110							
-90	115							
	120							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,715 **EASTING (ft):** 1,003,183
GROUND SURFACE EL. (ft): 46.2 **DATE START/END:** 4/30/2020 - 4/30/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 100.4 **DRILLER NAME:** Keith Parent
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING

B6

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 46.2
		S1	0 to 2	24/9	19-11-7-10	PID = 1.3ppm @S1		S1: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% angular gravel up to 1"; dark brown; dry. Brick, asphalt, and concrete fragments. Slight petroleum-like odor.
		S2	2 to 4	24/9	5-6-3-1	PID = 0.9ppm @S2		S1: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% angular gravel up to 1"; dark brown; dry. Brick, asphalt, and concrete fragments. Slight petroleum-like odor. S2: SILTY SAND (SM); Similar to S1. No petroleum odor.
	5	S3	4 to 6	24/7	2-9-6-8	PID = 30.2ppm @S3		S3: SILTY SAND (SM); Similar to S1. No petroleum odor.
40		S4	6 to 8	24/7	3-3-4-3	PID = 1.3ppm @S4		S4: SILTY SAND (SM); Similar to S1. No petroleum odor.
		S5	8 to 10	24/10	5-4-1-4	PID = 0.8ppm @S5		S5: SILTY SAND (SM); Similar to S1. No petroleum odor.
								STRATUM IIA - LOOSE SAND (CLASS 6) at ~10 ft / El. 36.2
	10	S6	10 to 12	24/12	4-3-2-6	PID = 2.3ppm @S6		S6: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine to medium sand, ~10% nonplastic fines, ~5% subangular gravel up to 1"; dark brown; dry.
						Drive casing to 14 feet below grade. Rollerbit to 15 feet.		
	15	S7	15 to 17	24/0	6-8-6-7			S7: No Recovery. Attempted to sample with 3" spoon; no recovery.
30								**STRATUM IIC - SAND (CLASS 3B) at ~16 ft / El. 30.2**
						Roller bit to 20 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,715 **EASTING (ft):** 1,003,183
GROUND SURFACE EL. (ft): 46.2 **DATE START/END:** 4/30/2020 - 4/30/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B6

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/6	11-4-11-10	PID = 0.0ppm @S8		S8: SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~20% nonplastic fines, ~20% subangular gravel up to 1.5"; brown to orange-brown; dry.
						Roller bit to 25 feet.		
	25	S9	25 to 27	24/2	10-8-7-9	PID = 0.0ppm @S9		S9: WIDELY GRADED SAND WITH GRAVEL (SW); ~70% sand, ~30% subrounded gravel up to 1.5"; brown; dry.
20						Drive casing to 25 feet below grade. Roller bit to 30 feet.		**STRATUM III - TILL (CLASS 3A) at ~28.5 ft / El. 17.7**
	30	S10	30 to 32	24/13	10-11-12-14	PID = 0.0ppm @S10		S10: NARROWLY GRADED SAND (SP): ~95% fine to medium sand, ~5% nonplastic fines; tan; dry.
						Roller bit to 35 feet. Rig chatter from 32 to 35 feet.		
	35	S11	35 to 37	24/24	11-14-14-12	PID = 0.0ppm @S11		S11: NARROWLY GRADED SAND (SP); Similar to S10.
10						Roller bit to 40 feet. Rig chatter from 36 to 37 feet.		
	40	S12	40 to 42	24/15	9-12-15-17	PID = 0.0ppm @S12		S12: SILT WITH SAND (ML); 82.9% nonplastic fines, 17.1% sand; light brown; dry. [GRAIN SIZE TEST PERFORMED].
						Roller bit to 45 feet.		
	45	S13	45 to 47	24/18	15-19-32-40	PID = 0.0ppm @S13		S13: SILTY SAND (SM); ~60% sand, ~30% nonplastic fines, ~10% subrounded gravel up to 1"; brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,715 **EASTING (ft):** 1,003,183
GROUND SURFACE EL. (ft): 46.2 **DATE START/END:** 4/30/2020 - 4/30/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B6

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet.		
	50	S14	50 to 52	24/15	31-40-41-54	PID = 0.0ppm @S14		S14: SILTY SAND (SM); ~75% fine to medium sand, ~20% nonplastic fines, ~5% fine subrounded gravel up to 0.5"; brown; wet. Trace mica.
						Roller bit to 55 feet.		
	55	S15	55 to 55.3	4/4	100/4"	PID = 0.0ppm @S15		S15: SILTY SAND WITH GRAVEL (SM); 49% sand, 35.9% gravel, 15.1% nonplastic fines; wet. Trace mica. [GRAIN SIZE TEST PERFORMED].
-10						Roller bit to 60 feet. Rig chatter from 55 to 57 feet and 59 to 60 feet.		
	60	S16	60 to 60.8	10/10	49-101/4"	PID = 0.0ppm @S16		S16: WIDELY GRADED SAND (SW); ~90% sand, ~5% nonplastic fines, ~5% fine subangular gravel up to 0.5"; brown; wet.
						Roller bit to 65 feet.		
	65	S17	65 to 65.9	11/11	83-102/5"	PID = 0.0ppm @S17		S17: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~20% subrounded gravel up to 1.5", ~5% nonplastic fines; brown; wet. Trace mica.
-20						Roller bit to 70 feet. Rig chatter ~67 feet.		
	70	S18	70 to 70.8	9/9	88-100/3"	PID = 0.0ppm @S18		S18: SILTY SAND (SM); ~60% sand, ~20% subrounded gravel up to 1.5", ~20% nonplastic fines; brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,715 **EASTING (ft):** 1,003,183
GROUND SURFACE EL. (ft): 46.2 **DATE START/END:** 4/30/2020 - 4/30/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B6

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet. Rig chatter from 72 to 73 feet.		
	75	S19	75 to 75.3	4/4	107/4"	PID = 0.0ppm @S19		S19: SILTY SAND (SM); Similar to S18.
-30								
						Roller bit to 80 feet. Intermittent rig chatter from 75 to 80 feet.		
	80	S20	80 to 80.3	4/4	108/4"	PID = 0.0ppm @S20		S20: SILTY SAND (SM); Similar to S18.
						Roller bit to 85 feet.		
	85	S21	85 to 85.2	2/1	100/2"	PID = 0.0ppm @S21		S21: SILTY SAND (SM); Similar to S18.
-40								
						Roller bit to 90 feet. Intermittent rig chatter from 85 to 90 feet.		
	90	S22	90 to 90.8	9/9	98-100/3"	PID = 0.0ppm @S22		S22: WIDELY GRADED SAND (SW); ~90% sand, ~5% nonplastic fines, ~5% fine subrounded gravel up to 0.5"; tan-brown; wet.
						Roller bit to 95 feet.		
	95	S23	95 to 95.3	4/4	100/4"	PID = 0.0ppm @S23		S23: WIDELY GRADED SAND (SW); Similar to S22.
-50								
						Roller bit to 100 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,715 **EASTING (ft):** 1,003,183
GROUND SURFACE EL. (ft): 46.2 **DATE START/END:** 4/30/2020 - 4/30/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B6

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Intermittent chatter from 95 to 100 feet.		
	100	S24	100 to 100.4	5/5	103/5"	PID = 0.0ppm @S24		S24: WIDELY GRADED SAND (SW); Similar to S22. Backfilled with cuttings and hole plug. Bottom of boring at depth 100.4 ft.
	105							
-60								
	110							
	115							
-70								
	120							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,766 **EASTING (ft):** 1,003,203
GROUND SURFACE EL. (ft): 40.1 **DATE START/END:** 4/29/2020 - 4/29/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 102.0 **DRILLER NAME:** Keith Parent
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING

B7

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 40.1
		S1	0 to 2	24/13	38-25-20-12	PID = 0.0ppm @S1		S1: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% angular gravel up to 1.25"; gray to black; dry. Brick, asphalt, wood, and concrete fragments. Slight petroleum-like odor.
		S2	2 to 4	24/6	10-7-8-10	PID = 0.0ppm @S2		S2: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine to medium sand, ~40% subangular gravel up to 1.5", ~10% nonplastic fines; dark brown; dry. Concrete fragments.
	5	S3	4 to 6	24/10	10-10-17-12	PID = 0.0ppm @S3		S3: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S2.
		S4	6 to 8	24/8	16-12-6-8	PID = 0.0ppm @S4		S4: SILTY GRAVEL WITH SAND (GM); 47.7% subangular gravel up to 1.5", 34.7% sand, 17.6% nonplastic fines; dark brown; dry. Brick, asphalt, wood, glass, and concrete fragments. [GRAIN SIZE TEST PERFORMED].
		S5	8 to 10	24/9	22-13-9-8	PID = 0.0ppm @S5		S5: NARROWLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); ~70% fine to medium sand, ~20% subangular gravel up to 1.5", ~10% nonplastic fines; dark brown; dry. Concrete fragments.
30	10	S6	10 to 12	24/13	16-10-8-29	PID = 0.0ppm @S6		S6: WIDELY GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~60% sand, ~30% subangular gravel up to 1.5", ~10% nonplastic fines; dark brown; dry. Wood fragments and black staining on bottom 6" of sample.
						Drive casing to 14 feet below grade. Rollerbit to 15 feet.		
	15	S7	15 to 17	24/13	8-7-70-17			S7: CLAYEY SAND (SC); ~70% fine to medium sand, ~20% low plasticity fines, ~10% gravel; subangular up to 1"; dark brown; dry. Some organics in top 6".
						Roller bit to 20 feet.		**STRATUM IIC - SAND (CLASS 3B) at ~18.5 ft / El. 21.6**

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,766 **EASTING (ft):** 1,003,203
GROUND SURFACE EL. (ft): 40.1 **DATE START/END:** 4/29/2020 - 4/29/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B7

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/10	8-6-5-6	PID = 0.0ppm @S8		S8: WIDELY GRADED SAND (SW); ~90% sand, ~5% nonplastic fines, ~5% subangular gravel up to 1.5"; brown; dry.
						Roller bit to 25 feet.		
	25	S9	25 to 27	24/10	6-6-9-16	PID = 0.0ppm @S9		S9: SILTY SAND (SM); ~60% fine sand, ~40% nonplastic fines; brown; dry.
						Roller bit to 30 feet.		
10	30	S10	30 to 32	24/11	6-6-6-6	PID = 0.0ppm @S10		S10: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% nonplastic fines; tan; dry.
						Roller bit to 35 feet.		**STRATUM III - TILL (CLASS 3A) at ~33.5 ft / El. 6.6**
	35	S11	35 to 37	24/12	13-17-15-17	PID = 0.0ppm @S11		S11: SILTY SAND (SM); ~75% fine to medium sand, ~25% nonplastic fines; tan; dry.
						Roller bit to 40 feet.		
0	40	S12	40 to 42	24/16	17-20-18-19	PID = 0.0ppm @S12		S12: SILTY SAND WITH GRAVEL (SM); 56.7% sand, 23.2% nonplastic fines, 20.1% subangular gravel; brown; dry. [GRAIN SIZE TEST PERFORMED].
						Roller bit to 45 feet. Rig chatter from 44 to 45 feet.		
	45	S13	45 to 45.9	11/5	40-101/5"	PID = 0.0ppm @S13		S13: SILTY SAND WITH GRAVEL (SM); Similar to S12.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,766 **EASTING (ft):** 1,003,203
GROUND SURFACE EL. (ft): 40.1 **DATE START/END:** 4/29/2020 - 4/29/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B7

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Rig chatter from 46 to 48 feet.		
-10	50	S14	50 to 52	24/9	14-11-19-13	PID = 0.0ppm @S14		S14: WIDELY GRADED SAND WITH GRAVEL (SW); ~70% sand, ~25% subrounded gravel up to 1.5", ~5% nonplastic fines; brown to reddish-brown; wet.
						Roller bit to 55 feet. Rig chatter from 51 to 52 feet and 53 to 55 feet.		
	55	S15	55 to 55.3	3/3	100/3"	PID = 0.0ppm @S15		S15: SILTY SAND WITH GRAVEL (SM); 51.8% sand, 28.9% subangular gravel up to 1", 19.3% nonplastic fines; brown; wet. [GRAIN SIZE TEST PERFORMED].
						Roller bit to 60 feet. Rig chatter from 58 to 60 feet.		
-20	60	S16	60 to 60	0/0	57/0"	PID = 0.0ppm @S16		S16: NO RECOVERY. No spoon penetration.
						Roller bit to 65 feet. Rig chatter from 60 to 62 feet.		
	65	S17	65 to 66.3	16/13	71-93-100/4"	PID = 0.0ppm @S17		S17: WIDELY GRADED SAND WITH SILT (SW-SM); ~85% sand, ~10% nonplastic fines, ~5% fine subrounded gravel up to 0.5"; brown; wet.
						Roller bit to 70 feet. Intermittent rig chatter from 65 to 70 feet.		
-30	70	S18	70 to 72	24/19	46-44-94-106	PID = 0.0ppm @S18		S18: WIDELY GRADED SAND WITH SILT (SW-SM); Similar to S17.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,766 **EASTING (ft):** 1,003,203
GROUND SURFACE EL. (ft): 40.1 **DATE START/END:** 4/29/2020 - 4/29/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B7

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet.		
	75	S19	75 to 75.1	1/1	102/1"	PID = 0.0ppm @S19		S19: NO RECOVERY. Cobble stuck in tip.
						Roller bit to 80 feet. Intermittent rig chatter from 75 to 80 feet.		
-40	80	S20	80 to 80.4	5/5	100/5"	PID = 0.0ppm @S20		S20: WIDELY GRADED SAND (SW); ~85% sand, ~10% subangular gravel up to 1", ~5% nonplastic fines; brown; wet.
						Roller bit to 85 feet. Rig chatter from 80 to 85 feet.		
	85	S21	85 to 85.3	4/4	101/4"	PID = 0.0ppm @S21		S21: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% subangular gravel up to 1.25"; brown; wet. Trace mica.
						Roller bit to 90 feet. Rig chatter from 85 to 90 feet.		
-50	90	S22	90 to 90	0/0	57/0"	PID = 0.0ppm @S22		S22: NO RECOVERY. Cobble stuck in tip.
						Roller bit to 95 feet. Intermittent rig chatter between 90 to 95 feet.		
	95	S23	95 to 95.4	5/5	100/5"	PID = 0.0ppm @S23		S23: SILTY SAND (SM); ~75% fine to medium sand, ~20% nonplastic fines, ~5% subangular gravel up to 0.75"; brown; wet.
						Roller bit to 100 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,766 **EASTING (ft):** 1,003,203
GROUND SURFACE EL. (ft): 40.1 **DATE START/END:** 4/29/2020 - 4/29/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B7

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Intermittent rig chatter between 95 to 100 feet.		
-60	100	S24	100 to 100.3	3/3	100/3"	PID = 0.0ppm @S24		S24: SILTY SAND (SM); Similar to S23.
								Backfilled with cuttings and hole plug. Bottom of boring at depth 102 ft.
	105							
-70	110							
	115							
-80	120							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,825 **EASTING (ft):** 1,003,207
GROUND SURFACE EL. (ft): 23.6 **DATE START/END:** 3/3/2020 - 3/5/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 85.0 **DRILLER NAME:** Joe Schuster
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING

B8(OW)

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NX Wireline
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** 2.125 inch / 3 inch
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft): ▼ 18.1 3/9/2020 6:40 am in observation well

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 23.6
		S1	0 to 2	24/10	4-8-16-77	PID = 0.0ppm @S1		S1: SILTY SAND WITH GRAVEL (SM); ~50% fine sand, ~30% nonplastic fines, ~20% angular gravel up to 1.5"; dark brown; dry. Brick fragments.
		S2	2 to 4	24/4	6-9-46-16	PID = 0.0ppm @S2		S2: SILTY SAND WITH GRAVEL (SM); Similar to S1; with metal fragments.
20		S3	4 to 6	24/11	8-12-12-9	PID = 0.0ppm @S3		S3: SILTY SAND (SM); ~80% fine sand; ~20% nonplastic fines; asphalt fragments.
	5	S4	6 to 8	24/9	6-12-12-10	PID = 0.0ppm @S4		S4: SILTY SAND (SM); similar to S3.
								STRATUM IIC - SAND (CLASS 3B) at ~8 ft / El. 15.6
		S5	8 to 10	24/10	3-3-5-5	PID = 0.0ppm @S5		S5: NARROWLY GRADED SAND (SP); ~100% fine to medium sand; light brown and tan; dry.
	10	S6	10 to 12	24/9	4-4-5-5	PID = 0.0ppm @S6		S6: NARROWLY GRADED SAND (SP); similar to S5.
						Drive casing 12 feet below grade.		
10								
	15	S7	15 to 17	24/14	2-3-8-29	PID = 0.0ppm @S7		S7: SILTY SAND (SM); ~60% fine to medium sand, ~30% nonplastic fines, ~10% subangular gravel up to 0.75"; light brown; moist.
								STRATUM III - TILL (CLASS 3A) at ~17 ft / El. 6.6
						Rig chatter from 17 to 20 ft.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,825 **EASTING (ft):** 1,003,207
GROUND SURFACE EL. (ft): 23.6 **DATE START/END:** 3/3/2020 - 3/5/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B8(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/9	14-27-34-50	PID = 0.0ppm @S8		S8: WIDELY SAND WITH SILT AND GRAVEL (SW-SM); ~70% sand, ~20% gravel subangular up to 1.25", ~10% nonplastic fines; brown and black; wet.
						Drive casing to 18 feet below grade. Rig chatter ~24 feet.		
0								
	25	S9	25 to 26.8	21/11	30-17-52-10/3"	PID = 0.0ppm @S9		S9: NARROWLY GRADED SAND WITH SILT (SP-SM); ~80% fine to medium sand, ~10% nonplastic fines, ~10% subangular gravel up to 1.25"; brown; wet. Some mica.
						Drive casing to 23 feet. Rig chatter from 27 to 30 feet.		
	30	S10	30 to 32	24/16	25-27-37-38	PID = 0.0ppm @S10		S10: WIDELY GRADED SAND (SW); ~95% sand, ~5% subangular gravel up to 0.75"; brown, wet.
						Rig chatter from 33 to 35 feet.		
-10								
	35	S11	35 to 35.4	5/4	105/5"	PID = 0.0ppm @S11		S11: SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~20% nonplastic fines, ~20% subangular gravel up to 1.25"; brown; wet.
						Rig chatter from 36 to 37 feet and 39 to 40 feet.		
	40	S12	40 to 41.8	21/18	65-63-80-102/3"	PID = 0.0ppm @S12		S12: WIDELY GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~70% sand, ~20% subangular gravel, ~10% nonplastic fines; brown; wet.
						Rig chatter from 41 to 45 feet.		
-20								
	45	S13	45 to 45.3	3/2	102/3"	PID = 0.0ppm @S13		S13: SILTY SAND (SM); ~70% fine sand, ~25% nonplastic fines, ~5% fine subangular gravel up to 0.5"; brown; wet. Boulder/cobble fragment in tip of shoe.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,825 **EASTING (ft):** 1,003,207
GROUND SURFACE EL. (ft): 23.6 **DATE START/END:** 3/3/2020 - 3/5/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B8(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Rig chatter from 48 to 50 feet.		
	50	S14	50 to 50.8	10/8	90-100/4"	PID = 0.0ppm @S14		S14: SILTY SAND (SM); Similar to S13.
						Rig chatter from 52 to 55 feet.		
-30								
	55	S15	55 to 55.3	3/3	101/3"	PID = 0.0ppm @S15		S15: SILTY SAND (SM); ~60% fine sand, ~30% nonplastic fines, ~10% subangular gravel up to 1"; brown; wet.
						Rig chatter from 55 to 58 feet.		
	60	S16	60 to 60.2	2/2	100/2"	PID = 0.0ppm @S16		S16: SILTY SAND (SM); Similar to S15.
						Rig chatter from 63 to 65 feet.		
-40								
	65	S17	65 to 65.3	3/3	111/3"	PID = 0.0ppm @S17		S17: SILTY SAND WITH GRAVEL (SM); ~50% fine to medium sand, ~30% subangular gravel up to 1.25", ~20% nonplastic fines; brown; wet.
						Rig chatter from 69 to 70 feet.		
	70	S18	70 to 71.4	17/11	43-55-101/3"	PID = 0.0ppm @S18		S18: SILTY SAND WITH GRAVEL (SM); ~60% fine sand, ~20% nonplastic fines, ~20% subangular gravel up to 1.5"; brown; wet.
						Rig chatter from 72 to 73		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,825 **EASTING (ft):** 1,003,207
GROUND SURFACE EL. (ft): 23.6 **DATE START/END:** 3/3/2020 - 3/5/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B8(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						feet.		
-50								
	75	S19	75 to 76.2	14/14	58-67-100/2"	PID = 0.0ppm @S19		S19 (0-13"): SILTY SAND (SM); ~60% fine sand, ~30% nonplastic fines, ~10% subangular gravel up to 1.5"; orange-brown; wet.
								STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~76.1 ft / El. -52.5
						Rig chatter from 77 to 80 feet.		S19 (13"-14"): DECOMPOSED BEDROCK.
	80							**STRATUM V - BEDROCK (CLASS 1C) at ~80 ft / El. -56.4**
		S20 C1	80 to 80 80 to 85	0/0 60/38	65/0" 38%			S20: No Recovery. Spoon did not advanced. on top of bedrock. C1: No Recovery. Lost core. 2nd Attempt to grab core revealed GNEISS; hard slight weathering.
-60								
	85							Backfilled with cuttings and hole plug. Bottom of boring at depth 85 ft.
	90							
-70								
	95							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,855 **EASTING (ft):** 1,003,277
GROUND SURFACE EL. (ft): 22.3 **DATE START/END:** 4/20/2020 - 4/22/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 102.0 **DRILLER NAME:** Keith Parent
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING

B9

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 22.3
		S1	0 to 2	24/23	9-7-6-7	PID = 0.0ppm @S1		(0-8"): Asphalt. **STRATUM IIA - LOOSE SAND (CLASS 6) at ~0.7 ft / El. 21.6** S1: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine to medium sand, ~10% nonplastic fines, ~5% subangular gravel up to 1.5"; tan-brown; dry.
20		S2	2 to 4	24/8	2-3-3-4	PID = 0.0ppm @S2		S2: NARROWLY GRADED SAND (SP); ~95% fine sand, ~5% nonplastic fines; tan; dry.
	5	S3	4 to 6	24/12	2-5-3-4	PID = 0.0ppm @S3		S3: NARROWLY GRADED SAND (SP); Similar to S2. **STRATUM IIB - SILT/CLAY (CLASS 4B/5B) at ~6 ft / El. 16.3**
		S4	6 to 8	24/17	5-4-3-5	PID = 0.0ppm @S4		S4: LEAN CLAY (CL); ~89.9% low plasticity fines, 10.1% fine to medium sand; tan-brown; dry. [GRAIN SIZE TEST PERFORMED]. **STRATUM IIC - SAND (CLASS 3B) at ~8 ft / El. 14.3**
		S5	8 to 10	24/14	4-4-5-18	PID = 0.0ppm @S5		S5: SILTY SAND (SM); ~80% fine sand, ~20% nonplastic fines; light brown; dry.
	10	S6	10 to 12	24/13	20-26-30-86	PID = 0.0ppm @S6		S6 (0-3"): SILTY SAND (SM); Similar S5. **STRATUM III - TILL (CLASS 3A) at ~10.5 ft / El. 11.8** S6 (3"-13"): SILTY SAND (SM): ~70% fine to medium sand, ~20% nonplastic fines, ~10% subangular gravel up to 1.25"; brown; dry.
10						Drive casing to 14 feet below grade. Rollerbit to 15 feet.		
	15	S7	15 to 17	24/13	22-19-19-23			S7: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~10% subangular gravel up to 1", ~5% nonplastic fines; brown; moist. Trace mica.
						Roller bit to 20 feet. Intermittent rig chatter from 15 to 18 feet. Rig chatter / slow advancement from 18 to 20 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,855 **EASTING (ft):** 1,003,277
GROUND SURFACE EL. (ft): 22.3 **DATE START/END:** 4/20/2020 - 4/22/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B9

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 20.8	10/3	29-114/4"	PID = 0.0ppm @S8		S8: WIDELY GRADED GRAVEL WITH SAND (GW); ~80% subangular gravel up to 1.5", ~20% sand; brown to black; wet.
0						Roller bit to 25 feet.		
	25	S9	25 to 27	24/19	36-64-80-91	PID = 0.0ppm @S9		S9: WIDELY GRADED SAND WITH GRAVEL (SW); ~80% sand, ~20% subangular gravel up to 1.5"; light brown; wet.
						Roller bit to 30 feet. Slow advancement from 27 to 29 feet.		
	30	S10	30 to 32	24/16	36-58-69-62	PID = 0.0ppm @S10		S10: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~10% subangular gravel up to 1", ~5% nonplastic fines; light brown; wet.
-10						Roller bit to 35 feet. Rig chatter ~33 and ~34 feet.		
	35	S11	35 to 36.3	15/9	78-63-102/3"	PID = 0.0ppm @S11		S11: NARROWLY GRADED SAND (SP); Similar to S10.
						Roller bit to 40 feet.		
	40	S12	40 to 42	24/21	58-69-70-79	PID = 0.0ppm @S12		S12: NARROWLY GRADED SAND WITH GRAVEL (SP); ~75% fine sand, ~25% subangular gravel up to 1.25"; light brown; wet. Trace mica.
-20						Roller bit to 45 feet. Rig chatter from 42 to 44 feet.		
	45	S13	45 to 46.3	15/12	71-114-102/3"	PID = 0.0ppm @S13		S13: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~25% fie to coarse angular gravel up to 1.5"; brown; wet. Trace mica.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,855 **EASTING (ft):** 1,003,277
GROUND SURFACE EL. (ft): 22.3 **DATE START/END:** 4/20/2020 - 4/22/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B9

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Rig chatter from 46 to 48 feet.		
	50	S14	50 to 50.8	9/9	66-103/3"	PID = 0.0ppm @S14		S14: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, ~5% subangular gravel up to 0.75", ~5% nonplastic fines; grayish brown; wet.
-30						Roller bit to 55 feet. Rig chatter from 51 to 52 feet.		
	55	S15	55 to 55.8	9/9	83-115/3"	PID = 0.0ppm @S15		S15: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, ~5% subangular gravel up to 1.5", ~5% nonplastic fines; brown; wet.
						Roller bit to 60 feet. Intermittent rig chatter from 55 to 60 feet.		
	60	S16	60 to 60.8	10/10	52-111/4"	PID = 0.0ppm @S16		S16: WIDELY GRADED SAND (SW); ~95% sand, ~5% subangular gravel up to 0.75"; tan-brown; wet.
-40						Roller bit to 65 feet. Rig chatter from 62 to 65 feet.		
	65	S17	65 to 65.3	4/4	121/4"	PID = 0.0ppm @S17		S17: NARROWLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); ~55% fine to medium sand, ~35% subangular gravel up to 1.5", ~10% nonplastic fines; brown; wet.
						Roller bit to 70 feet. Intermittent rig chatter from 65 to 70 feet.		
	70	S18	70 to 70.4	5/5	120/5"	PID = 0.0ppm @S18		S18: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, ~5% nonplastic fines, ~5% fine subangular gravel up 0.5"; brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,855 **EASTING (ft):** 1,003,277
GROUND SURFACE EL. (ft): 22.3 **DATE START/END:** 4/20/2020 - 4/22/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B9

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet. Rig chatter from 72 to 75 feet.		
	75	S19	75 to 75.4	5/5	100/5"	PID = 0.0ppm @S19		S19: SILTY SAND WITH GRAVEL (SM); ~50% fine sand, ~30% nonplastic to low plasticity fines, ~20% fine subrounded gravel up to 1.5"; grayish brown; wet. Trace mica.
						Roller bit to 80 feet. Intermittent rig chatter from 75 to 80 feet.		
	80	S20	80 to 81.4	17/17	32-89-102/5"	PID = 0.0ppm @S20		S20: SILTY SAND WITH GRAVEL (SM); Similar to S19.
-60						Roller bit to 85 feet. Intermittent rig chatter from 80 to 85 feet.		
	85	S21	85 to 87	24/19	42-41-41-27	PID = 0.0ppm @S21		S21: SILTY SAND WITH GRAVEL (SM); Similar to S19. Orange-reddish brown.
						Roller bit to 90 feet.		**STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~88.5 ft / El. -66.2**
	90	S22	90 to 92	24/22	6-9-12-14	PID = 0.0ppm @S22		S22: SILT (ML); ~90% nonplastic to low plasticity fines, ~5% sand, ~5% gravel up to 1"; blue to blue-green; wet. Trace mica. Decomposed Rock.
-70						Roller bit to 95 feet.		
	95	S23	95 to 97	24/17	5-10-10-9	PID = 0.0ppm @S23		S23: SILT (ML); Similar to S21; except white. Decomposed Rock.
						Roller bit to 100 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,855 **EASTING (ft):** 1,003,277
GROUND SURFACE EL. (ft): 22.3 **DATE START/END:** 4/20/2020 - 4/22/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B9

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
	100	S24	100 to 102	24/24	15-21-19-35	PID = 0.0ppm @S24		S24: SILT (ML); Similar to S21. Decomposed Rock.
-80								Backfilled with cuttings and hole plug. Bottom of boring at depth 102 ft.
	105							
	110							
-90								
	115							
	120							
-100								

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,877 **EASTING (ft):** 1,003,222
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 4/16/2020 - 4/20/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 85.0 **DRILLER NAME:** Keith Parent
LOGGED BY: A. Erb / G. Holmes **RIG TYPE:** CME 75

BORING B10

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 21.9
		S1	0 to 2	24/13	11-16-10-9			S1 (0-6"): Asphalt. S1 (6"-13"):SILTY SAND (SM); ~85% fine to medium sand, ~15% nonplastic fines; light brown; dry.
20								**STRATUM IIA - LOOSE SAND (CLASS 6) at ~2 ft / El. 19.9**
		S2	2 to 4	24/15	9-6-7-7			S2: NARROWLY GRADED SAND WITH SILT (SP-SM); ~90% fine to medium sand, ~10% nonplastic fines; tannish brown; dry. Trace mica.
	5	S3	4 to 6	24/17	4-4-4-2			S3: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S2.
		S4	6 to 8	24/15	4-2-3-4			S4: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S2.
		S5	8 to 10	24/11	4-4-3-3	Drive casing to 9 feet below grade. Rollerbit to 10 feet.		S5: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S2.
	10	S6	10 to 12	24/8	3-4-4-6			S6: NARROWLY GRADED SAND (SM); ~95% fine to medium sand, ~5% nonplastic fines; brown; dry.
10						Roller bit to 15 feet.		**STRATUM III - TILL (CLASS 3A) at ~13.5 ft / El. 8.4**
	15	S7	15 to 17	24/11	10-26-18-38			S7: SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~25% subangular gravel up to 0.75", ~15% nonplastic fines; dark gray; moist.
						Roller bit to 20 feet. Rig chatter ~16 feet and from 18.5 to 20 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,877 **EASTING (ft):** 1,003,222
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 4/16/2020 - 4/20/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B10

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 20	0/0	50/0"			S8: No Recovery. Cobble in tip.
0						Roller bit to 25 feet. Expected cobble from 20 to 22 feet.		
	25	S9	25 to 27	24/14	34-34-33-72			S9: WIDELY GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~70% sand, ~20% subrounded gravel up to 1.0", ~10% nonplastic fines; brown; wet.
						Roller bit to 30 feet. Rig chatter from 29 to 30 feet.		
	30	S10	30 to 32	24/18	53-70-58-56			S10: NARROWLY GRADED SAND WITH SILT AND GRAVEL (SP): ~55% fine to medium sand, ~35% subrounded gravel up to 1.5", ~10% nonplastic fines; brown; wet.
-10						Roller bit to 35 feet. Rig chatter from 33 to 34 feet.		
	35	S11	35 to 35.3	3/0	100/3"			S11: No Recovery. Cobble stuck in tip.
						Roller bit to 40 feet. Rig chatter from 35 to 40 feet.		
	40	S12	40 to 40.9	11/11	78-110/5"			S12: SILTY SAND WITH GRAVEL (SM); ~50% fine to medium sand, ~35% subangular gravel up to 1.0", ~15% nonplastic fines; brown and gray; wet. Trace mica.
-20						Roller bit to 45 feet. Intermittent rig chatter to 50 feet.		
	45	S13	45 to 45.3	3/3	100/3"			S13: SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~25% fine subangular gravel, ~15% low plasticity fines; brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,877 **EASTING (ft):** 1,003,222
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 4/16/2020 - 4/20/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B10

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Rig chatter from 46 to 49 feet.		
	50	S14	50 to 50.3	4/2	100/4"			S14: SILTY SAND WITH GRAVEL (SM); Similar to S13.
-30						Roller bit to 55 feet. Rig chatter from 51 to 55 feet.		
	55	S15	55 to 55.3	3/3	110/3"			S15: SILTY SAND WITH GRAVEL (SM); Similar to S13.
						Roller bit to 60 feet. Intermittent rig chatter from 55 to 60 feet.		
	60	S16	60 to 60.3	4/4	125/4"			S16: SILTY SAND WITH GRAVEL (SM); Similar to S13.
-40								**STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~62.7 ft / El. -40.8**
						Roller bit to 65 feet. Rig chatter from 60 to 65 feet.		
	65	S17	65 to 65.3	3/2	111/3"			S17: WEATHERED BEDROCK: Soft gneiss rock pieces; wet.
						Roller bit to 70 feet. Rig chatter from 65 to 66 feet and 67 to 70 feet.		
	70	S18	70 to 70.1	1/0	102/1"			S18: No Recovery.
-50								

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,877 **EASTING (ft):** 1,003,222
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 4/16/2020 - 4/20/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B10

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet. Rig chatter from 70 to 75 feet.		
	75							**STRATUM V - BEDROCK (CLASS 1B) at ~75 ft / El. -53.1**
		C1	75 to 80	60/55	68%			C1: HARTLAND FORMATION; Gneiss; hard; fine grained; banded; slight to moderate weathering at fractures; grayish black and white. Horizontal fractures at 5", 10", 17", 22.5", 30", 36", and 41". Core run times per foot (minutes:seconds): 4:57, 5:53, 5:46, 2:30, and 3:07.
	80	C2	80 to 85	60/58	92%			C2: HARTLAND FORMATION; Gneiss; hard; fine to medium grained; banded; slight weathering at fractures; grayish black to white. Horizontal fractures at 7", 13.5", 18.5", 23.5", 28", 34", 46" and 55". Core run times per foot (minutes:seconds): 1:59, 3:34, 3:45, 11:51, and 7:07.
-60								
	85							Backfilled with cuttings and hole plug. Bottom of boring at depth 85 ft.
	90							
-70								
	95							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,898 **EASTING (ft):** 1,003,171
GROUND SURFACE EL. (ft): 21.7 **DATE START/END:** 5/7/2020 - 5/7/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 90.0 **DRILLER NAME:** Keith Parent
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING B11

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 21.7
		S1	0 to 2	24/6	41-12-2-5	PID = 0.0ppm @S1		(0-4"): Asphalt. S1:SILTY SAND (SM): ~70% fine to medium sand, ~20% nonplastic fines, ~10% fine to medium angular gravel up to 1"; dark brown; dry. Asphalt / concrete fragments.
20		S2	2 to 4	24/17	3-54-18-5	PID = 0.0ppm @S2		S2: WIDELY GRADED SAND WITH SILT (SW-SM); ~80% sand, ~10% nonplastic fines, ~10% subangular gravel up to 1" tannish brown; dry. Concrete fragments in bottom 7" of spoon. Fill.
								STRATUM IIA - LOOSE SAND (CLASS 6) at ~4 ft / El. 17.7
		S3	4 to 6	24/11	3-4-4-3	PID = 0.0ppm @S3		S3: WIDELY GRADED SAND (SW); ~100% sand; tan-brown; dry.
	5	S4	6 to 8	24/5	2-2-3-3	PID = 0.0ppm @S4		S4: WIDELY GRADED SAND (SW); ~90% sand, ~5% nonplastic fines, ~5% subangular up to 1"; brown; dry. Some mica.
		S5	8 to 10	24/3	2-3-3-7	PID = 0.0ppm @S5		S5: WIDELY GRADED SAND (SW); Similar to S4.
								STRATUM IIC - SAND (CLASS 3B) at ~10 ft / El. 11.7
	10	S6	10 to 12	24/11	9-6-6-5	PID = 0.0ppm @S6		S6: WIDELY GRADED SAND WITH GRAVEL (SW); ~70% sand, ~30% subangular gravel up to 1.5"; brown; dry. Trace mica.
10						Drive casing to 9 feet below grade. Roller bit to 15 feet. Rig chatter from 12 to 14 feet.		
								STRATUM III - TILL (CLASS 3A) at ~13.5 ft / El. 8.2
	15	S7	15 to 17	24/3	16-21-16-20	PID = 0.0ppm @S7		S7: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~20% subangular gravel up to 1.25", ~5% nonplastic fines; tan-brown; dry. Trace mica.
						Roller bit to 20 feet. Rig chatter from 16 to 20 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,898 **EASTING (ft):** 1,003,171
GROUND SURFACE EL. (ft): 21.7 **DATE START/END:** 5/7/2020 - 5/7/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B11

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/10	13-22-20-14			S8: WIDELY GRADED SAND WITH GRAVEL (SW); Similar to S8.
0						Roller bit to 25 feet. Intermittent rig chatter from 20 to 25 feet.		
	25	S9	25 to 27	24/11	25-38-23-36			S9: NARROWLY GRADED SAND WITH SILT (SP-SM); ~80% fine to medium sand, ~10% nonplastic fines, ~10% subangular gravel up to 1.5"; brown; wet. Trace mica.
						Roller bit to 30 feet. Rig chattert from 26 to 28 feet.		
	30	S10	30 to 30.8	9/9	81-100/3"			S10: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S9.
-10						Roller bit to 35 feet.		
	35	S11	35 to 35.4	5/5	102/5"			S11: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S9.
						Roller bit to 40 feet. Rig chatter from 39 to 40 feet.		
	40	S12	40 to 40.4	5/5	107/5"			S12: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% subangular gravel up to 1.0"; gray-brown; wet.
-20						Roller bit to 45 feet. Intermittent rig chatter from 40 to 45 feet.		
	45	S13	45 to 45.3	4/4	102/4"			S13: SILTY SAND (SM); Similar to S12.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,898 **EASTING (ft):** 1,003,171
GROUND SURFACE EL. (ft): 21.7 **DATE START/END:** 5/7/2020 - 5/7/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B11

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Rig chatter / slow advancement from 45 to 50 feet.		
	50	S14	50 to 51.3	16/13	42-43-102/4"			S14: WIDELY GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~70% sand, ~20% subangular gravel up to 1.5", 10% nonplastic fines; brown; wet. Trace mica.
-30						Roller bit to 55 feet. Rig chatter from 51 to 52 feet and 53 to 55 feet.		
	55	S15	55 to 55	0/0	62/0"			S15: No Recovery; Spoon refusal.
						Roller bit to 60 feet. Intermittent rig chatter from 55 to 60 feet.		
	60	S16	60 to 60.4	5/5	100/5"			S16: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% subangular gravel up to 0.75"; light brown; wet.
-40						Roller bit to 65 feet. Rig chatter from 63 to 65 feet.		
	65	S17	65 to 65.3	3/3	100/3"			S17: SILTY SAND (SM); Similar to S16.
						Roller bit to 70 feet. Rig chatter from 65 to 66 feet and 67 to 70 feet.		
	70	S18	70 to 71.7	20/17	34-58-64-100/2"			S18: SILTY SAND (SM); ~50% fine sand, ~45% nonplastic to low plasticity fines, ~5% fine subangular gravel up to 0.75"; black to tan; wet.
-50								**STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~71.5 ft / El. -49.8**

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,898 **EASTING (ft):** 1,003,171
GROUND SURFACE EL. (ft): 21.7 **DATE START/END:** 5/7/2020 - 5/7/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B11

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet.		
	75	S19	75 to 75.1	1/0	100/1"			S19: No Recovery.
						Roller bit to 80 feet. Rig chatter / slow advancement from 75 to 80 feet.		
	80							**STRATUM V - BEDROCK (CLASS 1B) at ~80 ft / El. -58.3**
		C1	80 to 85	60/55	75%			C1: HARTLAND FORMATION; Gneiss; hard; fine to medium grained; banded; slight weathering at fractures; black and white. Horizontal fractures at 3", 6", 10", 14", 15", 19", 23.5" 27.5" 32.5", 38", 43.5", 48", and 52". Core run times per foot (minutes:seconds): 3:51, 2:32, 2:55, 2:22 and 2:54.
-60								
	85	C2	85 to 90	60/56	83%			C2: HARTLAND FORMATION; Gneiss; hard; fine to medium grained; banded; slight weathering at fractures; grayish black to white. Horizontal fractures at 3.5", 10", 14", 20", 24.5" 30", 35", 39", 44" and 49". Core run times per foot (minutes:seconds): 6:12, 3:11, 3:22, 3:47 and 5:36.
	90							Backfilled with cuttings and hole plug. Bottom of boring at depth 90 ft.
-70								
	95							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 222,043 **EASTING (ft):** 1,003,593
GROUND SURFACE EL. (ft): 14.8 **DATE START/END:** 5/27/2020 - 5/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 77.0 **DRILLER NAME:** Ed Flanagan
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING
B12

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 14.8
		S1	0 to 2	24/9	9-4-6-3			(0-2"): Asphalt. S1: NARROWLY GRADED GRAVEL WITH SAND (GP); ~75% fine angular gravel up to 1.5", ~25% sand; brown and black; dry. Asphalt. Contains 3" seam of sand.
		S2	2 to 2.8	9/7	6-50/3"			S2: NARROWLY GRADED SAND WITH GRAVEL (SP); ~80% fine to medium sand, ~20% fine angular gravel up to 1"; black and brown; dry. Asphalt.
10	5					Roller bit to 5.5 feet with stabilizer bit.		
		S3	5.5 to 7	18/10	24-22-18			S3: NARROWLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); ~70% fine to medium sand, ~15% nonplastic fines, ~15% fine angular gravel up to 1"; brown and white; wet. Concrete fragments.
		S4	7 to 9	24/0	15-10-4-1			S4: No Recovery.
		S5	9 to 11	24/0	4-3-1-1	No recovery. Redrive with 3-inch split spoon. @S5		S5: NARROWLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); ~70% fine to medium sand, ~15% nonplastic fines, ~15% angular gravel up to 1"; brown and black; wet. Contains glass and roots.
	10							
						Advance casing to 15 feet below grade. Roller bit to 15 feet.		**STRATUM IIC - SAND (CLASS 3B) at ~13 ft / El. 1.8**
0	15	S6	15 to 17	24/6	4-4-4-3			S6: WIDELY GRADED SAND WITH GRAVEL (SW); ~85% sand, ~15% fine angular gravel up to 1.5"; brown; wet.
						Advance casing to 20 feet below grade. Roller bit to 20 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,043 **EASTING (ft):** 1,003,593
GROUND SURFACE EL. (ft): 14.8 **DATE START/END:** 5/27/2020 - 5/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B12

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S7	20 to 22	24/6	10-10-10-11			S7: NARROWLY GRADED SAND WITH SILT (SP-SM); ~90% fine to medium sand, ~10% nonplastic fines; brown and white; wet.
						Roller bit to 25 feet. Rig chatter from 20 to 22 feet and 23 to 25 feet.		**STRATUM III - TILL (CLASS 3A) at ~23.5 ft / El. -8.7**
-10	25	S8	25 to 27	24/6	22-22-21-28			S8: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% nonplastic fines; brown; wet.
						Advance casing to 30 feet below grade. Roller bit to 30 feet.		
	30	S9	30 to 32	24/0	42-47-36-30			S9: No Recovery.
						Roller bit to 35 feet.		
-20	35	S10	35 to 36.7	20/9	46-37-49-50/2"			S10: NARROWLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); ~70% fine to medium sand, ~15% nonplastic fines, ~15% subangular gravel up to 1"; brown; wet.
						Advance casing to 35 feet below grade. Roller bit to 40 feet. Rig chatter from 35 to 40 feet.		
	40	S11	40 to 40.2	2/0	100/2"			S11: No Recovery.
						Roller bit to 45 feet. Rig chatter /slow advancement from 40 to 45 feet.		
-30	45	S12	45 to 47	24/12	45-49-51-62			S12: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine to medium sand, ~15% nonplastic fines; brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,043 **EASTING (ft):** 1,003,593
GROUND SURFACE EL. (ft): 14.8 **DATE START/END:** 5/27/2020 - 5/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B12

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet.		
	50	S13	50 to 51.4	17/11	52-71-100/5"			S13: SILTY SAND (SM); ~70% fine to medium sand, ~10% nonplastic fines, ~10% fine subangular gravel up to 3/4"; brown; wet.
						Roller bit to 55 feet. Rig chatter from 53 to 55 feet.		
-40	55	S14	55 to 55.4	5/5	100/5"	PID = 0.0ppm @S14		S14: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine to medium sand, ~10% nonplastic fines, ~5% fine subangular to subrounded gravel; brown; wet.
						Roller bit to 60 feet. Slight rig chatter.		
	60	S15	60 to 61.8	21/9	49-48-72-100/3"	PID = 0.0ppm @S15		S15: SILTY SAND (SM); ~75% fine to medium sand, ~20% nonplastic fines, ~5% subangular to subrounded gravel up to 1"; tan-brown; wet.
						Roller bit to 65 feet.		
-50	65	S16	65 to 65.4	5/5	101/5"	PID = 0.0ppm @S16		S16: SILTY SAND (SM); Similar to S15, except sand and orange-brown to yellow-brown.
								STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~67.7 ft / El. -52.9
						Roller bit to 70 feet.		
	70	S17	70 to 70.3	3/3	103/3"	PID = 0.0ppm @S17		S17: SILTY SAND (SM); ~65% micaceous sand, ~30% nonplastic to low plasticity fines, ~5% fine gravel; black, white, reddish-brown; wet. Decomposed rock.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,043 **EASTING (ft):** 1,003,593
GROUND SURFACE EL. (ft): 14.8 **DATE START/END:** 5/27/2020 - 5/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B12

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet. Slow advancement from 70 to 74 feet.		
-60	75	S18	75 to 77	24/24	24-25-33-30	PID = 0.0ppm @S18		S18: SILTY SAND (SM); Similar to S17, except banded.
								Backfilled with cuttings and hole plug. Bottom of boring at depth 77 ft.
	80							
-70	85							
	90							
-80	95							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,884 **EASTING (ft):** 1,003,427
GROUND SURFACE EL. (ft): 23.5 **DATE START/END:** 5/6/2020 - 5/6/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 102.0 **DRILLER NAME:** Keith Parent
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING

B13

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 23.5
		S1	0 to 2	24/9	7-7-8-12	PID = 0.0ppm @S1		S1: SILTY SAND (SM); ~60% fine to medium sand, ~30% nonplastic fines, ~10% angular gravel up to 1"; dark brown; dry. Coal fragments.
		S2	2 to 4	24/10	2-4-3-6	PID = 0.0ppm @S2		S2: SILTY SAND (SM); 53.2% sand, 37.6% nonplastic fines, 7.6% low plasticity clay, ~2.2% fine subangular to subrounded gravel up to 1"; tan; dry. [GRAIN SIZE TEST PERFORMED].
20		S3	4 to 6	24/24	8-9-3-9	PID = 0.0ppm @S3		S3: NARROWLY GRADED SAND WITH SILT (SP-SM); ~90% fine to medium sand, ~10% nonplastic fines; orange-brown; dry.
	5							**STRATUM IIA - LOOSE SAND (CLASS 6) at ~6 ft / El. 17.5**
		S4	6 to 8	24/13	6-2-2-2	PID = 0.0ppm @S4		S4: WIDELY GRADED SAND (SW); ~90% sand, ~5% nonplastic fines, ~5% subrounded gravel up to 0.75"; reddish-brown; dry.
		S5	8 to 10	24/16	5-3-2-2	PID = 0.0ppm @S5		S5: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% nonplastic fines; brown; dry.
								STRATUM IIC - SAND (CLASS 3B) at ~10 ft / El. 13.5
	10	S6	10 to 12	24/24	4-3-7-8	PID = 0.0ppm @S6		S5: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% nonplastic fines; brown; dry.
10						Drive casing to 10 feet below grade. Rollerbit to 15 feet.		
	15	S7	15 to 17	24/8	10-8-8-10			S7: SILTY SAND (SM); 58.6% sand, 35.6% nonplastic fines, 5.8% fine subrounded gravel up to 1"; tan-brown; dry. [GRAIN SIZE TEST PERFORMED].
						Drive casing to 20 feet below grade. Rollerbit to 20 feet.		**STRATUM III - TILL (CLASS 3A) at ~18.5 ft / El. 5**

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,884 **EASTING (ft):** 1,003,427
GROUND SURFACE EL. (ft): 23.5 **DATE START/END:** 5/6/2020 - 5/6/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B13

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/15	14-19-41-27	PID = 0.0ppm @S8		S8: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% angular to subangular gravel; black to reddish-brown; wet.
0						Roller bit to 25 feet. Rig chatter from ~21 and ~24 feet.		
	25	S9	25 to 27	24/0	22-16-20-22	PID = 0.0ppm @S9		S9: No Recovery.
						Roller bit to 30 feet. Rig chatter from 25 to 27 feet and 28 to 29 feet.		
	30	S10	30 to 32	24/9	13-22-15-23	PID = 0.0ppm @S10		S10: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~10% angular to subrounded gravel up to 1.25", ~5% nonplastic fines; brown; wet. Some mica.
-10						Drive casing to 30 feet below grade. Roller bit to 35 feet. Intermittent rig chatter from 30 to 35 feet.		
	35	S11	35 to 37	24/22	41-59-57-73	PID = 0.0ppm @S11		S11: WIDELY GRADED SAND (SW); ~95% sand, ~5% subangular to subrounded gravel up to 1.5"; tan-brown; wet.
						Roller bit to 40 feet.		
	40	S12	40 to 42	24/16	28-28-19-17	PID = 0.0ppm @S12		S12: WIDELY GRADED SAND (SW); Similar to S11.
-20						Roller bit to 45 feet.		
	45	S13	45 to 47	24/16	54-84-112-108	PID = 0.0ppm @S13		S13: SILTY SAND WITH GRAVEL (SM); 56.3% sand, 25% nonplastic fines, 18.7% angular to subrounded gravel up to 1.5"; brown; wet. [GRAIN SIZE TEST PERFORMED].

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,884 **EASTING (ft):** 1,003,427
GROUND SURFACE EL. (ft): 23.5 **DATE START/END:** 5/6/2020 - 5/6/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B13

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Rig chatter from 46 to 50 feet.		
	50	S14	50 to 52	24/18	33-46-59-56	PID = 0.0ppm @S14		S14: WIDELY GRADED SAND (SW); ~90% sand, ~5% nonplastic fines, ~5% subangular to subrounded gravel up to 1"; brown; wet.
-30						Roller bit to 55 feet. Rig chatter from 53 to 55 feet.		
	55	S15	55 to 56.4	17/15	84-65-105/5"	PID = 0.0ppm @S15		S15: WIDELY GRADED SAND WITH SILT (SW-SM); ~85% sand, ~10% nonplastic fines, ~5% fine to course subangular to subrounded gravel up to 1"; brown; wet.
						Roller bit to 60 feet. Rig chatter from 56 to 60 feet.		
	60	S16	60 to 60.8	10/7	91-101/4"	PID = 0.0ppm @S16		S16: SILTY SAND (SM); ~65% fine to medium sand, ~25% nonplastic fines, ~10% subangular to subrounded gravel up to 1"; brown; wet. Trace mica.
-40						Roller bit to 65 feet. Rig chatter from 61 to 64 feet.		
	65	S17	65 to 65.3	4/4	108/4"	PID = 0.0ppm @S17		S17: SILTY SAND (SM); Similar to S16.
						Roller bit to 70 feet. Intermittent rig chatter from 65 to 70 feet.		
	70	S18	70 to 70.8	9/7	63-104/3"	PID = 0.0ppm @S18		S18: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine sand, ~10% nonplastic fines, ~5% subrounded gravel up to 1"; tan-brown; wet. Trace mica.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,884 **EASTING (ft):** 1,003,427
GROUND SURFACE EL. (ft): 23.5 **DATE START/END:** 5/6/2020 - 5/6/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B13

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
-50						Roller bit to 75 feet. Intermittent rig chatter from 71 to 75 feet.		
	75	S19	75 to 75.4	5/5	107/5"	PID = 0.0ppm @S19		S19: SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~20% angular gravel up to 1.5"; brown; wet. Trace mica.
						Roller bit to 80 feet. Intermittent rig chatter from 75 to 80 feet.		
	80	S20	80 to 80.3	4/4	100/4"	PID = 0.0ppm @S20		S20: SILTY SAND WITH GRAVEL (SM); Similar to S19.
								STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~82.7 ft / El. -59.2
-60						Roller bit to 85 feet. Rig chatter from 81 to 84 feet.		
	85	S21	85 to 87	24/20	10-16-20-20	PID = 0.0ppm @S21		S21: SANDY SILT (ML); ~80% nonplastic to low plasticity fines, ~20% fine sand; blue-green to red to tan to gray-black; moist. Banded, mica, flaky. Decomposed rock.
						Roller bit to 90 feet.		
	90	S22	90 to 92	24/24	5-9-18-22	PID = 0.0ppm @S22		S22: SANDY SILT (ML); Similar to S21, except red to pink and white.
-70						Roller bit to 95 feet.		
	95	S23	95 to 97	24/24	9-13-17-19	PID = 0.0ppm @S23		S23: SANDY SILT (ML); Similar to S21, except red to pink, blue-green and tan.
						Roller bit to 100 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,884 **EASTING (ft):** 1,003,427
GROUND SURFACE EL. (ft): 23.5 **DATE START/END:** 5/6/2020 - 5/6/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B13

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
	100	S24	100 to 102	24	5-11-20-14	PID = 0.0ppm @S24		S24: SANDY SILT (ML); Similar to S21, except red to pink, blue-green and tan.
								Backfilled with cuttings and hole plug. Bottom of boring at depth 102 ft.
-80	105							
	110							
-90	115							
	120							
-100								

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,930 **EASTING (ft):** 1,003,368
GROUND SURFACE EL. (ft): 21.8 **DATE START/END:** 6/8/2020 - 6/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 75.7 **DRILLER NAME:** Nick Beehlaer
LOGGED BY: A. Erb / G. Holmes **RIG TYPE:** CME 55LC

BORING
B14

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4.125 inch/ 4.375 inch **CORE BARREL TYPE:** NX Wireline
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** 2.125 inch / 3 inch
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 21.8
		S1	0 to 2	24/18	14-18-14-15			(0-4"):Concrete. S1: NARROWLY GRADED SAND WITH SILT (SP-SM): ~85% fine sand, ~30% nonplastic fines, ~5% subangular gravel up to 1"; tan-brown; dry.
20		S2	2 to 4	24/20	12-8-9-6	Roller bit to 4 feet.		S2: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% nonplastic fines, tan-brown; moist.
								STRATUM IIA - LOOSE SAND (CLASS 6) at ~4 ft / El. 17.8
		S3	4 to 6	24/16	5-4-3-4			S3: NARROWLY GRADED SAND (SP); Similar to S2.
	5	S4	6 to 8	24/7	4-5-8-5			S4: NARROWLY GRADED SAND (SP); ~95% sand, ~5% nonplastic fines; brown; moist.
		S5	8 to 10	24/13	2-2-2-2	Drive casing to 4 feet below grade. Roller bit to 10 feet.		S5: WIDELY GRADED SAND (SW): ~90% sand, ~5% fine subangular gravel, ~5% nonplastic fines; brown; moist. Trace mica.
								STRATUM IIC - SAND (CLASS 3B) at ~10 ft / El. 11.8
	10	S6	10 to 12	24/14	5-5-10-10			S6: NARROWLY GRADED SAND WITH SILT (SP-SM): ~90% fine to medium sand, ~10% nonplastic fines; brown; moist. Trace mica.
10						Roller bit to 15 feet. Add EZ mud.		
								STRATUM III - TILL (CLASS 3A) at ~13.5 ft / El. 8.3
	15	S7	15 to 17	24/12	17-12-12-9			S7: WIDELY GRADED SAND WITH SILT (SW-SM): ~70% sand, ~20% gravel up to 0.5", ~10% nonplastic fines; brown; wet. Trace mica.
						Roller bit to 20 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,930 **EASTING (ft):** 1,003,368
GROUND SURFACE EL. (ft): 21.8 **DATE START/END:** 6/8/2020 - 6/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B14

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/11	19-19-16-13			S8: WIDELY GRADED SAND (SW): ~75% sand, ~20% subangular gravel up to 0.5", ~5% nonplastic fines; brown to dark gray; wet. Trace mica.
0						Drive casing to 19 feet below grade. Roller bit to 25 feet. Rig chatter from ~22 feet.		
	25	S9	25 to 27	24/7	62-53-32-30			S9: WIDELY GRADED SAND (SW): ~65% sand; ~30% angular gravel up to 1.5"; ~5% nonplastic fines; brown; wet. Trace mica.
						Roller bit to 30 feet. Intermittent rig chatter from 25 to 30 feet.		
	30	S10	30 to 30.1	1/0	20/<1"	Roller bit to 31 feet. Slow advancement.		S10: No Recovery. C1: BOULDER; Gneiss. Angular cracks at 4" and 11. Core run times per foot (minutes:seconds): 2:00, 0:35, 0:34, 0:40, and 0:32.
-10		C1	31 to 35	48/12	15%			
	35	S11	35 to 35.3	4/4	100/4"			S11: WIDELY GRADED SAND (SW): ~85% sand, ~10% subangular gravel up to 1", ~5% nonplastic fines; grayish-brown; wet. Trace mica.
						Drive casing to 24 feet below grade. Roller bit to 40 feet. Rig chatter from 36 to 39 feet.		
	40	S12	40 to 40.7	8/7	100-50/2"			S12: NARROWLY GRADED SAND WITH GRAVEL (SP): ~70% fine to medium sand, ~25% subangular gravel up to 0.5", ~5% nonplastic fines; grayish brown; moist.
-20						Roller bit to 45 feet. Intermittent rig chatter and slow advancement from 42 to 45 feet.		
	45	S13	45 to 45.4	5/5	100/5"			S13: NARROWLY GRADED SAND (SP): ~90% fine to medium sand, ~5% fine subangular gravel, ~5% nonplastic fines; grayish brown; moist.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,930 **EASTING (ft):** 1,003,368
GROUND SURFACE EL. (ft): 21.8 **DATE START/END:** 6/8/2020 - 6/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B14

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
	50	S14	50 to 50.8	10/10	82-50/4"	Roller bit to 50 feet. Rig chatter from 52 to 55 feet.		S14: NARROWLY GRADED SAND WITH GRAVEL (SP): ~80% fine to medium sand, ~15% subangular gravel up to 0.75", ~5% nonplastic fines; grayish brown; moist.
-30								
	55	S15	55 to 56.3	15/15	67-100-50/3"	Roller bit to 60 feet.		S15: NARROWLY GRADED SAND WITH GRAVEL (SP); Similar to S14.
	60	S16	60 to 60.4	5/5	100/5"	Roller bit to 65 feet. Intermittent rig chatter.		S16: SILTY SAND WITH GRAVEL (SM): ~60% fine to medium sand, ~25% fine subangular gravel up to 0.5", ~15% nonplastic fines; gray; wet.
-40								
	65	S17	65 to 65.8	9/7	73-100/5"	Roller bit to 70 feet. Rig chatter from 65 to 66 feet and 68 to 70 feet.		S17: NARROWLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); ~60% fine to medium sand, ~30% subangular gravel up to 1.5", ~10% nonplastic fines; gray to tan; wet.
	70	S18	70 to 71.3	15/10	77-69-100/3"			S18: SILTY SAND WITH GRAVEL (SM); ~50% fine sand, ~30% nonplastic fines, ~20% subangular gravel up to 1"; gray to tan; wet.
-50								

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,930 **EASTING (ft):** 1,003,368
GROUND SURFACE EL. (ft): 21.8 **DATE START/END:** 6/8/2020 - 6/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B14

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet. Rig chatter from 70 to 75 feet.		
	75	S19	75 to 75.7	8/8	81-100/2"			S19: SILTY SAND WITH GRAVEL (SM); Similar to S18.
								Backfilled with cuttings and hole plug Bottom of boring at depth 75.7 ft.
-60	80							
	85							
	90							
-70	95							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,889 **EASTING (ft):** 1,003,534
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 5/11/2020 - 5/12/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 93.0 **DRILLER NAME:** Keith Parent
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING
B15

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NX Wireline
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** 2.125 inch / 3 inch
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 21.9
		S1	0 to 2	24/13	14-10-9-4	PID = 0.0ppm @S1		(0-4"): Asphalt. S1: SILTY SAND (SM); ~60% fine to medium sand, ~30% nonplastic fines, ~10% subangular gravel up to 1"; brown to reddish-brown; dry. Brick fragments.
20								**STRATUM IIA - LOOSE SAND (CLASS 6) at ~2 ft / El. 19.9**
		S2	2 to 4	24/19	7-5-4-4	PID = 0.0ppm @S2		S2: NARROWLY GRADED SAND WITH SILT (SP-SM); ~90% fine to medium sand, ~10% nonplastic fines; yellow-brown; dry.
		S3	4 to 6	24/8	2-2-3-5	PID = 0.0ppm @S3		S3: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% nonplastic fines; tan-brown; dry.
	5							**STRATUM IIC - SAND (CLASS 3B) at ~6 ft / El. 15.9**
		S4	6 to 8	24/16	11-6-10-6	PID = 0.0ppm @S4		S4: NARROWLY GRADED SAND (SP); Similar to S3.
		S5	8 to 10	24/12	10-7-6-3	PID = 0.0ppm @S5		S5: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~10% subrounded gravel up to 1 inch, ~5% nonplastic fines; yellow-brown; dry.
	10	S6	10 to 12	24/16	4-4-6-3	PID = 0.0ppm @S6		S6: WIDELY GRADED SAND WITH SILT (SW-SM); ~90% sand, ~10% nonplastic fines; yellow-brown to orange-brown; dry.
10						Drive casing to 15 feet below grade. Roller bit to 15 feet.		**STRATUM III - TILL (CLASS 3A) at ~13.5 ft / El. 8.4**
	15	S7	15 to 17	24/10	18-12-20-16			S7: SILTY SAND (SM); 77.3% sand, 35.6% nonplastic fines, 5.8% fine subangular gravel up to 1"; brown to black; wet. [GRAIN SIZE TEST PERFORMED].
						Roller bit to 20 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,889 **EASTING (ft):** 1,003,534
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 5/11/2020 - 5/12/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B15

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/3	18-12-15-14	PID = 0.0ppm @S8		S8: WIDELY GRADED SAND WITH GRAVEL (SW); ~70% sand, ~30% subangular gravel up to 1.5"; brown; wet.
0								
						Roller bit to 25 feet. Rig chatter from 23 to 25 feet.		
	25	S9	25 to 27	24/3	20-20-16-11	PID = 0.0ppm @S9		S9: Gravel stuck in shoe. subangular up to 1.5".
						Drive casing to 25 feet below grade. Roller bit to 30 feet. Intermittent rig chatter from 25 to 30 feet.		
	30	S10	30 to 32	24/13	24-44-85-92	PID = 0.0ppm @S10		S10: WIDELY GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~60% sand, ~30% subangular gravel up to 1.5", ~10% nonplastic fines; brown; wet.
-10								
						Roller bit to 35 feet. Rig chatter from 31 to 35 feet.		
	35	S11	35 to 37	24/14	33-35-45-61	PID = 0.0ppm @S11		S11: WIDELY GRADED SAND (SW); ~95% sand, ~5% subangular gravel up to 0.75"; tan-brown; wet.
						Roller bit to 40 feet. Rig chatter from 38 to 40 feet.		
	40	S12	40 to 40.9	11/10	53-120/5"	PID = 0.0ppm @S12		S12 (0-5"): WIDELY GRADED SAND (SW); Similar to S11. S12 (5"-10"): SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% subangular gravel up to 1.5"; brown; wet.
-20								
						Roller bit to 45 feet. Intermittent rig chatter and slow advancement from 41 to 45 feet.		
	45	S13	45 to 45.1	1/1	100/1"	PID = 0.0ppm @S13		S13: SILTY SAND (SM); Similar to S12 (5"-10"); black and white; micaceous sand.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,889 **EASTING (ft):** 1,003,534
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 5/11/2020 - 5/12/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B15

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet.		
	50	S14	50 to 50.2	2/2	100/2"	PID = 0.0ppm @S14		S14: SILTY SAND WITH GRAVEL (SM); ~50% fine to medium sand, ~30% nonplastic fines, ~20% subangular gravel up to 0.75"; orange-brown; wet.
-30								**STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~52.6 ft / El. -30.7**
						Roller bit to 55 feet. Rig chatter from 51 to 52 feet.		
	55	S15	55 to 55.9	11/11	54-100/5"	PID = 0.0ppm @S15		S15: SILTY SAND (SM); ~60% fine to medium micaceous sand, ~35% nonplastic to low plasticity fines, ~5% angular gravel up to 1"; brown; wet.
						Roller bit to 60 feet.		
	60	S16	60 to 62	24/16	23-22-27-56	PID = 0.0ppm @S16		S16: SILTY SAND (SM); Similar to S15. subangular gravel up to 1.5"; yellow-brown to brown.
-40								
						Roller bit to 65 feet. Rig chatter from 62 to 65 feet.		
	65	S17	65 to 65.1	1/0	100/1"	PID = 0.0ppm @S17		S17: No Recovery.
						Roller bit to 70 feet. Rig chatter / slow advancement from 65 to 70 feet.		
	70	S18	70 to 70	0/0	103/0"	PID = 0.0ppm @S18		S18: No Recovery.
-50								

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,889 **EASTING (ft):** 1,003,534
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 5/11/2020 - 5/12/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B15

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Rollerbit to 70 feet. Rig chatter / slow advancement from 70 to 75 feet.		
	75	S19	75 to 75	0/0	36/0"	PID = 0.0ppm @S19		S19: No Recovery.
						Rollerbit to 78 feet. Slow advancement from 75 to 78 feet.		
		C1	78 to 83	60/50	0%			C1: HARRISON FORMATION; Gneiss; hard; fine to medium grained; banded; completely weathered; black and white. Horizontal fractures at 3", 4", 6", 9", 10", 11-15", 17.5", 19", 21"-24", 27", 29", 31"-33", 35", 36", 39", 41"-44", 45.5" and 48". Core run times per foot (minutes:seconds): 5:05, 5:17, 4:15, 4:52 and 4:16.
	80							
-60								**STRATUM V - BEDROCK (CLASS 1B/1C) at ~83 ft / El. -61.1**
		C2	83 to 88	60/54	48%			C2: HARRISON FORMATION; Gneiss; hard; fine to medium grained; banded;slight to moderate weathering; black and white. Horizontal fractures at 0 to 1.5", 5.5", 8", 9", 12", 17.5", 20.5", 24.5", 30.5" 32-37", 39", 43", 43.5", and 48.5". Core run times per foot (minutes:seconds): 6:25, 7:33, 6:56, 6:56 and 6:28.
	85							
		C3	88 to 93	60/60	100%			C3: HARRISON FORMATION; Similar C1. Horizontal fractures at 9", 15.5", 20.5", 27.5", 32", 36", 42.5", 50.5", and 56.5". Core run times per foot (minutes:seconds): 5:02, 6:47, 6:45, 6:27 and 4:44.
	90							
-70								Backfilled with cuttings and hole plug. Bottom of boring at depth 93 ft.
	95							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,904 **EASTING (ft):** 1,003,499
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 3/2/2020 - 3/3/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 102.0 **DRILLER NAME:** Joe Schuster
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING
B16(OW)

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NX Wireline
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** 2.125 inch / 3 inch
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft): ▼ 17.3 3/10/2020 7:10 am in observation well

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S1	0 to 0.8	9/0	24-44/3"	PID = 0.0ppm @S1		S1 (0"-2"): Asphalt. S1 (2"-12"): Concrete.
20		S2	2 to 4	24/7	19-10-13-8	PID = 0.0ppm @S2		S2: SILTY SAND WITH GRAVEL (SM); ~50% fine to medium sand, ~30% subangular gravel up to 1", ~20% nonplastic fines; brown; dry. Brick, asphalt and concrete fragments.
								STRATUM IIC - SAND (CLASS 3B) at ~4 ft / El. 17.9
	5	S3	4 to 6	24/12	4-4-4-5	PID = 0.0ppm @S3		S3: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~10% low-plasticity fines, ~5% fine angular gravel up to 0.5"; light brown to reddish-brown; dry.
		S4	6 to 8	24/10	5-7-4-5	PID = 0.0ppm @S4		S4: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% low-plasticity fines; light brown to reddish-brown; dry.
		S5	8 to 10	24/8	5-4-9-12	PID = 0.0ppm @S5 Drive 8LF casing. Roller bit to 8 feet.		S5: SILTY SAND (SM); ~75% fine to medium sand, ~25% nonplastic fines; brown; dry.
								STRATUM III - TILL (CLASS 3A) at ~10 ft / El. 11.9
	10	S6	10 to 12	24/15	11-30-19-26	PID = 0.0ppm @S6		S6: SILTY SAND (SM); ~65% fine to medium sand, ~25% nonplastic fines, ~10% angular gravel up to 1"; brown; dry.
10						Rig chatter from 13 to 14 feet. Rollerbit		
		C1	14 to 15	12/0	0%	PID = 0.0ppm @C1		C1: No Recovery. Roller bit was grinding and not advancing. Begin coring. After 1' core barrel advanced quickly. Likely cobble. Core run times per foot (minutes:seconds): 2:04.
	15							
		S7	16 to 18	24/12	8-21-33-22	Rig chatter from 18 to 20 feet.		S7: SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~30% nonplastic fines, ~10% subangular gravel up to 1.5"; Crushed rock/cobble @11"-12"; brown; moist.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,904 **EASTING (ft):** 1,003,499
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 3/2/2020 - 3/3/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B16(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/8	12-13-15-14	PID = 0.0ppm @S8		S8: NARROWLY GRADED SAND WITH GRAVEL (SP); ~75% fine to medium sand with mica flakes, ~20% angular to subrounded gravel up to 1.25", ~5% nonplastic fines; brown to black; wet.
0						Rollerbit to 25 feet. Rig chatter from 22 to 25 feet.		
	25	S9	25 to 27	24/14	30-16-16-15	PID = 0.0ppm @S9		S9: NARROWLY GRADED SAND WITH GRAVEL (SP); SImilar to S8; except crushed rock powder and fragments @0-6".
						Drive casing to 18 feet due to fall in. Rollerbit to 30 feet. Rig chatter from 25 to 26 feet.		
	30	S10	30 to 32	24/22	28-63-69-101	PID = 0.0ppm @S10		S10: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, ~5% angular to subrounded gravel up to 0.75", ~5% nonplastic fines; brown; wet.
-10						Roller bit to 35 feet.		
	35	S11	35 to 36.4	17/13	64-47-103/3"	PID = 0.0ppm @S11		S11: NARROWLY GRADED SAND (SP); Similar to S10.
						Roller bit to 40 feet.		
	40	S12	40 to 40.4	5/4	106/5"	PID = 0.0ppm @S12		S12: NARROWLY GRADED SAND WITH CLAY (SP-SC); ~85% fine to medium sand, ~10% low plasticity clayey fines, ~5% angular to subrounded gravel up to 0.75"; brown; wet.
-20						Roller bit to 45 feet. Rig chatter at 41 feet.		
	45	S13	45 to 47	24/19	60-64-70-31	PID = 0.0ppm @S13		S13: WIDELY GRADED GRAVEL WITH SILT AND SAND (GW-GM); 47.7% angular to subrounded gravel up to 2", 45.2% sand, 7.1% nonplastic fines; brown; wet. [GRAIN SIZE TEST

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,904 **EASTING (ft):** 1,003,499
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 3/2/2020 - 3/3/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B16(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								PERFORMED].
						Roller bit to 50 feet.		
	50	S14	50 to 52	24/20	37-48-63-58	PID = 0.0ppm @S14		S14: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% angular to subrounded gravel up to 0.5"; brown; wet.
-30						Roller bit to 55 feet.		
	55	S15	55 to 57	24/21	44-33-84-86	PID = 0.0ppm @S15		S15 (0-10"): NARROWLY GRADED SAND (SP); Similar to S14. S15: (10"-21") SILTY SAND WITH GRAVEL (SM); 49.3% sand, 30.5% nonplastic fines, 20.2% angular to subrounded gravel up to 1"; brown; wet. [GRAIN SIZE TEST PERFORMED].
						Roller bit to 60 feet. Rig chatter from 58 to 60 feet.		
	60	S16	60 to 60.4	5/5	104/5"	PID = 0.0ppm @S16		S16: SILTY SAND (SM); ~60% fine sand, ~30% nonplastic fines, ~10% angular to subrounded gravel up to 1"; brown; wet; trace mica.
-40						Rollerbit to 65 feet. Rig chatter from 61 to 65 feet.		
	65	S17	65 to 67	24/24	55-37-42-32	PID = 0.0ppm @S17		S17: WIDELY GRADED SAND (SW); ~95% sand, ~5% nonplastic fines; orange to brown; wet.
	70	S18	70 to 72	24/16	16-34-79-102	PID = 0.0ppm @S18		S18 (0-11"): SILT WITH SAND (ML); ~75% nonplastic to low plasticity fines, ~20% fine sand, ~5% fine angular gravel up to 0.5"; orange-brown; dry. S18 (11"-16"): SILTY SAND (SM); ~75% fine to medium sand, ~20% nonplastic fines, ~5% fine subangular gravel up to 0.5"; yellow-brown; wet.
-50								

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,904 **EASTING (ft):** 1,003,499
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 3/2/2020 - 3/3/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B16(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM IV - DECOMPOSED/WEATHERED ROCK at ~73.5 ft / El. -51.6
	75	S19	75 to 77	24/19	35-38-49-69	PID = 0.0ppm @S19		S19: SANDY SILT (ML); ~65% nonplastic to low plasticity silty fines, ~30% fine sand, ~10% gravel angular up to 0.5"/ crushed rock, interbedded white layers of crushed rock and powder; silt varved; purple to gray; moist; trace mica. Decomposed Rock.
	80	S20	80 to 82	24/17	26-27-35-74	PID = 0.0ppm @S20		S20: SANDY SILT (ML); ~70% nonplastic silty fines, ~25% fine sand, ~5% fine gravel up to 0.5"; bluish green to green to brown; varved; moist; trace mica. Decomposed Rock.
-60								
	85	S21	85 to 87	24/24	11-21-27-47	PID = 0.0ppm @S21		S21: SILT (ML); ~90% nonplastic to low plasticity silty fines, ~10% fine sand, light gray to black; varved; moist; trace mica. Decomposed Rock.
	90	S22	90 to 92	24/15	8-14-21-37	PID = 0.0ppm @S22		S22: SILT (ML); ~80% low plasticity silty fines, ~20% fine sand, light gray to bluish gray; moist. Decomposed Rock.
-70								
	95	S23	95 to 97	24/24	13-25-31-35	PID = 0.0ppm @S23		S23 (0-18"): SILT (ML); Similar to S22. Decomposed Rock. S23 (18"-24"): SILT (ML); ~90% low plasticity fines, ~10% fine sand; light gray; moist. Decomposed Rock.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,904 **EASTING (ft):** 1,003,499
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 3/2/2020 - 3/3/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B16(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
	100	S24	100 to 102	24/19	11-14-26-42	PID = 0.0ppm @S24		S24: SILT (ML); ~90% low plasticity fines, ~10% fine sand; light gray to bluish gray; moist. Decomposed Rock.
-80								Backfilled with cuttings and hole plug. Bottom of boring at depth 102 ft.
	105							
	110							
-90								
	115							
	120							
-100								

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,948 **EASTING (ft):** 1,003,379
GROUND SURFACE EL. (ft): 21.5 **DATE START/END:** 6/11/2020 - 6/12/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 75.3 **DRILLER NAME:** Nick Beehlaer
LOGGED BY: A. Erb / G. Holmes **RIG TYPE:** CME 55LC

BORING B17

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4.125 inch/ 4.375 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 21.5
								(0-1'): Concrete.
								STRATUM IIC - SAND (CLASS 3B) at ~1 ft / El. 20.5
20		S1	1 to 2	12/10	23-16	PID = 0.0ppm @S1		S1: SILTY SAND WITH GRAVEL (SM); ~60% fine sand, ~20% nonplastic fines, ~20% angular gravel up to 1.5"; brown; dry. Concrete and brick fragments.
		S2	2 to 4	24/24	11-9-7-13	PID = 0.0ppm @S2 Roller bit to 4 feet below grade.		S2: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, ~5% nonplastic fines, ~5% fine gravel; brown to orange-brown; dry.
	5	S3	4 to 6	24/13	5-5-7-9	PID = 0.0ppm @S3		S3(0-7"): NARROWLY GRADED SAND (SP); Similar to S2. S3(7"-13"): NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% fine gravel; white to tan; dry.
		S4	6 to 8	24/8	11-14-14-17	PID = 0.0ppm @S4 Roller bit to 8 feet below grade.		S4: NARROWLY GRADED SAND (SP); Similar to S3 (7"-13").
		S5	8 to 10	24/10	5-4-7-8	PID = 0.0ppm @S5 Drive casing to 10 feet below grade. Roller bit to 10 feet.		S5: SILTY SAND (SM); ~70% fine sand, ~30% nonplastic fines; tan; dry. Trace mica.
	10	S6	10 to 12	24/10	13-9-11-11	PID = 0.0ppm @S6		S6: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine to medium sand, ~10% nonplastic fines, ~5% fine gravel; tan to brown; dry. Trace mica.
10						Roller bit to 15 feet.		**STRATUM III - TILL (CLASS 3A) at ~13.5 ft / El. 8**
	15	S7	15 to 17	24/15	31-47-25-20	PID = 0.0ppm @S7		S7: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% fine gravel; brown to black; dry. Black micaceous sand @7"-14".
						Drive casing to 15 feet below grade. Roller bit to 20 feet.		

NOTES: Sample ID S12 was skipped during drilling.

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,948 **EASTING (ft):** 1,003,379
GROUND SURFACE EL. (ft): 21.5 **DATE START/END:** 6/11/2020 - 6/12/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B17

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
0		S8	20 to 22	24/11	24-15-17-25	PID = 0.0ppm @S8		S8: WIDELY GRADED SAND WITH GRAVEL (SW); ~60% sand, ~35% subangular to subrounded gravel up to 1.5"; brown to black; wet. Micaceous sand from 0-2".
						Roller bit to 25 feet.		
	25	S9	25 to 27	24/9	15-17-13-47	PID = 0.0ppm @S9		S9: NARROWLY GRADED GRAVEL WITH SILT AND SAND (GW-GM); 59.6% fine to course subangular to subrounded gravel up to 1.5", 34.4% sand, 6% nonplastic fines; brown; wet. [GRAIN SIZE TEST PERFORMED].
						Rollerbit to 30 feet. Rig chatter from 27 to 28 feet.		
	30	S10	30 to 30.8	9/9	31-50/3"	PID = 0.0ppm @S10		S10: WIDELY GRADED SAND WITH SILT (SW-SM); ~80% sand, ~10% nonplastic fines, ~10% subrounded gravel up to 1"; light brown; wet. Trace mica.
-10						Roller bit to 40 feet. Boulder from 31 to 38 feet.		
	35							
	40	S11	40 to 40.4	5/5	100/5"	PID = 0.0ppm @S11		S11: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% subrounded gravel up to 1"; tan-brown; wet. Trace mica.
-20						Roller bit to 45 feet. Rig chatter from 44 to 45 feet.		
	45	S13	45 to 45.3	3/0	50/3"	PID = 0.0ppm @S13		S13: No Recovery.

NOTES: Sample ID S12 was skipped during drilling.

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,948 **EASTING (ft):** 1,003,379
GROUND SURFACE EL. (ft): 21.5 **DATE START/END:** 6/11/2020 - 6/12/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B17

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Intermittent rig chatter from 45 to 50 feet.		
	50	S14	50 to 50.8	10/9	96-87/4"	PID = 0.0ppm @S14		S14: SILTY SAND WITH GRAVEL (SM); 53.7% sand, 26.7% subrounded gravel up to 2", 19.6% nonplastic fines; grayish brown; moist. [GRAIN SIZE TEST PERFORMED].
-30								
						Roller bit to 55 feet.		
	55	S15	55 to 55.4	5/3	100/5"	PID = 0.0ppm @S15		S15: SILTY SAND WITH GRAVEL (SM); 55.2% sand, 23.6 nonplastic fines, 21.2% gravel, grayish brown. [GRAIN SIZE TEST PERFORMED].
						Roller bit to 65 feet. Boulder from 59 to 62 feet.		
	60							
-40								
	65	S16	65 to 65.3	3/3	100/3"	PID = 0.0ppm @S16		S16: SILTY SAND WITH GRAVEL (SM); 43.3% sand, 35.1% gravel, 21.6% nonplastic fines; dark gray and black; stiff; moist. [GRAIN SIZE TEST PERFORMED].
						Roller bit to 70 feet. Intermittent rig chatter.		
	70	S17	70 to 70.9	11/9	79-100/5"	PID = 0.0ppm @S17		S17: SILTY SAND (SM); 47.4% sand, 42.1% nonplastic fine, 10.5% fine gravel; gray; wet. [GRAIN SIZE TEST PERFORMED].
-50								

NOTES: Sample ID S12 was skipped during drilling.

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,948 **EASTING (ft):** 1,003,379
GROUND SURFACE EL. (ft): 21.5 **DATE START/END:** 6/11/2020 - 6/12/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B17

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet. Intermittent rig chatter.		
	75	S18	75 to 75.3	4/3	100/4"	PID = 0.0ppm @S18		S18: WIDELY GRADED SAND WITH SILT AND GRAVEL (SP-SM); 61.8% sand, 27.2 nonplastic fines, 11% fine subrounded gravel; gray; wet. [GRAIN SIZE TEST PERFORMED]. Backfilled with cuttings and hole plug. Bottom of boring at depth 75.3 ft.
-60	80							
	85							
-70	90							
	95							

NOTES: Sample ID S12 was skipped during drilling.

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,937 **EASTING (ft):** 1,003,535
GROUND SURFACE EL. (ft): 20.6 **DATE START/END:** 5/8/2020 - 5/8/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 100.2 **DRILLER NAME:** Keith Parent
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING
B18

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 20.6
20		S1	0 to 2	24/12	6-3-2-15	PID = 0.0ppm @S1		S1: WIDELY GRADED SAND WITH GRAVEL (SW); ~65% sand, ~30% angular to subangular gravel up to 1.5", ~5% nonplastic fines; brown to orange-brown; dry.
								STRATUM IIC - SAND (CLASS 3B) at ~2 ft / El. 18.6
		S2	2 to 4	24/11	7-5-7-8	PID = 0.0ppm @S2		S2: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~10% angular to subangular gravel up to 1", ~5% nonplastic fines; brown to dark brown; dry.
	5	S3	4 to 6	24/6	4-8-7-9	PID = 0.0ppm @S3		S3: NARROWLY GRADED SAND (SP); ~100% fine to medium sand; tan-brown; dry.
		S4	6 to 8	24/8	16-16-9-14	PID = 0.0ppm @S4		S4: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% nonplastic fines; tan-brown; dry.
		S5	8 to 10	24/5	14-12-8-8	PID = 0.0ppm @S5 Drive casing to 10 feet below grade. Roller bit to 10 feet.		S5: NARROWLY GRADED SAND WITH SILT (SP-SM); ~80% fine to medium sand, ~10% nonplastic fines, ~10% subangular to subrounded gravel up to 1.5"; brown to reddish-brown; dry.
	10	S6	10 to 12	24/2	12-10-10-24	PID = 0.0ppm @S6		S6: CLAYEY SAND (SC); ~70% fine to medium sand, ~20% low plasticity fines, ~10% subangular to subrounded gravel up to 1"; tan to black; moist. Some micaceous sand.
10						Roller bit to 15 feet.		
	15	S7	15 to 15.3	4/0	100/4"			S7: No Recovery.
						Drive casing to 15 feet below grade. Roller bit to 20 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,937 **EASTING (ft):** 1,003,535
GROUND SURFACE EL. (ft): 20.6 **DATE START/END:** 5/8/2020 - 5/8/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B18

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
0		S8	20 to 22	24/14	5-7-6-5	PID = 0.0ppm @S8		S8: SILTY SAND (SM); ~70% fine to medium micaceous sand, ~20% nonplastic fines, ~10% subangular to subrounded gravel up to 1"; black; wet.
						Drive casing to 20 feet below grade. Roller bit to 25 feet. Rig chatter from 22 to 24 feet.		**STRATUM III - TILL (CLASS 3A) at ~23.5 ft / El. -2.9**
	25	S9	25 to 27	24/6	88-42-52-23	PID = 0.0ppm @S9		S9: WIDELY GRADED SAND WITH GRAVEL (SW); ~70% sand, ~30% subangular to subrounded gravel up to 1.5"; brown; wet. Trace mica.
						Rollerbit to 30 feet. Rig chatter from 25 to 30 feet.		
-10	30	S10	30 to 30.1	1/0	100/1"	PID = 0.0ppm @S10		S10: No Recovery.
						Drive casing to 25 feet below grade. Roller bit to 35 feet. Rig chatter from 30 to 35 feet.		
	35	S11	35 to 37	24/12	34-34-31-37	PID = 0.0ppm @S11		S11: WIDELY GRADED SAND WITH GRAVEL (SW); ~80% sand, ~20% subangular to subrounded gravel up to 1"; light brown; wet.
						Roller bit to 40 feet.		
-20	40	S12	40 to 40.2	2/2	100/2"	PID = 0.0ppm @S12		S12: SILTY SAND WITH GRAVEL (SM); 52.9% sand, 32% subangular to subrounded gravel up to 1.5"; 15.1% nonplastic fines; brown; wet. [GRAIN SIZE TEST PERFORMED].
						Roller bit to 45 feet. Rig chatter from 42 to 45 feet.		
	45	S13	45 to 47	24/16	37-44-56-53	PID = 0.0ppm @S13		S13: WIDELY GRADED SAND (SW); ~95% sand, ~5% subrounded gravel up to 1"; tan-brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,937 **EASTING (ft):** 1,003,535
GROUND SURFACE EL. (ft): 20.6 **DATE START/END:** 5/8/2020 - 5/8/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B18

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Rig chatter from 49 to 50 feet.		
-30	50	S14	50 to 51.2	14/14	49-76-101/2"	PID = 0.0ppm @S14		S14: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine to medium sand, ~10% nonplastic fines, ~5% fine angular to subrounded gravel up to 0.5"; tan; wet.
						Roller bit to 55 feet.		
	55	S15	55 to 55.3	4/4	111/4"	PID = 0.0ppm @S15		S15: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S14.
						Roller bit to 60 feet. Rig chatter from 57 to 59 feet.		
-40	60	S16	60 to 60.9	11/7	52-100/5"	PID = 0.0ppm @S16		S16: SILTY SAND (SM); ~60% fine to medium sand, ~35% nonplastic fines, ~5% fine subangular to subrounded gravel up to 0.5"; brown; wet.
						Roller bit to 65 feet. Rig chatter from 64 to 65 feet.		
	65	S17	65 to 67	24/21	37-56-44-65	PID = 0.0ppm @S17		S17: WIDELY GRADED SAND WITH SILT (SW-SM); ~85% sand, ~10% nonplastic fines, ~5% angular to subrounded gravel up to 1.5"; orange-brown; wet. Trace mica.
						Roller bit to 70 feet.		**STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~68.5 ft / El. -47.9**
-50	70	S18	70 to 72	24/19	36-56-87-67	PID = 0.0ppm @S18		S18: SANDY SILT (ML); ~60% nonplastic to low plasticity fines, ~35% fine to medium sand, ~5% angular gravel up to 1"; orange-brown to red-brown to blue-gray; moist. Mica. Decomposed rock.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,937 **EASTING (ft):** 1,003,535
GROUND SURFACE EL. (ft): 20.6 **DATE START/END:** 5/8/2020 - 5/8/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B18

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet.		
	75	S19	75 to 77	24/24	19-29-40-59	PID = 0.0ppm @S19		S19: SANDY SILT (ML); Similar to S18, except banded.
						Roller bit to 80 feet.		
-60	80	S20	80 to 80.3	3/3	100/3"	PID = 0.0ppm @S20		S20: SANDY SILT (ML); Similar to S18, except banded.
						Roller bit to 85 feet. Rig chatter from 82 to 84 feet.		
	85	S21	85 to 85.3	3/3	114/3"	PID = 0.0ppm @S21		S21: SILTY SAND (SM); ~65% fine to medium micaceous sand, ~30% nonplastic to low plasticity fines, ~5% fine angular gravel; black and white; wet. Decomposed/very weathered rock.
						Roller bit to 90 feet.		
-70	90	S22	90 to 90.2	2/2	101/2"	PID = 0.0ppm @S22		S22: SILTY SAND (SM); Similar to S21.
						Roller bit to 95 feet.		
	95	S23	95 to 95.2	2/2	100/2"	PID = 0.0ppm @S23		S23: SILTY SAND (SM); Similar to S21.
						Roller bit to 100 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,937 **EASTING (ft):** 1,003,535
GROUND SURFACE EL. (ft): 20.6 **DATE START/END:** 5/8/2020 - 5/8/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B18

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
-80	100	S24	100 to 100.2	2/2	101/2"	PID = 0.0ppm @S24		S24: SILTY SAND (SM); Similar to S21. Backfilled with cuttings and hole plug. Bottom of boring at depth 100.2 ft.
	105							
-90	110							
	115							
-100	120							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,997 **EASTING (ft):** 1,003,398
GROUND SURFACE EL. (ft): 21.4 **DATE START/END:** 6/10/2020 - 6/11/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 75.4 **DRILLER NAME:** Nick Beehlaer
LOGGED BY: J. Passno / G. Holmes **RIG TYPE:** CME 55LC

BORING

B19

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4.125 inch/ 4.375 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 21.4
20		S1	0 to 0	0/0	50/3"	Roller bit through asphalt. Roller bit through concrete slab at 3 feet. @S1		S1: No Recovery. Drilled indicated second concrete slab, offset hole 4 feet to the south.
						Roller bit through slab to 4 feet.		
	5	S2	4 to 4.4	5/5	100/5"			S2: NARROWLY GRADED GRAVEL WITH SILT AND SAND (GP-GM); ~75% fine angular gravel up to 1.5", ~15% fine sand, ~10% nonplastic fines; black and gray; wet.
								STRATUM IIB - SILT/CLAY (CLASS 4B/5B) at ~6 ft / El. 15.4
		S3	6 to 8	24/14	5-4-6-10	Roller bit to 6 feet. Drill chatter from 4 to 6 feet.		S3: SILT WITH SAND (ML); ~85% nonplastic fines, ~15% fine sand; tan; dry. 3" seam of narrowly graded sand above silt.
								STRATUM IIC - SAND (CLASS 3B) at ~8 ft / El. 13.4
		S4	8 to 10	24	7-6-10-19			S4: NARROWLY GRADED SAND WITH GRAVEL (SP); ~85% fine to medium sand, ~15% fine angular gravel up to 1.5"; tan; dry.
	10	S5	10 to 12	24/12	20-10-10-10	Drive casing to 10 feet. Roller bit to 10 feet.		S5: SILTY SAND (SM); ~85% fine sand, ~15% nonplastic fines; tan; moist.
10								**STRATUM III - TILL (CLASS 3A) at ~13.5 ft / El. 7.9**
	15	S6	15 to 17	24/12	17-14-14-13	Roller bit to 15 feet. Drive casing to 15 feet.		S6: NARROWLY GRADED SAND WITH SILT (SP-SM); ~90% fine to medium sand, ~10% nonplastic fines; brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,997 **EASTING (ft):** 1,003,398
GROUND SURFACE EL. (ft): 21.4 **DATE START/END:** 6/10/2020 - 6/11/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B19

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
0		S7	20 to 22	24/11	26-41-26-16	Roller bit to 20 feet.		S7: NARROWLY GRADED SAND WITH GRAVEL (SP); ~80% fine to medium sand, ~15% fine subangular gravel up to 3/4"; brown; wet.
	25	S8	25 to 27	24	19-25-22-26	Roller bit to 25 feet.		S8: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~25% subangular to subrounded gravel up to 1"; brown; wet.
	30	S9	30 to 30.4	5/5	100/5"	Roller bit to 30 feet. Drill chatter from 26 to 28 feet.		S9: SILTY SAND WITH GRAVEL (SM); ~70% sand, ~15% nonplastic fines, ~15% fine gravel up to 1"; gray-brown; wet.
-10								
	35	S10	35 to 35.1	1/1	50/1"	Roller bit to 35 feet. Rig chatter from 31 to 35 feet. Slow advancement from 34 to 35 feet; likely gravel/cobble layer.		S10: No Recovery. Wash in split spoon, gravel stuck in shoe.
	40	S11	40 to 40.3	3/3	50/3"	Roller bit to 40 feet.		S11: SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~20% nonplastic fines, ~20% fine subangular to subrounded gravel up to 1"; gray-brown; wet.
-20								
	45	S12	45 to 45.3	4/4	100/4"			S12: NARROWLY GRADED SAND WITH GRAVEL (SP); ~80% fine to medium sand, ~20% subangular to subrounded gravel up to 0.75"; brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,997 **EASTING (ft):** 1,003,398
GROUND SURFACE EL. (ft): 21.4 **DATE START/END:** 6/10/2020 - 6/11/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B19

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Cobble/boulder from 46 to 48 feet.		
	50	S13	50 to 50.3	4/4	100/4"	Roller bit to 50 feet.		S13: NARROWLY GRADED SAND WITH GRAVEL (SP); Similar to S12, except gravel up to 1.5".
-30								
	55	S14	55 to 55.4	5/5	100/5"	Roller bit to 55 feet. Drill chatter at 53 feet.		S14: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~10% subangular to subrounded gravel up to 1.25", ~5% nonplastic fines; gray-brown; wet.
	60	S15	60 to 60.9	11/11	88-100/5"	Roller bit to 60 feet.		S15: NARROWLY GRADED SAND (SP); Similar to S14, except with fine sand.
-40								
	65					Boulder from 62 to 68 feet.		
	70	S16	70 to 70.2	2/2	50/2"	Roller bit to 70 feet. Drill chatter from 70 to 71 feet and 72 to 73 feet.		S16: No Recovery. Spoon stopped advancing. Drilled into rock, white/light gray.
-50								

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,997 **EASTING (ft):** 1,003,398
GROUND SURFACE EL. (ft): 21.4 **DATE START/END:** 6/10/2020 - 6/11/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B19

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
	75	S17	75 to 75.4	5/5	100/5"	Roller bit to 75 feet.		S17: NARROWLY GRADED SAND WITH SILT (SP-SM); ~80% fine to medium sand, ~10% nonplastic fines, ~10% subangular to subrounded gravel up to 1.5"; brown to yellow; wet. Backfilled with cuttings and hole plug. Bottom of boring at depth 75.4 ft.
-60	80							
	85							
-70	90							
	95							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 222,066 **EASTING (ft):** 1,003,426
GROUND SURFACE EL. (ft): 20.2 **DATE START/END:** 6/9/2020 - 6/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 75.1 **DRILLER NAME:** Nick Beehlaer
LOGGED BY: G. Holmes **RIG TYPE:** CME 55LC

BORING

B20

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4.125 inch/ 4.375 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 20.2
20		S1	0 to 2	24/16	9-14-21-32	PID = 1.1 ppm @S1		(0-4"): Concrete. S1: NARROWLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); ~70% fine to medium sand, ~20% angular to subangular gravel up to 1.25", ~10% nonplastic fines; brown to tan; dry. Slight petroleum-like odor.
		S2	2 to 4	24/21	47-21-36-24	PID = 0.1 ppm @S2		S2: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, ~5% nonplastic fines, ~5% subangular to subrounded gravel up to 0.75"; light to dark brown; dry. Coal fragments.
	5	S3	4 to 6	24/10	7-16-16-10	Roller bit to 4 feet. Rig chatter from 3-4 feet. PID = 0.0 ppm @S3		S3: NARROWLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); ~70% fine to medium sand, ~20% angular to subangular gravel up to 1", ~10% nonplastic fines; dark brown; dry. Coal and brick fragments.
		S4	6 to 8	24/8	19-11-7-12	PID = 0.0 ppm @S4		S4: NARROWLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); Similar to S3.
								STRATUM III - TILL (CLASS 3A) at ~8 ft / El. 12.2
		S5	8 to 10	24/9	5-16-26-14	PID = 0.0 ppm @S5		S5: SILTY SAND WITH GRAVEL (SM); ~60% sand, ~20% nonplastic fines, ~20% subangular to subrounded gravel up to 1.5"; tan to brown; dry.
10	10	S6	10 to 12	24/10	19-14-15-10	Drive casing 10 feet below grade. PID = 0.0 ppm @S6		S6: WIDELY GRADED SAND WITH GRAVEL (SW); ~65% sand, ~30% subangular to subrounded gravel up to 1.5", ~5% nonplastic fines; brown to dark brown; dry. Some micaceous sand.
	15	S7	15 to 17	24/6	11-18-19-26	Drive casing to 15 feet below grade. Roller bit to 15 feet. PID = 0.0 ppm @S7		S7: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~10% subrounded gravel up to 1", ~5% nonplastic fines; light brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,066 **EASTING (ft):** 1,003,426
GROUND SURFACE EL. (ft): 20.2 **DATE START/END:** 6/9/2020 - 6/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B20

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
0		S8	20 to 22	24/9	27-24-47-21	Roller bit to 20 feet. Rig chatter from 19 to 20 feet. PID = 0.0 ppm @S8		S8: NARROWLY GRADED SAND (SP); Similar to S7.
						Roller bit to 25 feet. Rig chatter at 22 feet and from 23 to 24 feet.		
	25	S9	25 to 27	24/12	27-22-20-16	PID = 0.0 ppm @S9		S9: WIDELY GRADED SAND WITH GRAVEL (SW); ~80% sand, ~20% subrounded gravel up to 1.25"; light brown; wet.
						Roller bit to 30 feet. Rig chatter/slow advance from 29 to 30 feet.		
-10	30	C1	30 to 35	60/17				C1: BOULDER. Core run times per foot (minutes:seconds): 01:14, 01:16, 01:12, 00:33, 00:26.
	35	S10	35 to 35.3	4/4	51/4"	PID = 0.0 ppm @S10		S10: SILTY SAND WITH GRAVEL (SM); ~60% fine sand, ~20% nonplastic fines, ~20% angular to subangular gravel up to 1"; tan to yellow-brown; wet.
						Roller bit to 40 feet. Rig chatter from 38 to 40 feet.		
-20	40	S11	40 to 40.3	4/4	100/4"	PID = 0.0 ppm @S11		S11: WIDELY GRADED SAND WITH SILT (SW-SM); ~85% micaceous sand, ~10% nonplastic fines, ~5% fine gravel; black to brown; wet.
						Roller bit to 45 feet. Rig chatter from 43 to 45 feet.		
	45	S12	45 to 45.4	5/5	100/5"	PID = 0.0 ppm @S12		S12: SILTY SAND WITH GRAVEL (SM); ~50% fine sand, ~30% subangular to subrounded gravel up to 1.5", ~20% nonplastic fines; gray-brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,066 **EASTING (ft):** 1,003,426
GROUND SURFACE EL. (ft): 20.2 **DATE START/END:** 6/9/2020 - 6/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B20

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Cobble/boulder from 45 to 49 feet.		
-30	50	S13	50 to 50.3	3/3	100/3"			S13: SILTY SAND WITH GRAVEL (SM); ~60% sand, ~20% fine subangular gravel up to 1.5", ~20% nonplastic fines; brown black; wet.
						Roller bit to 55 feet. Rig chatter from 53 to 55 feet.		
	55	S14	55 to 55.3	4/4	100/4"			S14: SANDY SILT WITH GRAVEL (ML); ~50% nonplastic fines, ~30% fine to medium sand, ~20% fine subrounded gravel up to 0.75"; brown; wet.
						Roller bit to 60 feet. Rig chatter/slow advance at 57 feet.		
-40	60	S15	60 to 60.9	11/7	68-100/5"			S15: SANDY SILT WITH GRAVEL (ML); Similar to S14, with gravel up to 1.5".
						Roller bit to 65 feet. Slow advance to 65 feet.		
	65	S16	65 to 65.3	4/4	100/4"			S16: SANDY SILT WITH GRAVEL (ML); ~60% nonplastic fines, ~20% fine to medium sand, ~20% fine subrounded gravel up to 1"; brown; wet.
						Roller bit to 70 feet. Slow advance from 65 to 70 feet.		
-50	70	S17	70 to 70.3	3/3	50/3"			S17: SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~20% nonplastic fines, ~20% fine subangular to subrounded gravel up yo 1"; brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,066 **EASTING (ft):** 1,003,426
GROUND SURFACE EL. (ft): 20.2 **DATE START/END:** 6/9/2020 - 6/9/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B20

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
	75	S18	75 to 75.1	1/0	100/1"	Roller bit to 75 feet. Slow advance from 70-75 feet. Rig chatter at 75 feet.		S18: No Recovery. Driller indicated likely boulder. Backfilled with cuttings and hole plug. Bottom of boring at depth 75.1 ft.
-60	80							
	85							
-70	90							
	95							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 222,090 **EASTING (ft):** 1,003,573
GROUND SURFACE EL. (ft): 14.0 **DATE START/END:** 5/12/2020 - 5/13/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 71.4 **DRILLER NAME:** Ed Flanagan
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING

B21

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 14
		S1	0 to 2	24/12	16-13-12-15	PID = 0.0ppm @S1		S1: SILTY SAND WITH GRAVEL (SM); ~50% fine to medium sand, ~30% nonplastic fines, ~20% subangular gravel up to 1.5"; dark brown to black; dry.
		S2	2 to 4	24/10	27-19-13-11	PID = 0.0ppm @S2		S2: SILTY SAND WITH GRAVEL (SM); Similar to S1.
10	5	S3	4 to 5.6	19/4	7-17-13-55/1"	PID = 0.0ppm @S3		S3: SILTY SAND (SM); ~70% sand, ~20% nonplastic fines, ~10% subangular gravel up to 1"; tan; dry.
		S4	6 to 8	24/6	16-10-13-62	PID = 0.0ppm @S4		S4: SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~20% nonplastic fines, ~20% subangular gravel up to 1.5"; brown to dark brown; dry. Brick fragments. Slight organic-like odor.
		S5	8 to 10	24/13	33-27-27-28	PID = 0.0ppm @S5		S5: SILTY SAND WITH GRAVEL (SM); ~50% sand, ~30% subangular gravel up to 1.5 inch, ~20% nonplastic fines; brown to black; dry. Red brick and concrete fragments; moist; slight organic-like odor.
	10	S6	10 to 10.4	5/0	100/5"			S6: No Recovery.
0						Drive casing to 15 feet below grade. Roller bit to 15 feet. Rig chatter from 10 to 15 feet. Cobble from 10 to 14 feet.		
	15	S7	15 to 17	24/4	16-8-5-3	PID = 0.0ppm @S7		S7: WIDELY GRADED GRAVEL WITH SAND (GW); ~80% subangular gravel up to 1.5", ~20% sand; brown; wet.
						Drive casing to 20 feet below grade. Roller bit to 20 feet.		**STRATUM IIA - LOOSE SAND (CLASS 6) at ~18.5 ft / El. -4.5**

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,090 **EASTING (ft):** 1,003,573
GROUND SURFACE EL. (ft): 14.0 **DATE START/END:** 5/12/2020 - 5/13/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B21

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/14	5-2-WOH-1	PID = 0.0ppm @S8		S8: CLAYEY SAND (SC); ~75% sand, ~20% low plasticity fines, ~5% fine gravel; dark brown and black; wet. Slight organic-like odor.
						Drive casing to 25 feet below grade. Roller bit to 25 feet.		
-10								
	25	S9	25 to 27	24/7	5-7-11-15	PID = 0.0ppm @S9		S9: CLAYEY SAND WITH GRAVEL (SC); ~50% sand, ~30% subangular gravel, ~20% low plasticity fines; black-white; wet. Some organic fibers. Organic-like odor.
						Drive casing to 30 feet below grade. Roller bit to 30 feet.		**STRATUM IIB - SILT/CLAY (CLASS 4B/5B) at ~28.5 ft / El. -14.5**
	30	S10	30 to 32	24/17	2-5-5-5	PID = 0.0ppm @S10		S10: FAT CLAY WITH GRAVEL (CH); ~85% medium plasticity fines, ~10% subangular gravel up to 1.5", ~5% fine sand; black; wet. Organic-like odor.
						Roller bit to 35 feet. Rig chatter from 32 to 34 feet (Cobble/boulder).		**STRATUM III - TILL (CLASS 3A) at ~33.5 ft / El. -19.5**
-20								
	35	S11	35 to 37	24/2	22-11-21-10	PID = 0.0ppm @S11		S11: WIDELY GRADED GRAVEL WITH SAND (GW); ~70% subangular gravel up to 1.5", ~30% sand; brown; wet.
						Roller bit to 40 feet. Rig chatter from 39 to 40 feet.		
	40	S12	40 to 42	24/8	12-21-24-26	PID = 0.0ppm @S12		S12: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~10% subangular gravel up to 1.5", ~5% nonplastic fines; yellow-brown; wet.
						Drive casing to 40 feet below grade. Roller bit to 45 feet.		
-30								
	45	S13	45 to 47	24/6	29-23-29-30	PID = 0.0ppm @S13		S13: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~25% subangular gravel up to 1.5"; light brown; wet.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,090 **EASTING (ft):** 1,003,573
GROUND SURFACE EL. (ft): 14.0 **DATE START/END:** 5/12/2020 - 5/13/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B21

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Rig chatter ~47 and from 49 to 50 feet.		
	50	S14	50 to 51.2	14/8	39-90-102/2"	PID = 0.0ppm @S14		S14: SILTY SAND WITH GRAVEL (SM): ~50% fine to medium sand; ~30% nonplastic fines; ~20% subangular gravel up to 1.5"; brown; wet. Trace mica. (Class 3a)
-40						Drive casing to 50 feet below grade. Roller bit to 55 feet. Rig chatter ~51 feet and from 52 to 54 feet.		
	55	S15	55 to 55.9	11/0	96-100/5"	PID = 0.0ppm @S15		S15: NO RECOVERY.
						Roller bit to 60 feet. Rig chatter ~56 feet.		
	60	S16	60 to 61.4	17/9	22-34-100/5"	PID = 0.0ppm @S16		S16: WIDELY GRADED SAND WITH SILT (SW-SM); ~80% sand, ~10% nonplastic fines, ~10% subangular gravel up to 1"; brown; wet. Some micaceous sand.
-50						Roller bit to 65 feet. Rig chatter ~61 feet and from 63 to 65 feet. Losing return drilling fluid.		
	65	S17	65 to 65.8	9/9	37-100/3"			S17: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~20% subangular gravel up to 1.5", ~5% nonplastic fines; brown; wet.
						Roller bit to 70 feet. Rig chatter from 66 to 70 feet. Cannot drive casing and losing return drilling fluid.		
	70	S18	70 to 71.4	17/7	66-65-100/5"			S18: SILTY SAND WITH GRAVEL (SM); ~50% fine to medium sand, ~30% nonplastic fines, ~20% subangular gravel up to 1.5"; orange-brown; wet. Trace mica.
								Backfilled with cuttings and hole plug. Bottom of boring at depth 71.4 ft.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 222,064 **EASTING (ft):** 1,003,531
GROUND SURFACE EL. (ft): 17.5 **DATE START/END:** 5/28/2020 - 5/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 75.1 **DRILLER NAME:** Ed Flanagan
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING

B22

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 17.5
		S1	0 to 2	24/13	4-14-7-5	PID =363.0ppm @S1		S1: SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~20% nonplastic fines, ~20% subangular gravel up to 1.5"; brown to black; dry. Slight petroleum odor, black staining. Red brick, concrete, wood and metal fragments.
		S2	2 to 4	24/11	9-13-12-7	PID = 154.9ppm @S2		S2: NARROWLY GRADED SAND WITH SILT (SP-SM); ~80% fine to medium sand, ~10% nonplastic fines, ~10% fie to coarse subangular gravel up to 1"; brown; dry.
	5	S3	4 to 6	24/9	17-13-12-9	PID = 121.4ppm @S3		S3: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S2. Some coal fragments.
		S4	6 to 8	24/14	3-2-4-10	PID = 58.9ppm @S4		S4: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S3.
10		S5	8 to 10	24/10	28-13-9-9	PID = 31.2ppm @S5		S5: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S3. Concrete fragments.
								STRATUM IIC - SAND (CLASS 3B) at ~10 ft / El. 7.5
	10	S6	10 to 12	24/6	2-3-2-5	PID = 24.7ppm @S6		S6: WIDELY GRADED SAND WITH SILT (SW-SM); ~85% sand, ~10% nonplastic fines, ~5% fine subrounded gravel up to 0.5"; brown to reddish-brown; dry.
						Advance casing to 15 feet below grade. Roller bit to 15 feet.		
	15	S7	15 to 17	24/8	3-3-4-2	PID = 13.6ppm @S7		S7: WIDELY GRADED SAND WITH SILT (SW-SM); Similar to S6.
0						Advance casing to 20 feet below grade. Roller bit to 20 feet.		**STRATUM III - TILL (CLASS 3A) at ~18.5 ft / El. -1**

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,064 **EASTING (ft):** 1,003,531
GROUND SURFACE EL. (ft): 17.5 **DATE START/END:** 5/28/2020 - 5/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B22

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 20.4	5/3	100/5"	PID = 0.0ppm @S8		S8: WIDELY GRADED SAND WITH GRAVEL (SW); ~80% sand, ~20% subangular gravel up to 1"; brown; wet.
						Roller bit to 25 feet. Rig chatter from 20 to 22 feet and 23 to 25 feet.		
	25	S9	25 to 27	24/6	59-46-43-31	PID = 0.0ppm @S9		S9: NARROWLY GRADED SAND WITH GRAVEL (SP); ~60% medium to coarse sand, ~40% subangular gravel up to 1.5"; brown; wet.
-10						Advance casing to 25 feet below grade. Roller bit to 30 feet. Rig chatter from 28 to 30 feet.		
	30	S10	30 to 31.4	17/6	10-54-102/5"	PID = 0.0ppm @S10		S10: SILTY SAND WITH GRAVEL (SM); ~48% sand, 32.5% subangular gravel up to 1.5", 19.5% nonplastic fines; brown; wet. [GRAIN SIZE TEST PERFORMED].
						Advance casing to 30 feet below grade. Roller bit to 35 feet. Rig chatter from 32 to 34 feet.		
	35	S11	35 to 36.3	16/6	46-61-103/4"	PID = 0.0ppm @S11		S11: SILTY SAND WITH GRAVEL (SM); ~40% fine to medium sand, ~30% nonplastic fines, ~30% subangular gravel up to 1.5"; brown; wet.
-20						Roller bit to 40 feet. Rig chatter from 36 to 37 feet and 39 to 40 feet.		
	40	S12	40 to 40.9	11/4	57-113/5"	PID = 0.0ppm @S12		S12: SILTY SAND (SM); ~60% fine to medium sand, ~30% nonplastic fines, ~10% subangular gravel up to 0.75"; brown; wet.
						Roller bit to 45 feet. Rig chatter from 42 to 45 feet.		
	45	S13	45 to 45.3	4/4	102/4"	PID = 0.0ppm @S13		S13: SILTY SAND (SM); Similar to S12.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,064 **EASTING (ft):** 1,003,531
GROUND SURFACE EL. (ft): 17.5 **DATE START/END:** 5/28/2020 - 5/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B22

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
-30						Roller bit to 50 feet. Intermittent chatter 45 to 50 feet.		
	50	S14	50 to 50.3	4/2	101/4"	PID = 0.0ppm @S14		S14: WIDELY GRADED SAND WITH GRAVEL (SW): ~70% sand, ~30% subangular gravel up to 1"; brown; wet. Some mica.
						Roller bit to 55 feet. Rig chatter from 51 to 55 feet.		
	55	S15	55 to 55.8	9/3	61-100/3"	PID = 0.0ppm @S15		S15: WIDELY GRADED SAND WITH GRAVEL (SW); SImilar to S14. Rock in tip.
-40						Roller bit to 60 feet. Rig chatter from 58 to 60 feet.		
	60	S16	60 to 60.4	5/2	100/5"	PID = 0.0ppm @S16		S16: NARROWLY GRADED SAND WITH GRAVEL (SM): ~50% fine sand, ~30% nonplastic fines, ~20% subrounded gravel up to 1"; brown; wet.
						Roller bit to 65 feet. Rig chatter from 61 to 62 feet and slow advancement from 63 to 65 feet.		
	65	S17	65 to 65.1	1/0	100/1"			S17: No Recovery.
-50						Roller bit to 70 feet.		
	70	S18	70 to 70.8	9/6	71-102/3"	PID = 0.0ppm @S18		S18: SILTY SAND WITH GRAVEL (SM): ~40% fine to medium sand, ~40% subangular gravel up to 1.5", ~20% nonplastic fines; brown; wet. Trace mica.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,064 **EASTING (ft):** 1,003,531
GROUND SURFACE EL. (ft): 17.5 **DATE START/END:** 5/28/2020 - 5/28/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B22

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet. Rig chatter from 71 to 72 feet.		
	75	S19	75 to 75.1	1/1	100/1"	PID = 0.0ppm @S19		S19: NARROWLY GRADED GRAVEL WITH SAND (GP); ~80% fine gravel, ~20% medium tog coarse sand; brown to black; wet. Backfilled with cuttings and hole plug. Bottom of boring at depth 75.1 ft.
-60								
	80							
	85							
-70								
	90							
	95							
-80								

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 222,133 **EASTING (ft):** 1,003,480
GROUND SURFACE EL. (ft): 15.0 **DATE START/END:** 3/10/2020 - 3/11/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 90.1 **DRILLER NAME:** Joe Schuster
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING

B23

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NX Wireline
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** 2.125 inch / 3 inch
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 15
		S1	0 to 2	24/12	13-26-37-25	PID = 0.9ppm @S1		(0-6"): Asphalt. S1 (6"-12"): SILTY SAND WITH GRAVEL (SM); ~60% fine sand, ~20% nonplastic fines, ~20% angular gravel up to 1.25"; dark brown; dry. Brick fragments.
		S2	2 to 4	24/3	90-37-33-41	PID = 0.4ppm @S2		S2: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% angular gravel up to 0.75"; brown; dry. Brick, asphalt and glass fragments.
10	5	S3	4 to 6	24/15	29-19-11-11	PID = 0.0ppm @S3		S3: SILTY SAND (SM); Similar to S2.
		S4	6 to 8	24/3	7-5-2-4	PID = 0.0ppm @S4		S4: GRAVEL WITH SAND (GP); ~70% subangular gravel, ~30% fine t coarse sand; brown; dry. Asphalt, brick, concrete fragments and plastic debris.
		S5	8 to 10	24/7	6-9-5-4	PID = 0.0ppm @S5		S5: SILTY SAND WITH GRAVEL (SM); ~50% fine to medium sand, ~30% nonplastic fines, ~20% subangular gravel up to 1"; brown; moist. Brick fragments and plastic debris.
						Drive casing to 8 feet below grade.		
	10	S6	10 to 12	24/7	5-5-3-7	PID = 0.0ppm @S6		S6:SILTY SAND WITH GRAVEL (SM); Similar to S5.
						Drive casing to 13 feet below grade.		
0	15	S7	15 to 17	24/7	9-7-6-5	PID = 0.0ppm @S7		S7:SILTY SAND WITH GRAVEL (SM); Similar to S5. Brown to black. Trace mica. Faint petroleum odor at bottom of spoon. Black staining.
						Drive casing to 18 feet below grade.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,133 **EASTING (ft):** 1,003,480
GROUND SURFACE EL. (ft): 15.0 **DATE START/END:** 3/10/2020 - 3/11/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B23

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/11	7-3-2-3	PID = 0.0ppm @S8		S8: CLAYEY SAND (SC); ~70% sand, ~20% low plasticity fines, ~10% gravel subangular up to 1"; brown and black; wet. Black staining; slight petroleum odor. Retained for environmental analysis.
						Drive casing to 23 feet below grade.		**STRATUM III - TILL (CLASS 3A) at ~23.5 ft / El. -8.5**
-10	25	S9	25 to 27	24/6	21-17-10-12	PID = 0.0ppm @S9		S9: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~25% subangular gravel up to 1.25"; grayish-brown; wet.
						Drive casing to 28 feet below grade. Rig chatter 28 to 30 feet.		
	30	S10	30 to 31.8	21/10	3-5-9-105/3"	PID = 0.0ppm @S10		S10: NARROWLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); ~70% fine to medium sand, ~20% subangular gravel up to 1.5", ~10% nonplastic fines; grayish-brown to brown, wet.
						Rollerbit to 35 feet. Rig chatter from 34 to 35 feet.		
-20	35	S11	35 to 36.7	20/17	18-24-45-102/2"	PID = 0.0ppm @S11		S11: NARROWLY GRADED SAND WITH SILT AND GRAVEL (SP-SM); Similar to S10.
		S12	37 to 37.1	1/0	102/1"			S12: No Recovery.
		C1	38 to 43	60/22				C1: BOULDER/COBBLE. Core run times: 7:31, 2:25, 1:45, 0:54, 0:20.
	40							
-30	45	S13	45 to 47	24/17	67-63-64-79	PID = 0.0ppm @S13		S13: SILTY SAND WITH GRAVEL (SM); 47.1% sand, 32.1% subangular gravel up to 1.5", 20.8% nonplastic fines; brown; wet. [GRAIN SIZE TEST PERFORMED].

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,133 **EASTING (ft):** 1,003,480
GROUND SURFACE EL. (ft): 15.0 **DATE START/END:** 3/10/2020 - 3/11/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B23

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Rig chatter from 47 to 49 feet.		
	50	S14	50 to 51.8	21/15	31-52-73-102/3"	PID = 0.0ppm @S14		S14: SILTY SAND (SM); Similar to S13.
						Intermittent rig chatter from 52 to 55 feet.		
-40	55	S15	55 to 55.3	3/2	102/3"	PID = 0.0ppm @S15		S15: SILTY SAND (SM); ~70% fine sand, ~25% nonplastic fines, ~5% subangular gravel up to 1"; brown; wet.
						Rig chatter at 56 to 57 feet.		
	60	S16	60 to 60.7	8/8	70-104/2"	PID = 0.0ppm @S16		S16: SILTY SAND (SM); Similar to S15.
						Rig chatter at 63 to 65 feet.		
-50	65	S17	65 to 67	24/17	41-47-32-79	PID = 0.0ppm @S17		S17: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% subangular gravel up to 1.5"; brown to orange-brown; wet.
						Rig chatter at 67 to 69 feet.		
	70	S18	70 to 72	24/20	88-84-61-116	PID = 0.0ppm @S18		S18: SILTY SAND (SM); Similar to S17. Orange-brown.
						Rig chatter at ~72 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,133 **EASTING (ft):** 1,003,480
GROUND SURFACE EL. (ft): 15.0 **DATE START/END:** 3/10/2020 - 3/11/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B23

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~73.5 ft / El. -58.5
-60	75	S19	75 to 77	24/20	11-21-29-39	PID = 0.0ppm @S19		S19: SILT (ML); ~85% nonplastic to low plasticity fines, ~10% sand, ~5% angular gravel up to 0.75"; greenish-blue. Decomposed bedrock.
						Rig chatter at 79 to 80 feet.		
	80	S20	80 to 80.1	1/0	105/1"			S20: NO RECOVERY. Spoon didn't advanced. On top of bedrock.
		C2	80.1 to 85.1	60/44	32%			C2: HARTLAND FORMATION; Gneiss, hard, slight weathering from 16" to base, moderate weathering above 16", black and white, banded, fine to medium grained. (4-10.5") is broken apart with sand. Horizontal fractures at 4", 10.5", 16", 22.5", 26.5", 29.5", 33", 36" and 41". Core run times per foot (minutes:seconds): 2:19, 1:54, 02:12, 03:21, and 04:11.
-70	85							**STRATUM V - BEDROCK (CLASS 1B) at ~85.1 ft / El. -70.1**
		C3	85.1 to 90.1	60/60	96%			C3: HARTLAND FORMATION; Horizontal fractures at 3", 15.5", 19.5" and 38.5". Gneiss, hard, slight weathering, moderate weathering at fracture at 19.5", black and white, banded, fine to medium grained. Core run times per foot (minutes:seconds): 03:05, 02:37, 02:43, 03:21, and 03:15.
	90							Backfilled with cuttings and hole plug. Bottom of boring at depth 90.1 ft.
-80	95							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 222,066 **EASTING (ft):** 1,003,320
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 3/16/2020 - 3/17/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 85.0 **DRILLER NAME:** Joe Schuster
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING
B29(OW)

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft): ▼ 16.9 3/18/2020 7:55 am in observation well

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 21.9
		S1	0 to 2	24/3	17-4-5-47	PID = 0.0ppm @S1		S1: WIDELY GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~80% sand, ~10% gravel angular to subrounded up to 1.25", ~10% nonplastic fines; brown; dry.
20		S2	2 to 4	24/14	52-21-9-5	PID = 0.0ppm @S2		S2: WIDELY GRADED SAND WITH SILT AND GRAVEL (SW-SM); Similar to S1. Drilled through cobble boulder 4 to 14 inches.
	5	S3	4 to 6	24/3	32-22-17-11	PID = 0.0ppm @S3		S3: WIDELY GRADED SAND (SW); ~95% sand, ~5% angular to subrounded gravel up to 0.75"; yellow-brown; dry.
		S4	6 to 8	24/7	11-11-6-11	PID = 0.0ppm @S4		S4: WIDELY GRADED SAND WITH GRAVEL (SW); ~70% sand, ~30% subangular to subrounded gravel up to 1.5"; orange-brown; dry.
								STRATUM IIC - SAND (CLASS 3B) at ~8 ft / El. 13.9
		S5	8 to 10	24/9	12-19-15-16	Advancing casing to 8feet; Roller bit to 10feet after sample. PID = 0.0ppm. @S5		S5: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, ~5% subangular to subrounded gravel up to 1.25", ~5% nonplastic fines; brown to reddish brown; dry.
	10	S6	10 to 12	24/8	12-8-8-14	PID = 0.0ppm @S6		S6 (0-12"): SILTY SAND (SM); ~75% fine to medium sand, ~20% nonplastic fines, ~5% subangular gravel up to 0.5"; brown; dry.
10								S6 (12"-18"): NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% nonplastic fines; tan; dry.
						Roller bit to 15 feet.		
	15	S7	15 to 17	24/17	7-4-5-26	PID = 0.0ppm @S7		S7 (0-7"): NARROWLY GRADED SAND (SP); Similar to S6 but brown and moist. S7 (7"-17"): SILT WITH SAND (ML); ~90% nonplastic fines, ~10% fine sand; brown; moist. Trace mica.
						Roller bit to 20 feet. Rig chatter 16 to 18 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,066 **EASTING (ft):** 1,003,320
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 3/16/2020 - 3/17/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B29(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24	16-7-10-15	PID = 0.0ppm @S8		S8: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, ~5% subangular to subrounded gravel up to 1.25", ~5% nonplastic fines; brown; wet.
0						Roller bit to 25 feet. Rig chatter from 23 to 25 feet.		**STRATUM III - TILL (CLASS 3A) at ~23.5 ft / El. -1.6**
	25	S9	25 to 27	24/11	23-21-21-24	PID = 0.0ppm @S9		S9: WIDELY GRADED SAND WITH GRAVEL (SW); ~70% sand, ~30% subangular to subrounded gravel up to 1.5"; brown; wet. Mica near the top.
						Roller bit to 30 feet. Rig chatter from 25 to 26 feet and 29 to 30 feet.		
	30	S10	30 to 30.8	9/5	38-104/3"	PID = 0.0ppm @S10		S10: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% angular to subangular gravel up to 0.75"; brown to reddish brown; wet.
-10						Roller bit to 35 feet. Rig chatter from 31 to 32 feet, 33 to 34 feet.		
	35	S11	35 to 35.8	9	118-101/3"	PID = 0.0ppm @S11		S11: NARROWLY GRADED SAND WITH SILT (SP-SM); ~80% fine to medium sand, ~10% angular to subrounded gravel up to 1.5", ~10% nonplastic fines; brown; wet. Drilled into boulder/cobble in shoe.
						Roller bit to 40 feet. Rig chatter from 36 to 40 feet.		
	40	S12	40 to 42	24/22	79-82-66-78	PID = 0.0ppm @S12		S12: WIDELY GRADED SAND WITH GRAVEL (SW): ~70% sand, ~30% subangular to subrounded gravel up to 1.5"; brown; wet.
-20						Roller bit to 45 feet. Rig chatter from 45 to 46 feet, 47 to 50 feet.		
	45	S13	45 to 45.2	2/2	102/2"	PID = 0.0ppm @S13		S13: SANDY SILT (ML): ~60% nonplastic fines, ~40% sand; brown; wet.

NOTES:

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CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,066 **EASTING (ft):** 1,003,320
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 3/16/2020 - 3/17/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B29(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 50 feet. Rig chatter from 45 to 46 feet.		
	50	S14	50 to 51.3	16/15	45-97-102/4"	PID = 0.0ppm @S14		S14: SILTY SAND (SM); ~55% fine sand, ~40% nonplastic fines, ~5% angular to subrounded gravel up to 0.75"; brown; wet. Trace mica.
-30						Roller bit to 55 feet. Rig chatter from 53 to 54 feet.		
	55	S15	55 to 55.4	5/3	110/5"	PID = 0.0ppm @S15		S15: SILTY SAND (SM); ~60% fine sand, ~30% nonplastic fines, ~10% subangular gravel up to 1"; brown; wet.
						Roller bit to 60 feet. Rig chatter at 56 and 58 feet.		
	60	S16	60 to 60.2	2/2	102/2"	PID = 0.0ppm @S16		S16: NARROWLY GRADED SAND WITH GRAVEL (SP); ~75% fine to medium sand, ~20% subangular to subrounded gravel up to 1", ~5% nonplastic fines; brown; wet.
-40						Rig chatter from 63 to 65 feet. Slow advancement 60 to 63 feet.		
	65	S17	65 to 65.1	1/0	105/1"	PID = 0.0ppm @S17		S17: No Recovery.
						Rig chatter from 67 to 70 feet. Slow advancement 65 to 69 feet. Quick advancement 69 to 70 feet.		**STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~67 ft / El. -45.1**
	70	S18	70 to 70.3	4/4	100/4"	PID = 0.0ppm @S18		S18: WIDELY GRADED SAND WITH SILT (SW-SM); ~85% sand, ~10% nonplastic to low plasticity fines, ~5% fine angular gravel < 0.5"; white to yellow-brown; wet. Decomposed rock.
-50								

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,066 **EASTING (ft):** 1,003,320
GROUND SURFACE EL. (ft): 21.9 **DATE START/END:** 3/16/2020 - 3/17/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B29(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Roller bit to 75 feet. Driller used low pressure on bit, slow advancement.		
	75	S19 C1	75 to 75 75 to 80	0/0 60/34	45/0" 35%	No advancement, hard bouncing.		S19: No Recovery. Spoon bouncing. C1: 1.5 to 8.5" very fractured. Gneiss; hard; fine to medium grained; horizontal and vertical banding; slight weathering at fractures; white to grey to black. Horizontal fractures at 1.5", 8.5", 12.5", 17.5", 21.5", and 26.5". Core run times per foot (minutes:seconds): 1:06, 2:42, 2:38, 3:52, and 3:06.
								STRATUM V - BEDROCK (CLASS 1B) at ~80 ft / El. -58.1
	80	C2	80 to 85	60/57	71%			C2: Gneiss; hard; fine to medium grained; horizontal and vertical banding; slight weathering at fractures; white to grey to black. Horizontal fractures at 4", 7", 11", 15.5", 19.5", 22.5", 29", 34", 39", 45"and 51.5". Core run times per foot (minutes:seconds): 4:01, 2:47, 2:57, 2:38, and 3:07.
-60								
	85							Backfilled with cuttings and hole plug. Bottom of boring at depth 85 ft.
	90							
-70								
	95							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,759 **EASTING (ft):** 1,003,421
GROUND SURFACE EL. (ft): 29.4 **DATE START/END:** 5/13/2020 - 5/14/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 55.0 **DRILLER NAME:** Keith Parent
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING
B53(OW)

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NX Wireline
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** 2.125 inch / 3 inch
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft): ▼ 23.5 5/15/2020 9:30 am in observation well

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 29.4
		S1	0 to 1.7	20/3	9-7-4-9/2"	PID = 0.0ppm @S1		(0-4"): Asphalt. S1: SILTY SAND (SM); ~75% fine sand, ~20% nonplastic fines, ~5% angular gravel up to 1"; yellow-brown; dry. Red brick fragments.
		S2	2 to 4	24/10	10-6-7-5	PID = 0.0ppm @S2		S2: SILTY SAND (SM); ~75% fine to medium sand, ~25% nonplastic fines; orange-brown to brown; dry.
								STRATUM IIC - SAND (CLASS 3B) at ~4 ft / El. 25.4
	5	S3	4 to 6	24/10	10-6-5-4	PID = 0.0ppm @S3		S3: NARROWLY GRADED SAND WITH SILT (SP-SM); ~90% fine to medium sand, ~10% nonplastic fines; tan-brown; dry. Trace mica.
		S4	6 to 8	24/19	6-3-3-4	PID = 0.0ppm @S4		S4: NARROWLY GRADED SAND WITH SILT (SP-SM); ~90% fine sand, ~10% nonplastic fines; tan to yellow-brown; dry. Trace mica.
20		S5	8 to 10	24/14	4-4-6-5	PID = 0.0ppm @S5		S5: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S4.
	10	S6	10 to 12	24/15	8-6-8-5	PID = 0.0ppm @S6		S6: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S4.
						Advance casing to 15 feet below grade. Roller bit to 15 feet.		**STRATUM III - TILL (CLASS 3A) at ~13.5 ft / El. 15.9**
	15	S7	15 to 17	24/7	9-8-17-19	PID = 0.0ppm @S7		S7: SILTY SAND WITH GRAVEL (SM); ~60% fine to medium sand, ~20% nonplastic fines, ~20% angular to subrounded gravel up to 1.5"; purple-brown; moist.
10						Advance casing to 20 feet below grade. Roller bit to 20 feet. Rig chatter ~16 feet and from 17 to 18 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,759 **EASTING (ft):** 1,003,421
GROUND SURFACE EL. (ft): 29.4 **DATE START/END:** 5/13/2020 - 5/14/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B53(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S8	20 to 22	24/10	20-48-45-49	PID = 0.0ppm @S8		S8: SILTY SAND WITH GRAVEL (SM); Similar to S7.
						Advance casing to 25 feet below grade. Roller bit to 25 feet.		
	25	S9	25 to 27	24/8	52-32-41-45	PID = 0.0ppm @S9		S9: WIDELY GRADED SAND WITH GRAVEL (SW); ~75% sand, ~25% subangular to rounded gravel up to 1.5"; brown; wet.
						Roller bit to 30 feet. Rig chatter from 25 to 26 feet.		
0	30	S10	30 to 32	24/9	20-21-27-26	PID = 0.0ppm @S10		S10: WIDELY GRADED SAND WITH GRAVEL (SW); Similar to S9.
						Roller bit to 35 feet. Rig chatter from 33 to 35 feet.		
	35	S11	35 to 37	24/12	42-66-39-44	PID = 0.0ppm @S11		S11: WIDELY GRADED SAND WITH GRAVEL (SW); ~70% sand, ~25% subangular to subrounded gravel up to 1.25", ~5% nonplastic fines; brown; wet.
						Roller bit to 40 feet.		**STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~38.5 ft / El. -9.1**
-10	40	S12	40 to 40.8	10/10	26-100/4"			S12: SILTY SAND (SM); ~70% fine to medium micaceous sand, ~25% nonplastic fines, ~5% subangular to subrounded gravel up to 1"; black and white, blue-green; wet.
						Roller bit to 45 feet. Rig chatter from 40 to 45 feet.		
	45	S13 C1	45 to 45	0 60/56	53/0" 74%			S13: No Recovery. Split-spoon bouncing. **STRATUM V - BEDROCK (CLASS 1B) at ~45 ft / El. -15.6**

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,759
EASTING (ft): 1,003,421
GROUND SURFACE EL. (ft): 29.4
DATE START/END: 5/13/2020 - 5/14/2020
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104
DRILLING COMPANY: Craig Geotechnical Drilling

BORING B53(OW)

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
			45 to 50					C1: HARTLAND FORMATION; Gneiss; hard; fine to coarse grained; black and white and blue-green; slight to moderate weathering; contains a lot of mica. Fractures at 4", 12", 22", 28", 35", 41.5", 45", 48", 50.5", and 52". Circular pockets of quartz. Core run times per foot (minutes:seconds): 05:59, 05:29, 04:53, 06:19, 05:16.
-20	50	C2	50 to 55	60/60	56%			C2: HARTLAND FORMATION; Similar to C1. Fractures at 5", 10", 13", 16", 21", 25", 31", 34.5", 41", 43", 47" and 55". Mica oriented vertically. Core run times per foot (minutes:seconds): 06:56, 06:56, 07:08, 05:52, 08:08.
	55							Backfilled with cuttings and hole plug. Bottom of boring at depth 55 ft.
-30	60							
	65							
-40	70							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 222,057 **EASTING (ft):** 1,003,490
GROUND SURFACE EL. (ft): 20.1 **DATE START/END:** 11/23/2021 - 11/23/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 102.0 **DRILLER NAME:** Marc Aquino
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING

B101

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NX Wireline
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** 2.125 inch / 3 inch
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
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SC = Sonic Core
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HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 20.1
		S1	0 to 2	24/15	11-7-6-6			(0-6"): Concrete. S1: SILTY SAND (SM); ~70% fine to medium sand, ~20% nonplastic fines, ~10% subangular to subrounded gravel up to 0.75"; dark brown; dry; moderately tight; concrete / brick fragments.
		S2	2 to 4	24/11	11-13-11-5			S2: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine to medium sand, ~10% nonplastic fines, ~5% subangular to subrounded gravel up to 0.75"; brown; dry.
		S3	4 to 6	24/9	8-5-25-19			S3: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine sand, ~10% nonplastic fines, ~5% fine gravel; brown; dry; loose. Drilled through rock (cobble/boulder) from 6 to 9".
	5	S4	6 to 8	24/7	17-7-6-5			S4: SILTY SAND (SM); ~70% fine sand, ~25% nonplastic fines, ~5% subangular to subrounded gravel up to 0.75"; brown; dry; loose.
								STRATUM IIA - LOOSE SAND (CLASS 6) at ~8 ft / El. 12.1
		S5	8 to 10	24/7	5-2-3-2	Drive casing to 8 feet below grade. Rollerbit to 8 feet. Added quick-gel to drilling mud.		S5: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, some mica, ~5% nonplastic fines, ~5% fine gravel; brown; dry; loose.
10	10	S6	10 to 12	24/0	3-2-1-2	Drive casing to 8 feet below grade. Rollerbit to 8 feet. Added quick-gel to drilling mud. @S5		S6: No Recovery.
		S7	12 to 14	24/0	2-1-1-2			S7: No Recovery.
						Rollerbit to 15 feet.		
	15	S8	15 to 17	24/5	2-1-1-1			S8: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine to medium sand, some mica, ~10% nonplastic fines, ~5% fine gravel; brown; wet; loose.
						Drive casing to 15 feet. Rollerbit to 20 feet. Rig chatter from 19 to 20 feet.		
								STRATUM IIC - SAND (CLASS 3B) at ~19 ft / El. 1.1

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,057 **EASTING (ft):** 1,003,490
GROUND SURFACE EL. (ft): 20.1 **DATE START/END:** 11/23/2021 - 11/23/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B101

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		S9	20 to 22	24/9	14-9-8-6			S9: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~5% nonplastic fines, ~10% subangular to subrounded gravel up to 1.25"; brown; wet; loose.
						Rollerbit to 25 feet. Rig chatter from 20 to 21 and 23 to 24 feet. Drive casing to 20 feet. Rollerbit to 25 feet. Intermittent rig chatter from 20 to 25 feet.		**STRATUM III - TILL (CLASS 3A) at ~23.5 ft / El. -3.4**
	25	S10	25 to 27	24/9	12-17-12-14			S10: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, ~5% nonplastic fines, ~5% subangular gravel up to 1"; 0 to 2" brown and 2 to 9" black (micaceous sand); wet; moderately tight.
						Drive casing to 25 feet. Rollerbit to 30 feet. Rig chatter from 28 to 30 feet.		
-10	30	S11	30 to 32	24/13	34-29-36-27			S11: NARROWLY GRADED SAND WITH SILT (SP-SM); ~80% fine sand, ~10% nonplastic fines, ~10% subangular to subrounded gravel up to 1"; brown; wet; tight.
						Rollerbit to 35 feet. Intermittent rig chatter from 30 to 35 feet.		
	35	S12	35 to 37	24/12	43-46-77-62			S12: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, trace micaceous sand, ~5% nonplastic fines, ~5% subangular to subrounded gravel up to 0.75"; brown; wet; tight.
						Rollerbit to 40 feet. Rig chatter from 37 to 39 feet.		
-20	40	S13	40 to 40.9	11/9	53-100/5"			S13: NARROWLY GRADED SAND (SP); Similar to S12. Drilled through rock (cobble/boulder) from 7 to 9".
						Rollerbit to 45 feet. Rig chatter from 41 to 42 feet.		
	45	S14	45 to 47	24/18	66-49-73-84			S14: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, some micaceous sand, ~5% nonplastic fines, ~10% angular to subrounded gravel up to 1.5"; brown; wet; tight.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,057 **EASTING (ft):** 1,003,490
GROUND SURFACE EL. (ft): 20.1 **DATE START/END:** 11/23/2021 - 11/23/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B101

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						Rollerbit to 50 feet. Rig chatter from 47 to 48 and 49 to 50 feet.		
-30	50	S15	50 to 50.3	4/2	101/4"	Rollerbit to 55 feet. Intermittent rig chatter from 50 to 55 feet / advanced slowly.		S15: NARROWLY GRADED SAND (SP); ~90% fine to medium micaceous sand, ~10% angular to subangular gravel up to 1"; black wet; tight.
	55	S16	55 to 55.8	10/7	53-100/4"	Rollerbit to 60 feet. Rig chatter from 55 to 56 and 59 to 60 feet. Boulder from 56 to 59 feet / advanced slowly.		S16: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~5% nonplastic fines, ~10% subangular to subrounded gravel up to 1"; brown; wet; tight.
-40	60	S17	60 to 60.4	5/3	100/5"	Rollerbit to 65 feet. Intermittent rig chatter from 60 to 65 feet.		S17: NARROWLY GRADED SAND (SP); Similar to S16.
	65	S18	65 to 65	0/0	50/0"	Spoon bounced. Rollerbit to 70 feet. Slow advance from 65 to 68 feet, quick advance from 68 to 69 feet, and slow advance from 69 to 70 feet. Just before 70 feet the advancement quickened. Spoon bounced. Rollerbit to 70 feet. Slow advance from 65 to 68 feet, quick advance from 68 to 69 feet, and slow advance from 69 to 70 feet. Just before 70 feet the advancement quickened. @S18		S18: No Recovery.
-50	70	S19	70 to 70.3	4/0	100/4"	Rollerbit to 75 feet. Rig chatter from 70 to 72 feet and slow advance from 72 to 73 feet.		S19: No Recovery.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,057 **EASTING (ft):** 1,003,490
GROUND SURFACE EL. (ft): 20.1 **DATE START/END:** 11/23/2021 - 11/23/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B101

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
		C1	73 to 76	36/11		Boulder to approx. 75 feet. Boulder to approx. 75 feet. @C1		C1: BOULDER/COBBLE; gneiss; core run times 4:35, 4:01, 3:31.
	75					Rollerbit to 80 feet. Rig chatter from 76 to 77 and 79 to 80 feet.		
-60	80	S20	80 to 82	24/11	24-27-42-44			S20: NARROWLY GRADED SAND WITH SILT (SP-SM); ~80% fine to medium sand, ~10% nonplastic fines, ~10% subangular to subrounded gravel up to 1.25"; brown; wet; tight.
						Rollerbit to 85 feet. Intermittent rig chatter from 80 to 85 feet.		
	85	S21	85 to 87	24/17	22-31-38-30			S21: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S20.
								STRATUM IV - DECOMPOSED/WEATHERED ROCK (CLASS 1D) at ~87 ft / El. -66.9
						Rollerbit to 90 feet. Rig chatter from 87 to 88 feet.		S22: DECOMPOSED BEDROCK; ~70% fine to medium sand, ~20% nonplastic to low-plasticity fines, ~10% subangular gravel up to 1.5"; brown, blue-green, reddish-brown; wet; tight.
-70	90	S22	90 to 92	24/17	19-20-21-20			
						Rollerbit to 95 feet.		
	95	S23	95 to 97	24/21	9-10-12-14			S23: DECOMPOSED BEDROCK; ~95% low-plasticity clay, flaky, ~5% sand; light red; wet; tight; mica; layering.
						Rollerbit to 100 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 222,057
EASTING (ft): 1,003,490
GROUND SURFACE EL. (ft): 20.1
DATE START/END: 11/23/2021 - 11/23/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104
DRILLING COMPANY: Craig Geotechnical Drilling

BORING B101

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
-80	100	S24	100 to 102	24/24	9-11-16-17			S24: DECOMPOSED BEDROCK; Similar to S23 but light red, blue, white-tan.
								Backfilled with cuttings and hole plug. Bottom of boring at depth 102 ft.
	105							
-90	110							
	115							
-100	120							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

BORING INFORMATION

NORTHING (ft): 221,943 **EASTING (ft):** 1,003,439
GROUND SURFACE EL. (ft): 21.4 **DATE START/END:** 11/24/2021 - 11/24/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling
TOTAL DEPTH (ft): 86.8 **DRILLER NAME:** Marc Aquino
LOGGED BY: G. Holmes **RIG TYPE:** CME 75

BORING

B102

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NA
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Mud Rotary Wash
WATER LEVEL DEPTHS (ft):

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split-Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PL = Plasticity Limit
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
								STRATUM I - FILL (CLASS 7) at ~0 ft / El. 21.4
20		S1	0 to 2	24/11	12-4-8-9			0-2": ASPHALT. S1: SILTY SAND (SM); ~70% fine sand, fine to medium at base, ~20% nonplastic fines, ~10% angular to subangular gravel up to 1.5"; brown; dry; tight; brick fragments.
		S2	2 to 4	24/12	11-4-6-3			S2: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% nonplastic fines; orange-brown; dry; loose.
	5	S3	4 to 6	24/13	7-5-2-2			S3: NARROWLY GRADED SAND (SP); Similar to S2.
		S4	6 to 8	24/10	4-4-3-2			S4: SILTY SAND (SM); ~60% fine sand, ~40% nonplastic fines; light brown; dry; loose.
		S5	8 to 10	24/0	63-31-53-42	Drive casing to 8 feet below grade. Rollerbit to 8 feet.		S5: No Recovery. Shoe broke off of spoon.
	10					Rollerbit to 15 feet. Rig chatter from 8 to 12 feet. Drive casing to 15 feet. Rollerbit to 15 feet.		
10								**STRATUM IIC - SAND (CLASS 3B) at ~13.5 ft / El. 7.9**
	15	S6	15 to 17	24/5	10-8-11-10			S6: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine to medium sand, ~10% nonplastic fines, ~5% fine gravel; light brown; wet; loose.
						Rollerbit to 20 feet. Rig chatter from 17 to 18 feet. Drive casing to 20 feet. Rollerbit to 20 feet.		**STRATUM III - TILL (CLASS 3A) at ~18.5 ft / El. 2.9**

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,943 **EASTING (ft):** 1,003,439
GROUND SURFACE EL. (ft): 21.4 **DATE START/END:** 11/24/2021 - 11/24/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B102

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
0		S7	20 to 22	24/13	17-17-18-18	Rollerbit to 25 feet. Drive casing to 25 feet. Rollerbit to 25 feet.		S7: SILTY SAND (SM); ~60% fine sand, some micaceous sand mixed in, ~30% nonplastic fines, ~10% subangular to subrounded gravel up to 1.25"; brown; wet; tight.
	25	S8	25 to 27	24/15	20-21-15-15	Added quick-gel to drilling mud. Rollerbit to 30 feet. Rig chatter from 28 to 30 feet. Drive casing to 30 feet. Rollerbit to 30 feet.		S8: NARROWLY GRADED SAND WITH SILT (SP-SM); ~80% fine to medium sand, ~10% nonplastic fines, ~10% subangular to subrounded gravel up to 1"; brown; wet; tight.
-10	30	S9	30 to 32	24/15	14-37-72-66	Rollerbit to 35 feet. Rig chatter from 31 to 35 feet.		S9: NARROWLY GRADED SAND (SP); ~85% fine to medium sand, ~5% nonplastic fines, ~10% angular to subangular gravel up to 1.5"; brown; wet; tight.
	35	S10	35 to 37	24/14	27-42-51-65	Rollerbit to 40 feet. Rig chatter from 36 to 40 feet.		S10: NARROWLY GRADED SAND WITH GRAVEL (SP); ~80% fine to medium sand, ~20% subangular to rounded gravel up to 1.5"; brown; wet; tight.
-20	40	S11	40 to 40.9	11/7	59-100/5"	Drive casing to 35 feet. Rollerbit to 45 feet. Intermittent rig chatter from 41 to 45 feet.		S11: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, ~5% nonplastic fines, ~5% subangular to subrounded gravel up to 0.75"; brown; wet; tight.
	45	S12	45 to 45	0/0	50/0"	Rollerbit to 50 feet. Rig chatter from 45 to 46 and 48		S12: No Recovery.

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,943 **EASTING (ft):** 1,003,439
GROUND SURFACE EL. (ft): 21.4 **DATE START/END:** 11/24/2021 - 11/24/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B102

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
						to 50 feet.		
	50	S13	50 to 51.3	15/13	60-84-100/3"			S13: NARROWLY GRADED SAND (SP); ~90% fine to medium sand, ~10% subangular to subrounded gravel up to 1.5"; brown; wet; tight.
-30						Rollerbit to 55 feet. Rig chatter from 51 to 53 feet.		
	55	S14	55 to 56.4	17/15	55-73-100/5"			S14: NARROWLY GRADED SAND (SP); Similar to S13.
						Rollerbit to 60 feet. Rig chatter from 56 to 58 and 59 to 60 feet.		
	60	S15	60 to 60.8	9/5	70-100/3"			S15: NARROWLY GRADED SAND (SP); ~80% fine sand, ~5% nonplastic fines, ~15% subangular to subrounded gravel up to 1.25"; brown; wet; tight.
-40						Rollerbit to 65 feet. Intermittent rig chatter from 61 to 65 feet.		
	65	S16	65 to 65.7	8/6	79-100/2"			S16: NARROWLY GRADED SAND (SP); ~95% fine to medium sand, ~5% fine gravel; brown; wet; tight.
						Rollerbit to 70 feet. Intermittent rig chatter from 66 to 70 feet.		
	70	S17	70 to 70.4	5/2	101/5"			S17: NARROWLY GRADED SAND WITH GRAVEL (SP); ~75% fine to medium sand, ~5% nonplastic fines, ~20% angular to subrounded gravel up to 1.5"; brown; wet; tight.
-50						Rollerbit to 75 feet. Rig chatter from 70 to 71 and 73 to 74 feet.		

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

NORTHING (ft): 221,943 **EASTING (ft):** 1,003,439
GROUND SURFACE EL. (ft): 21.4 **DATE START/END:** 11/24/2021 - 11/24/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD83 NY Zone 3104 **DRILLING COMPANY:** Craig Geotechnical Drilling

BORING B102

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Graphic Log	Soil and Rock Description
	75	S18	75 to 75.3	3/2	100/3"	Rollerbit to 80 feet. Intermittent rig chatter from 75 to 80 feet.		S18: SILTY SAND (SM); ~50% fine sand, ~40% nonplastic fines, ~10% subangular to subrounded gravel up to 1"; brown; wet; tight.
	80	S19	80 to 80.8	9/7	73-100/3"			S19: NARROWLY GRADED SAND WITH SILT (SP-SM); ~85% fine to medium sand, ~10% nonplastic fines, ~5% subangular to subrounded gravel up to 1"; brown; wet; tight.
-60						Rollerbit to 85 feet. Intermittent rig chatter from 80 to 85 feet.		
	85	S20	85 to 86.8	22/17	68-79-86-100/4"			S20: NARROWLY GRADED SAND WITH SILT (SP-SM); Similar to S19.
						Cannot advance drill rods past 40 feet.		Backfilled with cuttings and hole plug. Bottom of boring at depth 86.8 ft.
-70	90							
	95							

NOTES:

PROJECT NAME: Astoria Cove
CITY/STATE: Astoria, Queens, New York
GEI PROJECT NUMBER: 2305370

GEI Consultants

Appendix B

Well Installation Logs

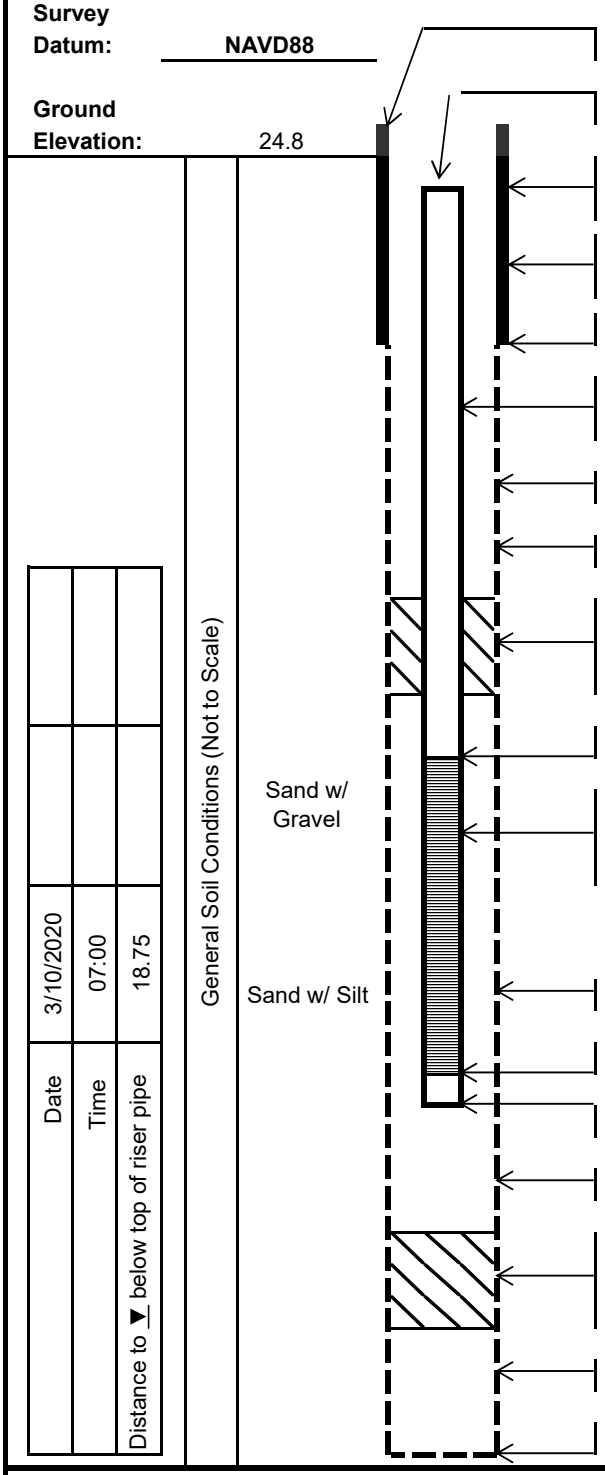
Groundwater Well Installation Log

B5(OW)

Project	Astoria Cove - Phase I	**GEI Proj. No.**	2305370
City / Town	Astoria, NY	**Location**	Bldg. 5
Client	SLIM Astoria 2468 LLC		N: 221777.8 ft E: 1003344.4 ft
Contractor	Craig Test Boring		
Driller	J. Schuster **GEI Rep.** G. Holmes	**Install Date**	3/9/2020

Survey Datum: NAVD88

Ground Elevation: 24.8



Length of Surface Casing above Ground	NA
Dist. Top of Surf. Casing to Top of Riser Pipe	NA
Type and Thickness of Seal around Surface Casing	concrete + 1" of cold patch
ID of Surface Casing	
Type of Surface Casing	4 in. Diam. Handhole
Depth Bottom of Surface Casing	NA
ID and OD of Riser Pipe	2 in. ID / 2.4 in. OD
Type of Riser Pipe	Sch. 40 PVC
Type of Backfill around Riser Pipe	cuttings
Diameter of Borehole	4 in. ID / 4.5 in. OD
Depth Top of Seal	11 ft
Type of Seal	HOLEPLUG 3/8 in.
Depth Bottom of Seal	13 ft
Depth Top of Screened Section	15 ft
Type of Screen	Sch. 40 PVC
Description of Screen Openings	20 slot
ID and OD of Screened Section	2 in. ID / 2.4 in. OD
Type of Filter Material	FILPRO Sand (WG #1)
Depth Bottom of Screened Section	25 ft
Depth Bottom of Silt Trap	25.9 ft
Depth Bottom of Filter Material	27 ft
Depth Top of Seal	N.A.
Type of Seal	N.A.
Depth Bottom of Seal	N.A.
Type of Backfill below Filter Material	cuttings
Bottom of Borehole	102 ft

Notes:

GEI Consultants

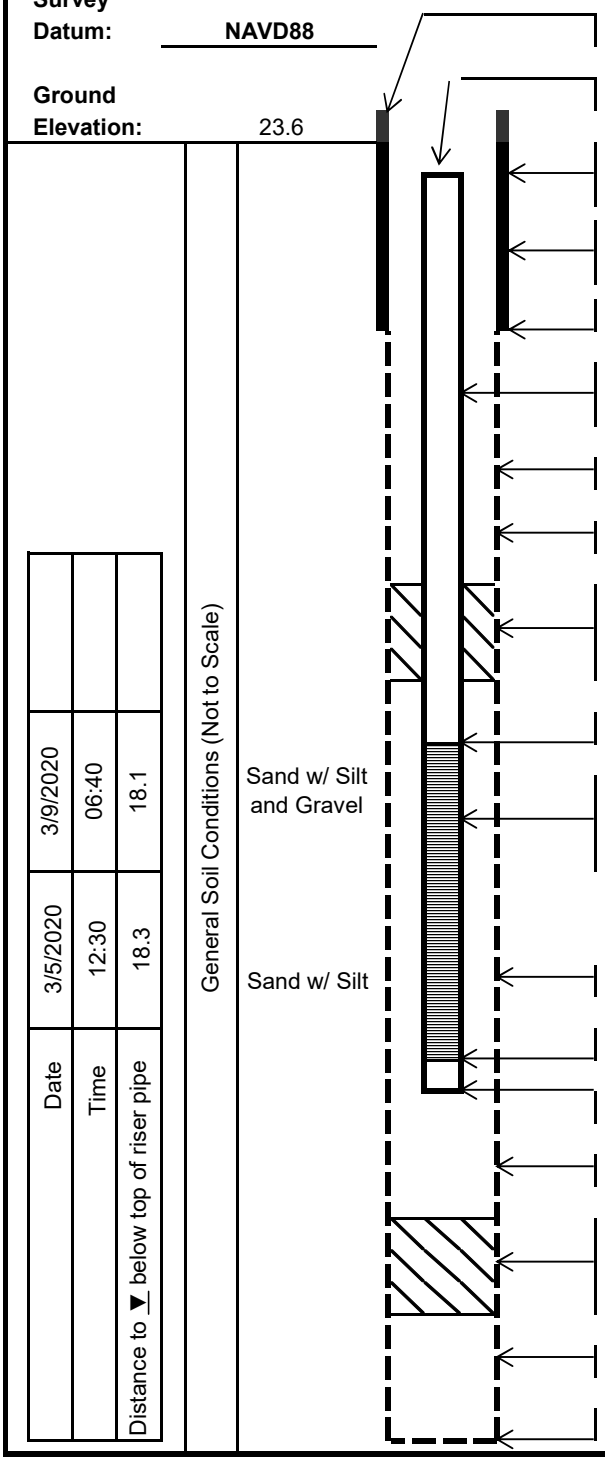
Groundwater Well Installation Log

B8(OW)

Project	Astoria Cove - Phase I	**GEI Proj. No.**	2305370
City / Town	Astoria, NY	**Location**	Bldg. 4
Client	SLIM Astoria 2468 LLC		N: 221818.8 ft E: 1003199.4 ft
Contractor	Craig Test Boring		
Driller	J. Schuster **GEI Rep.** G. Holmes	**Install Date**	3/5/2020

Survey Datum: NAVD88

Ground Elevation: 23.6



Date	Time	Distance to ▼ below top of riser pipe
3/5/2020	12:30	18.3
3/9/2020	06:40	18.1

Length of Surface Casing above Ground	NA
Dist. Top of Surf. Casing to Top of Riser Pipe	NA
Type and Thickness of Seal around Surface Casing	concrete + 1" of cold patch
ID of Surface Casing	
Type of Surface Casing	4 in. Diam. Handhole
Depth Bottom of Surface Casing	NA
ID and OD of Riser Pipe	2 in. ID / 2.4 in. OD
Type of Riser Pipe	Sch. 40 PVC
Type of Backfill around Riser Pipe	cuttings
Diameter of Borehole	4 in. ID / 4.5 in. OD
Depth Top of Seal	16 ft
Type of Seal	HOLEPLUG 3/8 in.
Depth Bottom of Seal	18 ft
Depth Top of Screened Section	20 ft
Type of Screen	Sch. 40 PVC
Description of Screen Openings	20 slot
ID and OD of Screened Section	2 in. ID / 2.4 in. OD
Type of Filter Material	FILPRO Sand (WG #1)
Depth Bottom of Screened Section	30 ft
Depth Bottom of Silt Trap	30.4 ft
Depth Bottom of Filter Material	32 ft
Depth Top of Seal	N.A.
Type of Seal	N.A.
Depth Bottom of Seal	N.A.
Type of Backfill below Filter Material	cuttings
Bottom of Borehole	85 ft

Notes:

GEI Consultants

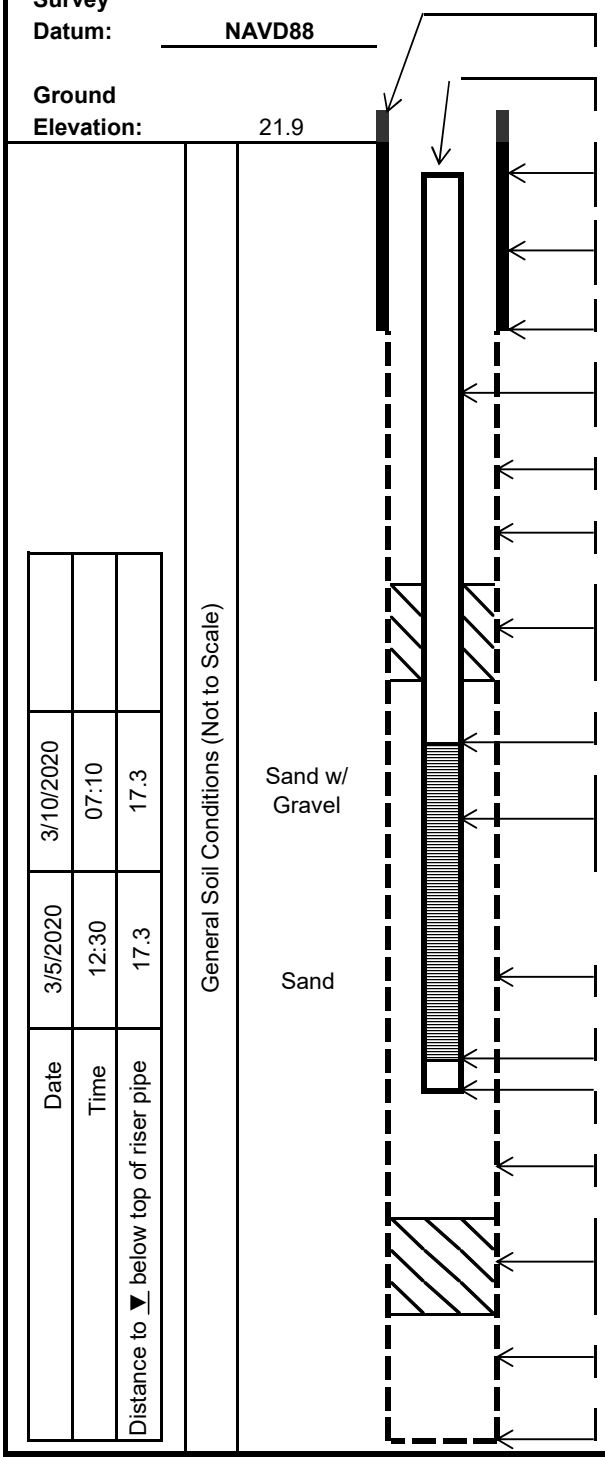
Groundwater Well Installation Log

B16(OW)

Project	Astoria Cove - Phase I	**GEI Proj. No.**	2305370
City / Town	Astoria, NY	**Location**	Bldg. 3A/3B
Client	SLIM Astoria 2468 LLC		N: 221903.5 ft E: 1003498.9 ft
Contractor	Craig Test Boring		
Driller	J. Schuster **GEI Rep.** G. Holmes	**Install Date**	3/3/2020

Survey Datum: **NAVD88**

Ground Elevation: 21.9



Date	Time	Distance to ▼ below top of riser pipe
3/10/2020	07:10	17.3
3/5/2020	12:30	17.3

Length of Surface Casing above Ground	NA
Dist. Top of Surf. Casing to Top of Riser Pipe	NA
Type and Thickness of Seal around Surface Casing	concrete + 1" of cold patch
ID of Surface Casing	
Type of Surface Casing	4 in. Diam. Handhole
Depth Bottom of Surface Casing	NA
ID and OD of Riser Pipe	2 in. ID / 2.4 in. OD
Type of Riser Pipe	Sch. 40 PVC
Type of Backfill around Riser Pipe	cuttings
Diameter of Borehole	4 in. ID / 4.5 in. OD
Depth Top of Seal	16 ft
Type of Seal	HOLEPLUG 3/8 in.
Depth Bottom of Seal	18 ft
Depth Top of Screened Section	22 ft
Type of Screen	Sch. 40 PVC
Description of Screen Openings	20 slot
ID and OD of Screened Section	2 in. ID / 2.4 in. OD
Type of Filter Material	FILPRO Sand (WG #1)
Depth Bottom of Screened Section	32 ft
Depth Bottom of Silt Trap	32.4 ft
Depth Bottom of Filter Material	32 ft
Depth Top of Seal	N.A.
Type of Seal	N.A.
Depth Bottom of Seal	N.A.
Type of Backfill below Filter Material	cuttings
Bottom of Borehole	102 ft

Notes:

GEI Consultants

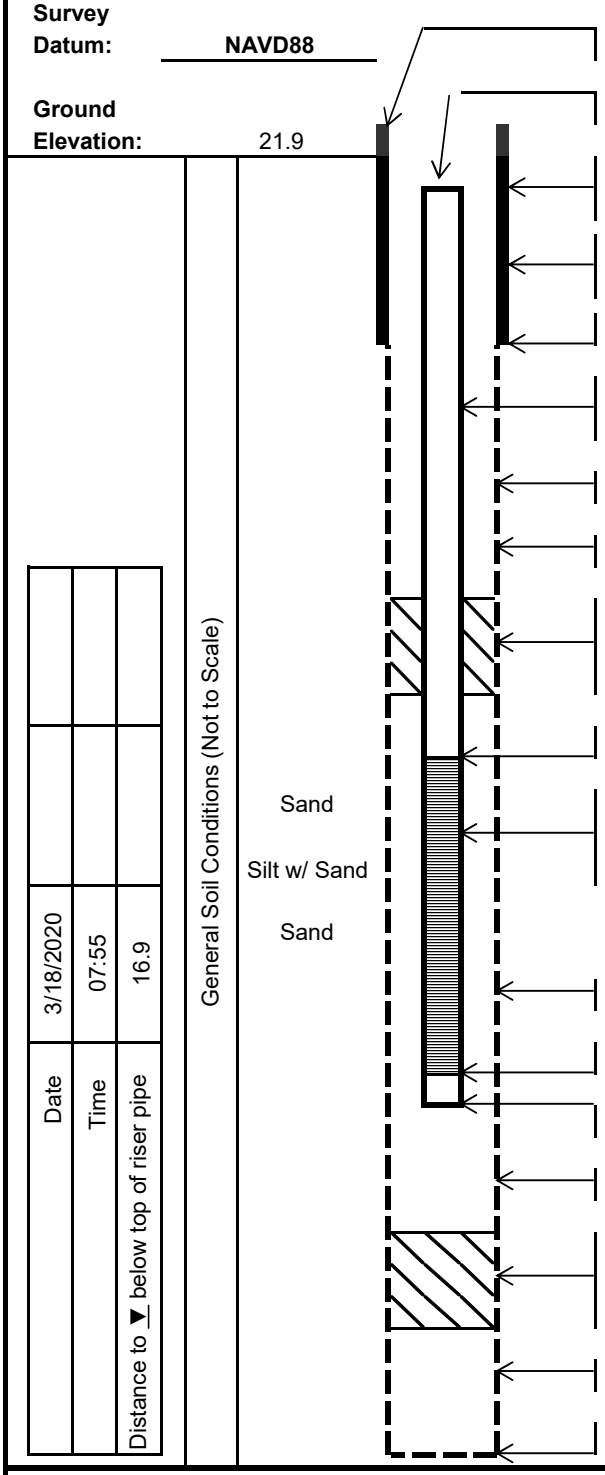
Groundwater Well Installation Log

B29(OW)

Project	Astoria Cove - Phase I	**GEI Proj. No.**	2305370
City / Town	Astoria, NY	**Location**	Bldg. 2
Client	SLIM Astoria 2468 LLC		N: 222065.7 ft E: 1003319.7 ft
Contractor	Craig Test Boring		
Driller	J. Schuster **GEI Rep.** G. Holmes	**Install Date**	3/17/2020

Survey Datum: **NAVD88**

Ground Elevation: 21.9



Date	Time	Distance to ▼ below top of riser pipe
3/18/2020	07:55	16.9

Length of Surface Casing above Ground	NA
Dist. Top of Surf. Casing to Top of Riser Pipe	NA
Type and Thickness of Seal around Surface Casing	concrete + 1" of cold patch
ID of Surface Casing	
Type of Surface Casing	4 in. Diam. Handhole
Depth Bottom of Surface Casing	NA
ID and OD of Riser Pipe	2 in. ID / 2.4 in. OD
Type of Riser Pipe	Sch. 40 PVC
Type of Backfill around Riser Pipe	cuttings
Diameter of Borehole	4 in. ID / 4.5 in. OD
Depth Top of Seal	11 ft
Type of Seal	HOLEPLUG 3/8 in.
Depth Bottom of Seal	13 ft
Depth Top of Screened Section	15 ft
Type of Screen	Sch. 40 PVC
Description of Screen Openings	20 slot
ID and OD of Screened Section	2 in. ID / 2.4 in. OD
Type of Filter Material	FILPRO Sand (WG #1)
Depth Bottom of Screened Section	25 ft
Depth Bottom of Silt Trap	25.4 ft
Depth Bottom of Filter Material	27 ft
Depth Top of Seal	N.A.
Type of Seal	N.A.
Depth Bottom of Seal	N.A.
Type of Backfill below Filter Material	cuttings
Bottom of Borehole	85 ft

Notes:

GEI Consultants

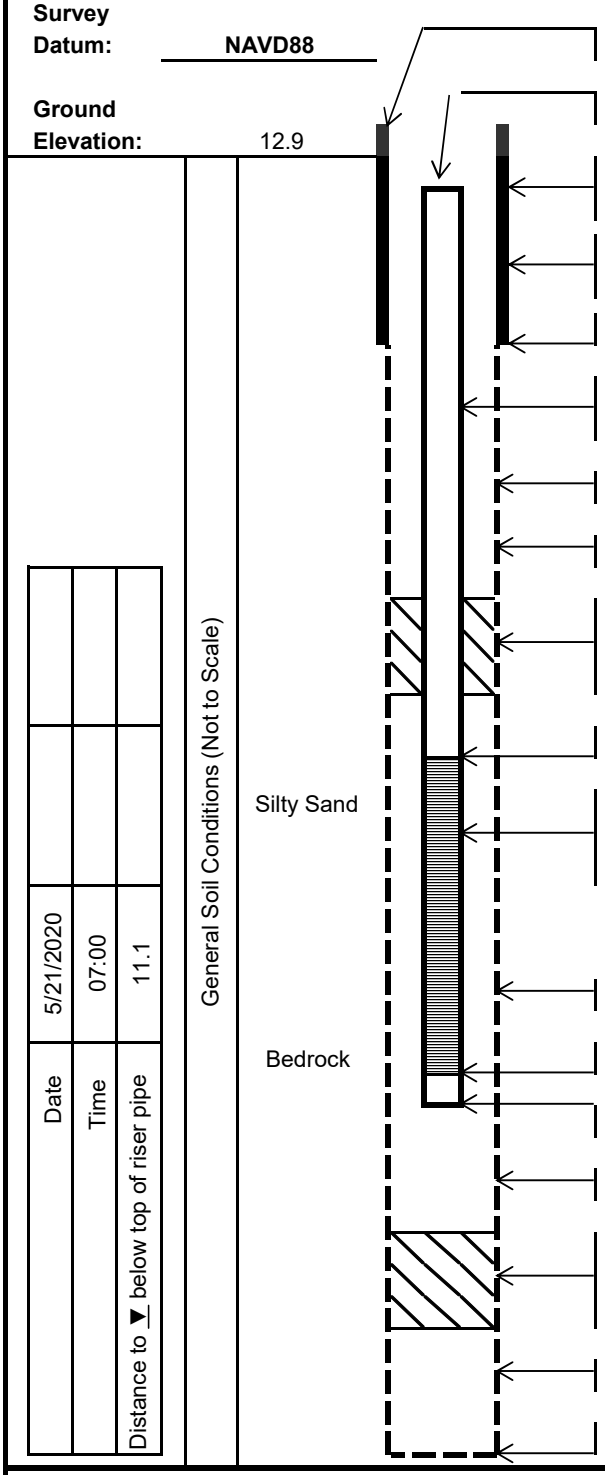
Groundwater Well Installation Log

B48(OW)

Project	Astoria Cove - Phase I	**GEI Proj. No.**	2305370
City / Town	Astoria, NY	**Location**	Bldg. 1
Client	SLIM Astoria 2468 LLC		N: 222443.4 ft E: 1003171.0 ft
Contractor	Craig Test Boring		
Driller	E. Flanagan **GEI Rep.** G. Holmes	**Install Date**	5/20/2020

Survey Datum: **NAVD88**

Ground Elevation: 12.9



Date	Time	Distance to ▼ below top of riser pipe
5/21/2020	07:00	11.1

Length of Surface Casing above Ground	NA
Dist. Top of Surf. Casing to Top of Riser Pipe	NA
Type and Thickness of Seal around Surface Casing	concrete + 1" of cold patch
ID of Surface Casing	
Type of Surface Casing	4 in. Diam. Handhole
Depth Bottom of Surface Casing	NA
ID and OD of Riser Pipe	2 in. ID / 2.4 in. OD
Type of Riser Pipe	Sch. 40 PVC
Type of Backfill around Riser Pipe	cuttings
Diameter of Borehole	4 in. ID / 4.5 in. OD
Depth Top of Seal	6 ft
Type of Seal	HOLEPLUG 3/8 in.
Depth Bottom of Seal	8 ft
Depth Top of Screened Section	10 ft
Type of Screen	Sch. 40 PVC
Description of Screen Openings	20 slot
ID and OD of Screened Section	2 in. ID / 2.4 in. OD
Type of Filter Material	FILPRO Sand (WG #1)
Depth Bottom of Screened Section	20 ft
Depth Bottom of Silt Trap	20.4 ft
Depth Bottom of Filter Material	22 ft
Depth Top of Seal	N.A.
Type of Seal	N.A.
Depth Bottom of Seal	N.A.
Type of Backfill below Filter Material	cuttings
Bottom of Borehole	34 ft

Notes:

GEI Consultants

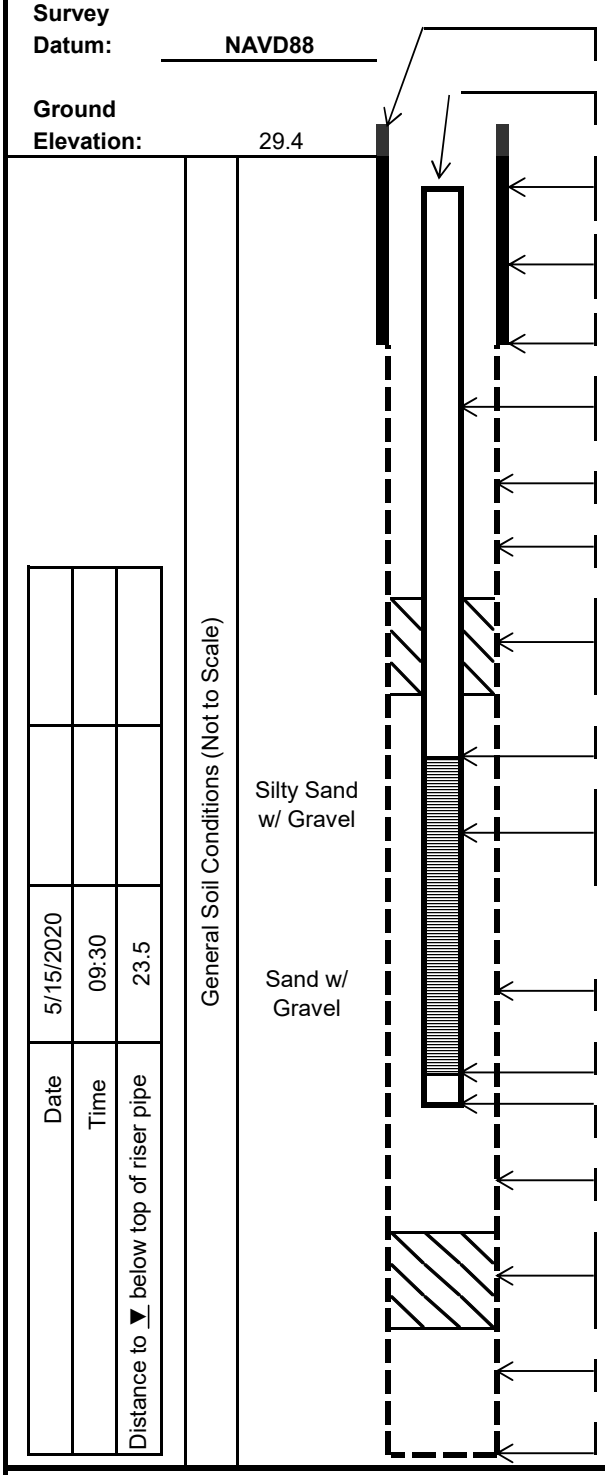
Groundwater Well Installation Log

B53(OW)

Project	Astoria Cove - Phase I	**GEI Proj. No.**	2305370
City / Town	Astoria, NY	**Location**	School
Client	SLIM Astoria 2468 LLC		N: 221759.0 ft E: 1003420.7 ft
Contractor	Craig Test Boring		
Driller	E. Flanagan **GEI Rep.** G. Holmes	**Install Date**	5/14/2020

Survey Datum: **NAVD88**

Ground Elevation: 29.4



Date	Time	Distance to ▼ below top of riser pipe
5/15/2020	09:30	23.5

Length of Surface Casing above Ground	NA
Dist. Top of Surf. Casing to Top of Riser Pipe	NA
Type and Thickness of Seal around Surface Casing	concrete + 1" of cold patch
ID of Surface Casing	
Type of Surface Casing	4 in. Diam. Handhole
Depth Bottom of Surface Casing	NA
ID and OD of Riser Pipe	2 in. ID / 2.4 in. OD
Type of Riser Pipe	Sch. 40 PVC
Type of Backfill around Riser Pipe	cuttings
Diameter of Borehole	4 in. ID / 4.5 in. OD
Depth Top of Seal	16 ft
Type of Seal	HOLEPLUG 3/8 in.
Depth Bottom of Seal	18 ft
Depth Top of Screened Section	20 ft
Type of Screen	Sch. 40 PVC
Description of Screen Openings	20 slot
ID and OD of Screened Section	2 in. ID / 2.4 in. OD
Type of Filter Material	FILPRO Sand (WG #1)
Depth Bottom of Screened Section	30 ft
Depth Bottom of Silt Trap	30.4 ft
Depth Bottom of Filter Material	22 ft
Depth Top of Seal	N.A.
Type of Seal	N.A.
Depth Bottom of Seal	N.A.
Type of Backfill below Filter Material	cuttings
Bottom of Borehole	55 ft

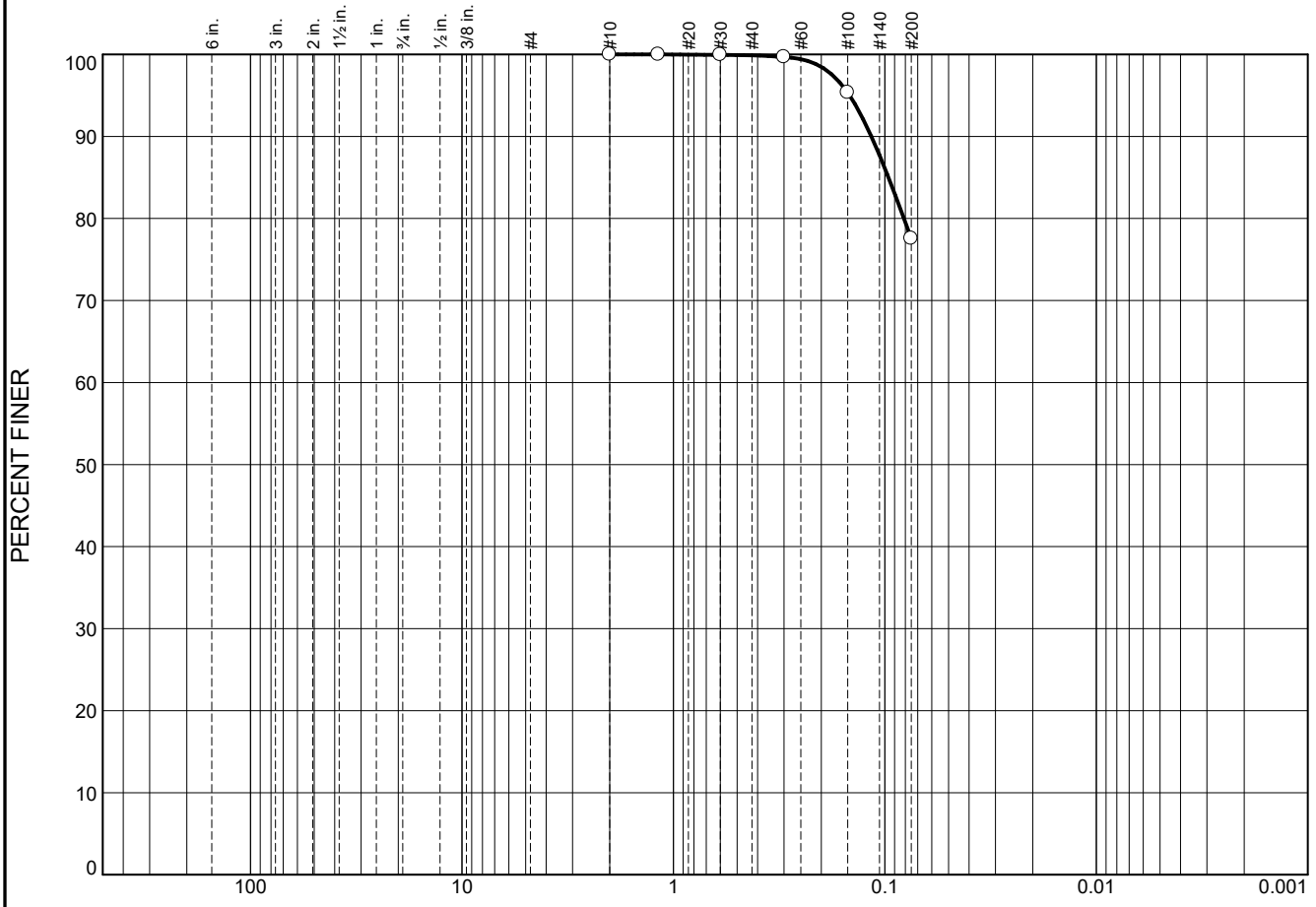
Notes:

GEI Consultants

Appendix C

Laboratory Testing Results

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.1	22.3	77.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0962							

Material Description	USCS	AASHTO
○ SILT with Sand	ML	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-3 **Depth:** 30-32 ft **Sample Number:** S10

Remarks:

○As received WC=21.4%.

Fines visually classified.

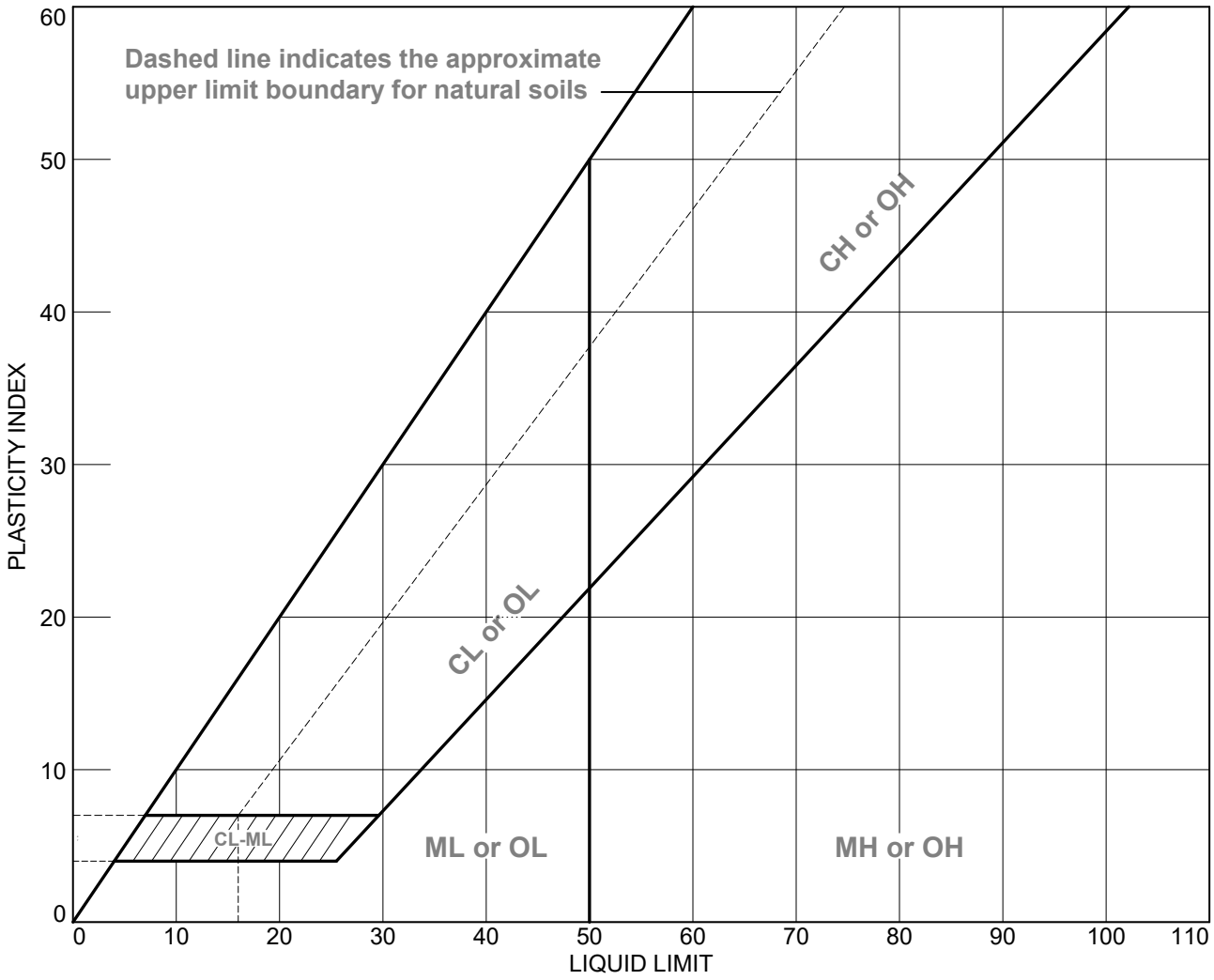
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: AH **Checked By:** W. Lukas

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-3	S9	25-27 ft	31.4	NP	NV	NP	ML

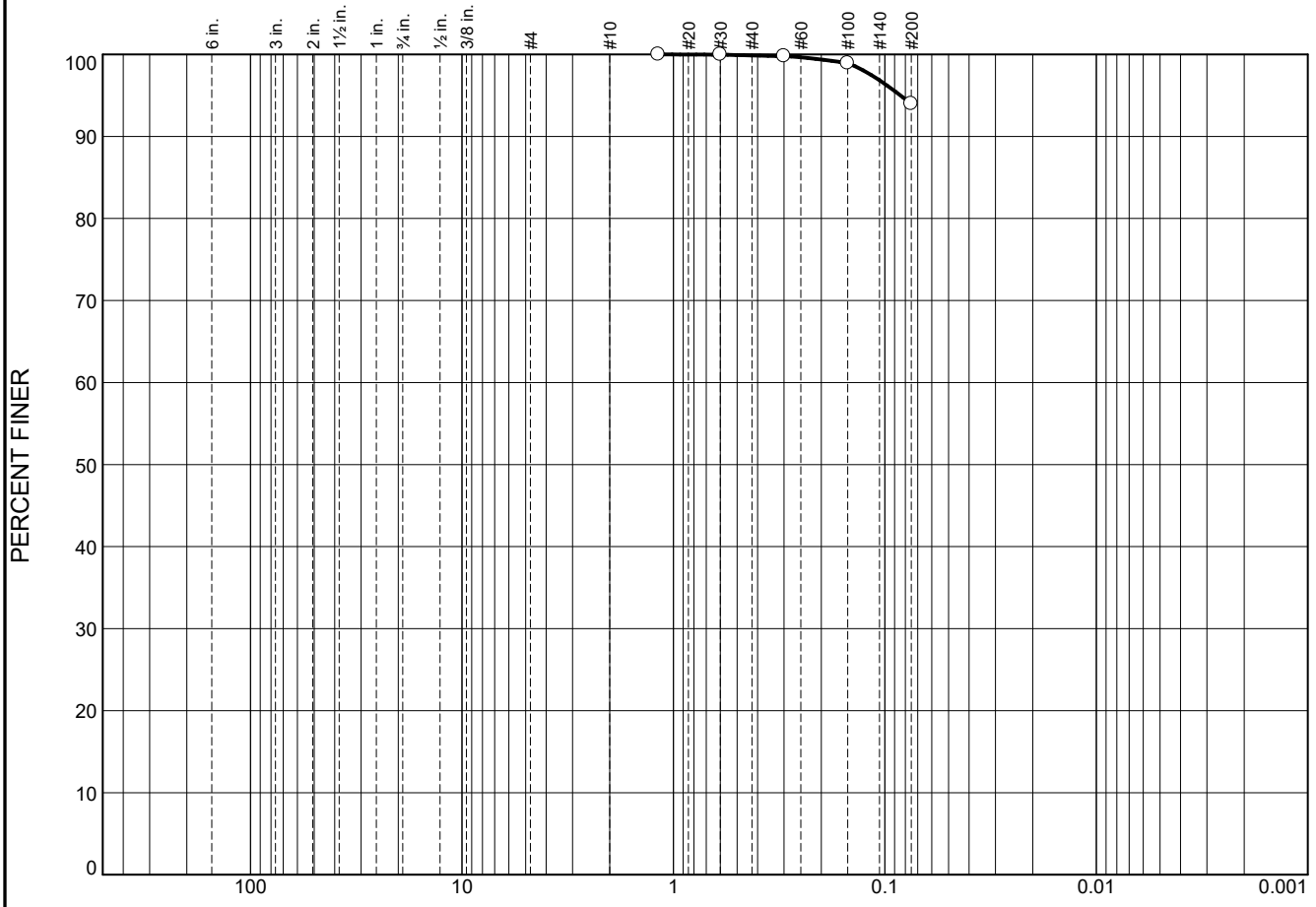
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

Client: Astoria Cove Phase I, LLC
Project: Astoria Cove BCP

Project No.: 1905297 **Figure**

Tested By: AH **Checked By:** EF

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.1	5.9	94.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP								

Material Description	USCS	AASHTO
○ SILT	ML	A-4(0)

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-3 **Depth:** 25-27 ft **Sample Number:** S9

Remarks:

○As received WC=31.6%

Fines classified visually.

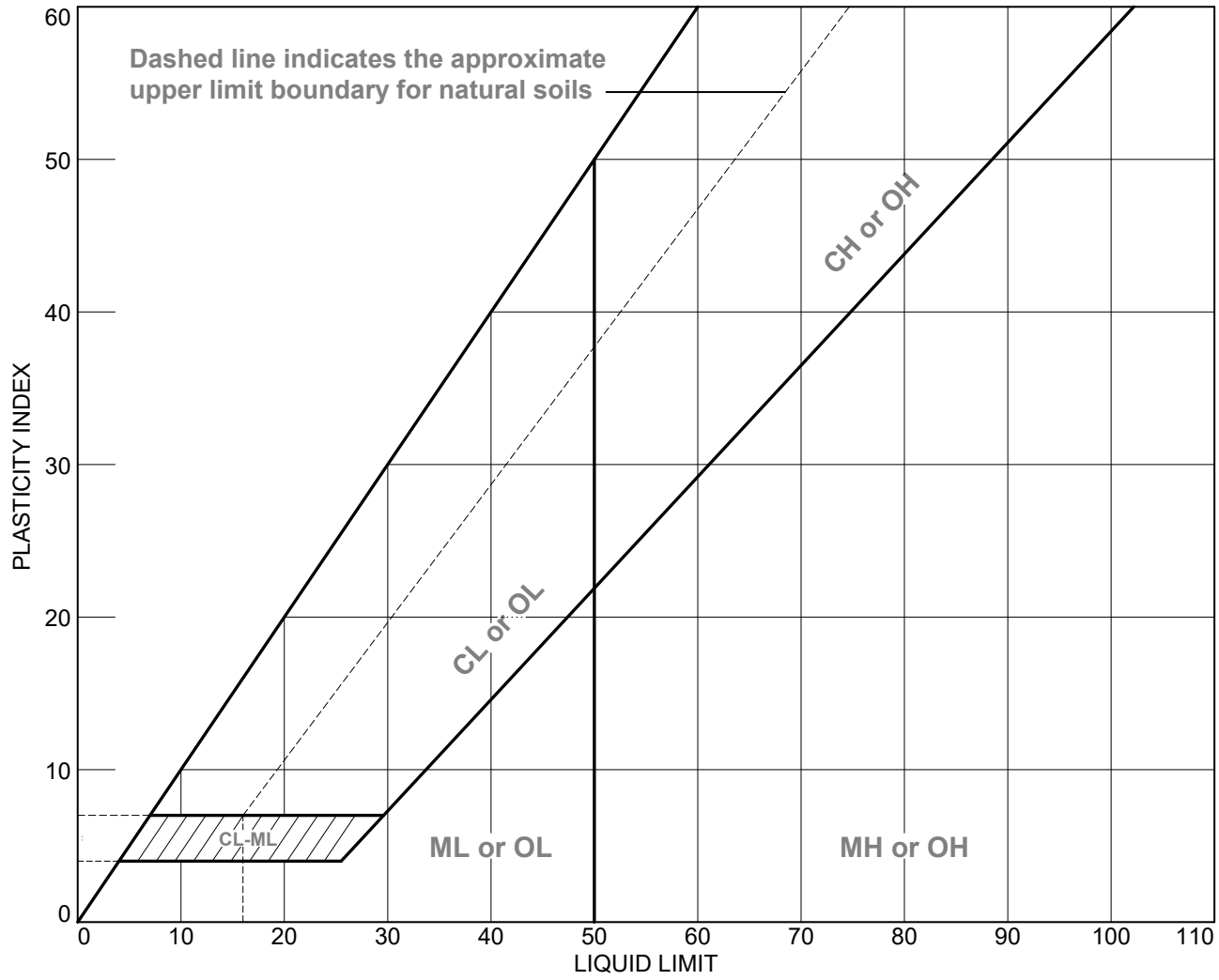
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: AH **Checked By:** W. Lukas

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-5	S6	10-12 ft	30.6	NP	NV	NP	ML

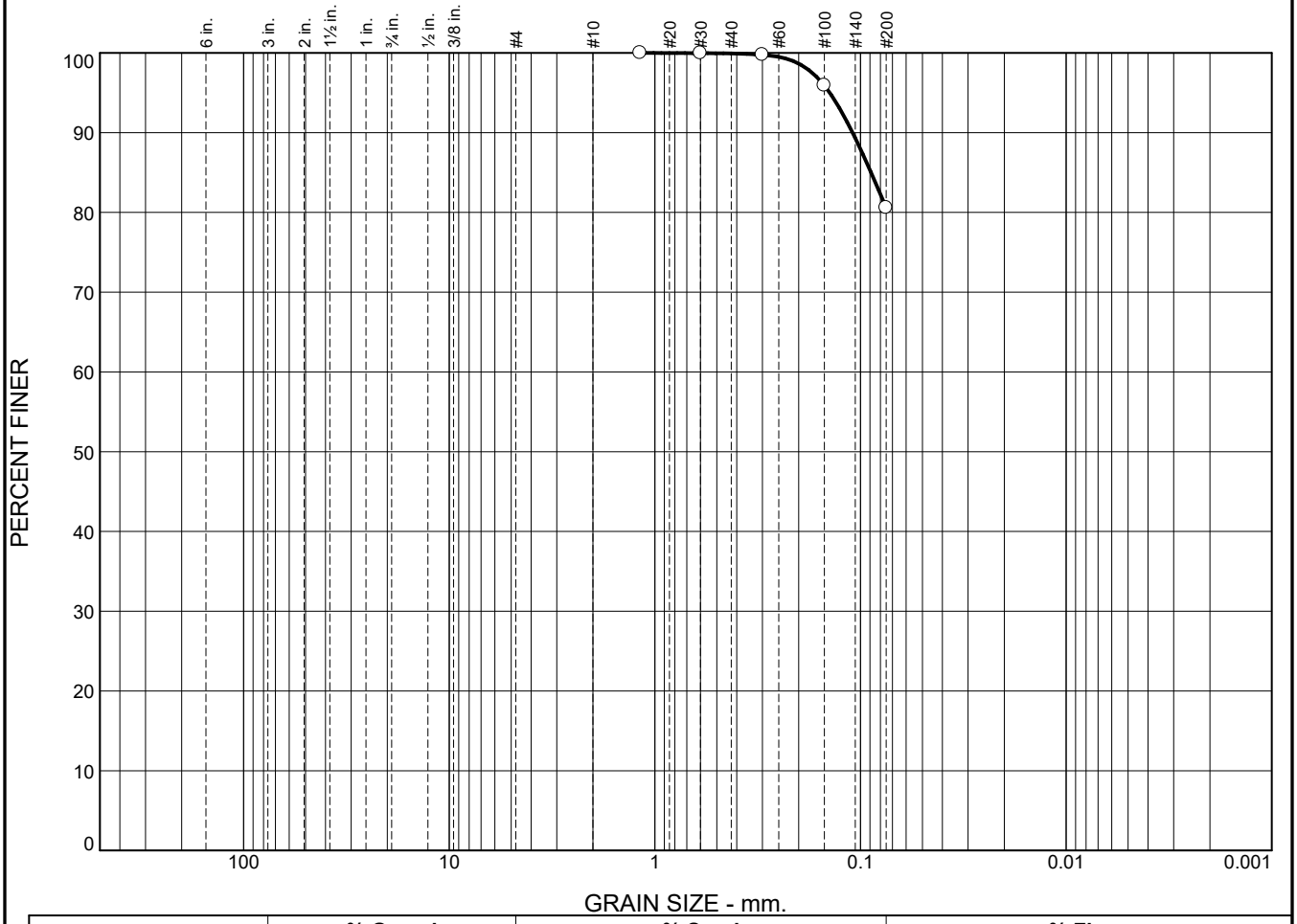
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

Client: Astoria Cove Phase I, LLC
Project: Astoria Cove BCP

Project No.: 1905297 **Figure**

Tested By: AH **Checked By:** EF

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.1	19.3	80.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	0.0889							

Material Description	USCS	AASHTO
○ SILT with Sand	ML	A-4(0)

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-5 **Depth:** 10-12 ft **Sample Number:** S6

Remarks:

○As received WC=31.4%

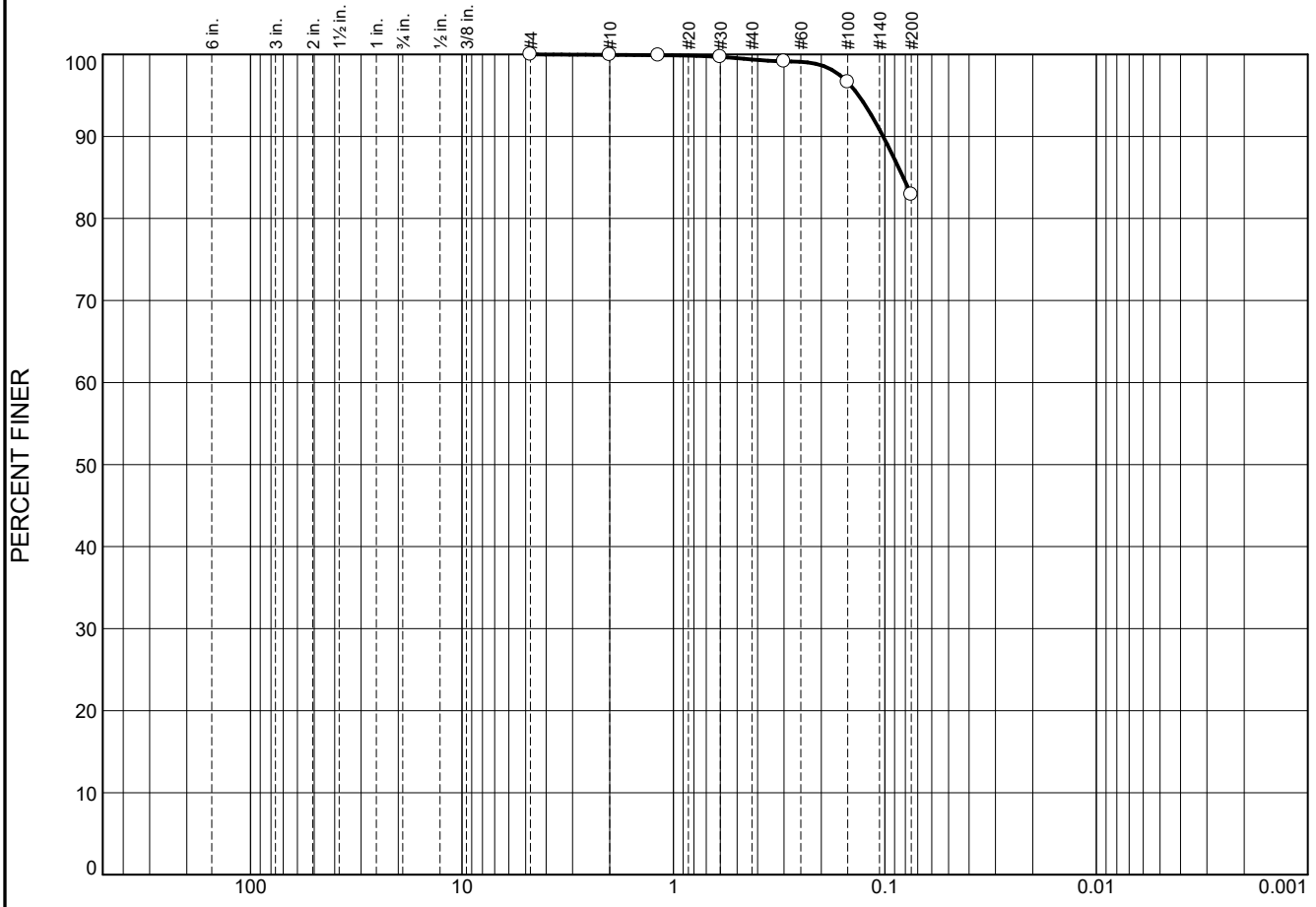
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: AH **Checked By:** W. Lukas

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.5	16.5	82.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0818							

Material Description	USCS	AASHTO
○ SILT with Sand	ML	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-6 **Depth:** 40-42 ft **Sample Number:** S12

Remarks:

○As received WC=25.9%.

Fines visually classified.

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400 Unicorn Park Drive
Woburn, MA 01801

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Figure

Tested By: AH **Checked By:** W. Lukas

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	14.8	21.1	6.5	13.0	29.5	15.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			18.8651	2.9533	0.6216	0.2071				

Material Description	USCS	AASHTO
○ Silty SAND with Gravel	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-6 **Depth:** 55-57 ft **Sample Number:** S15

Remarks:

○As received WC=11.5%.

Fines visually classified.

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Woburn, MA 01801

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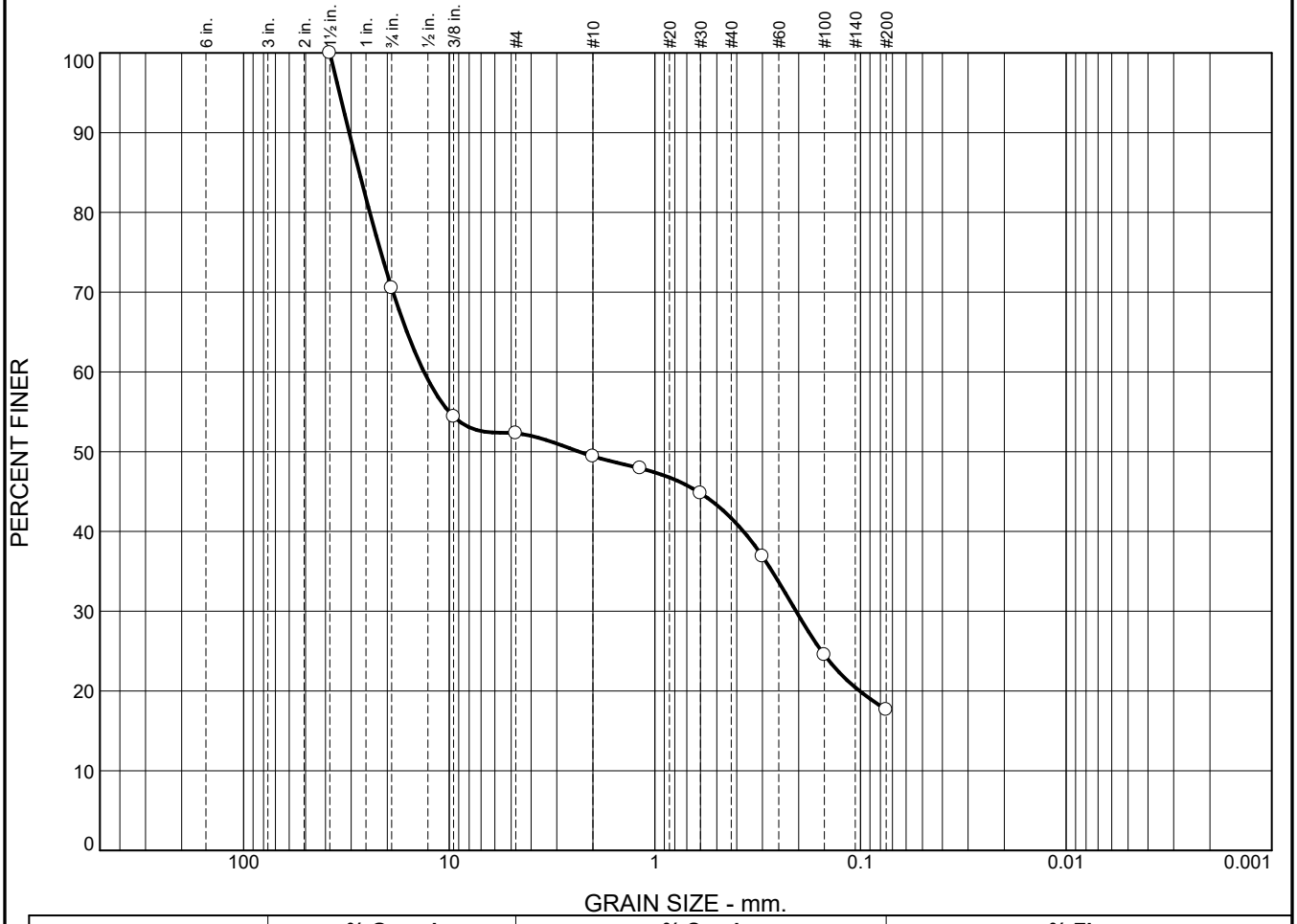
Figure

Tested By: AH **Checked By:** W. Lukas

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	29.5	18.2	2.9	7.7	24.1	17.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			27.3731	13.2644	2.3348	0.2058				

Material Description	USCS	AASHTO
○ Silty GRAVEL with Sand	GM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-7 **Depth:** 6-8 ft **Sample Number:** S4

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

Remarks:

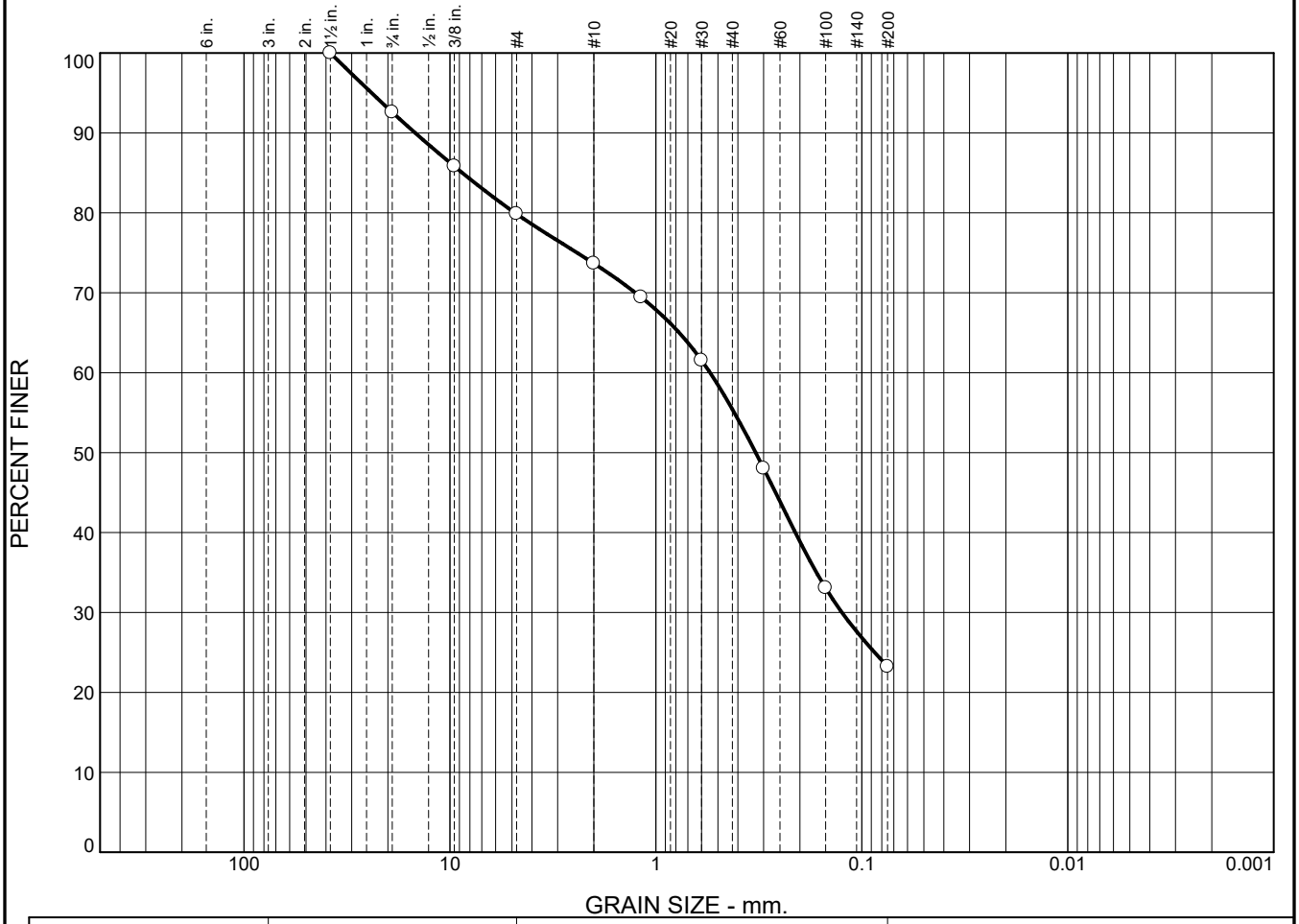
○As received WC=6.6%.

Fines visually classified.

Figure

Tested By: AH **Checked By:** W. Lukas

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	7.4	12.7	6.2	18.3	32.2	23.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			8.6988	0.5456	0.3278	0.1249				

Material Description	USCS	AASHTO
○ Silty SAND with Gravel	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-7 **Depth:** 40-42 ft **Sample Number:** S12

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

Remarks:

○Fines classified visually

As received WC= 10.3%

Figure

Tested By: CH **Checked By:** EF

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	10.1	18.8	6.5	22.6	22.7	19.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			14.2110	1.2138	0.6427	0.2113				

Material Description	USCS	AASHTO
○ Silty SAND with Gravel	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-7 **Depth:** 55-57 ft **Sample Number:** S15

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

Remarks:

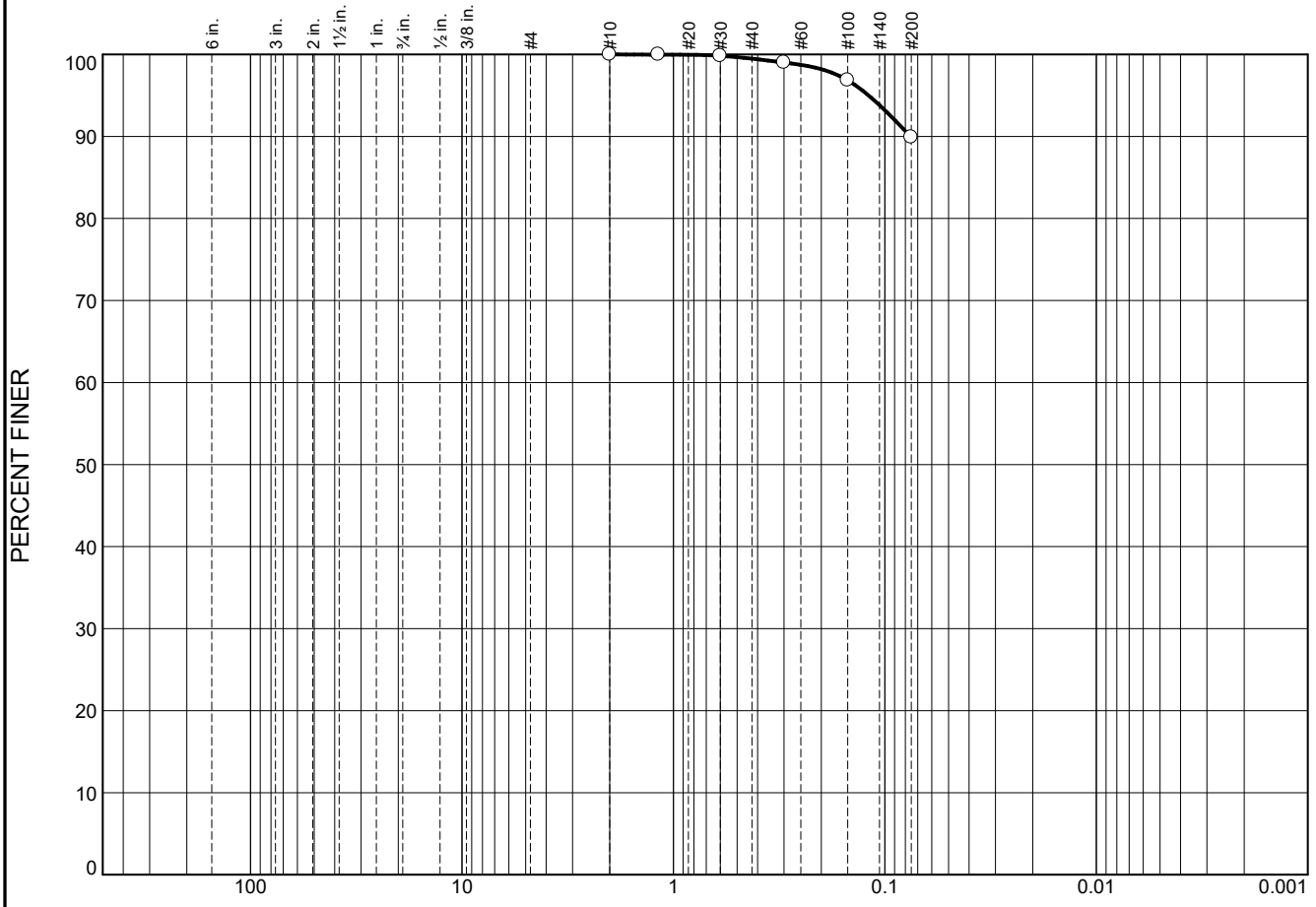
○As received WC=8.8%.

Fines visually classified.

Figure

Tested By: AH **Checked By:** W. Lukas

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.5	9.6	89.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○										

Material Description	USCS	AASHTO
○ LEAN CLAY	CL	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-9 **Depth:** 6-8 ft **Sample Number:** S4

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

Remarks:

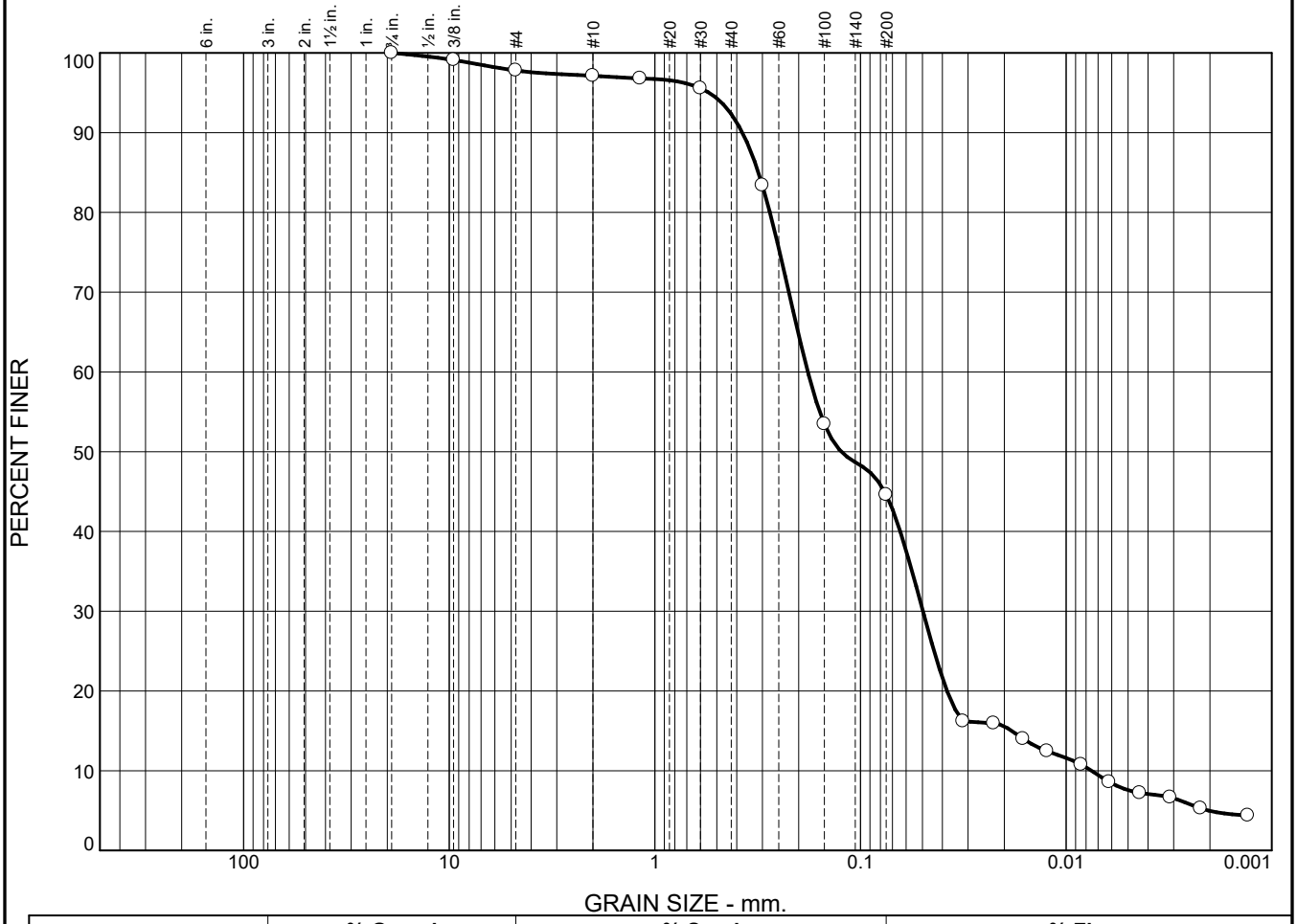
○As received WC=29.4%.

Fines visually classified.

Figure

Tested By: AH **Checked By:** W. Lukas

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.2	0.7	4.8	47.7	37.0	7.6

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.3137	0.1803	0.1240	0.0497	0.0184	0.0075	1.82	23.94

Material Description	USCS	AASHTO
○ Silty SAND	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-13 **Depth:** 2-4 ft **Sample Number:** S2

Remarks:

○Fines classified visually

As received WC= 15.2%

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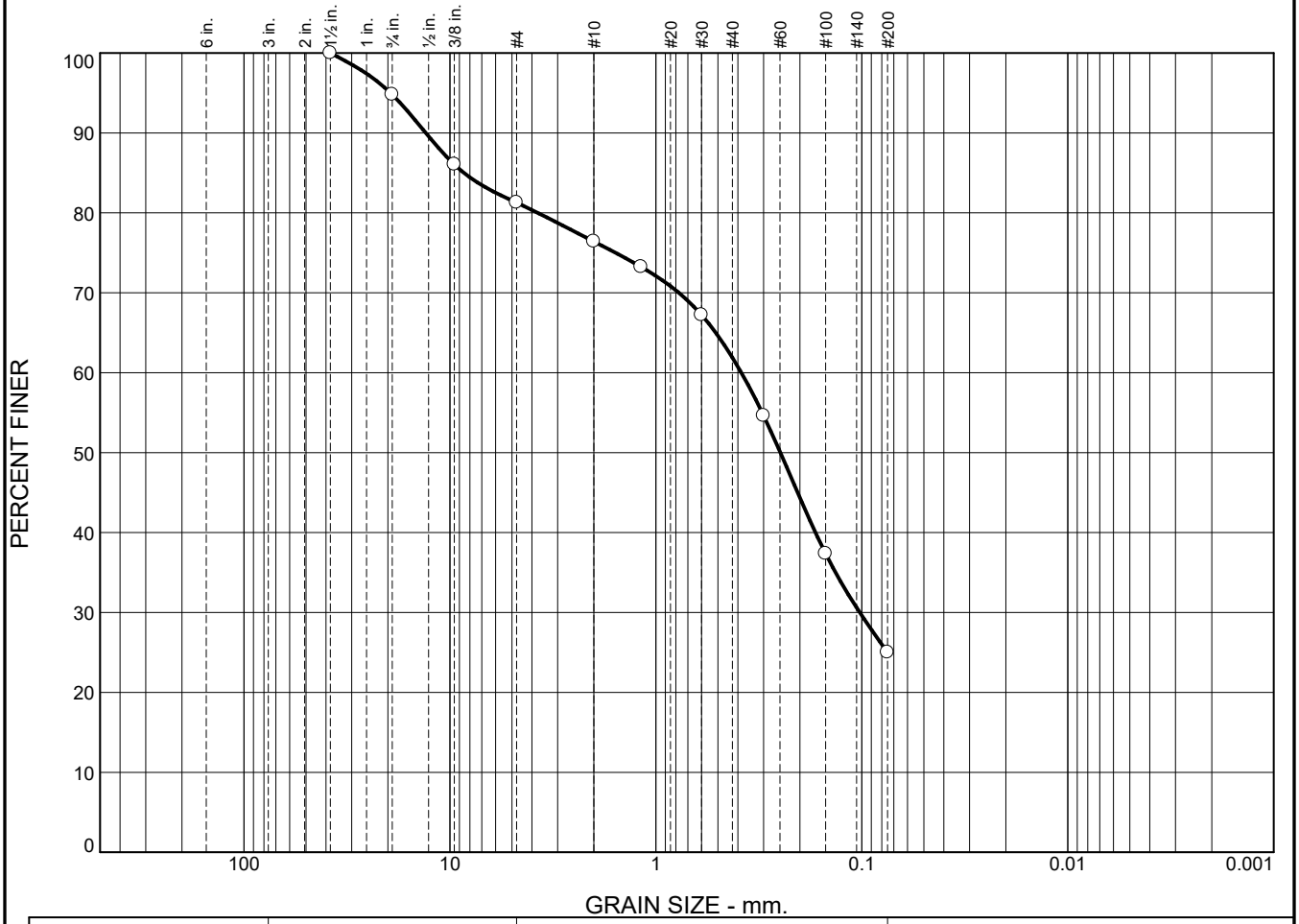
400 Unicorn Park Drive
Woburn, MA 01801

Figure

Tested By: CH **Checked By:** EF

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	5.2	13.5	4.9	14.5	36.9	25.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			8.5486	0.3846	0.2487	0.1023				

Material Description	USCS	AASHTO
○ Silty SAND with Gravel	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-13 **Depth:** 45-47 ft **Sample Number:** S13

Remarks:

○Fines classified visually

As received WC = 10.5%

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400 Unicorn Park Drive
Woburn, MA 01801

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Figure

Tested By: CH **Checked By:** EF

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	5.8	2.2	12.1	44.3	35.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.5945	0.2024	0.1446					

Material Description	USCS	AASHTO
○ Silty SAND	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-15 **Depth:** 15-17 ft **Sample Number:** S7

Remarks:

○As received WC=15.6%.

Fines visually classified.

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

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Figure

Tested By: AH **Checked By:** W. Lukas

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	24.7	23.0	9.8	16.4	19.0	7.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			25.9147	7.7490	3.9933	0.5546	0.2042	0.1261	0.31	61.47

Material Description	USCS	AASHTO
○ WIDELY GRADED GRAVEL with Silt and Sand	GW-GM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-16 **Depth:** 45-47 ft **Sample Number:** S13

Remarks:

○As received WC=7.2%.

Fines visually classified.

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400 Unicorn Park Drive
Woburn, MA 01801

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Figure

Tested By: AH **Checked By:** W. Lukas

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	7.9	12.3	6.0	15.9	27.4	30.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			8.0634	0.4842	0.2726					

Material Description	USCS	AASHTO
○ Silty SAND with Gravel	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source:** B-16 **Depth:** 55-57 ft **Sample No.:** S15 (10"-21")

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

Remarks:

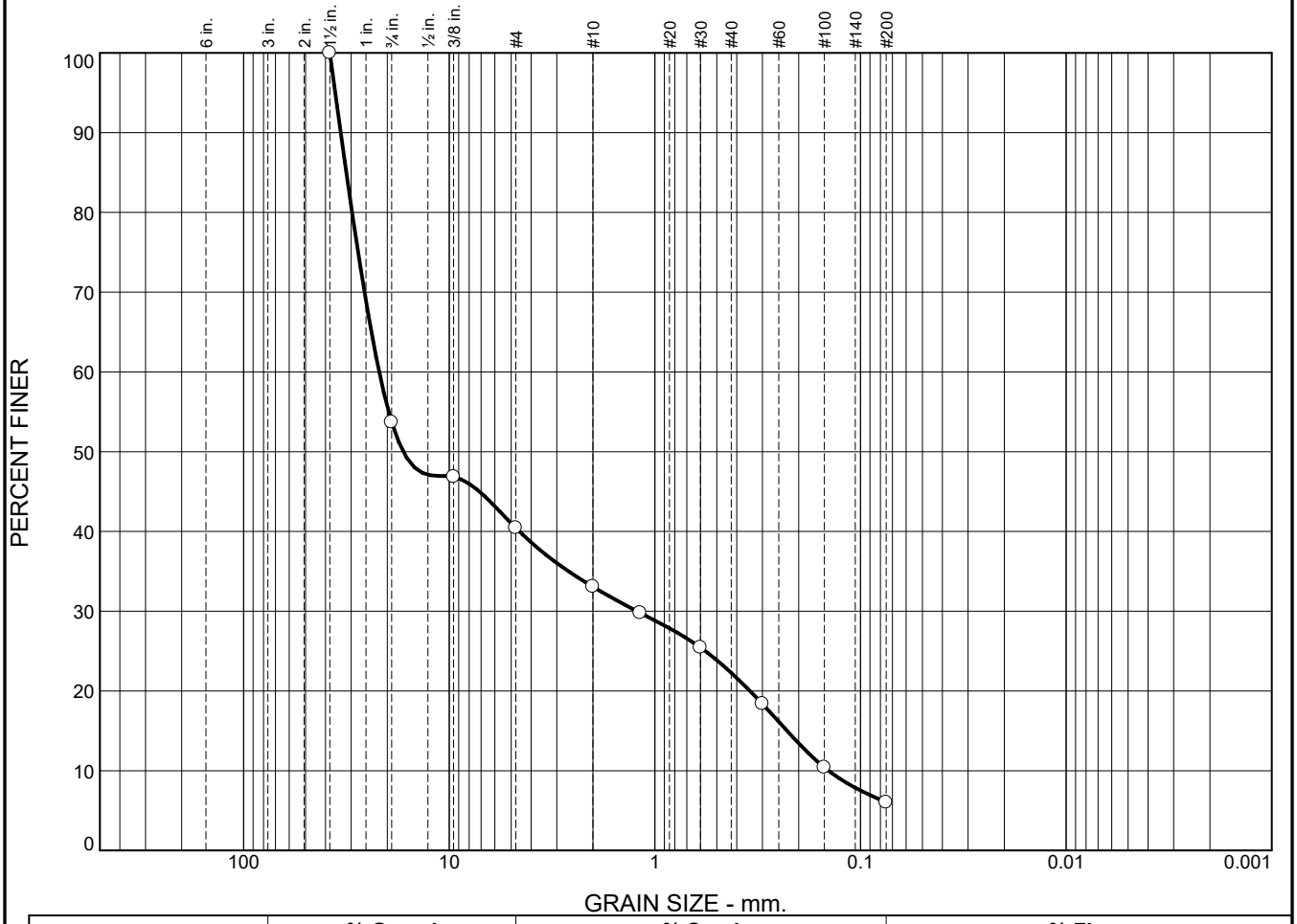
○Fines classified visually

As received WC = 10.3%

Figure

Tested By: CH **Checked By:** EF

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	46.3	13.3	7.3	10.8	16.3	6.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			31.6522	21.9131	16.7353	1.2229	0.2276	0.1430	0.48	153.27

Material Description	USCS	AASHTO
○ Narrowly Graded GRAVEL with Silt and Sand	GW-GM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-17 **Depth:** 25-27 ft **Sample Number:** S9

Remarks:

○Fines classified visually

As received WC = 10.8%

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: CH **Checked By:** EF

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	8.0	18.7	9.7	16.1	27.9	19.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			11.2860	1.3283	0.5044	0.1615				

	Material Description	USCS	AASHTO
○	Silty SAND with Gravel	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-17 **Depth:** 50-50.8 ft **Sample Number:** S14

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

Remarks:

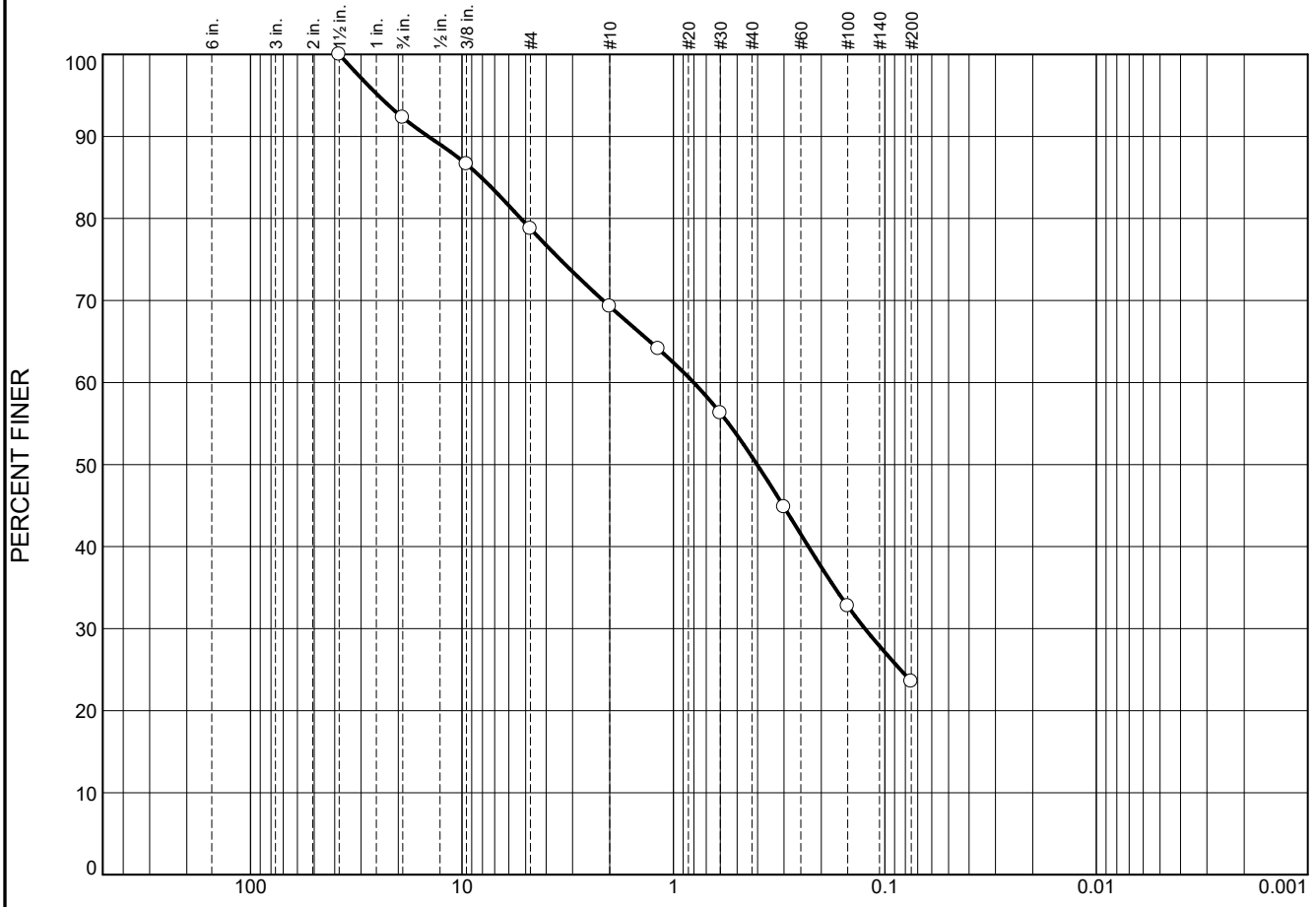
○Fines classified visually

As received WC = 8.4%

Figure

Tested By: CH **Checked By:** EF

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	7.7	13.5	9.5	18.4	27.3	23.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			8.1031	0.8024	0.4020	0.1243				

Material Description	USCS	AASHTO
○ Silty SAND with Gravel	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-17 **Depth:** 55-55.4 ft **Sample Number:** S15

Remarks:

○As received WC=8.0%.

Fines visually classified.

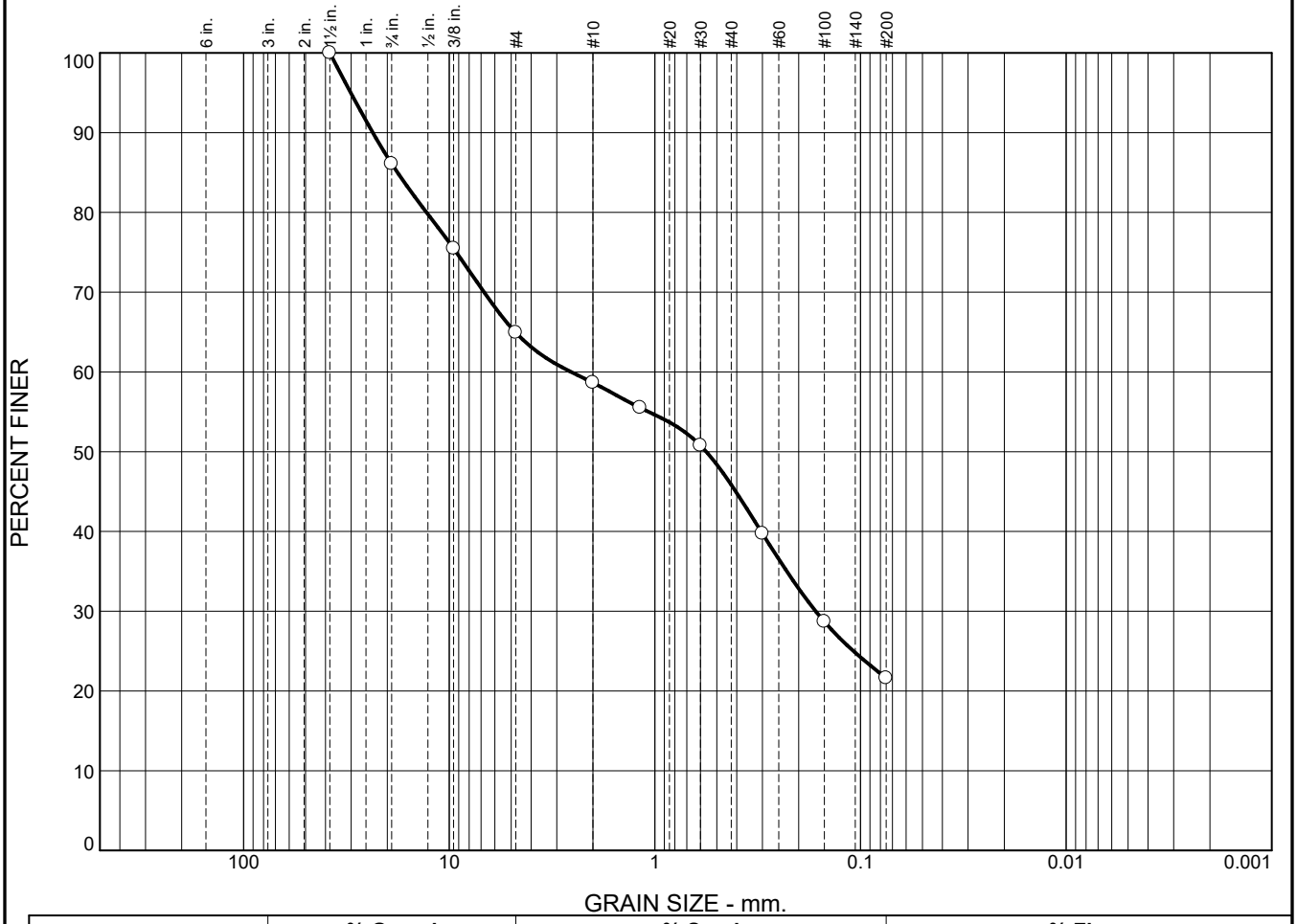
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: AH **Checked By:** W. Lukas

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	13.9	21.2	6.3	12.8	24.2	21.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			17.8466	2.5561	0.5626	0.1652				

Material Description	USCS	AASHTO
○ Silty SAND with Gravel	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-17 **Depth:** 65-65.3 ft **Sample Number:** S16

Remarks:

○As received WC=7.6%.

Fines visually classified.

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400 Unicorn Park Drive
Woburn, MA 01801

GEI Consultants

Figure

Tested By: AH **Checked By:** W. Lukas

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	10.5	6.1	14.5	26.8	42.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.5469	0.2460	0.1321					

Material Description	USCS	AASHTO
○ Silty SAND	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-17 **Depth:** 70-70.9 ft **Sample Number:** S17

Remarks:

○Fines classified visually

As received WC= 11.2%

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Woburn, MA 01801

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Figure

Tested By: CH **Checked By:** EF

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	11.0	6.8	22.3	32.7	27.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.8098	0.4270	0.2793	0.0937				

Material Description	USCS	AASHTO
○ Silty SAND	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-17 **Depth:** 75-75.3 ft **Sample Number:** S18

Remarks:

○As Received WC = 10.7%

Fines visually classified.

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Woburn, MA 01801

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Figure

Tested By: AH **Checked By:** EF

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	9.2	22.8	9.2	16.9	26.8	15.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			14.2336	2.3055	0.6929	0.2311				

Material Description	USCS	AASHTO
○ Silty SAND with Gravel	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-18 **Depth:** 40-42 ft **Sample Number:** S12

Remarks:

○As received WC=10.6%.

Fines visually classified.

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Woburn, MA 01801

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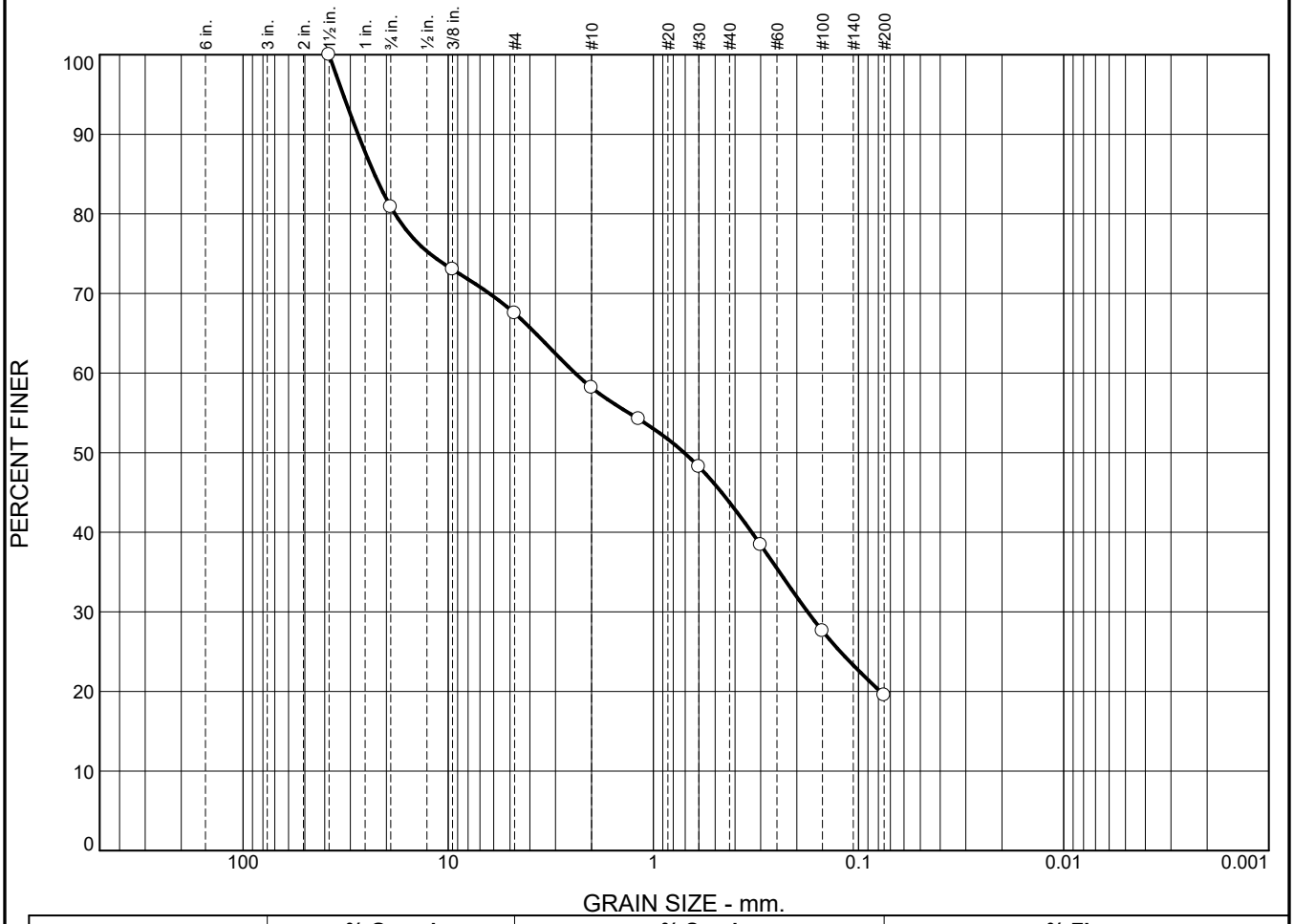
Figure

Tested By: AH **Checked By:** W. Lukas

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	19.1	13.4	9.3	14.5	24.2	19.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			22.8982	2.4073	0.7077	0.1770				

Material Description	USCS	AASHTO
○ Silty SAND with Gravel	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-22R **Depth:** 30-32 ft **Sample Number:** S10

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Remarks:

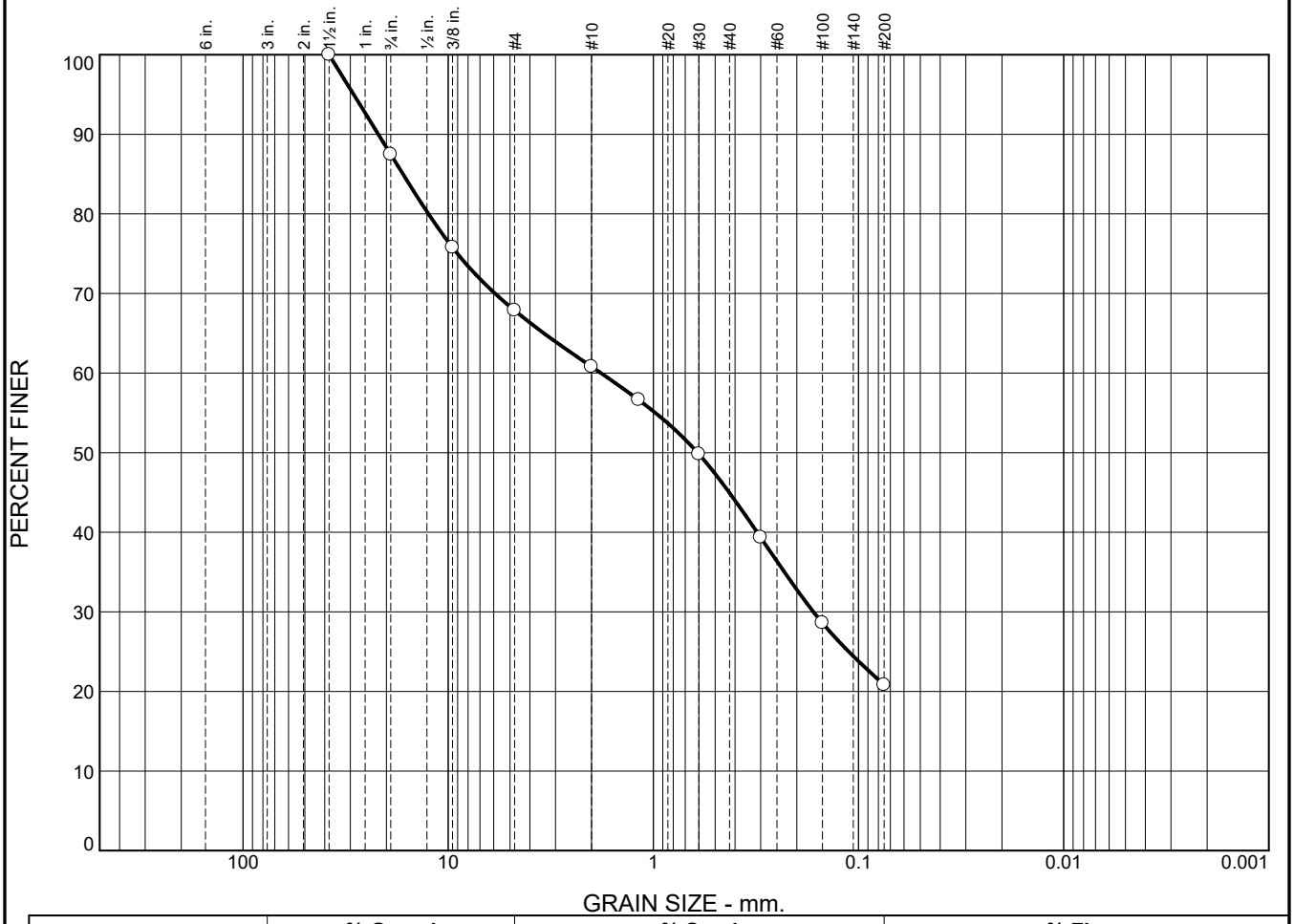
○Fines classified visually

As received WC = 8.2%

Figure

Tested By: CH **Checked By:** EF

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	12.5	19.6	7.1	15.9	24.1	20.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			16.6161	1.8026	0.6088	0.1658				

Material Description	USCS	AASHTO
○ Silty SAND with Gravel	SM	

Project No. 1905297 **Client:** Astoria Cove Phase I, LLC

Project: Astoria Cove BCP

○ **Source of Sample:** B-23 **Depth:** 45-47 ft **Sample Number:** S13

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Remarks:

○As Received WC = 7.1%

Fines classified visually

Figure

Tested By: CH **Checked By:** EF