PhilaPort
THE PORT OF PHILADELPHIA

Philadelphia Regional Port Authority
3460 North Delaware Ave. 2nd Floor
Philadelphia, PA 19134

July 19, 2023

To: All Bidders

From: Kate Bailey
Director of Procurement

Re: ADDENDUM NO. 6
23-026.1 - RFP for Design Build of Temperature Controlled Warehouse

This Addendum No. 6 is issued to:

1. Provide a *revised* Geotechnical Report (attached) which shall supersede the report provided in Addendum 5. Note, this report is being supplied for informational purposes only.

2. Clarify that Proposers are not required to identify the specific DBE subcontractors, suppliers, or manufacturers within the DBE-3 DBE Listing, Page 1 or 1 (Per Appendix E, DBE Listing.)

   However, if a DBE subcontractor is known at time of submission, the proposer must be included in Proposers Appendix D submission.

All other terms and conditions remain unchanged.

Bidders shall acknowledge receipt of this addendum by immediately emailing a copy of the completed acknowledgment to Kate Bailey at procurement@philaport.com

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ACKNOWLEDGMENT OF RECEIPT OF ADDENDUM NO. 6
Project #23-026.1
RFP for Design Build of Temperature Controlled Warehouse

Date__________

By________________________________

Company____________________________

Telephone___________________________

Fax________________________________

Email ______________________________

PhilaPort
THE PORT OF PHILADELPHIA

Philadelphia Regional Port Authority
3460 North Delaware Ave. 2nd Floor
Philadelphia, PA 19134

Revised Geotechnical Report

(For informational purposes only)

GEOTECHNICAL ENGINEERING SERVICES

PhilaPort Distribution Warehouse
Packer Avenue
Philadelphia, PA

Submitted To:

Philadelphia Regional Port Authority
3460 N. Delaware Avenue
Philadelphia, PA 19134

Submitted By:

Pennoni Associates Inc.
2041 Ave C, Suite 100
Bethlehem, PA 18017

Daniel P. Marano Jr., PE
Geotechnical Project Engineer

DANIEL PATRICK MARANO

PRPAX 17013.04

January 25, 2018
(Revised May 13, 2019)

Pennoni

January 25, 2018
(Revised May 13, 2019)

PRPAX 17013.04

Ms. Lisa Magee, PE
Chief Engineer/Director of Engineering
Philadelphia Reginal Port Authority
3460 N. Delaware Avenue
Philadelphia, PA 19134

Re: Geotechnical Engineering Services
PhilaPort Distribution Warehouse
Philadelphia, Pennsylvania

Ms. Magee:

We are pleased to submit our geotechnical engineering report for the referenced project. Work was initiated in general accordance with our revised proposal dated December 6, 2017, and your subsequent authorization to proceed.

In January of 2019 the project details began to finalize, this included building size, location, building loads and finished floor elevation. We have revised our report and recommendations based on the changes described above.

We trust that the information presented herein is what you require at this time and we thank you for the opportunity to assist you with this project. If you have any questions, or if you need any further assistance with this project, please contact this office at your earliest convenience.

Respectfully yours,

PENNONI ASSOCIATES INC.

Daniel P. Marano Jr., PE
Geotechnical Project Manager

Frederick A. Brinker, PE
Associate Vice President
Geotechnical Division Manager

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1. EXECUTIVE SUMMARY

Pennoni Associates, Inc. (Pennoni) has completed field exploration for the proposed PhilaPort Distribution Warehouse, located in the City of Philadelphia, Pennsylvania. The project area will occupy the existing new car parking lot between Pattison and Packer Avenues. The purpose of our study was to determine the subsurface conditions at the project site within the footprint of the proposed warehouse building, evaluate these conditions with respect to the proposed development, and present foundation recommendations.

It is our understanding the proposed construction consists of an approximate 197,000 ft^2 dry storage building with 42 loading dock spaces on the west side of the building. The finished floor elevation is anticipated to be established at Elev. 13.5+/-. An approximate 215,000 ft^2 cold storage addition is proposed on the south side of the dry storage warehouse. It is our understanding that the dry storage building will be approximately 45 ft high and house four storage levels (first level is the floor and three pallet levels supported by pallet racks above). Additionally, the use of high mast fork trucks will be used inside of the building and will require minimal differential settlement in the floor slab (1/8 in.) in order to operate. Typical warehouse column, and floor loads are anticipated not to exceed 70 kips, and 450 psf respectively. Structural loading information was provided by our Structural Technologies group.

Between the period of July 25 through August 1, 2017, five borings were drilled by Allied Well Drilling, as part of a preliminary subsurface exploration conducted by others. Appendix A includes the preliminary boring logs.

Between the period of December 21, 2017 through January 3, 2018, 20 borings were drilled by C.G.C. Geoservices, LLC. within the proposed warehouse building footprint. Appendix A includes the boring logs and the Boring Location Plan.

On April 18 and April 19, 2019, 20 test pits were excavated by Ambient Group within the property; 10 shallow test pits were excavated to evaluate the pavement thickness, and 10 test pits were excavated for the infiltration testing. Appendix A includes all test pits logs.

Based on the results from the above explorations, laboratory testing, engineering analyses, and our experience, we conclude that construction of the proposed warehouse is feasible. Based on the soils encountered and the anticipated loading, it is our professional opinion that the proposed structure can be supported on either shallow foundations after ground improvement (Controlled modulus columns/Rigid inclusions) is performed, or on deep foundations. Additionally, the proposed floor slab has higher than normal loading and limited tolerances for movement, so we recommend that the ground floor slab should be constructed as a structural slab supported on improved soils or deep foundations. Encountering obstructions (construction debris) should be anticipated during foundation and utility installation. Encountering groundwater in excavations (on the order of 6 to 8 ft) should be anticipated. Due to the proximity to the Delaware River the groundwater elevation may vary with the tidal action. On-site existing inert granular portions of the fill soils can be reused in compacted load bearing fills. Stratum 1 and 2 soils are not suitable, in their current state, for re-use in compacted load bearing fill. Detrimental long-term post-construction settlements are not expected if the recommendations provided herein are followed.

This report provides a more detailed summary of the field and laboratory testing program as well as a discussion of the conclusions and recommendations pertaining to design and construction of the proposed structure.

2. INTRODUCTION

2.1. LOCATION

The project site is located west of the Delaware River in south Philadelphia, Pennsylvania. The site is bounded on the north by commercial buildings (seafood market, cold storage, bank) and South Galloway Street followed by Packer Avenue, on the east by South 3rd Street, on the south by Pattison Avenue, on the west by commercial buildings followed by South Lawrence Street.

2.2. PROPOSED CONSTRUCTION

It is our understanding the proposed construction consists of an approximate 197,000 ft^2 steel frame, dry storage building with 42 loading dock spaces on the west side of the building. An approximate 215,000 ft^2 cold storage addition is proposed on the south side of the dry storage warehouse. The finished floor elevation of the dry storage building is anticipated to be established at Elev. 13.5+/-. It is also anticipated that the exterior of the buildings will be clad with insulated metal sandwich wall panels with hardening of the lower exterior and interior face of the façade provided via masonry or concrete panel walls. The dry storage building will be approximately 45 ft high and house four storage levels (first level is the floor and three pallet levels supported by pallet racks above). Additionally, the use of high mast fork trucks will be used inside of the building and will require minimal differential settlement in the floor slab (no more than 1/8 in.) in order to operate. Typical warehouse column, and floor loads are anticipated not to exceed 70 kips, and 450 psf respectively. Structural loading information was provided by our Structural Technologies group.

2.3. OBJECTIVES

Our objectives were to determine the subsurface conditions at the project site within the footprint of the proposed building, evaluate these conditions with respect to the proposed construction, and present recommendations regarding:

- foundation design, including a discussion of alternate solutions, if applicable, anticipated total and differential settlements;
- design frost depth;
- floor slab design;
- lateral earth pressure parameters;
- discussion of potential for consolidation and/or differential settlements of substrata encountered;
- "general procedure" Seismic Soil Site Classification in accordance with Table 1613.5.2 of the 2009 International Building Code;
- evaluation and determination of the earthwork requirements for use in preparation of the site area, including material selection and placement operations;
- suitability of on-site material for re-use as fill/backfill as part of the site work for the project;
- ground water conditions;
- removal or treatment of objectionable material, and;
- quality assurance, field-testing, and observations during construction.

3. FIELD AND LABORATORY WORK

3.1. PREVIOUS FIELD WORK

Between the period of July 25 through August 1, 2017, five borings were drilled by Allied Well Drilling, as part of a due-diligence subsurface exploration conducted by others. Soil samples were reported to have been obtained in general accordance with ASTM D 1586. The data obtained from the previous exploration were used in our analyses.

3.2. FIELD WORK

Between the period of December 21, 2017 through January 3, 2018, 20 borings were drilled by C.G.C. Geoservices, LLC. within the proposed warehouse building footprint at the approximate locations presented on Drawing No. LP-1. The boring locations were selected and established in the field by Pennoni personnel. Soil samples were obtained in general accordance with ASTM D 1586 and ASTM D1587 methods. Appendix A includes the boring logs and Drawing No. LP-1.

Our D. Marano, PE directed the field work; our D. Copeland, EIT, and S. Corcoran, performed a site reconnaissance and full-timed monitored the drilling operations.

Additionally, on April 18 and April 19, 2019, 20 test pits were excavated by Ambient Group within the property; 10 shallow test pits were excavated to evaluate the pavement thickness, and 10 test pits were excavated for the infiltration testing. Appendix A includes all test pits logs. The test pits locations were selected and established in the field by Pennoni personnel.

Our D. Marano, PE directed the field work; our N. Rex and E. Iannetti, full-timed monitored the excavating operations.

3.3. LABORATORY WORK

The soil samples collected during our fieldwork were delivered to our laboratory. Representative samples were selected and tested to determine moisture contents, organic contents, plasticity indices, unconfined compressive strengths, volumetric (unit weight, void ratio), gradation and consolidation characteristics of the subsoils. Additionally, laboratory testing data from the preliminary study performed by others was used in our study. Appendix B includes the results from both studies and a list of testing procedures.

4. SITE CHARACTERISTICS

4.1. SITE HISTORY

Review of historical documents dating back to 1940 indicates the site underwent massive earthwork during the 1940's and 50's. Due to the limited detail and resolution of the published data it is not clear what the site was used for during this period. Between 1957 and 1963, two large rectangular commercial buildings were constructed. The buildings stretched from Packer Avenue to Pattison Avenue and were separated in the middle by South Galloway Street.

The site remained largely unchanged through 2013. Between 2013 and present day, the buildings were razed. Evidence of the razed buildings is evident where the ground cover consists of compacted processed aggregate over the former building footprints. The site is currently being used as a parking lot for new cars.

4.2. SURFACE FEATURES

Currently the project site consists of a bituminous paved parking lot with associated curbing and light pole structures. The groundcover in the areas of the razed buildings consisted of compacted processed aggregate. The topography of the site is "bowl" shaped with perimeter elevations varying from Elev. 12 to Elev. 10 and descend towards the center of the site to approximate Elev. 9 to Elev. 8. Overhead electrical utilities were observed traversing in the northerly/southerly direction the center of the site. Stormwater inlets and associated underground utilizes were observed running bilaterally along the center of the site from the northern limit to the southern limit of the site.

4.3. GEOLOGY

The project site is located within the Lowland and Intermediate Upland section of the Atlantic Coastal Plain Province. The dominant topographic features of this section include very low local relief and a flat upper terrace surface cut by narrow, steep-sided to open valleys, shallow valleys; includes the Delaware River floodplain. The underlying subsurface material types consist of unconsolidated to poorly consolidated sand and gravel deposits, underlain by very complex, faulted and folded schist, gneiss, and other metamorphic rocks.

Available geological data indicates that the subject site is underlain by the Trenton Gravel Formation consisting of gray or pale-reddish-brown, very gravelly sand interstratified with crossbedded sand and clay-silt beds. This formation also includes areas of Holocene alluvium and swamp deposits

Underlying the Trenton Gravel Formation is the Wissahickon Formation. The Wissahickon Formation consists of a coarsely crystalline, excessively micaceous schist. Fracturing results in a well-developed, platy pattern. This formation is fissile to thinly bedded, moderately resistant to weathering, and often highly weathered to a moderate depth.

4.4. SUBSOILS

The borings and test pits revealed bituminous concrete/concrete/processed aggregate pavement or processed aggregate layer at the surface that varied in thickness from 5 to 13 inches. Appendix D presents pavement thickness encountered in all borings and test pits performed on site. The underlying subsoils have been grouped by us into six principal strata based on their physical and engineering properties and our interpretation of their origin. Following are descriptions of the subsoils encountered at this site.

Stratum F – Urban Fill

The borings and test pits disclosed an Urban Fill layer with a thickness that varies from approximately 7 to 18 ft. The fill generally consists of granular fine to medium SAND, some to trace gravel size rock fragments (brick, ash, cinder, glass, organics), some to trace silt, or SILT, some to trace fine to medium sand, some to trace gravel size rock fragments (brick, ash, cinder, glass, organics).

Standard penetration test (SPT) N-values indicate the density/consistency of this stratum varies from "very loose"/"soft" to "very dense"/"very hard". Typical USCS Classifications associated with this stratum are SM, SP-SM, and ML.

Although not encountered in the borings, encountering remnants of previous foundations and shoring systems during construction, should be expected within Stratum F. If encountered, these obstructions will most likely impair the construction process, especially utility and foundation construction.

Stratum 1 – Silty Clay/Clay (Alluvial)

A stratum of Silty CLAY/CLAY with varying amounts of fine sand gravel and organics (7.9% to 10.5%) was encountered beneath Stratum F fill in many of the borings. The thickness of this layer varies from approximately 5 to 15 ft. SPT N-values indicate the consistency of this soil varies from “very soft” to “firm”. The typical USCS Classifications associated with this stratum are OL and OH.

Consolidation testing disclosed a preconsolidation pressure (tsf), compression and recompression index of 0.95, 0.49 and 0.03, respectively. Laboratory testing and visual classification disclosed this layer contained trace to little organics. These data disclose Stratum 1 soils to be compressible.

Stratum 2 – Clayey SILT (Alluvial)

A stratum of SILT with varying amounts of fine sand, gravel and organics (up to 26.2%) was encountered beneath the Stratum F Fill or Stratum 1 soils in many of the borings. The thickness of this layer varies from approximately 5 to 15 ft. SPT N-values indicate the consistency of this stratum varies from “very soft” to “stiff”. Typical USCS Classifications associated with this stratum are OH and ML.

Laboratory testing and visual classification disclosed this layer contained trace to some organics. The percentage of organics in Stratum 2 is generally associated with high compressibility, significant secondary compression, often unsatisfactory strength characteristics, and low unit weight. This stratum is also considered compressible.

Stratum 3 – Sand/Gravel (Alluvial)

A stratum of SAND ranging in gradation from poorly (generally, gap graded fine to medium) to well graded with varying amounts of gravel and silt, or GRAVEL with varying amounts of sand was encountered beneath Strata 1 and 2. The thickness of this layer varies from approximately 10 to 32 ft. SPT N-values indicate the relative density of this stratum generally varies from “very loose” to “medium dense”. Typical USCS Classifications associated with this stratum are SP and SP-SM.

Stratum 4 – Sand/Gravel (Alluvial)

A stratum of well graded SAND with varying amounts of gravel, or poorly to well graded GRAVEL with various amounts of sand was encountered above and/or beneath Stratum 3 in the borings. Stratum 4 was generally encountered at depths ranging from 43 to 80 ft below the ground surface. SPT N-values indicate that the density of this stratum generally varies from “medium dense” to “very dense”. Typical USCS Classifications associated with this stratum is SW-SM, GM and GP.

It should be noted that COBBLES encountered Borings B-2 and B-12 at depths ranging from 45 to 50 ft below the ground surface were included in this Stratum. The material was observed when the augers were extracted.

Stratum 5 – Raritan Clay

A stratum of CLAY/Sandy CLAY with varying amounts of fine sand and gravel was encountered beneath and or between Stratum 4 in some of the borings. Stratum 5 was generally encountered at depths ranging from 53 to 80 ft below the ground surface and generally varies in thickness from approximately 5 to 7 ft. SPT N-values indicate the consistency of this soil varies from “stiff” to “very hard”. The typical USCS Classification associated with this stratum is CL.

Auger refusal was encountered in Borings B-2 and B-12 at depths of 47 and 50 ft below existing grades, respectively. Auger refusal is thought to be due to cobbles, rather than the top of rock.

4.5. GROUND WATER

Observations for groundwater were made in the borings during sampling and shortly after completion of drilling. Evidence of groundwater was generally encountered in the borings at depths of approximately 6 to 13 ft below existing grades (Elev. 6.5 to Elev. 0.0). Borings B-17, B-18 and B-20 disclosed evidence of groundwater at depths ranging from 18 to 28 ft below existing grades (Elev. -2.0 and Elev.-11.5), respectively. It is our professional opinion that these latter readings were affected by hydraulically restrictive Stratum 1, and not indicative of the static groundwater table.

Additionally, evidence of ground water was generally encountered in test-pits at depths of approximately 8 to 10.5 ft below existing grades. These observations are for the times indicated and may not be indicative of seasonal, daily or tidal variations in the ground water levels.

Given the project site’s vicinity to the Delaware River, daily fluctuations in the groundwater table could be influenced by the tide. Daily and seasonal variations of several feet should be anticipated.

5. ANALYSES AND RECOMMENDATIONS

5.1. SEISMIC SITE CLASS

The borings disclosed subsurface conditions generally described according to the 2015 International Building Code (IBC) as having a soil-profile corresponding to Site Class E – soft clay soil profile.

5.2. SITE WORK

Comparison of the proposed grades to existing grades indicates that cuts as on the order of 1 ft deep and fills up to 5 ft high are expected to establish the ground floor slab. Comparison of the proposed grades to existing grades indicates that cuts as deep as 3 ft and fills up to 2 ft high are required for general site grading. The borings and laboratory testing disclosed Stratum 1 and 2 are compressible. Fills greater than 2 ft high will likely result in consolidation related settlement, which may be significant (> 3 inches). New fills should be placed as early as possible within the construction schedule to allow for settlements to occur.

Prior to the construction of foundations, structural slabs, and pavements, any bituminous concrete must be removed from within the proposed areas of construction. Existing utilities located within the proposed building footprint should be abandoned and relocated outside the limits of the new structure. Any existing utility line abandoned in-place should be grouted or the line should be removed and the trench appropriately backfilled.

From historic aerial photography, it was disclosed that the site was once partially occupied by structures and associated paved parking. At the time of our field work evidence of previous structures was observed throughout the razed building footprints; however, remnants of the former foundations were not observed, or evident in the borings. The excavation of test pits prior to construction should be considered to better determine if remnants of the previous building will interfere with construction.

Any exposed subgrade should be proof-rolled in the presence of Pennoni personnel in an attempt to disclose unstable surface areas. During proof-rolling, any unstable area found should be stabilized by excavating and replacing those soils with suitable soil that is adequately compacted. This can be accomplished by properly adjusting the moisture content of the subgrade soils and compacting them, or by other methods (placing a geotextile and stone layer, etc.).

Our experience indicates that the clean inert granular portions of the Fill stratum can be reused in a compacted fill for backfill of utility excavations as long as it has a maximum particle size of 3 in., and is free of trash, environmental hazards, and other deleterious material. Additionally, demolition debris consisting of concrete and pavement millings can be used in compacted load bearing fills provided there are no environmental hazards associated with the materials and it is crushed to reduce the maximum particle size to less than 3 inches. Adjusting the moisture content prior to fill placement should be expected. Stratum 1 and Stratum 2 soils are not suitable, in their current state, for re-use in compacted load bearing fill.

Imported structural fill should be selected from suitable borrow sources and be approved by the Geotechnical Engineer's representative well in advance of fill construction. Granular fill ideally should consist of well-graded material with not more than 20 percent passing the No. 200 sieve and have a plasticity index not greater than 8 percent; PennDOT 2A, modified stone or recycled concrete can be considered. Other gradations can be considered based on laboratory testing and at the discretion of the Geotechnical Engineer.

Granular fills should be placed in layers not exceeding 10 to 12 in. loose thickness. This criterion might be adjusted by the geotechnical engineer in the field depending on the conditions present at the time of construction, on the compaction equipment used, and on the fill material selected. Fills for support of foundations and pavement should be compacted to at least 98 percent and 95 percent, respectively, of the laboratory determined maximum dry density, ASTM D 698, when small, hand-operated compaction equipment is used, and to at least 95 percent and 93 percent, respectively, of the laboratory determined maximum dry density, ASTM D 1557, when self-propelled, heavy–duty construction equipment is used. Fills should extend a minimum of 5 ft beyond the exterior edge of a loaded area and have side slopes not steeper than 2 horizontal to 1 vertical.

Specifications should indicate that the percentage of maximum dry density attained in the field is not the only criteria to be used for assessing fill compaction. Observation of the behavior of the fill under the loads of construction equipment should also be used. If the test results indicate that the percentage of compaction is being achieved, but the soil mass is moving under the equipment, placement of additional fill should not be continued until the movement is stabilized. Otherwise, settlement of the fill may occur.

5.3. FOUNDATIONS

Based on the soils encountered and the anticipated loading, it is our professional opinion that the proposed structure should be supported on shallow foundations bearing on improved soils or deep foundations. Controlled Modulus Columns/Rigid Inclusions (CMC's/RI's) can be considered to sufficiently improve the subsoils to allow the construction of shallow spread foundations. Alternatively, deep foundations like concrete filled steel pipe piles and auger cast-in-place piles can be considered for support. Because of the load carrying capacity of the deep foundations, as described, pile load tests (compression and tension) will be necessary.

5.3.1. CMC's/RI's

In order to support the structure on shallow spread footings we recommend improving the subgrade soil by installing CMCs/RIs elements. These elements improve the existing soil conditions to reduce both total and differential settlements by increasing the overall stiffness of the soil mass. A load transfer platform (LTP), sometimes reinforced with a geogrid, is constructed above the CMCs/RIs using granular fill with a thicknesses that may vary from 12 to 36 inches. CMCs/RIs are installed by a drill rig with a specially designed auger that drills down to the designed termination depth followed by a controlled pressure grouting during extraction. The instillation of the CMCs/RIs results in generating minimal auger spoils and vibration. Spread footings can then be designed to bear in the LTP layer for a maximum allowable net bearing capacity of up to 6,000 psf.

Continuous and isolated footings should be at least 1.5 ft wide and 3 ft square, respectively, to prevent localized shear failure in soil. The subgrade of all exterior footings exposed to freezing temperatures, during construction and/or the life of the structure should be established at least 30 in. below adjacent exposed grades or otherwise protected against frost action. Foundation subgrades should be checked by a representative of Pennoni to confirm conditions suitable for support of the design bearing pressure. Where an area is questionable, it should be further explored and/or remedied by removal and replacement of unsuitable material.

5.3.2. Concrete-filled Steel Pipe Piles

Concrete-filled steel pipe piles with an outside diameter (OD) of 16 in. and a minimum wall thickness of 0.5 in. driven into the dense to very dense sand and gravel deposit (Stratum 4) can be considered. Our analyses indicate piles installed to the recommended depths can obtain an allowable load carrying capacity in compression up to 125 tons. A temporary increase in the capacity of up to 33% can be applied to transient loads including wind, etc.

Based on the findings of the test borings and our analyses, the pile tips will be located approximately 60 to 80 ft. below the existing grades. The steel pipe pile should conform to ASTM A-252, Grade 3, specifications. The piles should have a flat boot plate of at least 2 in. thickness fully welded at the tip and flush with the outside wall of the pipe (no projection). The minimum pile spacing should be at least 3 times the pile diameter. In addition to the allowable compression capacity recommended above, the vertical piles can be designed for an allowable uplift capacity of 25 tons, and an allowable lateral capacity of 8 tons per pile.

To facilitate pile installations, the piles may be installed by pre-augering through upper portions of fill layer, if necessary. After pre-augering, the piles should be driven into the dense to very dense sands of Stratum 4, to attain the recommended design capacity. The piles should be driven for at least the last 10 ft. of their length to a resistance determined in accordance with Pile Dynamic Analysis (PDA) testing a suitable dynamic formula, such as a WEAP Analysis, and as verified by successful pile load tests. Production piles may be used for load tests.

5.3.3. Auger Cast Piles

Auger Cast Piles (ACIP) can also be considered for support of the proposed structure. This pile type is constructed by first drilling to the pre-determined depth/elevation using a standard continuous flight auger that removes or displaces material. After reaching the design depth, cement grout is injected, under pressure, as the auger is gradually withdrawn, forming an uncased grout shaft. A 28-day compressive strength of at least 5,000 psi is recommended for the cement grout. The pile shaft can be reinforced with one full-length reinforcing bar extending to the bottom and, if necessary, a reinforcing steel cage can be installed into the upper portion of the grout column while the grout is still fluid.

The piles will derive their capacity by a combination of skin friction and end bearing. An 16-in. diameter ACIP pile will have an estimated allowable axial load carrying capacity of 100 tons per pile. These piles should be constructed estimated to depths of 60 to 80 ft. below existing grade.
We estimate these piles as described will have tension and lateral capacities on the order of 50 tons and 8 tons per pile, respectively.

Piles designed to resist uplift loads (tension) should have reinforcing steel extending all the way to the pile tip. Moreover, piles subjected to lateral loads should have properly designed reinforcing in the upper portion of the pile shaft. We further recommend that the piles designed to carry uplift and lateral loads be spaced at least 3 pile diameters apart. The final design and/or allowable capacities should be determined by a specialty contractor with adequate experience in auger cast concrete pile design and construction. Production piles may be used for load tests but should failure occur, the pile can no longer be used. The auger cast pile installer is responsible for closely monitoring the pile during the load test and proving the pile was damaged during testing.

5.4. LOAD TESTING

CONCRETE FILLED STEEL PIPE PILES

The Wave Equation analysis should be used to determine the suitability of the proposed driving equipment. The contractor should incorporate the results of the wave equation analysis within any submittals that are due prior to construction for approval. Consideration should be given to performing dynamic monitoring on a minimum of 5% piles using a Pile Driving Analyzer (PDA). The PDA will provide information on the actual driving stresses, verification of ultimate geotechnical resistance, energy transfer efficiency, pile damage assessments, and verify the refusal criteria during pile installation. A minimum factor of safety of 2.25 should be used during the PDA testing to confirm the recommended installed pile capacity. In addition to the PDA we recommend that static load test piles be installed to better define pile length(s) and to confirm/refine pile installation procedures. We recommend that 2 sets of static load tests (axial, tension and lateral) be conducted.

We recommend that the installation of each pile should be monitored and documented by geotechnical personnel under the direct supervision of a professional engineer.

ACIP

Prior to production pile installation, we recommend that test piles be installed to better define pile length(s) and to confirm/refine pile installation procedures. We recommend that 2 sets of static load tests (axial, tension and lateral) be conducted and dynamic tests conducted on 5% of the production piles. The dynamic integrity testing for the auger cast piles should consist of Pile Integrity Testing (PIT) to confirm the construction of the piles.

GENERAL PILE LOAD TESTING RECOMMENDATIONS

The proposed pipe and auger cast piles are essentially a combination of tip bearing and/or friction piles. The load tests must verify a safe load carrying capacity and they must demonstrate that only a very small net settlement will occur while the full design load is carried by the pile. Therefore, the load test should be conducted in such a fashion and provided with such instrumentation that the loads carried by the pile shaft and pile tip, and the strains of the top, mid-point, and base of the test pile can be measured, where feasible.

The maximum test load should be not less than specified by Code and it is recommended to be higher to facilitate total load transfer to the tip of the pile. Experience has shown that testing a pile to a load greater than the Code requirement, although costlier initially, can prove advantageous during installation because of inconsistencies during construction. Therefore, we recommend that a maximum test load at least 2.5 times the maximum design load carrying capacity of the selected pile should be considered for evaluating maximum load carrying capabilities and load-settlement relationships.

Static and dynamic load tests should be conducted in accordance with the provisions of the latest version of the ASTM Standards. For static testing instrumentation, load test set-up, and loading procedures should be governed by ASTM D-1143 except that the procedures described under “Apparatus for Measuring Movements”, “Lateral Movements”, and “Incremental Loading Procedures” should be mandatory. PDA testing on driven piles should be performed in accordance with ASTM D-4945.

The geotechnical engineer should select load test locations. Load tests should not be production piles; if the pile/soil interface is failed during testing it will no longer be capable of supporting loads. No construction activity transmitting vibratory or impact loads should be permitted on the project site during load testing. The load test set-up should be protected from inclement weather (wind, rain, intense heat, sunlight, etc.), provided with lights for nighttime readings, and guarded on a full-time basis.

Technical details of the intended pile installation equipment and of the load test set-up (sketch, description, etc.) together with certification of the loading device, etc. should be submitted to the geotechnical engineer at least 1 week in advance of load test construction. Each load test must be monitored on a full-time basis and test results analyzed by a registered geotechnical engineer.

5.5. SETTLEMENT

Settlement of a soil mass is a function of the characteristics of the supporting materials and the stresses imposed on the soils from an external source. Our calculations indicate that settlements will occur due to the stresses imposed on the subsoils by newly placed load bearing fill for site fills and are proportional to the amount of pressure applied (fill height). Additionally, the organic layer of soil was determined to contain approximately 26% of organic material. Long term, secondary settlement is also anticipated in this layer as the material breaks down and consolidates.

The fill heights and secondary settlement may lead to uneven settlement below the floor slab. Therefore, consideration should be given to suspending the utilities from the structural slabs to prevent any serious differential movements in different portions of the utilities. Moreover, flexible connections should be used where the suspended pipes meet the outside pipelines not supported by piling.

Provided the building and structural slab are supported on deep foundations (driven piles, ACIP piles), determinantal total and differential settlements are not anticipated.

5.6. STRUCTURAL SLAB

Because of the differential settlement tolerances the ground floor slab should be designed as structural slab supported by piles and grade beams or they should be designed as “flat plates” supported by piles. The required new fill to attain the finish ground floor subgrade level should be placed as recommended in the Earthwork Section 5.2 to serve as an underside form for slab construction, but it will eventually settle away from the bottoms of the slabs due to consolidation of the compressible organic silt layers.

5.7. GROUND WATER AND SURFACE WATER MANAGEMENT

Observations for groundwater made in each test pit and boring indicate that water was generally encountered 6 to 13 ft. below existing grades. Water table fluctuations may occur with the tidal action of Delaware River. Static water levels could affect utility installation if they are proposed at depths greater than the Mean High Water (MHW) Elevation. The use of sumps and pumps should be expected; well points and/or a sheeting/shoring system comprised of steel interlocking sheeting and high capacity pumps may be required to control ground water during utility installation in deeper excavations (>5 ft. deep).

Surface runoff should be prevented from entering or ponding in excavations by creating soil berms or diversion swales along the perimeter, if the excavation will be left open for an extended period. Where ponding does occur, the water should be removed immediately by pumping. Grades should then be established to prevent further ponding.

5.8. LATERAL EARTH PRESSURE PARAMETERS

The soil parameters presented in Table 1 can be used to estimate earth pressures to design below grade structures and temporary shoring. If the top of the structure is restrained from movement, thereby preventing the mobilization of active soil pressures, the structure should be designed using the at-rest pressure coefficient.

The earth pressure coefficients are based on the assumption of vertical walls, horizontal backfill, no surcharges, no wall friction, and a safety factor of 1.0. A clear distance of 10 ft should be maintained during construction, between perimeter walls and stored materials or the wall must be design to resist the surcharge load from the stored materials. Where sufficient drainage cannot be provided to intercept and re-direct seepage and perched water from structures, hydrostatic pressures must also be considered in the design.

Table 1. Lateral Earth Pressure Design Parameters

Parameter	***Strata***						
	F	***1***	***2***	***3***	***4***	***5***	***Processed Aggregate*** *(PennDOT Type 2A)*
Unit Weight (pcf)	120	100	90	125	130	118	135
Angle of Internal Friction (degrees)	28	17	23	32	38	32	38
Cohesion (psf)	-	200	0	-	-	1000	-
Friction Factor (concrete)	0.35	0.20	0.20	0.40	0.50	0.40	0.50
Friction Factor (steel)	0.25	0.20	0.20	0.25	0.30	0.25	0.30
k_a	0.36	0.55	0.44	0.31	0.24	0.31	0.24
k_o	0.53	0.71	0.61	0.47	0.38	0.47	0.38
k_p	2.77	1.83	2.28	3.25	4.20	3.25	4.20

5.9. CONSTRUCTION DIFFICULTIES

Experience has shown that remnant construction and obstructions are often encountered when building within similar, previously developed urban sites. Encountering remnants of previous foundations and shoring systems should be expected. If encountered, these obstructions will most likely impair the construction process. Existing foundations or other structural components disclosed should be removed to a minimum depth of 18 in. below the bottom of new ground floor slabs and 36 in. below the bottom of new foundations.

6. RECOMMENDATIONS FOR FURTHER GEOTECHNICAL SERVICES

Our experience on numerous construction projects is that the interests of the project team are best served by retaining the Geotechnical Engineer to provide construction observations during earthwork and foundation construction operations. To determine if soils, other materials, and ground water conditions encountered during construction are similar to those encountered in the borings and test pits, and that they have comparable engineering properties or influences on the design of the structures, we recommend that Pennoni should provide field observation services during pile driving and load testing, and excavation; construction of compacted fill; preparation of foundation, floor slabs, and pavement subgrades; and installation/construction of foundations, floor slabs, and pavements. Pennoni's Geotechnical Technology should review specifications for earthwork and foundation design/construction when they are prepared.

7. LIMITATIONS

This work has been done in accordance with our authorized scope of work and in accordance with generally accepted professional practice in the fields of geotechnical and foundation engineering. This warranty is in lieu of all other warranties either expressed or implied. Our conclusions and recommendations are based on the data revealed by this exploration. We are not responsible for any conclusions or opinions drawn from the data included herein, other than those specifically stated, nor are the recommendations presented in this report intended for direct use as construction specifications.

This report is intended for use with regard to the specific project described herein; any changes in loads, structures, or locations should be brought to our attention so that we may determine how they may affect our conclusions. An attempt has been made to provide for normal contingencies but the possibility remains that unexpected conditions may be encountered during construction. If this should occur, or if additional or contradictory data are revealed in the future, we should be notified so that modifications to this report can be made, if necessary. If we do not review relevant construction documents and witness the relevant construction operations, then we cannot be responsible for any problems that may result from misinterpretation or misunderstanding of this report or failure to comply with our recommendations.

APPENDICES

APPENDIX A - Field Data

TEST BORING LOG

BORING B-1
PAGE 1 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 1/4/18 **COMPLETED** 1/4/18
GROUND ELEVATION 15.5 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger
∇ **DURING DRILLING** 13.00 / Elev 2.50
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY S. Corcoran **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0				▒	P	1.0	5.0 in. BITUMINOUS CONCRETE	14.5	
	S-1	12	16-24	▩	F	2.0	7.0 in. Gray C/F gravel size ROCK FRAGMENTS AND F/M SAND, trace Silt	13.5	
	S-2	24	16-20-32-40			4.0	FILL: Black to tan F/M SAND, little Fine Gravel, trace Silt, trace Brick Fragments	11.5	
5	S-3	24	23-20-21-27			6.0	FILL: Black to tan F/M SAND, some Fine Gravel, Cinder Fragments	9.5	Petroleum odor
	S-4	12	15-8-9-7			8.0	FILL: Black to red F/M SAND, little Fine Gravel, some Brick Fragments, trace Cinder and Concrete Fragments	7.5	
10	S-5	12	4-4-5-5				FILL: Black to dark gray Silty CLAY, some F/M Sand, trace Brick and Cinder Fragments		
∇						13.0	FILL: Dark gray Silty CLAY AND F/M SAND, some organic pieces of Wood, trace Cinder	2.5	
15	S-6	12	3-2-3-2			18.0	FILL: Dark gray Fine SAND, Micaceous, some Silt	-2.5	
20	S-7	24	WOH/12"-2-2	▨	1	23.0	Dark gray Silty CLAY, trace Fine Sand	-7.5	
25	S-8	12	1-1-1-1	░	3	28.0	Gray F/M SAND AND brown SILT, little Organics	-12.5	
30	S-9	20	5-6-4-7				Gray to tan M/F SAND, trace Silt		Added mud
35	S-10	18	4-6-9-9						

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-1
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35					3		Gray to tan M/F SAND, trace Silt *(continued)*		
40	S-11	12	8-9-13-15			38.0	Brown to tan to gray F/C GRAVEL, some C/M/F Sand, trace Silt	-22.5	Very wet
45	S-12	12	12-26-20-15						
50	S-13	0	10-14-13-25		4	48.0	NO RECOVERY	-32.5	
55	S-14	0	39-50/3"			53.0	NO RECOVERY	-37.5	Pushing gravel
60	S-15	3	50/4"			58.0	White C/F GRAVEL, little C/M/F Sand, trace Silt	-42.5	
						60.0	Boring terminated at 60.0 feet.	-44.5	

NOTES:

TEST BORING LOG

BORING B-2
PAGE 1 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/28/17 **COMPLETED** 12/29/17
GROUND ELEVATION 16 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger
▽ **DURING DRILLING** 10.00 / Elev 6.00
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY S. Corcoran **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0				⁘	P	0.9	5.0 in. BITUMINOUS CONCRETE	15.1	
	S-1	10	15-22	▦		2.0	6.0 in. Gray C/F gravel size ROCK FRAGMENTS AND F/M SAND, trace Silt	14.0	
	S-2	20	14-27-22-11	▦			Tan to white F/M SAND, trace Silt		
				▦		4.0	Tan to white F/M SAND, little Fine Gravel, trace Silt	12.0	
5	S-3	12	6-6-7-7	▦					Petroleum odor
				▦		6.0	Black to tan F/M SAND AND Fine GRAVEL	10.0	
	S-4	12	12-13-8-5	▦			Brown F/M SAND, little Fine Gravel, Organics		
				▦		8.0		8.0	
10 ▽	S-5	7	1-1-1-1	▦	F		Black M/C/F SAND AND F/C gravel size ROCK FRAGMENTS, little Clay, little Organics, Debris		Wet on spoon Petroleum odor 4' to 15'
				▦		13.0		3.0	
15	S-6	16	1-2-1-1	▦			Dark gray F/M SAND, little Silt, trace Glass and Brick Fragments		
				▦		18.0		-2.0	
20	S-7	24	WOH/24"	▨			Gray Silty CLAY, trace Fine Sand, trace Organics		Wet, Saturated
				▨		23.0		-7.0	
25	S-8	24	1-1-2-2	▨	1		Gray Silty CLAY, trace Fine Sand, little Organics		
				▨		28.0		-12.0	
30	S-9	24	4-4-4-5	▨			Gray Silty CLAY, little to some Fine Gravel, Micaceous		
				▨		33.0		-17.0	
35	S-10	12	6-7-7-6	⁘	3		Tan to gray M/F SAND, trace Silt		

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-2
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35							Tan to gray M/F SAND, trace Silt *(continued)*		
40	☒ S-11	12	4-4-5-7		3				
						43.0		-27.0	
45	☒ S-12	12	7-17-18-15		4		Gray C/M/F SAND, little Fine gravel		
						47.0		-31.0	Auger refusal at 47 ft
	S-13	2	50/2"			47.2	COBBLES	-31.2	

Boring terminated at 47.2 feet.

NOTES:

TEST BORING LOG

BORING B-3
PAGE 1 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/26/17 **COMPLETED** 12/26/17
GROUND ELEVATION 16 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger
∇ **DURING DRILLING** 8.00 / Elev 8.00
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY S. Corcoran **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0				░	P	0.4	5.0 in. BITUMINOUS CONCRETE	15.6	
	S-1	10	35-45	▩	F	2.0	FILL: Gray C/F gravel size ROCK FRAGMENTS AND M/F/C SAND, trace Silt	14.0	
	S-2	5	50/5"	▩		4.0	FILL: Gray to tan F/M SAND, some F/C Gravel	12.0	
5	S-3	8	15-13-7-6	▩		6.0	FILL: Black to gray F/M SAND, some F/C Gravel, trace Silt, trace Brick and Cinder Fragments	10.0	
	S-4	16	8-5-3-3	▩		8.0	FILL: Black SILT, some F/M Sand	8.0	
∇ 10	S-5	6	3-3-2-2	▩		13.0	FILL: Black C/F GRAVEL AND F/M/C SAND, little Silt	3.0	Wet
15	S-6	14	2-1-1-1	▥	2	18.0	Black SILT AND F/M SAND, trace Organics	-2.0	
20	S-7	22	WOH/24"	▨	1	23.0	Gray Silty CLAY, trace Fine Sand	-7.0	Wet
25	S-8	24	1-1-1-1	▨	1	28.0	Gray Silty CLAY, trace Fine Sand, trace Organics	-12.0	
30	S-9	12	5-5-5-9	▥	2	33.0	Brown SILT AND ORGANICS, trace Fine Sand	-17.0	
35	S-10	9	5-6-7-6	░	3		Gray to tan M/F/C SAND, trace Silt		

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-3
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35					3		Gray to tan M/F/C SAND, trace Silt *(continued)*		
40	☒ S-11	10	5-5-7-14			38.0	Gray to tan M/F/C SAND, little to some C/F Gravel, trace Silt	-22.0	
45	☒ S-12	12	6-7-13-36		4	43.0	Gray to tan F/M/C SAND, trace Fine Gravel, trace Silt	-27.0	
						44.5	Gray to tan C/F GRAVEL, some C/M/F Sand, trace Silt	-28.5	
	☒ S-13	24	28-33-42-50/3"						
50						49.0	Gray to tan F/M/C SAND, trace Fine Gravel, trace Silt	-33.0	
55	☒ S-14	16	50-40-9-13			53.0	Gray to tan C/F GRAVEL, some C/M/F Sand, trace Silt	-37.0	
60	☒ S-15	18	8-20-7-34			58.0	Gray to tan C/M/F SAND AND C/F GRAVEL, trace Silt	-42.0	
						60.0		-44.0	

Boring terminated at 60.0 feet.

NOTES:

TEST BORING LOG

BORING B-4
PAGE 1 OF 2

CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013.04

PROJECT LOCATION Philadelphia, PA

DATE STARTED 12/22/17 **COMPLETED** 12/22/17

GROUND ELEVATION 13.5 +/- feet NAVD88

DRILLING CONTRACTOR CGC Geoservices, LLC

WATER ENCOUNTERED:

DRILLING METHOD Hollow Stem Auger w/ Mud

▽ **DURING DRILLING** 13.00 / Elev 0.50

DRILLER / HELPER Eric Blemings

AT END OF DRILLING ---

LOGGED BY D. Copeland **CHECKED BY** D. Marrano

AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0					P	0.5	6.0 in. BITUMINOUS CONCRETE	13.0	
	S-1	12	29-26-50		F	4.0	FILL: Brown C/F gravel size ROCK FRAGMENTS AND M/F SAND	9.5	Dry
	S-2	4	50/4"						
5	S-3	16	5-8-9-6			8.0	FILL: Black SILT, some M/F Sand, trace Incinerated Material, trace Organics	5.5	
	S-4	16	6-6-6-7						Moist
10	S-5	18	7-9-8-7		3	13.0	Gray Fine SAND, trace Silt	0.5	
▽									
15	S-6	24	WOH/24"		1	18.0	Gray Silty CLAY, trace Organics, trace Fine Sand	-4.5	
20	S-7	24	1/12"-1/12"			23.0	Gray Silty CLAY, some Organics	-9.5	
25	S-8	24	2-2-2-2		2	33.0	Dark brown SILT AND ORGANICS	-19.5	
30	S-9	24	5-7-9-12						
35	S-10	22	4-7-7-9		3		Brown M/F SAND, trace Silt		

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-4
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION Depth	Elev.	REMARKS
35						Brown M/F SAND, trace Silt *(continued)*		
						38.0	-24.5	
40	S-11	22	4-6-7-5		3	Brown M/C/F SAND, trace Silt		
						43.0	-29.5	
45	S-12	10	43-45-45-45			Brown M/F/C SAND, some C/F Gravel, trace Silt		Auger Chatter
50	S-13	22	19-20-24-19					
55	S-14	2	15-15-15-16		4			
60	S-15	20	6-10-11-12			60.0	-46.5	

Boring terminated at 60.0 feet.

NOTES:

Pennoni

TEST BORING LOG

BORING B-5

PAGE 1 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/21/17 **COMPLETED** 12/21/17
GROUND ELEVATION 13.5 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger w/ Mud
▽ **DURING DRILLING** 13.00 / Elev 0.50
DRILLER / HELPER Eric Blamings
AT END OF DRILLING ---
LOGGED BY D. Copeland **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0									
	S-1	14	25-11-50/3"		P	0.4	5.0 in. BITUMINOUS CONCRETE	13.1	Dry
	S-2	5	50/5"		F		FILL: Brown F/C gravel size ROCK FRAGMENTS AND F/M/C SAND		
						4.0		9.5	
5	S-3	6	5-3-2-2				FILL: Brown SILT, some F/M Sand, trace Mica		Moist
						6.0		7.5	
	S-4	24	2-2-2-2		1		Gray Silty CLAY, trace Organics		
10	S-5	24	2-4-3-3						
▽						13.0		0.5	
15	S-6	22	1/12"-1/12"		3		Brown Fine SAND, some Silt		Wet
20	U-1	0	REC=0%			20.0		-6.5	
	S-7	24	2-2-2-2		1		Dark brown Silty CLAY, some F/M Sand, little Organics		
	U-2	20	REC=83%						
25	S-8	24	2-2-4-4						
						28.0		-14.5	
30	S-9	22	4-4-4-4		3		Brown M/F SAND		
35	S-10	22	8-8-9-11						

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-5
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION Depth	DESCRIPTION	DESCRIPTION Elev.	REMARKS
35							Brown M/F SAND *(continued)*		
						38.0		-24.5	
							Brown C/F GRAVEL AND M/F SAND		
40	☒ S-11	22	10-11-14-16						
						43.0		-29.5	
							Brown M/F SAND, trace Fine Gravel		
45	☒ S-12	22	5-6-6-5						
					3	48.0		-34.5	
							Brown F/C GRAVEL AND M/C/F SAND		
50	☒ S-13	16	7-8-10-11						
						53.0		-39.5	
							Brown C/M/F SAND		
55	☒ S-14	18	12-11-10-12						
60	☒ S-15	18	4-6-8-8			60.0		-46.5	

Boring terminated at 60.0 feet.

NOTES:

Pennoni

TEST BORING LOG

BORING B-6
PAGE 1 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 1/3/18 **COMPLETED** 1/3/18
GROUND ELEVATION 12.5 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger
∇ **DURING DRILLING** 13.00 / Elev -0.50
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY S. Corcoran **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0	S-1	5	50/5"		P		8.0 in. BITUMINOUS CONCRETE		
						1.1	5.0 in. M/C/F SAND, little F/C gravel size Rock Fragments, trace Silt	11.4	
	S-2	10	37-50/3"				FILL: Black M/F/C SAND, some F/C Gravel, little Silt, trace Brick, Cinder, and Asphalt Fragments		
5	S-3	10	12-5-4-3						
						6.0		6.5	
	S-4	20	6-5-5-5		F		FILL: Black F/M/C SAND AND CLAY, little Fine Gravel, trace Brick and Cinder Fragments		
10	S-5	10	5-2-2-2						
∇						13.0		-0.5	
15	S-6	24	1-1-1-1				Dark gray Silty CLAY, trace Fine Sand		Wet
						18.0		-5.5	
20	S-7	24	WOH/24"		1		Gray SIlty CLAY, trace Fine Sand, trace Organics		
						23.0		-10.5	
							Gray Silty CLAY, some Organics, trace Fine Sand		
						24.0		-11.5	
25	S-8	24	2-3-2-2				Tan to gray F/M SAND, little Silt		Very wet
						28.0		-15.5	
30	S-9	24	7-8-7-8		3		Tan to gray M/F SAND, trace Silt		Added mud
						33.0		-20.5	
35	S-10	20	5-6-9-6				Tan to gray M/F SAND, trace Silt, trace Fine Gravel		

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-6
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35					3		Tan to gray M/F SAND, trace Silt, trace Fine Gravel *(continued)*		
40	S-11	12	13-18-10-7			38.0	Tan to gray M/F/C SAND, little Fine Gravel, trace Silt	-25.5	
45	S-12	7	20-13-16-14			43.0	Gray to tan C/M/F SAND, little Fine Gravel, trace Silt	-30.5	
50	S-13	10	4-10-10-11			48.0	Gray to tan C/M/F SAND, some F/C Gravel, trace Silt	-35.5	
55	S-14	2	50/3"		4	53.0	Gray C/F GRAVEL, little C/M/F Sand	-40.5	
60	S-15	12	24-38-42-44			58.0	Yellow to white to tan F/M SAND, trace Fine Gravel, trace Silt, mottled	-45.5	
65	S-16	24	12-16-19-21			63.0	Yellow to white to tan F/M SAND, little Clay, trace Fine Gravel, trace Silt, mottled	-50.5	
						68.0	White to gray Fine SAND, little Silt	-55.5	
70	S-17	24	17-12-15-13		5	69.0	White to gray CLAY, some to little Fine Sand	-56.5	
						70.0	Boring terminated at 70.0 feet.	-57.5	

NOTES:

Pennoni

TEST BORING LOG

BORING B-7
PAGE 1 OF 3

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/27/17 **COMPLETED** 12/27/17
GROUND ELEVATION 12 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger
▽ **DURING DRILLING** 8.00 / Elev 4.00
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY S. Corcoran **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0	S-1	6	45-50/5"		P	0.6	7.0 in. BITUMINOUS CONCRETE	11.4	
	S-2	18	38-27-20-31		F		FILL: Gray to black to brown M/F/C SAND, some Silt, little Fine gravel size Brick, Cinder, Ash and Rock Fragments		
5	S-3	17	7-10-6-4						
▽	S-4	18	3-4-3-5						
10	S-5	6	3-2-1-1						Wet
						13.0		-1.0	
15	S-6	0	5-3-2-2				NO RECOVERY		TRAP OK
						18.0		-6.0	
20	S-7	24	WOH/24"		1		Gray Silty CLAY, trace Organics, trace Fine Sand		
						23.0		-11.0	
25	S-8	24	1-1-1-1				Dark gray Silty CLAY AND F/M SAND, little Organics		Add mud
						28.0		-16.0	
30	S-9	14	4-6-7-10		3		Tan to gray M/F SAND, trace Silt		
35	S-10	12	4-7-5-5						

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-7
PAGE 2 OF 3

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35							Tan to gray M/F SAND, trace Silt *(continued)*		
						38.0		-26.0	
40	S-11	11	4-3-3-5		3		Tan to gray F/M SAND, trace Silt, Micaceous		
						43.0		-31.0	Auger Chatter
45	S-12	11	38-50/5"		4		Tan to gray to purple C/F GRAVEL, some Clay, little F/M Sand		Auger Chatter
						48.0		-36.0	
50	S-13	12	12-8-14-17				Tan to brown to gray C/M/F SAND, little F/C Gravel, trace Silt		
						53.0		-41.0	
55	S-14	14	4-5-6-12				Tan to brown to gray C/M/F SAND, some F/C Gravel, trace Silt		
60	S-15	10	4-4-14-24		3				
						63.0		-51.0	
65	S-16	12	6-6-16-38				Tan to yellow F/M SAND, trace Silt		
						68.0		-56.0	
70	S-17	20	35-32-25-25				Tan M/F SAND, little Fine Gravel, trace Silt		
					4	73.0		-61.0	
75	S-18	0	NA				NO RECOVERY		No SPT sampling possible due to soil rising through augers

NOTES:

(Continued Next Page)

BORING B-7
PAGE 3 OF 3

TEST BORING LOG

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
					4	78.0	NO RECOVERY *(continued)*	-66.0	
80	S-19	0	NA			80.0	NO RECOVERY	-68.0	No SPT sampling possible due to soil rising through augers

Boring terminated at 80.0 feet.

NOTES:

TEST BORING LOG

BORING B-8
PAGE 1 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 1/3/18 **COMPLETED** 1/3/18
GROUND ELEVATION 12.5 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger
▽ **DURING DRILLING** 8.00 / Elev 4.50
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY S. Corcoran **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0	S-1	3	50/3"		P	0.4	5.0 in. BITUMINOUS CONCRETE	12.1	
	S-2	5	50/5"		F		FILL: Gray to black F/M SAND, some Fine Gravel, trace Silt		
5	S-3		12-26-21-20			6.0		6.5	
	S-4	24	21-19-6-4			8.0	FILL: Black F/M SAND, little Fine Gravel, trace Silt, trace Brick and Cinder Fragments	4.5	
10	S-5	6	5-3-3-1		3	13.0	Black F/M SAND AND CLAY, trace Brick and Cinder Fragments	-0.5	Wet
15	S-6	20	4-5-6-6			18.0	Black to dark gray F/M SAND, little Fine Gravel, little Clay	-5.5	
20	S-7	24	WOH/6"-1-WOH/6"-1		1	23.0	Gray Silty CLAY, trace Fine Sand, trace Organics	-10.5	
25	S-8	24	2-2-2-2		2	29.0	Brown SILT AND ORGANICS	-16.5	
30	S-9	24	5-6-5-5		3		Gray to tan F/M SAND, trace Silt		
35	S-10	5	8-12-9-8						

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-8
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION Depth	Elev.	REMARKS
35						Gray to tan F/M SAND, trace Silt *(continued)*		
40	☒ S-11	20	9-14-15-12		3			Auger chatter
						43.0	-30.5	
45	☒ S-12	15	24-25-32-32			Gray to tan C/M/F SAND, some F/C Gravel, trace Silt		
						48.0	-35.5	
50	☒ S-13	0	22-24-24-27			Pushing Gravel - NO RECOVERY		
						53.0	-40.5	
55	☒ S-14	12	8-11-12-24			White to gray C/M/F SAND, little to some Clay, little Fine Gravel		
					4	58.0	-45.5	
60	☒ S-15	12	7-17-23-27			Gray to white Fine SAND, trace Silt		
						63.0	-50.5	
65	☒ S-16	14	9-23-27-33			Gray to white to yellow M/C/F SAND, trace Silt		
						68.0	-55.5	
70	☒ S-17	0	28-50-50/3"			NO RECOVERY		Spoon lost in hole
						70.0	-57.5	

Boring terminated at 70.0 feet.

NOTES:

BORING B-9

PAGE 1 OF 2

TEST BORING LOG

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/29/17 **COMPLETED** 12/29/17
GROUND ELEVATION 12.5 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger
▽ **DURING DRILLING** 6.00 / Elev 6.50
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY S. Corcoran **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0					P	0.8	6.0 in. BITUMINOUS CONCRETE	11.7	
	S-1	10	22-18			2.0	4.0 in. Gray C/F gravel size ROCK FRAGMENTS AND F/M SAND, trace Silt	10.5	
	S-2	14	24-14-7-8			4.0	Gray F/M/C SAND, some Fine gravel size Rock Fragments, trace Silt	8.5	
5	S-3	18	16-10-7-6			5.0	Black to dark gray F/M SAND, little Fine gravel size Rock Fragments, trace Brick, trace Asphalt Fragments	7.5	
▽	S-4	20	9-6-5-7		F	7.0 8.0	Black to dark gray F/M SAND, little Fine gravel size Rock Fragments, trace Brick, Asphalt, Cinder, and Concrete Fragments	5.5 4.5	Wet on spoon
10	S-5	24	7-8-7-4				Black F/M SAND, little Silt, trace Glass		
							Black SILT, some F/M Sand, trace Organics, trace Brick Fragments		
						13.0	Black C/M/F SAND AND F/C GRAVEL, Debris, Organics, Brick, Concrete, little Clay	-0.5	
15	S-6	24	1-2-1-1				Gray Silty CLAY, trace Fine Sand		Very soft
					1				
20	S-7	24	WOH/24"						Very soft
						23.0		-10.5	
25	S-8	24	2-4-4-2		2	24.5	Brown to gray SILT, Organics, trace F/M Sand	-12.0	Added mud
						28.0	Tan to gray M/F SAND, trace Silt	-15.5	
30	S-9	12	5-7-9-7		3		Tan to gray M/F SAND, little Silt		
						33.0		-20.5	
35	S-10	10	6-7-7-7				Gray M/F SAND, trace Silt		

NOTES:

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TEST BORING LOG

BORING B-9
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION	Depth	Elev.	REMARKS
35					3	Gray M/F SAND, trace Silt *(continued)*	38.0	-25.5	
40	☒ S-11	18	6-9-5-8			Gray M/F SAND, trace Fine Gravel, trace Silt	43.0	-30.5	
45	☒ S-12	9	38-50/5"		4	Tan C/F GRAVEL, some M/C/F Sand, trace Silt	48.0	-35.5	Trap replaced
50	☒ S-13	13	38-36-15-13			Tan to gray C/F Gravel, some C/M/F Sand, little Clay	53.0	-40.5	
55	☒ S-14	9	37-45-48-38			Light gray F/M SAND, little Silt, trace Coarse Gravel	58.0	-45.5	
60	☒ S-15	17	15-30-35-39			Yellow to tan to white C/M/F SAND, trace Silt, mottled	64.0	-51.5	
65	☒ S-16	18	11-30-45-50/5"			Light gray to white F/M SAND, trace Silt, mottled			
70	☒ S-17	18	12-35-35-35				70.0	-57.5	

Boring terminated at 70.0 feet.

NOTES:

TEST BORING LOG

BORING B-10
PAGE 1 OF 3

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/26/17 **COMPLETED** 12/26/17
GROUND ELEVATION 13 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger
∇ **DURING DRILLING** 13.00 / Elev 0.00
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY S. Corcoran **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0					P	0.4	5.0 in. BITUMINOUS CONCRETE	12.6	
	S-1	12	37-24			1.0 2.0	FILL: Gray to dark gray C/F gravel size ROCK FRAGMENTS AND M/F/C SAND, trace Silt	12.0 11.0	
	S-2	18	40-21-8-9			4.0	FILL: Black to dark gray F/M SAND, some F/C Gravel, trace Brick Fragments	9.0	
5	S-3	16	2-2-2-2				FILL: Black to dark gray F/M SAND, some F/C Gravel, trace Brick and Cinder Fragments		
	S-4	20	2-2-3-4		F		FILL: Dark gray F/M/C SAND AND SILT, little Fine gravel size Brick, Cinder, Ash and Rock Fragments		
10	S-5	14	4-3-3-2						
∇						13.0		0.0	
15	S-6	3	WOH/6"-1-1-1		1		Dark gray Silty CLAY AND F/M SAND		Wet
						18.0 18.5	Gray Silty CLAY, trace Fine Sand, trace Organics	-5.0 -5.5	
20	S-7	24	1-1-1-1		2		Brown SILT, some Organics, trace Fine Sand		
						23.0		-10.0	
25	S-8	20	1-1-1-1		1		Gray to brown Silty CLAY to Clayey SILT, trace Organics, trace Fine Sand		
						28.0		-15.0	
30	S-9	13	4-5-6-7		2	29.0	Brown SILT, trace Organics, trace Fine Sand	-16.0	
					3		Tan to gray M/F/C SAND, trace Fine Gravel, trace Silt		
35	S-10	12	4-6-7-10						

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-10
PAGE 2 OF 3

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35					3	38.0	Tan to gray M/F/C SAND, trace Fine Gravel, trace Silt *(continued)*	-25.0	
40	S-11	15	9-15-15-12		4	43.0	Gray to tan C/F GRAVEL AND C/M/F SAND, trace Silt	-30.0	
45	S-12	8	14-22-35-22			48.0	Gray to tan C/F GRAVEL, some C/M/F Sand, trace Silt	-35.0	
50	S-13	18	35-40-25-32			53.0	Gray to tan C/M/F SAND, little C/F Gravel, trace Silt	-40.0	
55	S-14	0	11-9-19-17		3	58.0	NO RECOVERY	-45.0	No Recovery, TRAP OK
60	S-15	9	10-6-10-10			63.0	Gray to tan C/F GRAVEL, some C/M/F Sand, trace Silt	-50.0	
65	S-16	10	15-27-36-50/2"		4	68.0	Gray to tan C/M/F SAND, little C/F Gravel, trace Silt	-55.0	
70	S-17	15	8-12-46-30			73.0	Tan F/M SAND, trace Silt, trace Fine Gravel	-60.0	
75	S-18	20	7-31-50/5"				Tan F/M SAND, trace Fine Gravel, trace Silt		

NOTES:

(Continued Next Page)

Pennoni

TEST BORING LOG

BORING B-10
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CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013.04

PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
					4	78.0	Tan F/M SAND, trace Fine Gravel, trace Silt *(continued)*	-65.0	
80	S-19	18	5-6-7-7		5	80.0	Red to white to purple Silty CLAY, trace Fine Sand	-67.0	

Boring terminated at 80.0 feet.

NOTES:

Pennoni

TEST BORING LOG

BORING B-11
PAGE 1 OF 3

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 1/2/18 **COMPLETED** 1/2/18
GROUND ELEVATION 12.5 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger w/ Mud
▽ **DURING DRILLING** 13.00 / Elev -0.50
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY D. Copeland **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0					P	0.8	4.0 in. BITUMINOUS CONCRETE	11.7	
	S-1	10	30-26			2.0	6.0 in. CONCRETE	10.5	
	S-2	12	38-5-7-6			4.0	FILL: Brown F/C gravel size BRICK AND ROCK FRAGMENTS	8.5	
5	S-3	12	16-4-5-8				FILL: Brown to green Micaceous F/M SAND, some Silt		Wet
	S-4	6	49-10-9-4				FILL: Black F/M SAND AND SILT, trace Fine gravel size Ash, Cinders, Coal and Rock Fragments		
10	S-5	12	4-4-4-5		F				
▽									
15	S-6	0	12-9-5-4			15.0		-2.5	
							Dark brown SILT, some Organics		
20	S-7	16	1/12"-1/12"			23.0		-10.5	
25	S-8	24	1-2-1-2		2		Brown to gray Clayey SILT, trace Organics		Added drill mud
30	S-9	24	5-6-8-9			33.0		-20.5	
35	S-10	16	6-8-8-11		3		Brown F/M SAND trace Silt		

NOTES:

(Continued Next Page)

TEST BORING LOG

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35							Brown F/M SAND trace Silt *(continued)*		
40	S-11	16	8-9-8-9		3				
						43.0		-30.5	
45	S-12	18	42-37-27-38				Brown F/C GRAVEL, some M/C/F Sand, trace Silt		
50	S-13	18	17-12-15-21						
55	S-14	18	14-28-32-24		4				
60	S-15	18	12-14-14-18						
						63.0		-50.5	
65	S-16	0	5-6-7-6		3		Tan C/M/F SAND, some F/C Gravel, trace Silt		
						68.0		-55.5	
70	S-17	20	10-13-20-14		4		Brown F/C GRAVEL, some M/C/F Sand, trace Silt		
						73.0		-60.5	
75	S-18	24	8-8-10-17		5		Red to gray CLAY		

NOTES:

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TEST BORING LOG

BORING B-11
PAGE 3 OF 3

CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013.04

PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION Depth	DESCRIPTION	DESCRIPTION Elev.	REMARKS
					5		Red to gray CLAY *(continued)*		
80	☒ S-19	24	6-6-9-14			80.0		-67.5	

Boring terminated at 80.0 feet.

NOTES:

BORING B-12
PAGE 1 OF 2

TEST BORING LOG

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/22/17 **COMPLETED** 12/22/17
GROUND ELEVATION 13 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger w/ Mud
∇ **DURING DRILLING** 8.00 / Elev 5.00
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY D. Copeland **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0				░	P	0.8	4.0 in. BITUMINOUS CONCRETE	12.2	
	☒ S-1	6	43-50/3"	▩			6.0 in. CONCRETE		
	☒ S-2	12	15-11-12-17	▩		4.0	FILL: Green to brown Micaceous Fine SAND AND SILT	9.0	Damp
5	☒ S-3	18	11-19-18-8	▩			FILL: Brown SILT AND M/F SAND, some Fine gravel size Brick, Concrete, Coal, and Rock Fragments		
∇	☒ S-4	0	8-9-14-21	▩	F	8.0		5.0	
10	☒ S-5	16	20-10-12-6	▩			FILL: Black Fine gravel size ROCK FRAGMENTS, some C/M/F Sand, some Silt		Wet Strong petroleum odor
				▩		13.0		0.0	
15	☒ S-6	24	1/12"-1/12"	▨			Dark brown Silty CLAY, some Organics		
				▨	1	18.0		-5.0	
20	☒ S-7	24	1/24"	▥			Dark brown Clayey SILT AND ORGANICS		
25	☒ S-8	24	1-1-1-1	▥	2				
30	☒ S-9	8	5-6-7-7	▥		33.0		-20.0	
35	☒ S-10	14	5-6-6-7	░	3		Brown F/M SAND, trace Silt		Added drilling mud

NOTES:

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Pennoni

TEST BORING LOG

BORING B-12
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35							Brown F/M SAND, trace Silt *(continued)*		
						38.0		-25.0	
							Brown M/F/C SAND		
40	S-11	16	6-6-6-6		3				
						43.0		-30.0	
							Brown M/F/C SAND AND F/C GRAVEL, trace Silt		
45	S-12	12	18-18-7-10			45.0		-32.0	Auger Chatter
							COBBLES		
	S-13	1	50/1"		4				
50						50.0		-37.0	Auger refusal at 50 ft

Boring terminated at 50.0 feet.

NOTES:

Pennoni

TEST BORING LOG

BORING B-13

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CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/21/17 **COMPLETED** 12/21/17
GROUND ELEVATION 13 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger w/ Mud
∇ **DURING DRILLING** 13.00 / Elev 0.00
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY D. Copeland **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION Depth	DESCRIPTION	DESCRIPTION Elev.	REMARKS
0					P	0.8	7.0 in. BITUMINOUS CONCRETE	12.3	
	S-1	16	8-8-7				2.0 in. PROCESSED AGGREGATE FILL: Gray Micaceous Fine SAND, some Silt		Dry
	S-2	16	9-7-5-5			4.0		9.0	Damp
5	S-3	10	5-4-4-4				FILL: Black SILT, some F/M Sand, trace Fine gravel size Brick and Rock Fragments		Moist
	S-4	1	40-30-17-9		F	8.0		5.0	Rock fragment clogged spoon
10	S-5	14	8-7-6-6				FILL: Black Silty CLAY		Strong petroleum odor 4' to 10'
∇						13.0		0.0	
15	S-6	6	1/12"-1/12"		3	18.0	Gray to brown Fine SAND, some Silt	-5.0	Wet
20	S-7	16	WOH/24"		1	23.0	Dark gray Silty CLAY	-10.0	
25	S-8	24	1-1-1-1		2	28.0	Dark brown SILT AND ORGANICS	-15.0	
30	S-9	22	1-2-2-4		3		Brown M/F SAND		Wet
35	S-10	22	6-5-4-6						

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-13
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35							Brown M/F SAND *(continued)*		
40	S-11	22	3-6-5-5			38.0	Brown M/C/F SAND	-25.0	
45	S-12	22	10-5-6-6			43.0	Brown Fine GRAVEL AND C/M/F SAND	-30.0	
50	S-13	20	8-12-13-25		3	48.0	Brown F/C GRAVEL, some C/M Sand	-35.0	
55	S-14	22	6-8-10-14			53.0	Brown C/M//F SAND, trace Fine Gravel	-40.0	
60	S-15	22	10-13-15-17			60.0		-47.0	

Boring terminated at 60.0 feet.

NOTES:

TEST BORING LOG

BORING B-14
PAGE 1 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 1/2/18 **COMPLETED** 1/2/18
GROUND ELEVATION 13 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger w/ Mud
∇ **DURING DRILLING** 13.00 / Elev 0.00
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY D. Copeland **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0	S-1	24	34-6-5-7		P	1.0	12.0 in. PROCESSED AGGREGATE	12.0	
					F	2.0	FILL: Brown Micaceous Fine SAND AND SILT	11.0	
	S-2	4	5-7-8-7			4.0	FILL: Brown Micaceous Fine SAND	9.0	Damp
5	S-3	22	4-4-4-5			6.0	FILL: White Micaceous Fine SAND AND SILT	7.0	
	S-4	4	5-5-3-3			8.0	FILL: Black SILT, some Fine Sand, trace Ash, Cinder	5.0	Wet
10	S-5	24	2-2-2-2		2		Dark brown SILT, trace Organics		
∇									
15	S-6	0	1/24"						
20	S-7	24	1/12"-1/12"			23.0		-10.0	
25	S-8	24	1/12"-1/12"		1	28.0	Gray Silty CLAY	-15.0	
30	S-9	18	5-5-8-10		3	33.0	Brown F/M SAND, trace Silt	-20.0	Added drill mud
35	S-10	18	10-15-15-15		4		Brown F/M SAND, some F/C Gravel, trace Silt		

NOTES:

(Continued Next Page)

Pennoni

TEST BORING LOG

BORING B-14
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35					4		Brown F/M SAND, some F/C Gravel, trace Silt *(continued)*		
40	S-11	12	9-13-14-17						
						43.0		-30.0	
							Brown F/C GRAVEL, some M/C/F Sand, trace Silt		
	S-12	16	49-50/5						
45									
						48.0		-35.0	
							Light gray Fine SAND, trace Silt		
50	S-13	20	10-20-23-26						
	S-14	4	39-50/4"						
55									
	S-15	10	33-50/4"						
60									
65	S-16	18	10-15-17-21						
70	S-17	18	7-10-16-19			70.0		-57.0	

Boring terminated at 70.0 feet.

NOTES:

TEST BORING LOG

BORING B-15
PAGE 1 OF 3

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/27/17 **COMPLETED** 12/27/17
GROUND ELEVATION 13 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger
▽ **DURING DRILLING** 13.00 / Elev 0.00
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY S. Corcoran **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0									
	☒ S-1	18	9-8-7-7	▩		0.7	FILL: Dark gray to black F/C gravel size ROCK FRAGMENTS AND F/M/C SAND, trace Silt	12.3	
	☒ S-2	24	16-11-5-3	▩		2.0	FILL: Brown to black Micaceous F/M SAND, some Silt, little Fine Gravel	11.0	
5	☒ S-3	24	3-4-3-4	▩		4.0	FILL: White to tan to brown F/M SAND, some Organics, Debris, some Fine Gravel, little Silt, Micaceous	9.0	Dry
	☒ S-4	20	8-7-13-17	▩	F	6.5	FILL: White to tan F/M SAND, some to AND SILT, Micaceous	6.5	Petroleum odor
10	☒ S-5	18	8-14-13-10	▩		8.0	FILL: Black F/M SAND, little Sitl, Organics FILL: Black to tan F/M SAND, some gravel size Rock Fragments, Cinders, Brick, trace Silt	5.0	Brick and cinder fragments Dry
▽				▩		13.0		0.0	
15	☒ S-6	24	3-2-2-2	▩		14.0	FILL: Black to dark gray Silty CLAY, trace Fine Sand, trace Organics, trace Fine Gravel Gray Silty CLAY, trace Fine Sand	-1.0	Observed soil heaving at surface
20	☒ S-7	24	1-2-1-2	▨	1				
25	☒ S-8	20	1-2-1-2	▨		23.0	Gray Silty CLAY, trace Fine SAND, trace Organics	-10.0	Petroleum odor Mud added
30	☒ S-9	15	7-7-8-12	⁘	3	28.0	Brown to tan M/F SAND, trace Silt	-15.0	
35	☒ S-10	12	7-8-9-13	⁘					

NOTES:

(Continued Next Page)

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TEST BORING LOG

BORING B-15
PAGE 2 OF 3

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35					3	38.0	Brown to tan M/F SAND, trace Silt *(continued)*	-25.0	
40	S-11	12	24-22-13-12		4	39.5	Tan to brown C/F GRAVEL some C/M/F Sand, trace Silt	-26.5	
						43.0	Tan to brown M/F/C SAND, some Fine Gravel, trace Silt	-30.0	
45	S-12	16	18-14-26-15			48.0	Tan to brown M/F SAND, little Silt	-35.0	Auger Chatter
50	S-13	12	49-23-19-17			53.0	Tan to brown M/F/C SAND, little Silt	-40.0	
55	S-14	14	7-10-9-11		5	58.0	Tan to pink Silty CLAY, little fine Sand, trace Fine Gravel	-45.0	
60	S-15	16	6-26-50-50/5"		4	63.0	Tan F/M SAND, some Silt/Clay	-50.0	
65	S-16	3	50/3"		5	68.0	Tan to white Silty CLAY, trace Fine Gravel, trace F/M Sand	-55.0	
70	S-17	12	40-50-50/2"		4	73.0	Tan to yellow to white M/C/F SAND, little clay, trace Fine Gravel, mottled	-60.0	
75	S-18	9	44-50/3"				Tan to gray M/F/C SAND, some to AND C/F GRAVEL, trace Silt, mottled		

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-15
PAGE 3 OF 3

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
					4	78.0	Tan to gray M/F/C SAND, some to AND C/F GRAVEL, trace Silt, mottled *(continued)*	-65.0	
80	☒ S-19	7	10-40-50/3"			80.0	Tan to gray to white M/C/F SAND, trace Silt	-67.0	

Boring terminated at 80.0 feet.

NOTES:

BORING B-16
PAGE 1 OF 2

TEST BORING LOG

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 1/3/18 **COMPLETED** 1/3/18
GROUND ELEVATION 16 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger
∇ **DURING DRILLING** 13.00 / Elev 3.00
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY S. Corcoran **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION	Depth	Elev.	REMARKS
0	S-1	24	47-20-10-9			FILL: Tan to gray to black F/M SAND, some to little F/C Gravel	2.0	14.0	
	S-2	12	12-14-9-7			FILL: Tan to black F/M SAND AND Fine GRAVEL, some Clay, trace Brick Fragments	4.0	12.0	
5	S-3	12	8-9-10-20			FILL: Black F/M SAND, some Fine Gravel, trace Cinders, Brick	6.0	10.0	
	S-4	0	50/5"			NO RECOVERY	8.0	8.0	TRAP OK
10	S-5	7	2-4-4-3		F	FILL: Red C/F gravel size BRICK FRAGMENTS, some F/M Sand	13.0	3.0	
∇ 15	S-6	5	1-1-1-1			FILL: Black F/C gravel size ROCK FRAGMENTS, some F/M/C Sand, trace Silt	18.0	-2.0	Wet
20	S-7	0	1-1-1-1			NO RECOVERY	23.0	-7.0	TRAP OK
25	S-8	24	2-2-2-2		1	Gray Silty CLAY, trace Fine Sand, trace Organics	24.5	-8.5	
30	S-9	10	3-4-6-9		3	Tan to gray F/M SAND, trace Silt	33.0	-17.0	
35	S-10	10	16-11-20-17			Gray F/M SAND, little Fine Gravel, little Clay			

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-16
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CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35						38.0	Gray F/M SAND, little Fine Gravel, little Clay *(continued)*	-22.0	
40	S-11	12	5-6-7-7		3	43.0	Gray F/M SAND, trace Silt	-27.0	
45	S-12		29-33-36-28		4	48.0	Tan to gray to red F/M SAND AND F/C GRAVEL, trace Silt	-32.0	
50	S-13	0	21-11-18-19			53.0	NO RECOVERY	-37.0	TRAP OK
55	S-14	24	7-7-10-11		5	58.0	Tan to gray to white CLAY, little F/M Sand	-42.0	
60	S-15	12	14-22-47-50/3"		4	60.0	Gray Fine SAND, trace Silt	-44.0	

Boring terminated at 60.0 feet.

NOTES:

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TEST BORING LOG

BORING B-17
PAGE 1 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/29/17 **COMPLETED** 12/29/17
GROUND ELEVATION 16 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger
▽ **DURING DRILLING** 18.00 / Elev -2.00
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY S. Corcoran **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION (Depth / Elev.)	REMARKS
0	S-1	12	12-10-10-5			Dark gray F/M SAND AND F/C GRAVEL, trace Silt	
	S-2	24	10-7-8-5			Tan to yellow F/M SAND, little Silt, Micaceous	
5	S-3	16	4-4-4-5				
	S-4	17	5-6-12-18			Black to brown F/M SAND, little Silt, trace C/F Gravel, trace Brick, Cinders	
10	S-5	17	15-6-8-20		F	Black to tan F/M SAND, little Fine Gravel, little Silt, Micaceous	Strong petroleum odor
15	S-6	12	10-3-2-2			Gray Silty CLAY, Organics, some F/M Sand	
▽						18.0 -2.0	
20	S-7	10	2-1-2-1		1	Gray Silty CLAY, trace Fine Sand	Wet
25	U-1	23	REC=95%			25.0 -9.0	
	S-8	18	8-5-6-6			Gray M/F SAND, trace Silt	
30	S-9	20	5-5-5-7		3	Gray M/F SAND, trace Silt, trace Fine Gravel	
35	S-10	24	20-32-13-11		4	Gray M/F SAND, little C/F Gravel, trace Silt	

NOTES:

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TEST BORING LOG

BORING B-17
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013.04

PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION			REMARKS
35						Depth		Elev.	
							Gray M/F SAND, little C/F Gravel, trace Silt *(continued)*		
40	S-11	20	9-9-10-18						
45	S-12	11	10-33-40-47		4		Tan to gray M/F/C SAND, some to AND F/C GRAVEL, trace Silt		
						48.0		-32.0	
50	S-13	0	20-35-20-14				NO RECOVERY		
						53.0		-37.0	
55	S-14	15	7-7-9-15		5		White to light gray CLAY, trace Fine Gravel		
						58.0		-42.0	
60	S-15	12	30-35-50/3"		3		Light gray to yellow F/M SAND, trace Silt, mottled		
						60.0		-44.0	

Boring terminated at 60.0 feet.

NOTES:

BORING B-18
PAGE 1 OF 2

TEST BORING LOG

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/26/17 **COMPLETED** 12/16/17
GROUND ELEVATION 17 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger
∇ **DURING DRILLING** 28.00 / Elev -11.00
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY S. Corcoran **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION Depth / Elev.	REMARKS
0	S-1	14	5-10-13-15	▨	F	FILL: Black to tan F/M/C SAND, some F/C Gravel, little Silt 2.0 / 15.0	
	S-2	16	16-4-5-3	▨		FILL: Brown to tan F/M SAND, little Silt, Micaceous 4.0 / 13.0	
5	S-3	5	4-13-7-7	▨		FILL: Brown to tan F/M SAND AND C/F GRAVEL, trace Silt 6.0 / 11.0	
	S-4	6	18-14-7-7	▨		FILL: Black to brown F/M SAND, little F/C Gravel, some Silt 8.0 / 9.0	
10	S-5	15	5-5-20-22	▨		FILL: Black F/M SAND AND SILT, trace Fine Gravel, trace Brick and Cinder Fragments	
				▨		13.0 / 4.0	
15	S-6	16	2-1-1-1	▧	1	Dark gray Silty CLAY, trace Fine Sand	
				▧			
20	S-7	24	WOH/6"-1-2-2	▧		19.0 / -2.0 Dark gray to brown Clayey SILT, trace Fine Sand	
				▥		23.0 / -6.0	
25	S-8	24	1-1-1-1	▥	2	Brown Clayey SILT, Organics, trace Fine Sand 24.0 / -7.0 Brown SILT AND F/M SAND	
∇				▥		28.0 / -11.0	
30	S-9	8	4-6-7-8	░		Tan to gray M/F SAND, trace Silt	Wet on spoon
				░	3	33.0 / -16.0	
35	S-10	14	4-6-7-9	░		Gray M/F SAND, trace Silt	

NOTES:

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TEST BORING LOG

BORING B-18
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
35							Gray M/F SAND, trace Silt *(continued)*		
40	S-11	18	7-14-13-11						
						43.0		-26.0	
45	S-12	0	15-18-17-14		3		NO RECOVERY		TRAP OK
						48.0		-31.0	
50	S-13	0	5-6-7-9				NO RECOVERY		TRAP OK
						53.0		-36.0	
55	S-14	10	7-14-20-50/3"				Tan to gray CLAY, trace Fine Sand		
					5	58.0		-41.0	
60	S-15	16	13-36-50/5"				Tan to white F/M SAND AND CLAY, mottled		
						60.0		-43.0	
							Boring terminated at 60.0 feet.		

NOTES:

Pennoni

TEST BORING LOG

BORING B-19
PAGE 1 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/22/17 **COMPLETED** 12/22/17
GROUND ELEVATION 16.5 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger w/ Mud
▽ **DURING DRILLING** 8.00 / Elev 8.50
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY D. Copeland **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	STRATA	REMARKS
0	S-1	18	1-10-5-5	P / F	
	S-2	6	8-7-10-11	F	
5	S-3	8	6-8-7-9	F	Moist
▽	S-4	3	15-8-6-6	F	
10	S-5	18	8-6-6-5	F	Wet
15	S-6	24	1/12"-1/12"	1	
20	S-7	24	WOH/24"	1	
25	S-8	24	1-1-1-1	2	
30	S-9	18	7-9-12-13	3	Added drilling mud
35	S-10	18	6-8-7-5	3	

Depth	DESCRIPTION	Elev.
0.5	6.0 in. PROCESSED AGGREGATE	16.0
4.0	FILL: Brown Fine SAND AND Fine gravel size ROCK FRAGMENTS, trace Silt	12.5
8.0	FILL: Brown Micaceous Fine SAND AND SILT	8.5
13.0	FILL: Black SILT, some F/M Sand size Incinerate Material, trace Organics	3.5
18.0	Brown to gray Silty CLAY, trace Organics	-1.5
23.0	Brown to gray Silty CLAY, some Organics	-6.5
28.0	Dark brown SILT AND ORGANICS	-11.5
	Brown M/F SAND, trace Silt	

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-19
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013.04

PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION Depth Elev.	REMARKS
35							
					3	Brown M/F SAND, trace Silt *(continued)*	
40	S-11	18	5-5-7-6				
						43.0 -26.5	
					4	Brown F/C GRAVEL AND M/F SAND, trace Silt	
45	S-12	16	22-29-6-9				
50	S-13	16	10-13-15-18				
55	S-14	16	10-11-12-15				
60	S-15	16	10-10-8-13			60.0 -43.5	

Boring terminated at 60.0 feet.

NOTES:

TEST BORING LOG

BORING B-20
PAGE 1 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA
DATE STARTED 12/21/17 **COMPLETED** 12/21/17
GROUND ELEVATION 16.5 +/- feet NAVD88
DRILLING CONTRACTOR CGC Geoservices, LLC
WATER ENCOUNTERED:
DRILLING METHOD Hollow Stem Auger w/ Mud
▽ **DURING DRILLING** 28.00 / Elev -11.50
DRILLER / HELPER Eric Blemings
AT END OF DRILLING ---
LOGGED BY D. Copeland **CHECKED BY** D. Marrano
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0					P	0.6	6.0 in. BITUMINOUS CONCRETE 1.0 in. PROCESSED AGGREGATE	15.9	
	S-1	18	16-20-21			2.0	FILL: Brown F/M/C SAND AND Fine gravel size ROCK FRAGMENTS	14.5	
	S-2	5	50/5"				FILL: Dark brown SILT, some F/M Sand, trace gravel size Rock Fragments		
5	S-3	20	4-5-5-7			6.0		10.5	Moist
	S-4	20	3-3-4-5		F		FILL: Black SILT, some Fine Sand		Wet
10	S-5	20	6-7-7-7						Strong petroleum odor 4' to 10'
						13.0		3.5	
15	S-6	24	1-1-1-2				Dark gray Silty CLAY, trace Organics		
					1				
20	S-7	24	1-1-1-1						
						23.0		-6.5	
25	S-8	24	1-1-1-2				Dark brown SILT, some Organics		
					2				
▽						28.0		-11.5	
30	S-9	22	2-3-4-5				Brown M/F SAND		Drilling mud added
					3				
35	S-10	22	3-4-4-5						

NOTES:

(Continued Next Page)

TEST BORING LOG

BORING B-20
PAGE 2 OF 2

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013.04
PROJECT LOCATION Philadelphia, PA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS	GRAPHIC LOG	STRATA	DESCRIPTION Depth	DESCRIPTION	DESCRIPTION Elev.	REMARKS
35							Brown M/F SAND *(continued)*		
40	S-11	22	5-5-6-8						
					3				
45	S-12	22	5-6-7-6						
						48.0		-31.5	
50	S-13	22	10-9-8-11				Brown F/C GRAVEL, some M/F Sand		
55	S-14	22	12-10-9-11		48				
60	S-15	22	10-14-17-13			60.0		-43.5	

Boring terminated at 60.0 feet.

NOTES:

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TEST PIT LOG

Test Pit TP-1
PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013
PROJECT LOCATION Philadelphia, PA
DATE STARTED 4/18/19 **COMPLETED** 4/18/19
GROUND ELEVATION 8.5'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION ---
OPERATOR / HELPER Victor
AT END OF EXCAVATION ---
LOGGED BY N. Di Sessa **CHECKED BY** D. Marano
▽ **0 HRS AFTER EXCAVATION** 8.0' / Elev 0.5'

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0							
			P	0.3	ASPHALT	8.3	
			P	1.0	Processed Aggregate similar to 3A	7.5	
			F	4.0	FILL: Gray F/M/C SAND and F GRAVEL and BRICK FRAGMENTS, trace Silt	4.5	
5			F		FILL: Black SILT, some F/M Sand, trace F/C Gravel		
▽				9.0		-0.5	Trace Timber Asphalt Odor

Test Pit terminated at 9.0 feet.

NOTES:

Test Pit TP-2

PAGE 1 OF 1

TEST PIT LOG

CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013

PROJECT LOCATION Philadelphia, PA

DATE STARTED 4/18/19 **COMPLETED** 4/18/19

GROUND ELEVATION 8.5'

EXCAVATION CONTRACTOR Ambient Group, LLC

WATER ENCOUNTERED:

EXCAVATION METHOD Rubber Tire Backhoe

DURING EXCAVATION ---

OPERATOR / HELPER Victor

AT END OF EXCAVATION ---

LOGGED BY N. Di Sessa **CHECKED BY** D. Marano

▽ **0 HRS AFTER EXCAVATION** 9.0' / Elev -0.5'

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	DESCRIPTION Depth		Elev.	REMARKS
0		■	P	0.3	ASPHALT	8.3	
		▨		1.0	Processed Aggregate similar to 3A	7.5	
		▩		3.0	FILL: Red-Brown F SAND and SILT	5.5	
		▩		4.0	FILL: Green micaceous F SAND and SILT, trace F/C Gravel	4.5	
5 ▽		▩	F	9.0	FILL: Black F SAND, some SILT and F/C Gravel	-0.5	Oily water surface

Test Pit terminated at 9.0 feet.

NOTES:

Test Pit TP-3
PAGE 1 OF 1

TEST PIT LOG

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013
PROJECT LOCATION Philadelphia, PA
DATE STARTED 4/18/19 **COMPLETED** 4/18/19
GROUND ELEVATION 8.0'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION ---
OPERATOR / HELPER Victor
AT END OF EXCAVATION ---
LOGGED BY N. Di Sessa **CHECKED BY** D. Marano
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0		■	P	0.3	ASPHALT	7.7	
		∘		1.0	Processed Aggregate similar to 3A	7.0	
		▩	F	4.0	FILL: Tan F/M SAND, some Clay and F Gravel	4.0	
5		▩		6.0	FILL: Black F/M SAND, some C/F Gravel, trace Silt	2.0	
10		▩		11.0	FILL: Black F/M SAND, some to little Silt, little F Gravel	-3.0	

Test Pit terminated at 11.0 feet.

NOTES:

TEST PIT LOG

Test Pit TP-4

PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013

PROJECT LOCATION Philadelphia, PA

DATE STARTED 4/18/19 **COMPLETED** 4/18/19

GROUND ELEVATION 8.0'

EXCAVATION CONTRACTOR Ambient Group, LLC

WATER ENCOUNTERED:

EXCAVATION METHOD Rubber Tire Backhoe

DURING EXCAVATION ---

OPERATOR / HELPER Victor

AT END OF EXCAVATION ---

LOGGED BY N. Di Sessa **CHECKED BY** D. Marano

▽ **0 HRS AFTER EXCAVATION** 9.0' / Elev -1.0'

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0		■		0.3	ASPHALT	7.7	
		○	P	1.0	Processed Aggregate similar to 3A	7.0	
		▨		4.0	FILL: Gray F/M SAND and F Gravel, some Clay, trace Brick Fragments	4.0	
5 ▽		▨	F	9.5	FILL: Black F/M SAND, some F Gravel, trace Brick Fragments and Silt	-1.5	

Test Pit terminated at 9.5 feet.

NOTES:

Pennoni

TEST PIT LOG

Test Pit TP-5

PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013

PROJECT LOCATION Philadelphia, PA

DATE STARTED 4/18/19 **COMPLETED** 4/18/19

GROUND ELEVATION 10.0'

EXCAVATION CONTRACTOR Ambient Group, LLC

WATER ENCOUNTERED:

EXCAVATION METHOD Rubber Tire Backhoe

DURING EXCAVATION ---

OPERATOR / HELPER Victor

AT END OF EXCAVATION ---

LOGGED BY N. Di Sessa **CHECKED BY** D. Marano

▽ **0 HRS AFTER EXCAVATION** 9.0' / Elev 1.0'

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0		■	P	0.3	ASPHALT	9.7	
		○		1.0	Processed Aggregate similar to 3A	9.0	
		▨	F	1.5	FILL: Brown C/F gravel size ROCK FRAGMENTS and F/M SAND, trace Silt	8.5	
		▨		3.0	FILL: Tan F/M SAND, little F Gravel, trace Silt and Brick Fragments	7.0	Rebar Encountered
5		▨		5.0	FILL: Black F/M SAND, some Brick Fragments, little F Gravel, trace Cinder Fragments, glass	5.0	
▽		▨		9.0	FILL: Brown-Orange-Gray F/M/C SAND, some F/C Gravel, some Silt	1.0	

Test Pit terminated at 9.0 feet.

NOTES:

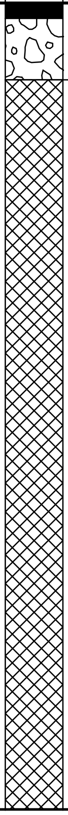
Pennoni

TEST PIT LOG

Test Pit TP-6

PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013
PROJECT LOCATION Philadelphia, PA
DATE STARTED 4/18/19 **COMPLETED** 4/18/19
GROUND ELEVATION 12.0'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION ---
OPERATOR / HELPER Victor
AT END OF EXCAVATION ---
LOGGED BY N. Di Sessa **CHECKED BY** D. Marano
▼ **0 HRS AFTER EXCAVATION** 10.5' / Elev 1.5'



DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0				0.2	ASPHALT	11.8	
			P	1.0	Processed Aggregate similar to 3A	11.0	
				2.0	FILL: Brown F/M SAND, some C/F Gravel, trace Silt	10.0	
				3.0	FILL: Brown to Tan F/M SAND, little F Gravel, trace Silt	9.0	
5				5.0	FILL: Brown to Black F/M SAND, little F Gravel, trace Cinder Fragments and Silt	7.0	
10 ▼			F	10.5	FILL: Black F/M SAND, some Silt, some to little F/C Gravel and Brick Fragments	1.5	Telphone poles Hole collapsed

Test Pit terminated at 10.5 feet.

NOTES:

Pennoni

TEST PIT LOG

Test Pit TP-7

PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013

PROJECT LOCATION Philadelphia, PA

DATE STARTED 4/19/19 **COMPLETED** 4/19/19

GROUND ELEVATION 10.0'

EXCAVATION CONTRACTOR Ambient Group, LLC

WATER ENCOUNTERED:

EXCAVATION METHOD Rubber Tire Backhoe

DURING EXCAVATION ---

OPERATOR / HELPER Victor

AT END OF EXCAVATION ---

LOGGED BY N. Di Sessa **CHECKED BY** D. Marano

AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0			P	0.5	ASPHALT	9.5	
				1.0	Processed Aggregate similar to 3A	9.0	
5				6.0	FILL: Tan to Brown F/M SAND, some C/F Gravel, trace Silt	4.0	Wood Post (telephone pole) Moist
10			F	11.0	FILL: Black M/C/F SAND and F/C GRAVEL and BRICK FRAGMENTS, little Clay, little organics, debris, wood	-1.0	

Test Pit terminated at 11.0 feet.

NOTES:

Pennoni

TEST PIT LOG

Test Pit TP-8
PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013
PROJECT LOCATION Philadelphia, PA
DATE STARTED 4/19/19 **COMPLETED** 4/19/19
GROUND ELEVATION 10.0'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION ---
OPERATOR / HELPER Victor
AT END OF EXCAVATION ---
LOGGED BY N. Di Sessa **CHECKED BY** D. Marano
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0		■	P	0.3	ASPHALT	9.7	
		○		1.0	Processed Aggregate similar to 3A	9.0	
		▨	F	4.0	FILL: Tan to Brown F/M SAND, some C/F Gravel, trace Silt	6.0	
5 10		▨		11.0	FILL: Black M/C/F SAND and F/C BRICK FRAGMENTS, little Clay, debris	-1.0	

Test Pit terminated at 11.0 feet.

NOTES:

Pennoni

TEST PIT LOG

Test Pit TP-9

PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013

PROJECT LOCATION Philadelphia, PA

DATE STARTED 4/19/19 **COMPLETED** 4/19/19

GROUND ELEVATION 9.0'

EXCAVATION CONTRACTOR Ambient Group, LLC

WATER ENCOUNTERED:

EXCAVATION METHOD Rubber Tire Backhoe

DURING EXCAVATION ---

OPERATOR / HELPER Victor

AT END OF EXCAVATION ---

LOGGED BY N. Di Sessa **CHECKED BY** D. Marano

⊻ 0 HRS AFTER EXCAVATION 9.0' / Elev 0.0'

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0				0.3	ASPHALT	8.7	
				1.0	Processed Aggregate similar to 3A	8.0	
				4.0	FILL: Black F/C GRAVEL and F/M/C SAND, little Silt	5.0	
5				6.0	FILL: Brown SILT, some F/M SAND, trace F Gravel	3.0	
⊻ 10			F	11.0	FILL: Black Silty Clay, some F/M SAND	-2.0	

Test Pit terminated at 11.0 feet.

NOTES:

Pennoni

TEST PIT LOG

Test Pit TP-10
PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013
PROJECT LOCATION Philadelphia, PA
DATE STARTED 4/19/19 **COMPLETED** 4/19/19
GROUND ELEVATION 9.0'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION ---
OPERATOR / HELPER Victor
AT END OF EXCAVATION ---
LOGGED BY N. Di Sessa **CHECKED BY** D. Marano
▽ **0 HRS AFTER EXCAVATION** 9.0' / Elev 0.0'

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0		■		0.3	ASPHALT	8.8	
			P	1.0	Processed Aggregate similar to 3A	8.0	
		▨		4.0	FILL: Black F/C GRAVEL and F/M/C SAND, little Silt	5.0	
5 ▽		▨	F	9.0	FILL: Brown F/M SAND, some Silt, little F/C Gravel and Brick Fragments, trace Clay	0.0	

Test Pit terminated at 9.0 feet.

NOTES:

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TEST PIT LOG

Test Pit P-1
PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013
PROJECT LOCATION Philadelphia, PA
DATE STARTED 4/18/19 **COMPLETED** 4/18/19
GROUND ELEVATION 8.0'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION ---
OPERATOR / HELPER Victor
AT END OF EXCAVATION ---
LOGGED BY E. Iannetti **CHECKED BY** D. Marano
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0							
		■	P	0.5	6" ASPHALT	7.5	
				1.0	6" Processed Aggregate similar to 3A	7.0	
				1.3	Tan F/M/C SAND	6.7	

Test Pit terminated at 1.3 feet.

NOTES:

Pennoni

TEST PIT LOG

Test Pit P-2

PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013

PROJECT LOCATION Philadelphia, PA

DATE STARTED 4/18/19 **COMPLETED** 4/18/19

GROUND ELEVATION 12.0'

EXCAVATION CONTRACTOR Ambient Group, LLC

WATER ENCOUNTERED:

EXCAVATION METHOD Rubber Tire Backhoe

DURING EXCAVATION ---

OPERATOR / HELPER Victor

AT END OF EXCAVATION ---

LOGGED BY E. Iannetti **CHECKED BY** D. Marano

AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0							
		■	P	0.4	5" ASPHALT	11.6	
		▨		1.2	9" Processed Aggregate similar to 3A	10.8	
		░		1.5	Tan F/M/C SAND	10.5	

Test Pit terminated at 1.5 feet.

NOTES:

TEST PIT LOG

Test Pit P-3

PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013

PROJECT LOCATION Philadelphia, PA

DATE STARTED 4/18/19 **COMPLETED** 4/18/19

GROUND ELEVATION 12.0'

EXCAVATION CONTRACTOR Ambient Group, LLC

WATER ENCOUNTERED:

EXCAVATION METHOD Rubber Tire Backhoe

DURING EXCAVATION ---

OPERATOR / HELPER Victor

AT END OF EXCAVATION ---

LOGGED BY E. Iannetti **CHECKED BY** D. Marano

AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	DESCRIPTION			REMARKS
0				Depth		Elev.	
		■	P	0.4	5" ASPHALT	11.6	
		▨		1.1	8" Processed Aggregate similar to 3A	10.9	

Test Pit terminated at 1.1 feet.

NOTES:

Pennoni

TEST PIT LOG

Test Pit P-4
PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013
PROJECT LOCATION Philadelphia, PA
DATE STARTED 4/18/19 **COMPLETED** 4/18/19
GROUND ELEVATION 9.0'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION ---
OPERATOR / HELPER Victor
AT END OF EXCAVATION ---
LOGGED BY E. Iannetti **CHECKED BY** D. Marano
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0		■		0.3	4" ASPHALT	8.7	Concrete slab encountered on one side of test pit
		▨	P	1.3	11" Processed Aggregate similar to 3A	7.8	

Test Pit terminated at 1.3 feet.

NOTES:

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TEST PIT LOG

Test Pit P-5

PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority

PROJECT NAME PhilaPort Distribution Warehouse

PROJECT NUMBER PRPAX17013

PROJECT LOCATION Philadelphia, PA

DATE STARTED 4/18/19 **COMPLETED** 4/18/19

GROUND ELEVATION 9.0'

EXCAVATION CONTRACTOR Ambient Group, LLC

WATER ENCOUNTERED:

EXCAVATION METHOD Rubber Tire Backhoe

DURING EXCAVATION ---

OPERATOR / HELPER Victor

AT END OF EXCAVATION ---

LOGGED BY E. Iannetti **CHECKED BY** D. Marano

AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0		■	P	0.3	4" ASPHALT	8.7	
		▨		1.0	8" Processed Aggregate similar to 3A	8.0	

Test Pit terminated at 1.0 feet.

NOTES:

TEST PIT LOG

Test Pit P-6
PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013
PROJECT LOCATION Philadelphia, PA
DATE STARTED 4/18/19 **COMPLETED** 4/18/19
GROUND ELEVATION 11.0'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION ---
OPERATOR / HELPER Victor
AT END OF EXCAVATION ---
LOGGED BY E. Iannetti **CHECKED BY** D. Marano
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0							
				0.3	4" ASPHALT	10.7	
			P	1.1	9" Processed Aggregate similar to 3A	9.9	
				1.2	Tan F/M/C SAND	9.8	
					Test Pit terminated at 1.2 feet.		

NOTES:

TEST PIT LOG

Test Pit P-7
PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013
PROJECT LOCATION Philadelphia, PA
DATE STARTED 4/18/19 **COMPLETED** 4/18/19
GROUND ELEVATION 12.5'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION ---
OPERATOR / HELPER Victor
AT END OF EXCAVATION ---
LOGGED BY E. Iannetti **CHECKED BY** D. Marano
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0							
		■		0.3	4" ASPHALT	12.2	
		▨	P	1.2	10" Processed Aggregate similar to 3A	11.3	

Test Pit terminated at 1.2 feet.

NOTES:

TEST PIT LOG

Test Pit P-8
PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013
PROJECT LOCATION Philadelphia, PA
DATE STARTED 4/18/19 **COMPLETED** 4/18/19
GROUND ELEVATION 9.0'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION ---
OPERATOR / HELPER Victor
AT END OF EXCAVATION ---
LOGGED BY E. Iannetti **CHECKED BY** D. Marano
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	DESCRIPTION			REMARKS
0				Depth		Elev.	
		■		0.3	4" ASPHALT	8.7	
		○	P	1.2	10" Processed Aggregate similar to 3A	7.8	

Test Pit terminated at 1.2 feet.

NOTES:

Test Pit P-9
PAGE 1 OF 1

TEST PIT LOG

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013
PROJECT LOCATION Philadelphia, PA
DATE STARTED 4/18/19 **COMPLETED** 4/18/19
GROUND ELEVATION 9.0'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION ---
OPERATOR / HELPER Victor
AT END OF EXCAVATION ---
LOGGED BY E. Iannetti **CHECKED BY** D. Marano
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0		■	P	0.6	7" ASPHALT	8.4	
		▨		1.1	6" Processed Aggregate similar to 3A	7.9	

Test Pit terminated at 1.1 feet.

NOTES:

TEST PIT LOG

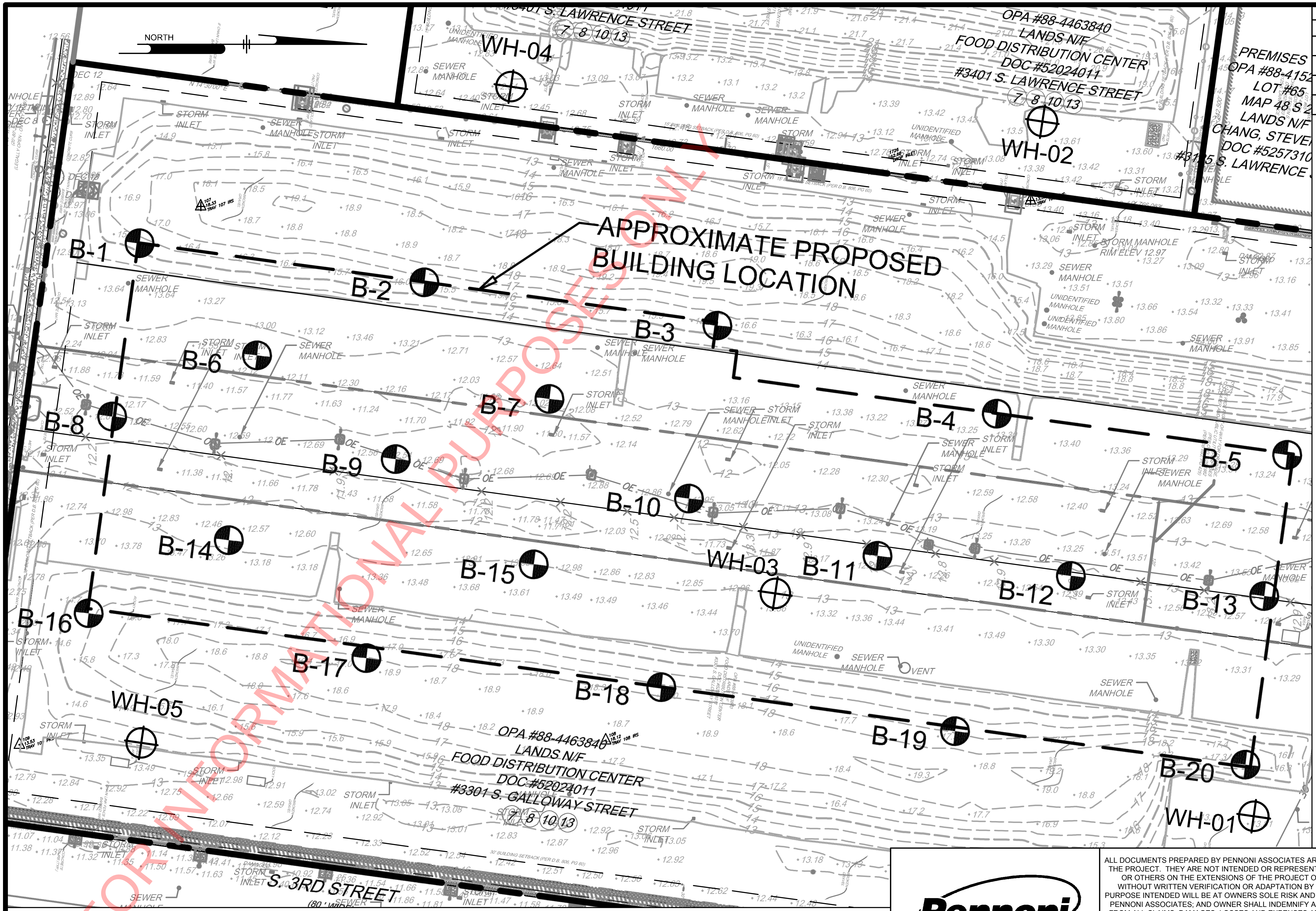
Test Pit P-10
PAGE 1 OF 1

CLIENT Philadelphia Regional Port Authority
PROJECT NAME PhilaPort Distribution Warehouse
PROJECT NUMBER PRPAX17013
PROJECT LOCATION Philadelphia, PA
DATE STARTED 4/18/19 **COMPLETED** 4/18/19
GROUND ELEVATION 13.0'
EXCAVATION CONTRACTOR Ambient Group, LLC
WATER ENCOUNTERED:
EXCAVATION METHOD Rubber Tire Backhoe
DURING EXCAVATION ---
OPERATOR / HELPER Victor
AT END OF EXCAVATION ---
LOGGED BY E. Iannetti **CHECKED BY** D. Marano
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	STRATA	Depth	DESCRIPTION	Elev.	REMARKS
0							
		■		0.3	4" ASPHALT	12.7	
			P	1.2	8.5" Processed Aggregate similar to 3A	11.8	
				1.5	Tan F/M/C SAND	11.5	

Test Pit terminated at 1.5 feet.

NOTES:



REVISIONS

NO.	DESCRIPTION	DATE	BY
#	#	#	#

LEGEND

B-1 ● INDICATES APPROXIMATE TEST BORING LOCATION AND IDENTIFYING NUMBER FOR THE CURRENT STUDY.

WH-01 ⊕ INDICATES APPROXIMATE TEST BORING LOCATION AND IDENTIFYING NUMBER CONDUCTED BY OTHERS FOR THE PRELIMINARY STUDY.

NOTES

WATER LEVELS, WHERE SHOWN, ARE THOSE OBSERVED AT THE TIME NOTED AND MAY NOT REFLECT DAILY OR SEASONAL VARIATIONS IN THE GROUND WATER LEVEL.

THE SUBSURFACE CONDITIONS REVEALED BY THIS STUDY REPRESENT CURRENT CONDITIONS AT THE SPECIFIED TEST LOCATIONS ONLY AND MAY NOT BE INDICATIVE OF CONDITIONS AT OTHER LOCATIONS.

0 100' 200'

Pennoni

PENNONI ASSOCIATES INC.
2041 Avenue C, Suite 100
Bethlehem, PA 18017
T 610.231.0600 F 610.231.2033

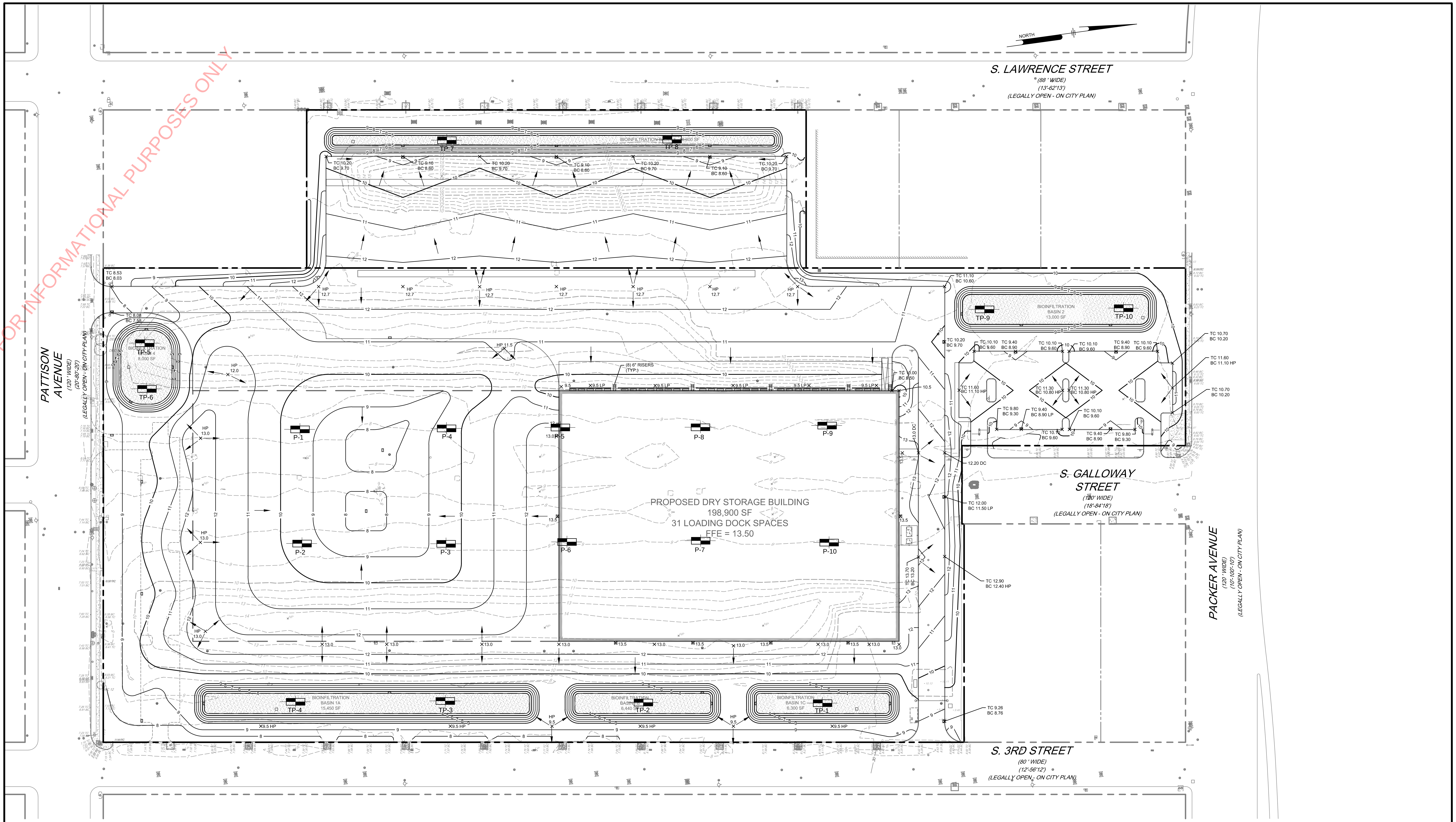
PHILAPORT DISTRIBUTION WAREHOUSE
PACKER AVENUE
PHILADELPHIA, PA

BORING LOCATION PLAN

PHILADELPHIA REGIONAL PORT AUTHORITY
3460 N. DELAWARE AVENUE
PHILADELPHIA, PA 19134

PROJECT PRPAX 17013
DATE 2018-01-23
DRAWING SCALE 1"=100'
DRAWN BY DAC
APPROVED BY DPM
DRAWING NO. LP-1
SHEET 1 OF 1

U:\ACCOUNTS\PRPAX\PRPAX17013 - PHILAPORT DISTRIBUTION CENTER\DESIGN\B\LP-1.DWG
PLOTTED: 1/23/2018 1:38:26 PM, BY: DAVID A. COPELAND PLOTSTYLE: PENNONI NCS.STB, PROJECT STATUS: ----



LEGEND

- PROPOERTY LINE
- ADJACENT PROPERTY LINE
- RIGHT OF WAY LINE
- HISTORIC BUILDING
- BUILDING SETBACK LINE
- EXISTING FENCE
- EXISTING TELEPHONE EASEMENT
- EXISTING GAS EASEMENT
- EXISTING EASEMENT
- EXISTING BUILDING
- EXISTING CURB
- EXISTING CONCRETE
- EXISTING MANHOLE
- EXISTING VALVES
- EXISTING INLET
- VENT — EXISTING SEWER VENT
- EXISTING LIGHT POLE
- EXISTING ELECTRIC UTILITIES
- OE — OE — OE — EXISTING OVERHEAD ELECTRIC
- EXISTING GAS METER
- EXISTING HYDRANT
- EXISTING TRAFFIC SIGNAL
- EXISTING BOLLARD
- EXISTING POST
- EXISTING SIGN
- DEC 12 — EXISTING TREE

- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED CURB
- PROPOSED EDGE OF PAVEMENT
- PROPOSED BUILDING
- PROPOSED FUTURE BUILDING
- D — D — D — PROPOSED STORM SEWER
- S — S — S — PROPOSED SANITARY SEWER
- F — F — F — PROPOSED FIRE SERVICE
- W — W — W — PROPOSED WATER SERVICE
- E — E — E — PROPOSED ELECTRIC SERVICE
- UG — UG — UG — PROPOSED GAS SERVICE
- PROPOSED SURFACE UTILITIES
- PROPOSED STOP BAR
- PROPOSED SIGN
- 5 — PROPOSED MAJOR CONTOUR
- 4 — PROPOSED MINOR CONTOUR
- PROPOSED FLOW ARROW
- 9.5 × PROPOSED SPOT ELEVATION

NOTES:

SITE INFORMATION:

CURRENT SITE ADDRESS:
3309 SOUTH GALLOWAY AVENUE & 3401 SOUTH LAWRENCE STREET
39TH WARD, CITY & COUNTY OF PHILADELPHIA
COMMONWEALTH OF PENNSYLVANIA 19148
OPA #'S 885900607 & 885052675

OWNER/CLIENT:
PHILADELPHIA REGIONAL PORT AUTHORITY
3460 NORTH DELAWARE AVENUE
PHILADELPHIA, PA 19134

DESIGNER:
PENNONI
1900 MARKET STREET, SUITE 300
PHILADELPHIA, PA 19103

SITE NOTES:

1. A FIELD SURVEY OF THE SITE WAS PERFORMED BY PENNONI ASSOCIATES IN APRIL 2017.
2. LOCATIONS OF ON AND OFF SITE UTILITIES AS SHOWN ARE APPROXIMATE AND MAY OR MAY NOT BE COMPLETE. THE NATURE AND EXACT LOCATION OF EXISTING UTILITIES SHOULD BE VERIFIED PRIOR TO INITIATING ANY ACTIVITY THAT MAY AFFECT THEIR USE OR LOCATION.
   - 2.A. THE LOCATION OF THE EXISTING UNDERGROUND UTILITIES SHOWN ON THIS PLAN HAVE BEEN TAKEN FROM EXISTING UTILITY RECORDS AVAILABLE AT THE TIME THESE PLANS WERE PREPARED AND FROM SURFACE OBSERVATION OF THE SITE.
   - 2.B. COMPLETENESS OR ACCURACY OF LOCATION AND DEPTH OF UNDERGROUND UTILITIES AND STRUCTURES IS NOT GUARANTEED.
   - 2.C. IN ACCORDANCE WITH PA ACT 287 OF 1974 AS AMENDED BY PA ACT 121 OF 2008 ENTITLED "UNDERGROUND UTILITY LINE PROTECTION LAW". THE CONTRACTOR SHALL NOTIFY ALL UTILITIES WITHIN THE WORK AREA VIA THE PENNSYLVANIA ONE CALL SYSTEM, INC. (800-242-1776) A MINIMUM OF 3 WORKING DAYS BEFORE THE START OF EXCAVATION.
   - 2.D. THE CONTRACTOR SHALL VERIFY LOCATIONS AND DEPTHS OF ALL UNDERGROUND UTILITIES AND STRUCTURES BEFORE THE START OF WORK.
   - 2.E. IF CONFLICTS ARE FOUND THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND DESIGN ENGINEER FOR INSTRUCTION BEFORE PROCEEDING WITH WORK.
3. ALL BOUNDARY DIMENSIONS SHOWN ARE IN CITY OF PHILADELPHIA DISTRICT STANDARD MEASURE (DS) UNLESS DESIGNATED (US) TO DENOTE U.S. SURVEY FOOT.
4. THE HORIZONTAL DATUM FOR THIS PROJECT REFERENCES THE PENNSYLVANIA STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, NORTH AMERICAN DATUM OF 1983.
5. THE VERTICAL DATUM FOR THIS PROJECT REFERENCES THE VERTICAL DATUM OF THE CITY OF PHILADELPHIA (CITY).

FLOOD ZONE INFORMATION:

BY GRAPHIC PLOTTING ONLY, BASED UPON THE THE FLOOD INSURANCE RATE MAP, PANEL NOS. 191-194 OF 230, COMMUNITY MAP NO. 4207570191-4H WHICH BEARS AN EFFECTIVE DATE OF NOVEMBER 18TH 2015, THE SITE IS LOCATED IN THE FOLLOWING AREA:

ZONE X AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN

NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

MUNICIPAL ZONING INFORMATION:

THE SITE IS LOCATED IN THE FOLLOWING ZONE IN THE CITY OF PHILADELPHIA:

I-2 (MEDIUM INDUSTRIAL)

FOR COMPLETE ZONING INFORMATION PLEASE REFER TO THE ZONING CODE OF THE CITY OF PHILADELPHIA AS CURRENTLY AMENDED

REFERENCE PLANS:

EXISTING CONDITIONS SURVEY PERFORMED IN APRIL 2017 BY PENNONI ASSOCIATES INC. BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN HEREON IS TAKEN FROM THE PLANS ENTITLED "ALTA/NSPS LAND TITLE SURVEY," SHEETS V0301, V-0302, AND V-0303, DATED 05-23-2017.

GRADING NOTES:

1. A GEOTECHNICAL ENGINEER IS REQUIRED TO INSPECT, TEST AND CERTIFY TO THE COMPACTION OF ALL LOAD BEARING FILLS.
2. MINIMUM PAVEMENT GRADE SHALL BE 1.5% UNLESS NOTED OTHERWISE.
3. BEDDING REQUIREMENTS SPECIFIED HEREIN ARE TO BE CONSIDERED AS MINIMUMS FOR RELATIVELY DRY, STABLE EARTH CONDITIONS. ADDITIONAL BEDDING SHALL BE REQUIRED FOR ROCK TRENCHES AND WET AREAS. CONTRACTOR SHALL HAVE THE RESPONSIBILITY TO PROVIDE SUCH ADDITIONAL BEDDING AS MAY BE REQUIRED TO PROPERLY CONSTRUCT THE WORK.
4. COMPACTION OF THE BACKFILL OF ALL TRENCHES SHALL BE COMPACTED TO THE DENSITY OF 95% OF THEORETICAL MAXIMUM DRY DENSITY (ASTM D698). BACKFILL MATERIAL SHALL BE FREE FROM ROOTS, STUMPS, OR OTHER FOREIGN DEBRIS AND SHALL BE PLACED IN LIFTS NOT TO EXCEED 6 INCHES IN COMPACTED FILL THICKNESS. CORRECTION OF ANY TRENCH SETTLEMENT WITHIN A YEAR FROM THE DATE OF APPROVAL WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE CONTRACTOR SHALL ENSURE THAT POSITIVE AND ADEQUATE DRAINAGE IS MAINTAINED AT ALL TIMES WITHIN THE PROJECT LIMITS. THIS MAY INCLUDE, BUT NOT BE LIMITED TO, REPLACEMENT OR RECONSTRUCTION OF EXISTING DRAINAGE STRUCTURES THAT HAVE BEEN DAMAGED OR REMOVED OR REGRADING AS REQUIRED BY THE ENGINEER, EXCEPT FOR THOSE DRAINAGE ITEMS SHOWN AT SPECIFIC LOCATIONS AND HAVING SPECIFIC PAY ITEMS IN THE DETAILED ESTIMATE. NO SEPARATE PAYMENT WILL BE MADE FOR ANY COSTS INCURRED TO COMPLY WITH THIS REQUIREMENT.
6. THE CONTRACTOR SHALL PROVIDE ANY AND ALL EXCAVATION AND MATERIAL SAMPLES NECESSARY TO CONDUCT REQUIRED SOIL TESTS. ALL ARRANGEMENTS AND SCHEDULING FOR THE TESTING SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
7. SOILS TESTING AND ON-SITE INSPECTION SHALL BE PERFORMED BY AN INDEPENDENT GEOTECHNICAL ENGINEER. THE SOILS ENGINEER SHALL PROVIDE COPIES OF TEST REPORTS TO THE CONTRACTOR, THE OWNER AND THE OWNER'S REPRESENTATIVE AND SHALL PROMPTLY NOTIFY THE OWNER, HIS REPRESENTATIVE AND THE CONTRACTOR, SHOULD WORK PERFORMED BY THE CONTRACTOR FAIL TO MEET THESE SPECIFICATIONS.
8. CONTRACTOR SHALL FURNISH AND MAINTAIN ALL NECESSARY BARRICADES AROUND THE WORK AREA AND SHALL PROVIDE PROTECTION AGAINST WATER DAMAGE AND SOIL EROSION.
9. MAXIMUM SIDEWALK CROSS SLOPE IS 2% AND MINIMUM SIDEWALK CROSS SLOPE IS 1.5% WITHIN THE RIGHT OF WAY.
10. ELEVATIONS ARE BASED ON CITY OF PHILADELPHIA VERTICAL DATUM.
11. CONTRACTOR SHALL RESET EXISTING MANHOLE RIMS TO FINISHED GRADE. CONTRACTOR SHALL COORDINATE DETAIL WITH RESPECTIVE UTILITY COMPANIES.

0 60' 120'

NOT FOR CONSTRUCTION

PROJECT STATUS: ----
PLOTSTYLE: Pennoni NCS.stb
PLOTTED: 3/29/2019 4:50 PM, BY: Samuel J. Kush
U:\Accounts\PRPAX\PRPAX17013 - PhilaPort Distribution Center\DESIGN_SHEETS\C150.dwg

PENNONI ASSOCIATES INC.
1900 Market Street, Suite 300
Philadelphia, PA 19103
T 215.222.3000 **F** 215.222.3588

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR
AND OWNER MUST BE NOTIFIED OF ANY
DISCREPANCIES BEFORE PROCEEDING WITH WORK

PHILAPORT DISTRIBUTION CENTER

3309 SOUTH GALLOWAY AVENUE & 3401 SOUTH LAWRENCE STREET
PHILADELPHIA, PA 19148

GRADING PLAN

PHILADELPHIA REGIONAL PORT AUTHORITY
3460 NORTH DELAWARE AVENUE
PHILADELPHIA, PA 19134

DATE	NO.	REVISIONS	BY
2019-04-01	1	30% DESIGN DOCUMENTS	JAS

PROJECT	PRPAX17013
DATE	2019-04-01
DRAWING SCALE	1" = 60'
DRAWN BY	SJK
APPROVED BY	KEW

C150

SHEET 3 OF 11

TEST BORING/TEST PIT/AUGER PROBE LOG KEY SHEET

COLUMN	DESCRIPTION
Depth	Depth in feet below ground surface
Description	Description of sample including color, texture, and classification of subsurface material as applicable. Estimated depths to bottom of strata as interpolated from the boring are also shown.
Stratum	Strata numbers as assigned by the geotechnical engineer
Sample No.	Split barrel sample and sample number (S-x) Undisturbed Tube sample and sample number (U-x) Rock core run and core number (R-x) NR indicates no recovery
Blow Counts	For soils sample (ASTM D 1586): indicates number of blows obtained for each 6 inches penetration of the standard split-barrel sampler. For rock coring (ASTM D 2113): indicates percent recovery (REC) per run and rock quality designation (RQD). RQD is the sum of rock pieces that are 4 inches or longer in length in one core run divided by the total core run.
Recovery	For soil samples indicates the length of recovery in the sample spoon
Remarks	Special conditions or test data as noted during drilling

Ground Water: Free water level as shown ( )*; * Free water level as noted may not be indicative of daily, seasonal, or long term fluctuations.

DESCRIPTIVE TERMS

RELATIVE PROPORTIONS

Descriptive Term	Symbol	Estimated Percentages
Trace	tr	1 to 10
Little	l	10 to 20
Some	sm	20 to 35
And	and	35 to 50

GRADATION OF COARSE GRAINED COMPONENTS

Soil Component	Size Range	Particle Size	
		Maximum	Minimum
Boulders		-	12”
Cobbles		12”	3”
Gravel	Coarse	3”	¾”
	Fine	¾”	#4 Sieve
Sand	Coarse	#4 Sieve	#10 Sieve
	Medium	#10 Sieve	#40 Sieve
	Fine	#40 Sieve	#200 Sieve
Silt		#200 Sieve	.005 mm
Clay		.005 mm	-

COMPOSITION OF COARSE-GRAINED COMPONENTS

Gradation Designation	Symbol	Defining Proportions
Coarse to Fine	CF	All fractions greater than 10% of the component
Coarse to Medium	CM	Less than 10% Fine
Medium to Fine	MF	Less than 10% Coarse
Coarse	C	Less than 10% Fine and Medium
Medium	M	Less than 10% Coarse and Fine
Fine	F	Less than 10% Coarse and Medium

1/2014

ENGINEER'S LOG

Sheet 1 of 5

Boring **WH-01** ECMS
District: County: Philadelphia
SR Section
Baseline: FDC Site - Port Authority
Sta. Offset
Segment Offset
Coordinates:
Lat. Long.
219498.7770 E 2696490.0640 N
Ground Elev. 14.0 ft.
Water Level Elev./Elapsed Time:
▽ Initial -6.4 ft. Elapsed 0.0 hr.
▼ Final -7.8 ft. Elapsed 96.0 hr.
Driller: Gary B.
Company: Allied Well Drilling

Drilling Start: 07/27/2017 5:30 pm
Drilling Complete: 07/28/2017 1:05 pm
Grouting Complete: 08/02/2017 8:45 am
Rig: Acker XLS Track Rig
Hammer Type: Automatic
SPT Hammer Efficiency:
Assumed 0.8 Measured
Hammer Calibration Date:
Hole Type:
Casing Type: HSA/FJC - Spun
Casing I.D.: 3.25 in Casing Depth: 35.0 ft.
Rock Core Method:
Inspector: Jeremy Boozer
Inspector Cert. No. 410-17

PE-053530-E
9/21/17
PG/PE Seal, Signature and Date

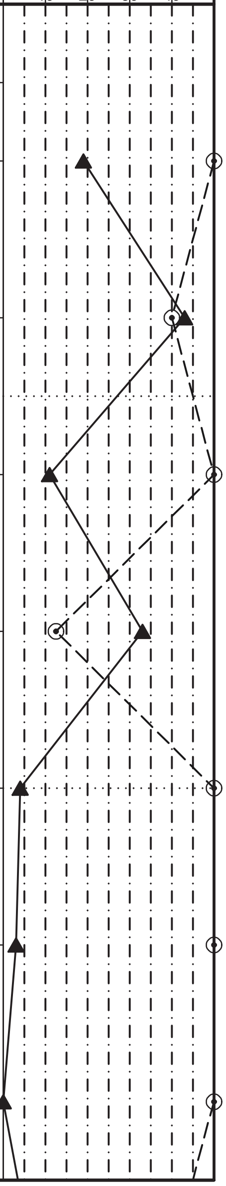
Final Log Checked and Approved
By: Carrie Nicholson
Date: 9/21/2017

▨ Lab Testing Performed on Sample

NOTE: N values and all graphical plots are for information only.

ELEV.	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
	BITUMINOUS CONCRETE, *- 5" White crushed gravel between two layers of pavement.* 0.8'/El. 13.2							
	Subbase. 1.0'/El. 13.0		1.0	S-1	20-14	19	1.0	100
	SAND and **GRAVEL**, little Silt, medium dense, moist, heterogeneous, well graded, sub-angular to angular, non-plastic, gray to dark gray, fill. *- organics, brick, and mica in S-3.*	a-2-4 / sm	2.0	S-2	15-13-19-22	43	1.6	80
10			4.0	S-3	15-4-4-11	11	2.0	100
	- quartz piece stuck in S-4 shoe. *- mica in S-4.* 8.0'/El. 6.0		6.0	S-4	37-15-10-12	33	0.5	25
5	**SILT** and **CLAY**, some Sand, soft to very soft, wet, heterogeneous, poorly graded, rounded to sub-angular, low plastic fines, black, fill, *- tar odor.* 10.5'/El. 3.5	a-2-4 / ml	8.0	S-5	2-2-1-4 **Pen=0.50 tsf**	4	2.0	100
	CLAY and **SILT**, little Sand, very soft, wet, heterogeneous, poorly graded, rounded, medium plastic fines, black to dark gray, alluvium, *Class. on jar samples collected from SB-6B & SB-7T* *A-7-5(16)/ML* *N.M.C.=62.4%.*	A-7-5 / ML	10.0	▨ S-6	2-1-1-2 **Pen=0.25 tsf**	3	2.0	100
	13.5'/El. 0.5		12.0	▨ S-7	WOH-WOH-WOH-4 **Pen=0.25 tsf**	0	2.0	100
0		A-4 / ML	14.0		1-3-2-3			

◇ RQD % ◇
⊙ Soil/Rock Rec.% ⊙
20 40 60 80
▲ SPT (N_{60}) ▲
10 20 30 40



pennsylvania DEPARTMENT OF TRANSPORTATION

ENGINEER'S LOG

Boring **WH-01** ECMS ______ District: ______ County: Philadelphia

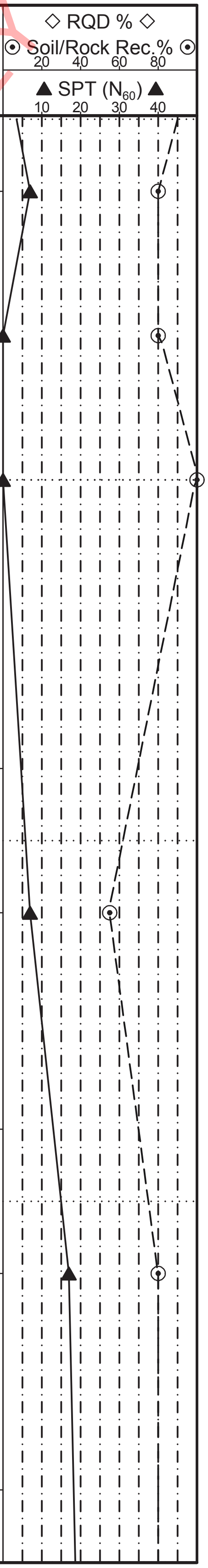
SR ______ Section ______ Sheet 2 of 5

Sta. ______ Offset ______

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	GRAPHIC	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
		SILT and **CLAY**, some Sand, very soft, wet, lensed, poorly graded, rounded, non-plastic, brown, alluvium, *Class. on jar samples collected from S-9 & S-10* *A-4(0)/ML* *N.M.C.=52.9%.* *(Layer continued from the previous page.)*	A-4 / ML		S-8	**Pen=0.25 tsf**	7	1.6	80
				16.0	S-9	WOH-WOH-WOH-3 **Pen=0.25 tsf**	0	1.6	80
-5				18.0	S-10	WOH-WOH-WOH-WOH **Pen=0.25 tsf**	0	2.0	100
∇ ▼		*- pocket penetrometer readings are from clay seams; soil is lensed.* 24.0'/El. -10.0		20.0					
-10		**CLAY** and **SILT**, some Sand, very soft, wet, homogeneous, poorly graded, rounded, medium plastic fines, black to dark gray, alluvium.	a-6 / cl	24.0	S-11	WOH-2-3-3 **Pen=0.25 tsf**	7	1.1	55
		29.0'/El. -15.0		26.0					
-15		**SAND**, little Silt, little Gravel, medium dense, wet, heterogeneous, poorly graded, sub-rounded to sub-angular, non-plastic, brown, alluvium.	a-3 / sp	29.0	S-12	6-7-6-6	17	1.6	80
				31.0					
-20				34.0					



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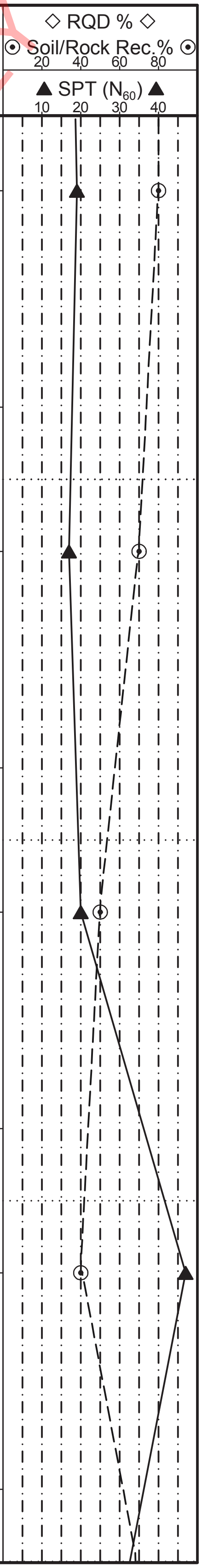
ENGINEER'S LOG

Boring **WH-01** ECMS
District: County: Philadelphia
SR Section
Sta. Offset
Sheet 3 of 5

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
	SAND, little Silt, little Gravel, medium dense, wet, heterogeneous, poorly graded, sub-rounded to sub-angular, non-plastic, brown, alluvium. *(Layer continued from the previous page.)*			S-13	6-7-7-8	19	1.6	80
			36.0					
-25			39.0					
				S-14	5-5-8-6	17	1.4	70
			41.0					
	- hard to very hard, coarse gravel caused drill rig to abnormally vibrate when boring was advanced with tri-cone roller bit while applying downward pressure between 41.0' and 44.0'.	a-3 / sp						
-30			44.0					
				S-15	17-7-8-6	20	1.0	50
			46.0					
-35	49.0'/El. -35.0		49.0					
	SAND and **GRAVEL**, trace Silt, medium dense, wet, heterogeneous, well graded, sub-angular to angular, non-plastic, brown, alluvium, *Class. on jar samples collected from S-16 to S-19* *A-1-b/SP-SM* *N.M.C.=10.5%.*			▨ S-16	20-19-16-16	47	0.8	40
			51.0					
		A-1-b / SP-SM						
-40			54.0					



09/21/2017 **FINAL**

pennsylvania
DEPARTMENT OF TRANSPORTATION

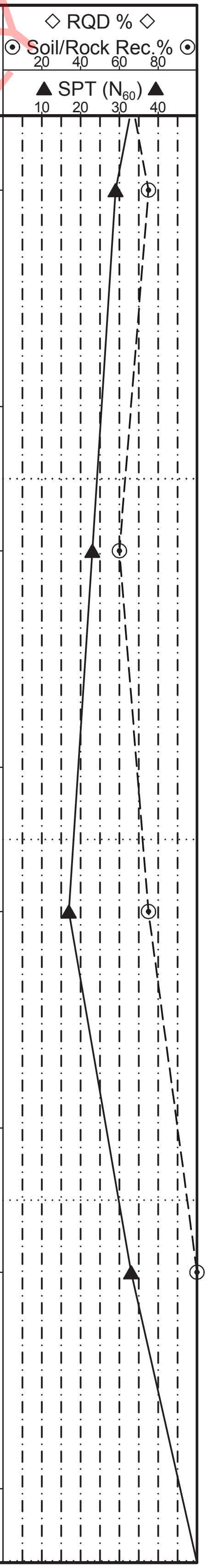
ENGINEER'S LOG

Boring **WH-01** ECMS ______
District: ______ County: Philadelphia
Sheet 4 of 5
SR ______ Section ______
Sta. ______ Offset ______

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
	SAND and **GRAVEL**, trace Silt, medium dense, wet, heterogeneous, well graded, sub-angular to angular, non-plastic, brown, alluvium, *Class. on jar samples collected from S-16 to S-19* *A-1-b/SP-SM* *N.M.C.=10.5%.* *(Layer continued from the previous page.)*			S-17 ▨	14-12-10-11	29	1.5	75
			56.0					
-45			59.0					
		A-1-b / SP-SM		S-18 ▨	10-9-8-7	23	1.2	60
			61.0					
-50			64.0					
				S-19 ▨	11-7-6-7	17	1.5	75
			66.0					
-55	69.0'/El. -55.0		69.0					
	GRAVEL and **SAND**, little Clay, dense to very dense, wet, heterogeneous, poorly graded, sub-angular to angular, medium plastic fines, tan to light brown, alluvium.			S-20	9-11-14-17	33	2.0	100
			71.0					
		a-1-b / gp						
-60			74.0					
				S-21	32-33-50/.4'	111	1.4	100



PENNDOT ENGINEER'S LOG - PENNDOT_GINT_VERSION_1.2.2.3_9-21-2016.GDT - 9/21/17 08:55 - P:\6 - (M) MUNICIPAL\M17001-13 PRPA PORT DEVELOPMENT\GEOTECH\DRILLING\LOGS\WAREHOUSE\PORT AUTH LOGS.GPJ

09/21/2017 **FINAL**

pennsylvania
DEPARTMENT OF TRANSPORTATION

ENGINEER'S LOG

Boring **WH-01** ECMS ______ District: ______ County: Philadelphia Sheet 5 of 5

SR ______ Section ______

Sta. ______ Offset ______

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	GRAPHIC	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)	◇ RQD % ◇ ⊙ Soil/Rock Rec.% ⊙ 20 40 60 80 ▲ SPT (N_{60}) ▲ 10 20 30 40
		75.4'/El. -61.4								
		Bottom of boring.								
-65										
-70										
-75										
-80										

PENNDOT ENGINEER'S LOG - PENNDOT_GINT_VERSION_1.2.2.3_9-21-2016.GDT - 9/21/17 08:55 - P:\6 - (M) MUNICIPAL\M17001-13 PRPA PORT DEVELOPMENT\GEOTECH\DRILLING\LOGS\WAREHOUSE\PORT AUTH LOGS.GPJ

pennsylvania
DEPARTMENT OF TRANSPORTATION

ENGINEER'S LOG

Sheet 1 of 4

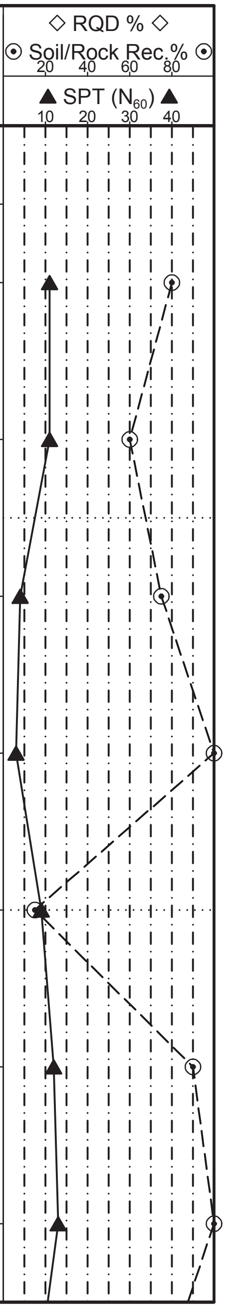
Boring **WH-02** ECMS
District: County: Philadelphia
SR Section
Baseline: FDC Site - Port Authority
Sta. Offset
Segment Offset
Coordinates:
Lat. Long.
219294.3170 E 2695829.6000 N
Ground Elev. 13.9 ft.
Water Level Elev./Elapsed Time:
▽ Initial -0.1 ft. Elapsed 0.0 hr.
▼ Final -3.9 ft. Elapsed 24.0 hr.
Driller: Gary B.
Company: Allied Well Drilling

Drilling Start: 07/25/2017 12:58 pm
Drilling Complete: 07/26/2017 11:55 am
Grouting Complete: 08/01/2017 2:40 pm
Rig: Acker XLS Track Rig
Hammer Type: Automatic
SPT Hammer Efficiency:
Assumed 0.8 Measured
Hammer Calibration Date:
Hole Type:
Casing Type: HSA/FJC - Spun
Casing I.D.: 3.25 in Casing Depth: 20.0 ft.
Rock Core Method:
Inspector: Jeremy Boozer
Inspector Cert. No. 410-17

DAVID J. WHITLATCH
PE-053530-E
9/21/17
PG/PE Seal, Signature and Date

Final Log Checked and Approved
By: Carrie Nicholson
Date: 9/21/2017
▨ Lab Testing Performed on Sample
NOTE: N values and all graphical plots are for information only.

ELEV.	GRAPHIC	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N60 --- RQD %	REC (ft.)	REC (%)
		BITUMINOUS CONCRETE. 0.3'/El. 13.6							
		Subbase. 1.0'/El. 12.9		1.0	S-1	9-8	11	0.8	80
		Coarse **SAND**, trace Gravel, loose, moist, homogeneous, poorly graded, sub-rounded, non-plastic, light brown, fill. 3.7'/El. 10.2	a-3 / sp	2.0	S-2	6-4-4-6	11	1.2	60
10		**SLAG, ASPHALT MILLINGS.** 4.0'/El. 9.9		4.0					
		SAND and **SILT**, very loose to loose, wet, lensed, well graded, sub-rounded, low plastic fines, dark gray to black, alluvium, *- clay and silt seams from 4.2' to 4.5' and 7.5' to 8.0'.*			S-3	4-1-2-1 **Pen=0.50 tsf**	4	1.5	75
		- pocket penetrometer readings are from clay seams.	a-2-4 / sm	6.0	S-4	1-1-1-1 **Pen=0.25 tsf**	3	2.0	100
5				8.0	S-5	WOH-2-5-7 **Pen=0.25 tsf**	9	0.3	15
		10.8'/El. 3.1		10.0					
		CLAY and **SILT**, some Sand, very soft, wet, homogeneous, poorly graded, rounded, medium plastic fines, dark gray to black, alluvium.	a-6 / cl		S-6	4-4-5-5 **Pen=0.25 tsf**	12	1.8	90
				12.0	S-7	3-4-6-7 **Pen=0.25 tsf**	13	2.0	100
▽ 0		14.0'/El. -0.1		14.0					
			a-3 / sp						



09/21/2017 **FINAL**

pennsylvania
DEPARTMENT OF TRANSPORTATION

ENGINEER'S LOG

Boring **WH-02** ECMS ______ District: ______ County: Philadelphia ______ Sheet 2 of 4

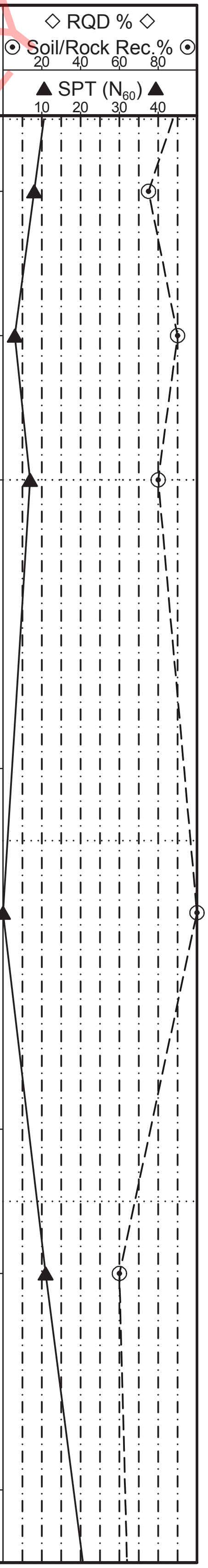
SR ______ Section ______

Sta. ______ Offset ______

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
	SAND and **GRAVEL**, some Silt, loose, wet, heterogeneous, well graded, angular, non-plastic, dark gray, alluvium, *- tan, coarse gravel-sized pieces of angular, very hard, quartz frequent in samples S-8 and S-9.* *(Layer continued from the previous page.)*	a-3 / sp	16.0	S-8	WOH-2-4-2	8	1.5	75
			18.0	S-9	2-1-1-1	3	1.8	90
-5	18.9'/El. -5.0							
	CLAY and **SILT**, trace Sand, trace Gravel, soft, wet, homogeneous, poorly graded, rounded, high plastic fines, dark gray, alluvium, *Class. on jar samples collected from S-10B to S-11* *A-7-5(31)/MH* *N.M.C.=57.7%.*		20.0	S-10	2-2-3-4 **Pen=0.50 tsf**	7	1.6	80
-10		A-7-5 / MH	24.0					
			26.0	S-11	WOH-WOH-WOH-2 **Pen=0.25 tsf**	0	2.0	100
-15			29.0					
	30.2'/El. -16.3		31.0	S-12	3-4-4-6 **Pen=0.25 tsf**	11	1.2	60
	SAND, some Gravel, trace Silt, medium dense to very dense, wet, heterogeneous, poorly graded, sub-rounded, non-plastic, red gray, alluvium.	A-1-b / SW-SM	34.0					
-20								



09/21/2017 **FINAL**

pennsylvania
DEPARTMENT OF TRANSPORTATION

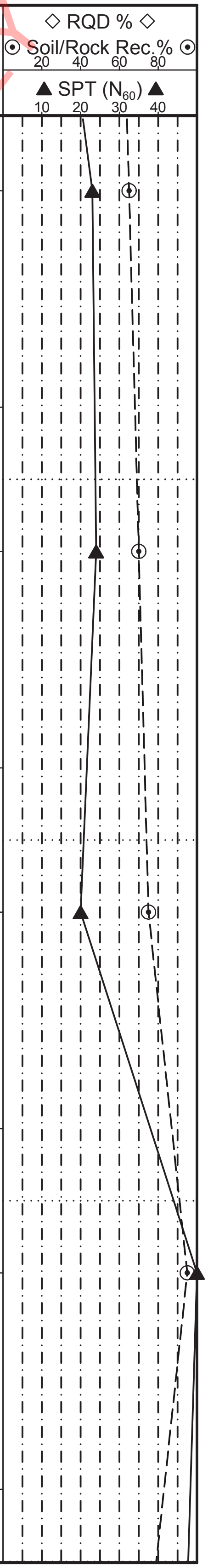
ENGINEER'S LOG

Boring **WH-02** ECMS ______
District: ______ County: Philadelphia
SR ______ Section ______
Sta. ______ Offset ______
Sheet 3 of 4

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
	SAND, some Gravel, trace Silt, medium dense to very dense, wet, heterogeneous, poorly graded, sub-rounded, non-plastic, red gray, alluvium. *(Layer continued from the previous page.)*			S-13	7-7-10-11	23	1.3	65
			36.0					
-25	*- tan, coarse gravel-sized pieces of angular, very hard, quartz frequent in samples S-13, S-14, and S-15* *Class. on jar samples collected from S-14 to S-16* *A-1-b/SW-SM* *N.M.C.=13.4%.*		39.0					
				S-14	7-8-10-13	24	1.4	70
			41.0					
-30		A-1-b / SW-SM	44.0					
				S-15	6-7-8-18	20	1.5	75
			46.0					
-35	*- brown, gray, white, green, red and purple, coarse gravel, subrounded to rounded, medium hard to very hard with frequent minerals in alluvial deposit in bottom 6" of S-16.*		49.0					
				S-16	17-35-49-42	112	1.9	95
			51.0					
-40	54.0'/El. -40.1							
		A-1-a / SP	54.0					



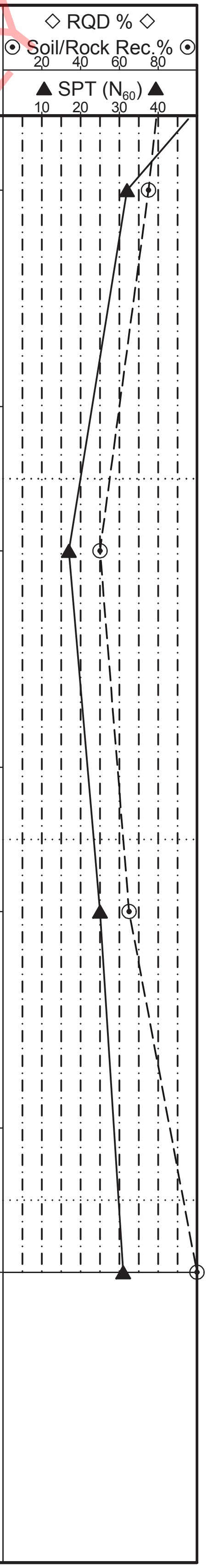
ENGINEER'S LOG

Boring **WH-02** ECMS ______
District: ______ County: Philadelphia
Sheet 4 of 4
SR ______ Section ______
Sta. ______ Offset ______

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	GRAPHIC	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
-45		**GRAVEL** and **SAND**, trace Silt, medium dense to dense, wet, heterogeneous, poorly graded, angular, non-plastic, brown, alluvium, *Class. on jar samples collected from S-17 to S-18* *A-1-a/SP* *N.M.C.=17.6%.* *(Layer continued from the previous page.)* *- low recovery in S-18 due to coarse gravel in shoe and broken basket.*	A-1-a / SP	56.0	▨ S-17	5-12-12-13	32	1.5	75
				59.0 61.0	▨ S-18	6-6-7-9	17	1.0	50
-50		64.0'/El. -50.1							
-55		**GRAVEL** and **SAND**, little Clay, medium dense to dense, wet, heterogeneous, poorly graded, sub-angular to angular, medium plastic fines, tan to light brown, alluvium, *- heaving sand and gravel clogged tri-cone bit and AWS rod, required tool cleaning and hole reaming.*	a-1-b / gp	64.0 66.0	S-19	4-7-12-16	25	1.3	65
				69.0	S-20	3-5-18-49	31	2.0	100
		71.0'/El. -57.1							
-60		*Abandoned hole due to heaving sands. Ran casing advancer down to 74.0' twice; the first time it caved at 48.0' and the second time it caved at 54.0' when trying to sample.* Bottom of boring.							



09/21/2017 **FINAL**

pennsylvania
DEPARTMENT OF TRANSPORTATION

ENGINEER'S LOG

Sheet 1 of 5

Boring **WH-03** ECMS

District: County: Philadelphia

SR Section

Baseline: FDC Site - Port Authority

Sta. Offset

Segment Offset

Coordinates:

Lat. Long.

219044.6650 E 2696277.2210 N

Ground Elev. 13.1 ft.

Water Level Elev./Elapsed Time:

▽ Initial -8.7 ft. Elapsed 0.0 hr.

▼ Final 6.0 ft. Elapsed 23.0 hr.

Driller: Gary B.

Company: Allied Well Drilling

Drilling Start: 07/31/2017 2:05 pm

Drilling Complete: 08/01/2017 12:45 pm

Grouting Complete: 08/02/2017 11:45 am

Rig: Acker XLS Track Rig

Hammer Type: Automatic

SPT Hammer Efficiency:

Assumed 0.8 Measured

Hammer Calibration Date:

Hole Type:

Casing Type: HSA/FJC - Spun

Casing I.D.: 3.25 in Casing Depth: 30.0 ft.

Rock Core Method:

Inspector: Jeremy Boozer

Inspector Cert. No. 410-17

David J. Whitlatch
DAVID J. WHITLATCH
9/21/17
PE-053530-E
PG/PE Seal, Signature and Date

Final Log Checked and Approved

By: Carrie Nicholson

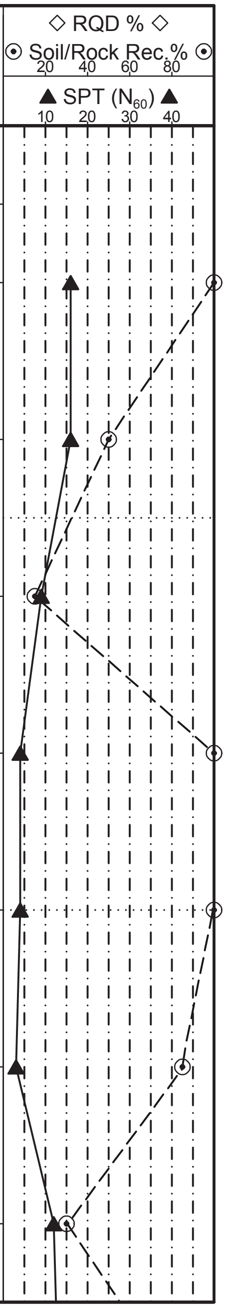
Date: 9/21/2017

▨ Lab Testing Performed on Sample

NOTE: N values and all graphical plots are for information only.

ELEV.	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS
	BITUMINOUS CONCRETE. 0.4'/El. 12.8	
	Subbase, coarse cobble-sized limestone pieces. 1.0'/El. 12.1	a-2-4 / sm
10	**SAND** and **GRAVEL**, some Silt, medium dense, wet, heterogeneous, well graded, sub-rounded to sub-angular, low plastic fines, brown and red black, fill. 3.0'/El. 10.1	a-6 / cl
	CLAY and **SILT**, some Gravel, very stiff, wet, heterogeneous, poorly graded, sub-rounded to sub-angular, medium plastic fines, light brown to light gray, fill, *- trace pyrite in S-2.* 4.0'/El. 9.1	
▼ 5	**SAND** and **SILT**, some Gravel, loose, wet, lensed, well graded, rounded to angular, low plastic fines, dark brown to black, fill. *- tar odor in S-5 and S-6.* 12.5'/El. 0.6	a-2-4 / sm
0		A-2-4 / SM

SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
1.0	S-1	16-12	16	1.0	100
2.0	S-2	8-5-7-10 **Pen=3.00 tsf**	16	1.0	50
4.0	S-3	7-4-3-3	9	0.3	15
6.0	S-4	2-1-2-3 **Pen=0.25 tsf**	4	2.0	100
8.0	S-5	1-1-2-1 **Pen=0.25 tsf**	4	2.0	100
10.0	S-6	1-1-1-1 **Pen=0.25 tsf**	3	1.7	85
12.0	S-7	WOH-1-8-8	12	0.6	30
14.0	▨				



09/21/2017 **FINAL**

PENNDOT ENGINEER'S LOG - PENNDOT_GINT_VERSION_1.2.2.3_9-21-2016.GDT - 9/21/17 08:55 - P:\6 - (M) MUNICIPAL\M17001-13 PRPA PORT DEVELOPMENT\GEOTECH\DRILLING\LOGS\WAREHOUSE\PORT AUTH LOGS.GPJ

ENGINEER'S LOG

Boring **WH-03** ECMS ______ District: ______ County: Philadelphia Sheet 2 of 5

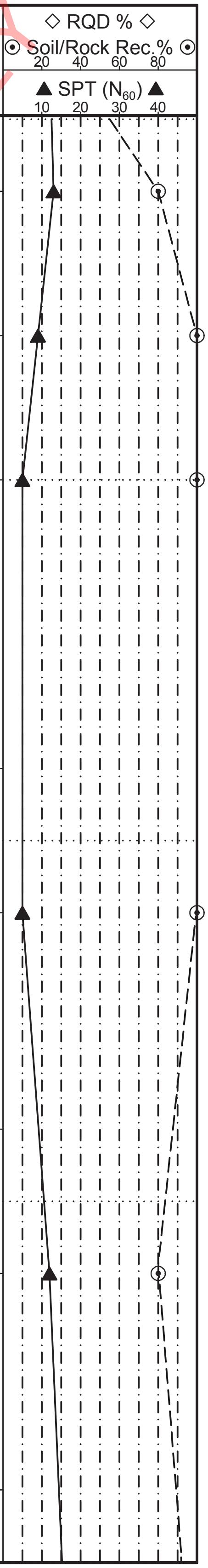
SR ______ Section ______

Sta. ______ Offset ______

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	GRAPHIC	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
		SAND, little Silt, trace Gravel, medium dense, wet, heterogeneous, poorly graded, sub-rounded to sub-angular, non-plastic, brown, fill, *Class. on jar samples collected from S-8 to S-9* *A-2-4(0)/SM* *N.M.C.=19.8%.* *(Layer continued from the previous page.)* 19.2'/El. -6.1	A-2-4 / SM		S-8	2-3-7-7	13	1.6	80
				16.0	S-9	5-4-3-3	9	2.0	100
-5				18.0	S-10	2-2-2-3 **Pen=1.00 tsf**	5	2.0	100
▽		**CLAY** and **SILT**, trace Sand, stiff, wet, homogeneous, poorly graded, rounded, medium plastic fines, dark gray, fill. *- organics/weeds in sample from 25.2' to 26.0'.* 26.0'/El. -12.9	a-6 / cl	20.0					
-10				24.0	S-11	WOH-2-2-4 **Pen=2.00 tsf**	5	2.0	100
-15		**SAND**, trace Silt, trace Gravel, medium dense to dense, wet, heterogeneous, poorly graded, sub-rounded to angular, non-plastic, brown, alluvium, *Class. on jar samples collected from S-12 to S-13* *A-3/SP-SM* *N.M.C.=22.3%.*	A-3 / SP-SM	26.0					
				29.0	S-12	3-4-5-5	12	1.6	80
-20				31.0					
				34.0					



PENNDOT ENGINEER'S LOG - PENNDOT_GINT_VERSION_1.2.2.3_9-21-2016.GDT - 9/21/17 08:55 - P:\6 - (M) MUNICIPAL\M17001-13 PRPA PORT DEVELOPMENT\GEOTECH\DRILLING\LOGS\WAREHOUSE\PORT AUTH LOGS.GPJ

ENGINEER'S LOG

Boring **WH-03** ECMS ______ District: ______ County: Philadelphia

Sheet 3 of 5

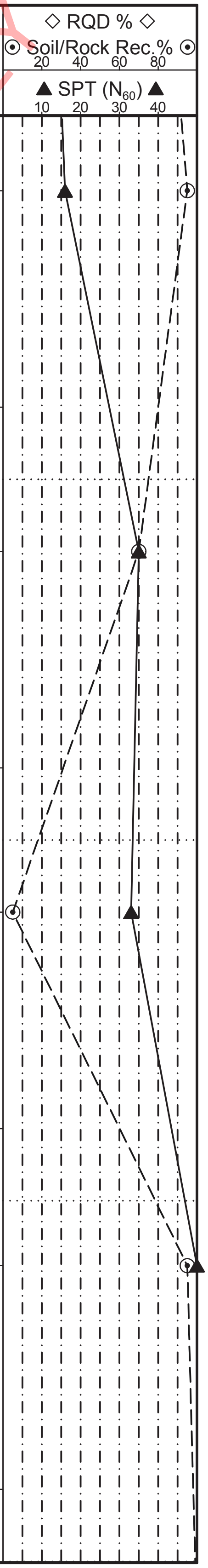
SR ______ Section ______

Sta. ______ Offset ______

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	GRAPHIC	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
		SAND, trace Silt, trace Gravel, medium dense to dense, wet, heterogeneous, poorly graded, sub-rounded to angular, non-plastic, brown, alluvium,		36.0	S-13	4-7-5-6	16	1.9	95
-25		*Class. on jar samples collected from S-12 to S-13* *A-3/SP-SM* *N.M.C.=22.3%.* *(Layer continued from the previous page.)*	A-3 / SP-SM	39.0 41.0	S-14	6-7-19-24	35	1.4	70
-30		44.0'/El. -30.9		44.0					
		GRAVEL and **SAND**, trace Clay, dense to very dense, wet, heterogeneous, poorly graded, sub-angular to angular, medium plastic fines, brown, alluvium, *- gravel stuck in S-15 shoe.*		46.0	S-15	10-14-11-9	33	0.1	5
-35			a-1-b / gp	49.0 50.9	S-16	20-40-46-50/.4'	>115	1.8	95
-40		54.0'/El. -40.9		54.0					
			a-3 / sp						



pennsylvania
DEPARTMENT OF TRANSPORTATION

ENGINEER'S LOG

Boring **WH-03** ECMS

District: County: Philadelphia

Sheet 4 of 5

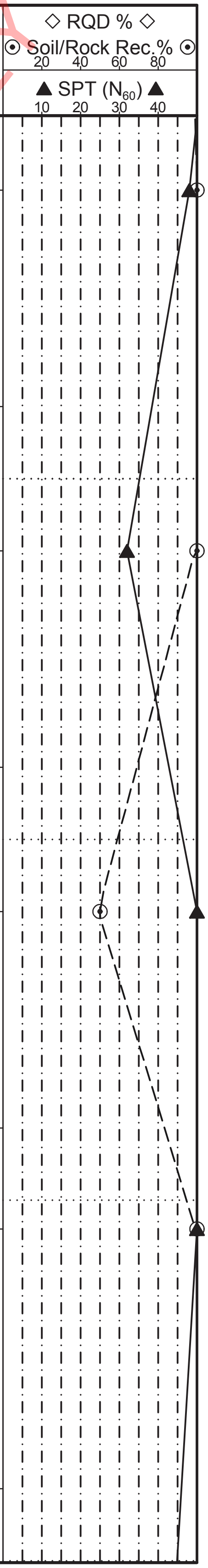
SR Section

Sta. Offset

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	GRAPHIC	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
-45		**SAND** and **GRAVEL**, little Silt, dense, wet, heterogeneous, gap graded, angular, non-plastic, brown, alluvium. *(Layer continued from the previous page.)* 59.0'/El. -45.9	a-3 / sp	56.0	S-17	19-20-16-17	48	2.0	100
		GRAVEL and **SAND**, trace Silt, dense to very dense, wet, heterogeneous, poorly graded, non-plastic, brown, alluvium.		59.0 61.0	S-18	10-12-12-11	32	2.0	100
-50				64.0 66.0	S-19	13-20-22-33	56	1.0	50
-55			a-1-b / gp	69.0 70.4	S-20	9-26-50/.4'	101	1.4	100
-60		74.0'/El. -60.9							
			A-7-6 / CL	74.0	▨	9-12-13-16			



PENNDOT ENGINEER'S LOG - PENNDOT_GINT_VERSION_1.2.2.3_9-21-2016.GDT - 9/21/17 08:55 - P:\6 - (M) MUNICIPAL\M17001-13 PRPA PORT DEVELOPMENT\GEOTECH\DRILLING\LOGS\WAREHOUSE\PORT AUTH LOGS.GPJ

pennsylvania
DEPARTMENT OF TRANSPORTATION

ENGINEER'S LOG

Boring **WH-03** ECMS

District: County: Philadelphia

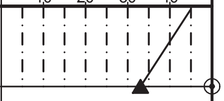
SR Section

Sta. Offset

Sheet 5 of 5

NOTE: **N values and all graphical plots are for information only.**

▨ Lab Testing Performed on Sample

ELEV.	GRAPHIC	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)	◇ RQD % ◇ ⊙ Soil/Rock Rec.% ⊙ 20 40 60 80 ▲ SPT (N_{60}) ▲ 10 20 30 40
		CLAY and **SILT**, trace Sand, trace Gravel, stiff, wet, heterogeneous, poorly graded, high plastic fines, red and white, alluvium, *Class. on jar samples collected from S-21* *A-7-6(30)/CL* *N.M.C.=22.2%.* *(Layer continued from the previous page.)* 76.0'/El. -62.9	A-7-6 / CL		S-21	**Pen=1.50 tsf**	33	2.0	100	
-65		Bottom of boring.								
-70										
-75										
-80										

09/21/2017 **FINAL**

pennsylvania
DEPARTMENT OF TRANSPORTATION

ENGINEER'S LOG

Sheet 1 of 5

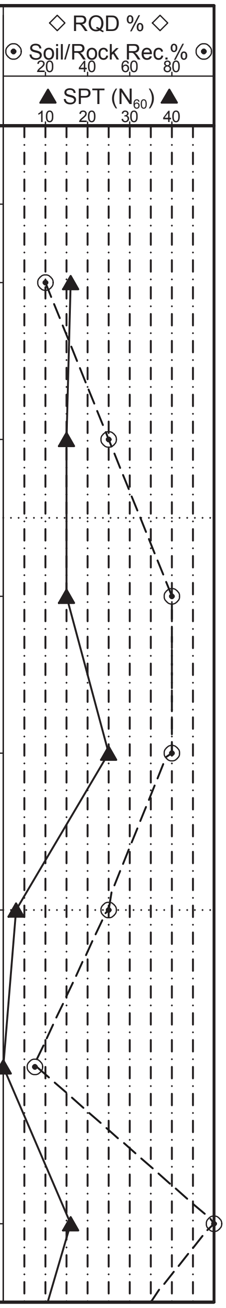
Boring **WH-04** ECMS
District: County: Philadelphia
SR Section
Baseline: FDC Site - Port Authority
Sta. Offset
Segment Offset
Coordinates:
Lat. Long.
218778.3140 E 2695791.4020 N
Ground Elev. 12.9 ft.
Water Level Elev./Elapsed Time:
▽ Initial -4.0 ft. Elapsed 0.0 hr.
▼ Final -0.1 ft. Elapsed 24.0 hr.
Driller: Gary B.
Company: Allied Well Drilling

Drilling Start: 07/26/2017 1:00 pm
Drilling Complete: 07/27/2017 4:10 pm
Grouting Complete: 08/01/2017 3:45 pm
Rig: Acker XLS Track Rig
Hammer Type: Automatic
SPT Hammer Efficiency:
Assumed 0.8 Measured
Hammer Calibration Date:
Hole Type:
Casing Type: HSA/FJC - Spun
Casing I.D.: 3.25 in Casing Depth: 35.0 ft.
Rock Core Method:
Inspector: Jeremy Boozer
Inspector Cert. No. 410-17

DAVID J. WHITLATCH
PE-053530-E
9/21/17
PG/PE Seal, Signature and Date

Final Log Checked and Approved
By: Carrie Nicholson
Date: 9/21/2017
▨ Lab Testing Performed on Sample
NOTE: N values and all graphical plots are for information only.

ELEV.	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
	BITUMINOUS CONCRETE. 0.5'/El. 12.5							
	Subbase. 1.0'/El. 11.9		1.0	S-1	19-12	16	0.2	20
10	**GRAVEL** and **SAND**, some Silt, medium dense, wet, heterogeneous, gap graded, angular, non-plastic, dark gray, fill. 4.5'/El. 8.4	a-1-b / gp	2.0	S-2	5-6-5-6	15	1.0	50
	SLAG, ASPHALT MILLINGS, AND TAR, *fill*. 6.0'/El. 6.9		4.0	S-3	8-5-6-8	15	1.6	80
5	**GRAVEL** and **SAND**, some Silt, very loose to medium dense, moist, heterogeneous, well graded, sub-angular, non-plastic, dark gray to black, fill, *- brick, wood, and asphalt fragments.*	a-2-4 / gm	6.0	S-4	9-10-9-9	25	1.6	80
			8.0	S-5	WOH-WOH-2-2	3	1.0	50
	- piece of wood stuck in S-6 shoe. 12.0'/El. 0.9		10.0	S-6	2-WOH-WOH-3	0	0.3	15
0 ▼	Coarse **SAND**, little Silt, little Gravel, loose to medium dense, wet, homogeneous, poorly graded, sub-rounded to sub-angular, non-plastic, dark gray, alluvium.	a-3 / sp	12.0 14.0	S-7	4-5-7-5	16	2.0	100



ENGINEER'S LOG

Boring **WH-04** ECMS

District: County: Philadelphia

SR Section

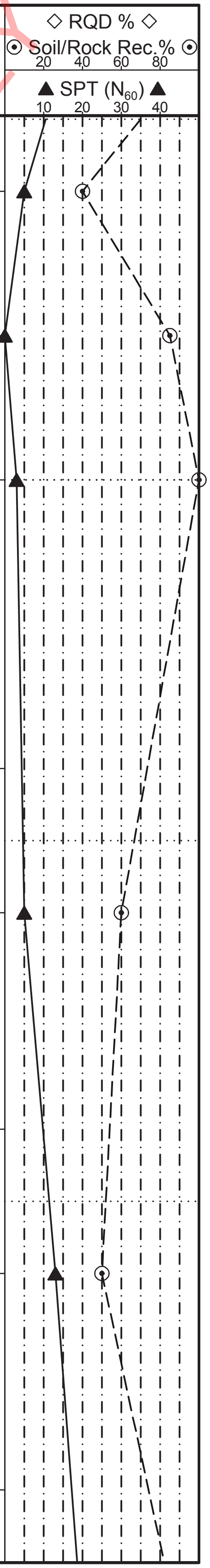
Sta. Offset

Sheet 2 of 5

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	GRAPHIC	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
		16.5'/El. -3.6	a-3 / sp		S-8	2-2-2-2	5	0.8	40
▽		**CLAY** and **SILT**, trace Sand, very soft to soft, wet, homogeneous, poorly graded, rounded, medium plastic fines, dark gray, alluvium.	a-6 / cl	16.0	S-9	WOH-WOH-WOH-WOH **Pen=0.25 tsf**	0	1.7	85
-5				18.0	S-10	2-1-1-2 **Pen=0.50 tsf**	3	2.0	100
				20.0					
-10				24.0	S-11	WOH-2-2-4 **Pen=0.25 tsf**	5	1.2	60
				26.0					
-15		29.0'/El. -16.1							
		SAND and **GRAVEL**, trace Silt, medium dense, wet, heterogeneous, gap graded, sub-rounded, non-plastic, red gray, alluvium.	a-3 / sp	29.0	S-12	5-4-6-6	13	1.0	50
				31.0					
-20				34.0					



09/21/2017 **FINAL**

pennsylvania
DEPARTMENT OF TRANSPORTATION

ENGINEER'S LOG

Boring **WH-04** ECMS ______

District: ______ County: Philadelphia

SR ______ Section ______

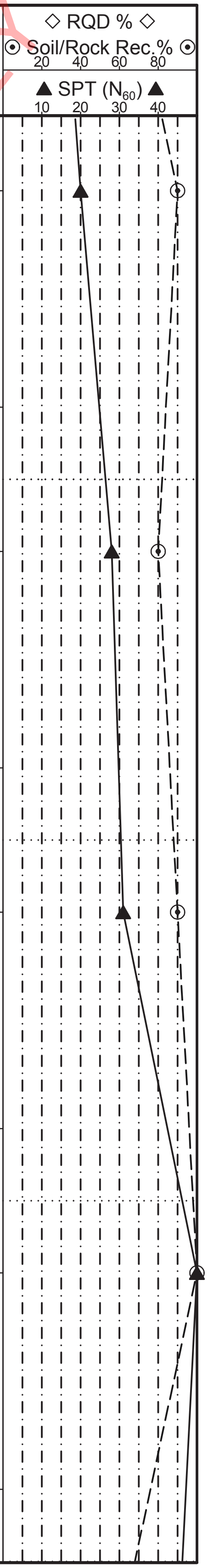
Sta. ______ Offset ______

Sheet 3 of 5

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	GRAPHIC	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
		SAND and **GRAVEL**, trace Silt, medium dense, wet, heterogeneous, gap graded, sub-rounded, non-plastic, red gray, alluvium. *(Layer continued from the previous page.)*	a-3 / sp	36.0	S-13	6-8-7-9	20	1.8	90
-25									
				39.0 41.0	S-14	12-14-7-16	28	1.6	80
-30		44.0'/El. -31.1							
		GRAVEL and **SAND**, some Clay, dense, wet, heterogeneous, well graded, sub-angular to angular, medium plastic fines, gray to brown, alluvium.	a-2-6 / gc	44.0 46.0	S-15	10-12-11-13	31	1.8	90
-35		49.0'/El. -36.1							
		GRAVEL, some Sand, trace Silt, medium dense to very dense, wet, heterogeneous, poorly graded, angular, non-plastic, brown, alluvium, *Class. on jar samples collected from S-17 to S-18* *A-1-a/SW-SM* *N.M.C.=17.2%.*	A-1-a / SW-SM	49.0 51.0	S-16	7-19-47-47	88	2.0	100
-40				54.0					



ENGINEER'S LOG

Boring **WH-04** ECMS ______ District: ______ County: Philadelphia ______ Sheet 4 of 5

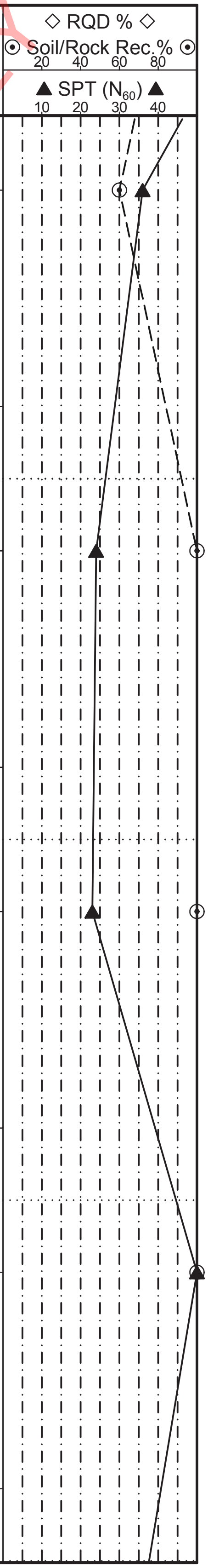
SR ______ Section ______

Sta. ______ Offset ______

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N60 --- RQD %	REC (ft.)	REC (%)
-45 -50	**GRAVEL**, some Sand, trace Silt, medium dense to very dense, wet, heterogeneous, poorly graded, angular, non-plastic, brown, alluvium, *Class. on jar samples collected from S-17 to S-18* *A-1-a/SW-SM* *N.M.C.=17.2%.* *(Layer continued from the previous page.)* 65.0'/El. -52.1	A-1-a / SW-SM	56.0	S-17 ▨	6-9-18-16	36	1.2	60
			59.0 61.0	S-18 ▨	14-11-7-8	24	2.0	100
-55	**CLAY** and **SILT**, some Sand, very stiff, wet, homogeneous, poorly graded, rounded, medium plastic fines, gray to tan, alluvium. 69.0'/El. -56.1	a-6 / cl	64.0 66.0	S-19	6-7-10-14 **Pen=3.50 tsf**	23	2.0	100
-60	**SAND** and **SILT**, some Clay, very dense, wet, homogeneous, gap graded, sub-rounded to sub-angular, low plastic fines, tan to light brown, alluvium. 75.0'/El. -62.1	a-3 / sw	69.0 71.0 74.0	S-20	16-26-32-42	77	2.0	100



PENNDOT ENGINEER'S LOG - PENNDOT_GINT_VERSION_1.2.2.3_9-21-2016.GDT - 9/21/17 08:55 - P:\6 - (M) MUNICIPAL\M17001-13 PRPA PORT DEVELOPMENT\GEOTECH\DRILLING\LOGS\WAREHOUSE\PORT AUTH LOGS.GPJ

ENGINEER'S LOG

Boring **WH-04** ECMS ______ District: ______ County: Philadelphia

SR ______ Section ______

Sta. ______ Offset ______

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	GRAPHIC	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)	◇ RQD % ◇ ⊙ Soil/Rock Rec.% ⊙ 20 40 60 80 ▲ SPT (N_{60}) ▲ 10 20 30 40
		CLAY and **SILT**, little Sand, stiff, wet, homogeneous, poorly graded, rounded, medium plastic fines, white to gray, alluvium. *(Layer continued from the previous page.)* 76.0'/El. -63.1	a-6 / cl		S-21	18-12-9-16	28	2.0	100	
		Hole collapsed between 10.0' and 11.0' as noticed on 8/1/17 when attempting to grout. Bottom of boring.								
-65										
-70										
-75										
-80										

pennsylvania
DEPARTMENT OF TRANSPORTATION

ENGINEER'S LOG

Sheet 1 of 4

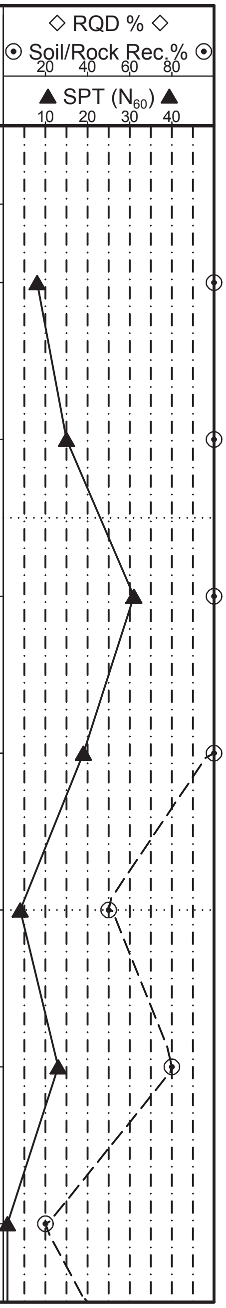
DAVID T. WHITLATCH
PE-053530-E
9/21/17
PG/PE Seal, Signature and Date

Boring **WH-05** ECMS
District: ____ County: Philadelphia
SR ____ Section ____
Baseline: FDC Site - Port Authority
Sta. ____ Offset ____
Segment ____ Offset ____
Coordinates:
Lat. ____ Long. ____
218421.0550 E 2696425.4050 N
Ground Elev. 13.1 ft.
Water Level Elev./Elapsed Time:
▽ Initial 11.6 ft. Elapsed -0.1 hr.
▼ Final 7.2 ft. Elapsed 47.9 hr.
Driller: Gary B.
Company: Allied Well Drilling

Drilling Start: 07/28/2017 2:40 pm
Drilling Complete: 07/30/2017 12:46 pm
Grouting Complete: 08/02/2017 10:30 am
Rig: Acker XLS Track Rig
Hammer Type: Automatic
SPT Hammer Efficiency:
Assumed 0.8 Measured ____
Hammer Calibration Date: ____
Hole Type: ____
Casing Type: HSA/FJC - Spun
Casing I.D.: 3.25 in Casing Depth: 30.0 ft.
Rock Core Method: ____
Inspector: Carmin Sbarro
Inspector Cert. No. 272-12

Final Log Checked and Approved
By: Carrie Nicholson
Date: 9/21/2017
▨ Lab Testing Performed on Sample
NOTE: N values and all graphical plots are for information only.

ELEV.	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
	BITUMINOUS CONCRETE. 0.5'/El. 12.6							
	Subbase (pulled from hole with hand). 1.0'/El. 12.1		1.0	S-1	6-6	8	1.0	100
10	**SAND** and **CLAY**, medium dense, moist, heterogeneous, gap graded, medium plastic fines, dark gray, fill, - *brick, mica and asphalt millings in S-2* - *burnt shale waste from 4.0'-6.0'.*	a-2-4 / sm	2.0	S-2	5-5-6-10	15	2.0	100
			4.0	S-3	8-11-12-13	31	2.0	100
	7.0'/El. 6.1		6.0	S-4	6-6-8-9	19	2.0	100
5	**SILT** and **CLAY**, some Sand, trace Gravel, soft, wet, heterogeneous, poorly graded, rounded to sub-angular, low plastic fines, black, fill, - *burnt shale waste in S-4*. 8.5'/El. 4.6	a-4 / ml	8.0	S-5	2-1-2-1	4	1.0	50
	SAND and **SILT**, very loose to medium dense, wet, heterogeneous, poorly graded, sub-angular to sub-rounded, non-plastic, black, fill, - *tar odor and black liquid throughout*.	a-2-4 / sm	10.0	S-6	2-8-2-1	13	1.6	80
0			12.0	S-7	1-WOH-1-1	1	0.4	20
			14.0		WOH-WOH-			



09/21/2017 **FINAL**

PENNDOT ENGINEER'S LOG - PENNDOT_GINT_VERSION_1.2.2.3_9-21-2016.GDT - 9/21/17 08:55 - P:\6 - (M) MUNICIPAL\M17001-13 PRPA PORT DEVELOPMENT\GEOTECH\DRILLING\LOGS\WAREHOUSE\PORT AUTH LOGS.GPJ

ENGINEER'S LOG

Boring **WH-05** ECMS ______ District: ______ County: Philadelphia

SR ______ Section ______

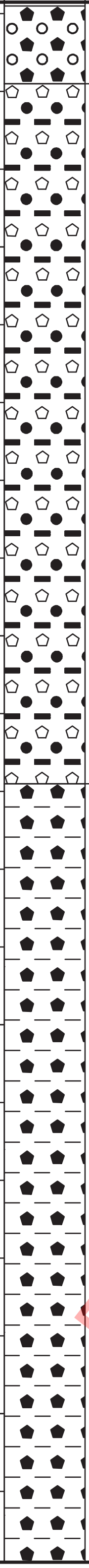
Sta. ______ Offset ______

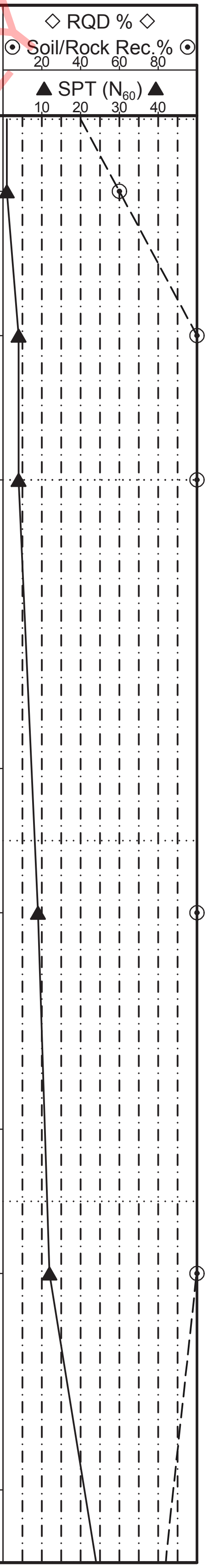
Sheet 2 of 4

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	GRAPHIC	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
		16.0'/El. -2.9	a-2-4 / sm		S-8	1-2	1	1.2	60
		CLAY and **SILT**, trace Sand, soft, wet, homogeneous, poorly graded, rounded, medium plastic fines, gray, alluvium.		16.0					
					S-9	1-1-2-2 **Pen=0.25 tsf**	4	2.0	100
-5				18.0					
					S-10	2-2-1-1 **Pen=0.25 tsf**	4	2.0	100
				20.0					
			a-6 / cl						
-10									
				24.0					
		25.0'/El. -11.9			S-11	3-3-4-4 **Pen=0.50 tsf**	9	2.0	100
		Coarse **SAND**, little Clay, little Gravel, medium dense, wet, heterogeneous, poorly graded, sub-rounded to sub-angular, medium plastic fines, brown, alluvium.		26.0					
-15									
				29.0					
			a-3 / sp		S-12	4-4-5-6	12	2.0	100
				31.0					
-20									
				34.0					





pennsylvania
DEPARTMENT OF TRANSPORTATION

ENGINEER'S LOG

Boring **WH-05** ECMS

District: County: Philadelphia

Sheet 3 of 4

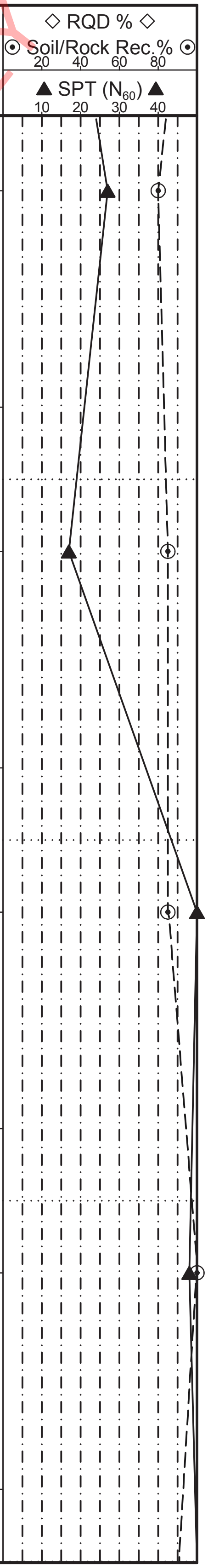
SR Section

Sta. Offset

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
	Coarse **SAND**, little Clay, little Gravel, medium dense, wet, heterogeneous, poorly graded, sub-rounded to sub-angular, medium plastic fines, brown, alluvium. *(Layer continued from the previous page.)*	a-3 / sp		S-13	17-12-8-10	27	1.6	80
			36.0					
-25								
			39.0					
				S-14	7-6-7-12	17	1.7	85
			41.0					
-30	44.0'/El. -30.9							
	GRAVEL and **SAND**, trace Silt, very dense, wet, heterogeneous, poorly graded, sub-angular to angular, low plastic fines, brown, alluvium.	a-1-b / gp	44.0					
				S-15	25-18-24-30	56	1.7	85
			46.0					
-35	49.0'/El. -35.9							
	SAND, little Silt, little Gravel, dense to very dense, wet, homogeneous, poorly graded, sub-rounded to sub-angular, non-plastic, light brown to tan, alluvium, *Class. on jar samples collected from S-17 to S-21* *A-2-4(0)/SM* *N.M.C.=17.3%.*	A-2-4 / SM	49.0	▨				
				S-16 ▨	15-15-21-31	48	2.0	100
			51.0	▨				
-40				▨				
			54.0	▨	25-27-19-			



09/21/2017 **FINAL**

pennsylvania
DEPARTMENT OF TRANSPORTATION

ENGINEER'S LOG

Boring **WH-05** ECMS ______ District: ______ County: Philadelphia

Sheet 4 of 4

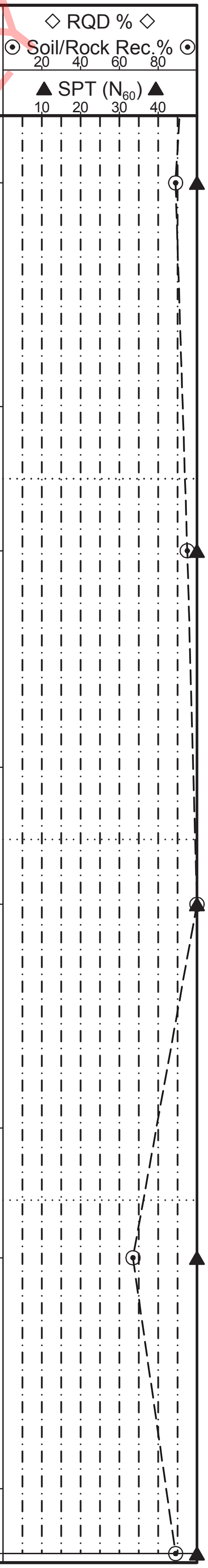
SR ______ Section ______

Sta. ______ Offset ______

NOTE: N values and all graphical plots are for information only.

▨ Lab Testing Performed on Sample

ELEV.	MATERIAL DESCRIPTION COMMENTS - OBSERVATIONS	AASHTO / USCS	SAMPLE DEPTH	SAMPLE No.	BLOW COUNTS (Blows/ 0.5ft)	N_{60} --- RQD %	REC (ft.)	REC (%)
	SAND, little Silt, little Gravel, dense to very dense, wet, homogeneous, poorly graded, sub-rounded to sub-angular, non-plastic, light brown to tan, alluvium, *Class. on jar samples collected from S-17 to S-21* *A-2-4(0)/SM* *N.M.C.=17.3%.* *(Layer continued from the previous page.)*		55.9	S-17	50/.4'	>61	1.7	89
-45								
			59.0 61.0	S-18	36-43-47-50	120	1.9	95
-50								
	- clay seam 64.8'-65.2'.	A-2-4 / SM	64.0 65.9	S-19	9-21-33-50/.4'	>72	1.9	100
-55								
			69.0 70.8	S-20	39-46-48-50/.3'	>125	1.2	67
	- heaving sands @ 72.0'.							
-60								
	74.9'/El. -61.8		74.0	S-21	34-50/.4'	>67	0.8	89



Bottom of boring.

09/21/2017 **FINAL**

PENNDOT ENGINEER'S LOG - PENNDOT_GINT_VERSION_1.2.2.3_9-21-2016.GDT - 9/21/17 08:55 - P:\6 - (M) MUNICIPAL\M17001-13 PRPA PORT DEVELOPMENT\GEOTECH\DRILLING\LOGS\WAREHOUSE\PORT AUTH LOGS.GPJ

APPENDIX B – Laboratory Data

SUMMARY OF LABORATORY DATA

BORING NUMBER	SAMPLE NUMBER	DEPTH (ft)	SOIL GROUP SYMBOL	GRAIN SIZE DISTRIBUTION			PLASTICITY				MOISTURE CONTENT w %	VOLUMETRIC				COMPACTION DATA			PRECONSOLIDATION PRESSURE (TSF) Pc	RECOMPRESSION INDEX (Cr)	COMPRESSION INDEX (Cc)	ORGANIC CONTENT %	SHEAR STRENGTH		
				GRAVEL %	SAND %	SILT/CLAY %	LIQUID LIMIT w_l	PLASTIC LIMIT wp	PLASTICITY INDEX I_p	LIQUIDITY INDEX I_L		SPECIFIC GRAVITY (G) (*) ASSUMED	DRY UNIT WEIGHT (pcf)	VOID RATIO (e)	DEGREE OF SATURATION %	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT %	STANDARD/MODIFIED					UNCONFINED COMPRESSIVE STRENGTH (tsf)	COHESION (tsf)	AXIAL STRAIN (%)
B-3	S-6	13-15	MH		37	63	84	86	NP		40.1											4.2			
B-4	S-12-15	43-60		31	60	9					11.8														
B-5	S-4	6-8	OL				47	33	14	1.6	55.7	2.70*	63.5	1.66	91							7.9	0.74	0.37	14.4
	U-2	22-24	OH		27	34/39	83	43	40	0.7	70.9	2.52	58.0	1.71	100				0.95	0.03	0.49	10.5			
B-7	S-2-5	2-10		17	51	32					27.3														
B-9	S-9-11	28-40		3	85	12					20.5														
B-10	S-3-5	4-10		13	46	41					35.4														
	S-7	18-20							NP		131.2											26.2			

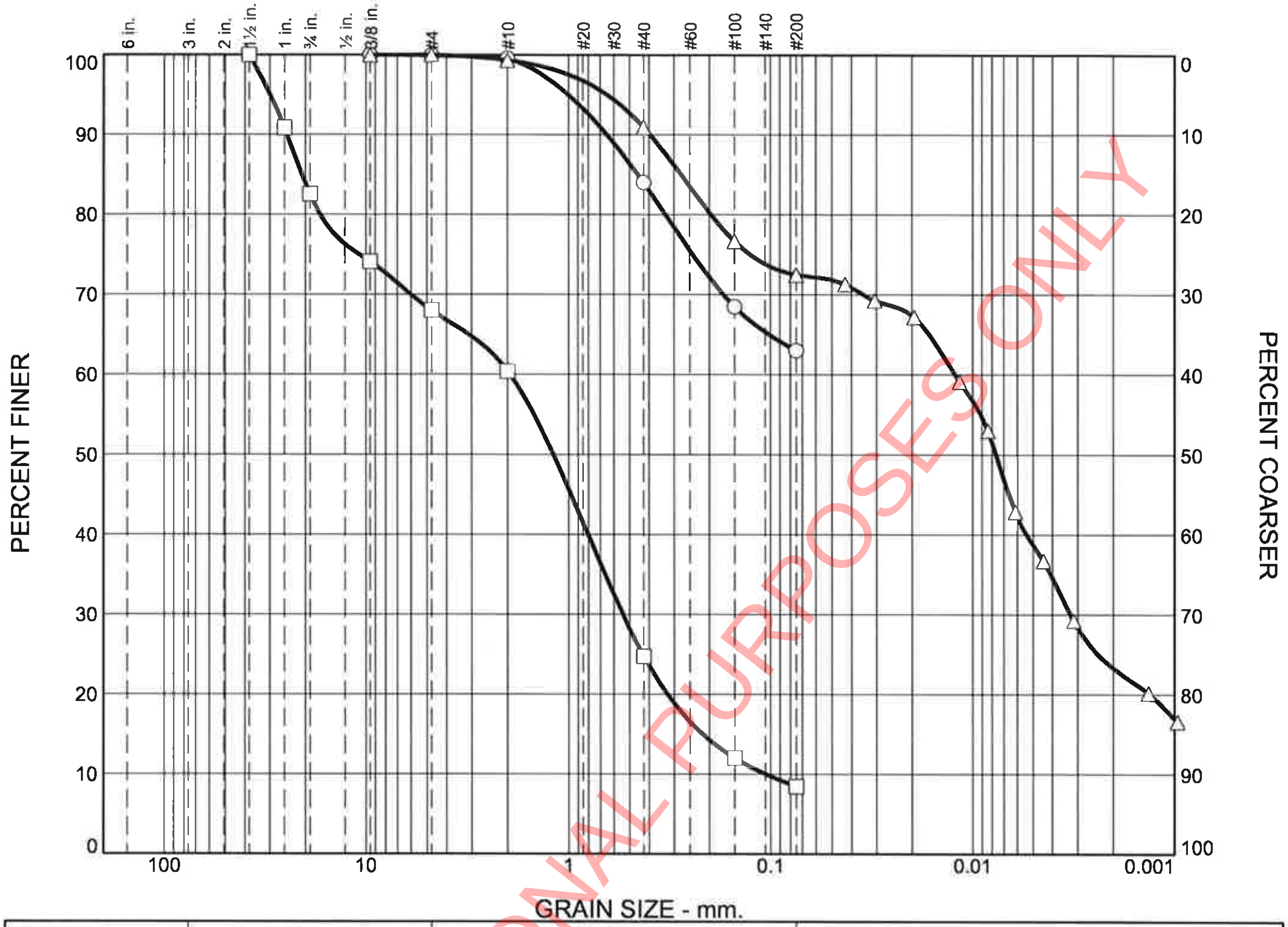
PENNONI ASSOCIATES INC.

DRAWN BY: RJE
DATE: 1/22/2018
CHECKED BY: DAC
DATE: 1/22/2018

PROJECT: **PHILAPORT DISTRIBUTION WAREHOUSE**
LOCATION: **PHILADELPHIA, PA**

JOB No.: **PRPAX 17013**
TABLE No.: **L-1**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

MATERIAL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-3	S-6	13-15	SILT AND F/M SAND, TRACE ORGANICS	MH
□	B-4	S-12-15	43-60	M/F/C SAND, SOME C/F GRAVEL, TRACE SILT	
△	B-5	U-2	22-24	SILTY CLAY, SOME F/M SAND, LITTLE ORGANICS	OH

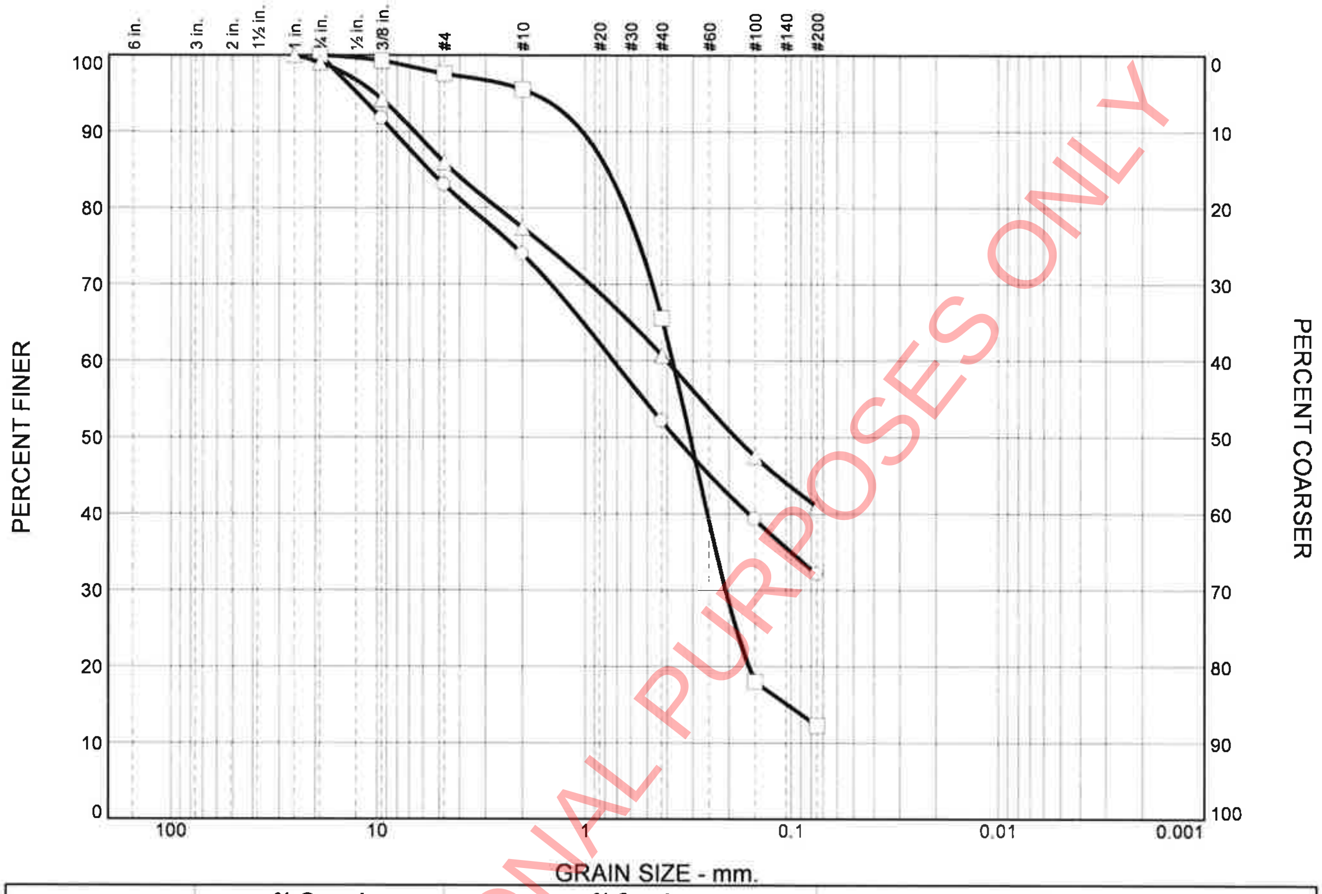
PENNONI ASSOCIATES INC.

Bethlehem, PA

Client: PHILADELPHIA PORT AUTHORITY
Project: PHILAPORT OFFSITE WAREHOUSE

Project No.: PRPAX17013 **Figure** S-1

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

MATERIAL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-7	S-2-5	2-10	M/F/C SAND, SOME SILT, LITTLE FINE GRAVEL	
□	B-9	S-9-11	28-40	F/M SAND, LITTLE SILT	
△	B-10	S-3-5	4-10	F/M/C SAND AND SILT, LITTLE FINE GRAVEL	

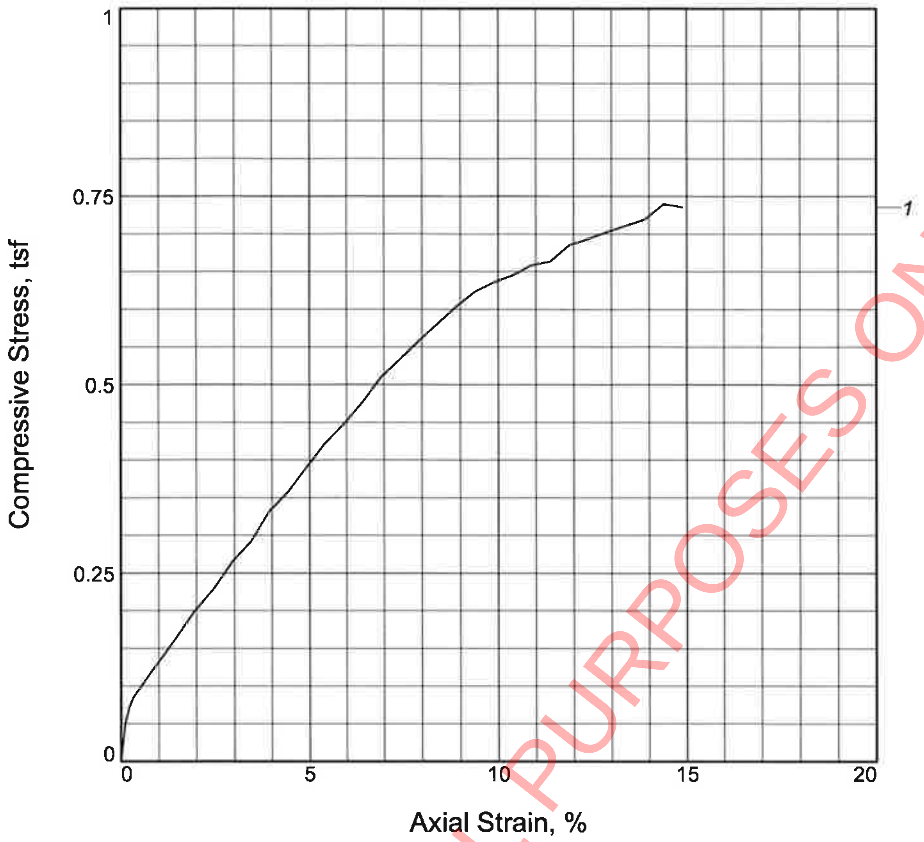
PENNONI ASSOCIATES INC.

Bethlehem, PA

Client: PHILADELPHIA PORT AUTHORITY
Project: PHILAPORT OFFSITE WAREHOUSE

Project No.: PRPAX17013 **Figure** S-2

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.740			
Undrained shear strength, tsf	0.370			
Failure strain, %	14.4			
Strain rate, in./min.	0.03			
Water content, %	55.7			
Wet density, pcf	98.8			
Dry density, pcf	63.5			
Saturation, %	90.8			
Void ratio	1.6559			
Specimen diameter, in.	1.43			
Specimen height, in.	2.75			
Height/diameter ratio	1.92			

Description:

LL = 47 | **PL =** 33 | **PI =** 14 | **Assumed GS=** 2.70 | **Type:** SPT

Project No.: PRPAX17013

Date Sampled:

Remarks:

Figure UCC-1

Client: PHILADELPHIA PORT AUTHORITY

Project: PHILAPORT OFFSITE WAREHOUSE

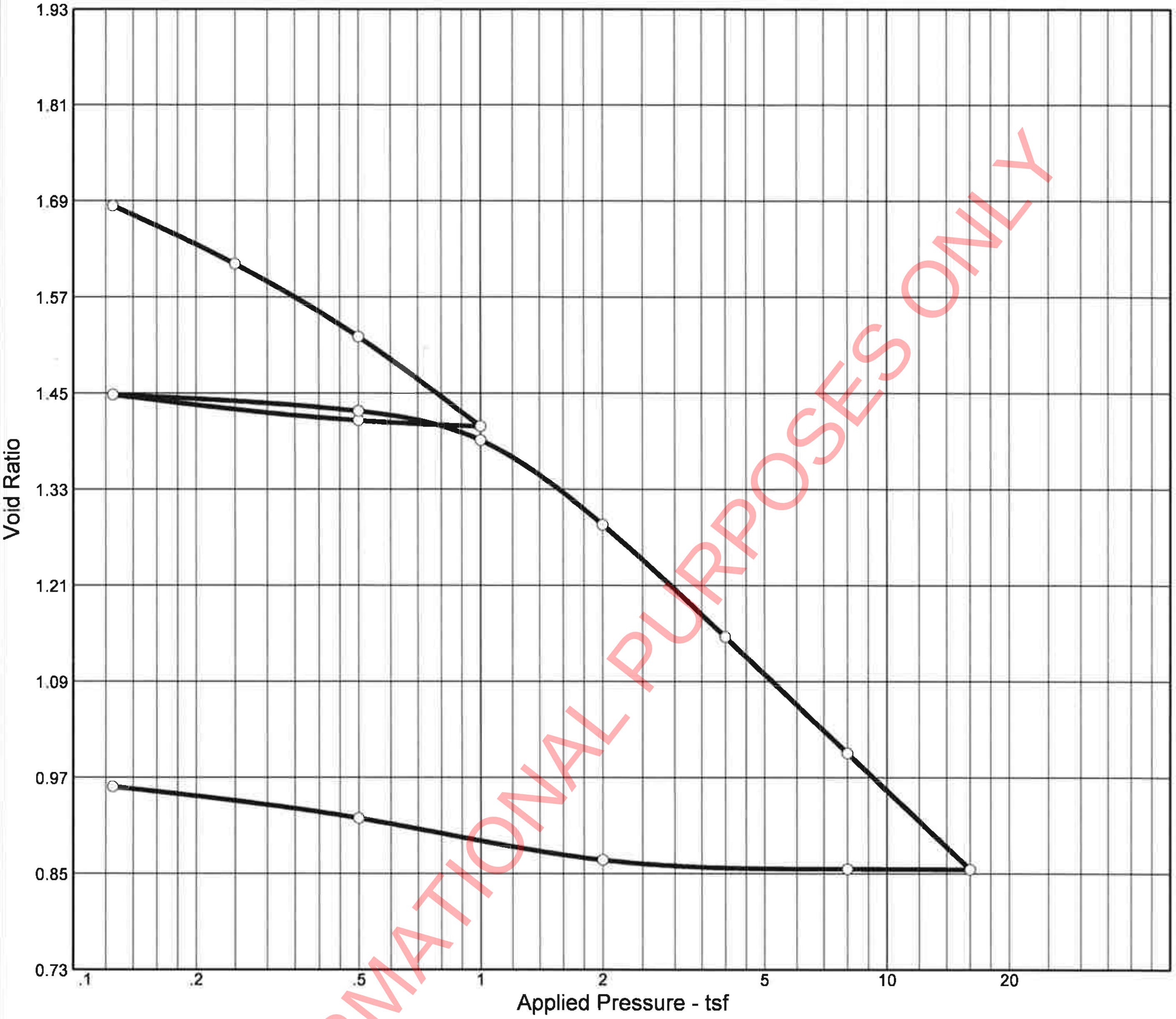
Source of Sample: B-5 **Depth:** 6-8

Sample Number: S-4

UNCONFINED COMPRESSION TEST
PENNONI ASSOCIATES INC.
Bethlehem, PA

Tested By: BL **Checked By:** RE

CONSOLIDATION TEST REPORT



MATERIAL DESCRIPTION	USCS	AASHTO
SILTY CLAY, SOME F/M SAND	MH	A-7-5(32)

LL	PI	Sp. Gr.	Overburden (tsf)	Dry Dens. (pcf)		Moisture		Saturation		Void Ratio		P_c (tsf)	C_c
				Init.	Final	Init.	Final	Init.	Final	Init.	Final		
83	40	2.52	1.00	58.0		70.9 %	70.9 %	104.2 %	100.0 %	1.714	0.959	0.79	0.48

Preparation Process:

Condition of Test:

D2435 Method	C_r	Swell Press. (tsf)	Heave %
	0.05		

Project No. PRPAX17013 **Client:** PHILADELPHIA PORT AUTHORITY

Project: PHILAPORT OFFSITE WAREHOUSE

Source: B-5 **Sample No.:** U-2 **Elev./Depth:** 22-24

CONSOLIDATION TEST REPORT

PENNONI ASSOCIATES INC.

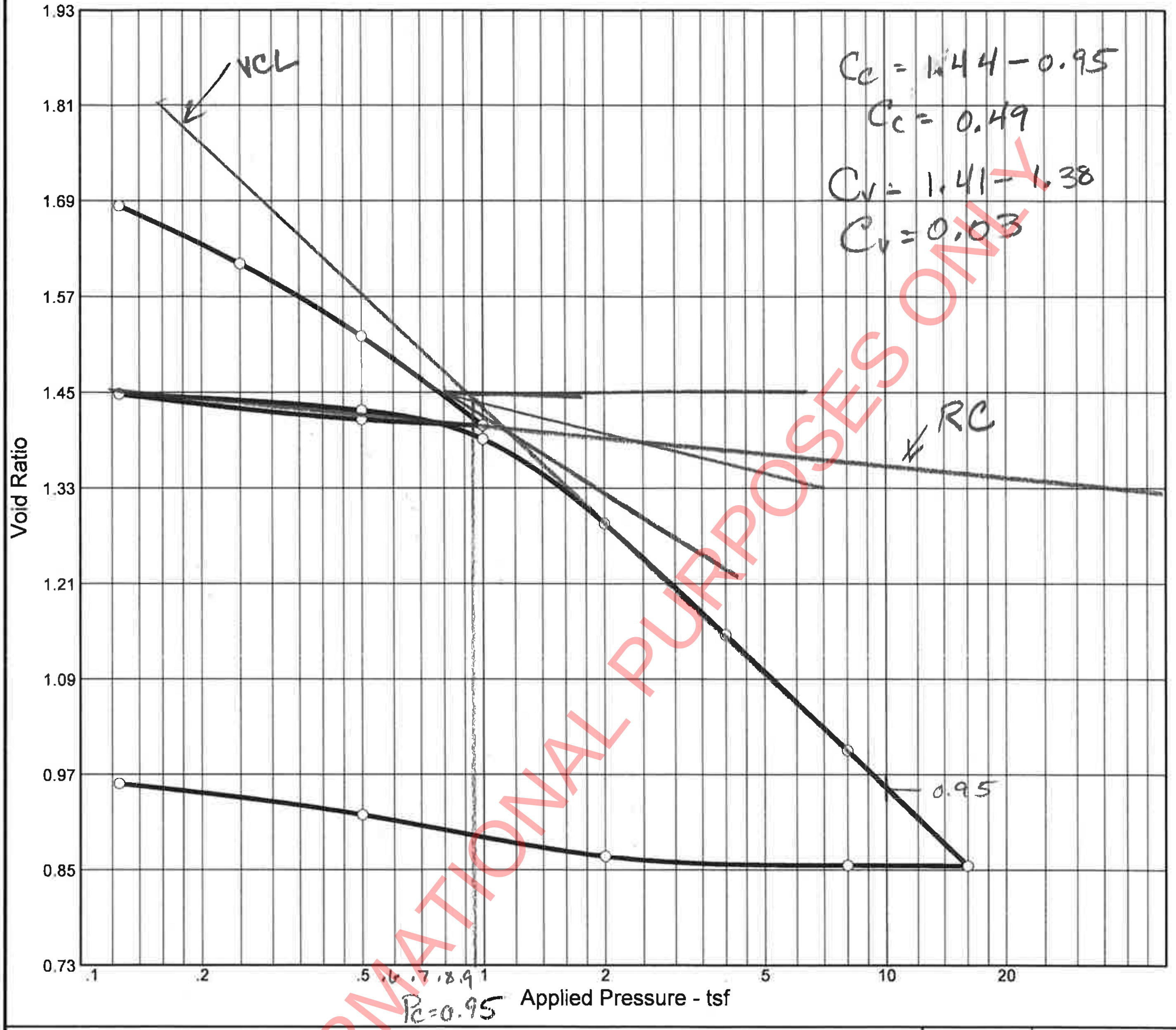
Remarks:

Checked By:

Title:

Figure CONS

CONSOLIDATION TEST REPORT



MATERIAL DESCRIPTION	USCS	AASHTO
SILTY CLAY, SOME F/M SAND	MH	A-7-5(32)

LL	PI	Sp. Gr.	Overburden (tsf)	Dry Dens. (pcf)		Moisture		Saturation		Void Ratio		P_c (tsf)	C_c
				Init.	Final	Init.	Final	Init.	Final	Init.	Final		
83	40	2.52	1.00	58.0		70.9 %	80.0 %	104.2 %	100.0 %	1.714	0.959	0.81	0.48

Preparation Process:

Condition of Test:

D2435 Method	C_r	Swell Press. (tsf)	Heave %
	0.05		

Project No. PRPAX17013 **Client:** PHILADELPHIA PORT AUTHORITY

Project: PHILAPORT OFFSITE WAREHOUSE

Source: B-5 **Sample No.:** U-2 **Elev./Depth:** 22-24

CONSOLIDATION TEST REPORT

PENNONI ASSOCIATES INC.

Remarks:

Checked By: DAC 1/16/18

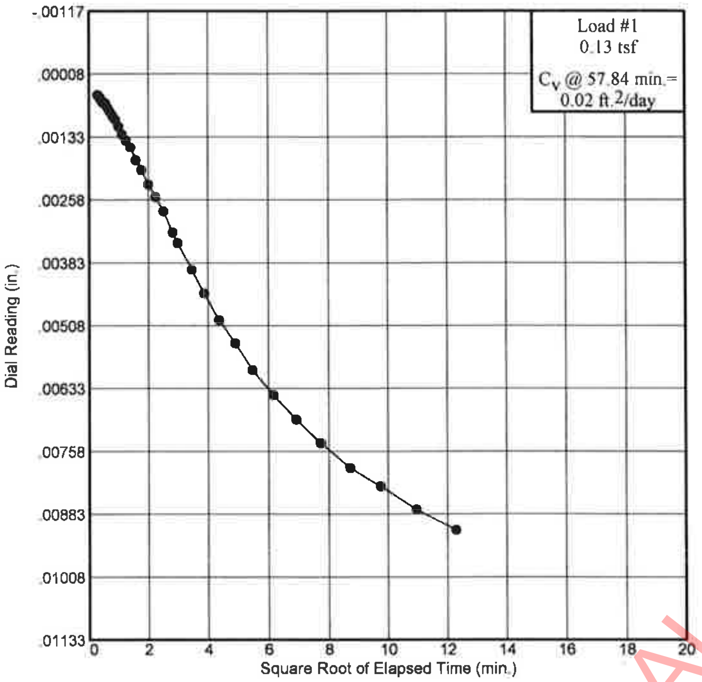
Title:

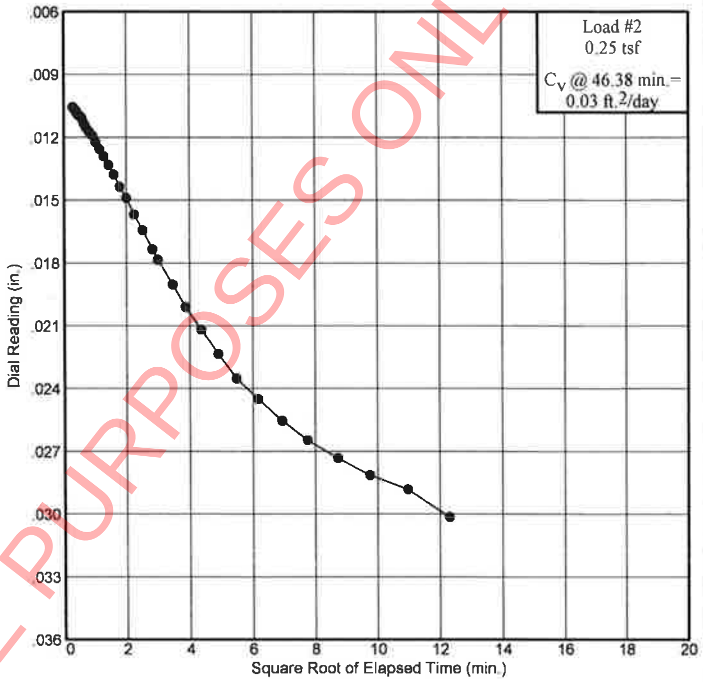
Figure CONS

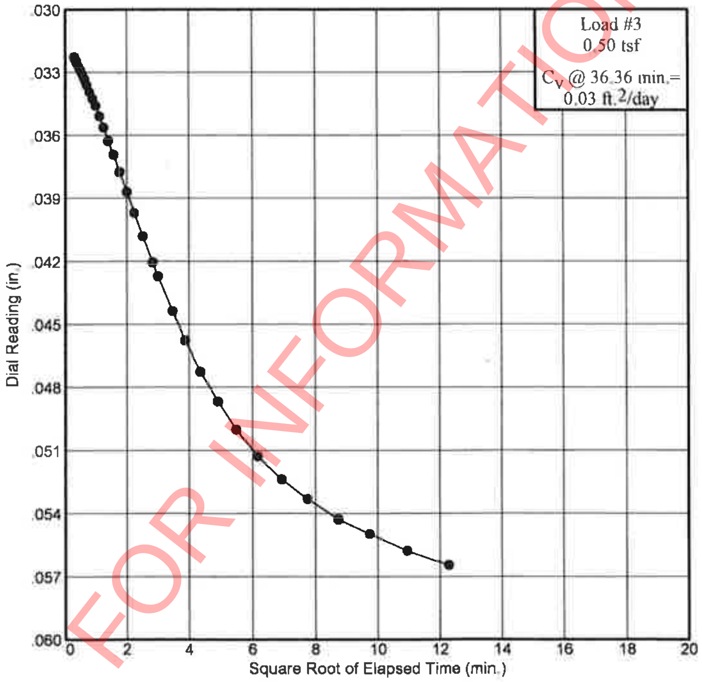
Dial Reading vs. Time

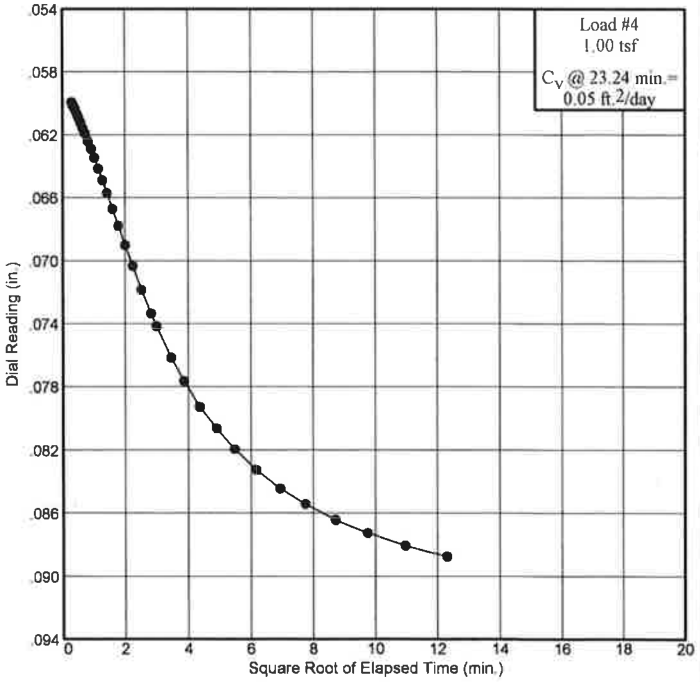
Project No.: PRPAX17013
Project: PHILAPORT OFFSITE WAREHOUSE

Source: B-5 **Sample No.:** U-2 **Elev./Depth:** 22-24









Dial Reading vs. Time

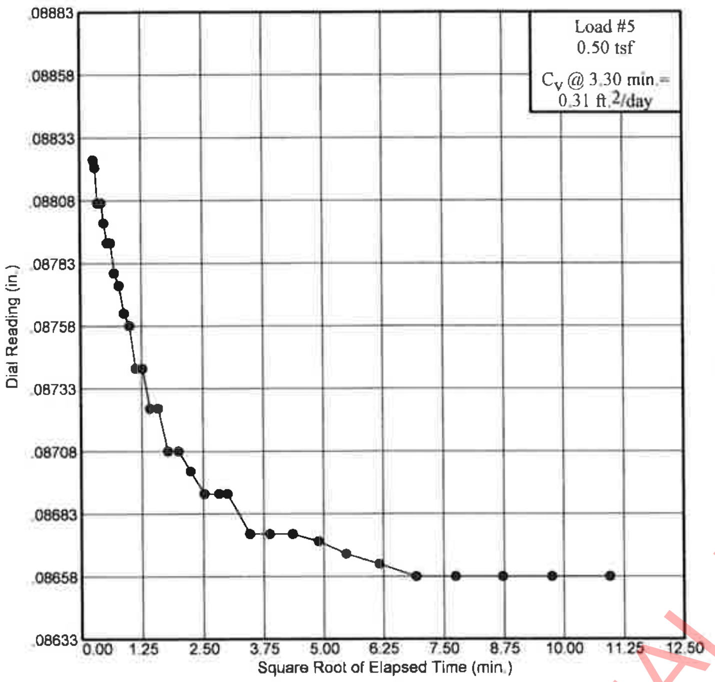
PENNONI ASSOCIATES INC.

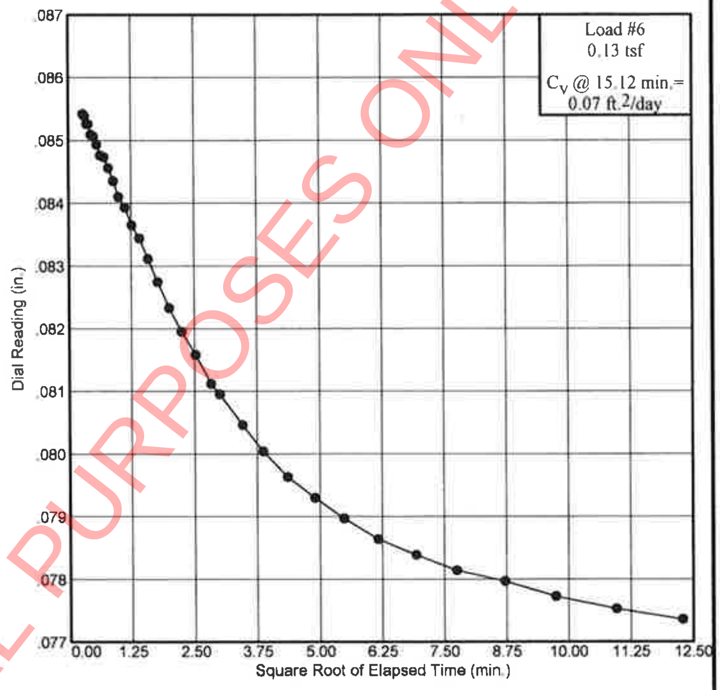
Figure

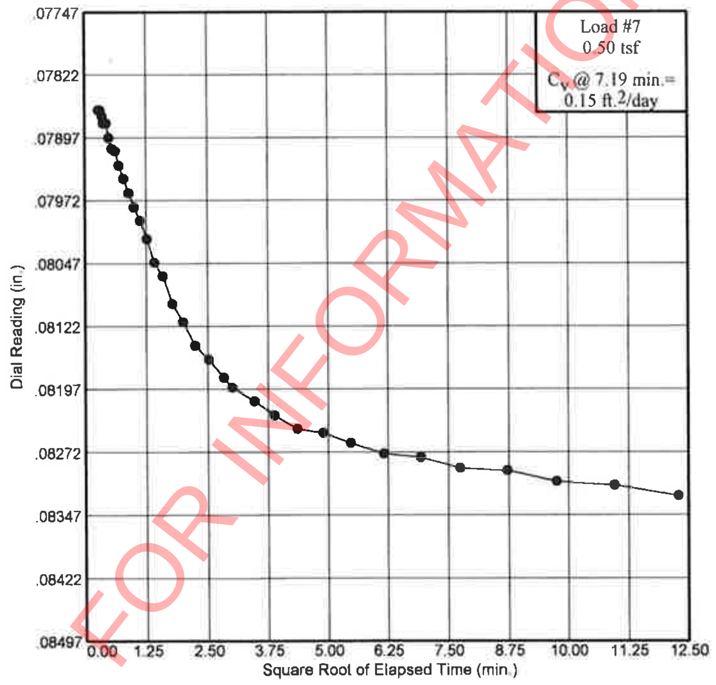
Dial Reading vs. Time

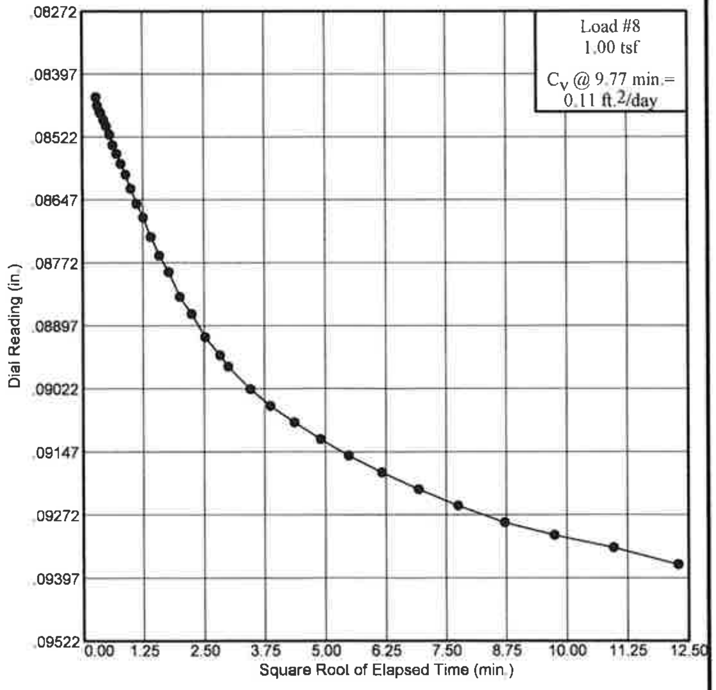
Project No.: PRPAX17013
Project: PHILAPORT OFFSITE WAREHOUSE

Source: B-5 Sample No.: U-2 Elev./Depth: 22-24









Dial Reading vs. Time

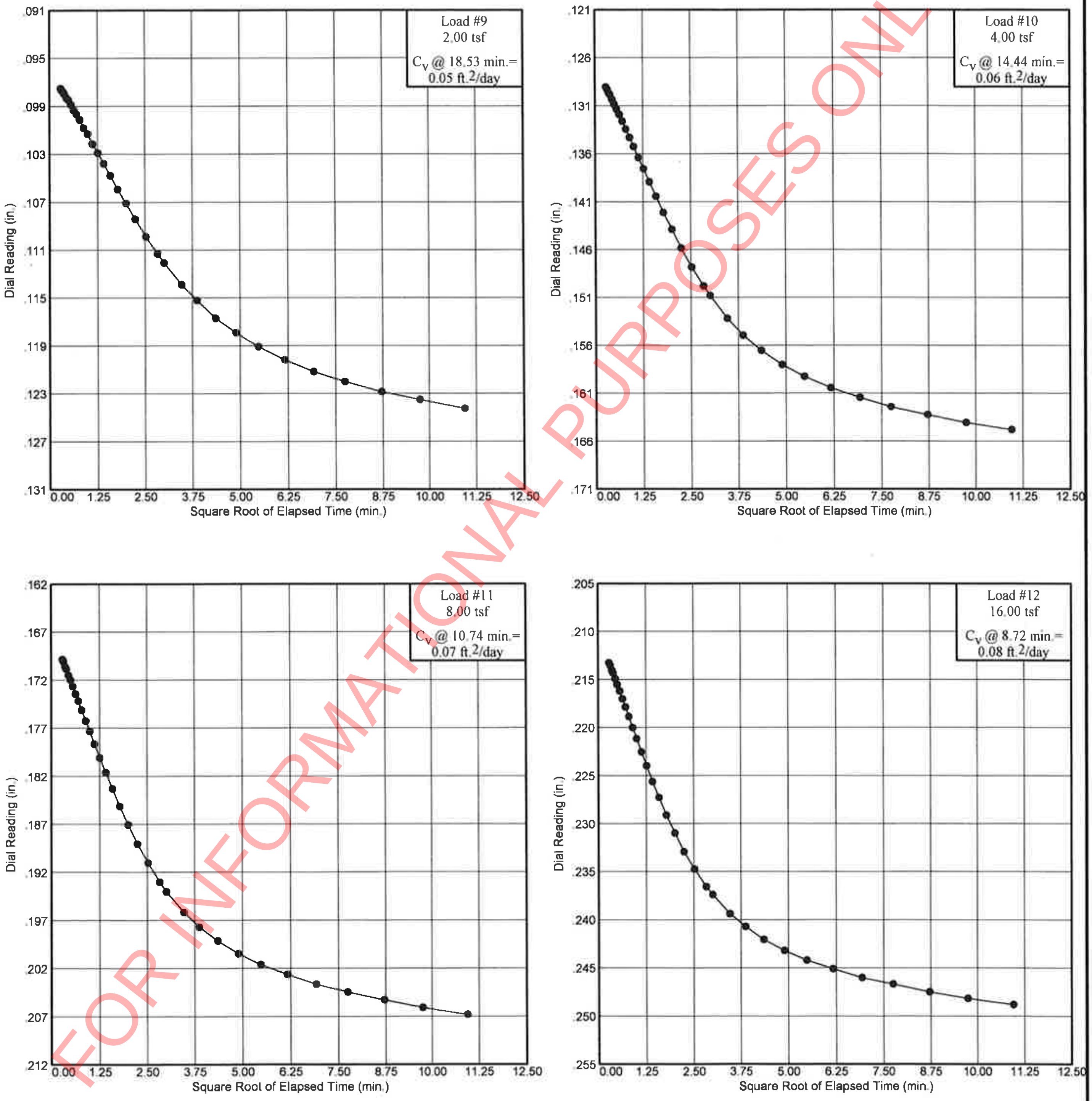
PENNONI ASSOCIATES INC.

Figure

Dial Reading vs. Time

Project No.: PRPAX17013
Project: PHILAPORT OFFSITE WAREHOUSE

Source: B-5 **Sample No.:** U-2 **Elev./Depth:** 22-24



Dial Reading vs. Time

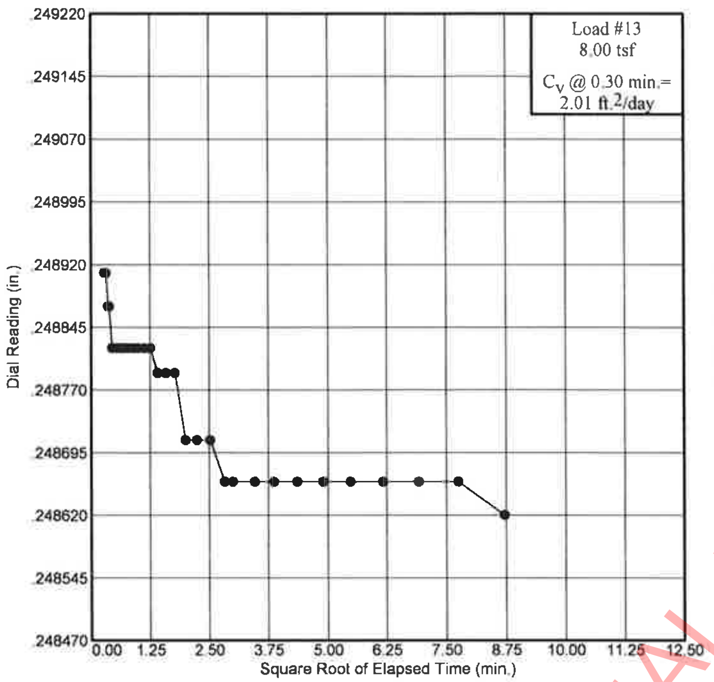
PENNONI ASSOCIATES INC.

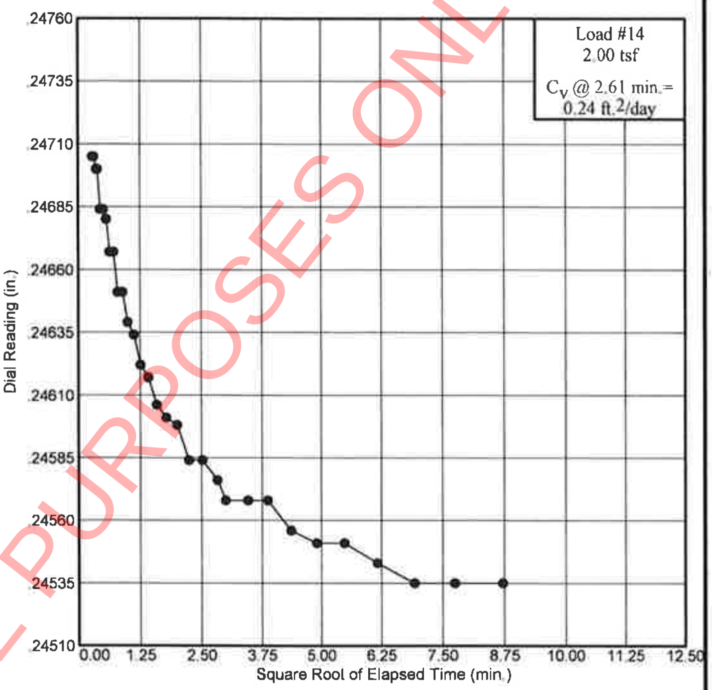
Figure

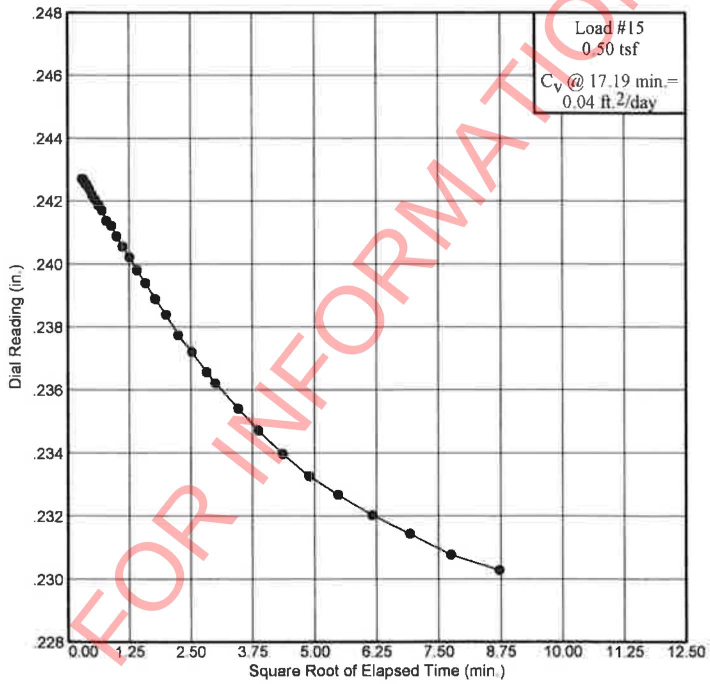
Dial Reading vs. Time

Project No.: PRPAX17013
Project: PHILAPORT OFFSITE WAREHOUSE

Source: B-5 Sample No.: U-2 Elev./Depth: 22-24







Dial Reading vs. Time

PENNONI ASSOCIATES INC.

Figure

LABORATORY TESTING PROCEDURES

All testing is either done in accordance with the indicated ASTM Designation-latest edition, or with other standard or generally accepted engineering practice as described:

1. Consolidation Test of Soils
   Preparation of samples and testing procedures generally follow the methods described in Lambe, op. Cit. In addition, the time of loading may be selected on the basis of:

   a. Controlled rate of percent of consolidation
   b. Controlled pore pressure gradient
   c. Controlled strain

   The method of test is selected to suit the soil type in question and the test is conducted in accordance with generally accepted engineering practice.

2. Atterberg Limits – Plasticity Indices
   a. Liquid limit of soils, ASTM D 4318
   b. Plastic limit and plasticity index of soils, ASTM D 4318
   c. Shrinkage factors of soils, ASTM D 427

   (Moisture content is also determined with the Atterberg Limit test, and liquidity index is also computed)

3. Moisture Content of Soil
   ASTM D 2216

4. Particle Size Analysis of Soils
   ASTM D 421, Dry preparation of soil samples; ASTM D 422, Sieve and/or hydrometer analysis.

5. Triaxial Compression Test of Soils
   Sample preparation, apparatus, and testing generally follow the procedures outlined in Soil Testing for Engineers, T.W. Lambe, John Wiley & Sons, Inc., New York, 1951 and in The Measurement of Soil Properties in the Triaxial Test, Alan W. Bishop & D.J. Henkel, 2nd Edition, St. Martin's Press, New York, 1962

6. Unconfined Compression Strength of Cohesive Soil
   ASTM D 2166

7. Specific Gravity of Soils
   ASTM D 854

8. Unit Weight Determination of Soils
   See ASTM D 2166 for preparation of specimen except that sample size may differ. For moisture content see ASTM D 2216.

9. Visual Identification of Soil Samples
   All soil samples are visually identified and/or classified. The classification system used is shown in Table L-1.

10. Identification of Rock
    Rock core samples are identified by the character and appearance of newly fractured surfaces of unweathered pieces, by core conditions and characteristics, and by the determination of simple physical and chemical properties.

11. Compaction Test of Soils
    a. Moisture-density relations of soils using 5.5 lb. hammer and 12 in. drop, ASTM D 698
    b. Moisture-density relations of soils using 10 lb. hammer and 18 in. drop, ASTM D 1557

12. Maximum and Minimum Densities of Granular Soils
    Testing procedures follow D.M. Burmeister, "Suggested Method of Test for Maximum and Minimum Densities of Granular Soils" cited in Proceedings for Testing Soils, Fourth Edition, ASTM, Philadelphia. 1964, pp 175-177.

13. Bearing Ratio of Laboratory Compacted Soils
    ASTM D 1883 (Sometimes called California Bearing Ratio or CBR)

14. Organic Content
    A modified dichromate oxidation method using ferrous ammonium sulfate is employed in determining the percent of organic matter in soil.

RAUDENBUSH ENGINEERING, INC
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WATER CONTENT DETERMINATION

(ASTM D2216-10) / (AASHTO T265)

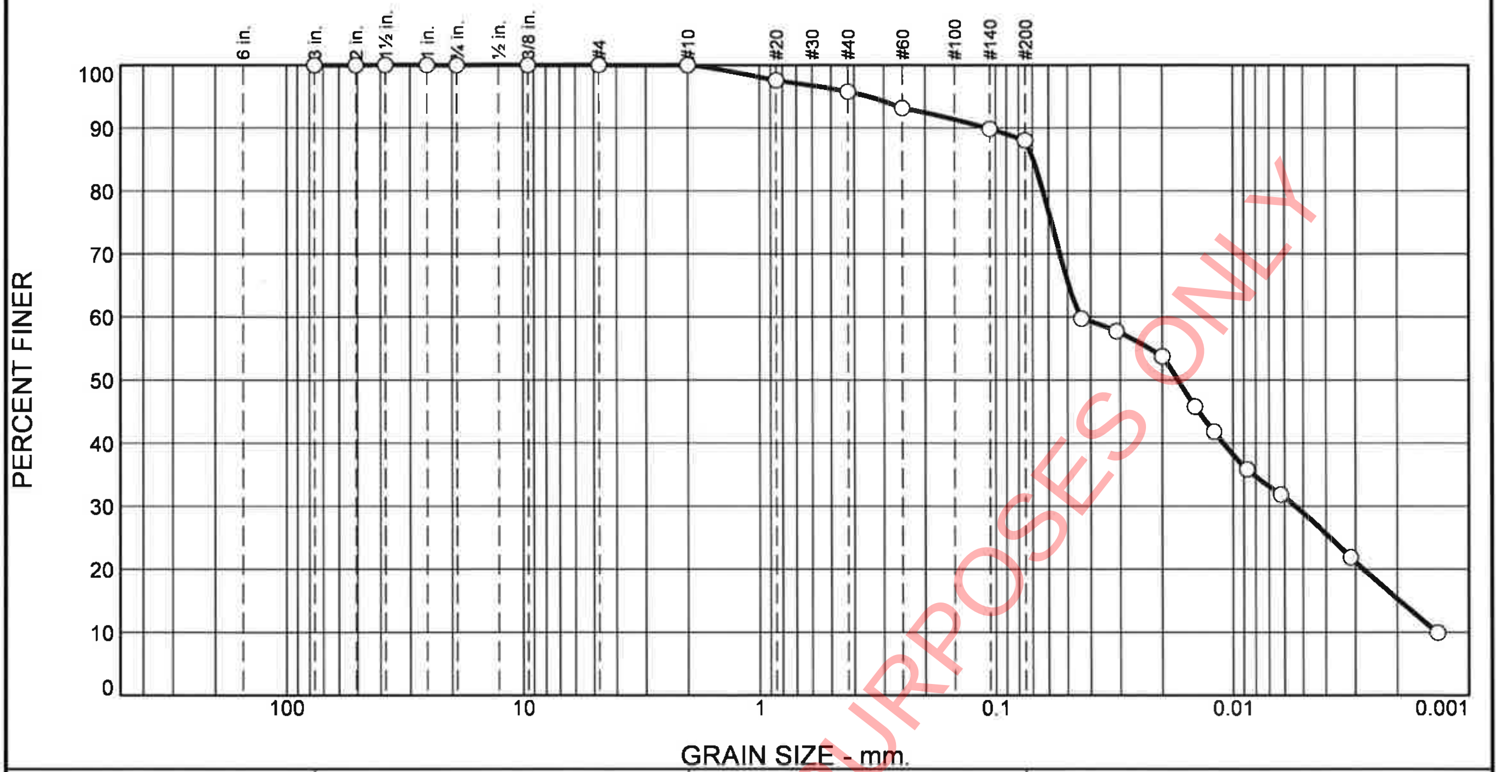
Client:	CH2M	Project #:	M17001-13
Project:	Port Authority Off-Terminal Ph. 1	Test Date:	8/18/2017
Project Location:	Philidelphia, PA	Tested By:	RKL
		Chk'd By:	MDH

Lab Sample No.:	70213	70214	70215	70216	70217
Boring No.:	WH-1	WH-1	WH-1	WH-2	WH-2
Depth (ft):	10.5-13.5	16.0-20.0	49.0-66.0	18.9-26.0	39.0-51.0
Sample No.:	S-6B & S-7T	S-9 & S-10	S-15 & S-16	S-10B & S-11	S-14 to S-16
Water Content (%):	**62.4%**	**52.9%**	**10.5%**	**57.7%**	**13.4%**

Lab Sample No.:	70218	70219	70220	70221	70222
Boring No.:	WH-2	WH-3	WH-3	WH-3	WH-4
Depth (ft):	54.0-61.0	14.0-18.0	29.0-36.0	74.0-76.0	55.0-61.0
Sample No.:	S-17 & S-18	S-8 & S-9	S-12 & S-13	S-21	S-17 & S-18
Water Content (%):	**17.6%**	**19.8%**	**22.3%**	**22.2%**	**17.2%**

Lab Sample No.:	70223
Boring No.:	WH-5
Depth (ft):	49.0-74.9
Sample No.:	S-17 to S-21
Water Content (%):	**17.3%**

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	0.0	4.3	7.7	72.7	15.3

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	100.0		
#20	97.6		
#40	95.7		
#60	93.1		
#140	89.8		
#200	88.0		
0.0437 mm.	59.7		
0.0312 mm.	57.7		
0.0200 mm.	53.7		
0.0146 mm.	45.8		
0.0121 mm.	41.8		
0.0087 mm.	35.8		
0.0062 mm.	31.8		
0.0031 mm.	21.9		
0.0014 mm.	10.0		

* (no specification provided)

Material Description

CLAY and SILT, little Sand

Atterberg Limits (ASTM D 4318)

PL= 34 **LL=** 48 **PI=** 14

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-7-5(16)

Coefficients

D_{90}= 0.1097 D_{85}= 0.0694 D_{60}= 0.0441
D_{50}= 0.0172 D_{30}= 0.0054 D_{15}= 0.0020
D_{10}= 0.0014 C_u= 32.47 C_c= 0.49

Remarks

N.M.C.=62.4%

Date Received: **Date Tested:** 8/23/17
Tested By: RKL
Checked By: DJW
Title:

Source of Sample: WH-1 **Depth:** 10.5'-13.5' **Date Sampled:**
Sample Number: S-6B to S-7T

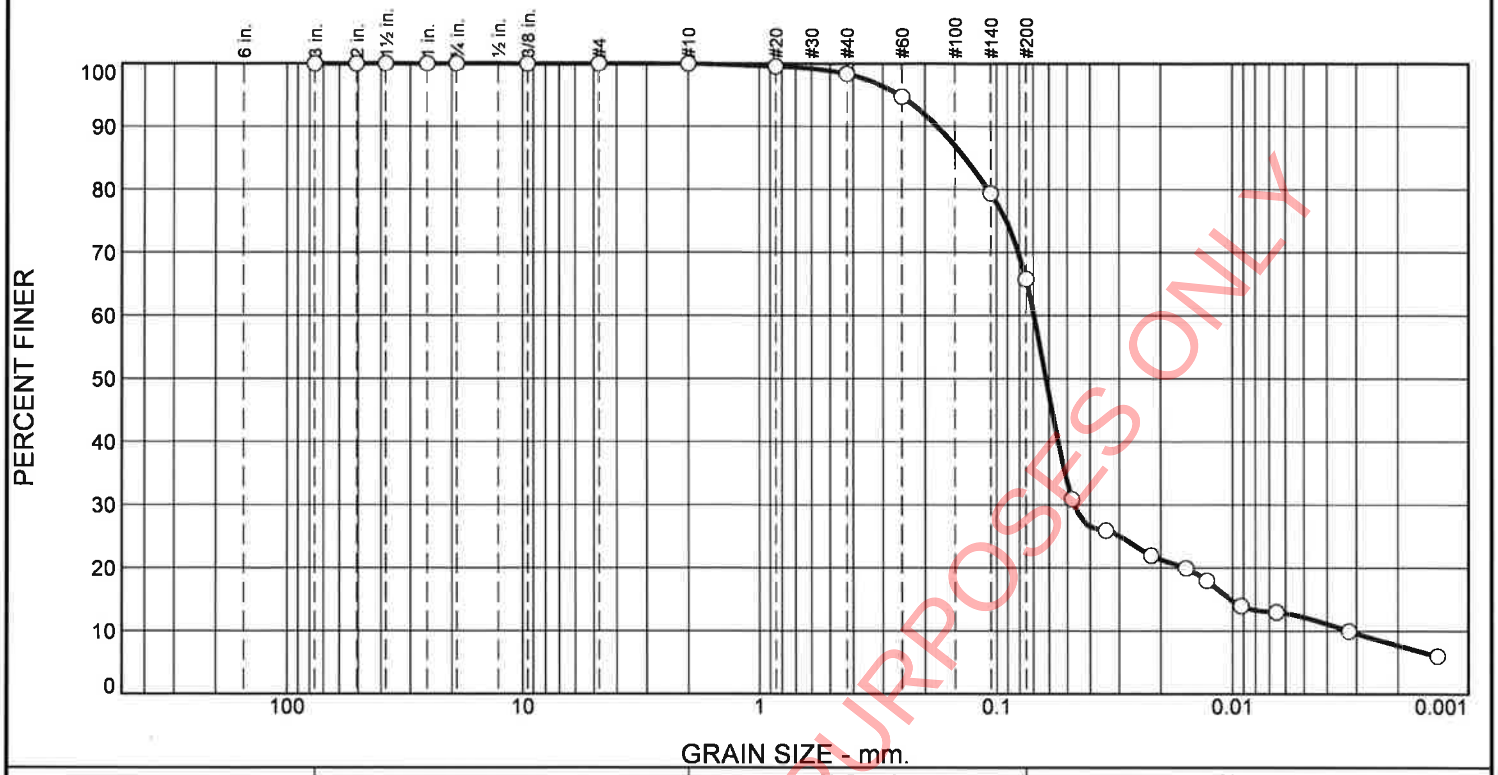
Raudenbush Engineering, Inc.

New Stanton, PA

Client: CH2M
Project: Port Authority - Off Terminal Ph 1
Project No: M17001-13 **Figure**

09/06/2017

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	0.0	1.6	32.7	58.0	7.7

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	100.0		
#20	99.5		
#40	98.4		
#60	94.7		
#140	79.3		
#200	65.7		
0.0478 mm.	30.9		
0.0344 mm.	25.9		
0.0220 mm.	21.9		
0.0157 mm.	19.9		
0.0129 mm.	17.9		
0.0092 mm.	14.0		
0.0065 mm.	13.0		
0.0032 mm.	10.0		
0.0014 mm.	6.0		

* (no specification provided)

Material Description

SILT and CLAY, some Sand

Atterberg Limits (ASTM D 4318)

PL= 30 **LL=** 28 **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.1780 D_{85}= 0.1363 D_{60}= 0.0694
D_{50}= 0.0618 D_{30}= 0.0468 D_{15}= 0.0102
D_{10}= 0.0032 C_u= 21.39 C_c= 9.74

Remarks

N.M.C.=52.9%

Date Received: **Date Tested:** 8/23/17

Tested By: RKL

Checked By: DJW

Title:

Source of Sample: WH-1 **Depth:** 16.0'-20.0' **Date Sampled:**
Sample Number: S-9 & S-10

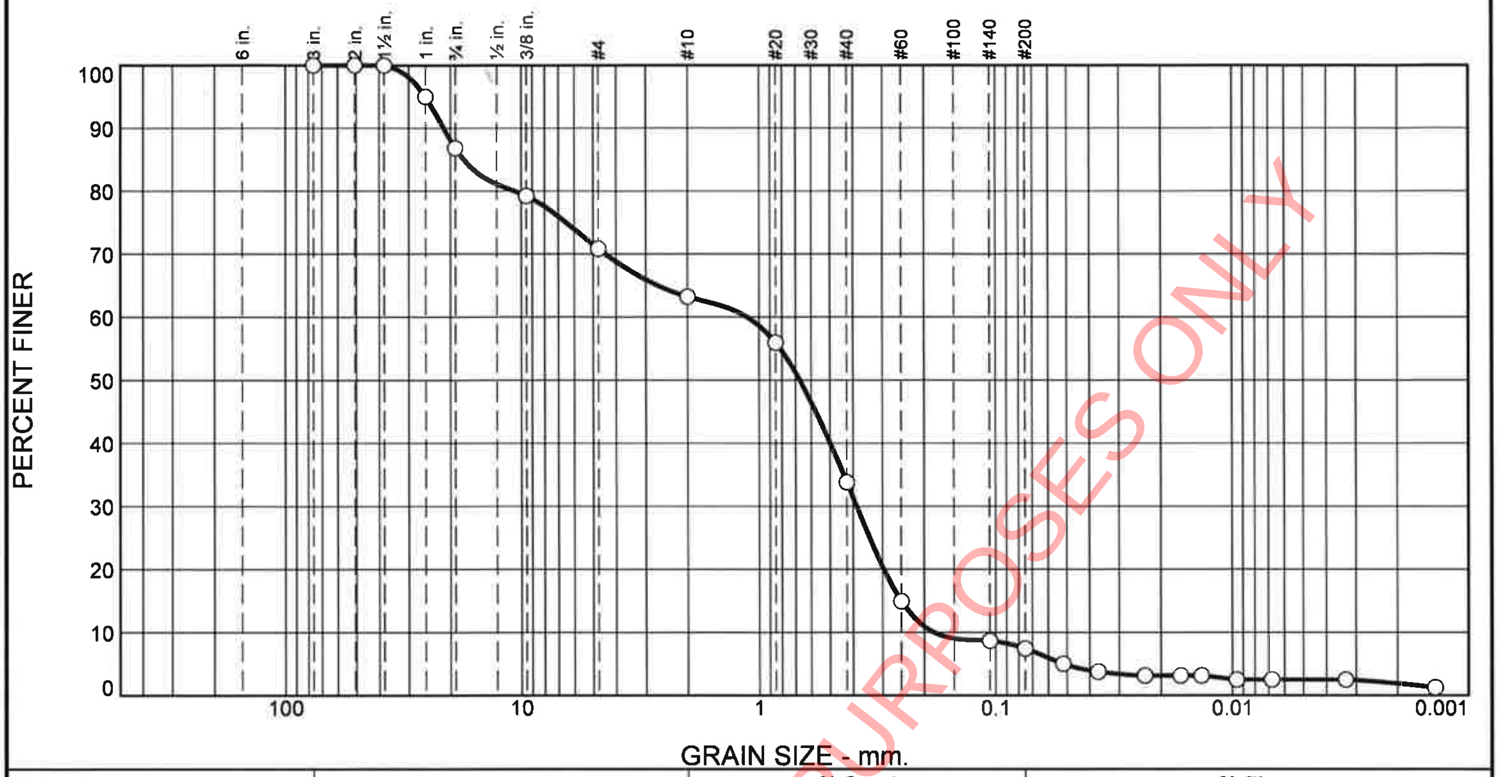
Raudenbush Engineering, Inc.

New Stanton, PA

Client: CH2M
Project: Port Authority - Off Terminal Ph 1
Project No: M17001-13 **Figure**

09/06/2017

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	36.8	29.4	26.4	5.5	1.9

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
2	100.0		
1.5	100.0		
1	95.0		
.75	86.8		
.375	79.2		
#4	70.8		
#10	63.2		
#20	55.9		
#40	33.8		
#60	14.9		
#140	8.7		
#200	7.4		
0.0519 mm.	5.0		
0.0369 mm.	3.8		
0.0234 mm.	3.1		
0.0165 mm.	3.1		
0.0135 mm.	3.1		
0.0096 mm.	2.5		
0.0068 mm.	2.5		
0.0033 mm.	2.5		
0.0014 mm.	1.3		

* (no specification provided)

Material Description

SAND and GRAVEL, trace Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NP **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 21.3484 D_{85}= 17.5809 D_{60}= 1.1234

D_{50}= 0.6711 D_{30}= 0.3864 D_{15}= 0.2507

D_{10}= 0.1824 C_u= 6.16 C_c= 0.73

Remarks

N.M.C.=10.5%

Date Received: **Date Tested:** 8/23/17

Tested By: RKL

Checked By: DJW

Title:

Source of Sample: WH-1 **Depth:** 49.0'-66.0' **Date Sampled:**

Sample Number: S-16 to S-19

Raudenbush Engineering, Inc.

New Stanton, PA

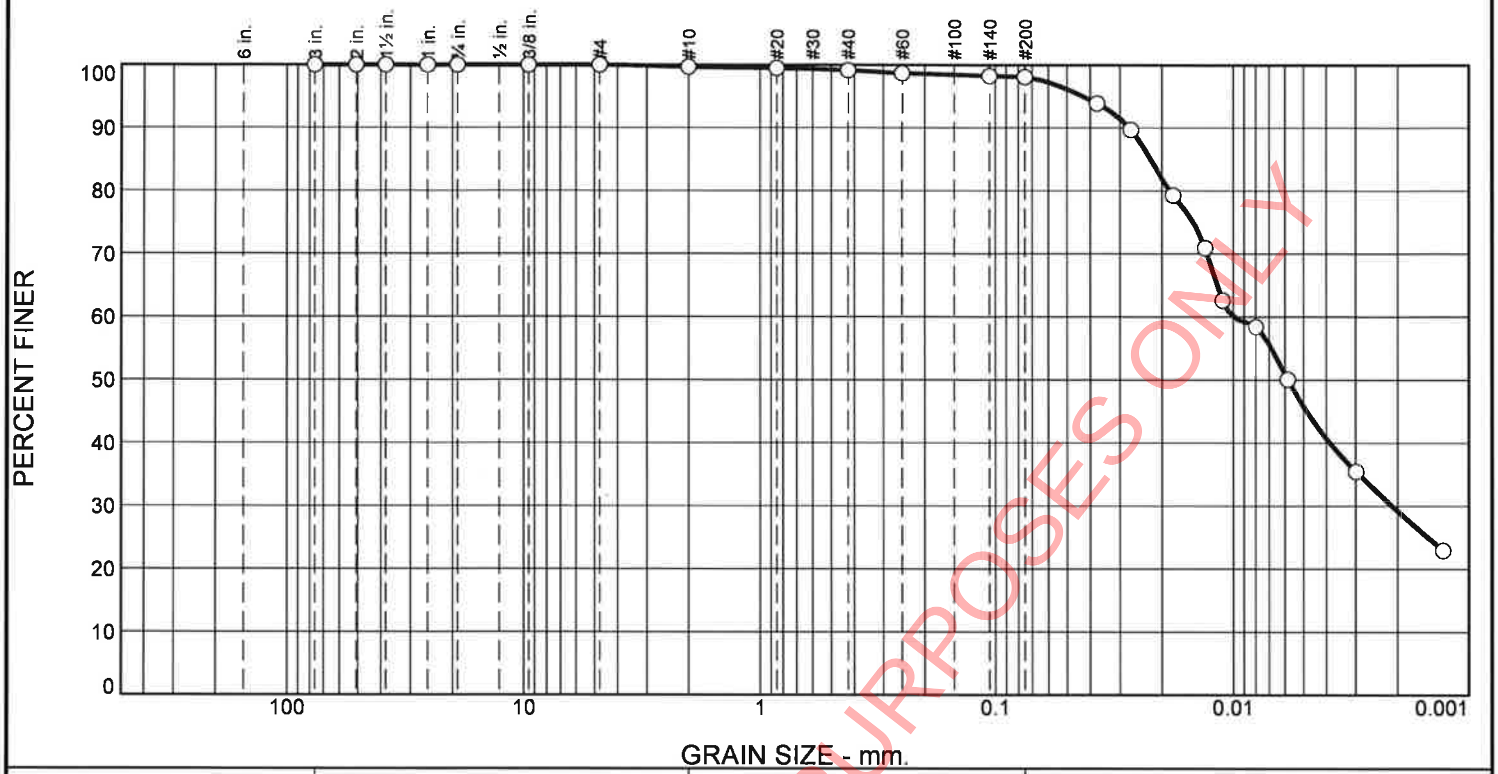
Client: CH2M

Project: Port Authority - Off Terminal Ph 1

Project No: M17001-13 **Figure**

09/06/2017

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	0.3	0.6	1.0	68.9	29.2

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.7		
#20	99.5		
#40	99.1		
#60	98.7		
#140	98.3		
#200	98.1		
0.0375 mm.	93.9		
0.0270 mm.	89.7		
0.0180 mm.	79.3		
0.0132 mm.	70.9		
0.0111 mm.	62.6		
0.0080 mm.	58.4		
0.0058 mm.	50.1		
0.0030 mm.	35.5		
0.0013 mm.	22.9		

* (no specification provided)

Material Description

CLAY and SILT, trace Sand, trace Gravel

Atterberg Limits (ASTM D 4318)

PL= 34 **LL=** 59 **PI=** 25

Classification

USCS (D 2487)= MH **AASHTO (M 145)=** A-7-5(31)

Coefficients

D_{90}= 0.0274 D_{85}= 0.0224 D_{60}= 0.0100
D_{50}= 0.0058 D_{30}= 0.0021 D_{15}=
D_{10}= C_u= C_c=

Remarks

N.M.C.=57.7%

Date Received: **Date Tested:** 8/23/17
Tested By: RKL
Checked By: DJW
Title:

Source of Sample: WH-2 **Depth:** 18.9'-26.0' **Date Sampled:**
Sample Number: S-10B to S-11

Raudenbush Engineering, Inc.

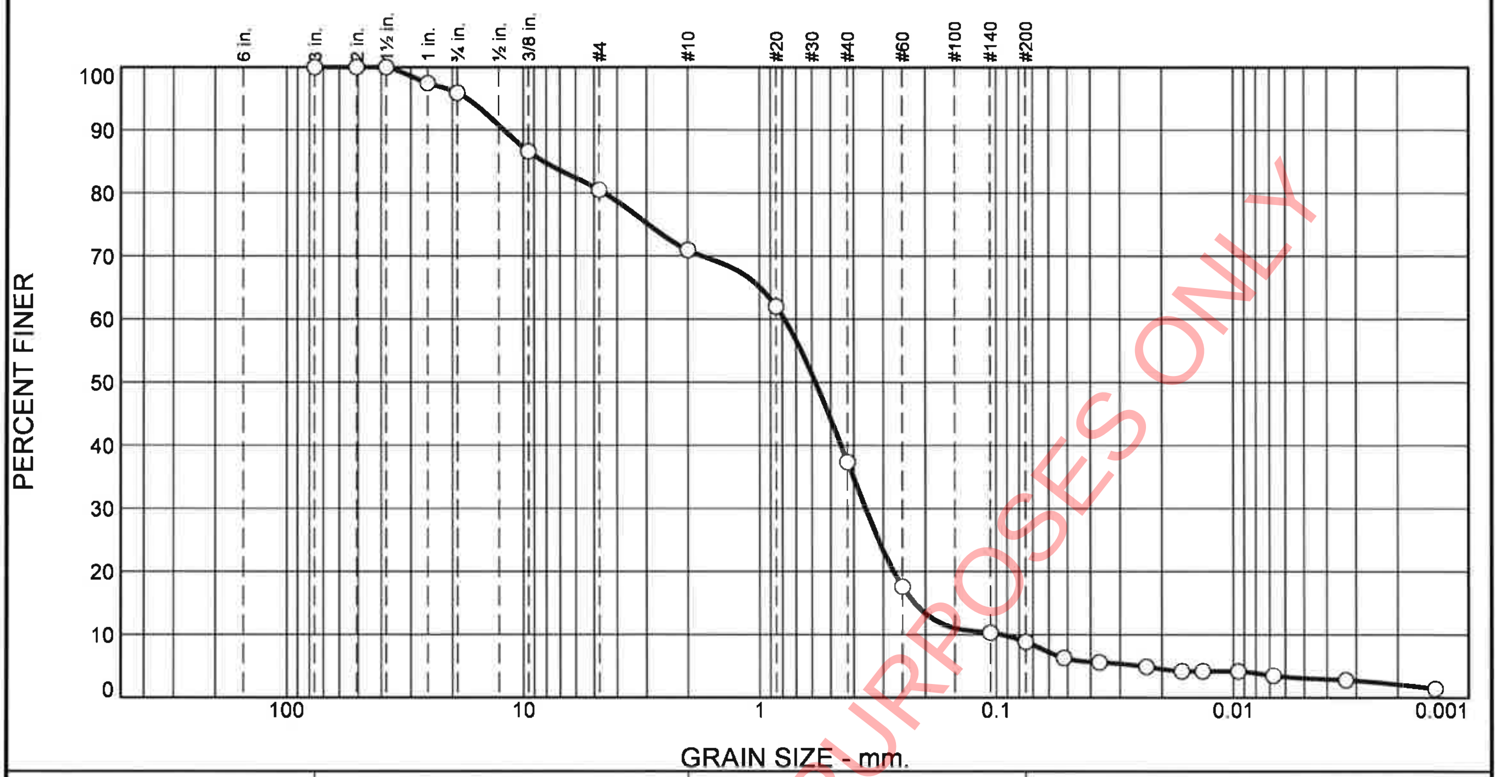
New Stanton, PA

Client: CH2M
Project: Port Authority - Off Terminal Ph 1

Project No: M17001-13 **Figure**

09/06/2017

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	29.0	33.6	28.6	6.7	2.1

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
2	100.0		
1.5	100.0		
1	97.5		
.75	95.9		
.375	86.6		
#4	80.5		
#10	71.0		
#20	62.0		
#40	37.4		
#60	17.6		
#140	10.3		
#200	8.8		
0.0517 mm.	6.3		
0.0367 mm.	5.6		
0.0233 mm.	4.9		
0.0165 mm.	4.2		
0.0134 mm.	4.2		
0.0095 mm.	4.2		
0.0068 mm.	3.5		
0.0033 mm.	2.8		
0.0014 mm.	1.4		

* (no specification provided)

Material Description

SAND, some Gravel, trace Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NP **PI=** NP

Classification

USCS (D 2487)= SW-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 12.0769 D_{85}= 8.2200 D_{60}= 0.7844
D_{50}= 0.5795 D_{30}= 0.3568 D_{15}= 0.2222
D_{10}= 0.0951 C_u= 8.25 C_c= 1.71

Remarks

N.M.C.=13.4%

Date Received: **Date Tested:** 8/23/17
Tested By: RKL
Checked By: DJW
Title:

Source of Sample: WH-2 **Depth:** 39.0'-51.0' **Date Sampled:**
Sample Number: S-14 to S-16

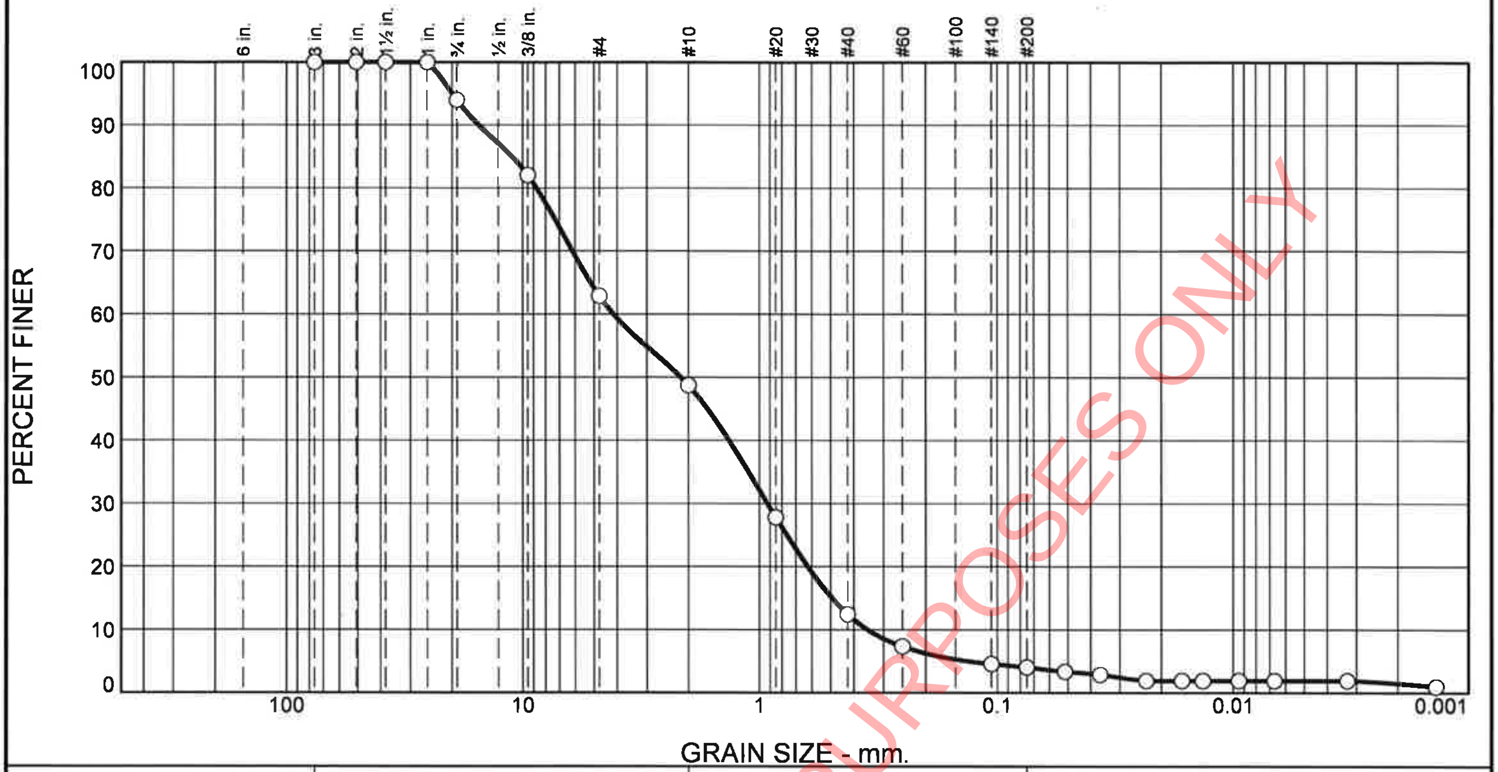
Raudenbush Engineering, Inc.

New Stanton, PA

Client: CH2M
Project: Port Authority - Off Terminal Ph 1
Project No: M17001-13 **Figure**

09/06/2017

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	51.3	36.3	8.4	2.5	1.5

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	94.0		
.375	82.1		
#4	62.9		
#10	48.7		
#20	27.8		
#40	12.4		
#60	7.3		
#140	4.6		
#200	4.0		
0.0514 mm.	3.4		
0.0365 mm.	2.9		
0.0232 mm.	1.9		
0.0164 mm.	1.9		
0.0134 mm.	1.9		
0.0095 mm.	1.9		
0.0067 mm.	1.9		
0.0033 mm.	1.9		
0.0014 mm.	1.0		

* (no specification provided)

Material Description

GRAVEL and SAND, trace Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NP **PI=** NP

Classification

USCS (D 2487)= SP **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 15.3591	D_{85}= 11.0889	D_{60}= 4.1476
D_{50}= 2.1539	D_{30}= 0.9226	D_{15}= 0.4932
D_{10}= 0.3509	C_u= 11.82	C_c= 0.58

Remarks

N.M.C.=17.6%

Date Received: **Date Tested:** 8/23/17

Tested By: RKL

Checked By: DJW

Title:

Source of Sample: WH-2 **Depth:** 54.0'-61.0' **Date Sampled:**

Sample Number: S-17 & S-18

Raudenbush Engineering, Inc.

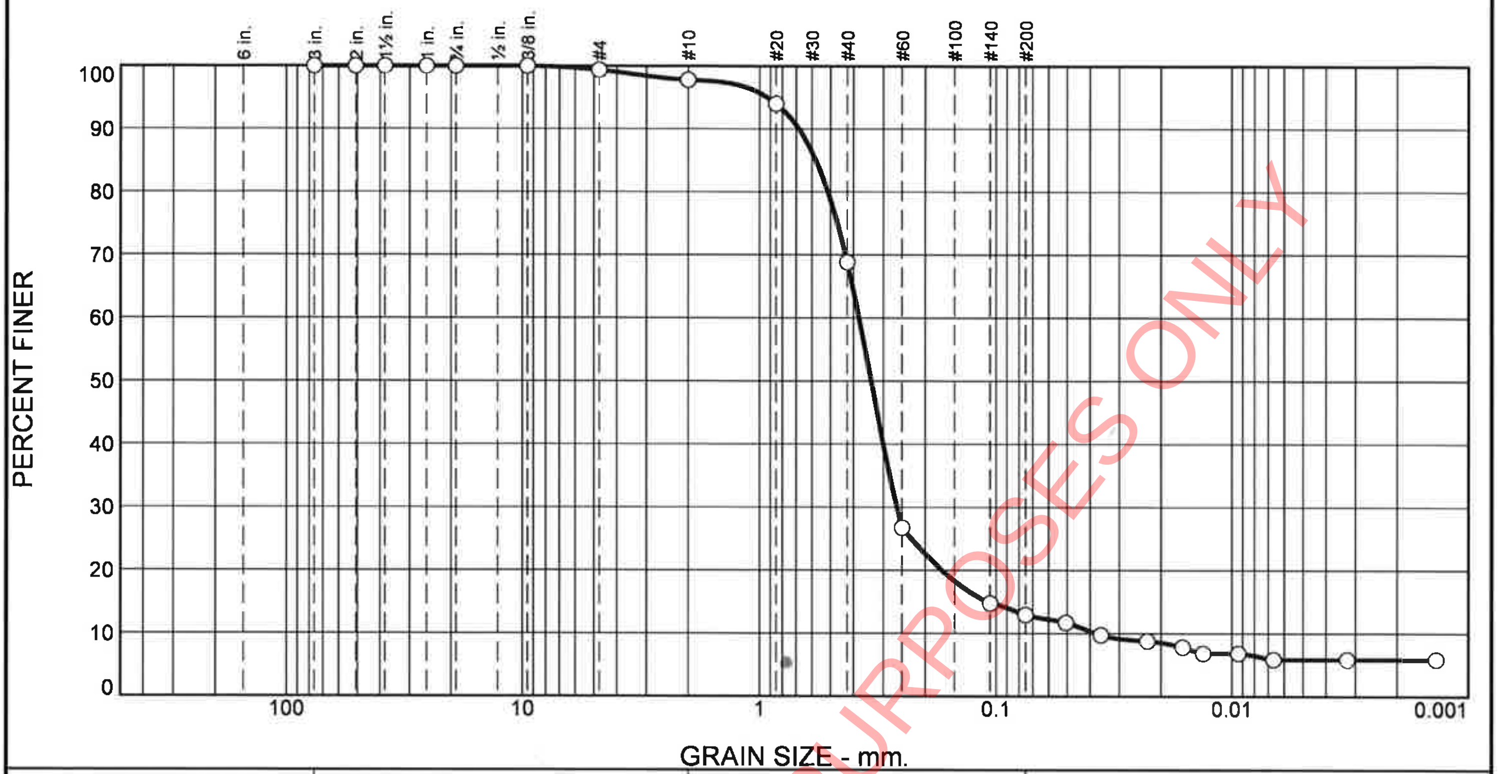
New Stanton, PA

Client: CH2M

Project: Port Authority - Off Terminal Ph 1

Project No: M17001-13 **Figure**

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	2.2	29.0	55.9	7.1	5.8

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	99.4		
#10	97.8		
#20	94.0		
#40	68.8		
#60	26.7		
#140	14.7		
#200	12.9		
0.0506 mm.	11.7		
0.0360 mm.	9.7		
0.0228 mm.	8.8		
0.0162 mm.	7.8		
0.0133 mm.	6.8		
0.0094 mm.	6.8		
0.0067 mm.	5.8		
0.0032 mm.	5.8		
0.0014 mm.	5.8		

* (no specification provided)

Material Description

SAND, little Silt, trace Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NP **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.6810 D_{85}= 0.5769 D_{60}= 0.3795

D_{50}= 0.3376 D_{30}= 0.2632 D_{15}= 0.1095

D_{10}= 0.0378 C_u= 10.04 C_c= 4.83

Remarks

N.M.C.=19.8%

Date Received: **Date Tested:** 8/23/17

Tested By: RKL

Checked By: DJW

Title:

Source of Sample: WH-3 **Depth:** 14.0'-18.0'

Sample Number: S-8 & S-9

Date Sampled:

Raudenbush Engineering, Inc.

New Stanton, PA

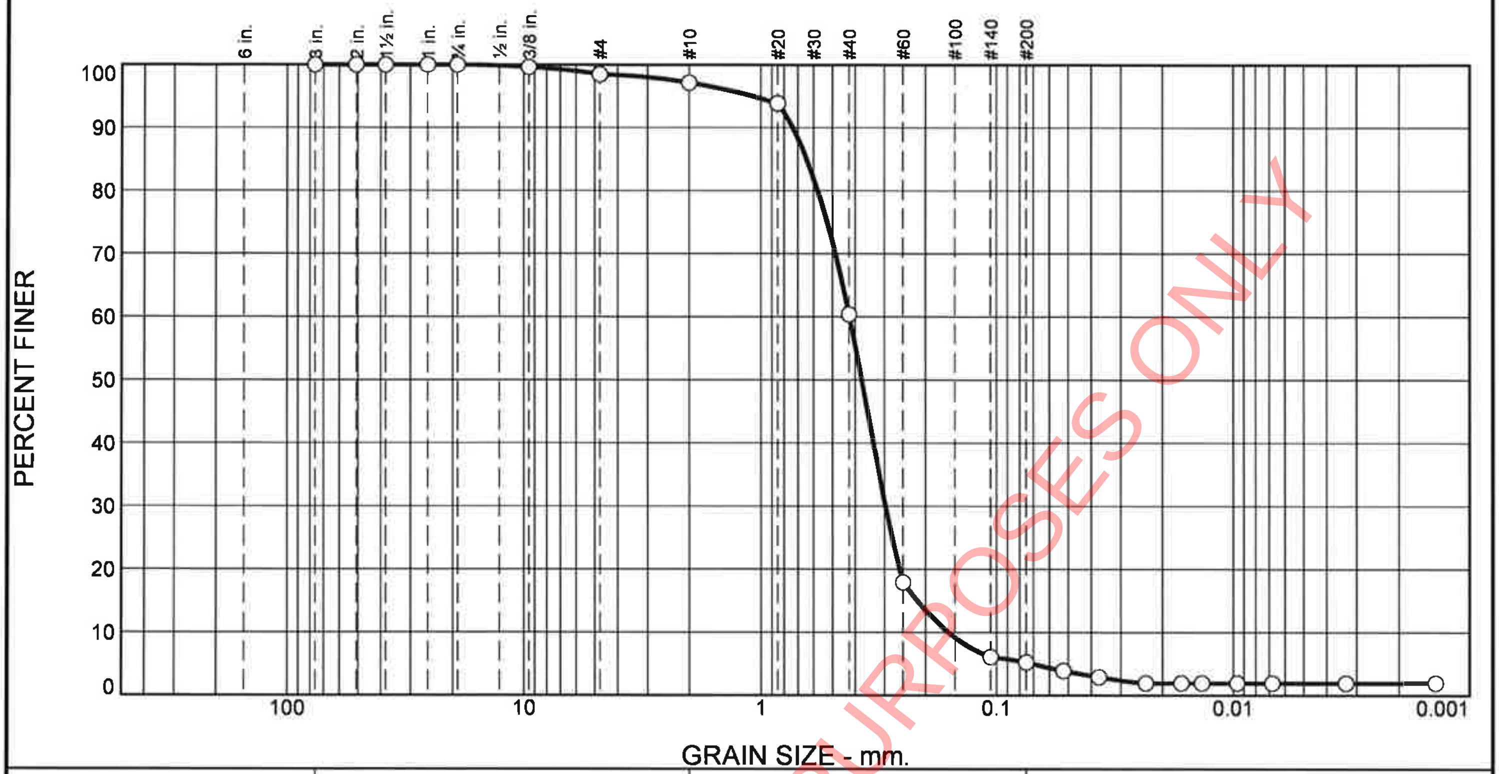
Client: CH2M

Project: Port Authority - Off Terminal Ph 1

Project No: M17001-13 **Figure**

09/06/2017

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	2.8	36.8	55.1	3.4	1.9

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	99.6		
#4	98.5		
#10	97.2		
#20	93.9		
#40	60.4		
#60	17.9		
#140	6.1		
#200	5.3		
0.0524 mm.	3.9		
0.0371 mm.	2.9		
0.0235 mm.	1.9		
0.0167 mm.	1.9		
0.0136 mm.	1.9		
0.0096 mm.	1.9		
0.0068 mm.	1.9		
0.0033 mm.	1.9		
0.0014 mm.	1.9		

* (no specification provided)

Material Description

SAND, trace Silt, trace Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NP **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-3

Coefficients

D_{90}= 0.7349 D_{85}= 0.6419 D_{60}= 0.4230
D_{50}= 0.3751 D_{30}= 0.2969 D_{15}= 0.2172
D_{10}= 0.1598 C_u= 2.65 C_c= 1.30

Remarks

N.M.C.=22.3%

Date Received: **Date Tested:** 8/23/17
Tested By: RKL
Checked By: DJW
Title:

Source of Sample: WH-3 **Depth:** 29.0'-36.0' **Date Sampled:**
Sample Number: S-12 & S-13

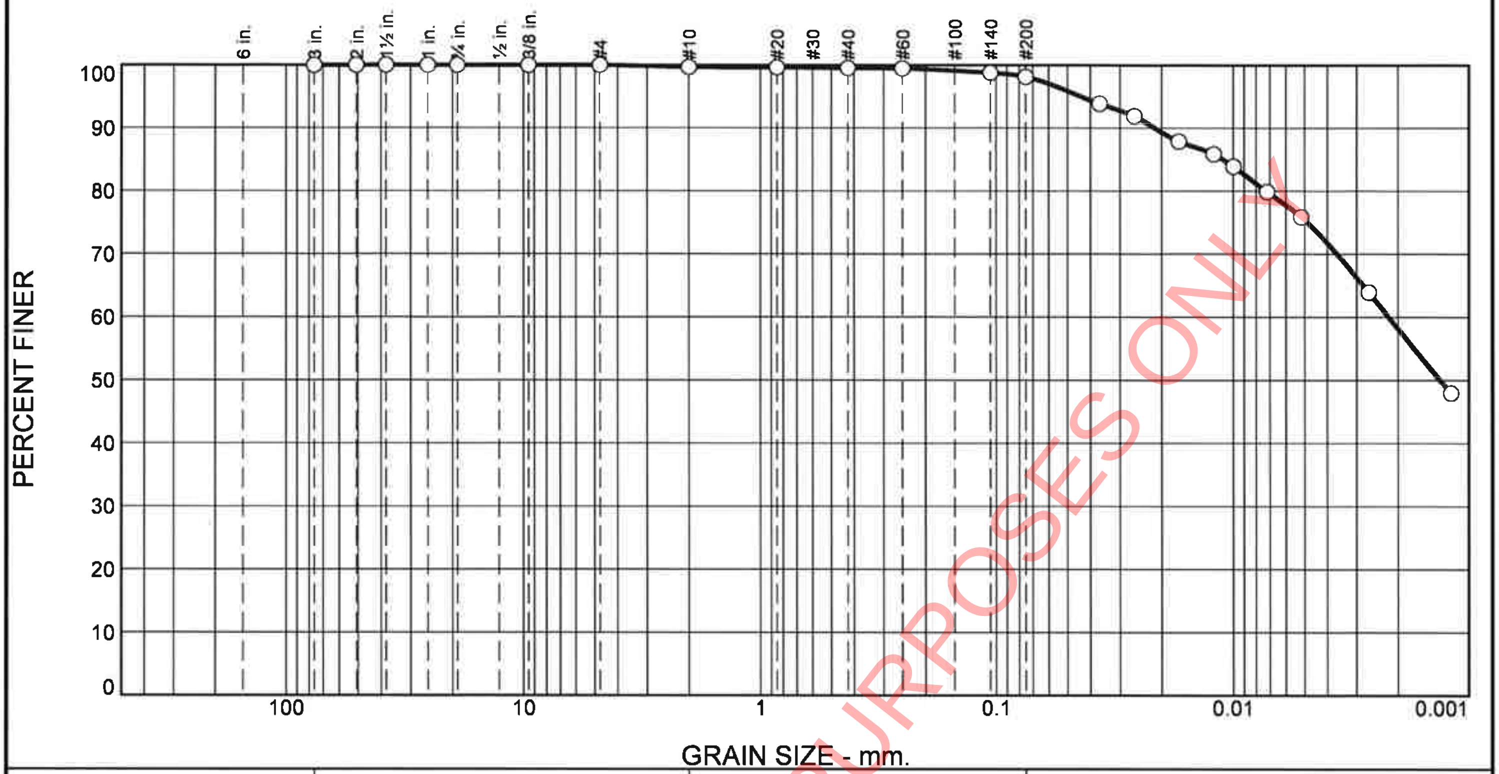
Raudenbush Engineering, Inc.

New Stanton, PA

Client: CH2M
Project: Port Authority - Off Terminal Ph 1
Project No: M17001-13 **Figure**

09/06/2017

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	0.3	0.2	1.4	40.0	58.1

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.7		
#20	99.6		
#40	99.5		
#60	99.5		
#140	98.8		
#200	98.1		
0.0366 mm.	93.9		
0.0262 mm.	91.9		
0.0169 mm.	87.9		
0.0121 mm.	85.9		
0.0100 mm.	83.9		
0.0072 mm.	79.9		
0.0052 mm.	75.9		
0.0027 mm.	63.9		
0.0012 mm.	47.9		

* (no specification provided)

Material Description

CLAY and SILT, trace Sand, trace Gravel

Atterberg Limits (ASTM D 4318)

PL= 22 **LL=** 49 **PI=** 27

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-7-6(30)

Coefficients

D_{90}= 0.0214 D_{85}= 0.0110 D_{60}= 0.0022
D_{50}= 0.0013 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

N.M.C.=22.2%

Date Received: **Date Tested:** 8/23/17
Tested By: RKL
Checked By: DJW
Title:

Source of Sample: WH-3 **Depth:** 74.0'-76.0' **Date Sampled:**
Sample Number: S-21

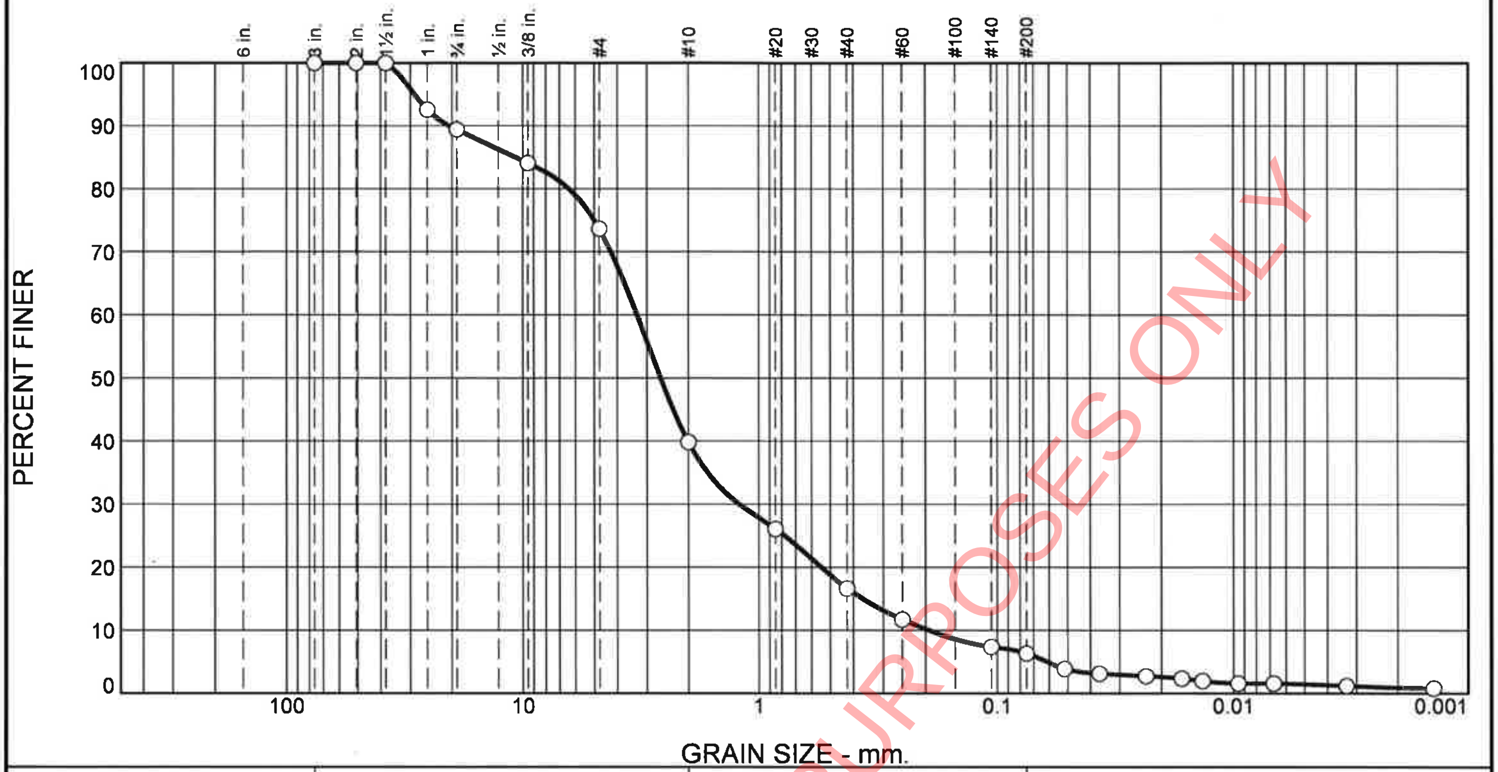
Raudenbush Engineering, Inc.

New Stanton, PA

Client: CH2M
Project: Port Authority - Off Terminal Ph 1
Project No: M17001-13 **Figure**

09/06/2017

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	60.2	23.1	10.4	5.4	0.9

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
2	100.0		
1.5	100.0		
1	92.5		
.75	89.4		
.375	84.1		
#4	73.6		
#10	39.8		
#20	26.1		
#40	16.7		
#60	11.7		
#140	7.4		
#200	6.3		
0.0515 mm.	3.9		
0.0366 mm.	3.1		
0.0232 mm.	2.8		
0.0165 mm.	2.4		
0.0135 mm.	2.0		
0.0096 mm.	1.6		
0.0068 mm.	1.6		
0.0033 mm.	1.2		
0.0014 mm.	0.8		

* (no specification provided)

Material Description

GRAVEL, some Sand, trace Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NP **PI=** NP

Classification

USCS (D 2487)= SW-SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 20.5476	D_{85}= 10.7811	D_{60}= 3.3126
D_{50}= 2.6270	D_{30}= 1.2162	D_{15}= 0.3665
D_{10}= 0.1935	C_u= 17.12	C_c= 2.31

Remarks

N.M.C.=17.2%

Date Received: **Date Tested:** 8/23/17

Tested By: RKL

Checked By: DJW

Title:

Source of Sample: WH-4 **Depth:** 55.0'-61.0' **Date Sampled:**

Sample Number: S-17 & S-18

Raudenbush Engineering, Inc.

New Stanton, PA

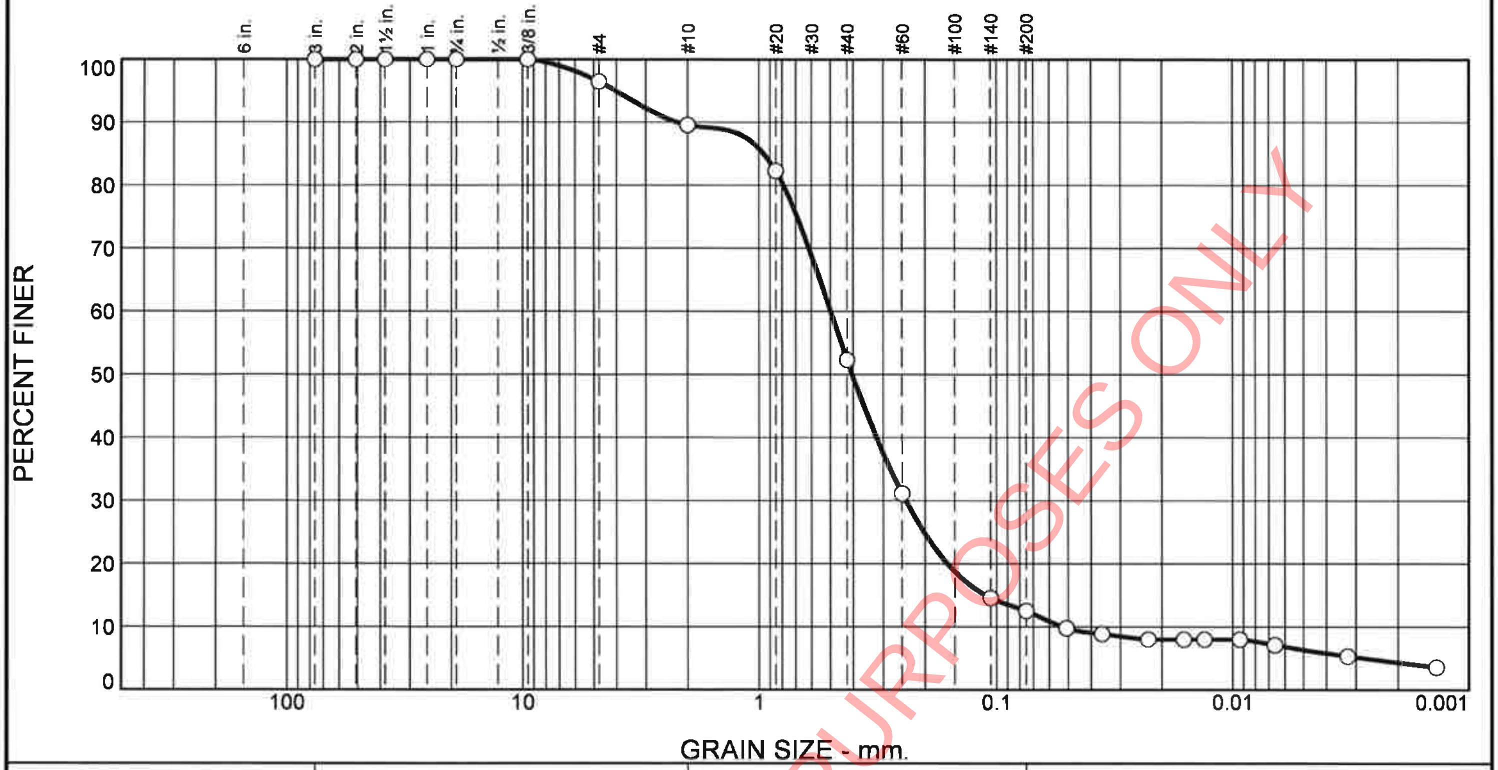
Client: CH2M

Project: Port Authority - Off Terminal Ph 1

Project No: M17001-13 **Figure**

09/06/2017

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	10.4	37.3	39.8	8.2	4.3

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	96.4		
#10	89.6		
#20	82.3		
#40	52.3		
#60	31.1		
#140	14.5		
#200	12.5		
0.0508 mm.	9.8		
0.0360 mm.	8.9		
0.0228 mm.	8.0		
0.0162 mm.	8.0		
0.0132 mm.	8.0		
0.0093 mm.	8.0		
0.0066 mm.	7.1		
0.0032 mm.	5.3		
0.0014 mm.	3.6		

* (no specification provided)

Material Description

SAND, little Silt, little Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NP **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 2.2169	D_{85}= 0.9535	D_{60}= 0.4986
D_{50}= 0.4043	D_{30}= 0.2413	D_{15}= 0.1119
D_{10}= 0.0530	C_u= 9.41	C_c= 2.21

Remarks

N.M.C.=17.3%

Date Received: **Date Tested:** 8/23/17

Tested By: RKL

Checked By: DJW

Title:

Source of Sample: WH-5 **Depth:** 49.0'-74.9' **Date Sampled:**

Sample Number: S-17 to S-21

Raudenbush Engineering, Inc.

New Stanton, PA

Client: CH2M

Project: Port Authority - Off Terminal Ph 1

Project No: M17001-13 **Figure**

APPEDIX C – Standard Symbols

STANDARD SYMBOLS

B	Width of footing
c	cohesion
c_v	coefficient of consolidation
C_c	compression index
C	coefficient of secondary compression
C_3	swelling index
C_u	uniformity coefficient (D_{60}/D_{10})
CBR	California Bearing Ratio
D_f	depth of foundation
D_p	diameter of grain corresponding to percentage p on grain size curve
D_{10}	effective grain size
E	modulus of linear deformation
E_s	Young's Modulus
e	void ratio
F_s	factor of safety
G	specific gravity
h	hydraulic head
H	stratum thickness
i	hydraulic gradient
I_L	liquidity index
I_P	plasticity index
k	coefficient of permeability
k_h	coefficient of horizontal subgrade reaction
k_v	coefficient of vertical subgrade reaction
l	length of footing
n	porosity
P	deviator stress
P_c	estimated probable preconsolidation pressure
P_o	existing overburden pressure
q_a	allowable soil bearing pressure
Q	triaxial compression test unconsolidated and undrained
Q_c	triaxial compression test consolidated and undrained
S	triaxial compression test consolidated and drained
S_r	degree of saturation
υ	pore-water pressure
U	degree of consolidation
U_c	unconfined compression test
w_f	moisture content at end of test
w_l	liquid limit
w_n	natural moisture content
w_p	plastic limit
γ	unit weight
γ_d	dry unit weight
γ_b	submerged unit weight
ε	unit linear strain
ε_f	unit linear strain at failure
σ	normal stress
σ_1	major principal stress
σ_3	minor principal stress
τ	shear stress
ϕ	angle of internal friction
k_a	coefficient of active pressure
k_p	coefficient of passive pressure
δ	friction angle
$\tan \delta$	friction factor

APPEDIX D – Pavement Thickness

TABLE 1 – Pavement Thickness in Borings Performed During 2017 Study

Boring No.	Thickness of Bituminous Concrete (in)	Thickness of Processed Aggregate (in)
B-1	5	7
B-2	5	6
B-3	5	---
B-4	6	---
B-5	5	---
B-6	8	5
B-7	7	---
B-8	5	---
B-9	6	4
B-10	5	---
B-11	4	6*
B-12	4	6*
B-13	7	2
B-14	---	12
B-15	---	---
B-16	---	---
B-17	---	---
B-18	---	---
B-19	---	6
B-20	6	1

*: Noted in boring logs as “Concrete”

**: Sand noted below processed aggregate

TABLE 2 – Pavement Thickness in Test pits Performed During 2019 Study

Test-pit No.	Thickness of Bituminous Asphalt (in)	Thickness of Processed Aggregate (in)
TP-1	4	8
TP-2	4	8
TP-3	4	8
TP-4	4	8
TP-5	4	8
TP-6	2.5	9.5
TP-7	0.5	0.5
TP-8	4	8
TP-9	4	8
TP-10	4	8
P-1**	6	6
P-2**	5	9
P-3	5	8
P-4	4	11
P-5	4	8
P-6**	4	9
P-7	4	10
P-8	4	10
P-9	7	6
P-10**	4	8.5

APPEDIX E – Important Information
About This Geotechnical Engineering Report by GBA

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

GEOTECHNICAL
BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org