Geosyntec consultants

engineers | scientists | innovators

GEOTECHNICAL FACTUAL REPORT

Collinsville – Pittsburg 230 kV

Offshore Investigation

Prepared for

LS Power Grid California, LLC
16150 Main Circle Drive, Suit 310
Chesterfield. MO 63017

Prepared by

Geosyntec Consultants, Inc.
1111 Broadway, 6th Floor
Oakland, California 94607

Project Number: WG3444

Date: 10/30/2024

Geotechnical Factual Report

Collinsville – Pittsburg 230 kV

Offshore Investigation

Prepared for

LS Power Grid California, LLC
16150 Main Circle Drive, Suit 310
Chesterfield, MO 63017

Prepared by

Geosyntec Consultants, Inc.
1111 Broadway, 6th Floor
Oakland, CA 94607

Christopher Hunt, PhD, PE, GE
Senior Principal

David Umberg, PE, GE
Senior Geotechnical Engineer

Project Number: WG3444

Date: 10/30/2024

TABLE OF CONTENTS

1. INTRODUCTION 1
1.1 Purpose and Scope 1
1.2 Report Organization 1

2. GEOLOGIC AND SEISMIC SETTING 2
2.1 Surficial Geology 2
2.2 Seismic Setting 2

3. FIELD INVESTIGATION PROGRAM 3
3.1 Introduction 3
3.2 Preparation 3
3.3 Permits 4
3.4 Offshore Drilling 4
3.5 Drilling and Logging 5
3.6 Sampling Techniques 5
3.6.1 Shelby Tube Sampling 5
3.6.2 Modified California Sampling 5
3.6.3 Standard Penetration Test Sampling 6
3.7 Blow Counts 6

4. LABORATORY TESTING PROGRAM 7

5. SUBSURFACE CONDITIONS 8
5.1 Soil Stratigraphy 8
5.1.1 Unit 1: Poorly Graded Sand with Silt 8
5.1.2 Unit 2: Sandy Lean Clay/Silt to Silty Sand 8
5.1.3 Unit 3: High Plasticity Clay and Silt with Organics 8
5.1.4 Unit 4: Lean Clay/Inelastic Silt 8
5.1.5 Unit 5: Poorly Graded Gravel with Sand 9
5.1.6 Unit 6: Lean Clayey Gravel with Sand 9
5.2 Cross Section 9

6. LIMITATIONS 10

7. REFERENCES 11

LIST OF TABLES

Table 1: Offshore Investigation Summary
Table 2: Geotechnical Laboratory Test Results Summary

LIST OF FIGURES

Figure 1: Site Location Map
Figure 2: Site Layout Map
Figure 3: Surface Geology
Figure 4: Liquefaction Susceptibility
Figure 5: Location of Faults in the Vicinity of the Site
Figure 6: Cross Section A-A' Along Cable 3

LIST OF APPENDICES

Appendix A: Boring Logs
Appendix B: Laboratory Testing Results
Appendix C: Photo Log

ACRONYMS AND ABBREVIATIONS

ASTM	ASTM International
B&V	Black & Veatch
CGS	California Geologic Survey
CH	fat clay
CL	lean clay
Cooper	Cooper Testing Laboratory
DS-CD	consolidated drained direct shear test
DS-CU	consolidated undrained direct shear test
GC	clayey gravel
Geosyntec	Geosyntec Consultants, Inc.
GP	poorly graded gravel
GPS	global positioning system
Gregg	Gregg Drilling, Inc
LS Power	LS Power Grid California, LLC
MH	elastic silt
ML	silt
Mod-Cal	Modified California sampler
N	SPT blows per foot
N60	SPT blows per foot normalized to 60% energy ratio
NSHM	National Seismic Hazard Model
NWP	Department of the Army Nationwide Permit
Project	offshore portion of the Pittsburg-Collinsville 230 kV transmission line
Sealaska	Sealaska, Inc.
SM	silty sand
SP	poorly graded sand
SP-SM	poorly graded sand with silt
SPT	Standard Penetration Test
THA	Task Hazard Assessment
TX-UU	unconsolidated undrained triaxial test
USCS	Unified Soil Classification System

USGS	United States Geological Survey

1. INTRODUCTION

1.1 Purpose and Scope

LS Power Grid California, LLC (LS Power) is developing a series of six submarine cables which will cross the Sacramento River to connect the new Collinsville substation to the existing Pittsburg substation, as part of the Collinsville-Pittsburg 230 kV transmission line project (Figure 1). To support the design of the project, LS Power commissioned Gregg Drilling, LLC (Gregg), a subsidiary of Sealaska, Inc. (Sealaska), to perform an offshore investigation on the Sacramento/San Joaquin River.

The investigation comprised a total of 12 geotechnical borings along the cable alignment, with 9 shallow borings, each approximately 20 feet deep below the mudline, and 3 deeper borings to depths of approximately 40, 80 and 100 feet below the mudline. The cable alignment and boring locations are shown on Figure 2. The investigation also included collection of soil samples for geotechnical, environmental, and soil thermal testing. Gregg retained Geosyntec Consultants, Inc. (Geosyntec) to provide geotechnical support during the offshore investigation by logging the soil borings, collecting geotechnical soil samples, coordinating geotechnical laboratory testing, and preparing this geotechnical factual report.

This report includes the data collected during the geotechnical investigation, provides a summary of the geotechnical laboratory testing, and presents the findings of the geotechnical investigation. This report is intended to provide data for support of the design of the offshore transmission line (by others) but does not include interpretation of the data. The environmental soil sampling and testing was also performed by Geosyntec, and the results will be presented as part of a separate report. In-situ and laboratory soil thermal testing was performed by Geotherm USA under a separate subcontract with Gregg; discussion of the soil thermal results is outside the scope of this report.

1.2 Report Organization

The remainder of this geotechnical factual report has been organized into the following sections:

- Section 2 describes the geologic and seismic setting;
- Section 3 describes the offshore geotechnical investigation field program;
- Section 4 provides details on the geotechnical laboratory testing;
- Section 5 describes the subsurface conditions that were encountered;
- Section 6 provides limitations relating to the use of this report; and
- Section 7 lists the references used to prepare this report.

Boring logs are included as Appendix A. Geotechnical laboratory test results are included as Appendix B. A photo log is provided as Appendix C.

2. GEOLOGIC AND SEISMIC SETTING

2.1 Surficial Geology

The offshore cable installation will be located in the Sacramento River, downstream of the confluence of the Sacramento and San Joaquin Rivers, and near the Sacramento River's outlet at Suisun Bay (Figure 1).

Based on published geologic mapping (Graymer et al. 2002, Sims et al. 1973), the surficial geology at the northern shore consists of Bay Mud and Delta mud deposited in the Holocene, described as "unconsolidated silt and clay with admixed abundant organic material; local peat, sand, and gravel lenses or discontinuous beds" (Sims et al. 1973). The surficial geology at the southern shore consists of undifferentiated artificial fill. The mapped surface geology near the site is shown in Figure 3.

According to the United States Geological Survey (USGS) (1999), up to approximately 115 million cubic meters of sediment was deposited in Suisun Bay and the surrounding area between 1867 and 1887, most of which was debris from hydraulic mining. However, after 1887, the Suisun Bay area changed to having more sediment erosion than deposition, as a result of the termination of hydraulic mining, along with implementation of flood control and water distribution projects in the Sacramento-San Joaquin watershed.

2.2 Seismic Setting

The site is located in an area with high seismic hazard. Figure 4 illustrates significant active and potentially active faults within an approximate 62-mile (100-km) radius of the Site.

Based on a review of the National Seismic Hazard Model (NSHM) fault sections database published by the USGS (2023), the nearest fault is the Pittsburg-Kirby Hills section of the Great Valley fault zone. This fault is located approximately 2.3 km to the west of the approximate middle of the cable alignment[1]. The second nearest fault is the Los Medanos-Roe Island Fault, located approximately 10.0 km to the west of the site. The Clayton Fault lies approximately 12.0 km to the southeast, the Concord Fault lies approximately 17.2 km to the west, and the Midland section of the Great Valley Fault lies approximately 20.9 km to the east. The site is in close proximity to many other significant faults, including the Mount Diablo Fault, Greenville Fault, Green Valley Fault, Calaveras Fault, and Hayward Fault[2].

Numerous sizeable earthquakes have been recorded in the Bay Area, the most recent of which has been the South Napa Earthquake on August 24, 2014, with a moment magnitude (Mw) of 6.0. The epicenter of the South Napa Earthquake was approximately 42 km northwest of the site.

[1] The middle of cable alignment is assumed to be located at approximately 38.0556 N latitude, 121.8698 W longitude.
[2] All distances provided are relative to the midpoint of the cable alignment. The distance between faults and the submarine cables vary based on location, and some project features may be subject to more intense shaking than others based on their locations.

Another recent earthquake within 50 km of the site is the Mw 5.8 Livermore Earthquake on January 24, 1980.

The northern shore is located in an area that was mapped by USGS as having high susceptibility to liquefaction, while the southern shore was mapped as having very high susceptibility to liquefaction (USGS 2006) (Figure 5). The liquefaction hazard offshore within the Sacramento River channel has not been mapped.

3. FIELD INVESTIGATION PROGRAM

3.1 Introduction

Gregg and Geosyntec performed an offshore field investigation to evaluate the subsurface soil conditions along the 230 kV cable alignment. The investigation consists of drilling twelve borings and collecting soil samples for laboratory testing. The offshore exploration program was developed after reviewing/considering the following:

- Available geological maps.
- Review of the specifications provided for the offshore investigation (Black & Veatch [B&V] 2023). B&V (2023) also specified the location and termination depths of each boring.
- A pre-investigation coordination meeting on 26 June 2024 with LS Power, Gregg, Geosyntec, and Geotherm USA.
- A bathymetric survey of the project area performed between 18 September and 25 October by eTrac Inc.
- Boring access at the time of the investigation, based on weather/wave conditions, ship traffic, and vessel anchoring capabilities.

The depth of the borings ranged between 20 feet and 100 feet below the mud line. During the investigation, Gregg recorded the locations of the borings using the global positioning system (GPS) aboard the drilling vessel. Figure 2 shows the proposed cable alignment, shaded bathymetry, and completed boring locations. Table 1 provides a summary of the boring depths and coordinates.

3.2 Preparation

Prior to drilling, Gregg, Geosyntec, and LS Power reviewed the following with the exploration team:

- Field exploration goals, objectives, and scope;
- Sampling procedure and requirements for laboratory testing;
- Boring logging protocol and sample storage; and
- Gregg's health and safety requirements while performing the investigation.

Field operations were summarized in a daily progress email to the project team.

In addition, Geosyntec prepared a site-specific Task Hazard Assessment (THA) for Geosyntec personnel to address potential hazards associated with the proposed offshore investigation. Once on site, field personnel participated in daily site safety tailgate meetings with Gregg's vessel captain prior to drilling.

3.3 Permits

Prior to the investigation, LS Power procured the following permits and authorizations for the work:

- California State Water Resources Control Board. *Amended Notice of Applicability for Enrollment Under State Water Board General Order for the Corps' Nationwide Permits (Order No. WQ 2021-0048-DWQ*. Effective 25 April 2024.
- *State of California, California State Lands Commission, Survey Permit, General Permit to Conduct Geological Surveys*. Form A4545. Executed 10 June 2024.
- Department of the Army. *Subject: File Number SPN-2022-00157*. Correspondence in reference to authorization under Department of the Army Nationwide Permit (NWP) 6. Dated 12 June 2024 and 5 July 2024.
- *License Agreement Between the City of Pittsburg and LS Power Grid California, LLC, to Use the City's Granted Sovereign Tidelands*. Executed 18 June 2024.

A copy of the permits and approvals were kept on board the vessel during the investigation.

3.4 Offshore Drilling

The offshore investigation was performed from 22 July 2024 to 2 August 2024. Gregg used their purpose built R/V Quin Delta drilling ship with Mobile B-80 drill rig mounted to the vessel. The R/V Quin remained stationed offshore during the investigation, and Gregg used a skiff to provide shore support and to transport Geosyntec, Geotherm USA, and Gregg's drilling staff to and from the Pittsburg Marina on each day of drilling. In shallower water (up to approximately 55 ft deep), two hydrostatically controlled spuds were used to hold the vessel in position during drilling. In deeper water, the vessel was anchored using a 4-point anchor system.

During drilling, a 7-inch outer diameter conductor casing was used through the water column and extending to a depth of approximately 1 to 5 feet below the mudline, to help protect the drill string. The boring was then completed using a 5-inch diameter drill bit attached to NWJ drill rods and advanced with the rotary drilling technique. River water was typically used as the drilling fluid, although drilling mud was occasionally used where needed to prevent caving of the borehole.

As the project location is tidally influenced, the depth between the water surface and mudline was typically measured at both the beginning and end of drilling at each boring. The water depth

was measured using a depth sounding from the R/V Quin, and corroborated by measuring the length of drill string required to reach the mudline.[3]

3.5 Drilling and Logging

Geosyntec field staff completed a boring log for each boring drilled. The boring log was created based on visual-manual observations of soil samples collected from each boring, in accordance with ASTM International (ASTM) D2488. The completed boring log was reviewed by the Geosyntec project manager. Once laboratory test results were received, the data was reviewed and logs were updated where appropriate. Where discrepancies between field logging and laboratory test data occurred, the field staff and project manager reviewed the log and, if necessary, re-evaluated the samples to finalize the boring log. The completed boring logs are included in Appendix A.

3.6 Sampling Techniques

Three types of soil samplers were used during the offshore field investigation program: Modified California samplers (Mod-Cal), thin-walled Shelby tubes, and Standard Penetration Test (SPT) samplers. The sampling methods are summarized below:

- A fixed-head, thin-walled Shelby tube sampler was hydraulically pushed to obtain "relatively undisturbed" samples from subsurface fine-grained soils.
- Mod-Cal samplers were used in all material types to obtain sufficient material for both geotechnical and geothermal laboratory testing (by Geotherm USA). Samples collected using this method were considered "disturbed."
- SPT samplers were generally used in granular soil types. Samples obtained by this method were considered "disturbed."

Samples were identified using "B#-S#", where B# represents the boring number and S# represents the sample number within that boring (e.g., 3-2 represents the second sample collected in Boring 3). The locations and names of samples are noted on the boring logs.

3.6.1 Shelby Tube Sampling

Thin-walled Shelby tube samplers were pushed where soft silt and clay materials were encountered. The tubes were 3 feet long with an outer diameter of 3 inches. The driller advanced the samplers approximately 30 inches by continuous pushing to limit sample disturbance. The maximum hydraulic pressure was recorded over the sample interval. Samples were capped and sealed for storage and transportation. Samples were stored and transported vertically to minimize disturbance.

3.6.2 Modified California Sampling

The Mod-Cal sampler is 3-inch outside diameter and 2.5-inch inner diameter and was used to obtain samples across all soil types encountered during the project. Six-inch long brass liners

[3] The boring logs have not been corrected for changes in water depth that may have occurred between the start and end of drilling at each boring.

were used within the Mod-Cal sampler to collect samples for index testing. The Mod-Cal samplers were advanced to a depth of 24 inches using a 140-pound automatic trip hammer falling through a vertical height of 30 inches. The number of blows required for each 6-inch penetration was recorded on the boring logs. Where clean sand was encountered, a sand catcher was used to improve sample recovery. The brass liners were then individually capped and labeled with postscripts A, B, C, and D, corresponding to the first 6-inches, the second 6-inches, etc., of each Mod-Cal sample interval. The end caps were taped to reduce moisture loss.

In general, Mod-Cal samples were collected at a similar depth as the in-situ geothermal tests performed by Geotherm USA. At the designated depths listed in the offshore investigation specification (B&V 2023), Geotherm USA coordinated with Geosyntec to collect one of the Mod-Cal liners for laboratory geothermal testing, for comparison with the in-situ geothermal testing performed at a similar depth.

3.6.3 Standard Penetration Test Sampling

An SPT sampler with a 2-inch outside diameter and a 1.375-inch inside diameter was used for sample collection in accordance with ASTM D1586. The SPT samplers were advanced 18 inches into the soil by using a 140-pound automatic trip hammer falling through a vertical height of 30 inches. The number of blows required for each 6-inch penetration was recorded on the boring logs. Where clean sand was encountered, a sand catcher was used to improve sample recovery.

3.7 Blow Counts

During SPT sampling, the sum of the number of hammer blows required for the second and third 6 inches of penetration (i.e., between 6 and 18 inches) is known as an SPT N value. These N values are recorded on the boring logs.

The SPT N values are frequently used for correlations with other engineering properties. However, the blow count values are sensitive to the energy of each specific SPT hammer used. Therefore, the SPT blow counts are typically normalized to a standard 60% efficiency which is represented by N60.

Gregg provided the results of the previous energy calibration performed on the automatic hammer used with the Mobile B-80 rig on the R/V Quin. Although the previous energy measurement was performed for a different project, these energy measurements are considered relevant, as we understand that the same automatic hammer and Mobile B-80 drill rig were used on both projects. The previous energy measurement was performed on 11 September 2023. Hammer calibrations were conducted in accordance with ASTM D4633 using dynamic measurements on a mixture of SPT and Mod-Cal samplers collected at 5, 10, 15, 20, and 25 feet below ground surface. The average energy transfer ratio measured during this previous calibration ranged between 83% and 101%, with an average of 92%. The average measured energy transfer ratio was used to estimate the N60 values which are reported on the boring logs.

4. LABORATORY TESTING PROGRAM

Samples obtained during the exploration program were reviewed and selected soil samples were sent to Cooper Testing Laboratory (Cooper) of Palo Alto, California for evaluation of geotechnical properties, including density, Atterberg limits, gradation, and strength. Test samples and test methods were selected based on requirements listed on the offshore investigation specifications (B&V 2023), review of the subsurface conditions, and to provide a representative selection of the materials encountered. A draft test request sheet was prepared and distributed to Gregg and LS Power prior to submitting the samples for geotechnical testing.

The following geotechnical laboratory tests have been performed on samples collected during the field investigations:

- Moisture Content/Dry Density (ASTM D7263b)
- Atterberg Limits via the wet prep method (ASTM D4318)
- Grain Size Distribution (ASTM D6913)
- Sieve Analysis with Hydrometer (ASTM D7928)
- Fines Content via #200 wash (ASTM D1140)
- Organics Content (ASTM D2974)
- Unconsolidated Undrained Triaxial Tests (TX-UU) (ASTM D2850)[4]
- Consolidated Drained Direct Shear Tests (DS-CD) (ASTM D3080)
- Consolidated Undrained Direct Shear Tests (DS-CU) (ASTM D3080 Modified)[5]

The TX-UU, DS-CD, and DS-CU tests were performed on relatively undisturbed Shelby tube samples of fine-grained soil. The DS-CD and DS-CU tests were performed at three confining pressures to develop effective and total stress strength parameters, respectively.

The results of the geotechnical laboratory tests are presented in Appendix B. Table 2 provides a summary of the laboratory results.[6]

---

[4] The offshore investigation specifications (B&V 2023) notes that unconfined compression tests should be performed on soil samples per ASTM D2166. However, given that soil samples were typically saturated, following discussion with LS Power, we performed TX-UU tests instead per ASTM D2850 to provide a better representation of in-situ undrained strength conditions, TX-UU tests were performed at confining pressures similar to the in-situ confining stress.

[5] The offshore investigation specifications (B&V 2023) notes that undrained direct shear tests should be performed via ASTM D6528, however, the cited ASTM test method is for consolidated undrained direct *simple* shear, not direct shear. We understand that the strength properties are intended to be used to evaluate horizontal shearing of soil during the cable installation (via hydroplowing), and have therefore recommended DS-CU strength testing via a modified version of ASTM D3080, following discussion with LS Power.

[6] We recommend that the design engineers review the raw laboratory test results and consider whether different interpretations of strength may be more appropriate than the single values presented in Table 2. For example, a strength corresponding to a different strain may be more appropriate in some cases.

5. SUBSURFACE CONDITIONS

5.1 Soil Stratigraphy

The subsurface soil conditions were evaluated based on field observation and soil samples collected during the investigation. Unified Soil Classification System (USCS) designations are provided in accordance with ASTM D2487 for samples that have been subjected to laboratory testing. These USCS designations are provided below and listed in the boring logs included as Appendix A.

A photo log of the field investigation, including representative photos from the investigation, is included in Appendix C. The subsurface soils can be idealized and categorized into the following soil units[7]:

5.1.1 Unit 1: Poorly Graded Sand with Silt

This soil unit consists of primarily poorly graded sand, ranging from clean sand (USCS: SP) to sand with silt (up to 15% silt) and trace gravel (SP-SM). Where this unit occurs at shallow depth (e.g., in B1 and B6), the soil can be very loose to loose, with N60 values of as low as 0 blows per foot, meaning the sampler was advanced using only the weight of the hammer. Where this unit was encountered elsewhere along the alignment, it was found to be medium dense to very dense.

5.1.2 Unit 2: Sandy Lean Clay/Silt to Silty Sand

This soil unit consists of sandy silt to silty sand (USCS: SM to ML), along with some sandy lean clay (CL). This soil unit is characterized as having a significant fraction of both low-plasticity fines and sand, ranging from approximately 20% to 85% sand by weight. In some areas, this unit was also observed to have trace organics. Atterberg limits tests in this unit indicates that the fine-grained material in this unit is non-plastic to low plasticity. Based on blow counts in this unit, the silty sand is typically characterized as medium dense to dense, while the sandy silt is typically characterized as stiff to hard. The silty sand and sandy silt was grouped together in this unit as both material types are expected to exhibit similar behavior type, dominated by the low-plasticity silty matrix.

5.1.3 Unit 3: High Plasticity Clay and Silt with Organics

This soil unit consists of high plasticity fat clay and elastic silt with organics (USCS: CH and MH). The stiffness of this material ranges from very soft to soft. Atterberg limits tests in this unit indicate that the soil has high plasticity, with a plasticity index of up to 61 (at a depth of 12-14.5 feet in B11). The soil in this unit can have up to 38% of sand by volume and up to 18% of organic material.

5.1.4 Unit 4: Lean Clay/Inelastic Silt

This soil unit consists of clay or silt with plasticity ranging from non-plastic to medium plasticity. The soil in this unit can have up to 20% of sand by volume. The stiffness of the soil

[7] Note that the term unit is used here as a convenience to refer to soils with similar descriptions and does not necessarily indicate that the soils are in the same stratigraphic unit.

can range from stiff to very hard. This soil unit often exists as a thin lens between other soil units. The soil in this unit can be classified as CL (lean clay) and ML (silt) by USCS.

5.1.5 Unit 5: Poorly Graded Gravel with Sand

This soil unit consists of primarily poorly graded gravel. This soil unit often has sand mixed in the gravel matrix, along with trace silt and clay. This soil unit exists mainly at deeper depths and is typically very dense. The soil in this unit can be classified as GP (poorly graded gravel) by USCS.

5.1.6 Unit 6: Lean Clayey Gravel with Sand

This soil unit was only encountered between a depth of approximately 85 and 95 feet below the mudline in B11, and consists of clayey gravel (USCS: GC). Sieve analysis on this soil indicates approximately 47% low to medium plasticity clay, 30% gravel, and 23% poorly graded sand. This soil unit was observed to be very dense.

5.2 Cross Section

A cross section of the bathymetry along the Cable 3 alignment is provided as Figure 6. This cross section also shows the approximate subsurface conditions along the alignment by projecting each boring onto the proposed cable alignment and showing an idealized soil profile at each soil boring using the unit descriptions presented above. Due to the large spacing between borings, the subsurface stratigraphy was not interpolated between borings. We anticipate that due to complex alluvial deposition of sediments in the Sacramento River, including potential for repeated changes in the alignment of the river, changes in the river sediment load, and changes in volume and erosive capacity of river flows over time, which would in turn result in changes in the locations and types of sediment during the river's depositional history, there is significant potential for variability between borings.

6. LIMITATIONS

This report has been prepared for the sole use of Gregg and LS Power to support the design of the offshore Collinsville-Pittsburg 230 kV transmission project in the Sacramento River, California. Use by any other party is at their own discretion and risk. The data and observations presented in this report have been formulated in accordance with accepted geotechnical engineering practices in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Conclusions in this memorandum are based upon our review of the soil conditions encountered during the geotechnical site investigation in July and August 2024. Subsurface conditions described in this report are based on subsurface soil conditions at limited exploration locations. Variations in subsurface conditions may exist between exploration locations, and the project team may not be able to identify all adverse conditions along the cable alignment.

Data presented in this report are time-sensitive in that they apply only to locations and conditions existing at the time of the exploration and preparation of this report. Data should not be applied to any other projects in or near the area of this study, nor should they be applied at a future time without appropriate verification.

7. REFERENCES

Black & Veatch. 2023. *Collinsville-Pittsburg 230 kV Transmission Line, Underwater Geotechnical Sampling Services, Technical Specifications*. 1 August.

Bryant, W.A., compiler. 2017. *Fault number 246, Rio Vista fault*, in *Quaternary Fault and Fold Database of the United States:* U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults

California Geological Survey (CGS). 2018. "Earthquake Fault Zones" Special Publication 42.

Cappiella, K., C. Malzone, R. Smith, and B. Jaffe. 1999. *Sedimentation and Bathymetry Changes in Suisun Bay: 1867-1990*. USGS.

Graymer, R. W., D.L. Jones, and E.E. Brabb. 2002. *Geologic map and map database of northeastern San Francisco Bay region, California: Most of Solano County and parts of Napa, Marin, Contra Costa, San Joaquin, Sacramento, Yolo, and Sonoma Counties.* U.S. Geological Survey. USGS Map MF-2403.

Hatem, A.E., C.M. Collett, R.D. Gold, R. Briggs, S.J. Angster, N. Field, M.L. Anderson, J.Y. Ben-Horin, T. Dawson, S.B. DeLong, C.B. Duross, J.A. Jobe, E. Kleber, K.L. Knudsen, R. Koehler, D. Koning, Z. Lifton, I. Madin, J. Mauch, M. Morgan, P. Pearthree, M.D. Petersen, F. Pollitz, K.M. Scharer, P.M. Powers, B. Sherrod, M. Stickney, S. Wittke, J. Zachariasen. 2021. *Earthquake Geology Inputs for the U.S. National Seismic Hazard Model (NSHM)* 2023, version 1.0.

Klotsko, S., J. Maloney, and J. Watt. 2023. *Shallow deformation on the Kirby Hills Fault, Sacramento-San Joaquin Delta, California (USA), Revealed from High-Resolution Seismic Refraction Data and Coring in a Fluvial System*. Geosphere, v. 19, no. 3, p. 748-769.

Sims, J.D., K.F. Fox Jr., J.A. Bartow, and E.J. Helley, compilers. 1973. *Preliminary Geologic Map of Solano County and Parts of Napa, Contra Costa, Marin, and Yolo Counties*. USGS Map MF-484.

U.S. Geological Survey and California Geologic Survey. 2006. *Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California.* USGS Open-File Report 2006-1037, accessed September 17, 2024, at: https://earthquake.usgs.gov/education/geologicmaps/liquefaction.php.

U.S. Geological Survey and California Geologic Survey, *NSHM Fault Sections Database (western U.S.), version 3, December, 2023*, at: https://www.sciencebase.gov/catalog/item/655bebe7d34ee4b6e05cc19f.

TABLES

Table 1: Offshore Investigation Summary

Boring	Date Drilled	Termination Depth (ft)[1]	Elevation of Mudline (ft)[2]	Easting[3]	Northing[3]	Latitude	Longitude
B01	7-31-24	21.5	-20.0	6176062.07	2214738.25	38.069732 N	121.839534 W
B02	7-29-24	22.5	-23.2	6173965.10	2213374.67	38.065905 N	121.846749 W
B03	7-29-24	21.5	-35.0	6173057.00	2212814.72	38.064332 N	121.849875 W
B04	7-26-24	21.5	-63.8	6170444.98	2212059.18	38.062154 N	121.858909 W
B05	7-25-24	21.5	-26.0	6168308.10	2210688.02	38.058303 N	121.866261 W
B06	7-25-24	21.5	-25.0	6166315.72	2208735.28	38.052861 N	121.873080 W
B07	7-24-24	21.5	-35.0	6164504.14	2207262.26	38.048743 N	121.879296 W
B08	7-31-24	21.5	-90.7	6161213.87	2206170.68	38.045612 N	121.890664 W
B09	7-22-24	81.5	-18.2	6159388.95	2204939.73	38.042157 N	121.896937 W
B10	7-23-24	42.0	-45.0	6159592.22	2205673.68	38.044181 N	121.896269 W
B11	7-30-24	101.5	-6.0	6177986.40	2215290.13	38.071323 N	121.832877 W
B12	8-2-24	21.5	-81.1	6161562.71	2206351.60	38.046123 N	121.889463 W

1. Termination depth refers to bottom of lowest sample, in feet below the mudline.
2. Approximate elevation of mudline is based on review of bathymetric survey at the location of each borehole. The bathymetric survey was conducted from September 18, 2023 to October 25, 2023 by eTrac, Inc. Elevations are in feet, in terms of NAVD88 based on GEOID 18.
3. As-drilled boring coordinates provided by Gregg Drilling, using GPS aboard the R/V Quin. The horizontal coordinates are in terms of NAD83, California State Plane Zone 2, in US Feet.

Table 2: Geotechnical Laboratory Test Results Summary

Boring	Sample ID	Depth	Sampler	Moisture and Density		Atterberg Limits			Organic Content	Grain Size Distribution			TX-UU [2]		DS-CU [3]		DS-CD [3]	
				Moisture Content[1]	Wet Unit Weight	LL	PL	PI		% Gravel	% Sand	% Fine	Confining Pressure	Undrained Shear Stress	φ	c	φ'	c'
		(ft)		(%)	(pcf)				(%)	(%)	(%)	(%)	(psf)	(psf)	(degrees)	(psf)	degrees	(psf)
B01	1-2D	6-6.5'	Mod Cal	--	--	NV	NP	NP	--	0.0	91.9	8.1	--	--	--	--	--	--
B01	1-5D	11'-11.5'	Mod Cal	25.4	126.7	--	--	--	--	0.0	91.8	8.2	--	--	--	--	--	--
B02	2-2	2.5'-5'	Shelby	40.5	112.1	40	35	5	--	--	--	--	245	647	--	--	26.8	200
B02	2-3D	6.5'-7	Mod Cal	34.2	119.4	--	--	--	2.5	0.0	26.9	73.1	--	--	--	--	--	--
B02	2-5B	11'-11.5'	Mod Cal	34.4	119.4	--	--	--	--	0.0	32.5	67.5	--	--	--	--	--	--
B02	2-7	20'-22.5'	Shelby	85.6	92.2	90	53	37	7.3	--	--	--	994	546	13.4	400	--	--
B03	3-2	5'-6.5'	SPT	--	--	69	34	35	--	0.0	27.4	72.6	--	--	--	--	--	--
B03	3-3B-C	5.5'-6.5'	Mod Cal	55.2	106.3	52	30	22	--	0.0	25.7	74.3	--	--	--	--	--	--
B03	3-4	7.5'-10'	Shelby	65.0	101.7	--	--	--	8.7	0.2	47.9	51.9	--	--	--	--	--	--
B03	3-6C	16'-16.5'	Mod Cal	47.1	--	--	--	--	5.2	0.0	73.8	26.2	--	--	--	--	--	--
B03	3-7	20'-21.5'	SPT	113.4	--	--	--	--	17.9	0.5	13.9	85.7	--	--	--	--	--	--
B04	4-3C	6'-6.5'	Mod Cal	29.8	123.6	--	--	--	--	0.0	96.2	3.8	--	--	--	--	--	--
B04	4-6C	16'-16.5'	Mod Cal	13.5	--	--	--	--	0.5	14.4	71.8	13.8	--	--	--	--	--	--
B05	5-3C	6'-6.5'	Mod Cal	36.0	118.3	--	--	--	--	0.0	77.4	22.6	--	--	--	--	--	--
B05	5-7C	16-16.5'	Mod Cal	--	--	--	--	--	--	0.0	90.3	9.7	--	--	--	--	--	--
B06	6-4C	11-11.5'	Mod Cal	33.7	118.7	--	--	--	--	0.0	84.7	15.3	--	--	--	--	--	--
B07	7-3	8.5'-11'	Shelby	39.6	112.6	NV	NP	NP		0.0	30.0	70.0	504	1778	32.8	150	--	--
B07	7-5B	15.5-16'	Mod Cal	58.0	104.3	69	33	36		0.4	1.3	98.3	--	--	--	--	--	--
B07	7-6	17.5'-20'	Shelby	26.9	114.2	23	24	NP		0.0	21.6	78.4	749	2882	--	--	--	--
B08	8-2B	6'-6.5'	Mod Cal	29.4	123.7	--	--	--	--	0.0	86.4	13.6	--	--	--	--	--	--
B08	8-4B-C	16'-17'	Mod Cal	--	--	--	--	--	--	77.4	22.2	0.4	--	--	--	--	--	--
B08	8-5	21.25-21.5'	SPT	--	--	39	20	19	--	--	--	--	--	--	--	--	--	--
B09	9-3C	6'-6.5'	Mod Cal	32.9	120.7	--	--	--	--	0.0	10.7	89.3	--	--	--	--	--	--
B09	9-5D	11'-12'	Mod Cal	26.0	126.6	--	--	--	--	0.6	74.4	25.0	--	--	--	--	--	--
B09	9-6B	15.5'-16'	Mod Cal	22.1	131.3	29	18	11	--	0.0	24.5	75.5	--	--	--	--	--	--
B09	9-8	25'-27.5'	Shelby	24.4	116.2	--	--	--	--	0.1	90.5	9.4	--	--	--	--	--	--
B09	9-9C	31'-31.5'	Mod Cal	25.9	126.6	--	--	--	--	0.0	44.3	55.7	--	--	--	--	--	--
B09	9-10B	35.5'-36'	Mod Cal	--	--	44	39	5	--	0.0	7.9	92.1	--	--	--	--	--	--
B09	9-11B+D	40.5'-41' & 41.5'-42'	Mod Cal	19.2	123.0	--	--	--	--	9.8	86.7	3.5	--	--	--	--	--	--
B09	9-13C	51'-51.5'	Mod Cal	--	--	--	--	--	--	78.6	20.8	0.6	--	--	--	--	--	--
B09	9-16	65'-67.5	Shelby	--	--	NV	NP	NP	--	0.0	88.0	12.0	--	--	--	--	--	--
B09	9-17C	70'-71'	Mod Cal	8.5	--	--	--	--	--	52.0	43.6	4.4	--	--	--	--	--	--
B10	10-2	2.5'-5'	Shelby	19.9	--	21	20	1	--	0.0	48.9	51.1	245	2605	--	--	41.2 [4]	200 [4]
B10	10-3C	6'-7'	Mod Cal	17.8	136.5	--	--	--	--	0.1	92.7	7.2	--	--	--	--	--	--
B10	10-7B	20.5'-22'	Mod Cal	11.4	146.1	--	--	--	--	31.7	62.2	6.1	--	--	--	--	--	--
B10	10-9C	20.5-21.5	Mod Cal	17.0	122.0	--	--	--	--	12.6	84.2	3.2	--	--	--	--	--	--

Table 2: Geotechnical Laboratory Test Results Summary

Boring	Sample ID	Depth	Sampler	Moisture and Density		Atterberg Limits			Organic Content	Grain Size Distribution			TX-UU [2]		DS-CU [3]		DS-CD [3]	
				Moisture Content[1]	Wet Unit Weight	LL	PL	PI		% Gravel	% Sand	% Fine	Confining Pressure	Undrained Shear Stress	φ	c	φ'	c'
		(ft)		(%)	(pcf)				(%)	(%)	(%)	(%)	(psf)	(psf)	(degrees)	(psf)	degrees	(psf)
B11	11-3	12'-14.5'	Shelby	118.2	84.7	112	51	61	5.7	0.0	2.9	97.1	--	--	--	--	27.9	0
B11	11-6	25'-27.5'	Shelby	--	--	--	--	--	--	0.0	91.3	8.7	--	--	--	--	--	--
B11	11-12	55.5'-57.5'	Shelby	126.9	88.8	107	84	23	13.6	0.0	7.3	92.7	2506	909	--	--	--	--
B11	11-14	65'-67.5'	Shelby	28.7	118.4	43	23	20	2.3	0.0	12.0	88.0	--		16	500	--	--
B11	11-15A	70'-70.5'	Mod Cal	31.8	121.8	51	26	25	--	0.0	16.5	83.5	--	--	--	--	--	--
B11	11-15D	71.5'-72'	Mod Cal	17.7	136.5	--	--	--	--	1.7	77.2	21.1	--	--	--	--	--	--
B11	11-18C-D	91'-92'	Mod Cal	16.6	129.8	32	18	14	--	30.0	22.7	47.3	--	--	--	--	--	--
B12	12-2C	6'-7'	Mod Cal	32.6	120.2	--	--	--	1.6	0.1	67.8	32.1	--	--	--	--	--	--
B12	12-4B	15.5'-17'	Mod Cal	37.6	117.0	--	--	--	--	0.0	20.1	79.9	--	--	--	--	--	--

Symbols:

--	not tested
φ	total stress friction angle
c	total stress cohesion
φ'	effective stress friction angle
c'	effective stress cohesion
%	percentage
% Gravel	percentage of sample coarser than #40 sieve (by mass)
% Sand	percentage of sample between #200 and #40 sieve (by mass)
% Fines	percentage of sample passing #200 sieve (by mass)

Abbreviations:

ASTM	American Society for Testing and Materials
DS-CD	Consolidated Drained Direct Shear Test (ASTM D3080)
DS-CU	Consolidated Undrained Direct Shear Test (ASTM D3080M)
ft	feet
LL	liquid limit
Mod Cal	Modified California Sampler
NP	non-plastic
NV	no value
pcf	pounds per cubic feet
PI	plasticity limit
PL	plastic limit
psf	pounds per square feet
Shelby	Shelby Tube Sampler
SPT	Standard Penetration Test Sampler
TX-UU	Unconsolidated Undrained Triaxial Compression (ASTM D2850)

Notes:

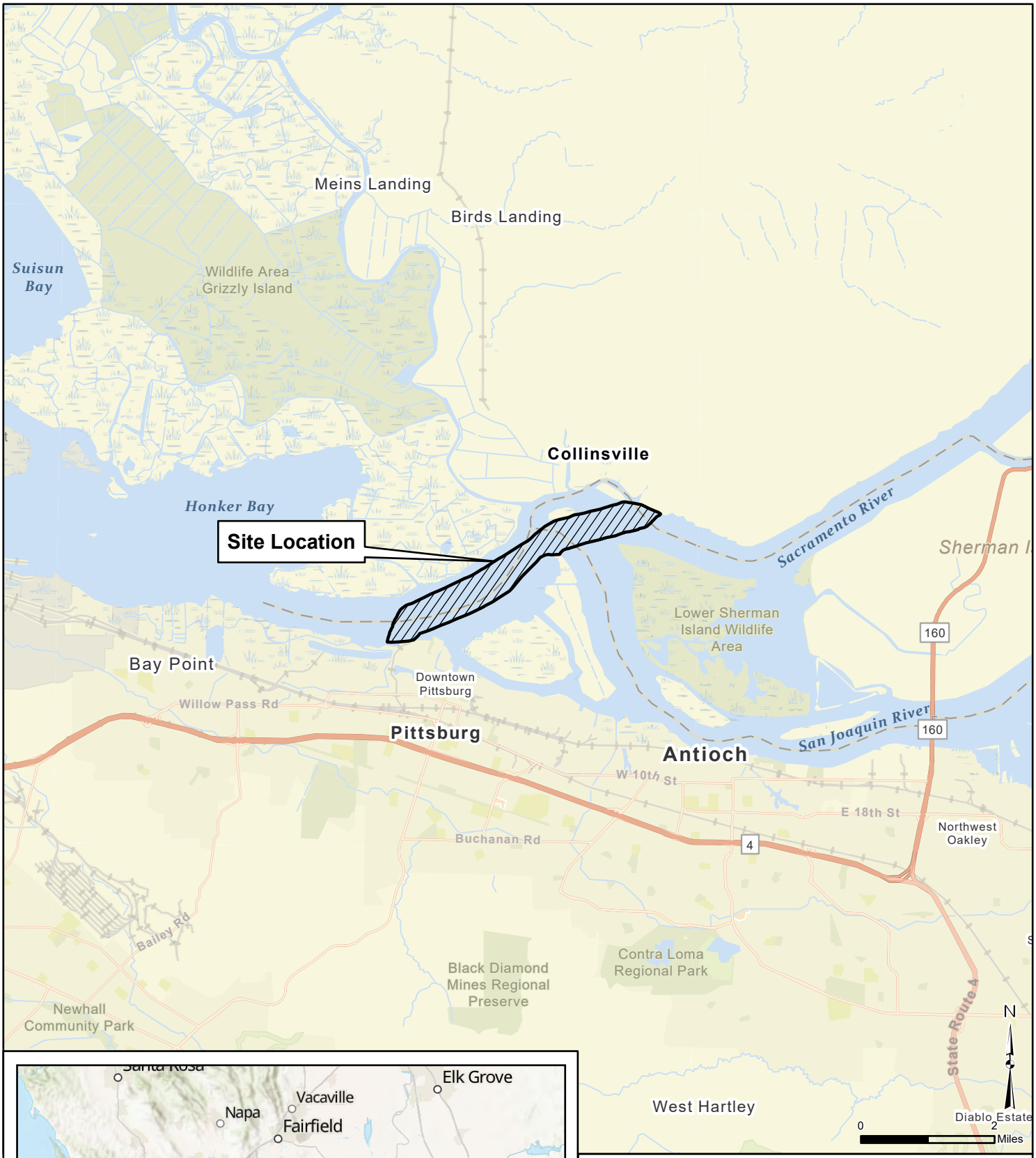
[1] Moisture content and wet unit weights are based on moisture-density measurements (ASTM D7263b) where available; otherwise, these values have been extracted from initial readings from strength or organic content tests.

[2] TX-UU samples were subject to an isotropic confining pressure of slightly higher than the estimated in-situ stress, and back-pressure saturated prior to shear. Undrained shear strength was taken as half the peak deviator stress.

[3] DS-CU and DS-CD tests were vertically consolidated at three selected normal pressures, then sheared at a strain rate of approximately 1.4%/min. for DS-CU and approximately 0.01%/min. for DS-CD. The reported strength parameters (c, φ, c', and φ') represent the total stress and effective stress strength conditions, respectively, for soil sheared along a horizontal plane, based on soil strength at 5% strain. For further details regarding the soil behavior during the direct shear test, refer to the laboratory test reports included in Appendix C.

[4] Due to the high apparent friction angle, no φ' or c' values were reported by the laboratory. Values were added manually by Geosyntec following review of the data, but should be used with caution.

FIGURES



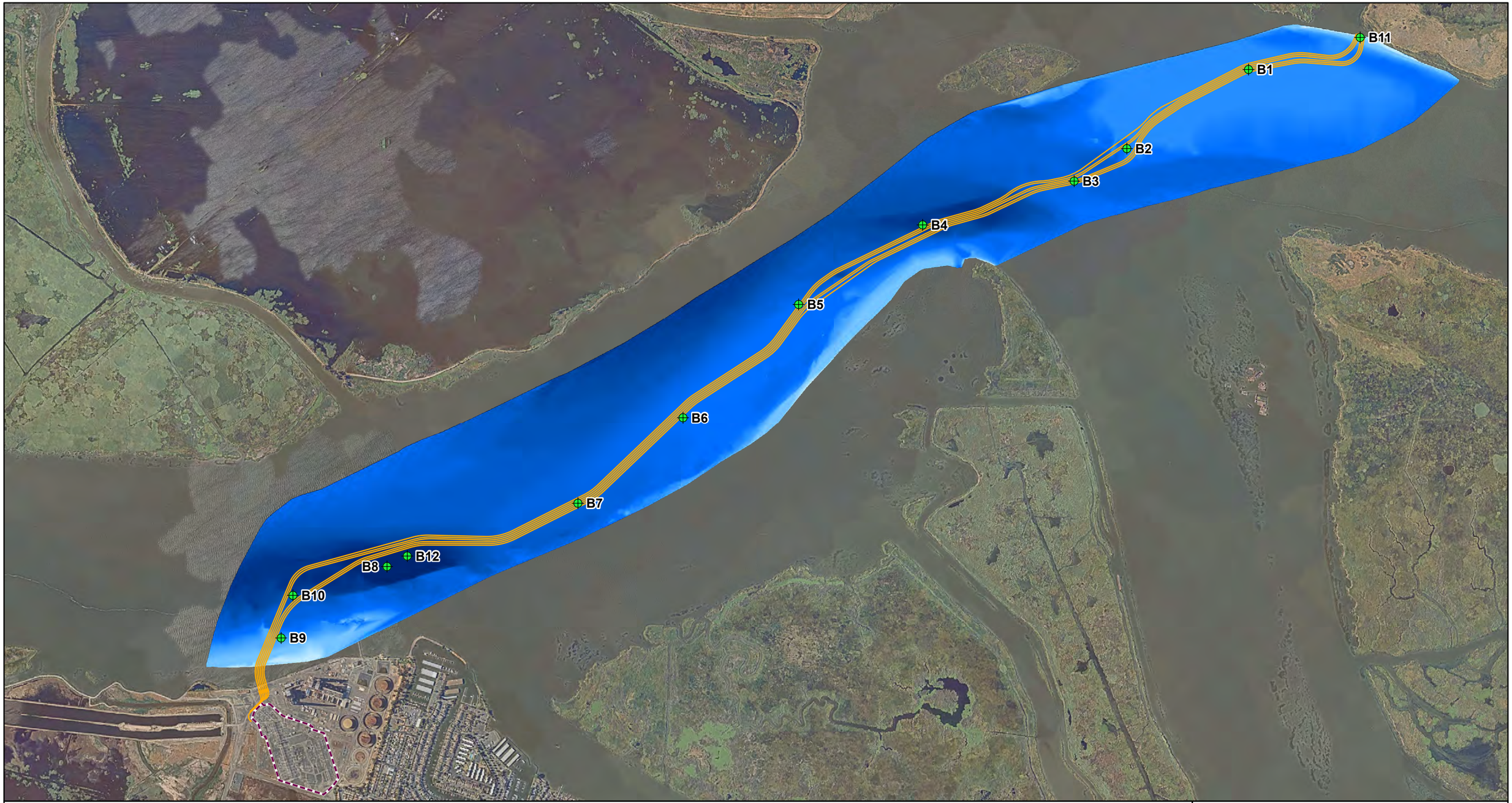
Site Location Map

Collinsville-Pittsburg 230 kV Offshore Investigation
Contra Costa and Solano Counties, California

Geosyntec consultants

WG3444	September 2024	Figure 1

\\oakland-01\data\GIS\CollinsvillePittsburg\Project\2024-08\Figures.aprx\Fig01_SiteLocationMap 9/20/2024 2:02 PM (kwalton)



Legend

- Boring Location
- Electrical Transmission Cable
- Pittsburg Substation Fence

Bathymetry Elevation (ft NAVD88)

0

-100

Notes:

ft NAVD88 = feet elevation referenced to the North American Vertical Datum of 1988.

1. The bathymetric survey was conducted from September 18, 2023 to October 25, 2023 by eTrac Inc. The survey was conducted using a vertical datum of NAVD88 based on GEOID18 and a horizontal datum of NAD83 (2011) State Plane California Zone 2 in US Feet.
2. The cable alignment is based on the 60% design alignment provided to Geosyntec by Power Engineers on 29 August 2024.
3. Aerial imagery source: Nearmap, July 2023.

N

0 1,600 Feet

Site Layout Map

Collinsville-Pittsburg 230 kV Offshore Investigation
Contra Costa and Solano Counties, California

Geosyntec consultants

WG3444 | September 2024

Figure 2

\\oakland-01\data\GIS\CollinsvillePittsburg\Project\2024-08\Figures.aprx\Fig01_LayoutMap 9/17/2024 1:33 PM (kwalton)

Honker Bay

Collinsville

Sacramento River

San Joaquin River

Pittsburg

B11
B1
B2
B3
B4
B5
B6
B7
B8
B12
B10
B9

Legend

- Boring Location
- Electrical Transmission Cable
- Pittsburg Substation Fence

Geology (1)

- af: Artificial Fill
- Qhym: Mud Deposits (late Holocene)
- Qha: Alluvium (Holocene)
- Qhy: Alluvium (late Holocene)
- Qpa: Alluvium (Peistocene)
- Qs: Beach and Dune Sand (Quaternary)
- QTs: Sediments (Early Pleistocene and/or Pliocene)

Notes:

1. Surface geology is based on: USGS. 2006. "Geologic map of the San Francisco Bay Region" Compliers: Graymer, R.W. B. C. Moring, G.J. Saucedo, C. M. Wentworth, E. E. Brabb, K. L. Knudsen. 19 April 2006. Honker Bay and Antioch North quadrangles. Electronic data at https://earthquake.usgs.gov/education/geologicmaps/geology.php, accessed 23 September 2024.
2. The cable alignment is based on the 60% design alignment provided to Geosyntec by Power Engineers on 29 August 2024.
3. Aerial imagery source: Nearmap, July 2023.

N

0 2,800 Feet

Surface Geology

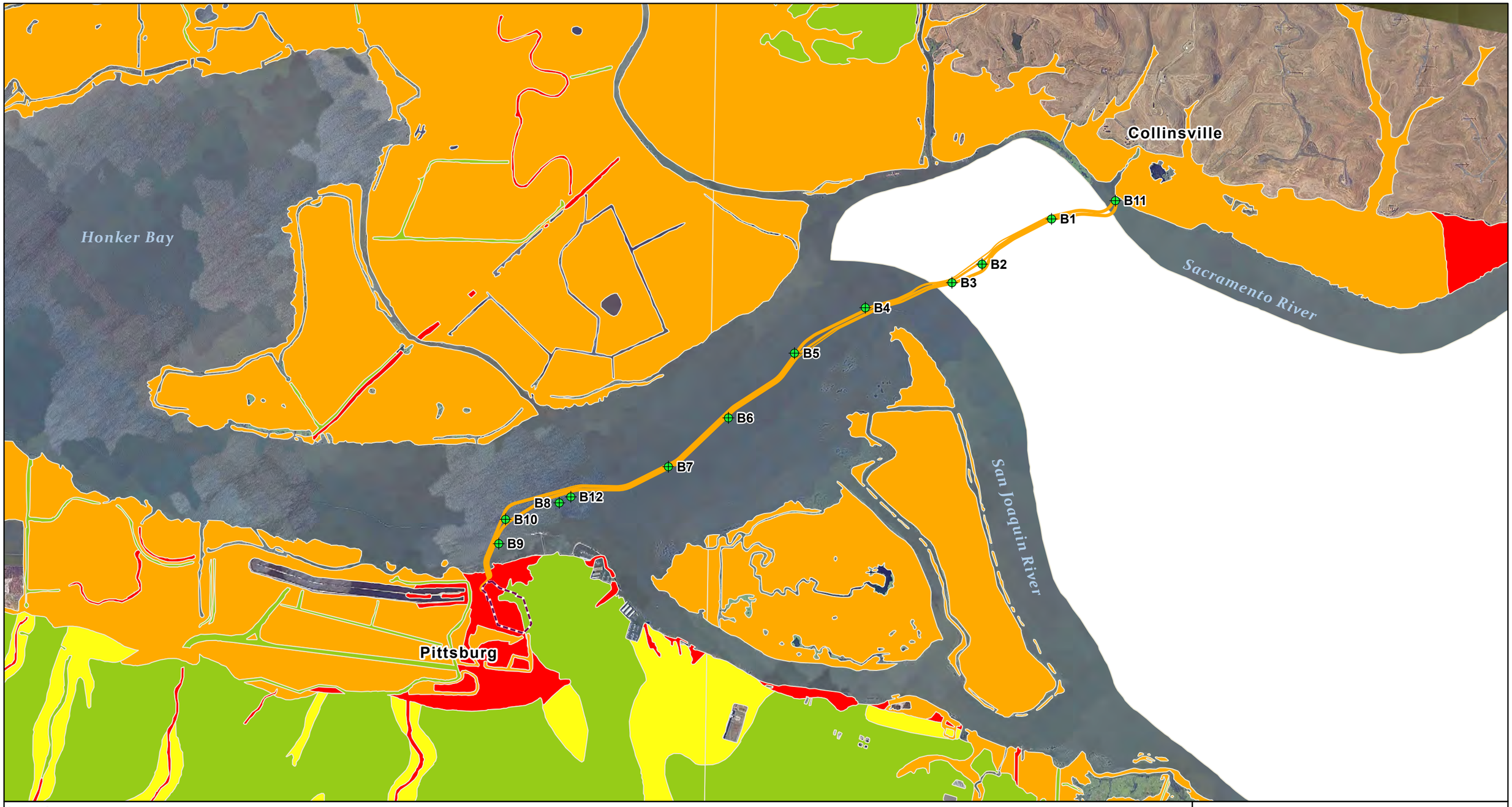
Collinsville-Pittsburg 230 kV Offshore Investigation
Contra Costa and Solano Counties, California

Geosyntec consultants

WG3444 | September 2024

Figure 3

\\oakland-01\data\GIS\CollinsvillePittsburg\Project\2024-08\Figures.aprx\Fig04_SurfaceGeology 9/23/2024 12:09 PM (kwalton)



Legend

- Boring Location
- Electrical Transmission Cable
- Pittsburg Substation Fence

Liquefaction Susceptibility (1)

- Low
- Moderate
- High
- Very High
- Not Mapped

Notes:

1. Liquefaction susceptibility is based on: USGS and CGS. 2006. "Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California." USGS Open-File Report 2006-1037, accessed September 23, 2024, at: https://earthquake.usgs.gov/education/geologicmaps/liquefaction.php.
2. The cable alignment is based on the 60% design alignment provided to Geosyntec by Power Engineers on 29 August 2024.
3. Aerial imagery source: Nearmap, July 2023.
4. Liquefaction susceptibility not mapped in Sacramento County or within the Sacramento-San Joaquin river channel.

N

0 2,800 Feet

Liquefaction Susceptibility

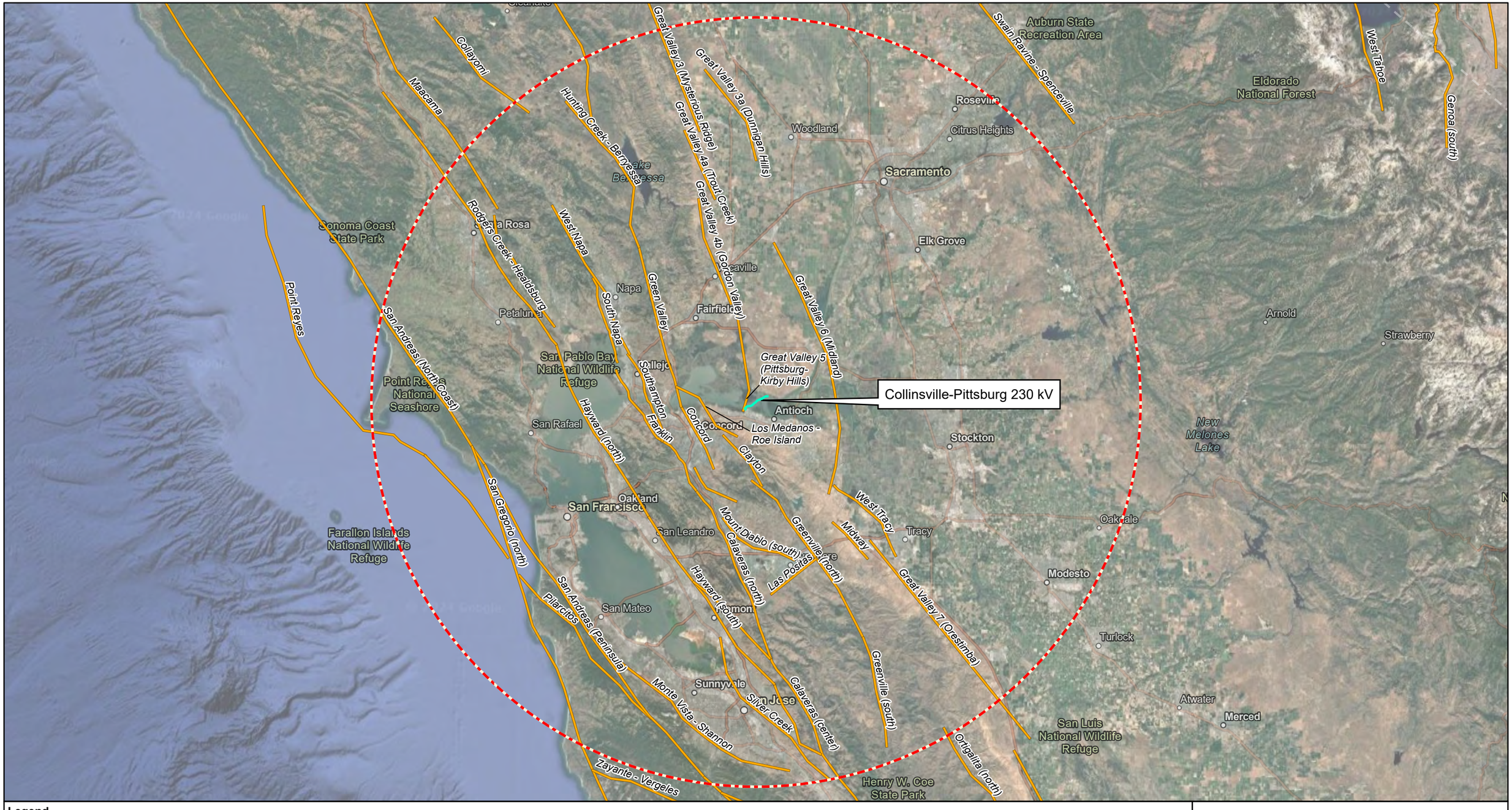
Collinsville-Pittsburg 230 kV Offshore Investigation
Contra Costa and Solano Counties, California

Geosyntec consultants

WG3444 | September 2024

Figure 4

\\oakland-01\data\GIS\CollinsvillePittsburg\Project\2024-08\Figures.aprx\Fig05_LiquefactionSusceptibility 9/23/2024 12:09 PM (kwalton)



Legend

- Electrical Transmission Cable
- 2023 National Seismic Hazard Model Fault Line
- 100-Kilometer Radius

Notes:
Fault locations are from Hatem et al. (2021) and represent the earthquake catalog and fault sections used in the USGS 2023 National Seismic Hazard Model.

N

0 15 Miles

Location of Faults in the Vicinity of the Site

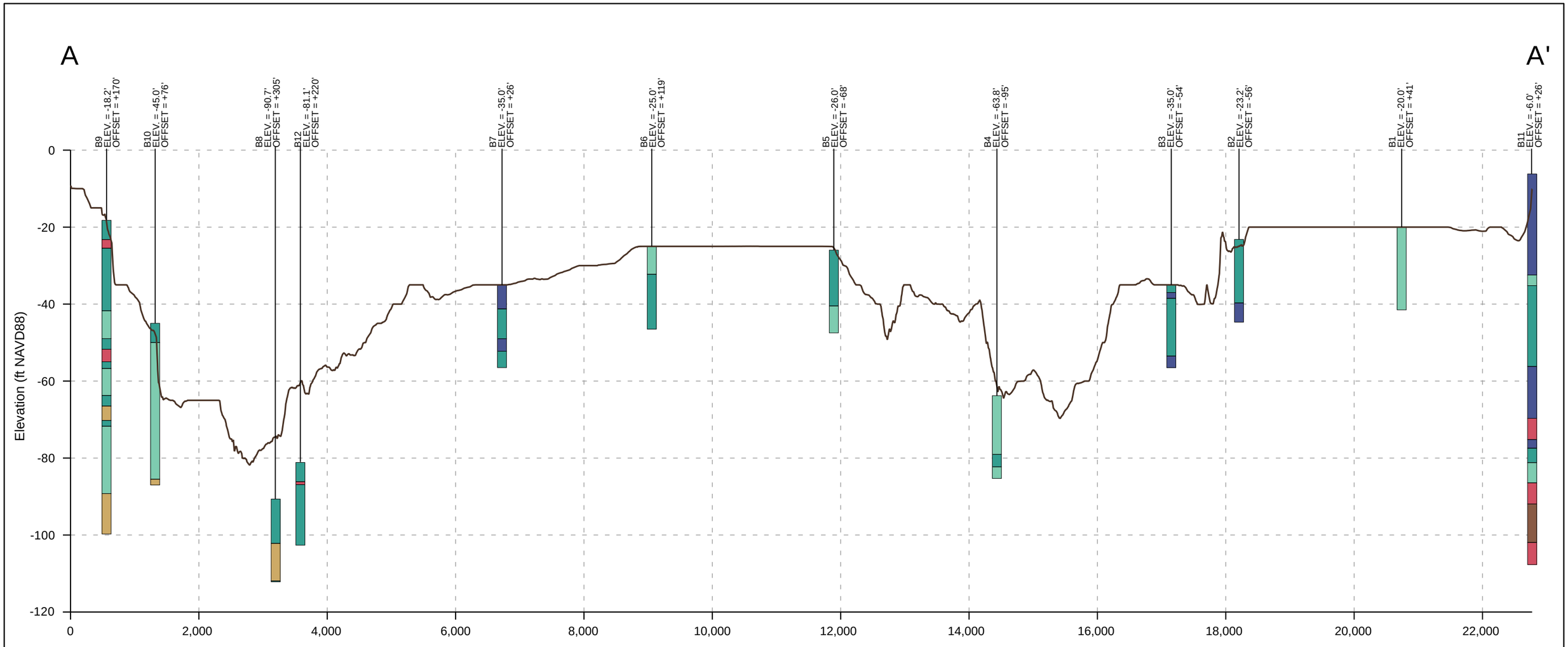
Collinsville-Pittsburg 230 kV Offshore Investigation
Contra Costa and Solano Counties, California

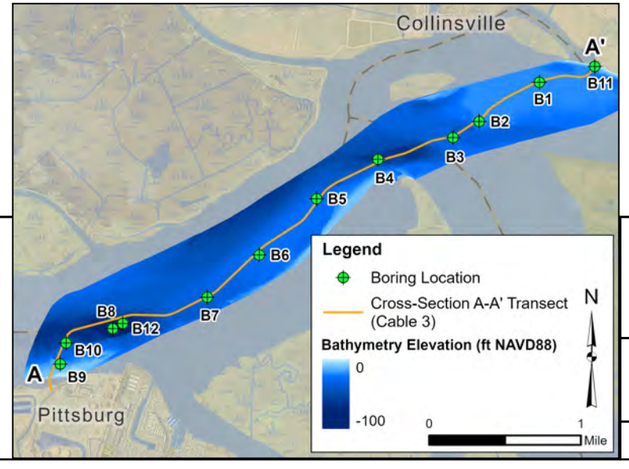
Geosyntec consultants

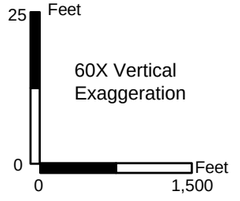
WG3444 | September 2024

Figure 5

\\oakland-01\data\GIS\CollinsvillePittsburg\Project\2024-08\Figures.aprx\Fig03_Faults 9/20/2024 1:17 PM (kwalton)







Legend

- Bathymetry Along Cable 3
- Unit 1: Poorly Graded Sand with Silt
- Unit 2: Sandy Lean Clay/Silt to Silty Sand
- Unit 3: High Plasticity Clay and Silt with Organics
- Unit 4: Lean Clay/Inelastic Silt
- Unit 5: Poorly Graded Gravel with Sand
- Unit 6: Lean Clayey Gravel with Sand

Notes:

ft NAVD88 = feet elevation referenced to the North American Vertical Datum of 1988.

1. Bathymetric survey was conducted from September 18, 2023 to October 25, 2023 by eTrac Inc. The survey was conducted using a vertical datum of NAVD88 based on GEOID18 and a horizontal datum of NAD83 (2011) State Plane California Zone 2 in US Feet.
2. Refer to Figure 1 for layout of borings and proposed cable alignment. Offsets represent nearest perpendicular distance to the Cable 3 alignment. Positive offset refers to borings located to the right (i.e., southeast) of the Cable 3 alignment.

Cross-Section A-A' Along Cable 3

Collinsville-Pittsburg 230 kV Offshore Investigation
Contra Costa and Solano Counties, California

Geosyntec consultants

WG3444 | September 2024

Figure 6

\\oakland-01\data\GIS\CollinsvillePittsburg\Project\2024-08\Fig02_CrossSectionAA.ai

APPENDIX A
Boring Logs

GROUP SYMBOLS AND NAMES

Graphic	Group Names	Graphic	Group Names	Graphic	Group Names
	Lean Clay (CL)		Lean Clay with Sand (CL)		Sandy Lean Clay (CL)
	Silty Clay (CL-ML)		Silty Clay with Sand (CL-ML)		Silt (ML)
	Silt with Sand (ML)		Sandy Silt (ML)		Poorly Graded Sand (SP)
	Poorly Graded Sand with Gravel (SP)		Poorly Graded Sand with Clay (SP-SC)		Poorly Graded Sand with Silt (SP-SM)
	Well-Graded Sand (SW)		Well-Graded Sand with Clay (SW-SC)		Well-Graded Sand with Silt (SW-SM)
	Well-Graded Sand with Silt and Gravel (SW-SM)		Clayey Sand (SC)		Silty Clayey Sand (SC-SM)
	Silty Sand (SM)		Silty Sand with Gravel (SM)		Well-Graded Gravel with Sand (GW)
	Well-Graded Gravel with Clay and Sand (GW-GC)		Well-Graded Gravel with Silt and Sand (GW-GM)		Clayey Gravel with Sand (GC)
	Silty Gravel with Sand (GM)		Gravelly Lean Clay with Sand (CL)		Lean Clay with Gravel (CL)
	Fat Clay (CH)		Fat Clay with Gravel (CH)		Gravelly Lean Clay (CL)
	Fat Clay with Sand (CH)		Gravelly Fat Clay with Sand (CH)		Sandy Lean Clay with Gravel (CL)
	Organic Silt (OL)		Organic Silt with Gravel (OL)		Clayey Sand with Gravel (SC)
	Organic Elastic Silt (OH)				

Note: Soils were classified in the field in general accordance with ATM D2488-06, Standard Practice for Description and Identification of Soils (Visual Manual Procedure). Where laboratory testing was performed, classifications were modified in general accordance with ASTM D2487-06, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

Borderline symbols, two group symbols separated by a slash, may be used in field visual classification when (1) percentage of fines is estimated to be between 45% and 55%, (2) percentages of sand and gravel are estimated to be about the same, (3) soil could be either well graded or poorly graded, (4) soil could be either a silt or a clay, or (5) fine-grained soil has properties indicating that it is at the boundary between low and high plasticity. Refer to DWR Soil and Rock Logging, Classification, and Presentation Manual for guidelines in the use of borderline symbols.

FIELD AND LABORATORY TESTS

AL	Atterberg Limits - Liquid Limit, Plastic Limit, Plasticity Index (AASHTO T 89-02 & T 90-00)
CL	Collapse Potential (ASTM D 5333-03)
CN	Consolidation (ASTM D 2435-04)
CP	Relative Compaction (CTM 216 - 06)
CR	Corrosion, Sulfates, Chlorides (CTM 643 - 99; CTM 417 - 06; CTM 422 - 06)
CU	Consolidated Undrained Triaxial (ASTM D 4767-02)
DS	Direct Shear (ASTM D 3080-04)
EI	Expansion Index (ASTM D 4829-03)
HD	Hydrometer (ASTM)
N_{60}	$N_{60}(ASTM)=N_m*(Eri/60)$
OC	Organic Content (ASTM D 2974-07)
PA	Particle Size Analysis (ASTM D 422-63 [2002])
PE	Permeability (CTM 220 - 05)
PM	Pressure Meter
PP	Pocket Penetrometer
RV	R-Value (CTM 301 - 00)
SE	Sand Equivalent (CTM 217 - 99)
SG	Specific Gravity (AASHTO T 100-06)
SL	Shrinkage Limit (ASTM D 427-04)
SW	Swell Potential (ASTM D 4546-03)
TV	Pocket Torvane
UC	Unconfined Compression (ASTM D 2166-06)
UU	Unconsolidated Undrained Triaxial (ASTM D 2850-03)
UW	Unit Weight (ASTM D 4767-04)
VS	Vane Shear (AASHTO T 223 - 96 [2004])
WC	Water Content (ASTM D 2216-05)

SAMPLER GRAPHIC SYMBOLS

- Standard Penetration Test (1.4 in. ID)
- Standard California (2.5 in. ID)
- Modified California (2.0 in. ID)
- Shelby Tube (2.87 in. or 2.37 in. ID)
- Bag Sample
- Sonic Core
- Dry Core
- Punch Core

WELL GRAPHIC SYMBOLS

- Blank casing in cement grout
- Blank casing in filter sand
- Native backfill or slough
- Blank casing in bentonite seal
- Slotted casing in filter sand
- Vibrating wire piezometer

WATER LEVEL SYMBOLS

- First water encountered during drilling
- Water level measured at end of drilling
- Static water level reading (short-term)
- Static water leavel reading (long-term)

Geosyntec consultants
engineers | scientists | innovators

Collinsville-Pittsburg 230 kV Offshore

BORING LEGEND

GEOS LEVEE LEGEND P1

CONSISTENCY OF COHESIVE SOILS (AASHTO 1988)		
Descriptor	**Pocket Penetrometer (tsf)**	**Torvane (tsf)**
Very Soft	< 0.25	< 0.12
Soft	0.25 - 0.50	0.12 - 0.25
Medium Stiff	0.50 - 1.0	0.25 - 0.50
Stiff	1.0 - 2.0	0.50 - 1.0
Very Stiff	2.0 - 4.0	1.0 - 2.0
Hard	> 4.0	> 2.0

APPARENT DENSITY OF COHESIONLESS SOILS (ASTM 6066-96 (2004))	
Descriptor	**SPT N(60) - Value (blows / foot)**
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

MOISTURE (ASTM D 2488-06)	
Descriptor	**Criteria**
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

SOIL PARTICLE SIZE (ASTM D 2488-06)		
Descriptor		**Size**
Boulder		> 12 inches
Cobble		3 to 12 inches
Gravel	Coarse	3/4 inch to 3 inches
	Fine	No. 4 Sieve to 3/4 inch
Sand	Coarse	No. 10 Sieve to No. 4 Sieve
	Medium	No. 40 Sieve to No. 10 Sieve
	Fine	No. 200 Sieve to No. 40 Sieve
Silt and Clay		Passing No. 200 Sieve

PLASTICITY OF FINE-GRAINED SOILS (ASTM D 2488-06)	
Descriptor	**Criteria**
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

DRY STRENGTH OF FINE-GRAINED SOILS (ASTM D 2488-06)	
Descriptor	**Criteria**
None	Dry specimen crumbles into powder with mere pressure of handling.
Low	Dry specimen crumbles into powder with some finger pressure.
Medium	Dry specimen breaks into pieces or crumbles with considerable finger pressure.
High	Dry specimen cannot be broken with finger pressure; will break into pieces between thumb and a hard surface.
Very High	Dry specimen cannot be broken between thumb and a hard surface.

DILATANCY OF FINE-GRAINED SOILS (ASTM D 2488-06)	
Descriptor	**Criteria**
None	No visible change in the specimen.
Slow	Water appears slowly on the surface of the specimen during shaking and does not disappear, or disappears slowly, upon squeezing.
Rapid	Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing.

TOUGHNESS OF FINE-GRAINED SOILS (ASTM D 2488-06)	
Descriptor	**Criteria**
Low	Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft.
Medium	Medium pressure is required to roll the thread to near the plastic limit. The thread and the lump have medium stiffness.
High	Considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump have very high stiffness.

CEMENTATION (ASTM D 2488-06)	
Descriptor	**Criteria**
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure.

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
07/31/2024	07/31/2024	--		21.5'
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Gregg Drilling		N/A	N/A	N/A
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Rotary Wash		Mobile B-80 aboard R/V Quin Delta		Geosyntec
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
5 in		N/A		J. Xia
BOREHOLE INCLINATION		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
N/A		N/A		D. Umberg
SAMPLER TYPE(S)		**SPT HAMMER TYPE**		**HAMMER EFFICIENCY**
SPT, Mod Cal		Automatic, 140 lb/30		92%
BOREHOLE BACKFILL OR COMPLETION		**DEPTH TO MUD LINE**	**BEFORE DRILLING**	**AFTER DRILLING**
N/A			20.8'	21.3'

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	0		POORLY GRADED SAND with silt (SP-SM); very loose; gray; wet; 92% poorly graded fine sand; 8% nonplastic fines.		1-1	40	1 0 0 [0]	0							08:21 AM; All samples collected for environmental test. White plastic piece present. 20.8 feet from mud line at 08:24 AM.
	5		As above except loose.		1-2	65	1 4 5 5				NV	NP	8.1		08:42 AM
	8		As above.		1-3	90	1 4 5 [9]	14							08:45 AM
	10		As above.		1-4	70	2 6 4 6			25.4			8.2		09:01 AM
	15		As above.		1-5	70	0 0 1 1								09:10 AM
	20														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2214738.25 **Easting:** 6176062.07
Latitude: 38.06973235 N **Longitude:** 121.83953365 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B1

Collinsville-Pittsburg 230 kV Offshore

GEOS LEVEE TEMPLATE CP

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	20		As above.		1-6	90	0 3 4 [7]	11							09:20 AM
	21		Boring terminated at 21.5 feet bgs.												
	22														
	23														
	24														
	25														
	26														
	27														
	28														
	29														
	30														
	31														
	32														
	33														
	34														
	35														
	36														
	37														
	38														
	39														
	40														
	41														
	42														
	43														
	44														
	45														

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2214738.25 **Easting:** 6176062.07
Latitude: 38.06973235 N **Longitude:** 121.83953365 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B1

Collinsville-Pittsburg 230 kV Offshore

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
07/29/2024	07/29/2024	--		22.5'
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Gregg Drilling		N/A	N/A	N/A
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Rotary Wash		Mobile B-80 aboard R/V Quin Delta		Geosyntec
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
5 in		N/A		J. Xia
BOREHOLE INCLINATION		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
N/A		N/A		D. Umberg
SAMPLER TYPE(S)		**SPT HAMMER TYPE**		**HAMMER EFFICIENCY**
SPT, Mod Cal, Shelby		Automatic, 140 lb/30		92%
BOREHOLE BACKFILL OR COMPLETION		**DEPTH TO MUD LINE**	**BEFORE DRILLING**	**AFTER DRILLING**
N/A			28'	not measured

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	0		SILT (ML); very soft; greenish gray; wet; ~90-95% low plasticity fines; ~5-10% poorly graded fine sand; trace organics.		2-1	100	1 1 1 [2]	3							12:13 PM
	1														
	2														
	3		As above.		2-2	100				40.5	40	5		TX-UU DS-CD	12:47 PM; 0 psi
	4														
	5		As above except soft.		2-3	100	2 4 7 8			34.2			73.1		12:57 PM
	6														
	7		SANDY SILT (ML); very soft; dark gray; wet; 27% poorly graded fine sand; 73% low plasticity fines; trace organics.		2-4	100	1 1 2 [3]	5							13:03 PM
	8														
	9														
	10		As above.		2-5	100	4 2 2 1			34.4			67.5		13:25 PM
	11														
	12														
	13														
	14														
	15		As above.		2-6	100	1 1 0 1								13:39 PM
	16														
	17		SANDY SILT with organics (OH); very soft; dark gray; wet; ~55% medium plasticity fines and organic soil; 38% poorly graded fine sand; ~7% organics.												
	18														
	19														
	20		SANDY SILT with organics (OH); very soft; dark gray; wet;												

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2213374.67 **Easting:** 6173965.10
Latitude: 38.06590548 N **Longitude:** 121.84674905 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B2

Collinsville-Pittsburg 230 kV Offshore

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA					REMARKS
										Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	
	20		~65% medium plasticity fines; ~28% poorly graded fine sand; 7% organics.		2-7	--				76.0	90	37		TX-UU DS-CU	13:52 PM
	21														
	22														
	23		Boring terminated at 22.5 feet bgs.												
	24														
	25														
	26														
	27														
	28														
	29														
	30														
	31														
	32														
	33														
	34														
	35														
	36														
	37														
	38														
	39														
	40														
	41														
	42														
	43														
	44														
	45														

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2213374.67 **Easting:** 6173965.10
Latitude: 38.06590548 N **Longitude:** 121.84674905 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B2

Collinsville-Pittsburg 230 kV Offshore

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
07/29/2024	07/29/2024	--		21.5'
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Gregg Drilling		N/A	N/A	N/A
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Rotary Wash		Mobile B-80 aboard R/V Quin Delta		Geosyntec
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
5 in		N/A		J. Xia
BOREHOLE INCLINATION		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
N/A		N/A		D. Umberg
SAMPLER TYPE(S)		**SPT HAMMER TYPE**		**HAMMER EFFICIENCY**
SPT, Mod Cal, Shelby		Automatic, 140 lb/30		92%
BOREHOLE BACKFILL OR COMPLETION		**DEPTH TO MUD LINE**	**BEFORE DRILLING**	**AFTER DRILLING**
N/A			37.8'	39'

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	0		SILT with sand (ML); very soft; dark gray; moist; 85% medium plasticity fines; 15% poorly graded fine sand.												
	1		SANDY SILT (ML); very soft; dark gray; wet; ~60% nonplastic fines; ~40% poorly graded fine sand.		3-1	100	0 1 1 [2]	3							08:42 AM
	2														
	3		SILT with sand (MH); soft; gray; wet; 73% medium plasticity fines; 27% poorly graded fine sand; trace organics.		3-2	100	0 1 2 [3]	5			69	35	72.6		08:58 AM
	4														
	5		As above.		3-3	100	1 1 3 2			55.2	52	22	74.3		09:21 AM
	6		SILT with sand (MH); soft; gray; wet; 74% medium plasticity fines; 26% poorly graded fine sand; trace organics.												
	7														
	8		SANDY SILT with organics (ML); soft; gray; wet; 52% low plasticity fines; 39% poorly graded fine sand; 9% organics.		3-4	100				65.0			51.9		09:40 AM
	9														
	10		SANDY SILT (ML); firm; dark gray; wet; ~65% low plasticity fines; ~35% poorly graded fine sand; trace quartz, dilates when pressed.		3-5	100	5 4 3 7								09:50 AM
	11														
	12		SILTY SAND (SM); loose; dark gray; wet; ~70% poorly graded fine sand; ~30% nonplastic fines.												
	13														
	14														
	15		SILTY SAND with organics (SM); loose; dark gray; wet; 69% sand; 26% nonplastic fines; 5% organics.		3-6	100	2 7 2 4			47.1			26.2		10:38 AM
	16														
	17														
	18														
	19														
	20														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2212814.72 **Easting:** 6173057.00
Latitude: 38.064332 N **Longitude:** 121.849875 W
Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B3

Collinsville-Pittsburg 230 kV Offshore

GEOS LEVEE TEMPLATE CP

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	20		ORGANIC CLAY with sand (CH); stiff; dark gray; wet; 68% medium plasticity fines; 14% poorly graded fine sand; 18% fine-grained rootlets and organics.		3-7	100	4 4 5 [9]	14		113.4			85.7		
	21		Boring terminated at 21.5 feet bgs.												
	22														
	23														
	24														
	25														
	26														
	27														
	28														
	29														
	30														
	31														
	32														
	33														
	34														
	35														
	36														
	37														
	38														
	39														
	40														
	41														
	42														
	43														
	44														
	45														

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2212814.72 **Easting:** 6173057.00
Latitude: 38.064332 N **Longitude:** 121.849875 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B3

Collinsville-Pittsburg 230 kV Offshore

DATE STARTED 07/26/2024	**DATE COMPLETED** 07/26/2024	**GROUND ELEVATION** --	**ELEVATION DATUM**	**TOTAL DEPTH OF BORING** 21.5'
DRILLING CONTRACTOR Gregg Drilling		**DRILLER'S NAME** N/A	**HELPER'S NAME** N/A	**TOTAL DEPTH OF FILL** N/A
DRILLING METHOD Rotary Wash		**DRILL RIG MAKE AND MODEL** Mobile B-80 aboard R/V Quin Delta		**CONSULTANT COMPANY** Geosyntec
DRILL BIT SIZE AND TYPE (HOLE DIAMETER) 5 in		**DRILLING ROD TYPE AND DIAMETER** N/A		**FIELD LOGGER** J. Xia
BOREHOLE INCLINATION N/A		**CASING TYPE, DIAMETER, INSTALLATION DEPTH** N/A		**FIELD LOG REVIEWER** D. Umberg
SAMPLER TYPE(S) SPT, Mod Cal		**SPT HAMMER TYPE** Automatic, 140 lb/30		**HAMMER EFFICIENCY** 92%
BOREHOLE BACKFILL OR COMPLETION N/A		**DEPTH TO MUD LINE**	**BEFORE DRILLING** not measured	**AFTER DRILLING** not measured

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	0		POORLY GRADED SAND (SP); medium dense; gray with some white and orange pieces; 95% poorly graded fine sand; 5% nonplastic fines.		4-1	30	3 6 7 [13]	20							10:11 AM
	1														
	2														
	3		As above.		4-2	100	2 4 6 [10]	15							10:25 AM
	4														
	5		As above except dense.		4-3	90	14 16 19 28			29.8			3.8		10:40 AM
	6														
	7														
	8		As above except medium dense.		4-4	2	7 11 8 [19]	29							10:55 AM
	9														
	10		As above.		4-5	100	5 7 12 16								11:25 AM
	11														
	12														
	13														
	14														
	15		As above.		4-6	70	17 14 25 26			13.5			13.8		11:45 AM
	16		SILT with sand (ML); very stiff; dark gray; wet; ~80% medium plasticity fines; ~20% poorly graded fine sand.												
	17		SILTY SAND (SM); very dense; gray with white and orange particles; wet; 72% sand; 14% gravel; 14% nonplastic fines.												
	18														
	19														
	20														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2212059.18 **Easting:** 6170444.98
Latitude: 38.06215357 N **Longitude:** 121.85890874 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B4

Collinsville-Pittsburg 230 kV Offshore

GEOS LEVEE TEMPLATE CP

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	20		POORLY GRADED SAND (SP); medium dense; dark gray with white and orange particles; wet; ~95% fine sand; ~5% nonplastic fines.		4-7	80	7 9 17 [26]	40							11:55 AM
	21		WELL-GRADED SAND (SW); medium dense; dark gray with white and brown particles; wet; ~85% sand; 10% well-graded subrounded gravel; ~5% nonplastic fines.												
	22		Boring terminated at 21.5 feet bgs.												
	23														
	24														
	25														
	26														
	27														
	28														
	29														
	30														
	31														
	32														
	33														
	34														
	35														
	36														
	37														
	38														
	39														
	40														
	41														
	42														
	43														
	44														
	45														

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2212059.18 **Easting:** 6170444.98
Latitude: 38.06215357 N **Longitude:** 121.85890874 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B4

Collinsville-Pittsburg 230 kV Offshore

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
07/25/2024	07/25/2024	--		21.5'
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Gregg Drilling		N/A	N/A	N/A
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Rotary Wash		Mobile B-80 aboard R/V Quin Delta		Geosyntec
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
5 in		N/A		J. Xia
BOREHOLE INCLINATION		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
N/A		N/A		D. Umberg
SAMPLER TYPE(S)		**SPT HAMMER TYPE**		**HAMMER EFFICIENCY**
SPT, Mod Cal, Shelby		Automatic, 140 lb/30		92%
BOREHOLE BACKFILL OR COMPLETION		**DEPTH TO MUD LINE**	**BEFORE DRILLING**	**AFTER DRILLING**
N/A			28.5'	not measured

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	0		SILTY SAND (SM); very loose; dark gray; wet; ~80% poorly graded sand; ~20% nonplastic fines.		5-1	100	1 2 2 [4]	6							12:00 PM
	1		SILT with sand (ML); soft; dark brownish gray; wet; ~70-80% nonplastic fines; ~20-30% sand.												
	2														
	3		No recovery.		5-2	0									12:20 PM; No recovery, 100 psi
	4														
	5		SILTY SAND (SM); medium dense; gray; wet; 77% poorly graded sand; ~23% nonplastic fines.		5-3	75	3 6 6 11			36.0			22.6		12:35 PM
	6														
	7														
	8		As above except loose.		5-4	100	2 4 4 [8]	12							13:00 PM
	9														
	10		As above except medium dense.		5-5	75	4 7 12 15								13:10 PM
	11														
	12														
	13		As above.		5-6	100	8 11 13 [24]	37							13:25 PM
	14														
	15		POORLY GRADED SAND with silt (SP-SM); dense; gray; 90% poorly graded fine sand; 10% noplastic fines.		5-7	75	9 15 20 24						9.7		13:40 PM
	16														
	17														
	18														
	19														
	20														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2210688.02 **Easting:** 6168308.10
Latitude: 38.0583031 N **Longitude:** 121.86626061 W
Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B5

Collinsville-Pittsburg 230 kV Offshore

GEOS LEVEE TEMPLATE CP

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	20		As above except medium dense; ~70% sand; ~30% nonplastic fines.	X	5-8	100	7 12 13 [25]	38							14:05 PM
	21		Boring terminated at 21.5 feet bgs.												
	22														
	23														
	24														
	25														
	26														
	27														
	28														
	29														
	30														
	31														
	32														
	33														
	34														
	35														
	36														
	37														
	38														
	39														
	40														
	41														
	42														
	43														
	44														
	45														

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2210688.02 **Easting:** 6168308.10
Latitude: 38.0583031 N **Longitude:** 121.86626061 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B5

Collinsville-Pittsburg 230 kV Offshore

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
07/25/2024	07/25/2024	--		21.5'
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Gregg Drilling		N/A	N/A	N/A
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Rotary Wash		Mobile B-80 aboard R/V Quin Delta		Geosyntec
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
5 in		N/A		J. Xia
BOREHOLE INCLINATION		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
N/A		N/A		D. Umberg
SAMPLER TYPE(S)		**SPT HAMMER TYPE**		**HAMMER EFFICIENCY**
SPT, Mod Cal		Automatic, 140 lb/30		92%
BOREHOLE BACKFILL OR COMPLETION		**DEPTH TO MUD LINE**	**BEFORE DRILLING**	**AFTER DRILLING**
N/A			31'	not measured

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	0		POORLY GRADED SAND with silt (SP-SM); very loose; dark gray; wet; ~90% poorly graded fine sand; ~10% low plasticity fines.		6-1	3	WOH								08:10 AM
	5		As above except 85-90% sand; 10-15% low plasticity fines.		6-2	10	1 1 0 0								08:30 AM
	7		SILTY SAND (SM); medium dense; dark gray; wet; ~65% poorly graded fine sand; ~35% low plasticity fines.		6-3	50	6 8 10 16								08:52 AM
	10		As above except 85% sand; 15% low plasticity fines.		6-4	70	4 7 10 10			33.7			15.3		09:03 AM
	13		As above except loose.		6-5	90	2 2 3 [5]	8							09:10 AM
	15		As above except medium dense.		6-6	70	3 8 12 15								09:25 AM
	18		As above except loose.		6-7	100	2 2 6 [8]	12							09:45 AM
	20														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2208735.28 **Easting:** 6166315.72
Latitude: 38.05286105 N **Longitude:** 121.87308029 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B6

Collinsville-Pittsburg 230 kV Offshore

GEOS LEVEE TEMPLATE CP

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	20		As above except medium dense.		6-8	100	10 12 17 [29]	44							09:54 AM
	21		Boring terminated at 21.5 feet bgs.												
	22														
	23														
	24														
	25														
	26														
	27														
	28														
	29														
	30														
	31														
	32														
	33														
	34														
	35														
	36														
	37														
	38														
	39														
	40														
	41														
	42														
	43														
	44														
	45														

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2208735.28 **Easting:** 6166315.72
Latitude: 38.05286105 N **Longitude:** 121.87308029 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B6

Collinsville-Pittsburg 230 kV Offshore

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
07/24/2024	07/24/2024	--		21.5'
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Gregg Drilling		N/A	N/A	N/A
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Rotary Wash		Mobile B-80 aboard R/V Quin Delta		Geosyntec
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
5 in		N/A		J. Xia
BOREHOLE INCLINATION		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
N/A		N/A		D. Umberg
SAMPLER TYPE(S)		**SPT HAMMER TYPE**		**HAMMER EFFICIENCY**
SPT, Mod Cal, Shelby		Automatic, 140 lb/30		92%
BOREHOLE BACKFILL OR COMPLETION		**DEPTH TO MUD LINE**	**BEFORE DRILLING**	**AFTER DRILLING**
N/A			40'	not measured

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	0														09:30 AM; Rods sunk 5 feet into mud line
	5		SILT with sand (MH); soft; dark grayish brown; wet; 80% medium to high plasticity fines; 20% sand.		7-1	100	9 4 3 [7]	11							
	7		SANDY SILT (ML); firm; greenish gray; wet; 70% nonplastic fines; 30% poorly graded sand.		7-2	90	5 5 3 5								09:50 AM
	9		As above.		7-3	90				34.4	NV	NP	70	TX-UU DS-CD	10:10 AM; 250 psi
	11		As above except stiff.		7-4	75	5 7 6 10								10:20 AM
	14														
	15		FAT CLAY (CH); firm; gray; wet; 98% medium plasticity fines; 2% fine sand; trace gravel; low dry strength.		7-5	100	0 2 4 6			58.0	69	36	98.3		10:40 AM
	17														
	18		SILT with sand (ML); stiff to very stiff; gray; wet; 78% low plasticity fines; 22% poorly graded sand.		7-6	98				26.9	23	NP	78.4	TX-UU	11:00 AM; 450 psi
	20														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2207262.26 **Easting:** 6164504.14
Latitude: 38.04874317 N **Longitude:** 121.87929573 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B7

Collinsville-Pittsburg 230 kV Offshore

GEOS LEVEE TEMPLATE CP

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	20		As above.		7-7	100	4 7 17 [24]	37							11:15 AM
	21		Boring terminated at 21.5 feet bgs.												
	22														
	23														
	24														
	25														
	26														
	27														
	28														
	29														
	30														
	31														
	32														
	33														
	34														
	35														
	36														
	37														
	38														
	39														
	40														
	41														
	42														
	43														
	44														
	45														

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2207262.26 **Easting:** 6164504.14
Latitude: 38.04874317 N **Longitude:** 121.87929573 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B7

Collinsville-Pittsburg 230 kV Offshore

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
07/31/2024	07/31/2024	--		21.5'
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Gregg Drilling		N/A	N/A	N/A
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Rotary Wash		Mobile B-80 aboard R/V Quin Delta		Geosyntec
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
5 in		N/A		J. Xia
BOREHOLE INCLINATION		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
N/A		N/A		D. Umberg
SAMPLER TYPE(S)		**SPT HAMMER TYPE**		**HAMMER EFFICIENCY**
SPT, Mod Cal, Shelby		Automatic, 140 lb/30		92%
BOREHOLE BACKFILL OR COMPLETION		**DEPTH TO MUD LINE**	**BEFORE DRILLING**	**AFTER DRILLING**
N/A			not measured	not measured

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	0		SANDY SILT (ML); stiff; dark gray; wet; ~70% low plasticity fines; ~30% poorly graded fine sand.		8-1	90	4 8 5 [13]	20							17:13 PM
	5		SILTY SAND (SM); medium dense; gray; wet; 86% poorly graded fine sand; 14% nonplastic fines.		8-2	75	0 1 10 17			29.4			13.6		17:48 PM
	10		As above.		8-3	70	6 13 21 21								17:59 PM; Sand catcher broke
	12		SILTY SAND (SM); medium dense to dense; dark gray with orange, black, and white (gravel); wet; ~60% poorly graded fine sand; 30% fines; 10% fine gravel.												
	13		POORLY GRADED GRAVEL with sand (GP); dense; dark gray with orange, black, and white (gravel); 75% subrounded and subangular well-graded gravel (max 2" diameter); 25% well-graded coarse sand; trace nonplastic fines.												
	15		As above except 77% gravel; 22% coarse sand; trace fines.		8-4	50	22 32 31 39						0.4		18:13 PM; Sand catcher broke
	20														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2206170.68 **Easting:** 6161213.87
Latitude: 38.0456121 N **Longitude:** 121.8906644 W
Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B8

Collinsville-Pittsburg 230 kV Offshore

GEOS LEVEE TEMPLATE CP

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	20		As above.		8-5	50	11 14 15 [29]	44			39	19			18:42 PM
	21		Sandy LEAN CLAY (CL); stiff; yellowish brown; moist; ~85% medium plasticity fines; ~15% poorly graded fine sand.												
	22		Boring terminated at 21.5 feet bgs.												
	23		Depth to mud line before drilling - 100'; after drilling - 95.5'												
	24														
	25														
	26														
	27														
	28														
	29														
	30														
	31														
	32														
	33														
	34														
	35														
	36														
	37														
	38														
	39														
	40														
	41														
	42														
	43														
	44														
	45														

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2206170.68 **Easting:** 6161213.87
Latitude: 38.0456121 N **Longitude:** 121.8906644 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B8

Collinsville-Pittsburg 230 kV Offshore

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
07/22/2024	07/22/2024	--		81.5'
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Gregg Drilling		N/A	N/A	N/A
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Rotary Wash		Mobile B-80 aboard R/V Quin Delta		Geosyntec
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
5 in		N/A		J. Xia
BOREHOLE INCLINATION		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
N/A		N/A		D. Umberg
SAMPLER TYPE(S)		**SPT HAMMER TYPE**		**HAMMER EFFICIENCY**
SPT, Mod Cal, Shelby		Automatic, 140 lb/30		92%
BOREHOLE BACKFILL OR COMPLETION		**DEPTH TO MUD LINE**	**BEFORE DRILLING**	**AFTER DRILLING**
N/A			24.2'	not measured

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	0		SANDY SILT (ML); hard; black (10YR 2/1); moist; 70-80% silt; 20-30% sand.		9-1	100	11 20 34								09:25 AM
	1														
	2		SILTY SAND (SM); very dense; 60-70% sand; 30-40% nonplastic fines.												
	3		No recovery.		9-2	0	7 13 18								10:15 AM; No recovery
	4														
	5		SILT (ML); very stiff; dark gray (10YR 4/1); moist; 89% nonplastic fines; 11% fine sand; low dry strength, pocket pen=2.5 tsf.		9-3	85	3 8 14 17		2.5P	32.9			89.3		10:30 AM
	6														
	7														
	8		SILTY SAND (SM); medium dense; dark gray (10YR 4/1); 50-60% sand; 40-50% medium plasticity fines; orange mottling.		9-4	100	3 11 12 [23]	35							10:46 AM
	9														
	10		SILTY SAND (SM); dense; olive gray; wet; 74% poorly graded sand; trace gravel; 25% nonplastic fines.		9-5	75	8 12 17 23			26.0			25		11:10 AM
	11														
	12														
	13														
	14														
	15		LEAN CLAY with sand (CL); very stiff; brownish yellow (10YR 6/8); moist; 75% low plasticity fines; 25% sand.		9-6	100	9 13 14 16		3.0- 3.5P	22.1	29	11	75.5		11:30 AM
	16														
	17														
	18														
	19														
	20														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2204939.73 **Easting:** 6159388.95
Latitude: 38.04215745 N **Longitude:** 121.89693713 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B9

Collinsville-Pittsburg 230 kV Offshore

GEOS LEVEE TEMPLATE CP

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	20		As above except very hard.				14 22 26 31								12:10 PM
	21				9-7	95			>4.5P						
	22		As above except very dark grayish brown (10YR 3/2).												
	23														
	24														
	25		POORLY GRADED SAND with silt (SP-SM); very dense; dark gray; moist to wet; 91% sand; 9% low plasticity fines; trace gravel.							24.4			9.4		13:10 PM; 700 psi
	26				9-8	80									
	27														
	28														
	29														
	30		WELL-GRADED SAND (SW); loose to medium dense; dark gray (10YR 4/1); wet; ~90% sand; 5% gravel; 5% nonplastic fines.				6 9 11 22								13:40 PM
	31		SANDY SILT (ML); medium dense; olive gray; wet; 56% nonplastic fines; 44% sand.		9-9	85				25.9			55.7		
	32														
	33														
	34														
	35		SILT (ML); hard; olive; moist; 92% nonplastic fines; 8% sand.				10 15 22 29								13:50 PM
	36				9-10	100					44	5	92.1		
	37		SILTY SAND (SM); dense; very dark gray (10YR 3/1); moist; 60% sand; 40% nonplastic to low plasticity fines.												
	38														
	39														
	40		POORLY GRADED SAND (SP); dense to very dense; dark gray (10YR 4/1); 87% sand; 10% gravel; 3% low plasticity fines.				10 15 22 29								14:20 PM
	41				9-11	100				19.2			3.5		
	42														
	43														
	44														
	45														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2204939.73 **Easting:** 6159388.95
Latitude: 38.04215745 N **Longitude:** 121.89693713 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B9

Collinsville-Pittsburg 230 kV Offshore

GEOS LEVEE TEMPLATE CP

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	45		As above except dense; 90% sand; 10% low plasticity fines; orange pieces.		9-12	60	20 39 52 [91]	140							14:50 PM
	46		SILTY SAND (SM); very dense; dark gray (10YR 4/1); wet; 80% sand; 20% low plasticity fines; trace gravel.												
	47														
	48														
	49														
	50		WELL-GRADED GRAVEL (GM); very dense; dark gray (10YR 4/1); wet; ~95% subangular-subrounded gravel (max 2" diameter); ~5% coarse sand.		9-13	65	10 40 52 54						0.6		15:20 PM
	51		WELL-GRADED GRAVEL with sand (GW); very dense; dark gray (10YR 4/1); 79% subangular-subrounded gravel (max 2" diameter); 21% coarse sand; trace silt.												
	52		SILTY SAND with gravel (SM); very dense; dark gray (10YR 4/1); wet; 50% well-graded sand; 30% gravel; 20% nonplastic fines.												
	53														
	54														
	55		WELL-GRADED SAND with gravel (SW); very dense; dark gray (10YR 4/1); wet; 80% sand; 20% gravel.		9-14	80	[>50]	>50							15:50 PM; Blows per 6-in. not recorded
	56		POORLY GRADED SAND with silt (SP-SM); very dense; gray; 88% sand; 12% nonplastic fines; trace gravel.												
	57														
	58														
	59														
	60		No recovery.		9-15	0	11 12 11 12								16:10 PM; Sand catcher broke, no recovery
	61														
	62														
	63														
	64														
	65		As above.		9-16	40					NV	NP	12		16:40 PM; 800 psi
	66														
	67														
	68														
	69														
	70														

(continued)

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2204939.73 **Easting:** 6159388.95
Latitude: 38.04215745 N **Longitude:** 121.89693713 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B9

Collinsville-Pittsburg 230 kV Offshore

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	70		WELL-GRADED SAND with silt and gravel (SW-SM); very dense; dark gray (10YR 4/1); wet; 60-65% sand; 30% subangular gravel (max 2" diameter); 5-10% nonplastic fines.		9-17	50	29 40 75			8.5			4.4		17:00 PM
	71														
	72		POORLY GRADED GRAVEL with sand (GP); very dense; dark gray (10YR 4/1) with some orange and white pieces; wet; 52% gravel (max 2" diameter); 44% well-graded sand; 4% nonplastic fines.												
	73														
	74														
	75														
	76														
	77														
	78														
	79														
	80		POORLY GRADED GRAVEL (GP); very dense; dark gray with white and black pieces; wet; ~95% subangular gravel (max 2" diameter); ~5% coarse sand.		9-18	40	6 19 32 [51]	78							17:20 PM
	81														
			Boring terminated at 81.5 feet bgs.												
	82														
	83														
	84														
	85														
	86														
	87														
	88														
	89														
	90														
	91														
	92														
	93														
	94														
	95														

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2204939.73 **Easting:** 6159388.95
Latitude: 38.04215745 N **Longitude:** 121.89693713 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B9

Collinsville-Pittsburg 230 kV Offshore

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
07/23/2024	07/23/2024	--		42'
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Gregg Drilling		N/A	N/A	N/A
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Rotary Wash		Mobile B-80 aboard R/V Quin Delta		Geosyntec
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
5 in		N/A		J. Xia
BOREHOLE INCLINATION		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
N/A		N/A		D. Umberg
SAMPLER TYPE(S)		**SPT HAMMER TYPE**		**HAMMER EFFICIENCY**
SPT, Mod Cal, Shelby		Automatic, 140 lb/30		92%
BOREHOLE BACKFILL OR COMPLETION		**DEPTH TO MUD LINE**	**BEFORE DRILLING**	**AFTER DRILLING**
N/A			48'	not measured

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	0		SANDY SILT (ML); very stiff; brownish yellow (10YR 6/6); moist; 51% low plasticity fines; 49% poorly graded fine sand.		10-1	75	6 8 13 [21]	32							10:10 AM
	1		As above except dark gray (10YR 4/1).												
	2														
	3		As above except very stiff.		10-2	95				19.9	21	1	51.1	TX-UU DS-CD	10:40 AM; 750 psi
	4														
	5														
	6		POORLY GRADED SAND with silt (SP-SM); very dense; gray; wet; 93% fine sand; 7% nonplastic fines; orange, black, and white pieces of sand.		10-3	65	21 30 29 29			17.8			7.2		11:00 AM
	7														
	8		As above except medium dense.		10-4	100	2 4 9 [13]	20							11:20 AM
	9														
	10														
	11		As above except dense.		10-5	75	8 8 16 24								11:55 AM
	12														
	13														
	14														
	15		POORLY GRADED SAND with silt and gravel (SP-SM); loose; gray; wet; 60% sand; 30% fine gravel; 10% nonplastic fines; orange, black, and white pieces of sand.		10-6	80	2 2 5 [7]	11							12:25 PM
	16														
	17														
	18														
	19														
	20														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2205673.68 **Easting:** 6159592.22
Latitude: 38.04418111 N **Longitude:** 121.89626938 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B10

Collinsville-Pittsburg 230 kV Offshore

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	20		As above except very dense.		10-7	90	28 34 34 30			11.4			6.1		13:35 PM
	25		POORLY GRADED SAND with gravel (SP); dense; dark gray with white and black gravel; wet; 80% well-graded sand; 20% subrounded gravel (max 1" diameter). As above except dark gray with light gray, white, and red pieces; 85% well-graded sand; 10% subrounded gravel (max 1" diameter); 5% nonplastic fines.		10-8	60	6 10 21 [31]	48							13:50 PM
	30		POORLY GRADED SAND (SP); very dense; gray with light gray, white, and red pieces; wet; 84% sand; 13% subrounded gravel (max 1/4" diameter); 3% low plasticity fines.		10-9	80	9 16 24 23			17.0			3.2		14:10 PM
	40		As above except max 1/2" diameter gravel.												14:30 PM
	41		POORLY GRADED GRAVEL with sand (GP); very dense; dark gray; wet; 80% subangular to subrounded gravel (max 2" diameter); 20% sand.		10-10	60	17 13 50								
	42		Boring terminated at 42 feet bgs.												
	45														

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2205673.68 **Easting:** 6159592.22
Latitude: 38.04418111 N **Longitude:** 121.89626938 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B10

Collinsville-Pittsburg 230 kV Offshore

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
07/30/2024	07/30/2024	--		101.5'
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Gregg Drilling		N/A	N/A	N/A
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Rotary Wash		Mobile B-80 aboard R/V Quin Delta		Geosyntec
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
5 in		N/A		J. Xia
BOREHOLE INCLINATION		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
N/A		N/A		D. Umberg
SAMPLER TYPE(S)		**SPT HAMMER TYPE**		**HAMMER EFFICIENCY**
SPT, Mod Cal, Shelby		Automatic, 140 lb/30		92%
BOREHOLE BACKFILL OR COMPLETION		**DEPTH TO MUD LINE**	**BEFORE DRILLING**	**AFTER DRILLING**
N/A			5.8'	6.7'

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	0														Sample rods sunk to 7 feet bgs, hard to roll because soil sticks
	6		SILT (MH); very soft; dark gray; wet; ~91% high plasticity silty fines; 3% poorly graded fine sand; 6% fine-grained organics.		11-1	100	WOH								08:26 AM
	10		As above.		11-2	100	WOH								08:50 AM
	12		As above.		11-3	100				89.6	112	61	97.1	DS-CD	08:58 AM; 100 psi
	15		As above except rootlets present.		11-4	100	1 0 0 0								09:20 AM
	20														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2215290.13 **Easting:** 6177986.40
Latitude: 38.0713232 N **Longitude:** 121.83287701 W
Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B11

Collinsville-Pittsburg 230 kV Offshore

GEOS LEVEE TEMPLATE CP

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	20		As above.		11-5	100	1 0 0 0								09:30 AM
	21														
	22														
	23														
	24														
	25		As above.		11-6	100							8.7		09:40 AM 6.7 feet to water to mud line at 09:41 AM
	26														
	27		POORLY GRADED SAND with silt (SP-SM); very loose to loose; gray; wet; 91% poorly graded fine sand; 9% nonplastic to low plasticity fines.												
	28														
	29														
	30		SILTY SAND (SM); loose; gray; ~55% sand; ~45% nonplastic to low plasticity fines.		11-7	40	0 1 2 3								09:58 AM
	31														
	32														
	33														
	34														
	35		As above except medium dense; ~70% sand; 30% nonplastic fines.		11-8	100	5 10 14 [24]	37							10:13 AM
	36														
	37														
	38														
	39														
	40		As above.		11-9	80	5 7 7 7								10:21 AM
	41														
	42														
	43														
	44														
	45														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2215290.13 **Easting:** 6177986.40
Latitude: 38.0713232 N **Longitude:** 121.83287701 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B11

Collinsville-Pittsburg 230 kV Offshore

GEOS LEVEE TEMPLATE CP

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	45		As above.		11-10	80	9 12 10 [22]	34							10:23 AM; Drilling mud in sampler
	46														
	47														
	48														
	49														
	50		SILT with organics (MH); medium stiff; dark gray; wet; 90% medium plasticity silty fines; 10% poorly graded fine sand; 10-15% organics.		11-11	100	0 0 3 4		0.5- 0.75P						11:01 AM
	51														
	52														
	53														
	54														
	55		As above.		11-12	100			0.75- 1.0P	126.9	107	23	92.7	TX-UU	11:13 AM
	56		As above except black; moist; brown clay interlayered in sample.												
	57														
	58														
	59														
	60		As above except stiff.		11-13	100	0 0 6 6		1.0- 1.5P						11:25 AM
	61														
	62														
	63														
	64														
	65		CLAY (CL); stiff; moist; 88% low to medium plasticity clayey fines; 12% poorly graded fine sand; 2% organics.		11-14	100			1.0- 1.5P	28.7	43	20	88	DS-CU	11:48 AM; 500 psi
	66														
	67														
	68														
	69														
	70														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2215290.13 **Easting:** 6177986.40
Latitude: 38.0713232 N **Longitude:** 121.83287701 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B11

Collinsville-Pittsburg 230 kV Offshore

GEOS LEVEE TEMPLATE CP

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	70		FAT CLAY with sand (CH); very stiff; dark gray; moist; 84% medium plasticity fines; 16% poorly graded fine sand.		11-15	100	8 13 25 33		3.5P	31.8	51	25	83.5		11:55 AM; Too hard to roll
	71		SILTY SAND (SM); very dense; dark gray; wet; 77% poorly graded fine sand; 21% nonplastic fines; 2% gravel.							17.7			21.1		
	72														
	73														
	74														
	75		POORLY GRADED SAND with silt (SP-SM); very dense; dark gray; wet; 80% sand; 10% gravel; 10% nonplastic fines.		11-16	95	17 21 29 [50]	77							12:02 PM
	76														
	77														
	78														
	79														
	80		As above.		11-17	90	8 15 20 [35]	54							12:14 PM; Too hard to roll
	81		CLAY (CL); very hard; yellowish-brown; wet; 95% medium plasticity fines; 5% poorly graded fine sand.												
	82														
	83														
	84														
	85														
	86														
	87														
	88														
	89														
	90		LEAN CLAYEY GRAVEL with sand (GC); very dense; olive brown; wet; 47% medium plasticity fines; 30% gravel; 23% poorly graded fine sand; claystone consistency, gray mottling.		11-18	65	22 36 46 37		>4.5P	16.6	32	14	47.3		13:08 PM
	91														
	92														
	93														
	94														
	95														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2215290.13 **Easting:** 6177986.40
Latitude: 38.0713232 N **Longitude:** 121.83287701 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B11

Collinsville-Pittsburg 230 kV Offshore

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	95														
	96														
	97														
	98														
	99														
	100		CLAY (CL); very hard; brownish yellow with gray mottling spots; wet; ~95% medium plasticity fines; ~5% poorly graded fine sand.		11-19	90	9 13 21 [34]	52							13:21 PM; Too hard to roll
	101		Boring terminated at 101.5 feet bgs.												
	102														
	103														
	104														
	105														
	106														
	107														
	108														
	109														
	110														
	111														
	112														
	113														
	114														
	115														
	116														
	117														
	118														
	119														
	120														

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2215290.13 **Easting:** 6177986.40
Latitude: 38.0713232 N **Longitude:** 121.83287701 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B11

Collinsville-Pittsburg 230 kV Offshore

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
08/02/2024	08/02/2024	--		21.5'
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Gregg Drilling		N/A	N/A	N/A
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Rotary Wash		Mobile B-80 aboard R/V Quin Delta		Geosyntec
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
5 in		N/A		J. Xia
BOREHOLE INCLINATION		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
N/A		N/A		D. Umberg
SAMPLER TYPE(S)		**SPT HAMMER TYPE**		**HAMMER EFFICIENCY**
SPT, Mod Cal		Automatic, 140 lb/30		92%
BOREHOLE BACKFILL OR COMPLETION		**DEPTH TO MUD LINE**	**BEFORE DRILLING**	**AFTER DRILLING**
N/A			85'	not measured

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	Liquid Limit	Plasticity Index	Fines, % <200	Other Lab Tests	REMARKS
	0		SILT with sand (ML); very soft; dark gray; wet; 75% non-plastic to low plasticity silt; ~25% poorly graded fine sand.		12-1	100	0 1 0 [1]	2							11:40 PM
	1		SILTY SAND (SM); very loose; dark gray; wet; ~70% poorly graded fine sand; ~30% nonplastic silt.												
	2														
	3														
	4														
	5		SILT (ML); soft; dark gray; wet; 95% nonplastic silt; 5% poorly graded fine sand.		12-2	80	10 6 8 5			32.6			32.1		12:05 PM; Rootlets present in 12-2A and 12-2B
	6		SILTY SAND (SM); medium dense; gray; wet; 68% poorly graded fine sand; 32% nonplastic fines; trace organics.												
	7														
	8														
	9														
	10		As above.		12-3	75	5 8 8 10								12:25 PM
	11														
	12														
	13														
	14														
	15		CLAY with sand (CL); stiff; gray; wet; 80% medium plasticity fines; 20% poorly graded fine sand.		12-4	95	2 8 11 14			37.6			79.9		12:50 PM
	16														
	17														
	18														
	19														
	20														

(continued)

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2206351.60 **Easting:** 6161562.71
Latitude: 38.04612312 N **Longitude:** 121.8894625 W
Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B12

Collinsville-Pittsburg 230 kV Offshore

ELEVATION (ft)	DEPTH (feet)	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery (%)	Blows per 6 in. [Blows per foot]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content (%)	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % <200	LABORATORY DATA: Other Lab Tests	REMARKS
	20		As above except rootlets present at middle of sampler.		12-5	100	2 9 12 [21]	32							13:10 PM
	21		Boring terminated at 21.5 feet bgs.												
	22														
	23														
	24														
	25														
	26														
	27														
	28														
	29														
	30														
	31														
	32														
	33														
	34														
	35														
	36														
	37														
	38														
	39														
	40														
	41														
	42														
	43														
	44														
	45														

GEOS LEVEE TEMPLATE CP

Geosyntec consultants
engineers | scientists | innovators

Borehole Location: Pittsburg-Collinsville **County:** Contra Costa/Solano
Coordinates: **Northing:** 2206351.60 **Easting:** 6161562.71
Latitude: 38.04612312 N **Longitude:** 121.8894625 W

Survey Method: N/A **Coord. System:** NAD 1983
Channel / River Name / Feature: Sacramento River

LOG OF BORING
B12

Collinsville-Pittsburg 230 kV Offshore

APPENDIX B
Laboratory Test Results

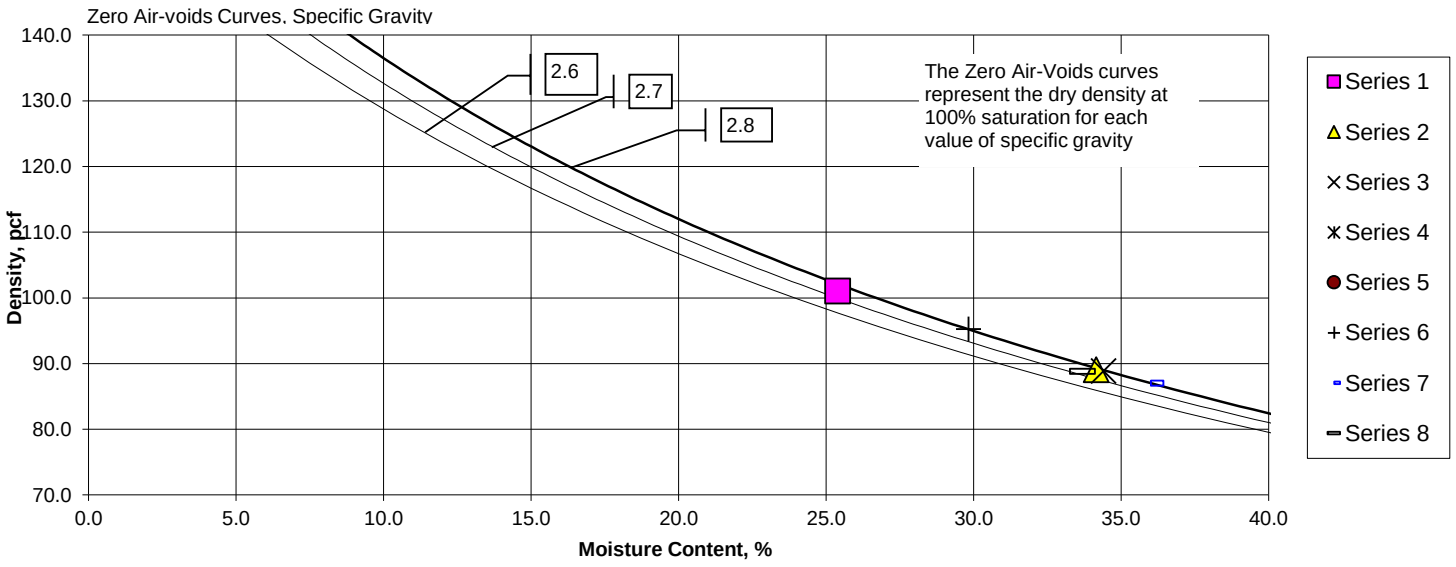
Moisture-Density-Porosity Report
Cooper Testing Labs, Inc. (ASTM D7263b)

CTL Job No:	461-383a	**Project No.**	WG3444	**By:**	RU
Client:	Geosyntec Consultants	**Date:**	08/23/24		
Project Name:	Collinsville-Pittsburg 230KV	**Remarks:**			

Boring:	B01	B02	B02	B03	B03	B04	B05	B06
Sample:	1-5D	2-3D	2-5B	3-3B	3-4	4-3C	5-3C	6-4C
Depth, ft:	11-11.5	6.5-7	11-11.5	5.5-6.0	7.5-10(Tip-3")	6-6.5	6-6.5	11-11.5
Visual Description:	Gray Silty SAND	Dark Gray SILT w/ Sand	Dark Gray Sandy SILT	Gray Sandy CLAY	Gray Sandy SILT w/ organics	Gray Poorly Graded SAND	Gray Silty SAND	Gray Silty SAND
Actual G_s								
Assumed G_s	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
Moisture, %	25.4	34.2	34.4	55.2	65.0	29.8	36.0	33.7
Wet Unit wt, pcf	126.7	119.4	119.4	106.3	101.7	123.6	118.3	118.7
Dry Unit wt, pcf	101.0	89.0	88.9	68.5	61.7	95.2	87.0	88.8
Dry Bulk Dens.ρb, (g/cc)	1.62	1.43	1.42	1.10	0.99	1.52	1.39	1.42
Saturation, %	97.3	99.3	99.6	99.6	99.2	99.9	100.0	97.4
Total Porosity, %	42.2	49.1	49.2	60.8	64.7	45.5	50.2	49.2
Volumetric Water Cont,θw,%	41.1	48.7	49.0	60.6	64.2	45.5	50.2	47.9
Volumetric Air Cont., θa,%	1.1	0.3	0.2	0.3	0.5	0.0	0.0	1.3
Void Ratio	0.73	0.96	0.97	1.55	1.83	0.84	1.01	0.97
Series	1	2	3	4	5	6	7	8

Note: All reported parameters are from the as-received sample condition unless otherwise noted. If an assumed specific gravity (Gs) was used then the saturation, porosities, and void ratio should be considered approximate.

Moisture-Density



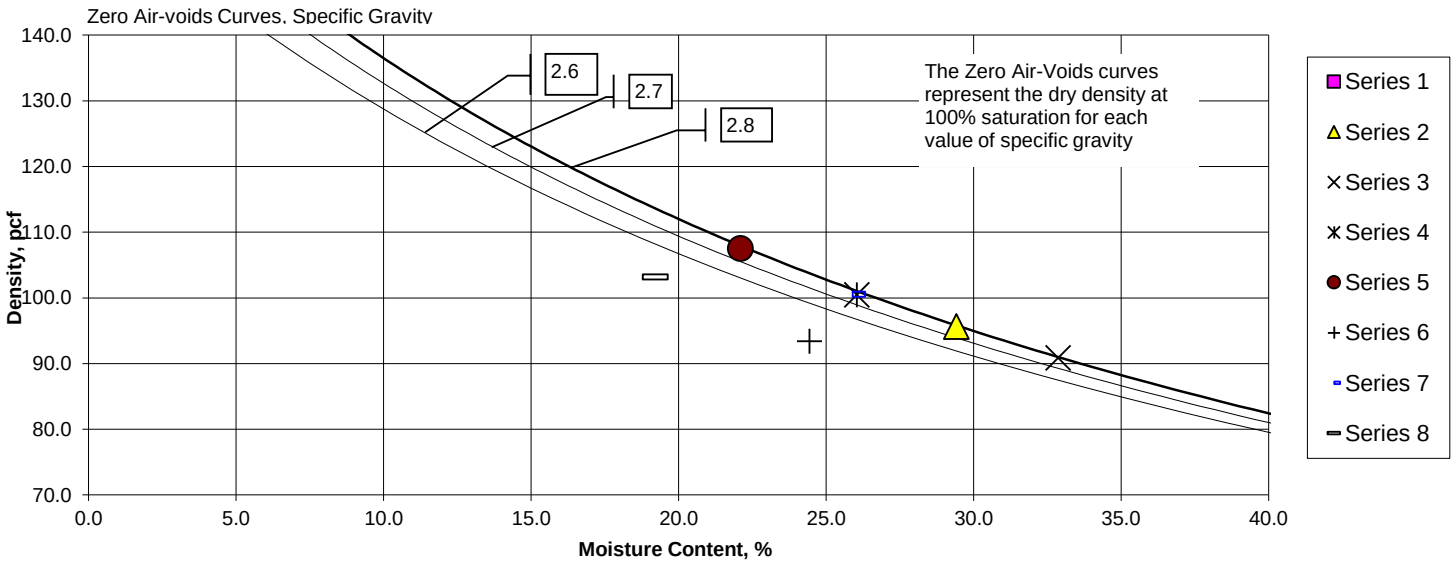
Moisture-Density-Porosity Report
Cooper Testing Labs, Inc. (ASTM D7263b)

CTL Job No:	461-383b	**Project No.**	WG3444	**By:**	RU
Client:	Geosyntec Consultants	**Date:**	08/23/24		
Project Name:	Collinsville-Pittsburg 230KV	**Remarks:**			

Boring:	B07	B08	B09	B09	B09	B09	B09	B09
Sample:	7-5B	8-2B	9-3C	9-5D	9-6B	9-8	9-9C	9-11B
Depth, ft:	15.5-16	6	6-6.5	11.5-12	15.5-16	25-27.5	31-31.5	40.5-41
Visual Description:	Gray Fat CLAY	Gray Silty SAND	Gray SILT	Olive Gray Silty SAND	Olive Brown Lean CLAY w/ Sand	Gray Poorly Graded SAND w/ Silt	Olive Gray Sandy CLAY	Gray Poorly Graded SAND
Actual G_s								
Assumed G_s	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
Moisture, %	58.0	29.4	32.9	26.0	22.1	24.4	25.9	19.2
Wet Unit wt, pcf	104.3	123.7	120.7	126.6	131.3	116.2	126.6	123.0
Dry Unit wt, pcf	66.0	95.6	90.8	100.4	107.5	93.4	100.6	103.2
Dry Bulk Dens.ρb, (g/cc)	1.06	1.53	1.46	1.61	1.72	1.50	1.61	1.65
Saturation, %	98.5	99.5	99.6	98.4	98.9	78.4	98.3	77.5
Total Porosity, %	62.2	45.3	48.0	42.6	38.5	46.6	42.5	41.0
Volumetric Water Cont,Θw,%	61.3	45.1	47.8	41.9	38.1	36.6	41.7	31.8
Volumetric Air Cont., Θa,%	0.9	0.2	0.2	0.7	0.4	10.0	0.7	9.2
Void Ratio	1.65	0.83	0.92	0.74	0.63	0.87	0.74	0.69
Series	1	2	3	4	5	6	7	8

Note: All reported parameters are from the as-received sample condition unless otherwise noted. If an assumed specific gravity (Gs) was used then the saturation, porosities, and void ratio should be considered approximate.

Moisture-Density

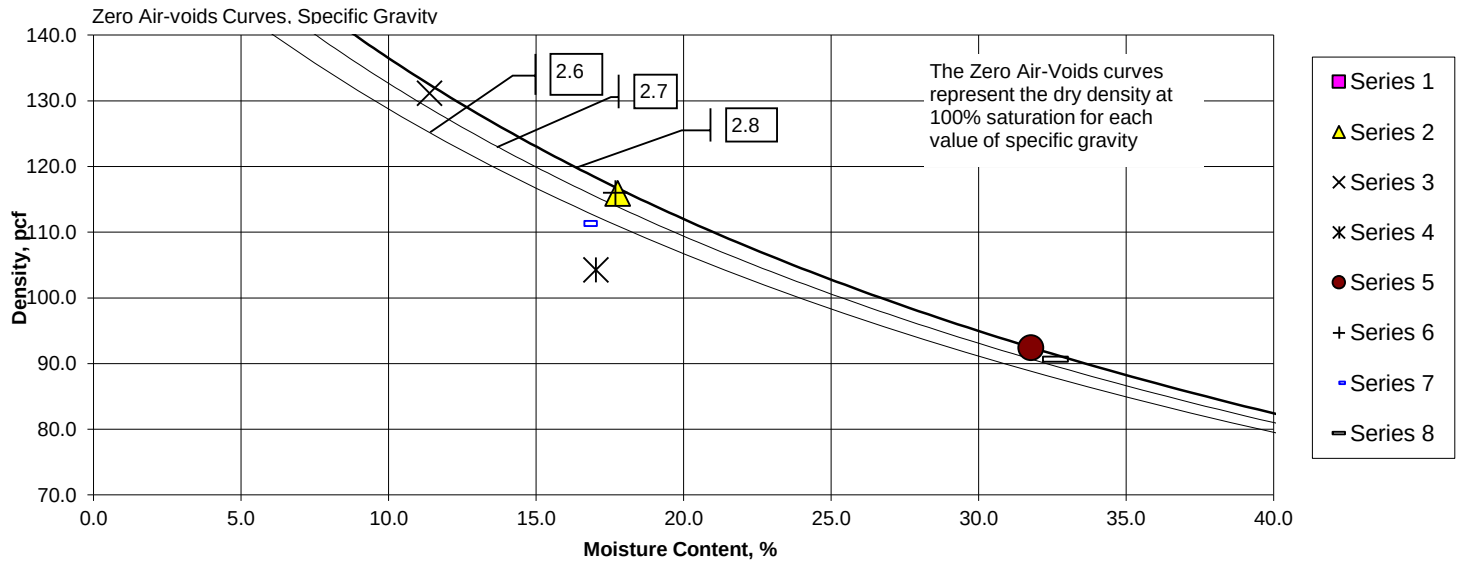


Moisture-Density-Porosity Report
Cooper Testing Labs, Inc. (ASTM D7263b)

CTL Job No:	461-383c	**Project No.**	WG3444	**By:**	RU
Client:	Geosyntec Consultants	**Date:**	08/23/24		
Project Name:	Collinsville-Pittsburg 230KV	**Remarks:**	B09 @ 70-71' - sample disturbed; m/c only.		

Boring:	B09	B10	B10	B10	B-11	B-11	B-11	B-12
Sample:	9-17C	10-3C	10-7B	10-9C	11-15A	11-15D	11-18C	12-2C
Depth, ft:	70-71	6-6.5	20.5-21	31-31.5	70-70.5	71.5-72	91-91.5	6-6.5
Visual Description:	Gray Silty GRAVEL w/ Sand	Gray Poorly Graded SAND w/ Silt	Gray Poorly Graded SAND w/ Silt & Gravel	Gray Poorly Graded SAND	Gray Fat CLAY w/ Sand	Gray Silty SAND	Olive Brown Lean Clayey GRAVEL w/ Sand	Gray Silty SAND
Actual G_s								
Assumed G_s		2.80	2.80	2.80	2.80	2.80	2.80	2.80
Moisture, %	8.5	17.8	11.4	17.0	31.8	17.7	16.6	32.6
Wet Unit wt, pcf		136.5	146.1	122.0	121.8	136.5	129.8	120.2
Dry Unit wt, pcf		115.9	131.1	104.2	92.4	116.0	111.3	90.6
Dry Bulk Dens.ρb, (g/cc)		1.86	2.10	1.67	1.48	1.86	1.78	1.45
Saturation, %		97.8	95.8	70.4	99.8	97.6	81.6	98.3
Total Porosity, %		33.7	25.0	40.4	47.1	33.7	36.3	48.1
Volumetric Water Cont,Θw,%		33.0	23.9	28.4	47.0	32.9	29.7	47.4
Volumetric Air Cont., Θa,%		0.7	1.1	11.9	0.1	0.8	6.7	0.8
Void Ratio		0.51	0.33	0.68	0.89	0.51	0.57	0.93
Series	1	2	3	4	5	6	7	8

Note: All reported parameters are from the as-received sample condition unless otherwise noted. If an assumed specific gravity (Gs) was used then the saturation, porosities, and void ratio should be considered approximate.

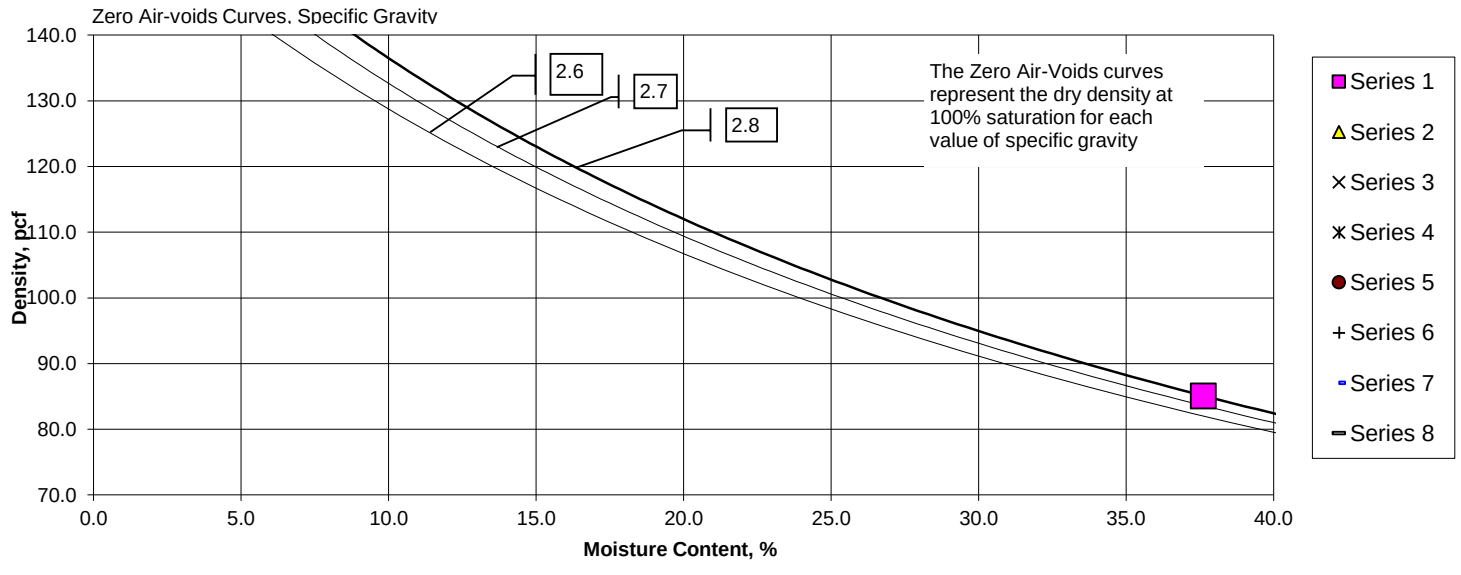


Moisture-Density-Porosity Report
Cooper Testing Labs, Inc. (ASTM D7263b)

CTL Job No:	461-383d	**Project No.**	WG3444	**By:**	RU
Client:	Geosyntec Consultants	**Date:**	08/23/24		
Project Name:	Collinsville-Pittsburg 230KV	**Remarks:**			

Boring:	B12							
Sample:	12-4B							
Depth, ft:	15.5-16							
Visual Description:	Gray CLAY w/ Sand							
Actual G_s								
Assumed G_s	2.80							
Moisture, %	37.6							
Wet Unit wt, pcf	117.0							
Dry Unit wt, pcf	85.0							
Dry Bulk Dens.ρb, (g/cc)	1.36							
Saturation, %	99.8							
Total Porosity, %	51.4							
Volumetric Water Cont,Θw,%	51.2							
Volumetric Air Cont., Θa,%	0.1							
Void Ratio	1.06							
Series	1	2	3	4	5	6	7	8

Note: All reported parameters are from the as-received sample condition unless otherwise noted. If an assumed specific gravity (Gs) was used then the saturation, porosities, and void ratio should be considered approximate.



Organic Content Test
ASTM D 2974-20 (Method A - 440 ºC)

CTL Number:	461-383a	**Project Name:**	Collinsville-Pittsburg 230KV	**Date:**	8/26/2024
Client Name:	Geosyntec Consultants	**Project Number:**	WG3444	**By:**	RU

Boring	B02	B02	B03	B03	B03	B04	B11	B11
Sample	2-3D	2-7	3-4	3-6C	3-7	4-6C	11-3	11-12
Depth (ft)	6.5-7	20-22.5	7.5-10	16-16.5	20-21.5	16-16.5	12-14.5	55.5-57.5
Visual Description	Dark Gray SILT w/ Sand	Greenish Gray Elastic SILT w/ organics (Bay Mud)	Gray Sandy SILT w/ organics	Dark Gray Silty SAND w/ organics	Black Organic CLAY w/ Sand	Gray Silty SAND	Dark Gray Elastic SILT w organics (Bay Mud)	Greenish Gray Organic Elastic SILT (Bay Mud)
Dish Number								
Dish weight (g)	75.42	75.80	80.21	63.10	73.31	74.34	81.78	67.88
Soil, Org, Dish & H_2O (g)	204.04	179.72	221.60	182.78	180.49	251.45	190.51	183.60
Oven Dry wt (110°C) (g)	172.84	134.85	165.91	144.45	123.54	230.36	139.12	118.89
Furnace Dry wt. (440°C) (g)	170.44	130.56	158.48	140.19	114.53	229.53	135.83	111.93
Moisture Content (%)	32.0	76.0	65.0	47.1	113.4	13.5	89.6	126.9
Ash Content (%)	97.5	92.7	91.3	94.8	82.1	99.5	94.3	86.4
Organic Material (%)	2.5	7.3	8.7	5.2	17.9	0.5	5.7	13.6

Note: ASTM provides no guidelines for including information about the organic content of a sample in the description when the wet/dry liquid limit data is not available. CTL developed the following guidelines to fill this gap:

0-5%: The organics are either not mentioned or mentioned as being "trace".
5-15%: The soil is considered as inorganic and is classified, as per ASTM 2487, with "with organics" included in the description.
15-50%: The soil is considered as organic and is described, per ASTM 2487.
> 50%: The soil is described as "Peat".

Organic Content Test
ASTM D 2974-20 (Method A - 440 ºC)

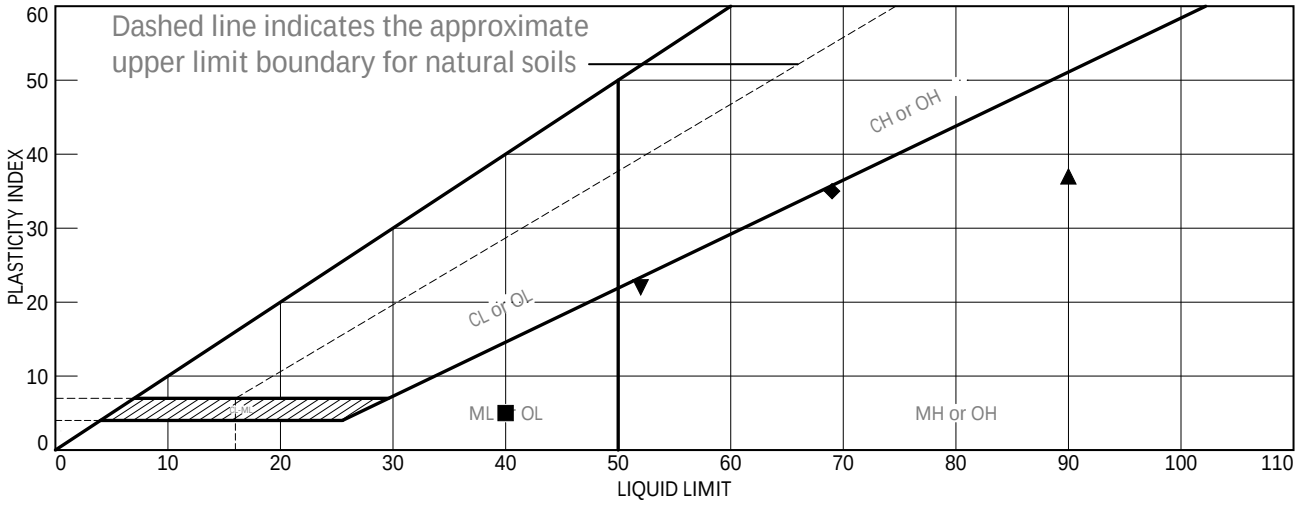
CTL Number: 461-383b
Client Name: Geosyntec Consultants
Project Name: Collinsville-Pittsburg 230KV
Project Number: WG3444
Date: 8/26/2024
By: RU

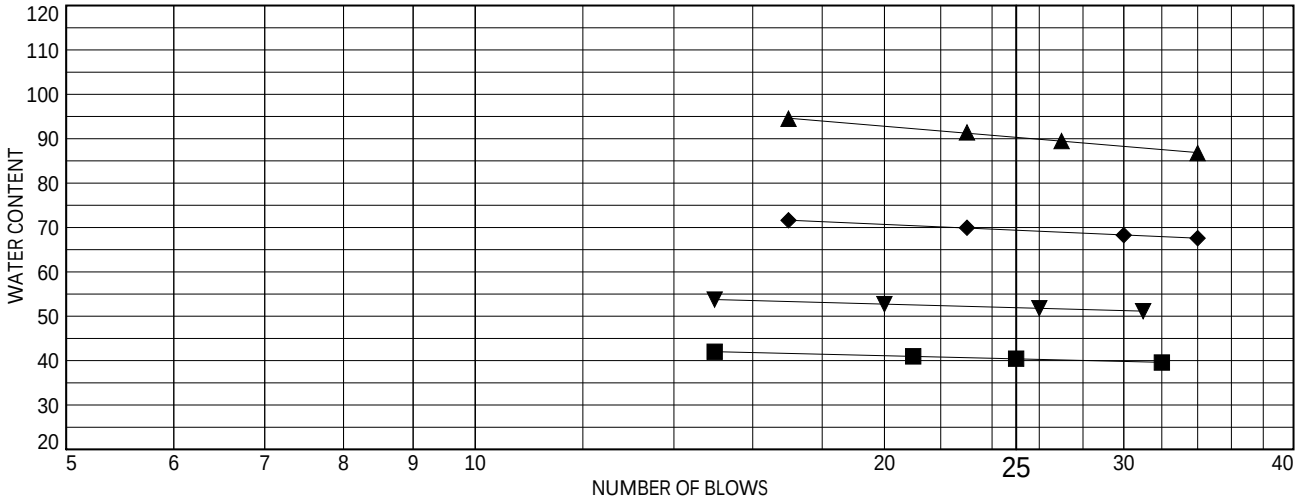
Boring	B11	B12						
Sample	11-14	12-2C						
Depth (ft)	65-67.5	6-6.5						
Visual Description	Greenish Gray Lean CLAY	Gray Silty SAND						
Dish Number								
Dish weight (g)	83.28	75.77						
Soil, Org, Dish & H_2O (g)	198.09	219.49						
Oven Dry wt (110°C) (g)	172.47	185.39						
Furnace Dry wt. (440°C) (g)	170.45	183.67						
Moisture Content (%)	28.7	31.1						
Ash Content (%)	97.7	98.4						
Organic Material (%)	2.3	1.6						

Note: ASTM provides no guidelines for including information about the organic content of a sample in the description when the wet/dry liquid limit data is not available. CTL developed the following guidelines to fill this gap:

0-5%: The organics are either not mentioned or mentioned as being "trace".
5-15%: The soil is considered as inorganic and is classified, as per ASTM 2487, with "with organics" included in the description.
15-50%: The soil is considered as organic and is described, per ASTM 2487.
> 50%: The soil is described as "Peat".

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray Poorly Graded SAND w/ Silt	NV	NP	NP	95.6	8.1	SP-SM
■	Greenish Gray Silty SAND	40	35	5			
▲	Greenish Gray Elastic SILT w/ organics (Bay Mud)	90	53	37			
◆	Gray Elastic SILT w/ Sand	69	34	35			
▼	Gray Elastic SILT w/ Sand	52	30	22	99.5	74.3	MH

Project No. 461-383 Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

●Source of Sample: B01	Depth: 6-6.5'	Sample Number: 1-2D
■Source of Sample: B02	Depth: 2.5-5'	Sample Number: 2-2
▲Source of Sample: B02	Depth: 20-22.5'	Sample Number: 2-7
◆Source of Sample: B03	Depth: 5-6.5'	Sample Number: 3-2
▼Source of Sample: B03	Depth: 5.5-6.5'	Sample Number: 3-3B-C

Remarks:

●Sample prepared using the wet prep method. Could not roll out. Samples slide in bowl. Non-plastic.

■Sample was prepared using the wet prep method.

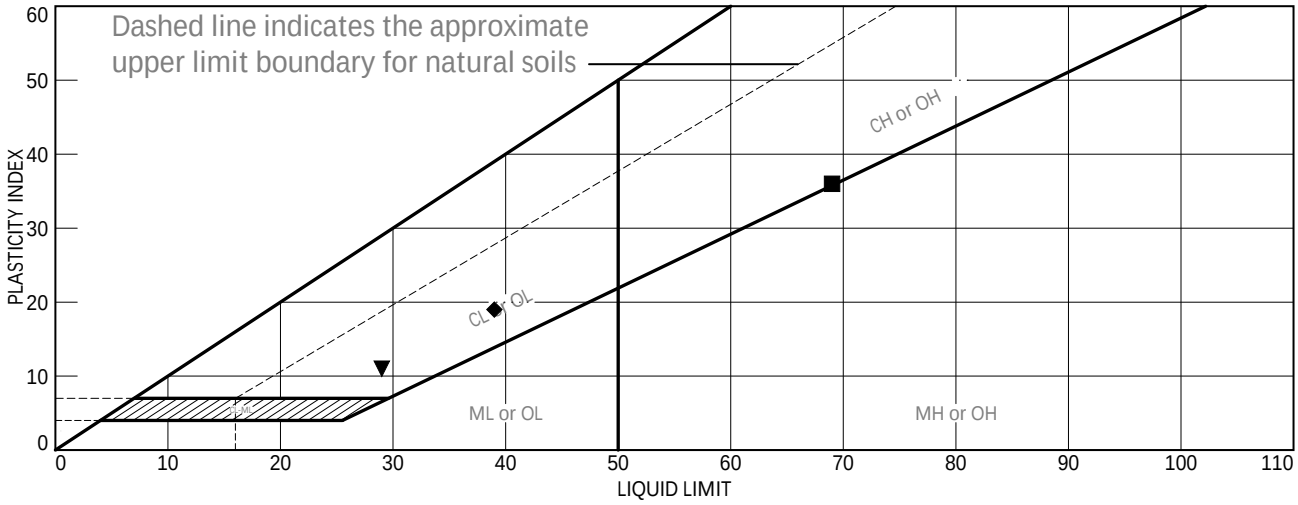
▲Sample was prepared using the wet prep method.

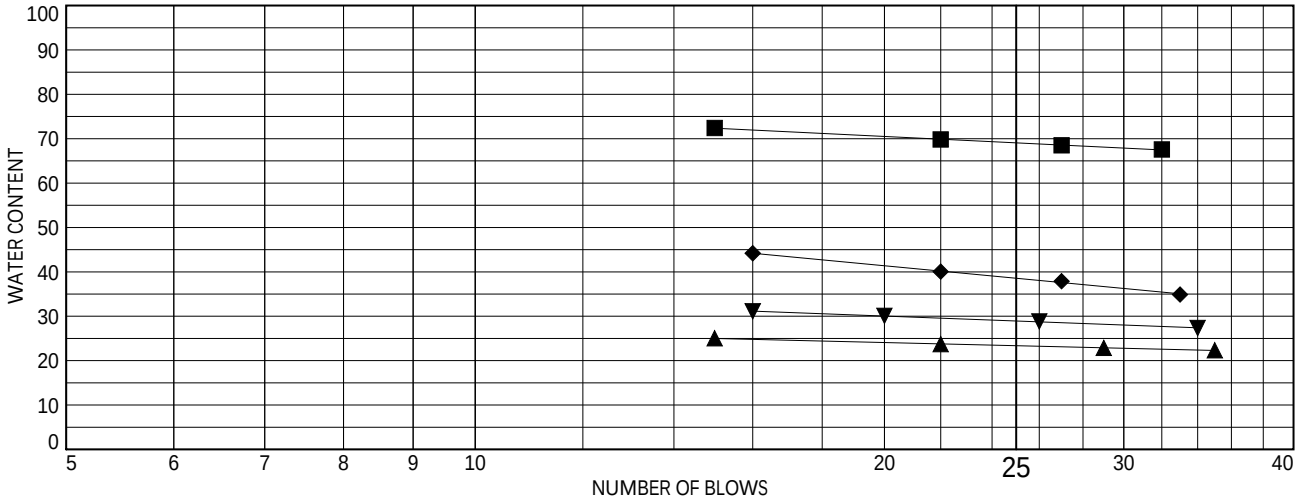
◆Sample was prepared using the wet prep method.

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish Gray Sandy SILT	NV	NP	NP	100.0	70.0	ML
■	Gray Fat CLAY	69	33	36	99.0	98.3	CH
▲	Gray SILT w/ Sand	23	24	NP	99.6	78.4	ML
◆	Yellowish Brown Sandy Lean CLAY	39	20	19			
▼	Olive Brown Lean CLAY w/ Sand	29	18	11	96.8	75.5	CL

Project No. 461-383 Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

●Source of Sample: B07	Depth: 8.5-11'	Sample Number: 7-3
■Source of Sample: B07	Depth: 15.5-16'	Sample Number: 7-5B
▲Source of Sample: B07	Depth: 17.5-20'	Sample Number: 7-6
◆Source of Sample: B08	Depth: 21.25-21.5'	Sample Number: 8-5
▼Source of Sample: B09	Depth: 15.5-16'	Sample Number: 9-6B

Remarks:

●Sample was prepared using the wet prep method.

▲Sample was prepared using the wet prep method.

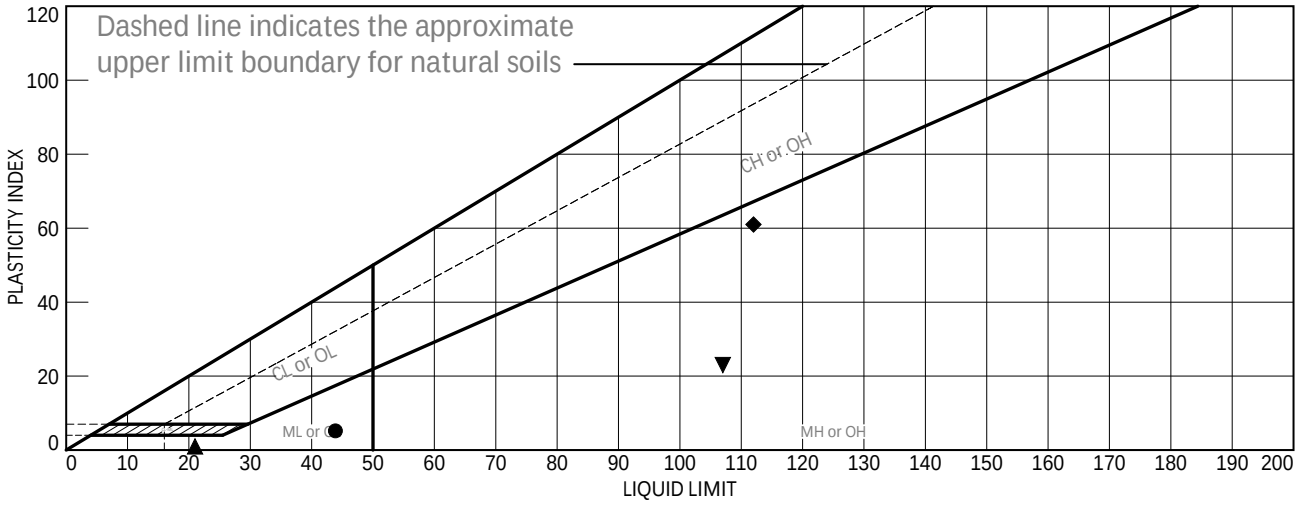
◆Sample was prepared using the wet prep method.

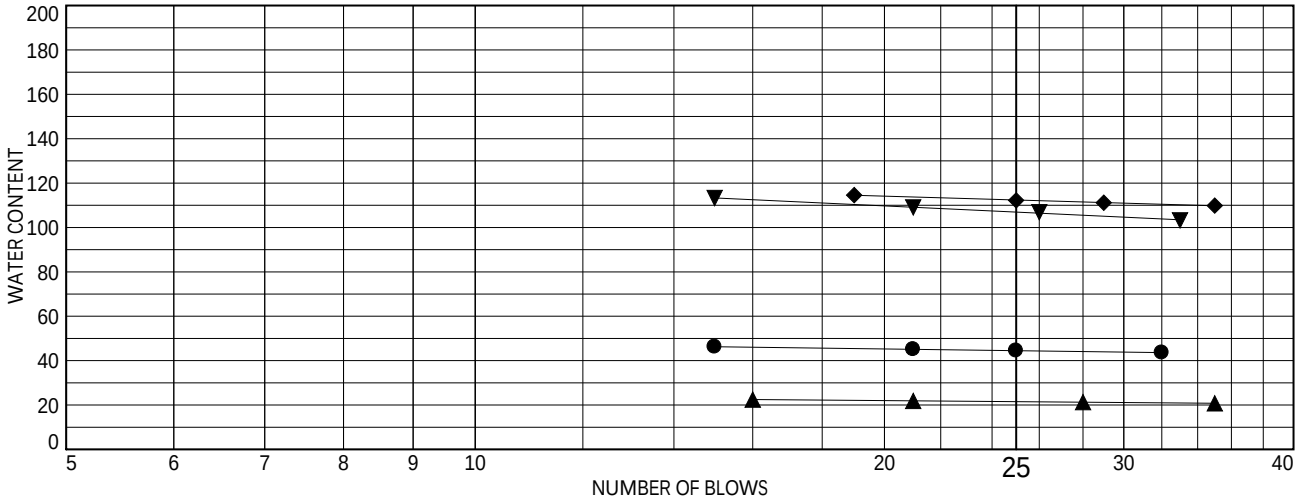
▼Sample was prepared using the wet prep method.

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Gray SILT	44	39	5	99.6	92.1	ML
■	Gray Poorly Graded SAND w/ Silt	NV	NP	NP	99.0	12.0	SP-SM
▲	Greenish Gray Sandy SILT	21	20	1	98.6	51.1	ML
◆	Dark Gray Elastic SILT w/ organics (Bay Mud)	112	51	61	99.4	97.1	MH
▼	Greenish Gray Organic Elastic SILT (Bay Mud)	107	84	23	99.3	92.7	MH

Project No. 461-383 Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

●	Source of Sample: B09	Depth: 35.5-36'	Sample Number: 9-10B
■	Source of Sample: B09	Depth: 65-67.5'	Sample Number: 9-16
▲	Source of Sample: B10	Depth: 2.5-5'	Sample Number: 10-2
◆	Source of Sample: B11	Depth: 12-14.5'	Sample Number: 11-3
▼	Source of Sample: B11	Depth: 55.5-57.5'	Sample Number: 11-12

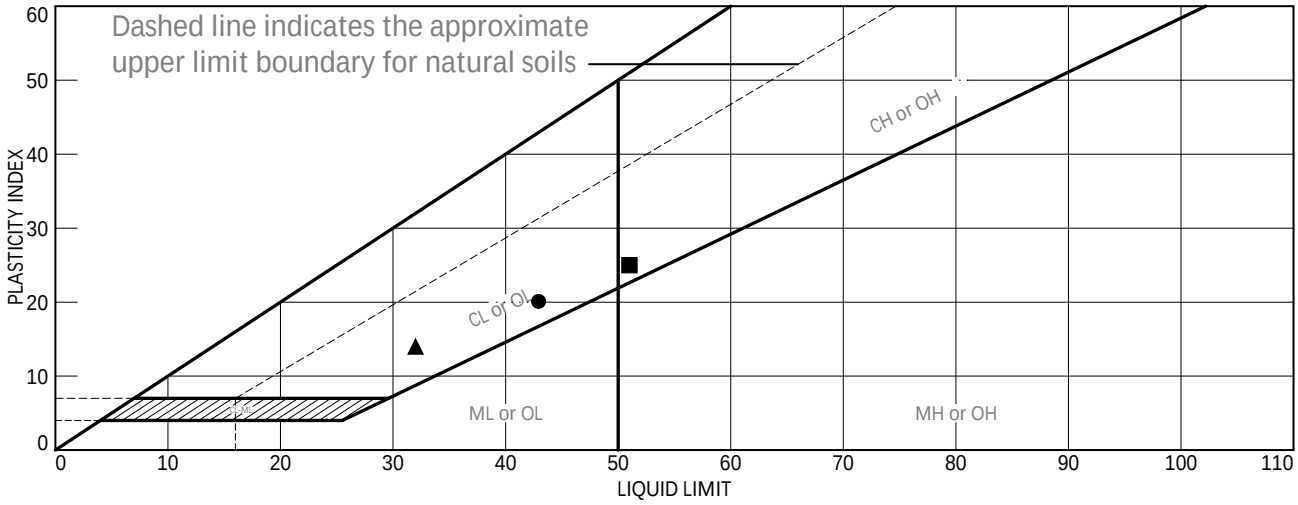
Remarks:

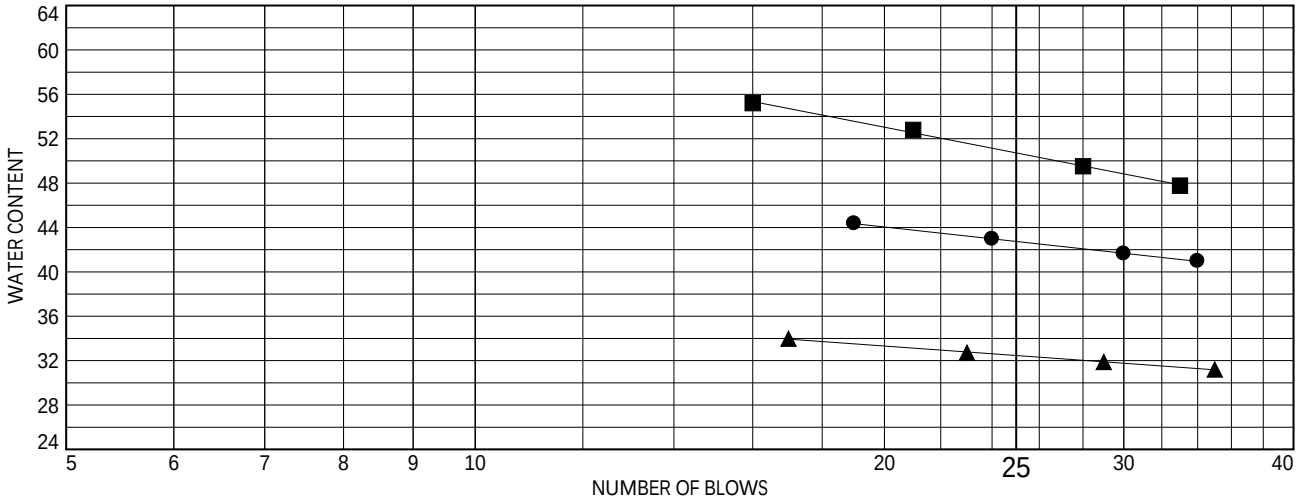
- ● Sample was prepared using the wet prep method.
- ■ Sample was prepared using the wet prep method.
- ▲ Sample was prepared using the wet prep method.
- ◆ Sample was prepared using the wet prep method.
- ▼ Sample was prepared using the wet prep method.

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greeenish Gray Lean CLAY	43	23	20	97.5	88.0	CL
■	Gray Fat CLAY w/ Sand	51	26	25	94.7	83.5	CH
▲	Olive Brown Lean Clayey GRAVEL w/ Sand	32	18	14	61.1	47.3	GC

Project No. 461-383 Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

●Source of Sample: B11 Depth: 65-67.5' Sample Number: 11-14

■Source of Sample: B11 Depth: 70-70.5' Sample Number: 11-15A

▲Source of Sample: B11 Depth: 91-92' Sample Number: 11-18C+D

Remarks:

●Sample was prepared using the wet prep method.

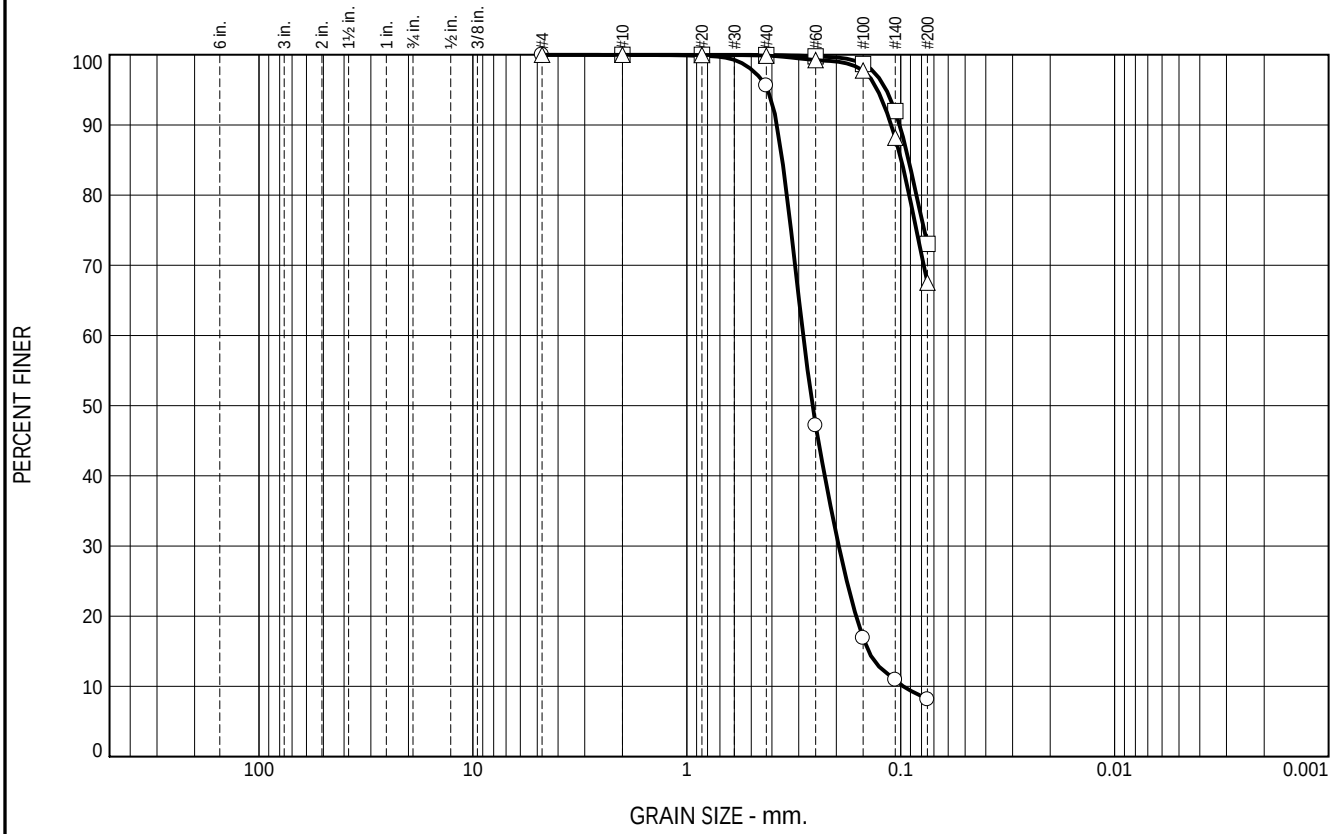
■Sample was prepared using the wet prep method.

▲Sample was prepared using the wet prep method.

COOPER TESTING LABORATORY

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.0	91.9	8.1		SP-SM	NV	NP	NP
□	0.0	0.0	26.9	73.1					
△	0.0	0.0	32.5	67.5					

SIEVE inches size	PERCENT FINER ○	□	△
	GRAIN SIZE		
D_{60}	0.2857		
D_{30}	0.1947		
D_{10}	0.0972		
	COEFFICIENTS		
C_c	1.37		
C_u	2.94		

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0		100.0
#10	100.0	100.0	100.0
#20	99.9	100.0	100.0
#40	95.6	100.0	99.9
#60	47.2	99.8	99.2
#100	16.9	98.7	97.8
#140	10.9	92.0	88.2
#200	8.1	73.1	67.5

Material Description

○Gray Poorly Graded SAND w/ Silt

□Dark Gray SILT w/ Sand

△Dark Gray Sandy SILT

REMARKS:

○

□

△

○Source of Sample: B01 Depth: 6-6.5' Sample Number: 1-2D

□Source of Sample: B02 Depth: 6.5-7' Sample Number: 2-3D

△Source of Sample: B02 Depth: 11-11.5' Sample Number: 2-5B

COOPER TESTING LABORATORY

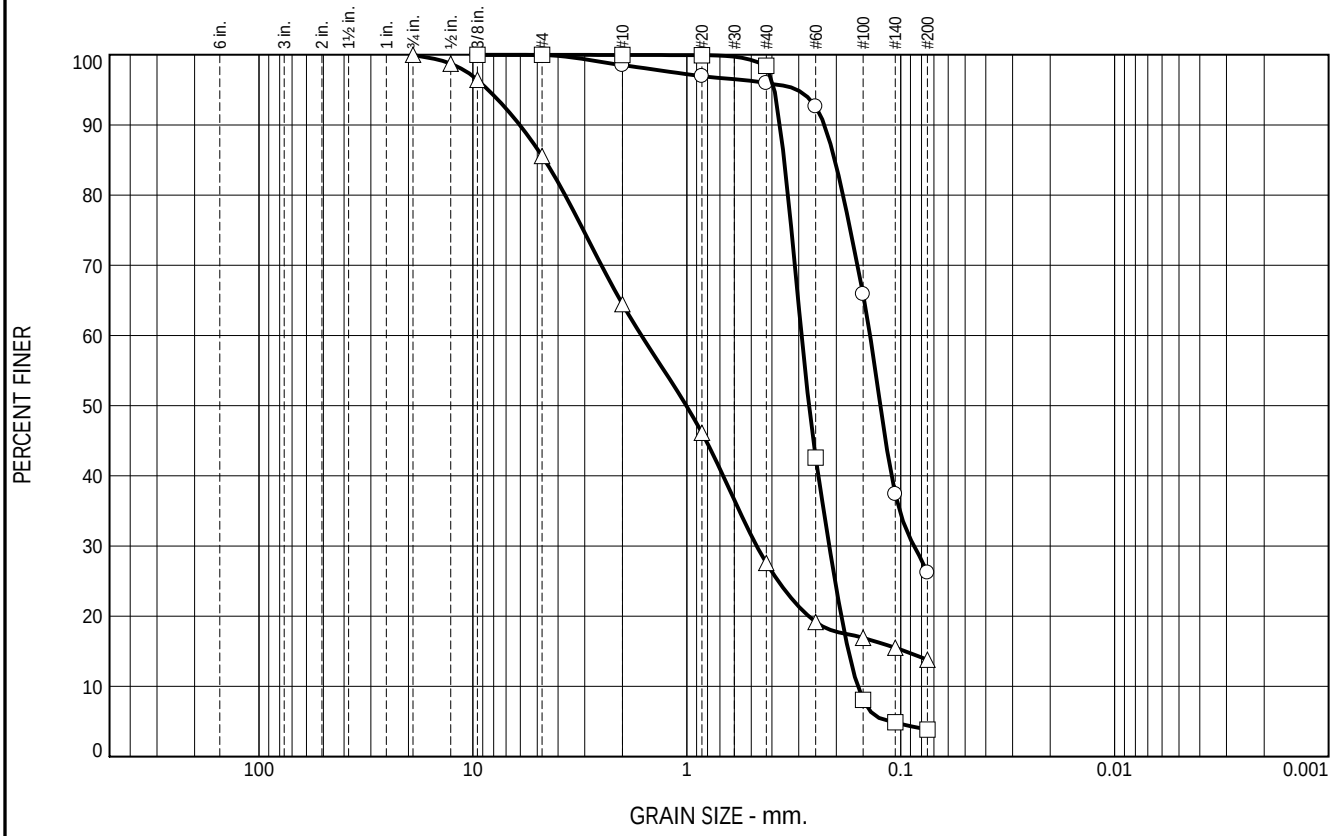
Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

Project No.: 461-383

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.0	73.8	26.2					
□	0.0	0.0	96.2	3.8		SP			
△	0.0	14.4	71.8	13.8					

SIEVE inches size	PERCENT FINER ○	□	△
3/4"			100.0
1/2"			98.7
3/8"	100.0	100.0	96.4
	GRAIN SIZE		
D_{60}	0.1390	0.2906	1.6289
D_{30}	0.0867	0.2157	0.4717
D_{10}		0.1588	
	COEFFICIENTS		
C_c		1.01	
C_u		1.83	

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	85.6
#10	98.5	100.0	64.5
#20	97.0	99.9	46.1
#40	96.0	98.4	27.6
#60	92.6	42.6	19.2
#100	65.9	8.1	16.9
#140	37.4	4.9	15.5
#200	26.2	3.8	13.8

Material Description

○Dark Gray Silty SAND w/ organics

□Gray Poorly Graded SAND

△Gray Silty SAND

REMARKS:

○

□

△

○Source of Sample: B03 Depth: 16-16.5' Sample Number: 3-6C

□Source of Sample: B04 Depth: 6-6.5' Sample Number: 4-3C

△Source of Sample: B04 Depth: 16-16.5' Sample Number: 4-6C

COOPER TESTING LABORATORY

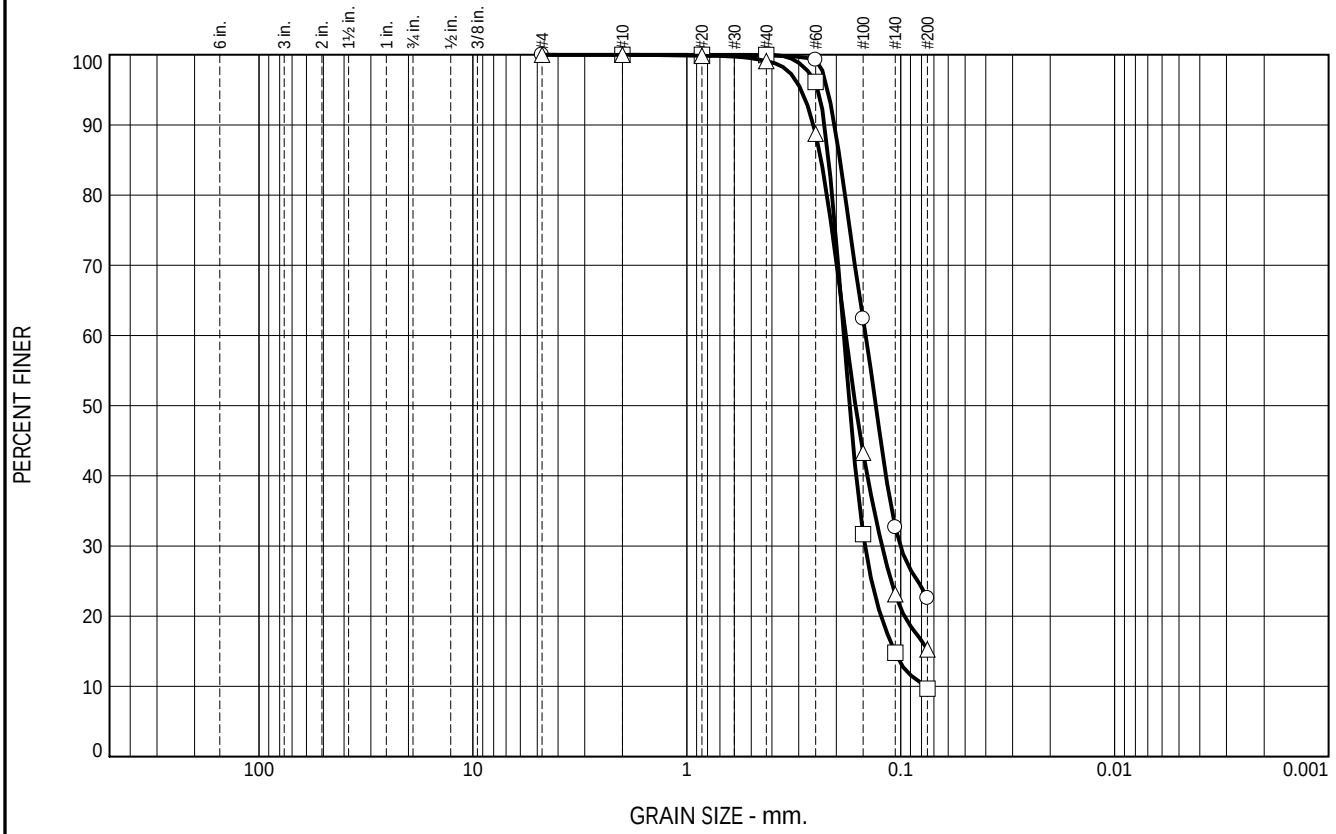
Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

Project No.: 461-383

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.0	77.4	22.6					
□	0.0	0.0	90.3	9.7					
△	0.0	0.0	84.7	15.3					

SIEVE inches size	PERCENT FINER ○	□	△
	GRAIN SIZE		
D_{60}	0.1457	0.1843	0.1803
D_{30}	0.1004	0.1470	0.1223
D_{10}		0.0768	
	COEFFICIENTS		
C_c		1.53	
C_u		2.40	

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0		100.0
#10	100.0	100.0	100.0
#20	100.0	100.0	99.9
#40	99.9	100.0	99.1
#60	99.3	96.1	88.8
#100	62.4	31.7	43.3
#140	32.7	14.8	23.1
#200	22.6	9.7	15.3

Material Description

○Gray Silty SAND

□Gray Poorly Graded SAND w/ Silt

△Gray Silty SAND

REMARKS:

○

□

△

○Source of Sample: B05 Depth: 6-6.5' Sample Number: 5-3C

□Source of Sample: B05 Depth: 16-16.5' Sample Number: 5-7C

△Source of Sample: B06 Depth: 11-11.5' Sample Number: 6-4C

COOPER TESTING LABORATORY

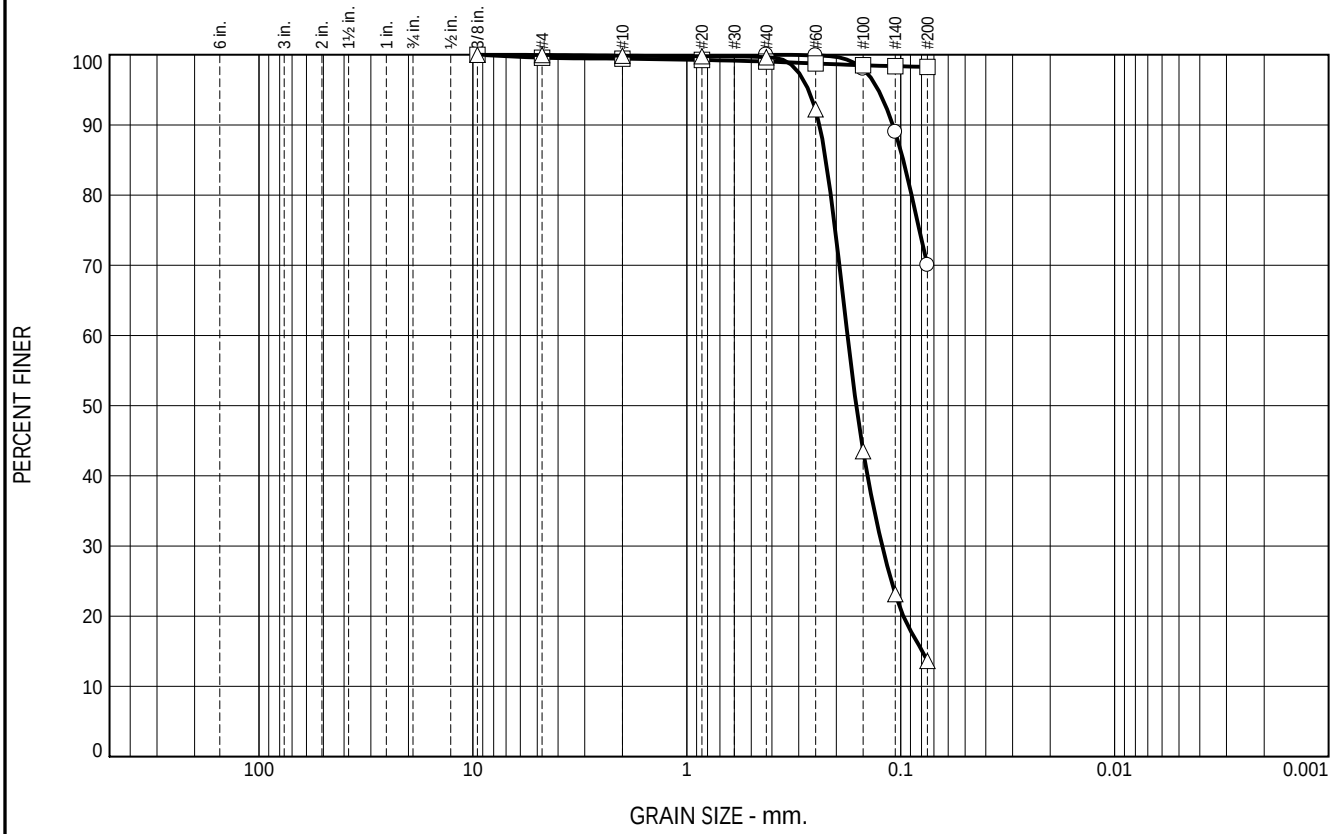
Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

Project No.: 461-383

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.0	30.0	70.0		ML	NP	NP	NP
□	0.0	0.4	1.3	98.3		CH	69	33	36
△	0.0	0.0	86.4	13.6					

SIEVE inches size	PERCENT FINER ○	□	△
3/8"		100.0	100.0
GRAIN SIZE			
D_{60}			0.1772
D_{30}			0.1220
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4		99.6	100.0
#10		99.4	99.9
#20		99.3	99.8
#40	100.0	99.0	99.6
#60	99.9	98.8	92.2
#100	98.0	98.5	43.5
#140	89.0	98.4	23.2
#200	70.0	98.3	13.6

Material Description

○Greenish Gray Sandy SILT

□Gray Fat CLAY

△Gray Silty SAND

REMARKS:

○

□

△

○Source of Sample: B07 Depth: 8.5-11' Sample Number: 7-3

□Source of Sample: B07 Depth: 15.5-16' Sample Number: 7-5B

△Source of Sample: B08 Depth: 6' Sample Number: 8-2B

COOPER TESTING LABORATORY

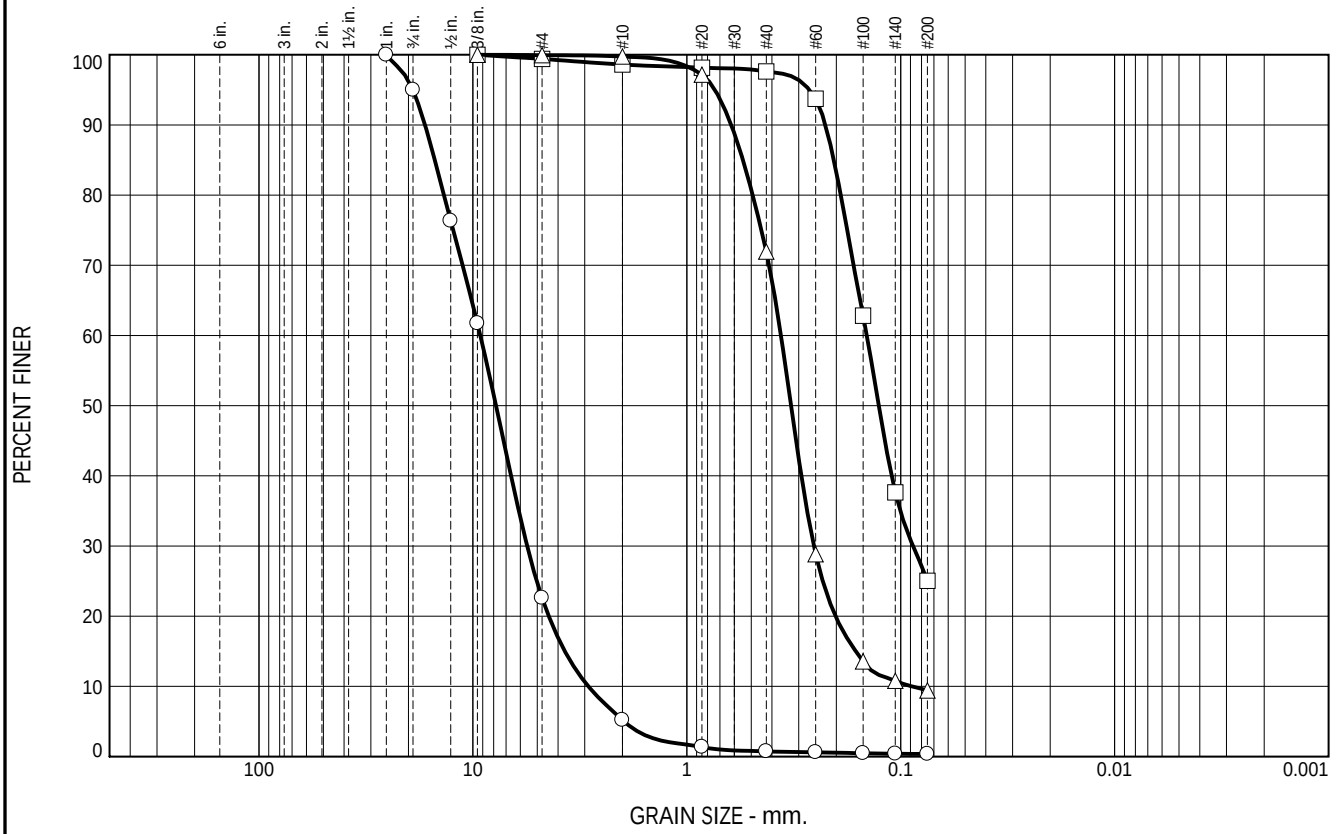
Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

Project No.: 461-383

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	77.4	22.2	0.4		GP			
□	0.0	0.6	74.4	25.0					
△	0.0	0.1	90.5	9.4					

SIEVE inches size	PERCENT FINER ○	□	△
1"	100.0		
3/4"	95.0		
1/2"	76.3		
3/8"	61.7	100.0	100.0
	GRAIN SIZE		
D_{60}	9.2260	0.1440	0.3628
D_{30}	5.5780	0.0876	0.2551
D_{10}	2.8840		0.0887
	COEFFICIENTS		
C_c	1.17		2.02
C_u	3.20		4.09

SIEVE number size	PERCENT FINER ○	□	△
#4	22.6	99.4	99.9
#10	5.2	98.6	99.7
#20	1.4	98.2	97.2
#40	0.7	97.6	71.9
#60	0.6	93.7	28.8
#100	0.5	62.8	13.6
#140	0.4	37.6	10.8
#200	0.4	25.0	9.4

Material Description

○Gray Poorly Graded GRAVEL w/ Sand

□Olive Gray Silty SAND

△Gray Poorly Graded SAND w/ Silt

REMARKS:

○

□

△

○Source of Sample: B08 Depth: 16-17' Sample Number: 8-4B-C

□Source of Sample: B09 Depth: 11.5-12' Sample Number: 9-5D

△Source of Sample: B09 Depth: 25-27.5' Sample Number: 9-8

COOPER TESTING LABORATORY

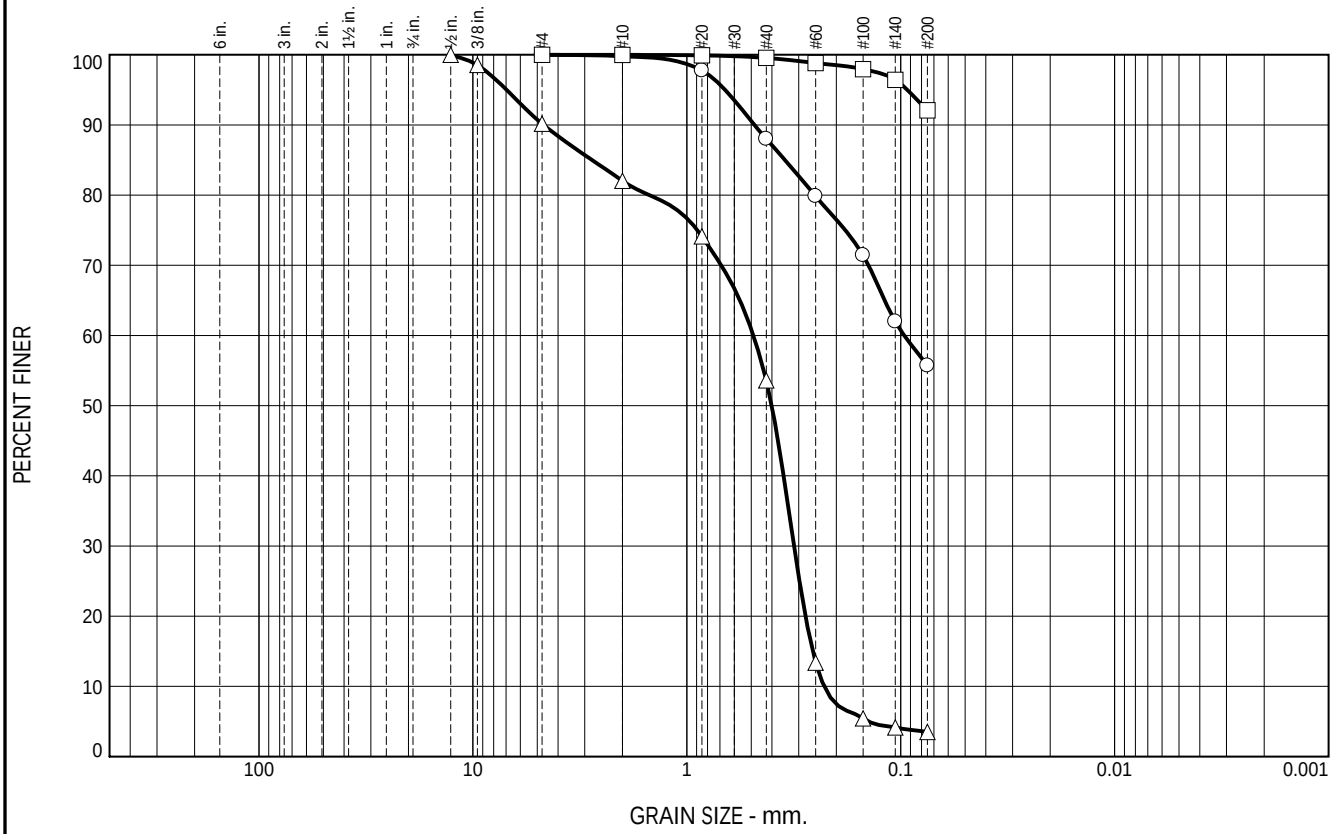
Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

Project No.: 461-383

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.0	44.3	55.7					
□	0.0	0.0	7.9	92.1		ML	44	39	5
△	0.0	9.8	86.7	3.5		SP			

SIEVE inches size	PERCENT FINER ○	□	△
1/2"			100.0
3/8"			98.6
GRAIN SIZE			
D_{60}	0.0963		0.4885
D_{30}			0.3151
D_{10}			0.2280
COEFFICIENTS			
C_c			0.89
C_u			2.14

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	90.2
#10	99.8	100.0	82.0
#20	97.8	99.9	74.1
#40	88.0	99.6	53.6
#60	79.9	98.8	13.4
#100	71.4	98.0	5.4
#140	62.0	96.4	4.1
#200	55.7	92.1	3.5

Material Description

○Olive Gray Sandy CLAY

□Olive Gray SILT

△Gray Poorly Graded SAND

REMARKS:

○

□

△

○Source of Sample: B09 Depth: 31-31.5' Sample Number: 9-9C

□Source of Sample: B09 Depth: 35.5-36' Sample Number: 9-10B

△Source of Sample: B09 Depth: 40.5-42' Sample Number: 9-11B+D

COOPER TESTING LABORATORY

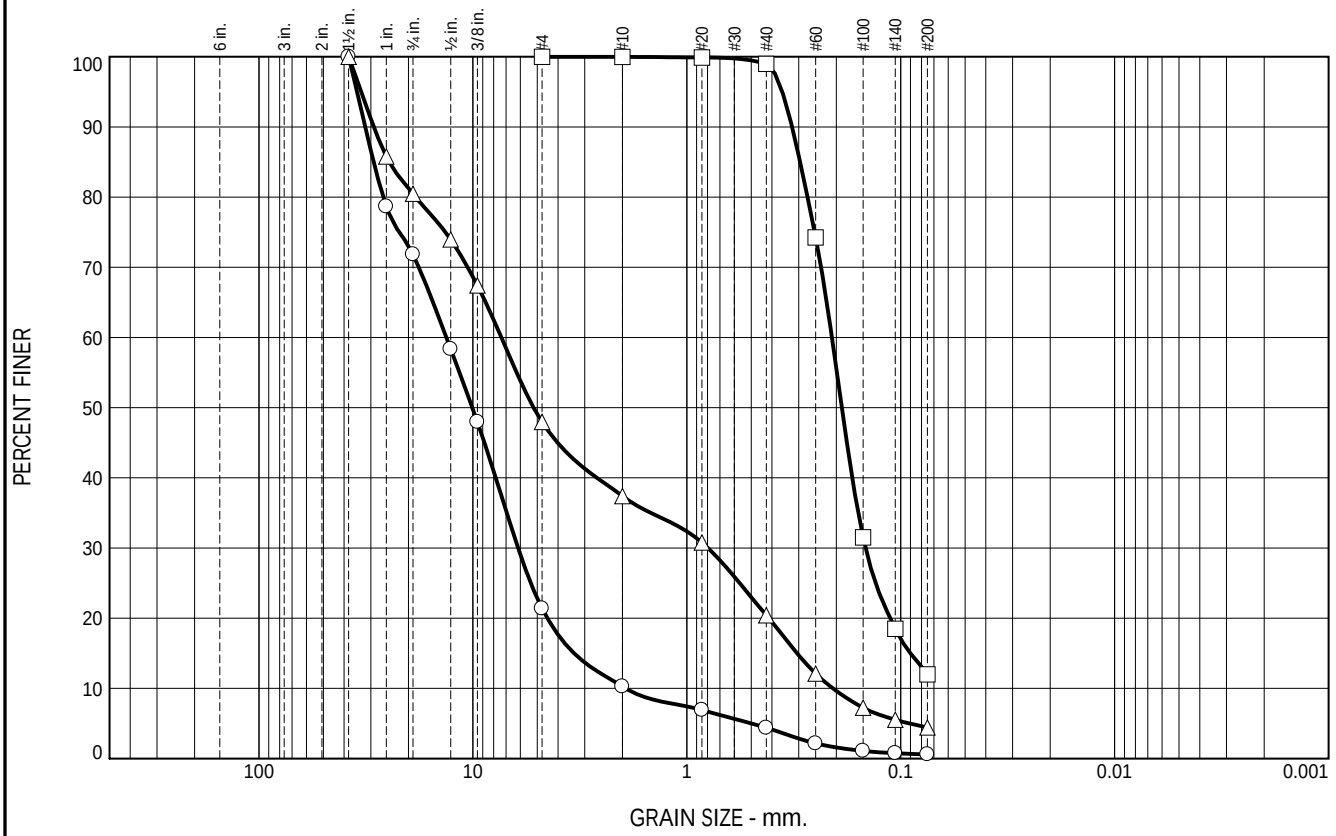
Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

Project No.: 461-383

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	78.6	20.8	0.6		GW			
□	0.0	0.0	88.0	12.0		SP-SM	NP	NP	NP
△	0.0	52.0	43.6	4.4		GP	0	0	

SIEVE inches size	PERCENT FINER ○	□	△
1.5	100.0		100.0
1"	78.7		85.8
3/4"	71.8		80.5
1/2"	58.4		74.0
3/8"	47.9		67.4
	GRAIN SIZE		
D_{60}	13.3136	0.2096	7.3598
D_{30}	6.1484	0.1461	0.7962
D_{10}	1.9352		0.2076
	COEFFICIENTS		
C_c	1.47		0.41
C_u	6.88		35.46

SIEVE number size	PERCENT FINER ○	□	△
#4	21.4	100.0	48.0
#10	10.3	100.0	37.4
#20	6.9	99.9	30.8
#40	4.4	99.0	20.4
#60	2.2	74.3	12.1
#100	1.1	31.5	7.2
#140	0.8	18.5	5.5
#200	0.6	12.0	4.4

Material Description

○Gray Well-Graded GRAVEL w/ Sand

□Gray Poorly Graded SAND w/ Silt

△Gray Poorly Graded GRAVEL w/ Sand

REMARKS:

○

□

△Due to the small sample size, relative to the largest particle size, this data should be considered to be approximate.

○Source of Sample: B09 Depth: 51-51.5' Sample Number: 9-13C

□Source of Sample: B09 Depth: 65-67.5' Sample Number: 9-16

△Source of Sample: B09 Depth: 70-71' Sample Number: 9-17C

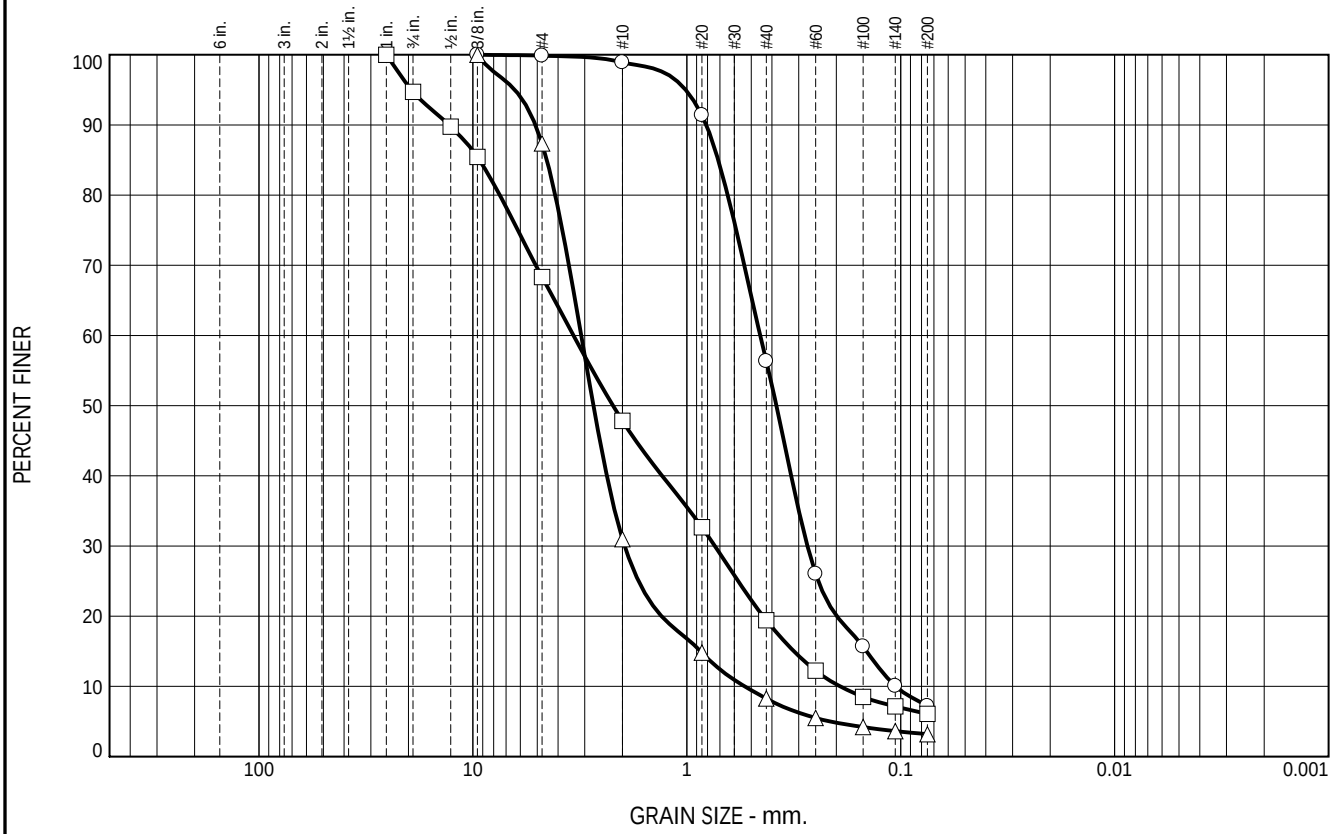
COOPER TESTING LABORATORY

Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

Project No.: 461-383 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.1	92.7	7.2					
□	0.0	31.7	62.2	6.1					
△	0.0	12.6	84.2	3.2		SP			

SIEVE inches size	PERCENT FINER ○	□	△
1"		100.0	
3/4"		94.7	
1/2"		89.8	
3/8"	100.0	85.5	100.0
	GRAIN SIZE		
D_{60}	0.4541	3.3848	3.1142
D_{30}	0.2731	0.7392	1.9531
D_{10}	0.1055	0.1920	0.5365
	COEFFICIENTS		
C_c	1.56	0.84	2.28
C_u	4.30	17.63	5.80

SIEVE number size	PERCENT FINER ○	□	△
#4	99.9	68.3	87.4
#10	98.9	47.8	31.0
#20	91.4	32.7	14.8
#40	56.3	19.4	8.3
#60	26.0	12.2	5.5
#100	15.7	8.5	4.2
#140	10.1	7.1	3.6
#200	7.2	6.1	3.2

Material Description

○Gray Poorly Graded SAND w/ Silt

□Gray Poorly Graded SAND w/ Silt & Gravel

△Gray Poorly Graded SAND

REMARKS:

○

□

△

○Source of Sample: B10 Depth: 6-6.5' Sample Number: 10-3C

□Source of Sample: B10 Depth: 20.5-21' Sample Number: 10-7B

△Source of Sample: B10 Depth: 31-31.5' Sample Number: 10-9C

COOPER TESTING LABORATORY

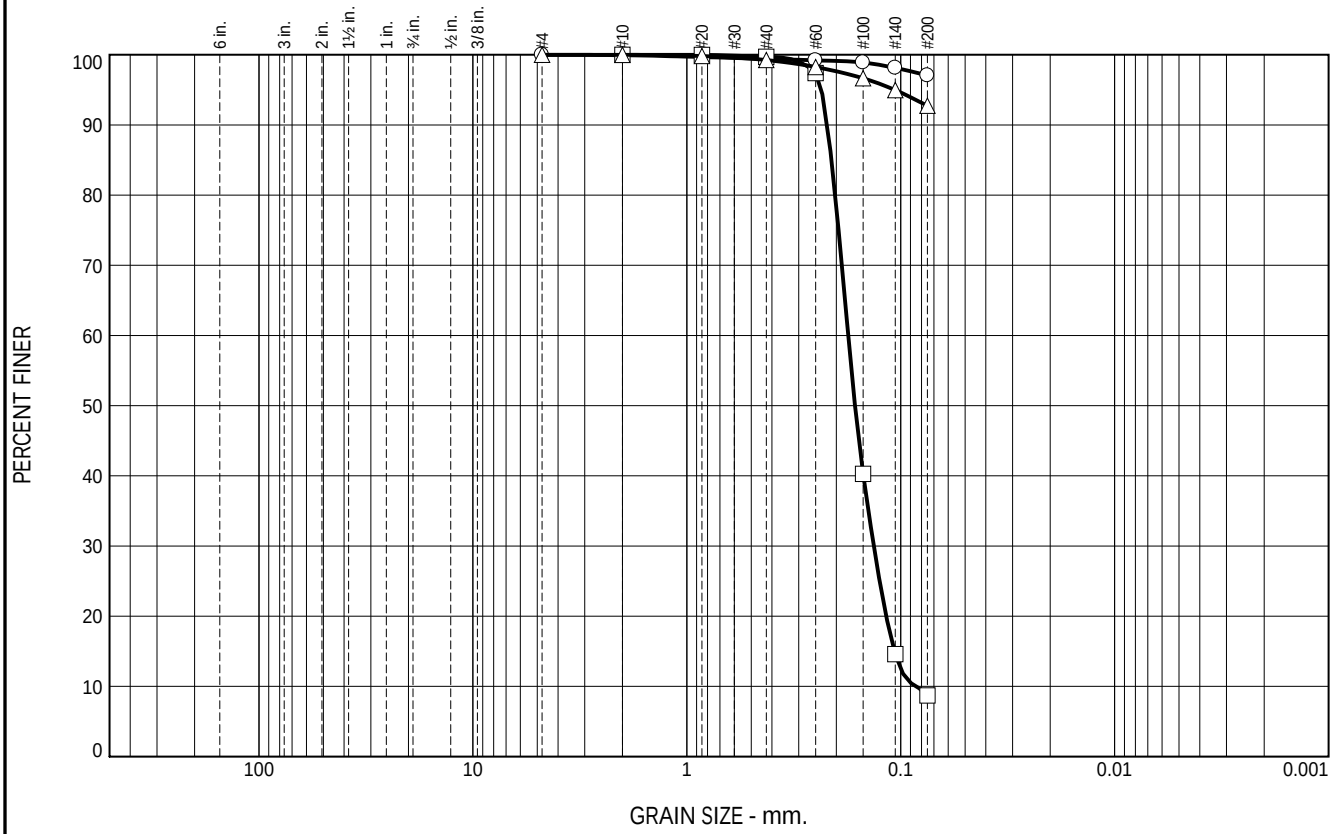
Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

Project No.: 461-383

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.0	2.9	97.1		MH	112	51	61
□	0.0	0.0	91.3	8.7					
△	0.0	0.0	7.3	92.7		MH	107	84	23

SIEVE inches size	PERCENT FINER ○	□	△
	GRAIN SIZE		
D_{60}		0.1759	
D_{30}		0.1336	
D_{10}		0.0849	
	COEFFICIENTS		
C_c		1.20	
C_u		2.07	

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0		100.0
#10	99.9	100.0	100.0
#20	99.7	100.0	99.8
#40	99.4	99.7	99.3
#60	99.2	97.4	98.3
#100	98.9	40.3	96.7
#140	98.1	14.6	95.0
#200	97.1	8.7	92.7

Material Description

○ Dark Gray Elastic SILT w/ organics (Bay Mud)

□ Gray Poorly Graded SAND w/ Silt

△ Greenish Gray Organic Elastic SILT (Bay Mud)

REMARKS:

○

□

△

○ Source of Sample: B11 Depth: 12-14.5' Sample Number: 11-3

□ Source of Sample: B11 Depth: 25-27.5' Sample Number: 11-6

△ Source of Sample: B11 Depth: 55.5-57.5' Sample Number: 11-12

COOPER TESTING LABORATORY

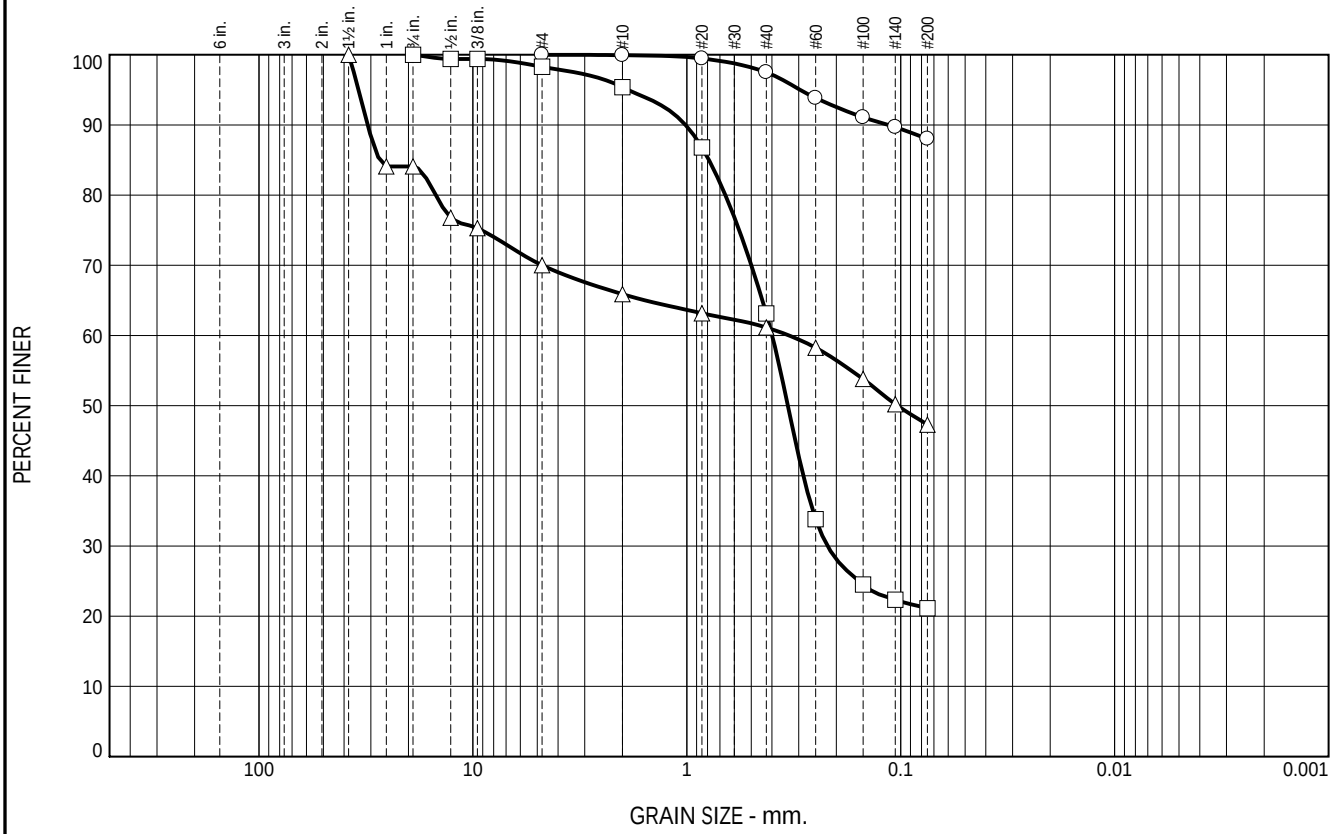
Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

Project No.: 461-383

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.0	12.0	88.0		CL	43	23	20
□	0.0	1.7	77.2	21.1					
△	0.0	30.0	22.7	47.3		GC	32	18	14

SIEVE inches size	PERCENT FINER ○	□	△
1.5"			100.0
1"			84.1
3/4"		100.0	84.1
1/2"		99.4	76.8
3/8"		99.4	75.3
GRAIN SIZE			
D_{60}		0.3987	0.3328
D_{30}		0.2199	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	98.3	70.0
#10	99.9	95.4	65.9
#20	99.5	86.8	63.2
#40	97.5	63.1	61.1
#60	93.8	33.8	58.3
#100	91.1	24.5	53.8
#140	89.7	22.3	50.2
#200	88.0	21.1	47.3

Material Description

○Greeenish Gray Lean CLAY

□Gray Silty SAND

△Olive Brown Lean Clayey GRAVEL w/ Sand

REMARKS:

○

□

△Due to the small sample size, relative to the largest particle size, this data should be considered to be approximate.

○Source of Sample: B11 Depth: 65-67.5' Sample Number: 11-14

□Source of Sample: B11 Depth: 71.5-72' Sample Number: 11-15D

△Source of Sample: B11 Depth: 91-92' Sample Number: 11-18C+D

COOPER TESTING LABORATORY

Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

Project No.: 461-383 Figure

Particle Size Distribution Report

	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.1	67.8	32.1					
□	0.0	0.0	20.1	79.9					

SIEVE inches size	PERCENT FINER ○	□	
3/8"	100.0		
	GRAIN SIZE		
D_{60}	0.1144		
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□
#4	99.9	100.0
#10	99.9	100.0
#20	99.9	100.0
#40	99.6	99.9
#60	97.7	98.4
#100	80.0	90.0
#140	54.3	85.3
#200	32.1	79.9

Material Description

○Gray Silty SAND

□Gray CLAY w/ Sand

REMARKS:

○

□

○Source of Sample: B12 Depth: 6-6.5' Sample Number: 12-2C

□Source of Sample: B12 Depth: 15.5-16' Sample Number: 12-4B

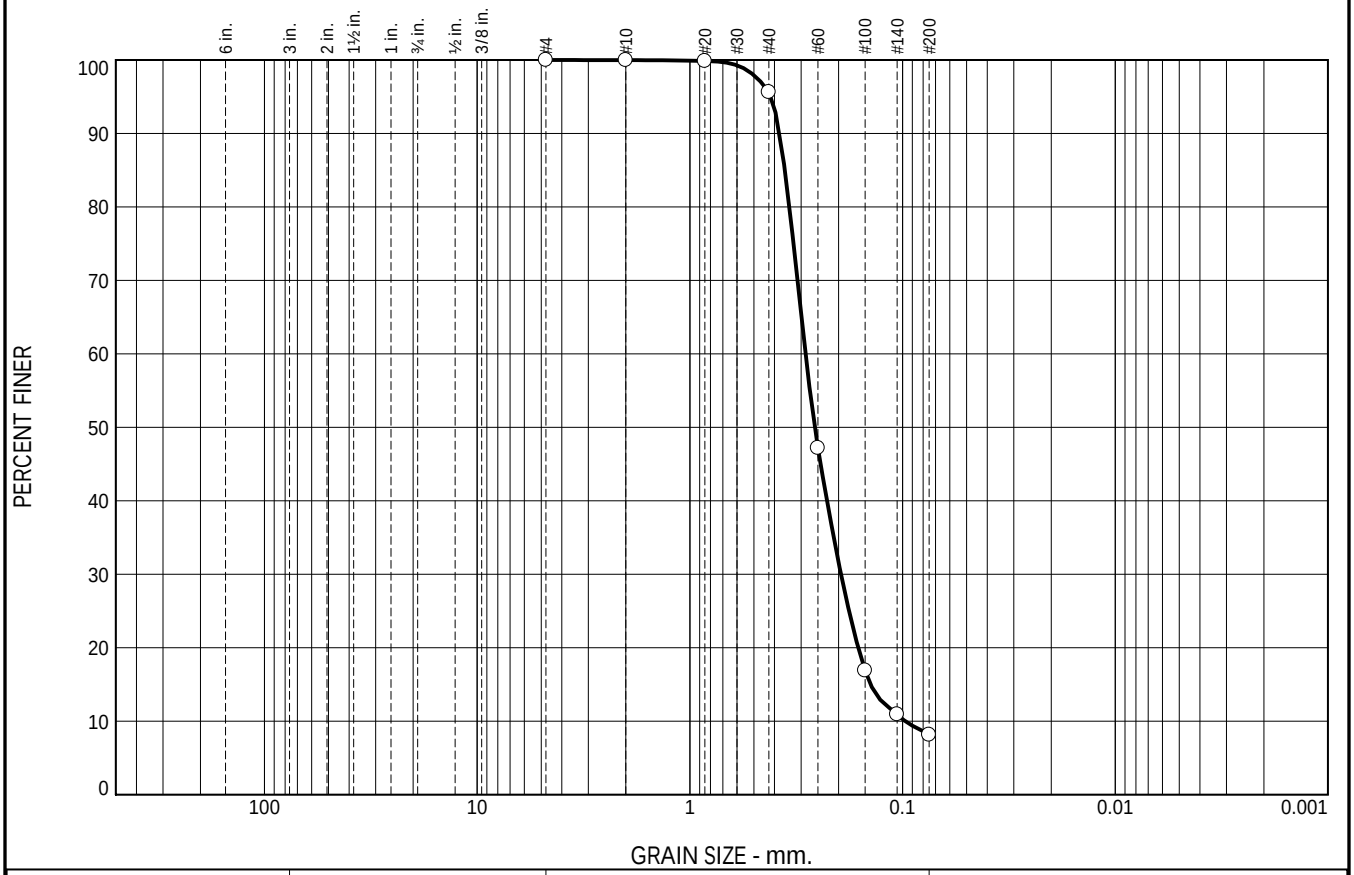
COOPER TESTING LABORATORY

Client: Geosyntec Consultants

Project: Collinsville-Pittsburg 230KV - WG3444

Project No.: 461-383 Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	4.4	87.5	8.1	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	99.9		
#40	95.6		
#60	47.2		
#100	16.9		
#140	10.9		
#200	8.1		

* (no specification provided)

Soil Description

Gray Poorly Graded SAND w/ Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.3790 D_{85}= 0.3576 D_{60}= 0.2857
D_{50}= 0.2588 D_{30}= 0.1947 D_{15}= 0.1415
D_{10}= 0.0972 C_u= 2.94 C_c= 1.37

Classification

USCS= SP-SM AASHTO= A-3

Remarks

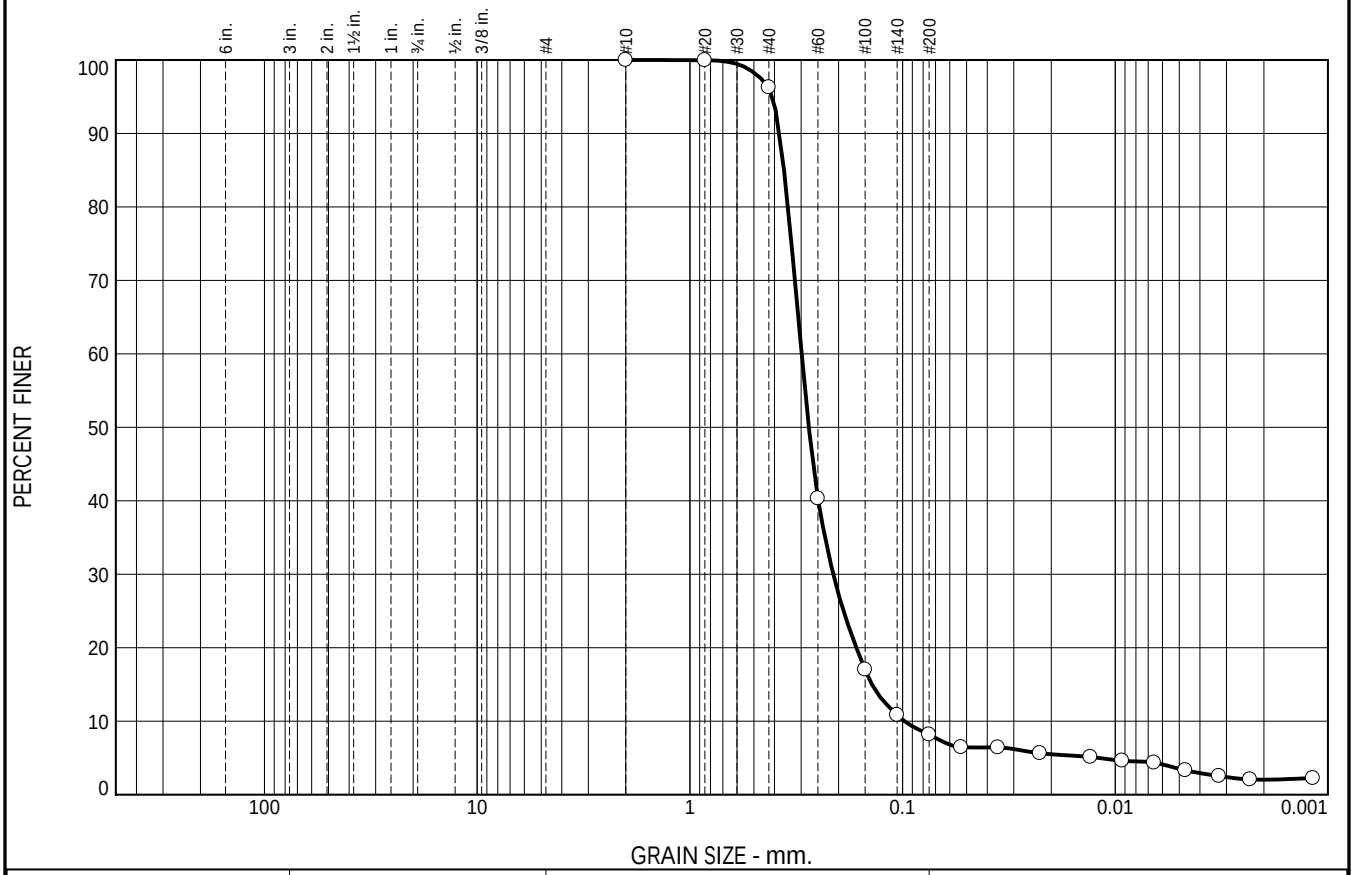
Source of Sample: B01 Depth: 6-6.5'
Sample Number: 1-2D Date:

COOPER TESTING LABORATORY

Client: Geosyntec Consultants
Project: Collinsville-Pittsburg 230KV - WG3444

Project No: 461-383 Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	3.7	88.1	6.2	2.0

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	96.3		
#60	40.3		
#100	17.0		
#140	10.8		
#200	8.2		
#270	6.5		
0.0356 mm.	6.4		
0.0226 mm.	5.6		
0.0131 mm.	5.1		
0.0093 mm.	4.6		
0.0066 mm.	4.4		
0.0047 mm.	3.3		
0.0033 mm.	2.5		
0.0023 mm.	2.1		
0.0012 mm.	2.2		

* (no specification provided)

Soil Description

Gray Silty SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3793 D_{85}= 0.3609 D_{60}= 0.2981
D_{50}= 0.2757 D_{30}= 0.2119 D_{15}= 0.1393
D_{10}= 0.0981 C_u= 3.04 C_c= 1.54

Classification

USCS= AASHTO=

Remarks

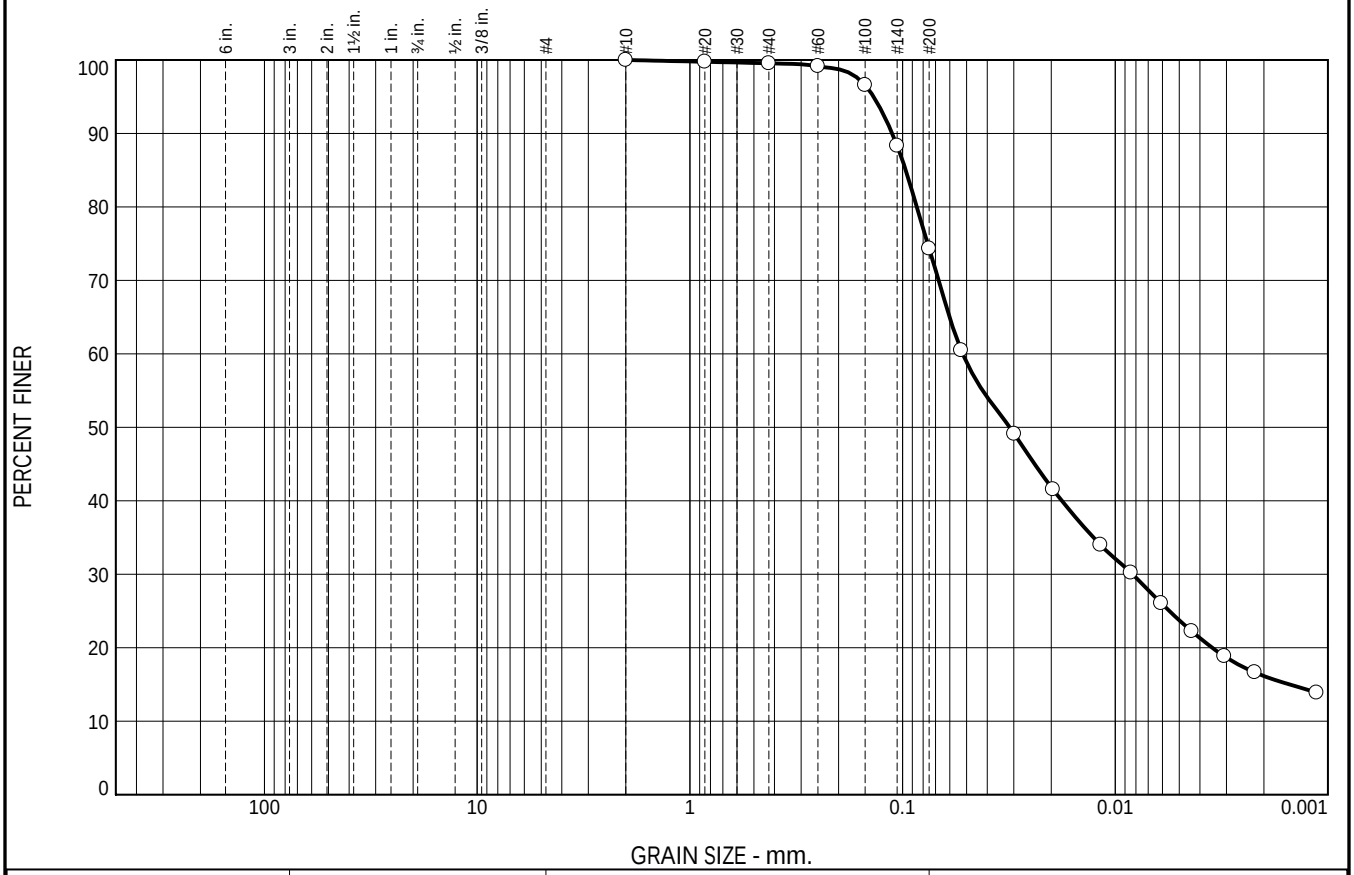
Source of Sample: B01 Depth: 11-11.5'
Sample Number: 1-5D Date:

COOPER TESTING LABORATORY

Client: Geosyntec Consultants
Project: Collinsville-Pittsburg 230KV - WG3444

Project No: 461-383 Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.5	25.2	58.2	16.1

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.8		
#40	99.5		
#60	99.1		
#100	96.6		
#140	88.3		
#200	74.3		
#270	60.5		
0.0298 mm.	49.1		
0.0196 mm.	41.5		
0.0117 mm.	34.0		
0.0084 mm.	30.2		
0.0061 mm.	26.1		
0.0044 mm.	22.2		
0.0031 mm.	18.8		
0.0022 mm.	16.6		
0.0011 mm.	13.9		

* (no specification provided)

Soil Description

Gray Elastic SILT w/ Sand

Atterberg Limits

PL= 30 LL= 52 PI= 22

Coefficients

D_{90}= 0.1119 D_{85}= 0.0967 D_{60}= 0.0521
D_{50}= 0.0313 D_{30}= 0.0083 D_{15}= 0.0015
D_{10}= C_u= C_c=

Classification

USCS= MH AASHTO= A-7-5(17)

Remarks

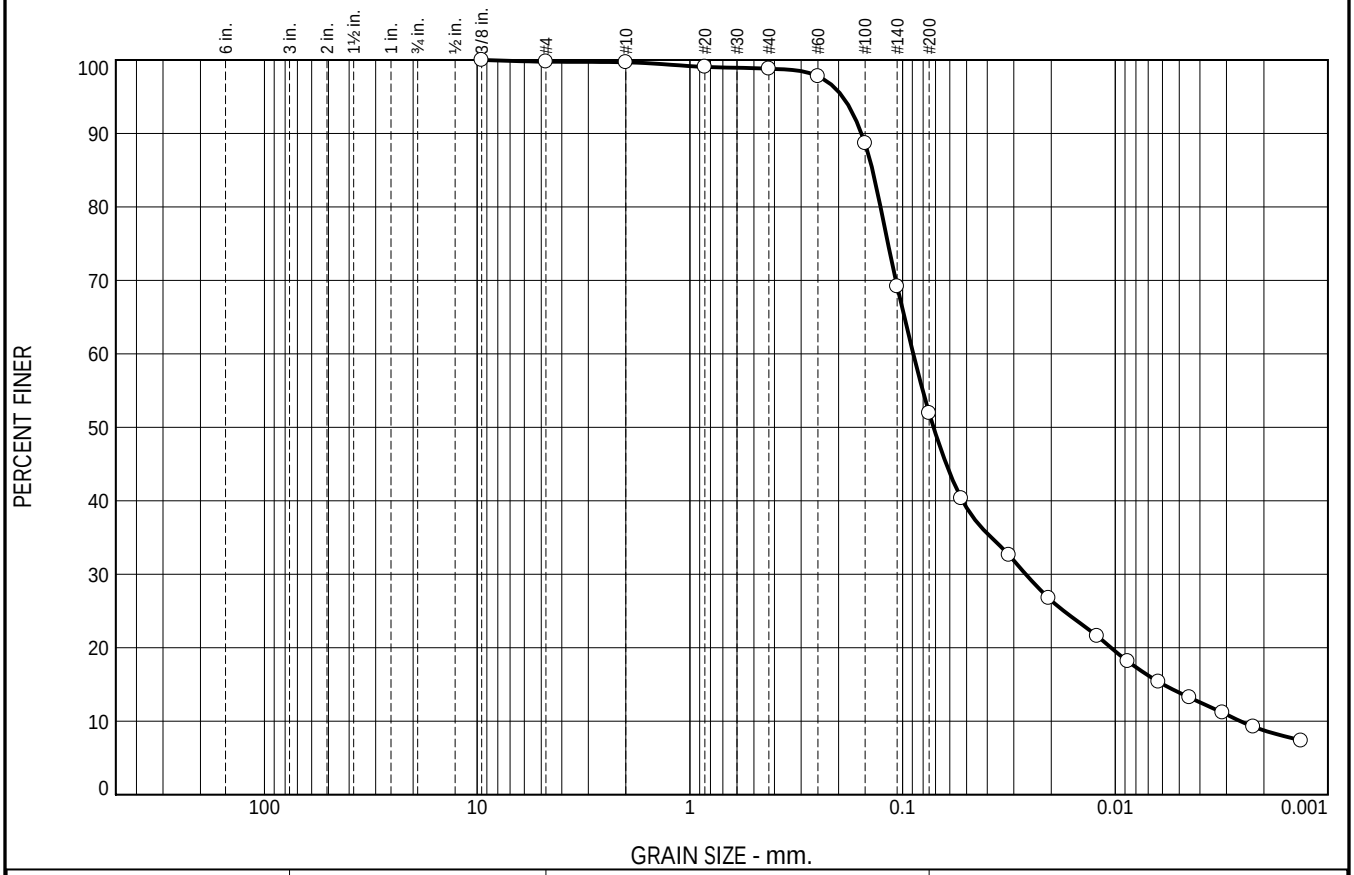
Source of Sample: B03 Depth: 5.5-6.5'
Sample Number: 3-3B-C Date:

COOPER TESTING LABORATORY

Client: Geosyntec Consultants
Project: Collinsville-Pittsburg 230KV - WG3444

Project No: 461-383 Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.1	0.9	46.9	43.2	8.7

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	99.8		
#10	99.7		
#20	99.1		
#40	98.8		
#60	97.8		
#100	88.7		
#140	69.2		
#200	51.9		
#270	40.3		
0.0316 mm.	32.6		
0.0206 mm.	26.8		
0.0122 mm.	21.6		
0.0087 mm.	18.2		
0.0063 mm.	15.4		
0.0045 mm.	13.2		
0.0031 mm.	11.2		
0.0022 mm.	9.2		
0.0013 mm.	7.3		

* (no specification provided)

Soil Description

Gray Sandy SILT w/ organics

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1559 D_{85}= 0.1384 D_{60}= 0.0891
D_{50}= 0.0715 D_{30}= 0.0263 D_{15}= 0.0060
D_{10}= 0.0026 C_u= 34.48 C_c= 3.02

Classification

USCS= AASHTO=

Remarks

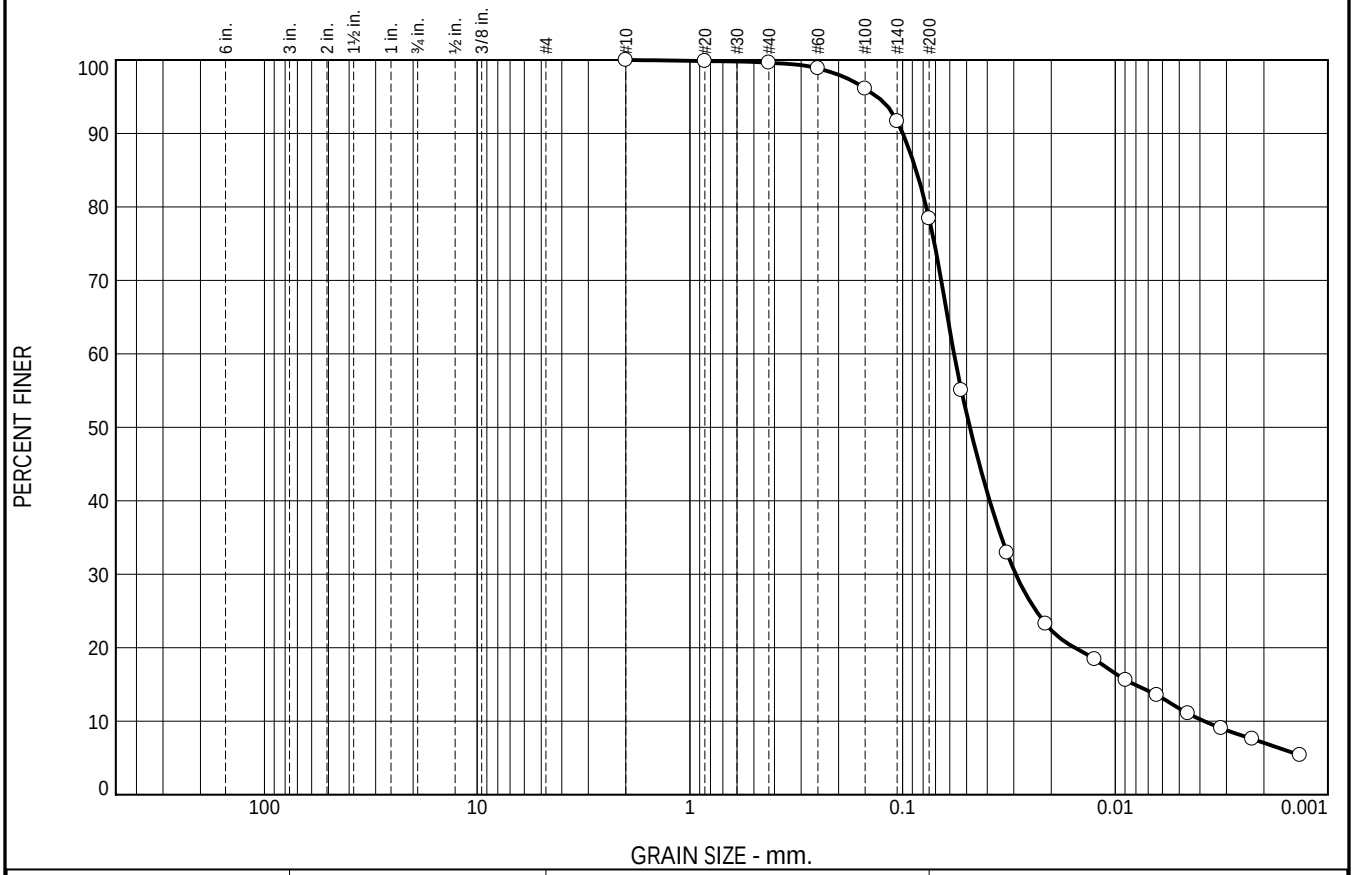
Source of Sample: B03 Depth: 7.5-10(Tip-3")
Sample Number: 3-4 Date:

COOPER TESTING LABORATORY

Client: Geosyntec Consultants
Project: Collinsville-Pittsburg 230KV - WG3444

Project No: 461-383 Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	21.2	71.4	7.0

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.6		
#60	98.9		
#100	96.1		
#140	91.7		
#200	78.4		
#270	55.0		
0.0323 mm.	32.9		
0.0213 mm.	23.3		
0.0125 mm.	18.4		
0.0089 mm.	15.6		
0.0064 mm.	13.6		
0.0046 mm.	11.1		
0.0032 mm.	9.0		
0.0023 mm.	7.6		
0.0014 mm.	5.4		

* (no specification provided)

Soil Description

Gray SILT w/ Sand

Atterberg Limits

PL= 24 LL= 23 PI= NP

Coefficients

D_{90}= 0.0998 D_{85}= 0.0864 D_{60}= 0.0573
D_{50}= 0.0483 D_{30}= 0.0294 D_{15}= 0.0081
D_{10}= 0.0038 C_u= 15.02 C_c= 3.95

Classification

USCS= ML AASHTO= A-4(0)

Remarks

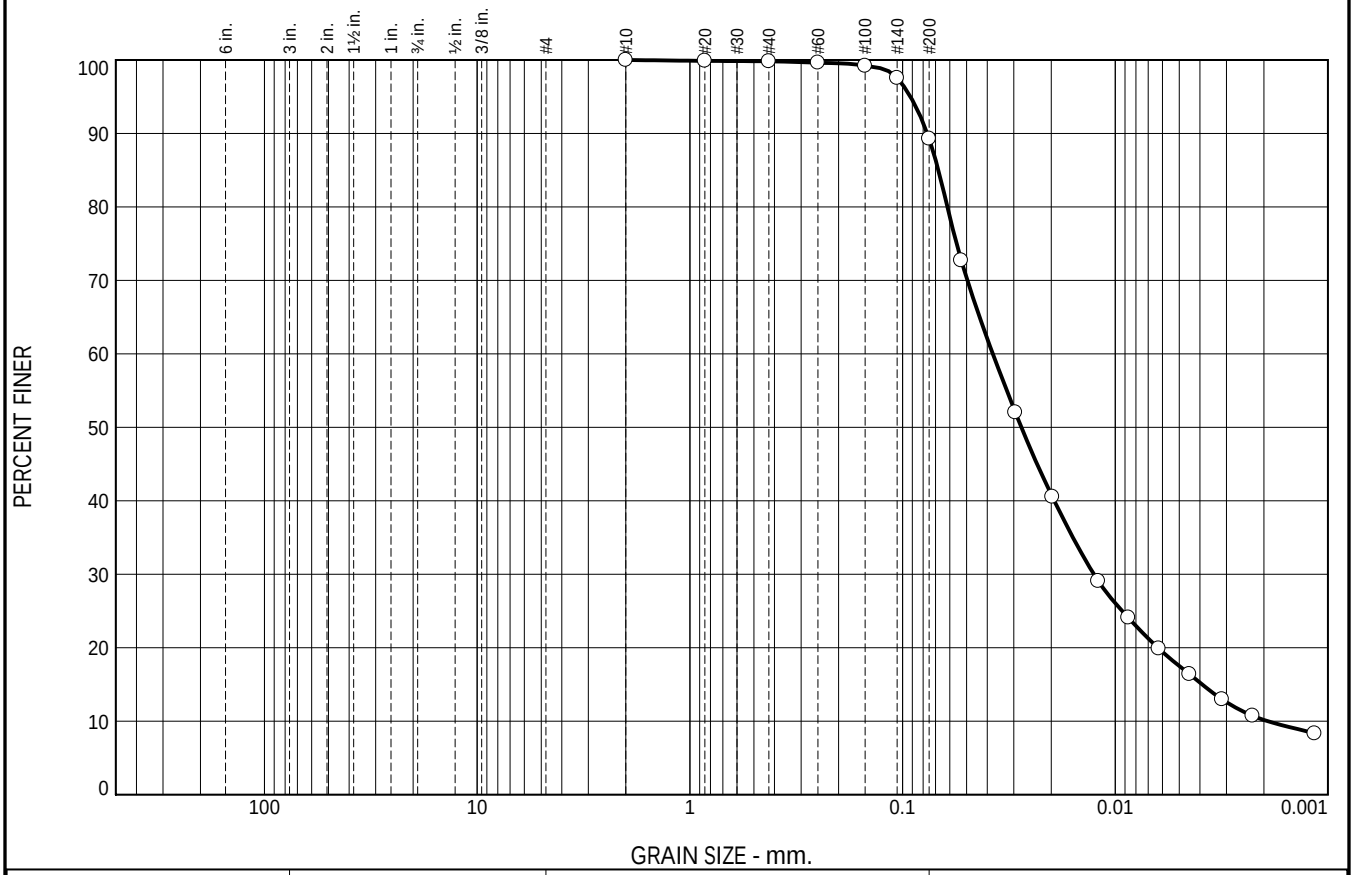
Source of Sample: B07 Depth: 17.5-20'
Sample Number: 7-6 Date:

COOPER TESTING LABORATORY

Client: Geosyntec Consultants
Project: Collinsville-Pittsburg 230KV - WG3444

Project No: 461-383 Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	10.5	79.1	10.2

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.8		
#60	99.6		
#100	99.2		
#140	97.5		
#200	89.3		
#270	72.7		
0.0295 mm.	52.0		
0.0198 mm.	40.5		
0.0120 mm.	29.1		
0.0087 mm.	24.1		
0.0062 mm.	19.9		
0.0045 mm.	16.4		
0.0031 mm.	13.0		
0.0023 mm.	10.7		
0.0012 mm.	8.3		

* (no specification provided)

Soil Description

Gray SILT

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0765 D_{85}= 0.0679 D_{60}= 0.0376
D_{50}= 0.0276 D_{30}= 0.0126 D_{15}= 0.0039
D_{10}= 0.0019 C_u= 19.60 C_c= 2.20

Classification

USCS= AASHTO=

Remarks

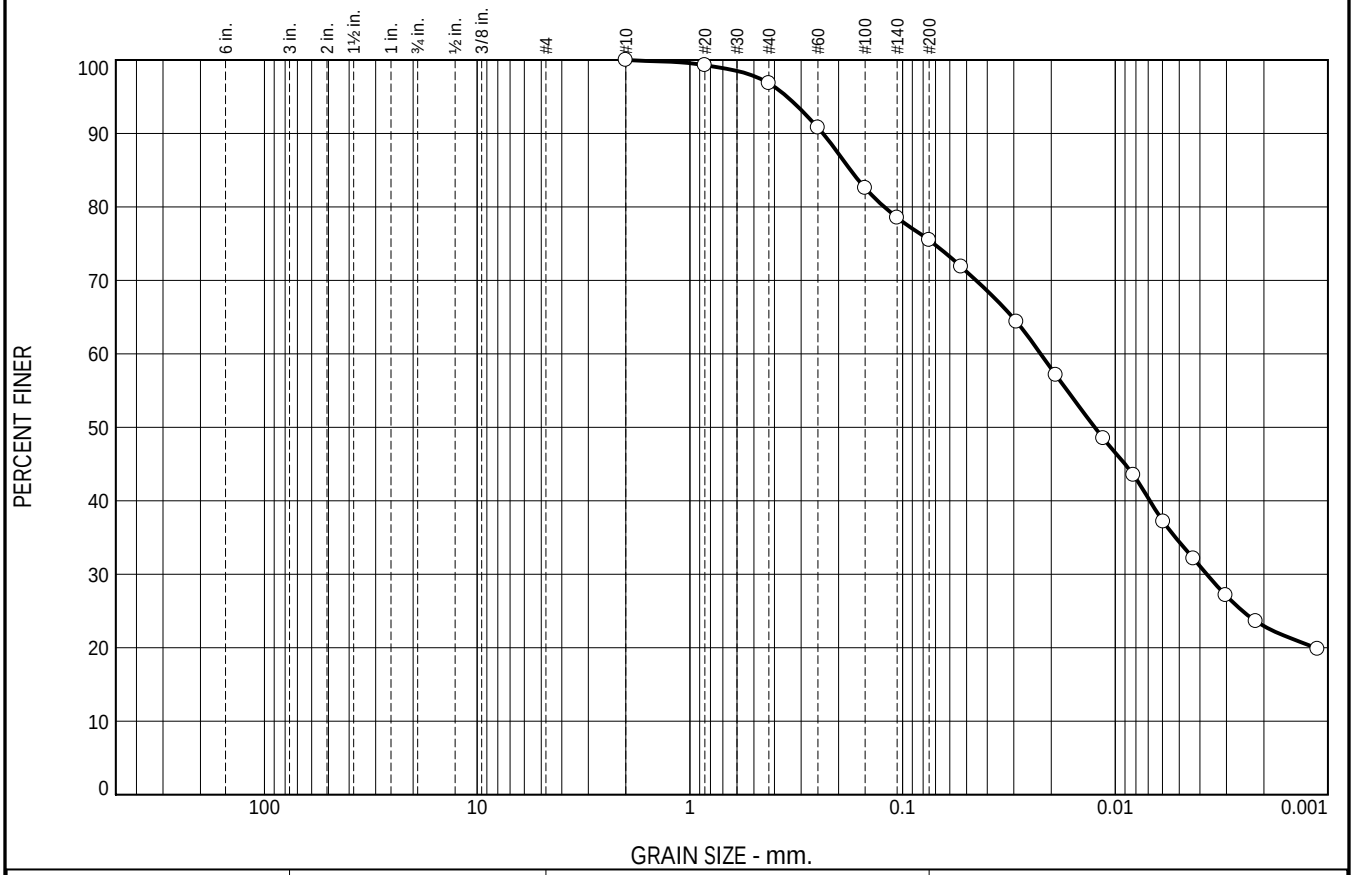
Source of Sample: B09 Depth: 6-6.5'
Sample Number: 9-3C Date:

COOPER TESTING LABORATORY

Client: Geosyntec Consultants
Project: Collinsville-Pittsburg 230KV - WG3444

Project No: 461-383 Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	3.2	21.3	52.6	22.9

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.3		
#40	96.8		
#60	90.8		
#100	82.6		
#140	78.5		
#200	75.5		
#270	71.9		
0.0291 mm.	64.4		
0.0190 mm.	57.1		
0.0114 mm.	48.5		
0.0082 mm.	43.5		
0.0059 mm.	37.2		
0.0043 mm.	32.1		
0.0030 mm.	27.1		
0.0022 mm.	23.6		
0.0011 mm.	19.8		

* (no specification provided)

Soil Description

Olive Brown Lean CLAY w/ Sand

Atterberg Limits

PL= 18 LL= 29 PI= 11

Coefficients

D_{90}= 0.2366 D_{85}= 0.1755 D_{60}= 0.0224
D_{50}= 0.0125 D_{30}= 0.0037 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(7)

Remarks

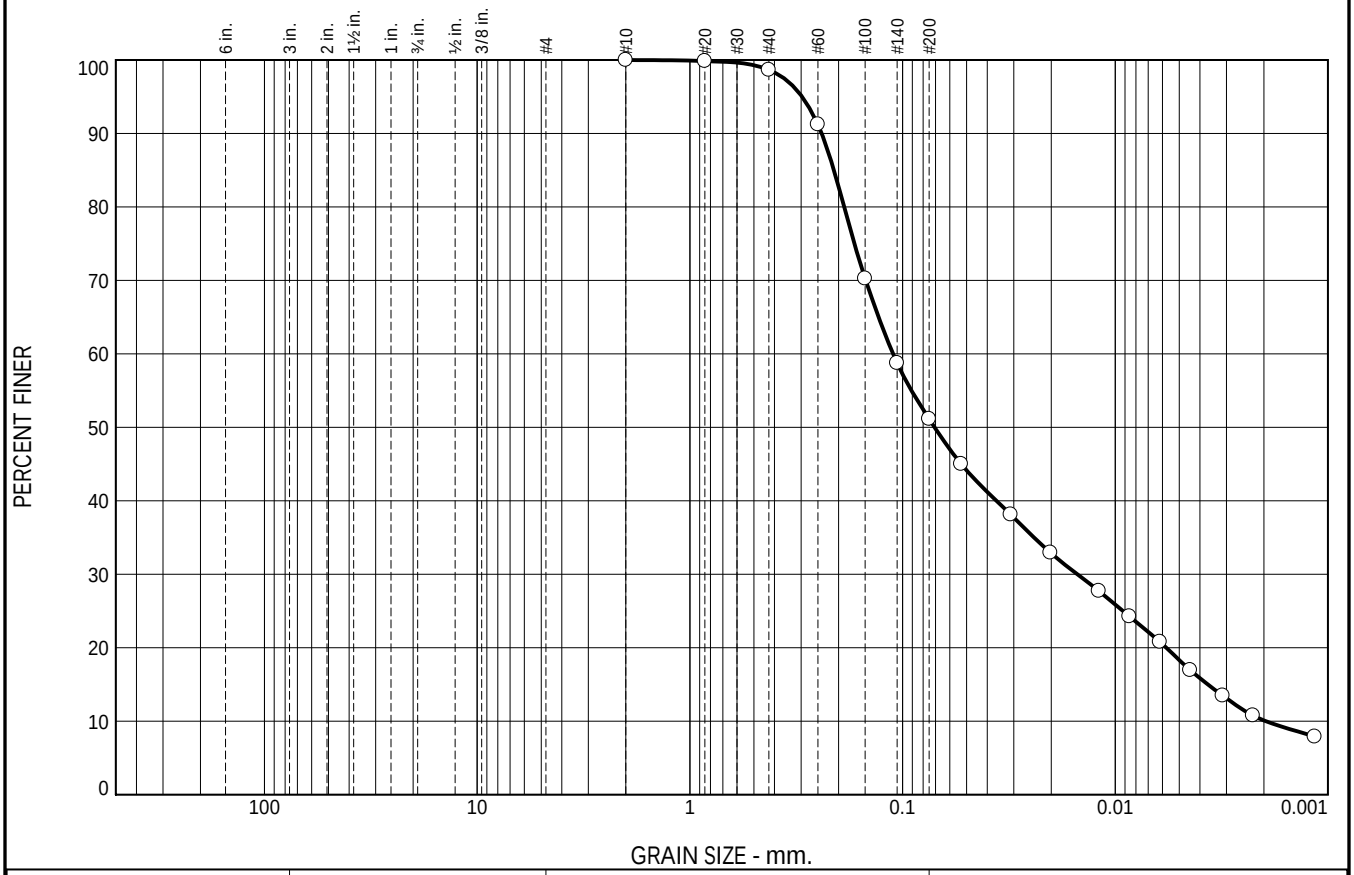
Source of Sample: B09 Depth: 15.5-16'
Sample Number: 9-6B Date:

COOPER TESTING LABORATORY

Client: Geosyntec Consultants
Project: Collinsville-Pittsburg 230KV - WG3444

Project No: 461-383 Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.4	47.5	41.0	10.1

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.8		
#40	98.6		
#60	91.2		
#100	70.2		
#140	58.7		
#200	51.1		
#270	45.0		
0.0310 mm.	38.1		
0.0202 mm.	32.9		
0.0119 mm.	27.7		
0.0086 mm.	24.3		
0.0062 mm.	20.8		
0.0044 mm.	16.9		
0.0031 mm.	13.5		
0.0023 mm.	10.8		
0.0012 mm.	7.9		

* (no specification provided)

Soil Description

Greenish Gray Sandy SILT

Atterberg Limits

PL= 20 LL= 21 PI= 1

Coefficients

D_{90}= 0.2400 D_{85}= 0.2103 D_{60}= 0.1108
D_{50}= 0.0707 D_{30}= 0.0151 D_{15}= 0.0037
D_{10}= 0.0020 C_u= 56.52 C_c= 1.05

Classification

USCS= ML AASHTO= A-4(0)

Remarks

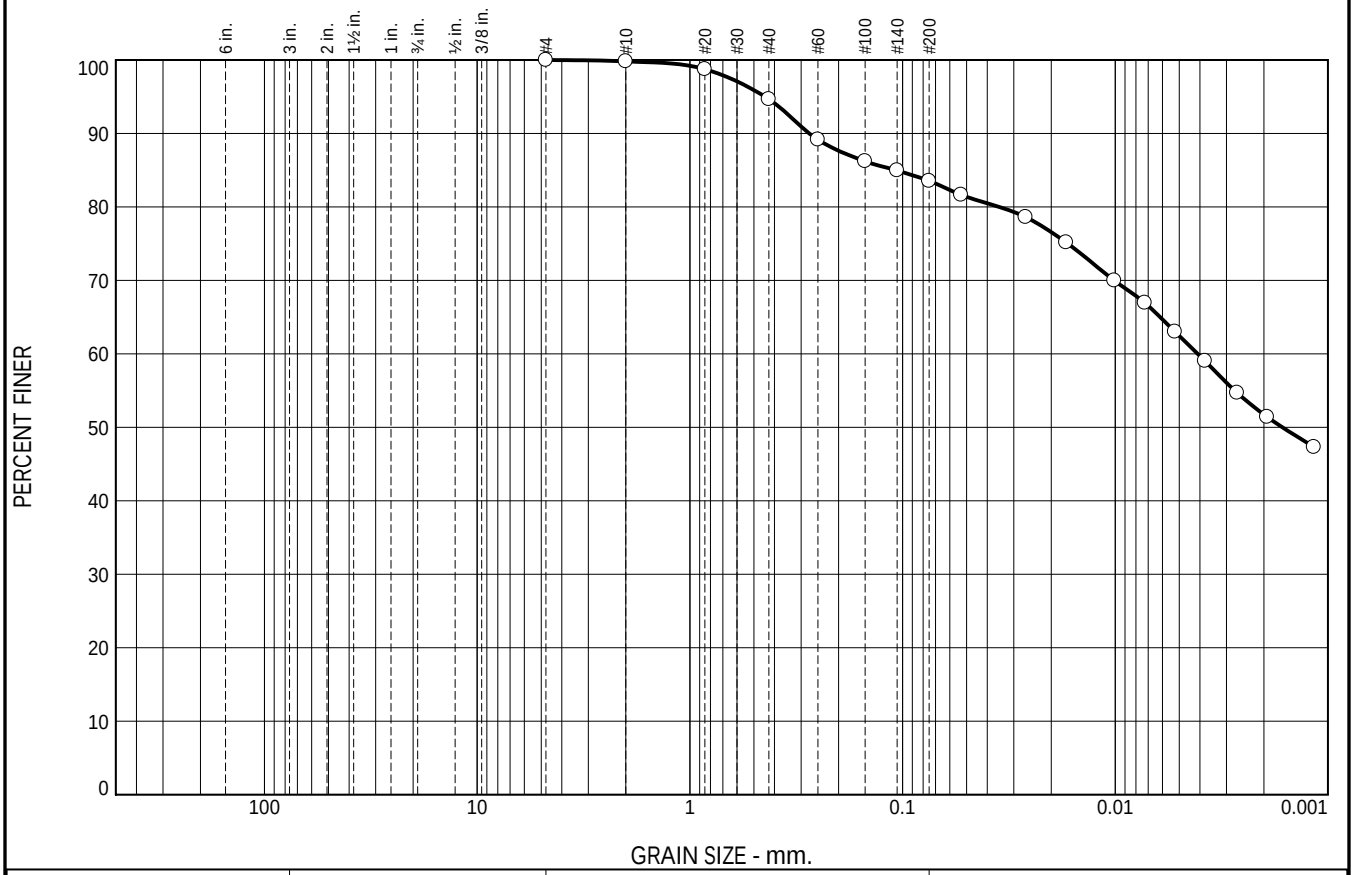
Source of Sample: B10 Depth: 2.5-5'
Sample Number: 10-2 Date:

COOPER TESTING LABORATORY

Client: Geosyntec Consultants
Project: Collinsville-Pittsburg 230KV - WG3444

Project No: 461-383 Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	5.1	11.2	31.8	51.7

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.8		
#20	98.7		
#40	94.7		
#60	89.2		
#100	86.2		
#140	85.0		
#200	83.5		
#270	81.6		
0.0264 mm.	78.6		
0.0170 mm.	75.1		
0.0101 mm.	70.0		
0.0073 mm.	66.9		
0.0052 mm.	63.0		
0.0038 mm.	59.0		
0.0027 mm.	54.7		
0.0019 mm.	51.4		
0.0012 mm.	47.3		

* (no specification provided)

Soil Description

Gray Fat CLAY w/ Sand

Atterberg Limits

PL= 26 LL= 51 PI= 25

Coefficients

D_{90}= 0.2743 D_{85}= 0.1073 D_{60}= 0.0041
D_{50}= 0.0016 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(23)

Remarks

Source of Sample: B11 Depth: 70-70.5'
Sample Number: 11-15A Date:

COOPER TESTING LABORATORY

Client: Geosyntec Consultants
Project: Collinsville-Pittsburg 230KV - WG3444

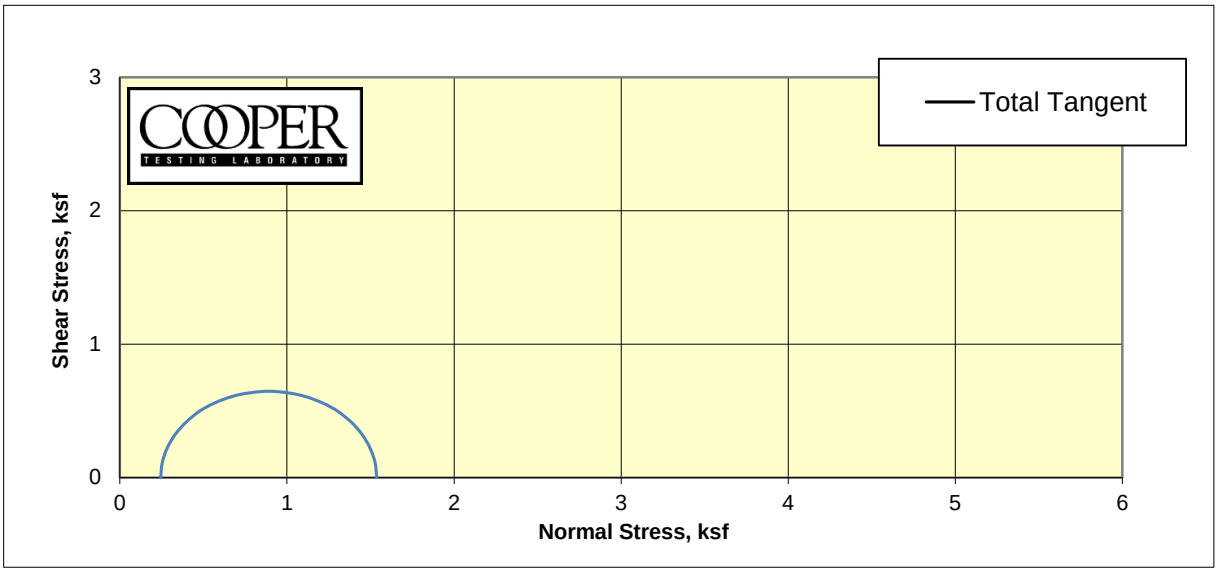
Project No: 461-383 Figure

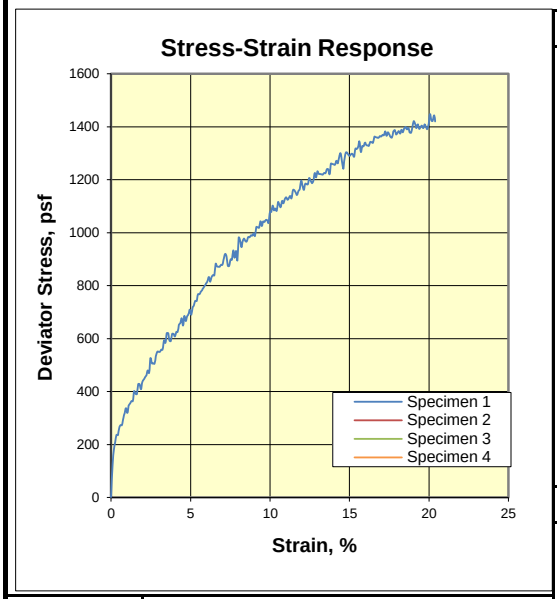
#200 Sieve Wash Analysis
ASTM D 1140

Job No.:	461-383		**Project No.:**	WG3444		**Run By:**	MD	
Client:	Geosyntec Consultants		**Date:**	9/4/2024		**Checked By:**	DC	
Project:	Collinsville-Pittsburg 230KV							
Boring:	B03	B03						
Sample:	3-2	3-7						
Depth, ft.:	5-6.5	20-21.5						
Soil Type:	Gray Elastic SILT w/ Sand	Black CLAY						
Wt of Dish & Dry Soil, gm	389.5	405.4						
Weight of Dish, gm	174.1	174.0						
Weight of Dry Soil, gm	215.4	231.4						
Wt. Ret. on #4 Sieve, gm	0.0	1.1						
Wt. Ret. on #200 Sieve, gm	59.0	33.1						
% Gravel	**0.0**	**0.5**						
% Sand	**27.4**	**13.9**						
% Silt & Clay	**72.6**	**85.7**						

Remarks: As an added benefit to our clients, the gravel fraction may be included in this report. Whether or not it is included is dependent upon both the technician's time available and if there is a significant enough amount of gravel. The gravel is always included in the percent retained on the #200 sieve but may not be weighed separately to determine

Unconsolidated Undrained Triaxial Compression
ASTM D2850



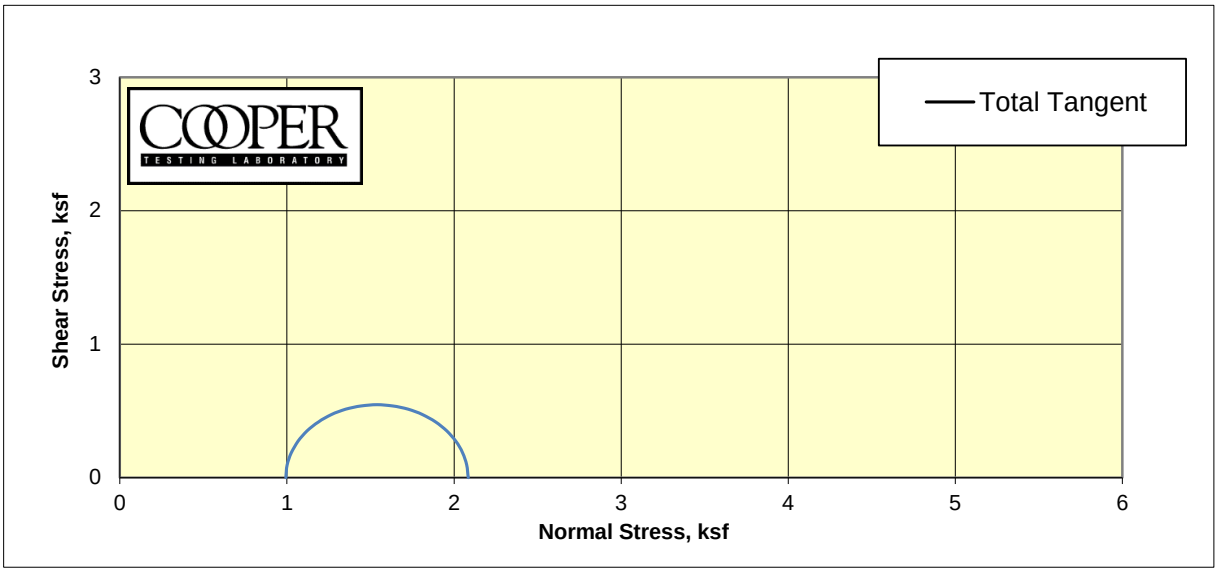


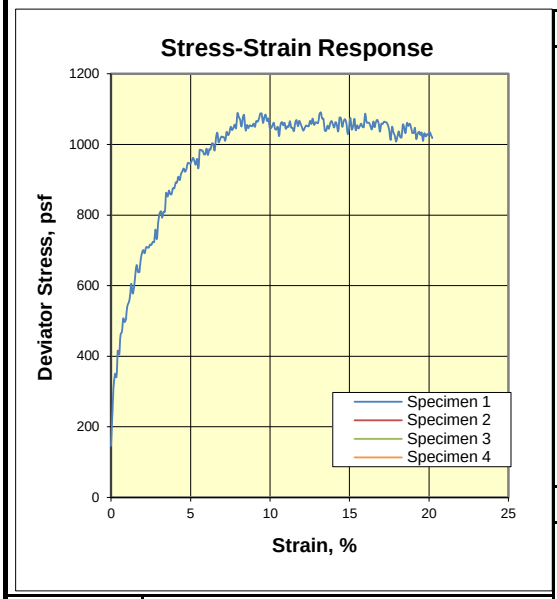
CTL Number:	461-383
Client Name:	Geosyntec Consultants
Project Name:	Collinsville-Pittsburg 230KV
Project Number:	WG3444
Date:	8/20/2024 By: MD/DC
Total C	ksf
Total phi	degrees
Eff. C	N/A ksf
Eff. Phi	N/A degrees ©

Remarks: Sample was back-pressure saturated to a B parameter of 0.95 or greater prior to shear.

Specimen	1	2	3	4
Boring	B02			
Sample	2-2			
Depth	2.5-5(Tip-2")			
Visual Description	Greenish Gray Silty SAND			
MC (%)	40.5			
Dry Density (pcf)	79.8			
Saturation (%)	98.2			
Void Ratio	1.112			
Diameter (in)	2.88			
Height (in)	6.00			
	Final			
MC (%)	36.7			
Dry Density (pcf)	84.7			
Saturation (%)	100.0			
Void Ratio	0.991			
Diameter (in)	2.82			
Height (in)	5.88			
Cell Pressure (psi)	50.7			
Back Pressure (psi)	49.0			
	Total Stresses At:			
Strain (%)	15.0			
Deviator (ksf)	1.293			
Excess PP (psi)				
Sigma 1 (ksf)	1.537			
Sigma 3 (ksf)	0.245			
P (ksf)	0.891			
Q (ksf)	0.646			
Stress Ratio	6.280			
Rate (in/min)	0.0300			

Unconsolidated Undrained Triaxial Compression
ASTM D2850



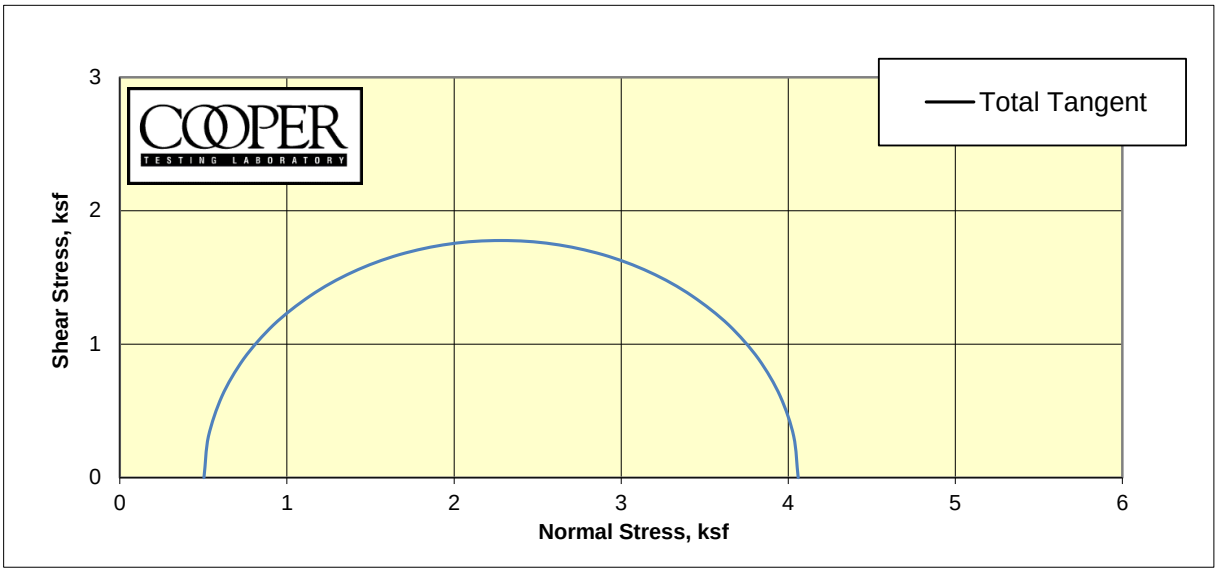


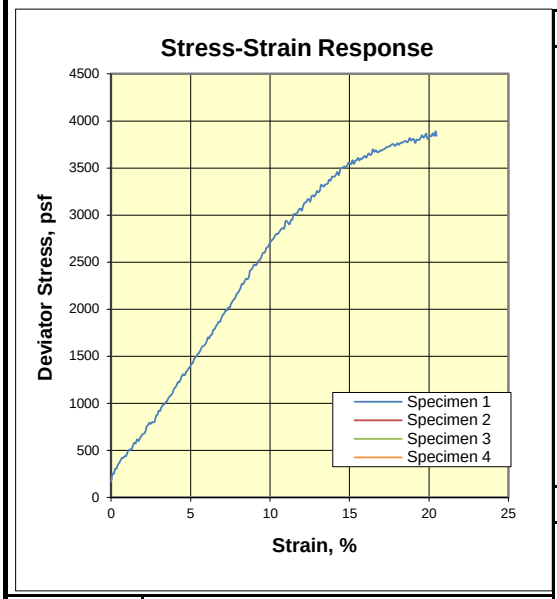
CTL Number:	461-383
Client Name:	Geosyntec Consultants
Project Name:	Collinsville-Pittsburg 230KV
Project Number:	WG3444
Date:	8/20/2024 By: MD/DC
Total C	ksf
Total phi	degrees
Eff. C	N/A ksf
Eff. Phi	N/A degrees ©

Remarks: Sample was back-pressure saturated to a B parameter of 0.95 or greater prior to shear.

Specimen	1	2	3	4
Boring	B02			
Sample	2-7			
Depth	20-22.5			
Visual Description	Greenish Gray Elastic SILT w/ organics (Bay Mud)			
MC (%)	85.6			
Dry Density (pcf)	49.7			
Saturation (%)	96.7			
Void Ratio	2.388			
Diameter (in)	2.81			
Height (in)	6.08			
	Final			
MC (%)	88.0			
Dry Density (pcf)	49.9			
Saturation (%)	100.0			
Void Ratio	2.376			
Diameter (in)	2.84			
Height (in)	5.93			
Cell Pressure (psi)	45.4			
Back Pressure (psi)	38.5			
	Total Stresses At:			
Strain (%)	13.2			
Deviator (ksf)	1.091			
Excess PP (psi)				
Sigma 1 (ksf)	2.085			
Sigma 3 (ksf)	0.994			
P (ksf)	1.539			
Q (ksf)	0.546			
Stress Ratio	2.098			
Rate (in/min)	0.0300			

Unconsolidated Undrained Triaxial Compression
ASTM D2850



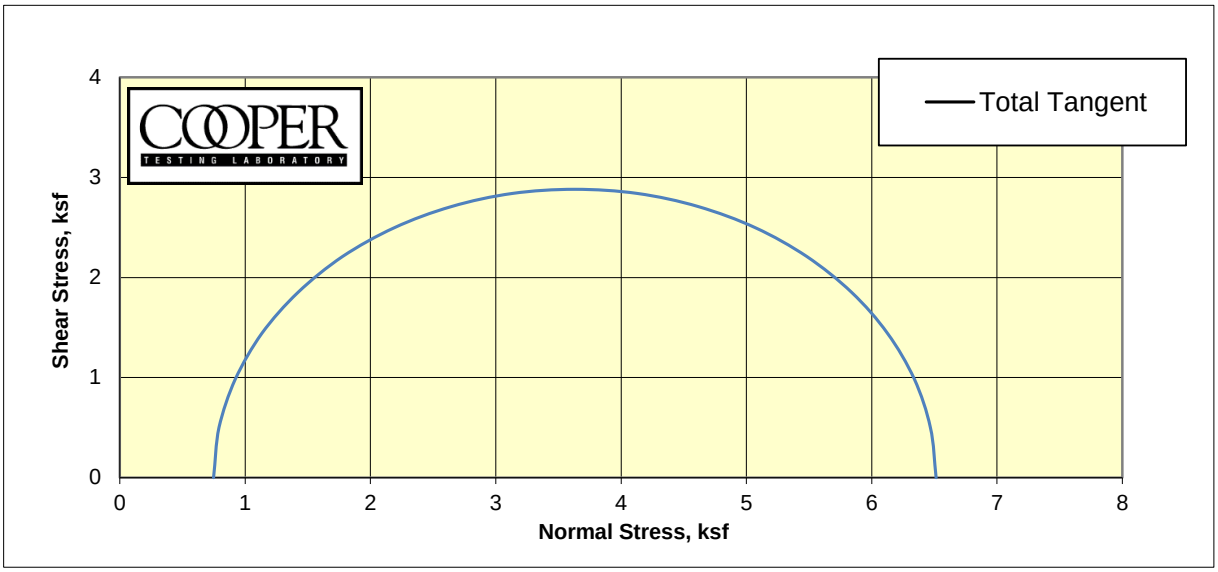


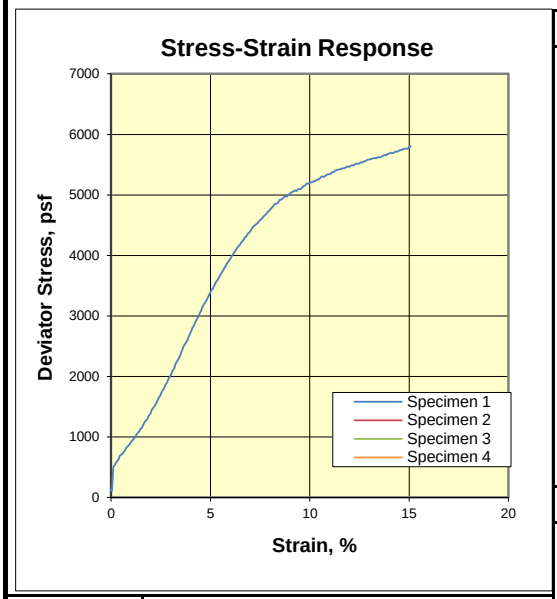
CTL Number:	461-383
Client Name:	Geosyntec Consultants
Project Name:	Collinsville-Pittsburg 230KV
Project Number:	WG3444
Date:	8/20/2024 By: MD/DC
Total C	ksf
Total phi	degrees
Eff. C	N/A ksf
Eff. Phi	N/A degrees ©

Remarks: Sample was back-pressure saturated to a B parameter of 0.95 or greater prior to shear.

Specimen	1	2	3	4
Boring	B07			
Sample	7-3			
Depth	8.5-11(Tip-1")			
Visual Description	Greenish Gray Sandy SILT			
MC (%)	34.4			
Dry Density (pcf)	86.2			
Saturation (%)	97.3			
Void Ratio	0.955			
Diameter (in)	2.86			
Height (in)	6.00			
	Final			
MC (%)	33.8			
Dry Density (pcf)	88.1			
Saturation (%)	100.0			
Void Ratio	0.913			
Diameter (in)	2.86			
Height (in)	5.86			
Cell Pressure (psi)	42.0			
Back Pressure (psi)	38.5			
	Total Stresses At:			
Strain (%)	15.0			
Deviator (ksf)	3.556			
Excess PP (psi)				
Sigma 1 (ksf)	4.060			
Sigma 3 (ksf)	0.504			
P (ksf)	2.282			
Q (ksf)	1.778			
Stress Ratio	8.055			
Rate (in/min)	0.0299			

Unconsolidated Undrained Triaxial Compression
ASTM D2850



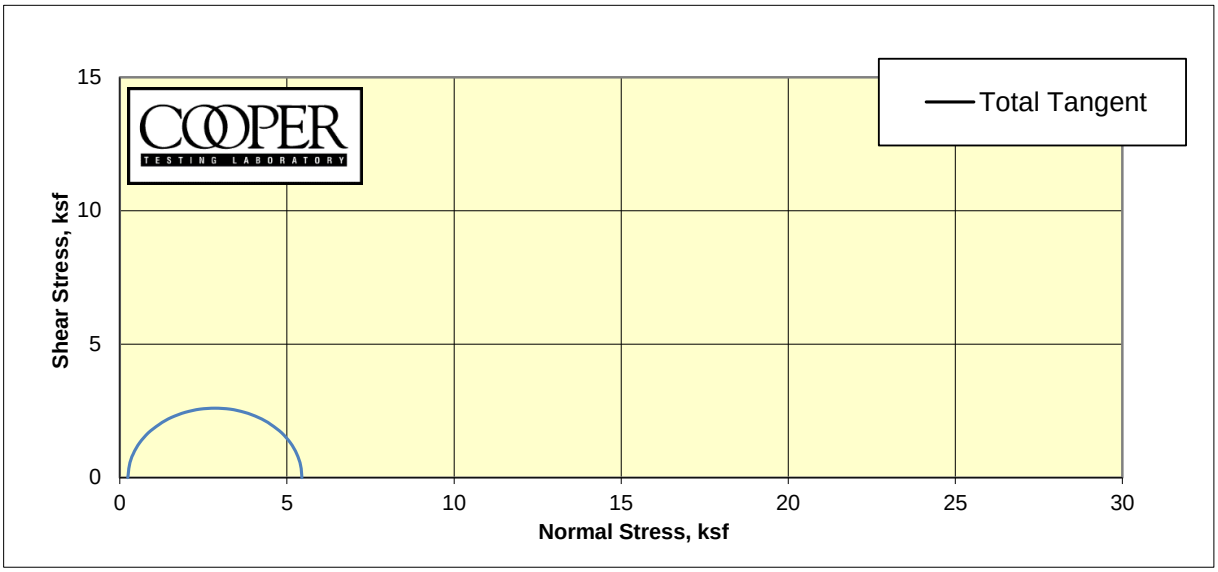


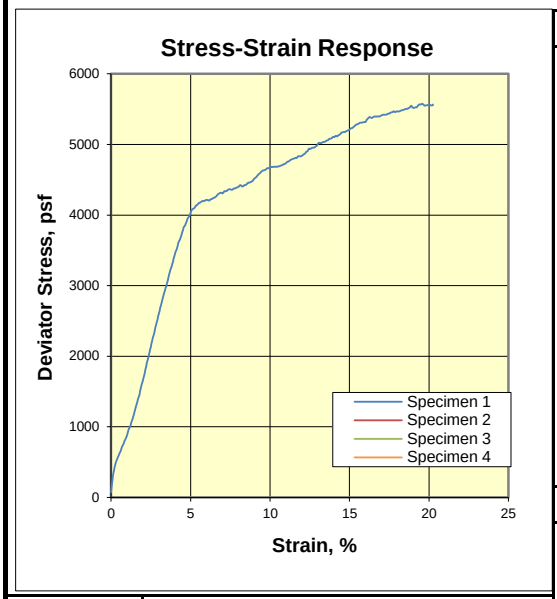
CTL Number:	461-383
Client Name:	Geosyntec Consultants
Project Name:	Collinsville-Pittsburg 230KV
Project Number:	WG3444
Date:	8/20/2024 By: MD/DC
Total C	ksf
Total phi	degrees
Eff. C	N/A ksf
Eff. Phi	N/A degrees ©

Remarks: Sample was back-pressure saturated to a B parameter of 0.95 or greater prior to shear.

Specimen	1	2	3	4
Boring	B07			
Sample	7-6			
Depth	17.5-20			
Visual Description	Gray SILT w/ Sand			
MC (%)	26.9			
Dry Density (pcf)	90.0			
Saturation (%)	83.3			
Void Ratio	0.873			
Diameter (in)	2.84			
Height (in)	6.08			
	Final			
MC (%)	31.7			
Dry Density (pcf)	90.8			
Saturation (%)	100.0			
Void Ratio	0.856			
Diameter (in)	2.86			
Height (in)	5.91			
Cell Pressure (psi)	54.2			
Back Pressure (psi)	49.0			
	Total Stresses At:			
Strain (%)	15.0			
Deviator (ksf)	5.764			
Excess PP (psi)				
Sigma 1 (ksf)	6.513			
Sigma 3 (ksf)	0.749			
P (ksf)	3.631			
Q (ksf)	2.882			
Stress Ratio	8.698			
Rate (in/min)	0.0290			

Unconsolidated Undrained Triaxial Compression
ASTM D2850



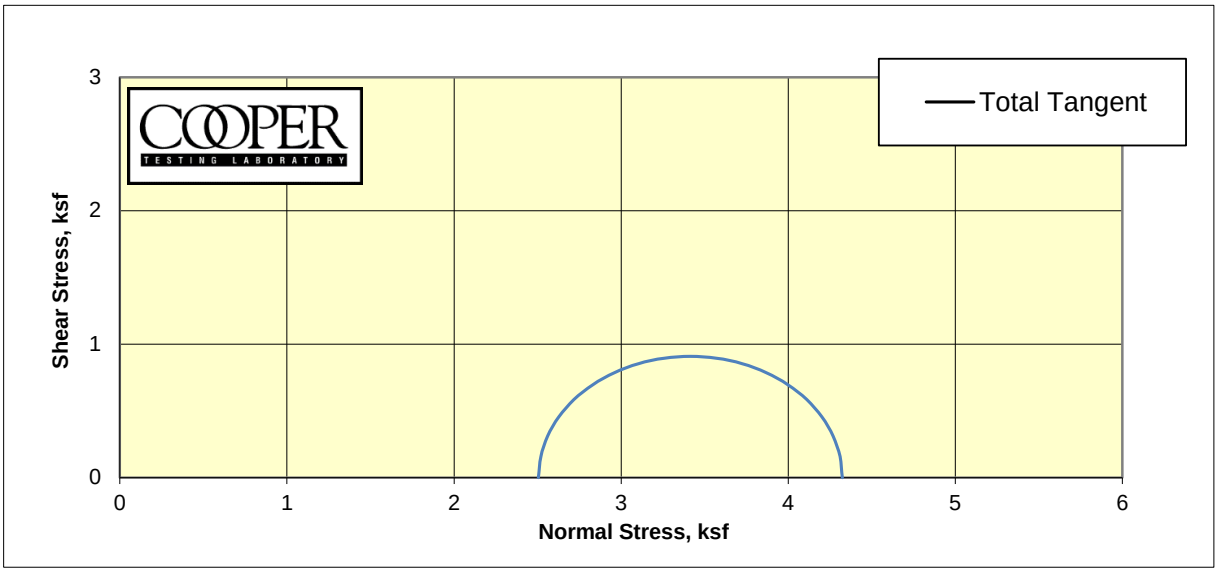


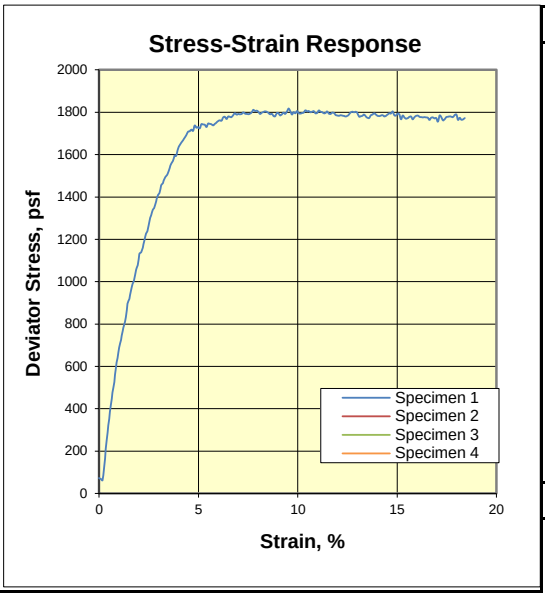
CTL Number:	461-383
Client Name:	Geosyntec Consultants
Project Name:	Collinsville-Pittsburg 230KV
Project Number:	WG3444
Date:	8/20/2024 By: MD/DC
Total C	ksf
Total phi	degrees
Eff. C	N/A ksf
Eff. Phi	N/A degrees ©

Remarks: Sample was back-pressure saturated to a B parameter of 0.95 or greater prior to shear.

Specimen	1	2	3	4
Boring	B10			
Sample	10-2			
Depth	2.5-5(Tip-2")			
Visual Description	Greenish Gray Sandy SILT			
MC (%)	19.9			
Dry Density (pcf)	106.0			
Saturation (%)	91.0			
Void Ratio	0.590			
Diameter (in)	2.86			
Height (in)	6.05			
	Final			
MC (%)	21.8			
Dry Density (pcf)	106.1			
Saturation (%)	100.0			
Void Ratio	0.589			
Diameter (in)	2.89			
Height (in)	5.92			
Cell Pressure (psi)	50.7			
Back Pressure (psi)	49.0			
	Total Stresses At:			
Strain (%)	15.0			
Deviator (ksf)	5.209			
Excess PP (psi)				
Sigma 1 (ksf)	5.454			
Sigma 3 (ksf)	0.245			
P (ksf)	2.849			
Q (ksf)	2.604			
Stress Ratio	22.278			
Rate (in/min)	0.0294			

Unconsolidated Undrained Triaxial Compression
ASTM D2850





CTL Number:	461-383
Client Name:	Geosyntec Consultants
Project Name:	Collinsville-Pittsburg 230KV
Project Number:	WG3444
Date:	8/20/2024 By: MD/DC
Total C	ksf
Total phi	degrees
Eff. C	N/A ksf
Eff. Phi	N/A degrees ©

Remarks: Sample was back-pressure saturated to a B parameter of 0.95 or greater prior to shear.

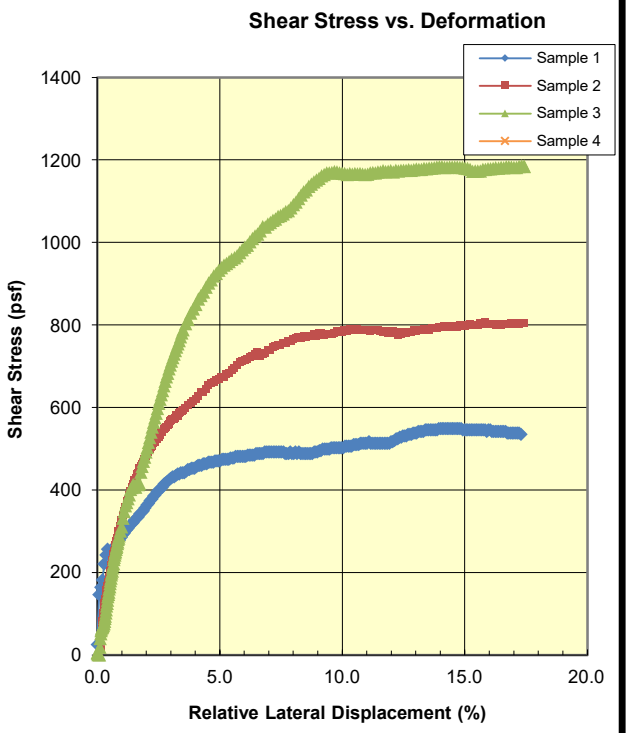
Specimen	1	2	3	4
Boring	B11			
Sample	11-12			
Depth	55.5-57.5			
Visual Description	Greenish Gray Organic Elastic SILT (Bay Mud)			
MC (%)	105.6			
Dry Density (pcf)	43.2			
Saturation (%)	98.2			
Void Ratio	2.904			
Diameter (in)	2.85			
Height (in)	6.04			
	Final			
MC (%)	106.1			
Dry Density (pcf)	43.6			
Saturation (%)	100.0			
Void Ratio	2.865			
Diameter (in)	2.86			
Height (in)	5.94			
Cell Pressure (psi)	55.9			
Back Pressure (psi)	38.5			
	Total Stresses At:			
Strain (%)	9.5			
Deviator (ksf)	1.818			
Excess PP (psi)				
Sigma 1 (ksf)	4.324			
Sigma 3 (ksf)	2.506			
P (ksf)	3.415			
Q (ksf)	0.909			
Stress Ratio	1.726			
Rate (in/min)	0.0295			

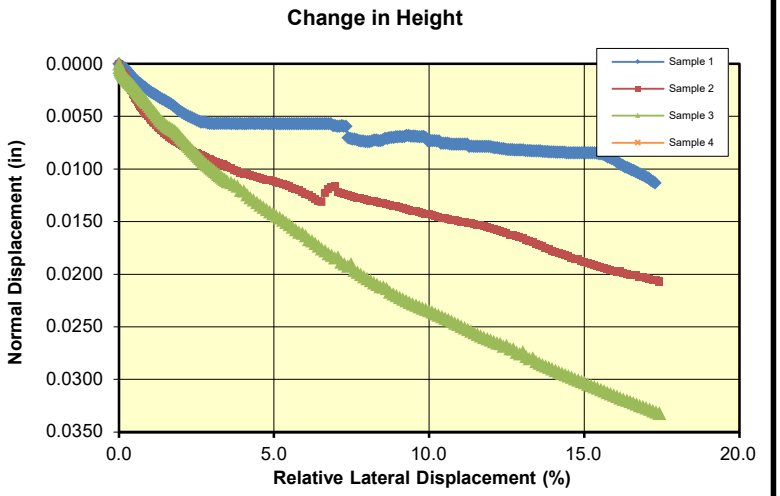
Consolidated Drained Direct Shear (ASTM D3080)

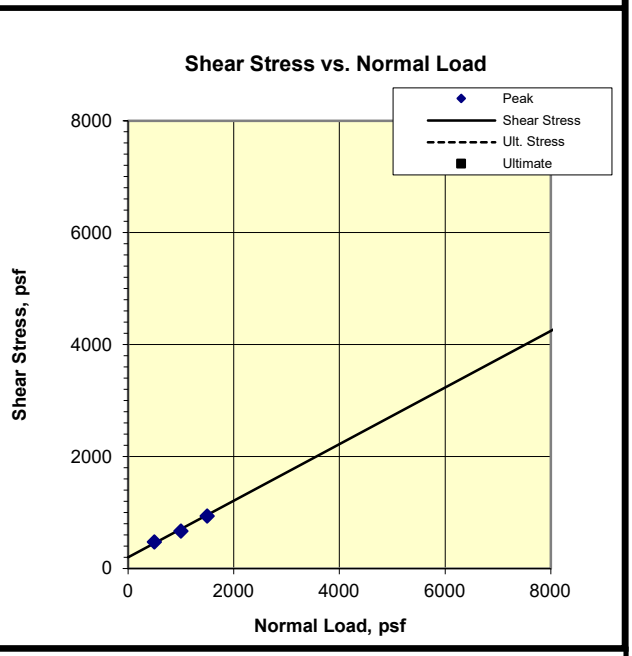
CTL Job #:	461-383	Project #:	WG3444	By:	MD
Client:	Geosyntec Consultants	Date:	8/22/2024	Checked:	PJ
Project Name:	Collinsville-Pittsburg 230KV	Remolding Info:			

Specimen Data				
	1	2	3	4
Boring:	B02	B02	B02	
Sample:	2-2	2-2	2-2	
Depth (ft):	2.5-5	2.5-5	2.5-5	
Visual Description:	Greenish Gray Silty SAND	Greenish Gray Silty SAND	Greenish Gray Silty SAND	
Normal Load (psf)	500	1000	1500	
Dry Mass of Specimen (g)	128.0	132.2	129.0	
Initial Height (in)	0.99	0.98	0.98	
Initial Diameter (in)	2.87	2.87	2.87	
Initial Void Ratio	1.215	1.122	1.174	
Initial Moisture (%)	44.4	38.6	40.1	
Initial Wet Density (pcf)	109.9	110.1	108.6	
Initial Dry Density (pcf)	76.1	79.4	77.5	
Initial Saturation (%)	98.8	92.9	92.3	
ΔHeight Consol (in)	0.0485	0.0666	0.0762	
At Test Void Ratio	1.106	0.978	1.005	
At Test Moisture (%)	40.7	36.0	35.1	
At Test Wet Density (pcf)	112.6	115.9	113.6	
At Test Dry Density (pcf)	80.0	85.2	84.1	
At Test Saturation (%)	99.3	99.3	94.3	
Strain Rate (%/min)	0.01	0.01	0.01	
Strengths Picked at	5%	5%	5%	
Shear Stress (psf)	470	668	933	
ΔHeight (in) at 5%	0.0057	0.0112	0.0142	
Ultimate Stress (psf)				

Phi (deg)	26.8	Ult. Phi (deg)	
Cohesion (psf)	200	Ult. Cohesion (psf)	







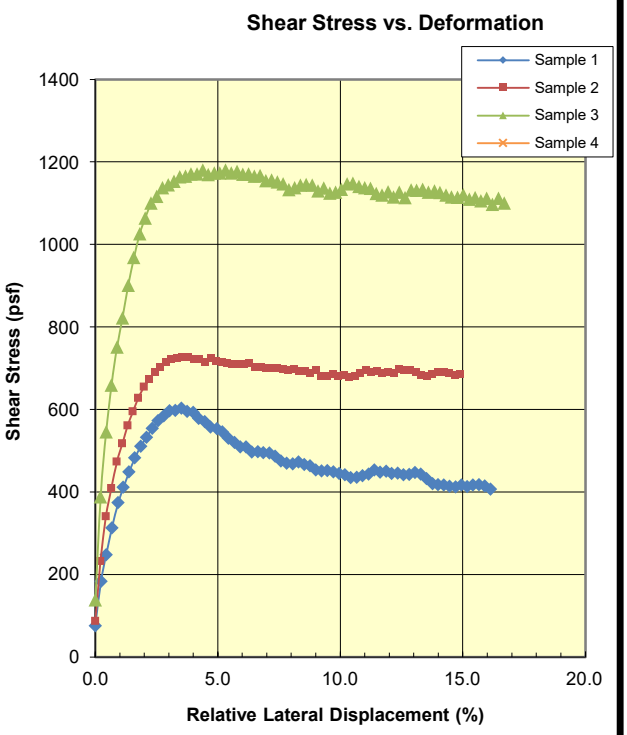
Remarks:

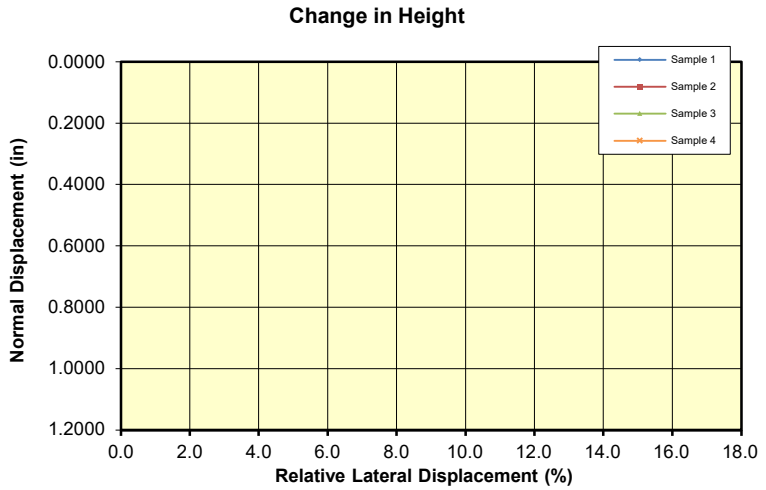
Consolidated Undrained Direct Shear (ASTM D3080M)

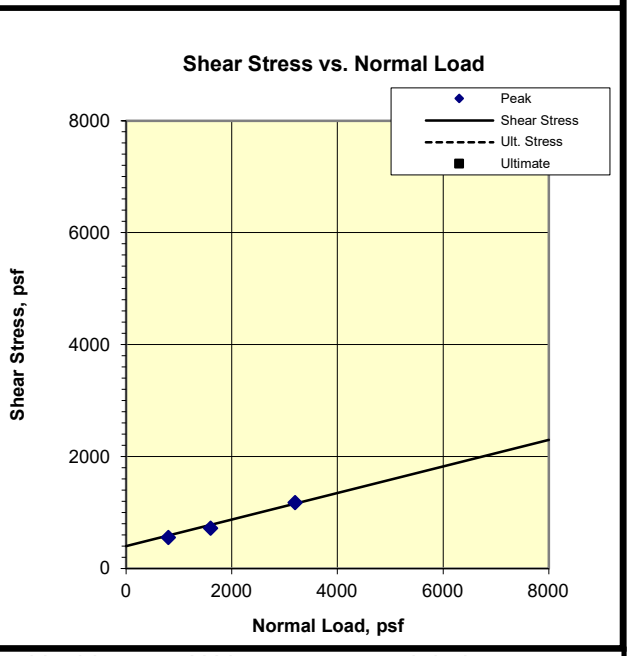
CTL Job #:	461-383	Project #:	WG3444	By:	MD
Client:	Geosyntec Consultants	Date:	8/20/2024	Checked:	PJ
Project Name:	Collinsville-Pittsburg 230KV	Remolding Info:			

Specimen Data				
	1	2	3	4
Boring:	B02	B02	B02	
Sample:	2-7	2-7	2-7	
Depth (ft):	20-22.5	20-22.5	20-22.5	
Visual Description:	Greenish Gray Elastic SILT w/ organics (Bay Mud)	Greenish Gray Elastic SILT w/ organics (Bay Mud)	Greenish Gray Elastic SILT w/ organics (Bay Mud)	
Normal Load (psf)	800	1600	3200	
Dry Mass of Specimen (g)	87.1	91.9	89.1	
Initial Height (in)	0.98	0.99	0.97	
Initial Diameter (in)	2.87	2.87	2.87	
Initial Void Ratio	2.215	2.069	2.126	
Initial Moisture (%)	77.0	71.2	73.5	
Initial Wet Density (pcf)	92.8	94.0	93.6	
Initial Dry Density (pcf)	52.4	54.9	53.9	
Initial Saturation (%)	93.8	93.0	93.4	
ΔHeight Consol (in)	0.0250	0.0481	0.1183	
At Test Void Ratio	2.133	1.919	1.746	
At Test Moisture (%)	76.9	69.4	64.7	
At Test Wet Density (pcf)	95.2	97.8	101.1	
At Test Dry Density (pcf)	53.8	57.7	61.4	
At Test Saturation (%)	97.3	97.6	100.0	
Strain Rate (%/min)	1.4	1.4	1.4	
Strengths Picked at	5%	5%	5%	
Shear Stress (psf)	554	718	1173	
ΔHeight (in) at 5%				
Ultimate Stress (psf)				

Phi (deg)	13.4	Ult. Phi (deg)	
Cohesion (psf)	400	Ult. Cohesion (psf)	







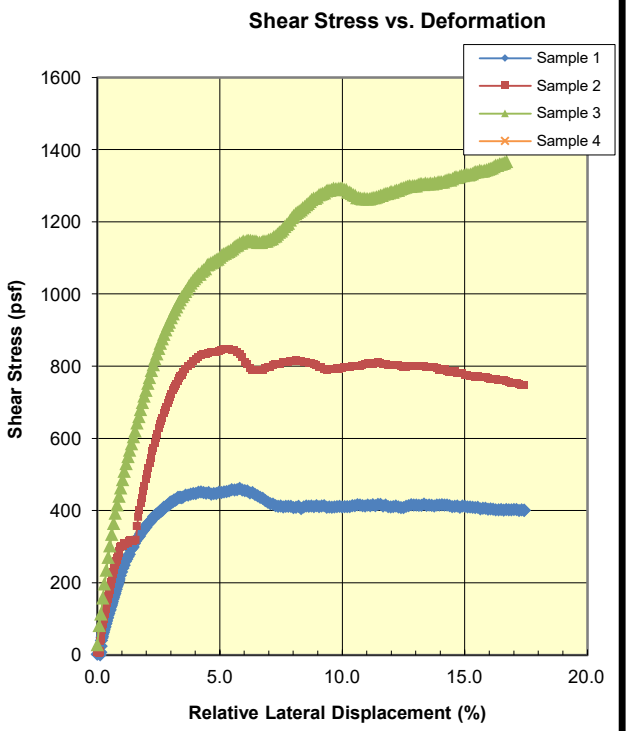
Remarks: *DS-CU* A fully undrained condition may not be attained in this test. ΔH is not measured during undrained direct shear tests.

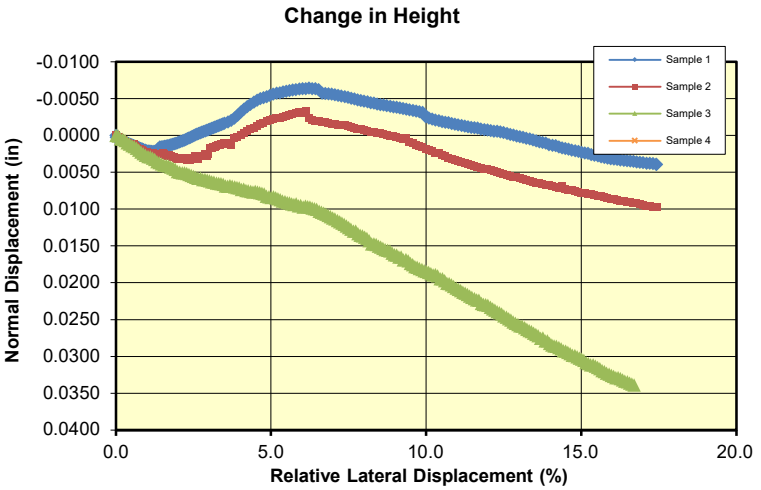
Consolidated Drained Direct Shear (ASTM D3080)

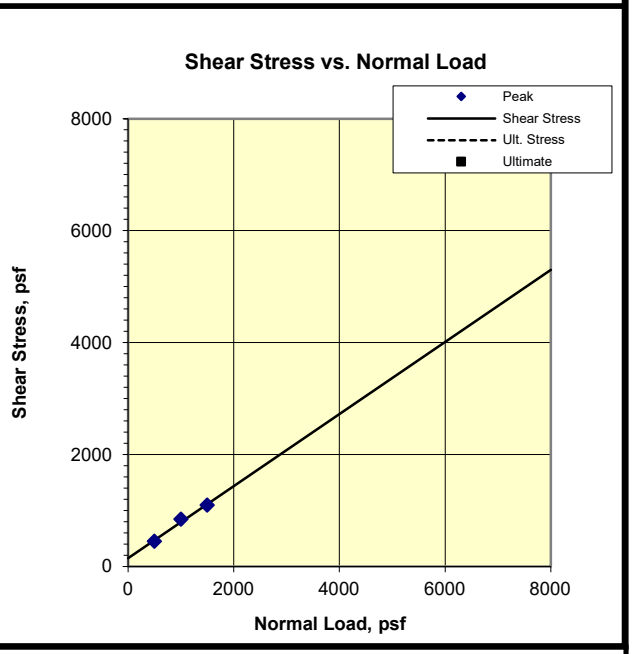
CTL Job #:	461-383	Project #:	WG34444	By:	MD
Client:	Geosyntec Consultants	Date:	8/22/2024	Checked:	PJ
Project Name:	CollinsvillePittsburg 230KV	Remolding Info:			

Phi (deg)	32.8	Ult. Phi (deg)	
Cohesion (psf)	150	Ult. Cohesion (psf)	

Specimen Data	1	2	3	4
Boring:	B07	B07	B07	
Sample:	7-3	7-3	7-3	
Depth (ft):	8.5-11	8.5-11	8.5-11	
Visual Description:	Greenish Gray Sandy SILT	Greenish Gray Sandy SILT	Greenish Gray Sandy SILT	
Normal Load (psf)	500	1000	1500	
Dry Mass of Specimen (g)	132.8	139.6	137.1	
Initial Height (in)	0.97	0.99	0.99	
Initial Diameter (in)	2.87	2.87	2.87	
Initial Void Ratio	1.090	1.031	1.072	
Initial Moisture (%)	39.6	37.4	39.1	
Initial Wet Density (pcf)	112.6	114.1	113.2	
Initial Dry Density (pcf)	80.6	83.0	81.4	
Initial Saturation (%)	98.0	98.1	98.6	
ΔHeight Consol (in)	0.0118	0.0173	0.0257	
At Test Void Ratio	1.065	0.995	1.018	
At Test Moisture (%)	38.8	36.7	37.6	
At Test Wet Density (pcf)	113.3	115.5	114.9	
At Test Dry Density (pcf)	81.6	84.5	83.5	
At Test Saturation (%)	98.3	99.6	99.7	
Strain Rate (%/min)	0.01	0.01	0.01	
Strengths Picked at	5%	5%	5%	
Shear Stress (psf)	451	842	1097	
ΔHeight (in) at 5%	-0.0054	-0.0020	0.0083	
Ultimate Stress (psf)				







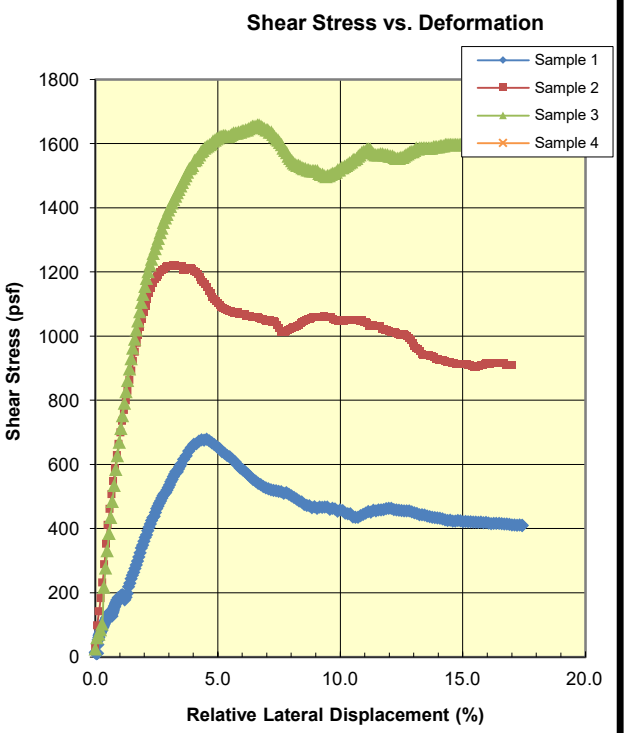
Remarks:

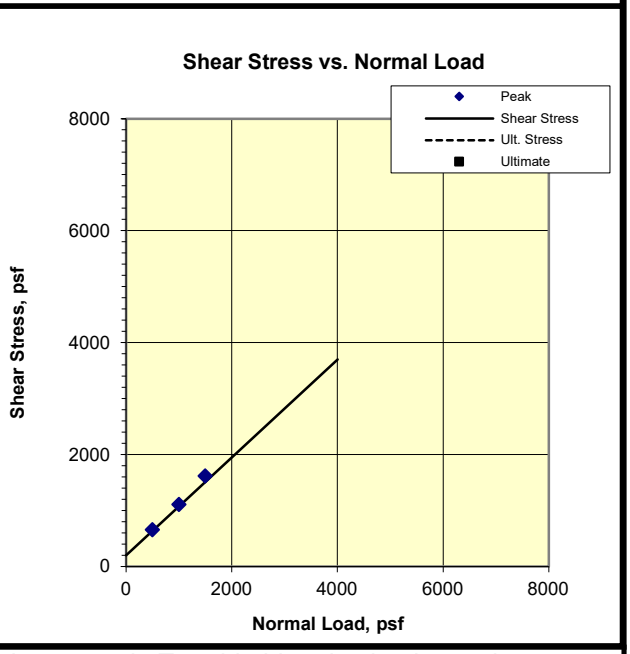
Consolidated Drained Direct Shear (ASTM D3080)

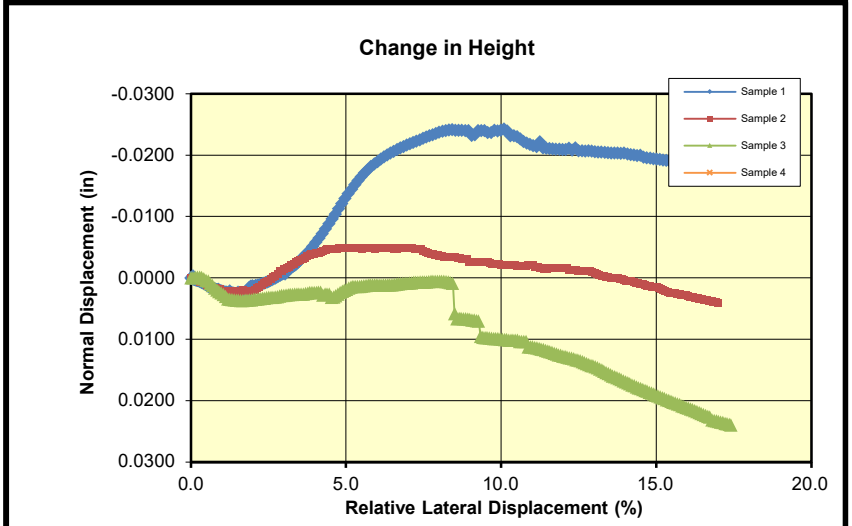
CTL Job #:	461-383	Project #:	WG3444	By:	MD
Client:	Geosyntec Consultants	Date:	8/26/2024	Checked:	PJ
Project Name:	Collinsville-Pittsburg 230KV	Remolding Info:			

Phi (deg)	41.2	Ult. Phi (deg)	
Cohesion (psf)	200	Ult. Cohesion (psf)	

Specimen Data	1	2	3	4
Boring:	B10	B10	B10	
Sample:	10-2	10-2	10-2	
Depth (ft):	2.5-5	2.5-5	2.5-5	
Visual Description:	Greenish Gray Sandy SILT	Greenish Gray Sandy SILT	Greenish Gray Sandy SILT	
Normal Load (psf)	500	1000	1500	
Dry Mass of Specimen (g)	164.4	161.9	158.7	
Initial Height (in)	0.99	0.97	0.99	
Initial Diameter (in)	2.87	2.87	2.87	
Initial Void Ratio	0.724	0.715	0.786	
Initial Moisture (%)	24.9	24.3	25.5	
Initial Wet Density (pcf)	122.1	122.1	118.5	
Initial Dry Density (pcf)	97.8	98.3	94.4	
Initial Saturation (%)	92.9	91.6	87.7	
ΔHeight Consol (in)	0.0080	0.0191	0.0224	
At Test Void Ratio	0.710	0.681	0.745	
At Test Moisture (%)	26.1	25.1	27.3	
At Test Wet Density (pcf)	124.3	125.5	122.9	
At Test Dry Density (pcf)	98.6	100.3	96.6	
At Test Saturation (%)	99.3	99.6	98.9	
Strain Rate (%/min)	0.01	0.01	0.01	
Strengths Picked at	5%	5%	5%	
Shear Stress (psf)	656	1107	1615	
ΔHeight (in) at 5%	-0.0129	-0.0048	0.0020	
Ultimate Stress (psf)				







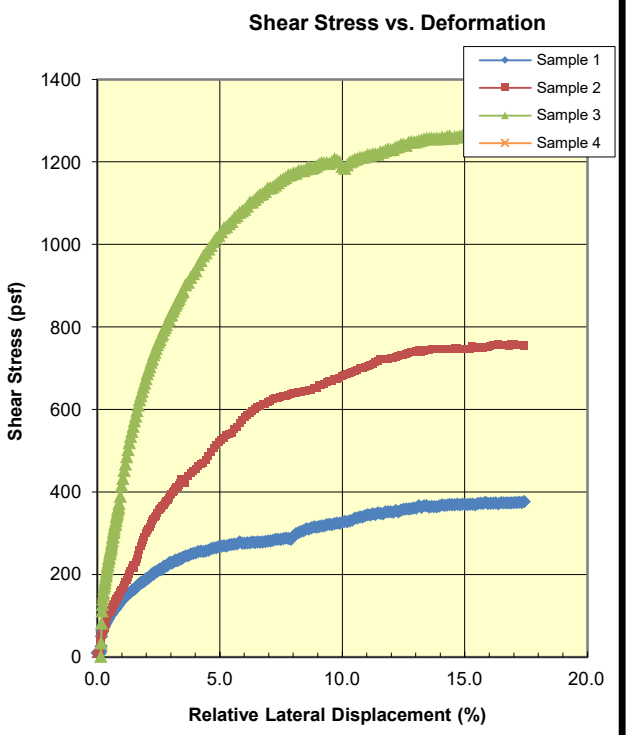
Remarks: Due to the high apparent phi angle, no phi or cohesion is reported. To add phi and cohesion to the report go to the "phi" tab and in cells G30, G31, H30, and H31 enter end points for a line through the 3 data points. The points plotted can be changed on the "Eng Values" tab using cells L6, A2, C2, and E2.

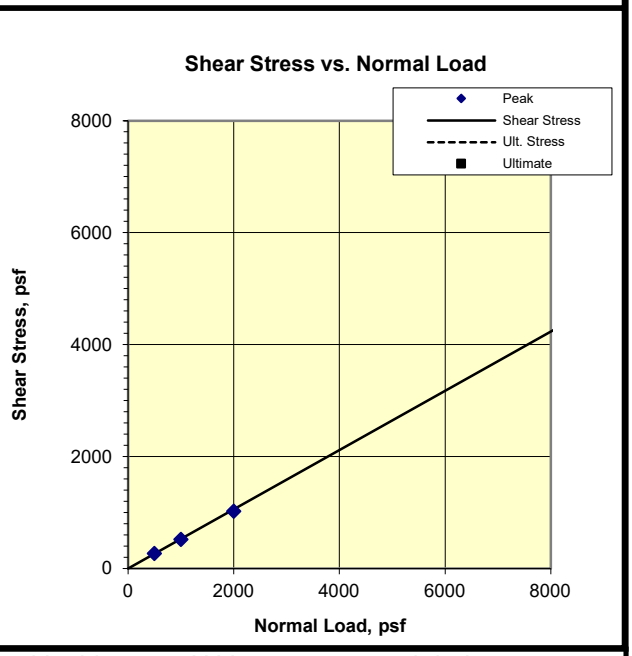
Consolidated Drained Direct Shear (ASTM D3080)

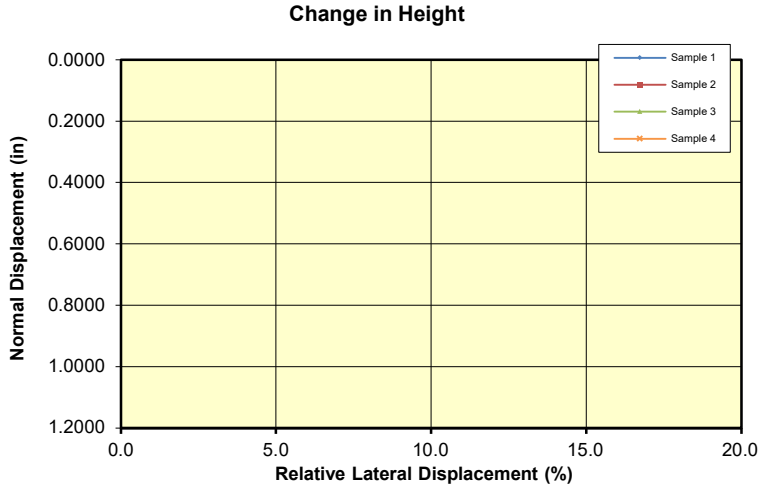
CTL Job #:	461-383	Project #:	WG3444	By:	MD
Client:	Geosyntec Consultants	Date:	8/27/2024	Checked:	PJ
Project Name:	Collinsville-Pittsburg 230KV	Remolding Info:			

Phi (deg)	27.9	Ult. Phi (deg)	
Cohesion (psf)	0	Ult. Cohesion (psf)	

Specimen Data	1	2	3	4
Boring:	B-11	B-11	B-11	
Sample:	11-3	11-3	11-3	
Depth (ft):	12-14.5	12-14.5	12-14.5	
Visual Description:	Dark Gray Elastic SILT (Bay Mud)	Dark Gray Elastic SILT (Bay Mud)	Dark Gray Elastic SILT (Bay Mud)	
Normal Load (psf)	500	1000	2000	
Dry Mass of Specimen (g)	64.2	65.8	66.9	
Initial Height (in)	0.98	0.98	0.98	
Initial Diameter (in)	2.87	2.87	2.87	
Initial Void Ratio	3.425	3.317	3.273	
Initial Moisture (%)	118.2	117.2	114.1	
Initial Wet Density (pcf)	84.7	86.4	86.0	
Initial Dry Density (pcf)	38.8	39.8	40.2	
Initial Saturation (%)	94.9	97.2	95.9	
ΔHeight Consol (in)	0.1138	0.1968	0.1236	
At Test Void Ratio	2.908	2.446	2.734	
At Test Moisture (%)	101.3	88.6	99.2	
At Test Wet Density (pcf)	88.4	94.0	91.6	
At Test Dry Density (pcf)	43.9	49.8	46.0	
At Test Saturation (%)	95.8	99.7	99.8	
Strain Rate (%/min)	0.01	0.01	0.01	
Strengths Picked at	5%	5%	5%	
Shear Stress (psf)	267	521	1022	
ΔHeight (in) at 5%				
Ultimate Stress (psf)				







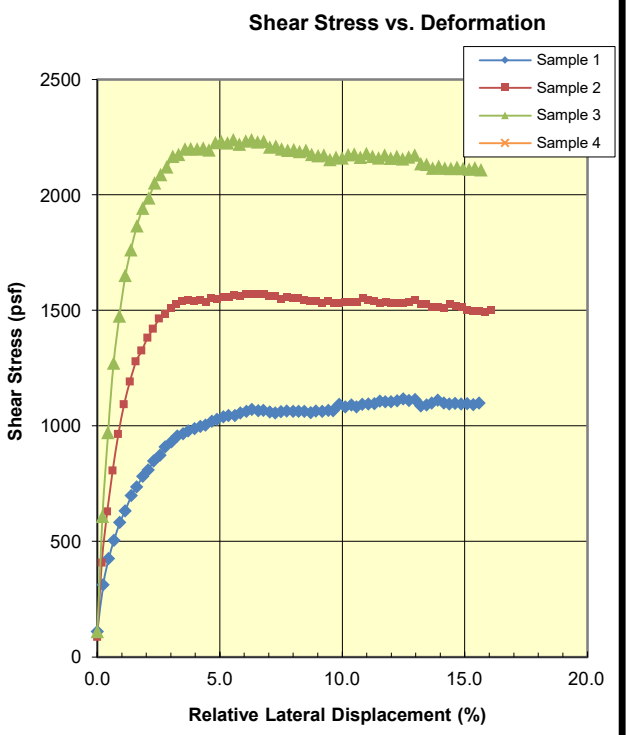
Remarks: *DS-CU* A fully undrained condition may not be attained in this test. ΔH is not measured during undrained direct shear tests.

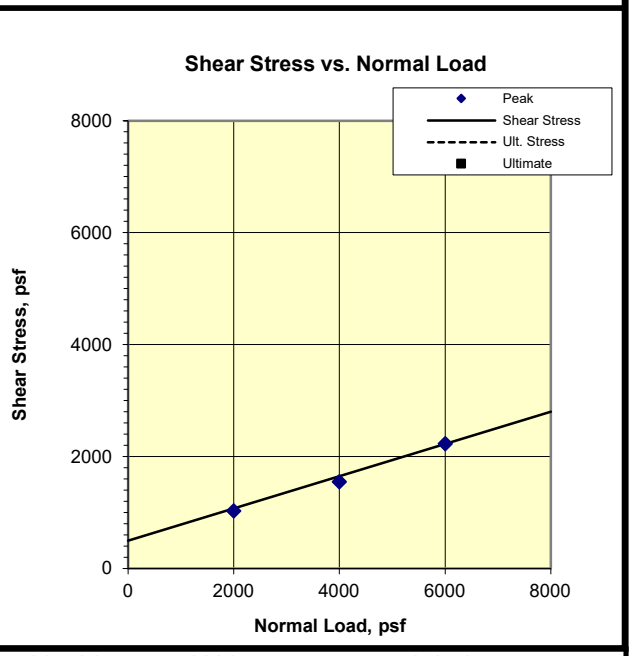
Consolidated Undrained Direct Shear (ASTM D3080M)

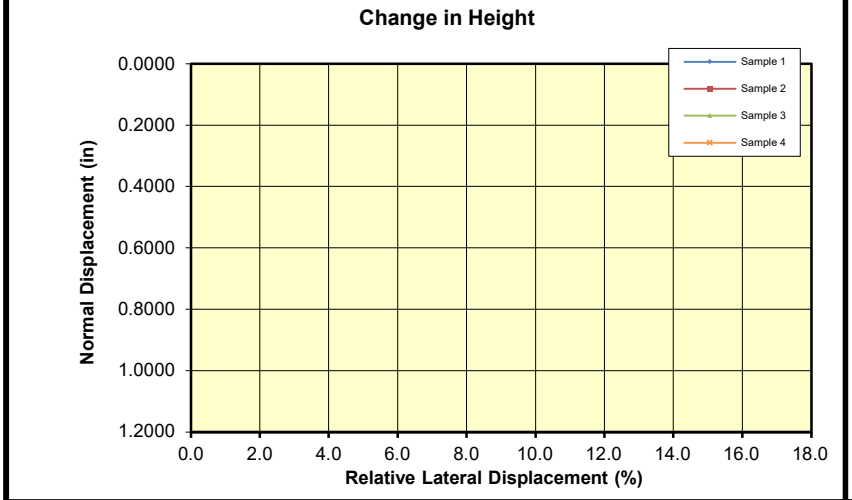
CTL Job #:	461-383	Project #:	WG3444	By:	MD
Client:	Geosyntec Consultants	Date:	8/21/2024	Checked:	PJ
Project Name:	Collinsville-Pittsburg 230KV	Remolding Info:			

Phi (deg)	16.0	Ult. Phi (deg)	
Cohesion (psf)	500	Ult. Cohesion (psf)	

Specimen Data	1	2	3	4
Boring:	B11	B11	B11	
Sample:	11-14	11-14	11-14	
Depth (ft):	65-67.5	65-67.5	65-67.5	
Visual Description:	Greenish Gray Lean CLAY	Greenish Gray Lean CLAY	Greenish Gray Lean CLAY	
Normal Load (psf)	2000	4000	6000	
Dry Mass of Specimen (g)	149.6	150.8	157.0	
Initial Height (in)	0.97	0.98	0.99	
Initial Diameter (in)	2.87	2.87	2.87	
Initial Void Ratio	0.891	0.894	0.838	
Initial Moisture (%)	30.4	31.2	29.0	
Initial Wet Density (pcf)	118.4	118.9	120.5	
Initial Dry Density (pcf)	90.8	90.6	93.4	
Initial Saturation (%)	93.8	95.8	95.2	
ΔHeight Consol (in)	0.0353	0.0588	0.0737	
At Test Void Ratio	0.822	0.781	0.701	
At Test Moisture (%)	29.5	27.8	25.4	
At Test Wet Density (pcf)	122.0	123.2	126.5	
At Test Dry Density (pcf)	94.2	96.4	100.9	
At Test Saturation (%)	98.7	98.1	99.6	
Strain Rate (%/min)	1.4	1.4	1.5	
Strengths Picked at	5%	5%	5%	
Shear Stress (psf)	1028	1549	2226	
ΔHeight (in) at 5%				
Ultimate Stress (psf)				







Remarks: *DS-CU* A fully undrained condition may not be attained in this test. ΔH is not measured during undrained direct shear tests.

APPENDIX C
Photo Log

Photo No.:	1	**Date:**	July 22, 2024
Photographer:	David Umberg		
Subject:	View of Gregg's R/V Quin Drill Ship set up with spuds at Boring #9 (looking west)		
Project:	Collinsville-Pittsburg 230 kV Offshore	**City/State:**	Sacramento River, CA

Photo No.:	2	**Date:**	July 22, 2024
Photographer:	Jim Xia Dea		
Subject:	Installation of 7-in. diameter outer conductor casing through water and within upper ~5' below mudline		
Project:	Collinsville-Pittsburg 230 kV Offshore	**City/State:**	Sacramento River, CA

Photo No.:	3	**Date:**	July 22, 2024
Photographer:	David Umberg		
Subject:	Installation of 5-in. diameter drill bit and NWJ rods through conductor casing at Mobile B80 drill rig		
Project:	Collinsville-Pittsburg 230 kV Offshore	**City/State:**	Sacramento River, CA

Photo No.:	4	**Date:**	August 01, 2024
Photographer:	Jim Xia Dea		
Subject:	View of the Mobile B80 rotary drilling rig from the bridge of the R/V Quin.		
Project:	Collinsville-Pittsburg 230 kV Offshore	**City/State:**	Sacramento River, CA

Photo No.:	5	**Date:**	July 22, 2024
Photographer:	Jim Xia Dea		
Subject:	View of soil taken from Sample 9-1. Sampled with Mod Cal Sampler. Soil Unit 2: Sandy Silt to Silty Sand		
Project:	Collinsville-Pittsburg 230 kV Offshore	**City/State:**	Sacramento River, CA

Photo No.:	6	**Date:**	July 31, 2024
Photographer:	Jim Xia Dea		
Subject:	View of Sample 1-3. Sampled with SPT sampler. Soil Unit 1: Poorly Graded Sand with Silt.		
Project:	Collinsville-Pittsburg 230 kV Offshore	**City/State:**	Sacramento River, CA

Photo No.:	7	**Date:**	July 29, 2024
Photographer:	Jim Xia Dea		
Subject:	View of Sample 2-7. Sampled with Shelby Tube. Soil Unit 3: Elastic Silt with sand and organics		
Project:	Collinsville-Pittsburg 230 kV Offshore	**City/State:**	Sacramento River, CA

Photo No.:	8	**Date:**	July 29, 2024
Photographer:	Jim Xia Dea		
Subject:	View of Sample 3-7. Sampled with SPT Sampler. Soil Unit 3: Fat Clay with Sand and Organics.		
Project:	Collinsville-Pittsburg 230 kV Offshore	**City/State:**	Sacramento River, CA

Photo No.:	9	**Date:**	July 30, 2024
Photographer:	Jim Xia Dea		
Subject:	View of Sample 11-19. Sampled with SPT Sampler. Soil Unit 4: Lean Clay.		
Project:	Collinsville-Pittsburg 230 kV Offshore	**City/State:**	Sacramento River, CA

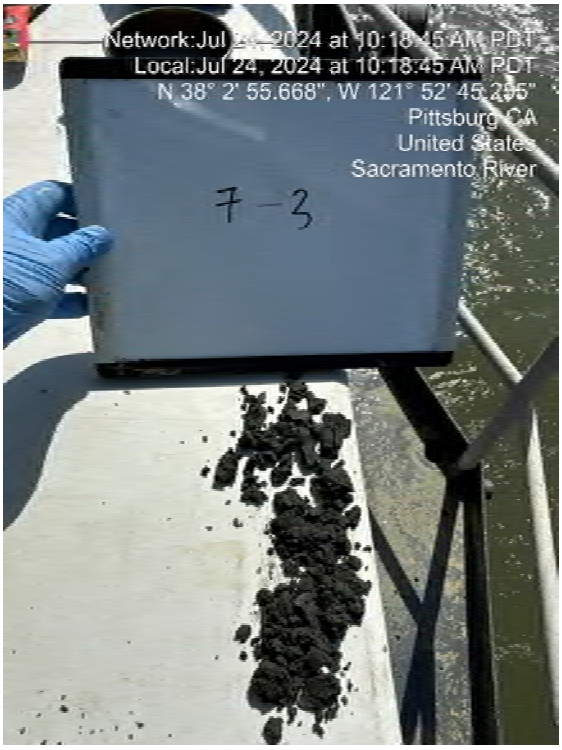


Photo No.:	10	**Date:**	July 24, 2024
Photographer:	Jim Xia Dea		
Subject:	View of Sample 7-3. Sampled with Shelby Tube. Soil Unit 2: Sandy Silt.		
Project:	Collinsville-Pittsburg 230 kV Offshore	**City/State:**	Sacramento River, CA

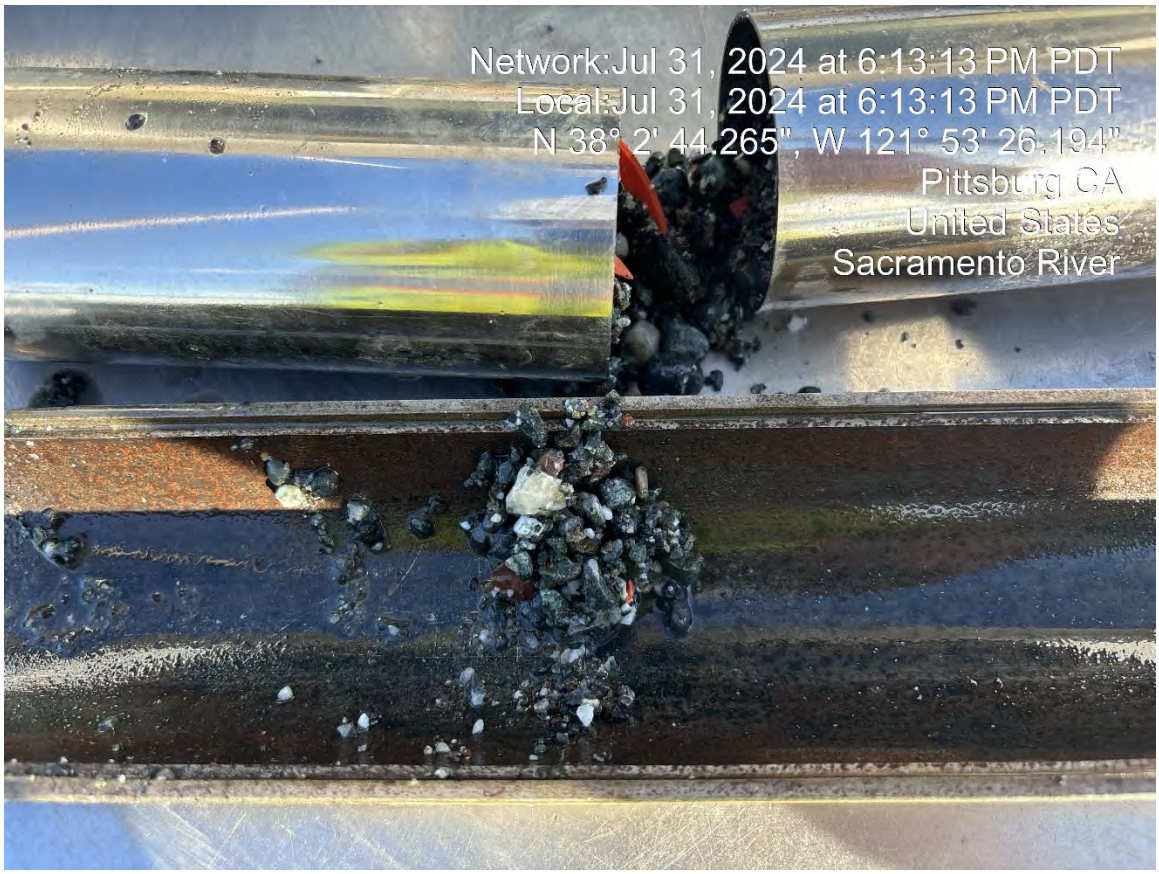


Photo No.:	11	**Date:**	July 24, 2024
Photographer:	Jim Xia Dea		
Subject:	View of Sample 8-4. Sampled with Mod Cal Sampler. Soil Unit 5: Poorly Graded Gravel with Sand.		
Project:	Collinsville-Pittsburg 230 kV Offshore	**City/State:**	Sacramento River, CA