GENERAL GEOTECHNICAL SUBSURFACE SOILS EVALUATION REPORT FOR

El PASO WATER - COORS CHANNEL DRAINAGE IMPROVEMENTS PROJECT

INTERSECTION OF GATEWAY BOULEVARD EAST AND EUCLID STREET
EL PASO, EL PASO COUNTY, TEXAS
CQC PROJECT NO. AGCQC22-008

el paso WATER

CONDE INC
engineering | planning | surveying

PREPARED FOR

CONDE, INC.
6080 SURETY DRIVE, SUITE 100
EL PASO, TEXAS 79905

CQC
construction quality control
testing and engineering

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October 14, 2022 (Revised October 31, 2022)

Conde Inc.
6080 Surety Drive, Suite 100
El Paso, Texas 79905

Attn: **Ms. Yvonne Conde Curry, P.E., CNU-A**
Principal

Re: **General Geotechnical Subsurface Soils Evaluation Report**
El Paso Water– Coors Channel Drainage Improvements Project
Intersection of Gateway East Boulevard and Euclid Street
El Paso, El Paso County, Texas
CQC Project No.: AGCQC22-008

Dear Ms. Conde,

In accordance with our scope of services under our contract agreement and proposal PGCQC20-078, dated October 29, 2020, CQC Testing and Engineering, L.L.C. (CQC) is pleased to provide **Conde Inc. (Client)** with our general subsurface soils evaluation report for the above referenced project. This report presents the results of our soil exploration borings, laboratory engineering soil classification test results, guidance information with respect to suitability of observed and tested subsurface soils. This reports also provide geotechnical considerations related to soil bearing capacity, existing soils potential construction use for pipeline and/or box culvert backfilling, proposed pond expansion slope erosion control and general trench safety guidelines.

Thank you for selecting our firm for geotechnical consulting services and we look forward to working with the design team on the construction phase of this project. Please feel free to contact us if you have any questions regarding the contents of this report or if we may assist you with other services.

Respectfully Submitted,
CQC Testing and Engineering, L.L.C.
TBPE Firm Registration No. F-10632

10/31/2022

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Report Table of Contents

List of Tables

List of Appendices

Section 1.0 – General Project Information

This general geotechnical subsurface soils evaluation report has been prepared for the use of **Conde, Inc. (Client)** for the El Paso Water Coors Channel Drainage Improvements Project. Based on general information provided by our Client, we understand that the subject project site is located within a commercial tract of land within the southwest quadrant at the intersection of Gateway Boulevard East and Euclid Street in central El Paso, El Paso County, Texas. A conceptual plan provided by our Client indicates that the project involves storm water collection and diversion improvements; including the modification of an existing shallow storm water collection pond within the project area. We understand that at this time the project includes; the design and installation of approximately 1,110 linear feet of 8-foot by 4-foot, 6-foot by 4-foot, and 4-foot by 4-foot concrete box culvert system to re-divert storm water to an existing pond. We understand that the existing pond shall be modified to increase its capacity and depth up to 27 feet based on current conceptual planning. We anticipate that existing site work will have to be removed to allow construction of the box culvert. We understand that the box culvert invert depth shall range from approximately 8 to 25 feet below the existing ground surface elevations.

Our scope of services for this project consisted of generally evaluating the subsurface soil conditions along the new storm sewer system alignment route by collecting subsurface soil information, conducting Standard Penetration Tests (SPT's) and developing soil related information with respect to the suitability of the on-site soils, engineering soil classifications, bearing resistance, and potential construction use for storm sewer backfilling.

The following sections of this report present our field evaluation methods, site soil-related considerations, and guideline information with respect to soil preparation, storm sewer embedment, soil backfilling and trench safety considerations. Please note that the entire report should be read for a thorough understanding of our evaluation, findings, and guideline recommendations. CQC Testing and Engineering, LLC (CQC) should be contacted through a written statement if our stated understanding of the project is not correct and/or if the owner changes the new storm sewer system route for this project. Route changes may result in our information and recommendations within this report to be invalid without further review and evaluation by CQC.

1.1 - Site Geologic Considerations

The Geologic Atlas of Texas (Van Horn-El Paso Sheet, Revised 1983) published by the Bureau of Economic Geology at the University of Texas at Austin indicates that that the storm sewer route is located in an area of Old Quaternary (Qao) and Bolson deposits (QTb) deposits. These deposits typically consist of colluvium, alluvium and fan deposits. These geologic formations will contain deposits of gravel, silt, sand, clay, caliche and gypsum in

bolsons. These deposits are usually variable over relatively short distances. The geologic atlas also indicated that the project area is located northwest of a fault zone.

It has been reported that no significant ground movement caused by the existing faults has been recorded for the past 50 years in the El Paso area. Please note that our scope of work did not include the specific delineation of faults along the storm sewer route. However, these services may be provided as an additional scope of work and services to our Client, if required.

1.2 – Existing Site Conditions and Topography

The new storm sewer route will traverse the existing parking lot of Cardwell Collaborative and continue south towards the existing ponding area and east towards the existing Coors Channel. The existing roadway where the new storm sewer structure shall traverse is paved with asphaltic concrete and contains underground utility infrastructure, which includes gas lines, water and sanitary sewer lines within the roadway area. Unclassified material was found within auger cuttings at approximately 15 feet in boring B-3. In addition, apparent trash, debris, and stained soils were encountered in soil samples within borings B-3 and B-5. Trash consisted of decomposing clothing, fabric and construction debris materials. Stained soil samples did not have an appreciable odor of hydrocarbons or organic material. Apparent orange stained and blackish brown soil samples were also encountered in borings B-3, B-5, B-6, B-8, B-9 and B-10. The boring locations are indicated on the General Geotechnical Subsurface Exploration Boring and DCP Test location aerial plan in Appendix A, Sheet A1. The boring plan also contains general comments with respect to our findings in the borings.

CQC was not provided with any historical survey plans, historical topographic surveys, historical photographs, historical grading plans, environmental reports or construction reports for review from our Client. Therefore, CQC has no knowledge if previous site excavations or fill required to construct the existing channel, earthen embankments, roadways, surrounding properties and utility infrastructure were appropriately backfilled with suitable soils and tested for compaction verification. We anticipate that existing utility infrastructure is over 20 years old.

1.3 – Seismic Considerations

On March 26, 2020 a 5.0 magnitude earthquake occurred near the town of Mentone, Texas that resulted in tremors in El Paso, El Paso County, Texas. There was a total of five earthquakes that registered near the town of Mentone. The earthquakes have registered on the richter scale between 2.6 to 5.0. The tremors were felt

throughout West Texas. It is not known if any of the existing utility infrastructures within the project area exhibited any damage or movement.

Seismic ground motion values are defined in the table below. The seismic coefficients were generated through Seismic Design Maps, a USGS web service developed by the Structural Engineers Association of California's (SEAOC) and California's Office of Statewide Health Planning and Development (OSHPD). These values should be verified by the project structural engineer prior to use in structural analysis. CQC should be informed if the reported values vary significantly.

Table 1 - Seismic Ground Motion Values

Latitude	Longitude	Site Classification	Period (Seconds)	Spectral Accelerations (g)	Site Coefficient, F_a	Site Coefficient, F_v
31.77618447	106.42828153	D	0.2 (S_s)	0.331	1.535	-
			1.0 (S_1)	0.108	-	2.385

Remarks: Site Class is based on the current National Earthquake Hazards Reduction Program (NEHRP 2015) and Site Classification for Seismic Design Definitions in conjunction with our review of the geologic conditions in the area. In the event that the owner and/or design representative is interested in determining the building code Site Class with a higher degree of accuracy, additional tests beyond our original requested scope of work shall be required.

Section 2.0 – General Subsurface Soils Evaluation Methods and Testing

The subsurface soils within the project area were evaluated by completing ten (10) vertical exploration borings with a truck mounted drilling rig and hand auger subsurface exploration techniques. Dynamic Cone Penetrometer (DCP) tests were performed near each hand auger boring for evaluation of the apparent bearing capacity of in-situ soils. Borings HAB-1 and HAB-2 were completed in the areas where drill rig access was limited. In addition, a single (1) soil percolation test was also performed within the project area existing storm water collection pond. As previously indicated, the approximate boring locations are shown in the boring location aerial plan. A summary of our subsurface vertical boring evaluation is reported in the table below. Our vertical exploration boring logs are presented in Sheets A2 through A11. DCP test results are reported in sheets A28 and A29.

Our engineering soil classification tests (i.e., moisture contents, soil particle size analysis and Atterberg Limit Tests) were performed in accordance with industry standard ASTM test procedures. In general, the results of our tests and estimated "N-Values" are presented in our soil boring logs and Summary of Laboratory Engineering Soil Classification Test Results in Sheets A22 and A23. In general, at the completion of our drilling activities the borings were backfilled with auger cuttings and firmly compacted to the approximate ground surface elevations. Borings within paved areas were patched with rapid set concrete or cold mix asphaltic-concrete material to the existing ground surface elevation.

The following table summarizes the completion depth of our borings, type of samples and number of soil samples collected at the time of our drilling operations.

Table 2 – Summary of Subsurface Vertical Boring Evaluation

Borehole No.	Approximate Termination Depth (ft.)	No. Split-Spoon Samples	No. Grab Samples	Approx. Observed Groundwater / Water Seepage Depth (ft.)
HAB-1	2½[1]	-	5	NE
HAB-2	10	-	20	NE
B-3	15[2]	5	-	NE
B-4	15	6	-	NE
B-5	15	6	-	NE
B-6	15	6	-	NE
B-7	15	6	-	NE
B-8	20	7	-	NE
B-9	20	7	-	NE
B-10	35	10	-	NE

Remarks: The vertical borings were logged during our drilling operations by a member of our geotechnical engineering staff. During our standard drill rig drilling operations, Standard Penetration Tests (SPT's) were performed in general conformance with ASTM D 1586. Soil samples were collected within a split-spoon sampler at discrete depth intervals and were containerized and transported to our laboratory for further observation and engineering soil classification testing on selected soil samples.
NE - Not encountered immediately at the completion of our drilling activities.
[1] - Hand auger refusal was experienced at the indicated depth due to encountered asphaltic concrete debris.
[2] - Boring B-3 terminated at reported depth due to encountered debris.

Contractors interested in bidding the project shall perform their own tests to verify the types of materials or review historical plans of the area to evaluate the excavation requirements prior to bidding the project. This is specifically true with respect to the encountered debris and stained soil samples. The purpose of this geotechnical evaluation was not to identify environmental concerns, remediation requirements and quantification of buried unclassified materials that would require appropriate disposal. Please refer to Section 11.2 for additional specification and construction considerations.

Please note that the collected soil samples from our soils evaluation shall be stored for a period of up to 60 days after the submittal of this report, if a longer period of storage is required by our Client, CQC should be informed in writing.

2.1 - Laboratory Engineering Soil Classification Testing

In the laboratory, selected soil samples were evaluated and visually classified by our geotechnical engineering staff in general accordance with the Unified Soil Classification System (USCS). The geotechnical engineering properties of selected soil samples were evaluated by the following tests:

Table 3 – Summary of Performed Engineering Soil Classification Tests

Type of Test	ASTM/TXDOT Test Procedure	Total Number Conducted
Moisture Content Tests	D 2216	34
Atterberg Limit Tests	D 4318	34
Soil Particle Size Analysis Tests	D 6913	34
Soil Moisture-Density Relationship Tests	D 1557	4

Selected soil sample particle size analysis test report results are reported in Sheets A12 through A21.

2.2 – Soil Moisture-Density Relationship Test Results

At the time of our drilling activities, four (4) bulk composite soil samples were obtained from the reported boring locations for soil moisture-density relationship testing. The samples were collected during our drilling activities from auger cuttings from approximately the ground surface or paved to the reported depth. The test results are reported in Sheets A24 through A27.

Table 4 – Summary of Soil Moisture-Density Relationship Test Results

Borehole No.	Approx. Sample Depth (ft)	ASTM D 1557, Method	Soil Classification[1]	Plasticity Index	Opt. Dry Density (pcf)	Opt. Moisture (%)
HAB-2	0 - 10	B	SM	NP	124.1	9.5
B-4	0 - 5	A	SM	NP	123.1	8.8
B-7	0 - 5	C	GP-GM	NP	137.9	6.3
B-10	0 - 3	A	CH	48	105.6	13.6

NP – None Plastic.
Note [1] - Soil description is reported in our test report results in Sheets A24 through A27.

Section 3.0 – Subsurface Soil Classification and Strength Considerations

Based on our soil classifications and laboratory tests, the subsurface soils encountered in our exploration borings along the storm sewer box culvert route may be described by generalized soil stratums presented in the following table. The logged depth of the soil formation types is approximately delineated in our boring logs. Based on the collected soil sample data, it is possible for variations in the types and depths of the soil formations to occur over relatively short distances.

Table 5 – Summary of Subsurface Soil Classification & Strength

Stratum	General Description	Consistency (SPT Blow Counts)	Moisture Content (%)	Atterberg Limits		%Passing No. 200	USCS Classification
				Liquid Limit	Plasticity Index		
I	Stratum I: Silty Sand, Clayey Sand and Poorly Graded Sand. Fine to coarse grained with gravel, clay and various amounts of silt.	Medium Dense to Dense (12 to 42)	1 to 15	NP to 38	NP to 22	4 to 34	SM, SC, SC-SM, SP-SM, and SP

	***Remarks*:** [1] Subsurface soil zones, which exhibit SPT values less than 11 blows per foot, shall be susceptible to settlement and soil sloughing during excavations. [2] In general, encountered Stratum I sandy soils in our borings may be considered Class III Backfill soil materials, provided that soil plasticity index values are less than 15. The encountered Stratum I soils are considered suitable pipe backfill soil material, above the pipe zone and backfill surrounding and above box culvert storm sewer structures. [3] Sands that classify as SC shall be blended with suitable relatively non-plastic (NP) sands to meet the Select Fill and Backfill Requirements. Blending shall be required to reduce the plasticity of the native clayey soils. Soils that classify as CH shall not be blended. [4] Poorly Graded sands were generally encountered in a dry condition and shall be susceptible to sloughing and collapse when unconfined.						
II	Stratum II: Sandy Silt, Fat Clay and Lean Clay with sand.	Medium Stiff to Very Stiff (7 to 23)	17 to 31	27 to 83	10 to 61	60 to 96	ML, CH and CL
	Pocket Penetrometer Readings (tsf):	1.0 to 4.5					
	***Remarks*:** [1] In general, the Stratum II clays and silts are considered Class IV backfill soil materials and are not considered suitable pipeline backfill soil materials. Excavated Stratum II soils shall be replaced with approved backfill soil materials. [2] Stratum II soils shall not be utilized as backfill surrounding the box culvert structure. The Stratum II soils may remain in-place along cut earthen sidewalls of trench excavations. The box culvert structure shall not bear directly on the Stratum II soils. The box culvert structure shall bear on approved Structural Fill soils as indicated in Section 7.0 of this report. [3] The Stratum II soils may remain along pond slope cuts. However, should be removed and replaced with relatively free draining soil material at the bottom of the pond. See report Section 9.0 for additional pond design and construction considerations.						

As previously mentioned, unclassified trash, debris and stained soil materials were encountered within our explanation borings. Unclassified materials encountered during excavation shall not be used as Structural Fill, Select Fill and/or Backfill soil material. These materials shall be removed and disposed of properly.

3.1 - Groundwater Depth Considerations

At the time of our drilling activities, groundwater or water seepage was not observed or encountered immediately at the completion of our subsurface exploratory borings. The groundwater depth in this area is anticipated to be below an anticipated maximum excavation depth of 30 feet for this project. In general, the subsurface soils were encountered in a relatively dry to moist condition. The moisture content of tested soil samples ranged from about 1 to 31 percent.

It is possible to encounter perched water zones above the relatively low permeability Stratum II soils. In the event that water seepage or perched water is encountered at shallower depths during construction at this site, the water seepage shall be appropriately removed. If an "artesian" condition is encountered it may be bridged with suitable Controlled Low Strength Materials (CLSM) or approved gravel rock. The proposed CLSM or gravel rock should be approved by the engineer of record through a submittal process. In any event, CQC should be immediately contacted to perform site observations of the noted conditions, if necessary. Workers shall be prohibited from working in excavations where water has accumulated or is accumulating.

3.2 - Soil Related Movement Considerations

The results of our observations and soil classification tests were used to evaluate the Potential Vertical Rise (PVR) of the Stratum II clayey soils in accordance with a published empirical method. This method is used to estimate the potential vertical movements of cohesive soils based on the plasticity index (PI) of the soil. The procedure allows the reduction of the initial estimated PVR for the existing soil conditions and/or dry soil profile through surcharge addition (i.e., fill soil pressure or load pressures) and replacement of the cohesive materials with non-plastic soils.

Based on our soil classification test results, the potential soil related ground movements for the encountered soils in our borings were estimated. Our estimates were based on the Texas Department of Transportation, Method for Determining the Potential Vertical Rise (PVR) Tex-124-E procedures. Based on the encountered soil moisture conditions, a surcharge pressure of at least 1 psi and an active soil zone of 15 feet; the following PVR values where estimated for each boring.

Table 6 - Estimated PVR Values

Borehole No. [1]	Estimated PVR Value (in.)
B-1	Negligible
B-2	Negligible
B-3	< ¼
B-4	< ¼
B-5	2
B-6	Negligible
B-7	¼
B-8	< ¾
B-9	1 ¼
B-10	1 ½

[1] Borehole approximate locations are indicated in General Geotechnical Subsurface Exploration Boring Location Aerial Plan in Sheet A1.

According to the PVR results, the subsurface clayey soils within the storm sewer line alignment exhibit a relatively low to moderate potential for swelling. Based on the invert depths of the storm sewer structure we anticipate that portions of the pipeline shall be placed on lean and fat clay soils. This may be true for areas near borings B-5, B-7, B-9 and B-10 where clayey soils where encountered at approximately 5 to 13½ feet below the existing ground elevations. Should plastic clayey soils be encountered at the embedment depth, the clayey soil shall be removed and replaced with suitable approved back fill soil materials as indicated in report Sections 7.1 and 7.2.

3.3 - Drainage Considerations

Drainage is an important key to the successful performance of any excavation and soil supported structure or pipeline. Positive surface drainage should be established prior to and be maintained during and after construction to prevent water from ponding within or adjacent to trench excavations. It is also possible for sinkholes to be created if trenches are left open during periods of significant rainfall events, especially in construction areas that have significant vertical changes in elevation.

3.4 – Storm Sewer Structure Subgrade Embedment Preparation Considerations

The existing subgrade soils that will support compacted Select Fill, Structural Fill and/or Class III backfill soil materials and pipeline / box culvert structures should be cleared of all vegetation, unclassified material, trash, contaminated soil, organic matter, topsoil and/or any foreign matter or as required by the project plans and specifications, whichever is most stringent.

Should Stratum II soils be encountered at the pipe embedment or box culvert bearing depth, the subgrade shall be overexcavated and replaced with Select Fill, Structural Fill and/or Class III backfill soils as indicated the following sections of this report. In all cases, Structures shall be supported on a minimum of 12 inches of approved soil materials.

The exposed subgrade at the specified cut depth or below specified Select Fill shall be scarified to a minimum depth of 8 inches, moisture conditioned and re compacted. Subgrade soils with a PI less than 18 shall be scarified and recompacted to 90 percent of maximum dry density determined per ASTM D 1557. Moisture content of subgrade shall be maintained within ±3 percent of optimum moisture content until permanently covered. Cohesive clay subgrade soils (i.e., soils with a PI of 18 or greater) should be compacted to at least 90 percent of maximum dry density per ASTM D 1557 with water content within 0 to 4 percentage points of optimum. The contractor should also control the application of moisture to the subgrade soils during earthwork operations to mitigate potential subgrade pumping. Weak or compressible soil zones identified during earthwork operations should be removed and replaced with properly compacted Select Fill or approved rock material to a minimum depth of 8 inches or as required to appropriately bridge over these soils, whichever is deeper.

Once the subgrade soils have been compacted and tested, prepared exposed subgrade soils shall be proof rolled with manual equipment such as jumping jack or robotic compactors that may access excavation trenches. Weak or pumping compressible soil zones identified during proof rolling shall be over excavated and replaced with Select Fill to a minimum depth of 12 inches or as required to appropriately bridge over these soils, whichever is

deeper. Any subgrade areas that demonstrates permanent deformation greater than 1 inch shall also be over excavated and replaced with compacted Select Fill material.

It is recommended that a unit bid price be requested from bidding contractors for the placement of gravel or rock material (i.e., minimum of 4 to 8 inch clean, uniformly angular, stable crushed limestone rock) at the over-excavation bottom cut depth, in the event that pumping of the subgrade soils is experienced. The placement of gravel shall serve as bridge over soft or loose wet spots at the bottom of the cut elevation.

The earthwork contractor shall consider that temporary excavation slopes shall be at least 1 ½ :1 or shored to control sloughing or cave-ins of the encountered soils in order to conduct earthwork activities and place new specified utility structures.

Section 4.0 – Soil Bearing Capacity and Design Considerations

4.1 – Storm Sewer Design Considerations

At the time this report was submitted, final pipeline and/or box culvert invert depths, details and plans were not available for our review. Once available, CQC should be provided this information to reevaluate our recommendations with respect to allowable soil bearing capacities and recommended soil improvement below the new storm sewer structure presented within this report. At this time, we understand that pipeline and/or box culvert embedment depth shall be about 8 to 25 feet below the existing pavement surface elevations. The encountered subsurface soils at the anticipated invert depths are anticipated to provide an allowable soil bearing capacity of at least 1,500 pounds per square foot (psf). The recommendations in the following sections of this report should also be considered in the design of the specified utility structures.

4.2 - Earth and Vehicle Loads

The analysis and design should consider the vehicular traffic loads, earth backfill loads, applicable pipe or structure laying methods, bending stresses, potential for settlement, and estimated structure deflections. The following soil related design parameters may be considered in the design analysis. CQC should be contacted if additional soil related information is required to supplement design and analysis.

- Soil Related Design Parameters

-135-145 pcf (Estimated Soil Total unit weight, may be considered in vertical earth load analysis)
-Category 1 - Sandy & Gravel Profile
- E' = 500 psi (Presumptive Allowable Modulus of Soil Reaction for
Sandy Gravels and Clean Sand Backfill Bedding Soils)

4.3 – Thrust Blocks

As applicable, we anticipate that thrust blocks shall be specified at curves and turns of the proposed pipeline, a passive earth resistance of 350 pounds per cubic foot may be used for design purposes. Thrust blocks should bear solidly against undisturbed trench walls in all directions.

Section 5.0 – Below Grade Lateral Earth Pressures

The proposed below grade structures related to this project will be subjected to vertical and lateral earth pressures depending upon the type of backfill soil. The table below presents at-rest (K_o) pressure coefficients for select backfill soils. The K_o pressures are recommended for cases where the structures will experience little yield. Select backfill soils should meet the requirements of Select Fill or as required by the project specifications, whichever is more stringent.

Vehicles live loads and surcharge pressures should also be considered in analysis, as applicable.

Table 7 – Earth Pressure Coefficients

Soil Type	Estimated Total Unit Weight Ranges (pcf)	Presumptive Soil Angle of Internal Friction Ranges (deg)	Lateral Earth Pressure Coefficients	Equivalent Fluid Weight (pcf)
			At-Rest (K_o)	At-Rest (K_o)
Structural Fill (Base Course Material)	145	42	0.33	49
Select Fill Soils (Select Backfill Soil) (PI<15)	125	32	0.50	60
Silty and Poorly Graded Sands	120	30	0.50	60
Sandy Gravel	135	36	0.50	68
Lean/Fat Clay	110	-	0.80	88

Section 6.0 – General Trench Safety Considerations

The following report sections present general trench safety excavation considerations.

6.1 – Trench Safety Considerations

Trench excavations of more than 4 feet in depth and extending to a maximum depth of 20 feet may be supported with shielded systems in accordance with OSHA regulations. Excavations beyond 20 feet are not covered by industry standard OSHA regulations and shall require the design of a specific excavation trench shoring system by a licensed engineer in the State of Texas.

Shielded systems, such as trench boxes, should not be subjected to loads exceeding those which the system was designed to withstand. Shields may be stacked, provided that they are installed in a manner to resist

lateral displacements or other hazardous movements of the shield in the event of sudden changes in lateral loads, such as sidewall collapse, or impact from excavation equipment or any other potential force.

Employees shall not be allowed in shielded trenches when shields are being installed, removed, or moved vertically or horizontally. Employees should not be permitted in trenches that show possible loss of soil from behind or below the bottom of the shield. Hard hats and warning vests or other highly visible Personal Protection Equipment (PPE) should be worn by all employees.

Surface encumbrances, such as boulders and vegetation, located so as to create a hazard to employees involved in excavation work or in the vicinity thereof at any time during operations, shall be removed, properly supported or made safe before excavation begins. Existing underground utility lines shall be located prior to performing excavations and protected during excavation construction. Excavations should not undermine existing structures and should be at least 10 feet from the toe of any structure.

When mobile equipment is operated adjacent to an excavation, a warning system should be utilized such as barricades, hand or mechanical signals, or stop logs.

Properly designed means of access and egress from excavations should be provided for employees. Structural members used as ramps and/or runways over excavations 6 feet or more in depth should be equipped with guardrails and should be uniform in thickness and supported properly to prevent displacements. Stairways, ladders, ramps, or other safe means of egress shall be located in trench excavations that are 4 feet in depth or more in depth so as to require no more than 25 feet of lateral travel for employees.

A “competent person” shall inspect and document the excavation conditions trench systems and equipment daily and notify the contractor's superintendent of any conditions which may adversely affect the reliability and safety of the excavation. The excavations shall also be inspected after each rainstorm or when any changes in conditions occur that can increase the possibility of a cave-in or slide. If evidence of possible cave-ins or slides is apparent, all work in the excavation shall cease until the necessary precautions for sloping or bracing have been taken to safeguard the employees and trench. Any loose soil shall be scaled from the slope and removed from the excavation to protect workers against falling soil.

The atmosphere within a trench deeper than 4 feet shall be tested when there is a possibility of oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or build-up of hazardous gases. Ventilation should be provided to prevent flammable gas build-up to 20 percent of lower explosive limit of the gas. In addition, testing should be conducted as often as necessary to ensure that the atmosphere remains safe. Emergency rescue procedures and equipment should be readily available at all times, especially where hazardous

atmospheric conditions could exist or develop during work in an excavation. Employees entering deep confined excavations should wear a safety harness with a lifeline securely attached to the harness.

A health and safety plan and emergency rescue plan should be established and maintained by the general contractor at all times during the project. In the event of an injury or emergency situation, it is imperative to follow all guidelines as detailed in the most recent OSHA Standards for the Construction Industry Manual, including completion of all necessary forms, accident procedures, and report documentation. After rescue operations are implemented the accident area should be closed off and made safe until an OSHA inspector visits the site and documents conditions after immediate notification. Emergency contact information should be posted on the site at all times during excavation activities.

Excavations of earth material to a level not greater than 2 feet below the bottom of a shield may be permitted, provided that the soil sidewalls are stable. Shields should extend to a minimum of 18 inches above the top of the vertical side or crest of the excavation.

The trench box system should be used in accordance with the Manufacturer's recommendations in accordance with the requirements of a trench safety plan and current OSHA regulations. Excavation safety systems for trenches shall be designed by a licensed professional engineer for all anticipated depths for this project.

It shall be the contractor's responsibility to document and record all daily excavation activities in accordance with OSHA regulations. CQC and our Client shall have no liability for the selected means and methods utilized by the contractor to perform excavations.

Section 7.0 – Concrete Box Culvert, Pipe Embedment and Backfill Considerations

As indicated above, the following recommendations should be considered in the design of the concrete box culvert, pipeline embedment and backfilling specifications. It is anticipated that a prefabricated concrete box culvert shall be specified.

Bidding contractors shall anticipate that import of suitable backfill soil materials and/or screening of the on-site gravelly soils may be required to meet the specified backfill soil requirements for the pipe embedment zone, pipe zone, backfill soils above the pipe zone and Structural Fill to support the box culvert. Excavated Class IV (Stratum II) soil layers shall be stockpiled separately and remove and disposed of properly. As previously indicated, excavated unclassified materials shall not be utilized as backfill and appropriately disposed.

7.1 – Concrete Box Culvert Considerations

Based on our understanding of the project, the storm sewer improvements shall include placement of concrete box culvert. It is our understanding that the storm sewer box shall bear at depths ranging from approximately 8 to 20 feet below the specified finished grade elevations. Our SPT data indicates that the existing subsurface soil formations shall provide allowable bearing capacity of at least 1,500 psf at the indicated depths. We recommend that the box culvert be placed above a minimum 8 to 12 inches of approved compacted Structural Fill material meeting current TXDOT Standard Specifications Item 247, Type A, Grade 3. Structural Fill shall be compacted to at least 95 percent of maximum dry density determined per ASTM D 1557 and the moisture content shall be maintained within ±3 percent of optimum moisture content. The specification of a leveling gravel or stone layer may also be considered above Structural Fill layer.

Prior to the placement of Structural Fill the subgrade soil shall be prepared and compacted as indicated in Section 3.4 of this report.

7.2 – Pipe Embedment and Backfill Considerations

The backfill soil materials above the box culvert shall consist of approved Class III and/or Select Fill soils. Based on the results of our explanation borings and laboratory tests, we anticipate that the native Stratum I sands shall be suitable backfill soils for use around and above the box culvert structure. The other comments in Section 3.0 of this report shall also be considered. The approved backfill soils shall be compacted to at least 95 percent of maximum dry density determined per ASTM D 1557. The moisture content of the Select Fill shall be maintained within ±3 percent of optimum moisture content.

The pipeline backfill soil materials shall meet the specified requirements and/or the El Paso Water (EPW) standard construction specifications for installation of water utility lines and applicable structures. The following table presents general guidelines for backfill soil materials. Section 11.0 of this report presents backfill soil material specifications. Pipeline backfill soil materials shall also meet the pipe manufacturer requirements.

Table 8 - Pipeline Backfill Material Guidelines

BACKFILL ZONE	BACKFILL MATERIAL TYPE	ASTM COMPACTION REQUIREMENTS
Below Pipe Embedment Zone	Class III or Select Fill	90% per ASTM D-1557
Embedment Pipe Zone	Class I, II or as specified	90% per ASTM D-1557
Trench Backfill Above Pipe Zone	Class III or Select Fill	90% per ASTM D-1557
Backfill Material from Finished Surface to 36-inches	Class III or Select Fill	95% per ASTM D-1557

Additional Requirements:

1) The moisture content of the backfill materials shall be maintained within ±3% of optimum moisture content or as specified. Pipe zone backfill material shall be maintained within +/- 2 % optimum moisture content.

2) The supporting subgrade soils at the cut excavation that shall support embedment backfill material and the pipes should be stripped of all vegetation, organic matter, clay soil lumps, topsoil, construction/pavement debris and/or any foreign matter.

3) In general, embedment soil materials and pipes should not be directly supported by soils classified as CH, CL, MH, ML, OH, OL and PT under the USCS in all cases.

4) Please note that the pipe zone is typically defined as the area extending from the bottom of the trench to 12 inches above the top of the pipe and extending to the undisturbed trench walls on both sides of the pipe.

7.3 – Manhole, Inlets and Junction Box Structures Considerations

Based on the understanding of the project, we anticipate that water improvements may include the installation of manholes, inlets and junction boxes. We recommend that these structures be supported by a minimum of 8 inches of compacted Structural Fill material meeting current TXDOT Standard Specifications Item 247, Type A, Grade 3. The Structural Fill shall be placed in loose lifts not to exceed 8 inches to allow proper consolidation of the backfill material. The Structural Fill should be compacted to at least 95 percent of the maximum dry density determined per ASTM D 1557. The moisture content of the Structural Fill shall be maintained within ± 2 percent of optimum moisture content until permanently covered.

The suitable subgrade soils that shall support the base coarse material should be compacted to at least 95 percent of maximum dry density per ASTM D 1557. The moisture content of the subgrade soils shall be maintained within ± 3 percent of optimum moisture content until permanently covered.

Section 8.0 – Pavement Replacement and Site Work Improvement Considerations

Based on our general observations of the existing pavement conditions, soil exploration boring soil samples and laboratory engineering soil classification test results, the following section presents our flexible pavement replacement recommendations. It is our understanding that a new flexible pavement shall be specified for excavations across an existing parking lot, above sections of the new specified box culvert and across Frutas Avenue. For our clients consideration three pavement sections are presented in report section 8.2. We understand that due to required invert depth of the box culvert, the top elevation of the culvert shall be within a few inches of the specified finished pavement surface elevation. We anticipated that box culverts shall be rated or designed to support applicable direct standard vehicle and/or heavy-duty traffic loadings.

8.1 – Existing Pavement Removal and Material Recycling

The approximate depth of the observed pavement materials within our soil borings are generally reported in our soil boring logs. In general, the asphaltic concrete pavement depth was about 2¾ inches and the apparent base course material layer depth was about 8½ inches based on the results from subsurface exploration boring B-3.

In the event that the general contractor may consider utilizing the reclaimed base materials as sub-base materials within the new pavement section, the recycled base should reasonable meet the recommended requirements in Section 11.0 of this report. The re-use of recycled base materials shall be approved by the engineer of record and owner prior to re-use.

8.2 – Proposed Flexible Pavement Structures

As indicated above the following three pavement sections are presented for our client's consideration.

Table 9 – Parking Lot Area – New Flexible Pavement Section

Material Layer	Material Section Type	Minimum Thickness (in.)	Specified Compaction, %, ASTM Methods
1	Hot Mix Asphaltic Concrete (HMAC), TXDOT Item 340 - Type D [1]	2-1/2	96 - 98% (Min.), D 2950 (Marshall Value)
2	Prime Coat TXDOT Item 310 – SS-1H	-	Application rate at 0.15 to 0.20 gal/yd^2
	Flexible Base Material TXDOT Item 247, Type A Grade 3 [2]	8	100%, ASTM D-1557
3	Scarified, Moisture Conditioned and Compacted Suitable Backfill Soils [3] - See Comments on Subgrade Treatment	8	95%, ASTM D-1557

Table 10 – Above Box Culvert Areas – New Flexible Pavement Section

Material Layer	Material Section Type	Minimum Thickness (in.)	Specified Compaction, %, ASTM Methods
1	Hot Mix Asphaltic Concrete (HMAC), TXDOT Item 340 - Type D [1] (Approved tack coat shall be applied to top of box prior to paving)	2	96 - 98% (Min.), D 2950 (Marshall Value)

Table 11 – Across Frutas Avenue –New Flexible Pavement Section

Material Layer	Material Section Type	Minimum Thickness (in.)	Specified Compaction, %, ASTM Methods
1	Hot Mix Asphaltic Concrete (HMAC), TXDOT Item 340 - Type D [1]	3	96 - 98% (Min.), D 2950 (Marshall Value)
2	Approved Non-Excavatable Flowable Soil Cement Backfill, TXDOT Item 401	12	-
3	Scarified, Moisture Conditioned and Compacted Suitable Backfill Soils [3] - See Comments on Subgrade Treatment	8	95%, ASTM D-1557

[1] The approved AC material mix shall meet the requirements of TXDOT Item 340. Mix design shall be established based on the Marshall Mix Design Method. The aggregate material shall meet all the requirements specified with TXDOT Item 340. The asphaltic concrete material shall be compacted to 96 to 98% of the Marshall Value. Approved mix shall exhibit a minimum stability of 1,800, air voids within 3 to 4½ percent, and flow of 8-16. Mix production, transport and placement temperature tolerances shall be maintained as required per TXDOT Item 340. The bitumen binder grade should consist of a PG70-22

material.

[2] As applicable, flexible base course should be placed in loose lifts not exceeding 8 inches in thickness and compacted to a minimum of 100 percent of the maximum dry density and at a moisture content within +/- 2 percentage points of the optimum moisture content as determined by ASTM D 1557. A prime coat shall be applied to the pavement surface prior to placement of the AC layer. The prime coat shall consist of a SS-1H (TXDOT Item 310). Application rate at 0.15 to 0.20 gal/yd2 .

[3] As applicable, the flexible base course shall be supported by a minimum of 8 inches of scarified and re compacted subgrade soils compacted to a minimum of 95 percent of maximum dry density and at +/- 3 percent of optimum moisture content as determined by ASTM D 1557. In the event that pumping of the subgrade occurs, the placement of an approved rock bed may be considered after the removal of pumping soils. The rock bed shall consist of approved imported rock material. A minimum of 6 to 12 inches of rock material shall be laid over and/or embedded into the subgrade soils as a means to bridge over weak or soft soils. The rock material shall be clean, uniformly angular, stable crushed limestone rock with a diameter between 4 to 8 inches or as approved by the design engineer. The rock bed shall be uniformly leveled and packed with roller equipment. As required, the installation of a permeable geotextile fabric to control migration of fines from the base course layer into the rock bed is recommended. We recommend a non-woven geotextile fabric similar to TenCate Mirafi 160N, 1100N or a similar that meets TxDOT DMS-6200 Type 2 requirements.

As applicable, should the contractor not be able to obtain the minimum subgrade soil compaction requirements of 95 percent of the maximum dry density as determined by ASTM D 1557 or stabilization of pumping subgrade soils, then cement subgrade treatment may be used to obtain the required compaction. The process of adding cement for treating subgrade soils shall include pulverizing the subgrade to a depth of at least 6 to 8 inches . Portland Cement shall be added at a rate of about 4 to 6 percent (by weight or as needed to produce the desire stability) to the pulverized subgrade soil. The mixture shall the be moisture conditioned by adding water to the mixture (not to exceed the optimum moisture content of the soil cement mixture as determined by ASTM D 558) before compacting the mixture to a minimum dry density of 95 percent of the maximum dry density as determined by ASTM D 558 and then curing. Traffic (construction or otherwise) shall not be allowed onto the treated subgrade for a minimum of 24 hours or as required to allow proper curing time. In addition, the Contractor must keep the cement treated subgrade moist during the curing period. As such, the Contractor shall have sufficient means to obtain, store and apply water throughout the curing period. Consult with the project geotechnical engineer for additional requirements and recommendations on cement treatment of subgrade soils prior to construction

Section 9.0 – Proposed Storm Water Retention Pond Considerations

The following section presents our opinions and recommendations that may be considered by our Client with respect to the improvement of the existing storm water collection pond within the project area. Prefinal plans of the specified pond expansion design were provided to CQC for review.

9.1 - Soil Infiltration Considerations

As requested, a single (1) soil percolation test was performed at an approximate depth of 26 feet below the existing ground subsurface elevations at the bottom of the existing pond. Our soil percolation test information is presented in Sheet A30 of this report. An approximate soil percolation value of 25 minutes per inch was estimated from our test results. In general, our test results indicate that the subsurface soils shall exhibit a relatively slow to moderate infiltration rate into the subsurface soils at the test location and depth. The test may have been performed above an existing clay layer based on the boring data from B-10.

It shall be necessary to remove at least five (5) feet of the existing clayey soils below the specified bottom of pond elevations and replace removed soils with relatively free draining granular soils to the specified bottom of pond elevation.

It should be noted that normal and steady water infiltration through the subsurface soils at the bottom of the pond shall be highly dependent on the degree of sediment built-up, which shall ultimately decrease the

infiltration rate. Periodic maintenance and cleaning shall be required in order to ensure that proper and steady infiltration continues to occur. The delineation of the lateral extent or lateral water seepage of storm water infiltration and impacts to adjacent structures was beyond our scope of work, but should be considered by the field designer and the owner.

The boring logs and specified depth of the pond should be reviewed to evaluate if overexcavation at the bottom of the pond may be required to remove clayey soils. Due to the possible variability of the subsurface soils throughout the project site, it is recommended that consideration be given to the application of a 60 min per inch rate in drainage analysis, if required. A soil percolation test should be performed once the pond has been graded and prepared as specified.

It is not recommended that the pond bottom contain soils classified as SC-SM, SC, CH, CL, MH, ML, OH nor PT or a combination of these under the USCS classification.

9.2 Pond Slope Considerations

Based on our review of the prefinal pond design plans, it is our understanding that the pond shall be approximately 26 feet in depth with a specified invert elevation of 3662.4 feet. The pond slopes are specified to be laid back with a configuration of 3:1 (horizontal: vertical), with the exception of the east slope which is specified to be laid back at no steeper than 2:1.

Based on the encountered subsurface soil formations, engineering classification of tested soils from exploratory borings B-5 through B-10 and design slope configurations, a general slope stability analysis resulted in a factor of safety of at least 1.5 with respect to a sliding failure mode. The pond slopes may be formed with existing native soils, however in order to mitigate sloughing of the encountred Stratum I poorly graded sands and silty sand formations, it is recommended that slopes be protected from localized erosion, especially specified slopes steeper than 3:1. The following items may be considered to mitigate localized slope erosion and improve the overall stability of the slopes.

- In general, it is recommended that exposed cut slopes be cleared of all debris and vegetation. Formed slopes with the native soil shall be compacted to a minimum of 90 percent of maximum dry density per ASTM D 1557. The moisture content of the soils should be maintained within 0 to 3 percent of optimum moisture content until covered. Compaction of side slopes should be parallel to the long direction of the side slopes, as achievable. As previously indicated, earthwork grading of the slopes should consider the installation of erosion control measures in order to maintain the specified design grades of the pond.

- In order to mitigate slope erosion, the owner should consider installing loose rock rip-rap along the earthen soil slopes to reduce erosion within select areas. It is recommended that the stone be angular, durable (exhibit an LA Abrasion not greater than 40 and chemically sound), non-weathered, and uniform

in size (i.e., 6 to 12 inches). The slope angle should also be considered in the final design to ensure that the loose rock rip-rap shall be stable. A geo-textile filter fabric should be placed between the finished soil slope surface and placed rock rip-rap.

- Concrete lining of the slopes may also be considered to protect earthen slopes from erosion if the owner is concerned with potential pond maintenance costs.

- The impact, collection and redirection of surface water run-off at the crest of the slopes should be carefully considered to mitigate potential future erosion of the slopes. The crest of the proposed pond should be maintained at least 10 feet away from any adjacent structures or perimeter walls. In addition, appropriate benches (i.e., 8 to 10 feet where possible) should be incorporated at the crest of the soil slopes to reduce the potential of surcharge loads being imposed on the side slopes. It is recommended that at least 8 inches of relatively low permeability clayey sands or clayey gravels (base course material) be placed within the benched portion at the crest of the slopes or surface of perimeter maintenance roads, as a means to reduce surface water flow paths through the slopes, which in turn may further instigate erosion.

- Where applicable, the civil engineer should consider the items indicated above in the final design of the pond and safety precautions (i.e., fencing, guardrails, etc…) at the crest of the slopes to protect the general public. It is recommended that the project civil engineer perform their own analysis to evaluate the stability of the designed slopes. In the event that additional soil related design parameters or physical properties are required, CQC should be contacted.

9.3 Pond Maintenance Access Ramp

The pond access maintenance ramp backfill soils shall consist of compacted approved Pond Ramp Select Fill soils that meet the requirements below. The approved Ramp Select Fill soils shall be compacted to at least 95 percent of maximum dry density determined per ASTM D 1557. The moisture content of the Select Fill shall be maintained within ±3 percent of optimum moisture content.

The final driving surface of the ramp should be constructed with a minimum of 8 to 10 inches of compacted Structural Fill soils that meet the requirements of Section 11.0 of this report.

The Ramp Select Fill (RSF) shall consist of granular sands which are free of clay lumps, deleterious materials, organic material, cobbles or boulders over 4 inches in nominal size and should have a liquid limit less than 40 and a plasticity index of 5 to 15. The RSF shall also exhibit a maximum dry density of at least 120 pcf. RSF shall meet one or a group of the following soil classifications in accordance with the USCS: SC-SM, SC, GC-GM, GC and the other requirements above. Sandy gravels or poorly graded gravels (i.e., GC, GC-GM, GM, GP-GM and GP-GC) and non-plastic by test may also be considered as suitable for use as RSF provided that these soils exhibit a linear bar

shrinkage of at least 6 percent or greater. The linear bar shrinkage test shall be conducted in accordance with TEX Method 107-E.

The RSF shall also meet the minimum gradation requirements tabulated below.

Table 12 – Pond Ramp Select Fill Gradation Requirements

Sieve Size (square opening)	% Passing by Weight
3-inch	100
3/4-inch	75 – 100
No. 4	45 – 100
No. 200	13 – 45

9.4 – OutFall Structure Considerations

The pond specified outfall structure shall be supported on a minimum of 8 inches of compacted Structural Fill material meeting current TXDOT Standard Specifications Item 247, Type A, Grade 3. The Structural Fill shall be placed in loose lifts not to exceed 8 inches to allow proper consolidation of the backfill material. The Structural Fill should be compacted to at least 95 percent of the maximum dry density determined per ASTM D 1557. The moisture content of the Structural Fill shall be maintained within ± 2 percent of optimum moisture content until permanently covered.

The suitable subgrade soils that shall support the base coarse material should be compacted to at least 95 percent of maximum dry density per ASTM D 1557. The moisture content of the subgrade soils shall be maintained within ± 3 percent of optimum moisture content until permanently covered.

Section 10.0 – Additional Evaluation Considerations

In excavations adjacent to existing structures, precautions should be taken not to undermine or damage existing structures, footings, and/or utility lines. Precautions should be taken to prevent distresses to nearby existing structures.

As typically expected with construction activities and pipeline excavation projects, a degree of vibratory impacts should be expected. Our scope of work did not include an assessment of the condition of private structures or facilities adjacent to the pipeline project limits nor opinions or statements of potential impacts. In accordance with the typical provisions of construction contracts the general contractor shall be responsible for monitoring of existing structures. As required the general contractor shall develop a vibration and ground settlement monitoring plan before, during the course of construction and after all construction activities have

been completed at the project site. The plan may include setting-up an array of monitoring points near the pipeline alignment and at radial distances from construction activities to monitor potential ground movements. It is recommended that the general contractor retain the services of a licensed professional engineer or geologist to develop a monitoring plan and provide site monitoring services as required. It may be necessary for the contractor to establish a contingency plan for observed movements of adjacent structures. The development of a settlement monitoring program was beyond our scope of work; however we may meet with our Client and owner to further discuss this issue, as required. The US Bureau of Mines, FHWA – "Geotechnical Instrumentation for Monitoring Field Performance" manual and ASCE publications may be referenced to establish a monitoring plan and set maximum vibration peak particle velocity and frequency thresholds to ensure that vibrations are maintained below these limits during construction.

Section 11.0 – Project Specification Information

11.1 – Fill Materials

In general approved backfill soils shall be placed in maximum 8 inch loose lifts and compacted to the specified requirements.

A. Structural Fill shall consist of a crushed stone base (CSB) coarse material conforming to requirements of a TXDOT Item 247 – Flexible Base, Type A, Grade 3 soil material. The flexible base material should meet the gradation requirements below, exhibit a liquid limit less than 35 and plasticity index of 12 or less. The flexible base material should also exhibit a maximum dry density of at least 135 pcf determined in accordance with ASTM D 1557. It is not recommended that recycled concrete base material be considered as a substitute for the requirement above, unless approved by the project civil engineer or owner.

Table 13 – Structural Fill Gradation Requirements

Sieve Size (square opening)	% Passing by Weight
2½ -inch	100
1¾ -inch	90 – 100
No. 4	25 – 55
No. 40	15 – 50

B. Select Fill should consist of granular clayey, silty sands or sandy clayey, silty gravel mixtures, free of clay lumps, clay balls, deleterious materials, organic material, vegetation, roots, cobbles or boulders over 3 inches in

nominal size. The Select Fill should have a liquid limit less than 35 and a plasticity index of 12 or less. The Select Fill shall also exhibit an optimum dry density of at least 112 pcf determined in accordance with ASTM D-1557. Select Fill soils should also meet the gradation requirements below.

Table 14 – Select Fill Gradation Requirements

Sieve Size (square opening)	% Passing by Weight
3-inch	100
3/4-inch	75 – 100
No. 4	45 – 100
No. 200	5 – 45

Select Fill soils should classify as SP-SM, SM, SC, SC-SM, GM, GC, GC-GM, GP-GM, and GP-GC in accordance with the Unified Soil Classification System (USCS).

C. Native Fill Soils (Existing On-Site Soils) should consist of granular clayey, silty sands or sandy gravel mixtures, free of clay lumps, deleterious materials, vegetation, organic material, roots, cobbles or boulders over 3 inches in nominal size. Native Fill soils are not considered suitable Select Fill soils unless approved by the architect and/or engineer of record. The Native Fill soils shall have a liquid limit less than 40 and a plasticity index of 15 or less. Suitable Native Fill soils should meet the gradation requirements below. Native Fill soils are not considered specified Select Fill or Structural Fill soils unless they strictly meet the requirements specified above.

Table 15 – Native Fill Soil Gradation Requirements

Sieve Size (square opening)	% Passing by Weight
3-inch	100
3/4-inch	70 – 100
No. 4	45 – 100
No. 200	3 – 45

Native Fill soils shall also classify according to the USCS list: SM, SW, SC, SP-SM, SP-SC, SC-SM, GW, GP, GM, GC, GP-GM and GP-GC.

It is recommended that on-site soils classified as SP be blended with low-plasticity clayey sands or as appropriate to mitigate potential soil sloughing during excavations in these types of soils and to create a relatively stable blended soil material that exhibits adequate bearing capacity.

Soils classified as CH, CL, MH, ML, OH, OL and PT or a combination of these under the USCS classification and soils that exhibit a plasticity index greater than 15 are not considered suitable for use as Native Fill, Select Fill and Structural Fill soil materials.

D. Recycled Flexible Base Coarse Material, if approved by the design engineer and owner, recycled base material shall be granular, free of clay lumps, deleterious materials, cobbles or boulders over 3 inches and crushed asphalt particles no greater than 1-3/4 inches in nominal size. Recycled base materials that shall be utilized should not contain more than 20% of asphaltic-concrete particles and should not be greater than 3-inches, unless approved by the owner and engineer. The recycled base soil materials should also meet the gradation requirements tabulated below.

Table 16 - Recycled Paving Materials Aggregate Base Grading Requirements

Sieve Size (square opening)	% Passing by Weight
1 -3/4-inch	100
No. 4	60 Max.
No. 40	50 Max.
No. 200	18 Max.

The recycled base should have a liquid limit less than 40, a plasticity index no greater than 12, and should also exhibit an optimum dry density of at least 130 pcf when determined in accordance with ASTM D1557. The recycled base material aggregates should also be tested in accordance with ASTM C-131-"Laboratory Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine" and should exhibit a maximum percent loss of 40. Recycled base soil materials should be classified as SC, SC-SM, GP, GP-GM, GP-GC, GC, and GC-GM in accordance with the USCS or similar AASHTO classifications.

It is not recommended that the recycled base materials be blended with approved new imported base materials unless authorized by the owner and design engineer of record.

E. Utility Line Backfill Soil Classifications The following soil backfill classifications are typically designated for utility pipe line backfill materials. **It is not recommended that slag be utilized for the backfill material unless approved by the engineer of record.** Class I, Class II, Class III, Class IV, and Class V materials may be defined as follows:

- **CLASS I** material may be manufactured angular, well-graded, crushed stone per ASTM D-2321 with a maximum particle size of 1½ inches. The following materials shall be acceptable under this class

designation: ASTM D-448 – Stone Sizes 4, 46, 5, 56, 57, and 6. Pea Gravel and other uniformly graded material are not acceptable under this class. A gradation of Class I material shall be submitted by the Contractor to the Engineer for approval prior to use.

- **CLASS II** material may be coarse sands and gravels per ASTM D-2487 with maximum particle size of 1½ inches, including variously graded sands and gravels, containing less than 12 percent fines (material passing the #200 sieve) generally granular and non-cohesive, either wet or dry. Soil types GW, GP, SW and SP are included in this class. (i.e., typically required within pipe zone). Proposed Class II material shall be submitted by the Contractor to the Engineer for evaluation and approval prior to use.

- **CLASS III** material may be fine sands, clayey sand mixtures, clayey gravel and sand mixtures, suitable clean native sands and gravels. Class III materials shall also be free of clay lumps, deleterious materials, cobbles or boulders over 3-inches in nominal size. Class III materials should have a liquid limit less than 35 and a plasticity index less than or equal to 15 and exhibit an optimum dry density of at least 112 pcf. Soils classified in the following list according to the USCS and ASTM may be considered satisfactory for use as Class III backfill soil materials above the pipe zone as approved by the project engineer of record: SM, SW, SC, SP-SM, SP-SC, SC-SM, GW, GP, GM, GC, GP-GM and GP-GC. Proposed Class III material shall be submitted by the Contractor to the Engineer for evaluation and approval prior to use.

- **CLASS IV and V** material may be classified as CH, CL, MH, ML, OH, OL and PT under the USCS. These soils **shall not be used** as backfill materials, unless approved by the engineer of record.

11.2 – Additional Specification and Construction Considerations

The following report section presents specific conditions that we have noted during our evaluation and should be considered by our Client and design team with respect to earthwork estimates and operations.

- At the time that this report was completed, a final civil design grading plan had not been provided for the review of CQC. Site work should be performed in accordance with the Site Preparation section of this report or as required by the project plans and specifications, whichever is more stringent.

- The project Contractor shall be responsible for conducting their own tests to verify the actual depths of the soil types within the project limits to perform earthwork. The owner shall not incur additional costs for variations in the soil formations or unclassified buried materials within the project limits and/or additional excavation requirements by the contractor. The boring logs and data in this report are intended for engineering design purposes. Bidding contractors may consider the information presented in this report at their own risk. If deemed necessary, bidding contractors shall collect additional subsurface material information for use

and/or interpretation for earthwork or demolition estimates that comply with the project specifications and plans to complete the specified work prior to bidding.

- The indicated suitability of the on-site soils and use as suitable Select Fill of this report should be considered by the design team and bidding general contractor. This is specifically true with respect to the encountered debris, stained soils and trash within the borings.

- Based on our soil borings and soil classification tests, the soils encountered at this site should be considered Type "C" soils under current Occupational Safety and Health Administration (OSHA) regulations (Standard – 29 CFR-Part 1926.650, Subpart P- Excavations) pertaining to excavations. In excavations penetrating these soils, the non-permanent sloping and benching schemes specified for Type "C" soils under the OSHA regulations require that the excavation sidewalls be sloped no steeper than 1½:1 (horizontal: vertical). Trenches or excavations 4 feet and deeper shall require the development of a trench safety plan to protect employees and the general public. Please note that it is the contractor's responsibility to assign a "competent" person to perform daily inspections and required documentation in accordance with OSHA regulations. In addition, OSHA limits excavations to 20 feet when excavations utilize soil benching and sloping methods and braced/shored trench box (i.e., rated) shielded systems designed by a licensed professional engineer. Trench excavations utilizing sheet piling systems or un-braced temporary shielded systems per OSHA regulations shall be designed by a licensed professional engineer for any excavation depth in consideration to protect the health and safety of all workers and the public.

- When utility lines are removed and/or installed at this site, the utility contractor should adequately overexcavate the soils in the utility line trench area and backfill with properly compacted approved on-site soils or box/pipe backfill soils to mitigate potential settlements caused by uncontrolled backfill during construction. In-situ and/or box backfill soils should be placed in loose lifts not to exceed 8 inches in thickness to the finished subgrade elevation or in accordance with the project plans and specifications, whichever is more stringent and compacted to at least 90 percent of the maximum dry density as determined by ASTM D 1557. Prior to placing the specified pipe backfill soils, the existing native soils at the bottom of the trench should be scarified and recompacted to a minimum 90 percent of the maximum dry density as determined by ASTM D 1557.

11.3 - Construction Materials Testing

We recommend that construction materials inspection and testing of site work, fill placement, foundation excavations, concrete placement, and all other applicable materials and structures be performed by CQC. The specification testing program should include the following testing frequencies as a minimum or as required by the project specifications and plans, whichever is more stringent:

1. At least one (1) Moisture-Density Relationship test (Proctor) for each type of in-situ soil and/or imported soil material to be used, according to ASTM D 1557. Additional soil samples for testing shall be requested by the General Contractor during the course of earthwork operations to ensure that the fill materials are maintained consistently within the specified requirements.

2. At least one (1) Soil Classification (Sieve Analysis and Atterberg Limits Test) for each type of in-situ soil and/or imported material to be used, according to ASTM D 6913 and D 4318. Additional soil samples for

testing shall be requested by the General Contractor during the course of earthwork operations to ensure that the fill materials are maintained consistently within the specified requirements.

3. A minimum of one (1) nuclear density test per 8 inch lift at 100 to 150 lineal feet spacing for pipe bedding and backfill operations shall be performed, according to ASTM D 6938 or D 1556.

4. Sampling and testing for quality assurance of placed **mortar**, Type S (minimum compressive strength of 1800 psi) should be performed for the project. The design strength of the mortar mix shall be evaluated by collecting 6-cube specimens for lab curing and testing in accordance with applicable ASTM procedures. At least two (2) sets of 3 mortar cubes should be collected for every day of mortar placement or as directed by the project engineer. The mortar specimens should be tested at 7 days (2 cubes) and 28 days (4 cubes) for verification of the specified design strength or as directed by the project plans and specifications. Cube samples may be also placed on hold for testing beyond 28 days.

5. Sampling and testing for quality assurance of placed **grout** materials (3/8" maximum aggregate with a minimum compressive strength of 2,500 psi) should be performed for the project. Grout field testing shall include testing for temperature and slump (8 to 10 inches maximum). The design strength of the grout mix shall be evaluated by collecting prisms specimens molded with on-site CMU blocks for lab curing and testing in accordance with applicable ASTM procedures. At least one set of four (4) grout prisms should be collected for each days batching or as directed by the project engineer. Grout with additives should be batched and placed in not more than 2 cubic yard volumes. The grout specimens should be tested at 7 days (1 prism) and 28 days (3 prisms) for verification of the specified design strength or as directed by the project plans and specifications.

6. Sampling and testing for quality assurance of placed **concrete** materials should be performed for the project. Concrete field testing shall include testing for temperature, slump and air content (if required). The design strength of the concrete mix shall be evaluated by collecting cylindrical concrete compression test specimens for lab curing and testing in accordance with applicable ASTM procedures. At least one set of four (4) 6-inch x 12-inch or five (5) 4-inch x 8-inch concrete cylinders should be collected for every 50 cubic yards or less of poured concrete or as directed by the project engineer. The concrete specimens should be tested at 7 days (1 cylinder) and 28 days (4 cylinders) for verification of the specified design strength or as directed by the project plans and specifications. The ACI guidelines for hot weather and cold weather concreting should be followed to mitigate the potential poor performance and shrinkage/contraction cracking of the concrete materials during significant periods of high (above 95° F) and low (below 35° F) temperatures.

7. The Hot-Mixed Asphaltic-Concrete (**HMAC**) paving materials should be tested during construction production for mix design verification. The plant produced HMAC should be sampled for each day's production or every 20 tons of material produced and tested for compliance with the approved Marshall Mix Design or in accordance with current TXDOT construction standards per TXDOT Item 340 and to determine the laboratory density of the material. The placed HMAC mat should be tested by conducting a minimum of one field density test every 50 to 150 if or as directed by the project engineer or project specifications.

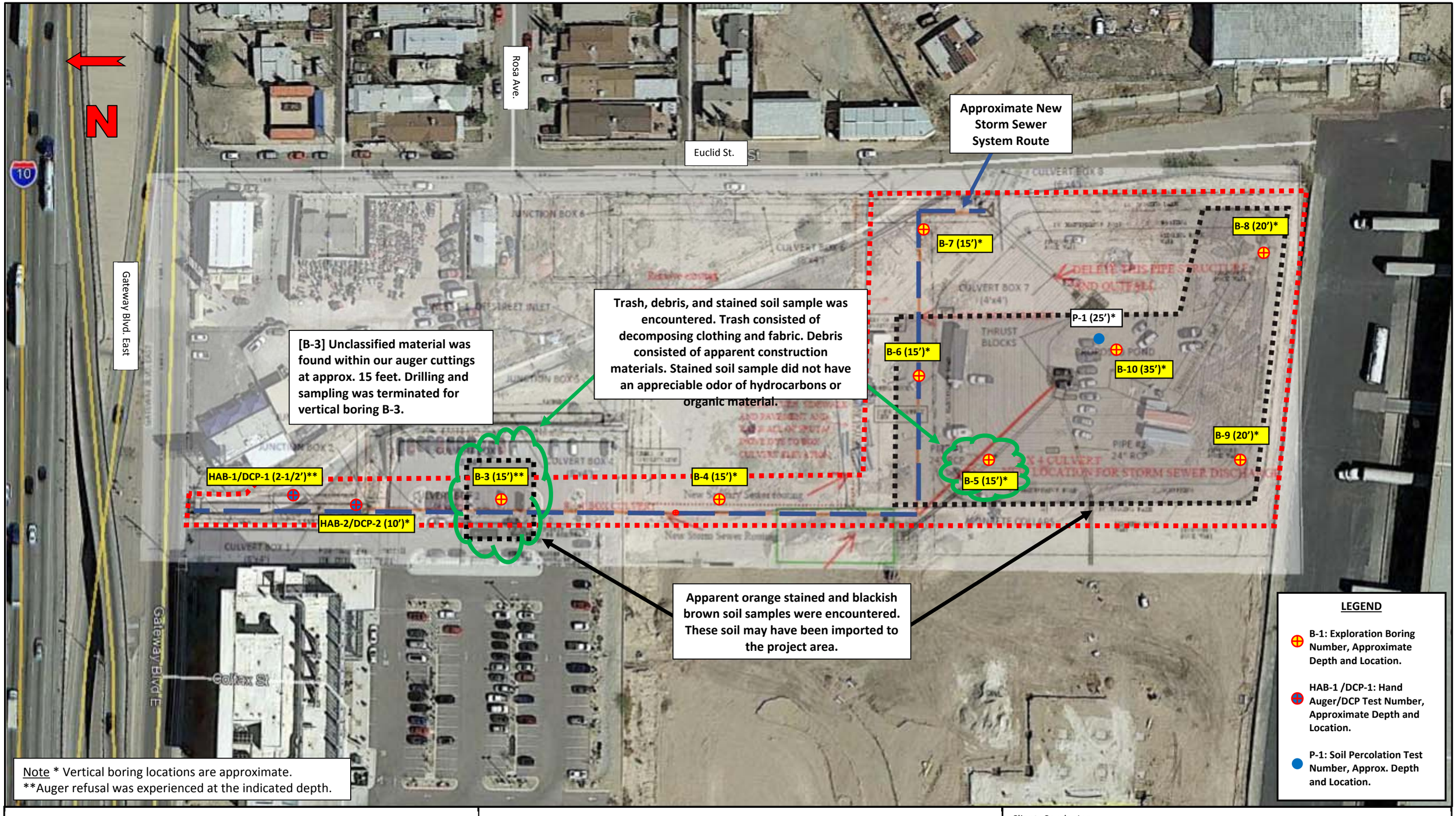
Section 12.0 – Soils Evaluation Report Considerations and Limitations

The analysis and recommendations in this report are based on the data obtained from ten (10) subsurface exploration vertical borings performed at the approximate locations indicated on the attached General Geotechnical Subsurface Exploration Boring and DCP Test Location Aerial Plan, Sheet A1. This report may not reflect all the variations that may occur between the vertical borings. The nature and extent of the variations may not become evident until during the course of construction. If variations appear during construction, CQC should be contacted immediately, it may be necessary for a reevaluation of our recommendations provided within this report to be made after performing on-site observations during the construction period and noting the characteristics of any variations. No other information relevant to the project limits history or known conditions of concern were discussed or disclosed to CQC by our Client or design representatives.

The scope of our soil evaluation did not include surveying services, ground water study, sinkhole study, landslide study, soil slope stability analysis, delineation of buried structures or unclassified materials, preparation of engineering plans, specifications, cost estimates, an environmental assessment of the property's air, soil, water, site fault delineation and evaluation, preparation of a dewatering plan, trench safety and/or shoring plan, delineation of subsurface flowing water or rock conditions either on or adjacent to the project site limits, therefore no opinions and/or conclusions are presented in this report. Our geotechnical scope of work for this site did not include an environmental assessment or chemical testing and analysis of the subsurface soils or encountered stained soils or buried trash within the site.

D:\Dropbox\CQC Files\CQC Working Files\GEO\Reports\2022\22-008 - EPW Coors Channel Drainage Imp (Conde)\07-Final Report Documents\2nd Report Submittal_ 10-31-2022\22-008_Report_Final - RVS-10-31-2022.docx

APPENDIX A



Note * Vertical boring locations are approximate.
**Auger refusal was experienced at the indicated depth.

construction quality control testing and engineering

General Geotechnical Subsurface Exploration Boring & DCP Test Location Aerial Plan

EPW – Coors Channel Drainage Improvements Project
Gateway Blvd. East and Euclid Street
El Paso, El Paso County, Texas

Client: Conde, Inc.	
CQC Proposal No. AGCQC22-008	
Scale: NTS	Check by: JR
Date: 10/14/2022	Sheet A1

CQC Testing and Engineering LLC - TBPE Firm No. F-10632
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El Paso, Texas 79904
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BORING NUMBER HAB-1

CLIENT Conde, Inc.
PROJECT NAME El Paso Water-Coors Channel Drainage Improvs Project
PROJECT NUMBER AGCQC22-008
PROJECT LOCATION Gateway Blvd. East and Euclid St., El Paso, Texas
DATE STARTED 3/29/22 **COMPLETED** 3/29/22
GROUND ELEVATION Ext. Grade **HOLE SIZE** 4 inches
DRILLING CONTRACTOR CQC **DRILLED BY** PG
GROUND WATER LEVELS:
DRILLING METHOD 4" ID - Hand Auger and Tools
AT TIME OF DRILLING ---
LOGGED BY JC **CHECKED BY** JLA
AT END OF DRILLING ---
NOTES Boring Location: See Attached Boring Location Plan, Sheet A1-1.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	BLOW COUNTS (N VALUE)	% Moisture Content	% - 4	% - 200	PI (LL-PL)	Pocket Pen. (tsf)	USCS	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 16 32 48 64 / % - 200 20 40 60 80
0			Reinforced Concrete Channel Lining- Approx. 5 inches thick.								
	AU 1		SAND, Fine to Coarse Grained, Silty, Tannish Brown to Multicolored, Loose to Medium Dense, Moist with asphaltic concrete debris - With traces of clay particles at approx. 1/2 foot.								
1	AU 2		- Encountered loose sandy soils shall be susceptible to soil sloughing and collapse during excavation.								
	AU 3				9.9	76	25	NP		SM	
2	AU 4		- Hand auger refusal experienced at approx. 2-1/2 feet.								
			NOTE: AU- Hand Auger Sample. Reported apparent relative density information is based on DCP Data.								
			Refusal at 2.5 feet. Bottom of borehole at 2.5 feet.								

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BORING NUMBER HAB-2

CLIENT Conde, Inc.
PROJECT NAME El Paso Water-Coors Channel Drainage Improvs Project
PROJECT NUMBER AGCQC22-008
PROJECT LOCATION Gateway Blvd. East and Euclid St., El Paso, Texas
DATE STARTED 3/29/22 **COMPLETED** 3/29/22
GROUND ELEVATION Ext. Grade **HOLE SIZE** 4 inches
DRILLING CONTRACTOR CQC **DRILLED BY** PG
GROUND WATER LEVELS:
DRILLING METHOD 4" ID - Hand Auger and Tools
AT TIME OF DRILLING ---
LOGGED BY JC **CHECKED BY** JLA
AT END OF DRILLING ---
NOTES Boring Location: See Attached Boring Location Plan, Sheet A1-1.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	BLOW COUNTS (N VALUE)	% Moisture Content	% - 4	% - 200	PI (LL-PL)	Pocket Pen. (tsf)	USCS
0.0	AU 1		SAND, Fine to Coarse Grained, Silty, Dark Brown to Tannish Brown, Loose to Medium Dense, Dry.							
	AU 2									
	AU 3		- With traces of calcareous material below 1 foot.							
	AU 4		- Light brown to multicolored with caliche nodules below approx. 1-1/2 to 4 feet.							
2.5	AU 5									
	AU 6									
	AU 7		- Encountered loose sandy soils shall be susceptible to soil sloughing and collapse during excavation.							
	AU 8		- With calcareous material below approx. 3-1/2 feet.		6.3	93	23	NP		SM
	AU 9		- Due to the collapse of the dry and loose silty sands water was added to stabilize borehole walls and facilitate the extraction of soil samples.							
5.0	AU 10									
	AU 11									
	AU 12									
	AU 13									
	AU 14		SAND, Fine to Coarse Grained, Poorly Graded, Tannish Brown to Multicolored, Loose, Dry to Slightly Moist with silt and traces of caliche nodules.							
7.5	AU 15				2.8	92	7	NP		SP-SM
	AU 16									
	AU 17		SAND, Fine to Medium Grained, Silty, Dark Brown to Tannish Brown, Loose, Dry to Slightly Moist.							
	AU 18									
	AU 19		- Encountered loose sandy soils shall be susceptible to soil sloughing during excavation.							
10.0	AU 20				3.5	99	15	NP		SM
			NOTE: AU- Hand Auger Sample. Reported apparent relative density information is based on DCP Data. Bottom of borehole at 10.0 feet.							

▲ SPT N VALUE ▲
10 20 30 40
PL MC LL
16 32 48 64
% - 200
20 40 60 80

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BORING NUMBER B-3

CLIENT Conde, Inc.
PROJECT NAME El Paso Water-Coors Channel Drainage Improvs Project
PROJECT NUMBER AGCQC22-008
PROJECT LOCATION Gateway Blvd. East and Euclid St., El Paso, Texas
DATE STARTED 4/9/22 **COMPLETED** 4/9/22
GROUND ELEVATION Ext. Grade **HOLE SIZE** 9 inches
DRILLING CONTRACTOR CQC **DRILLED BY** SC
GROUND WATER LEVELS:
DRILLING METHOD CME-75 w/ 4-1/4" ID HSA
AT TIME OF DRILLING ---
LOGGED BY JC **CHECKED BY** JLA
AT END OF DRILLING ---
NOTES Boring Location: See Attached Boring Location Plan, Sheet A1-1.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	BLOW COUNTS (N VALUE)	% Moisture Content	% - 4	% - 200	PI (LL-PL)	Pocket Pen. (tsf)	USCS
0.0			Asphaltic Concrete Pavement- Approx. 2-3/4 inches thick.							
	SS 1		Apparent Base Course Material- Approx. 8-1/2 inches thick.	17-14-15 (29)	8.1	98	24	NP		SM
2.5			SAND, Fine Grained, Silty, Dark Brown to Tannish Brown, Medium Dense, Moist.							
	SS 2		SAND, Fine to Coarse Grained, Silty, Clayey, Dark Brown to Tannish Brown, Medium Dense, Moist with gravel and apparent intermixed trash and debris.	7-4-8 (12)	9.4	80	24	5		SC-SM
5.0			- Apparent trash, debris and stained soil sample was encountered at approx. 2-1/2 feet and extended to 11-1/2 feet. Trash consisted of decomposing clothing and fabric. Apparent debris consisted of construction materials. Stained soil sample did not have appreciable odors of hydrocarbons or organic material.							
	SS 3			9-6-6 (12)						
7.5			SAND, Fine to Coarse Grained, Silty, Blackish Brown to Dark Brown, Medium Dense, Moist with gravel and apparent intermixed trash and debris.	1-6-11 (17)	10.5	88	16	NP		SM
10.0										
	SS 5		- Cave-in at approx. 10-1/2 feet after removal of hollow stem augers.	17-9-4 (13)						
12.5			- Drilling and sampling was terminated at approx. 15 feet due to apparent unclassified debris found within our auger cuttings.							
15.0			NOTE: SS- Split Spoon Sample. Refusal at 15.0 feet. Bottom of borehole at 15.0 feet.							

▲ SPT N VALUE ▲
10 20 30 40
PL MC LL
16 32 48 64
% - 200
20 40 60 80

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BORING NUMBER B-4

CLIENT Conde, Inc.
PROJECT NAME El Paso Water-Coors Channel Drainage Improvs Project
PROJECT NUMBER AGCQC22-008
PROJECT LOCATION Gateway Blvd. East and Euclid St., El Paso, Texas
DATE STARTED 4/9/22 **COMPLETED** 4/9/22
GROUND ELEVATION Ext. Grade **HOLE SIZE** 9 inches
DRILLING CONTRACTOR CQC **DRILLED BY** SC
GROUND WATER LEVELS:
DRILLING METHOD CME-75 w/ 4-1/4" ID HSA
AT TIME OF DRILLING ---
LOGGED BY JC **CHECKED BY** JLA
AT END OF DRILLING ---
NOTES Boring Location: See Attached Boring Location Plan, Sheet A1-1.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	BLOW COUNTS (N VALUE)	% Moisture Content	% - 4	% - 200	PI (LL-PL)	Pocket Pen. (tsf)	USCS
0.0	SS 1		SAND, Fine to Coarse Grained, Gravelly, Silty, Light Brown to Tannish Brown, Dense, Moist.	4-27-15 (42)	4.5	69	15	NP		SM
2.5	SS 2		SAND, Fine to Medium Grained, Poorly Graded, Tannish Brown to Multicolored, Medium Dense, Dry with silt.	7-13-10 (23)	2.1	100	10	NP		SP-SM
5.0	SS 3		- With traces of clay particles at approx. 5 feet. - Poorly Graded sands shall be susceptible to sloughing and collapse when unconfined during excavation.	5-7-7 (14)						
7.5	SS 4		LEAN CLAY, Moderately Plastic, Tannish Brown to Light Brown, Medium Stiff, Moist with sand.	4-7-8 (15)	18.2	100	82	15	4.5	CL
10.0	SS 5		SILT, Low Plasticity, Light Brown to Tannish Brown, Medium Stiff, Slightly Moist with sand. SAND, Fine Grained, Poorly Graded, Tannish Brown to Multicolored, Medium Dense, Dry with silt. - Cave-in at approx. 11-1/2 feet after removal of hollow stem augers. - Poorly Graded sands shall be susceptible to sloughing and collapse when unconfined during excavation.	5-6-15 (21)	1.0	100	12	NP		SP-SM
12.5	SS 6			5-6-6 (12)						
15.0			NOTE: SS- Split Spoon Sample. Bottom of borehole at 15.0 feet.							

▲ SPT N VALUE ▲
10 20 30 40
PL MC LL
16 32 48 64
% - 200
20 40 60 80

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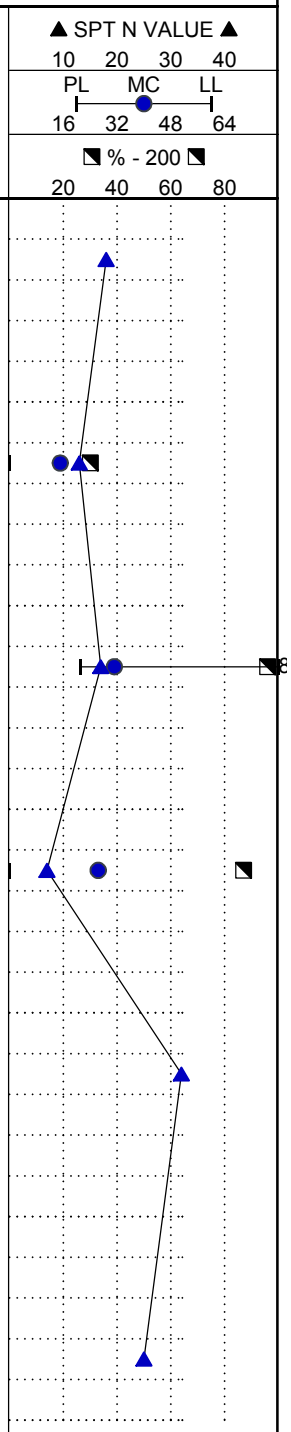
BORING NUMBER B-5

CLIENT Conde, Inc.
PROJECT NAME El Paso Water-Coors Channel Drainage Improvs Project
PROJECT NUMBER AGCQC22-008
PROJECT LOCATION Gateway Blvd. East and Euclid St., El Paso, Texas
DATE STARTED 4/12/22 **COMPLETED** 4/12/22
GROUND ELEVATION Ext. Grade **HOLE SIZE** 9 inches
DRILLING CONTRACTOR CQC **DRILLED BY** SC
GROUND WATER LEVELS:
DRILLING METHOD CME-75 w/ 4-1/4" ID HSA
AT TIME OF DRILLING ---
LOGGED BY JC **CHECKED BY** JLA
AT END OF DRILLING ---
NOTES Boring Location: See Attached Boring Location Plan, Sheet A1-1.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	BLOW COUNTS (N VALUE)	% Moisture Content	% - 4	% - 200	PI (LL-PL)	Pocket Pen. (tsf)	USCS
0.0	SS 1		SAND, Fine to Coarse Grained, Silty, Tannish Brown to Multicolored, Medium Dense, Very Moist with traces of clay particles and gravel. - Apparent black (stained) soils were encountered at approx. 1-1/2 feet. The stained soil sample presented no appreciable odors of hydrocarbons or organic material.	6-8-10 (18)						
2.5	SS 2		- Apparent orange stained soil sample was encountered at approx. 2-1/2 feet.	7-7-6 (13)	15.1	93	30	NP		SM
5.0	SS 3		FAT CLAY, Highly Plastic, Dark Brown to Tannish Brown, Very Stiff, Slightly Moist.	4-7-10 (17)	31.2	100	96	61	3.0	CH
7.5	SS 4		SILT, Dark Brown to Tannish Brown, Medium Stiff, Moist with sand. - Encountered silt soils shall be susceptible to consolidation settlement.	3-3-4 (7)	26.4	100	87	NP	1.0	ML
10.0	SS 5		SAND, Fine Grained, Poorly Graded, Tannish Brown to Multicolored, Dense, Dry with silt. - Cave-in at approx. 11 feet after removal of hollow stem augers.	10-12-20 (32)						
12.5	SS 6		- Poorly graded sands shall be susceptible to sloughing and collapse when unconfined during excavation. - Medium dense with traces of gravel at approx. 13-1/2 feet. NOTE: SS- Split Spoon Sample. Bottom of borehole at 15.0 feet.	8-11-14 (25)						
15.0										



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BORING NUMBER B-6

CLIENT Conde, Inc.
PROJECT NAME El Paso Water-Coors Channel Drainage Improvs Project
PROJECT NUMBER AGCQC22-008
PROJECT LOCATION Gateway Blvd. East and Euclid St., El Paso, Texas
DATE STARTED 4/9/22 **COMPLETED** 4/9/22
GROUND ELEVATION Ext. Grade **HOLE SIZE** 9 inches
DRILLING CONTRACTOR CQC **DRILLED BY** SC
GROUND WATER LEVELS:
DRILLING METHOD CME-75 w/ 4-1/4" ID HSA
AT TIME OF DRILLING ---
LOGGED BY JC **CHECKED BY** JLA
AT END OF DRILLING ---
NOTES Boring Location: See Attached Boring Location Plan, Sheet A1-1.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	BLOW COUNTS (N VALUE)	% Moisture Content	% - 4	% - 200	PI (LL-PL)	Pocket Pen. (tsf)	USCS
0.0	SS 1		SAND, Fine to Coarse Grained, Silty, Light Brown to Tannish Brown, Medium Dense, Slightly Moist to Moist with gravel and calcareous material.	8-12-7 (19)	3.9	79	25	NP		SM
2.5	SS 2		- Apparent black (stained) soil samples was encountered at approx. 2-1/2 feet. The stained soil sample presented no appreciable odors of hydrocarbons or organic material.	7-7-6 (13)						
5.0	SS 3			8-6-22 (28)						
7.5	SS 4		- Gravelly at 7-1/2 to 9 feet.	8-5-8 (13)	5.1	68	28	NP		SM
10.0	SS 5		- Fine grained, tannish brown to multicolored, dry at approx. 10 feet. - Cave-in at approx. 11 feet after removal of hollow stem augers.	6-6-11 (17)	1.5	100	20	NP		
12.5	SS 6		LEAN CLAY, Low Plasticity, Dark Brown to Tannish Brown, Stiff, Moist with some sand.	4-12-13 (25)	30.9	100	94	10	0.5	CL
15.0			SAND, Fine Grained, Poorly Graded, Tannish Brown to Multicolored, Medium Dense, Dry with silt. NOTE: SS- Split Spoon Sample. Bottom of borehole at 15.0 feet.							

▲ SPT N VALUE ▲
10 20 30 40
PL MC LL
16 32 48 64
% - 200
20 40 60 80

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BORING NUMBER B-7

CLIENT Conde, Inc.
PROJECT NAME El Paso Water-Coors Channel Drainage Improvs Project
PROJECT NUMBER AGCQC22-008
PROJECT LOCATION Gateway Blvd. East and Euclid St., El Paso, Texas
DATE STARTED 4/9/22 **COMPLETED** 4/9/22
GROUND ELEVATION Ext. Grade **HOLE SIZE** 9 inches
DRILLING CONTRACTOR CQC **DRILLED BY** SC
GROUND WATER LEVELS:
DRILLING METHOD CME-75 w/ 4-1/4" ID HSA
AT TIME OF DRILLING ---
LOGGED BY JC **CHECKED BY** JLA
AT END OF DRILLING ---
NOTES Boring Location: See Attached Boring Location Plan, Sheet A1-1.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	BLOW COUNTS (N VALUE)	% Moisture Content	% - 4	% - 200	PI (LL-PL)	Pocket Pen. (tsf)	USCS
0.0	SS 1		SAND, Fine to Coarse Grained, Gravelly, Silty, Tannish Brown to Light Brown, Medium Dense, Dry to Slightly Moist.	11-12-12 (24)	2.7	69	16	NP		SM
2.5	SS 2		- Fine to medium grained, silty sands below approx. 2-1/2 feet.	17-13-9 (22)	4.0	99	19	NP		
5.0	SS 3		SAND, Fine Grained, Poorly Graded, Tannish Brown to Multicolored, Medium Dense, Moist with silt. - Poorly Graded sands shall be susceptible to sloughing and collapse when unconfined during excavation.	6-7-10 (17)						
7.5	SS 4		LEAN CLAY, Sandy, Moderately Plastic, Dark Brown to Tannish Brown, Very Stiff, Slightly Moist to Moist. - Cave-in at approx. 8 feet after removal of hollow stem augers.	6-8-15 (23)	16.4	100	67	19	4.5	CL
10.0	SS 5			7-9-10 (19)	17.6	97	82	21	4.5	
12.5	SS 6		SAND, Fine Grained, Silty, Tannish Brown to Multicolored, Medium Dense, Dry to Slightly Moist.	7-6-6 (12)	3.5	100	33	NP		SM
15.0			NOTE: SS- Split Spoon Sample. Bottom of borehole at 15.0 feet.							

▲ SPT N VALUE ▲
10 20 30 40
PL MC LL
16 32 48 64
% - 200
20 40 60 80

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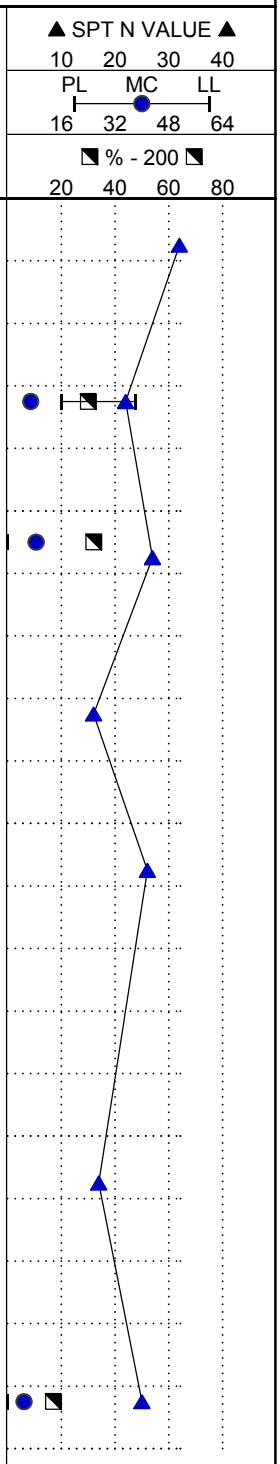
BORING NUMBER B-8

CLIENT Conde, Inc.
PROJECT NAME El Paso Water-Coors Channel Drainage Improvs Project
PROJECT NUMBER AGCQC22-008
PROJECT LOCATION Gateway Blvd. East and Euclid St., El Paso, Texas
DATE STARTED 4/12/22 **COMPLETED** 4/12/22
GROUND ELEVATION Ext. Grade **HOLE SIZE** 9 inches
DRILLING CONTRACTOR CQC **DRILLED BY** SC
GROUND WATER LEVELS:
DRILLING METHOD CME-75 w/ 4-1/4" ID HSA
AT TIME OF DRILLING ---
LOGGED BY JC **CHECKED BY** JLA
AT END OF DRILLING ---
NOTES Boring Location: See Attached Boring Location Plan, Sheet A1-1.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	BLOW COUNTS (N VALUE)	% Moisture Content	% - 4	% - 200	PI (LL-PL)	Pocket Pen. (tsf)	USCS
0	SS 1		SAND, Fine to Coarse Grained, Silty, Dark Brown to Blackish Brown, Dense, Dry with gravel.	19-16-16 (32)						
			- Apparent black (stained) soil sample was encountered at existing grade to approx. 2-1/2 feet. The stained soil sample presented no appreciable odors of hydrocarbons or organic material.							
	SS 2		SAND, Fine to Coarse Grained, Clayey, Whittish Brown to Light Brown, Medium Dense, Slightly Moist with calcareous material and stained soil particles.	9-11-11 (22)	6.9	82	30	22		SC
5			- Apparent thin caliche layer with caliche nodules at approx. 5 feet.							
	SS 3		- Caliche layer appears to extend from 5 to 5-1/2 feet. SAND, Fine to Coarse Grained, Silty, Blackish Brown to Dark Brown, Medium Dense, Moist with gravel, traces of clay particles and caliche nodules.	24-12-15 (27)	8.5	86	32	NP		SM
	SS 4		SAND, Fine to Medium Grained, Poorly Graded, Tannish Brown to Multicolored, Medium Dense, Dry to Slightly Moist with silt.	6-7-9 (16)						
10	SS 5		- Poorly graded sands shall be susceptible to sloughing and collapse when unconfined during excavation.	10-11-15 (26)						
			- Cave-in at approx. 13-1/2 feet after removal of hollow stem augers.							
15	SS 6			6-7-10 (17)						
	SS 7		SAND, Fine to Medium Grained, Silty, Reddish Brown to Tannish Brown, Medium Dense, Slightly Moist.	9-8-17 (25)	4.9	100	17	NP		SM
20			NOTE: SS- Split Spoon Sample. Bottom of borehole at 20.0 feet.							



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BORING NUMBER B-9

CLIENT Conde, Inc.
PROJECT NAME El Paso Water-Coors Channel Drainage Improvs Project
PROJECT NUMBER AGCQC22-008
PROJECT LOCATION Gateway Blvd. East and Euclid St., El Paso, Texas
DATE STARTED 4/12/22 **COMPLETED** 4/12/22
GROUND ELEVATION Ext. Grade **HOLE SIZE** 9 inches
DRILLING CONTRACTOR CQC **DRILLED BY** SC
GROUND WATER LEVELS:
DRILLING METHOD CME-75 w/ 4-1/4" ID HSA
AT TIME OF DRILLING ---
LOGGED BY JC **CHECKED BY** JLA
AT END OF DRILLING ---
NOTES Boring Location: See Attached Boring Location Plan, Sheet A1-1.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	BLOW COUNTS (N VALUE)	% Moisture Content	% - 4	% - 200	PI (LL-PL)	Pocket Pen. (tsf)	USCS
0	SS 1		SAND, Fine to Coarse Grained, Silty, Whittish Brown to Light Brown, Medium Dense to Dense, Moist with traces of calcareous material and clay particles.	4-10-9 (19)	6.4	97	36	NP		SM
			- with gravel below approx. 2-1/2 feet.							
	SS 2			15-15-18 (33)	3.6	74	27	NP		
5	SS 3			24-22-15 (37)						
	SS 4		FAT CLAY, Highly Plastic, Dark Brown to Tannish Brown, Very Stiff, Slightly Moist to Moist with traces of sand.	5-6-10 (16)					3.0	
10			- Stiff with traces of calcareous material at approx. 10 feet.							
	SS 5		- Cave-in at approx. 11 feet after removal of hollow stem augers.	5-5-7 (12)	28.7	100	90	59	3.0	CH
			SAND, Fine Grained, Poorly Graded, Tannish Brown to Multicolored, Medium Dense, Dry to Slightly Moist with silt and traces of clay particles.							
15	SS 6		- Apparent orange stained soil sample was encountered at approx. 15 feet.	4-6-7 (13)						
			- Poorly Graded sands shall be susceptible to sloughing and collapse when unconfined during excavation.							
	SS 7		LEAN CLAY, Sandy, Moderate Plasticity, Tannish Brown to Light Brown, Stiff, Moist with traces of calcareous material.	6-5-10 (15)	18.8	100	60	17	3.0	CL
20			SAND, Fine to Medium Grained, Silty, Tannish Brown to Multicolored, Medium Dense, Dry with traces of clay particles.							
			NOTE: SS- Split Spoon Sample.							
			Bottom of borehole at 20.0 feet.							

▲ SPT N VALUE ▲
10 20 30 40
PL MC LL
16 32 48 64
% - 200
20 40 60 80

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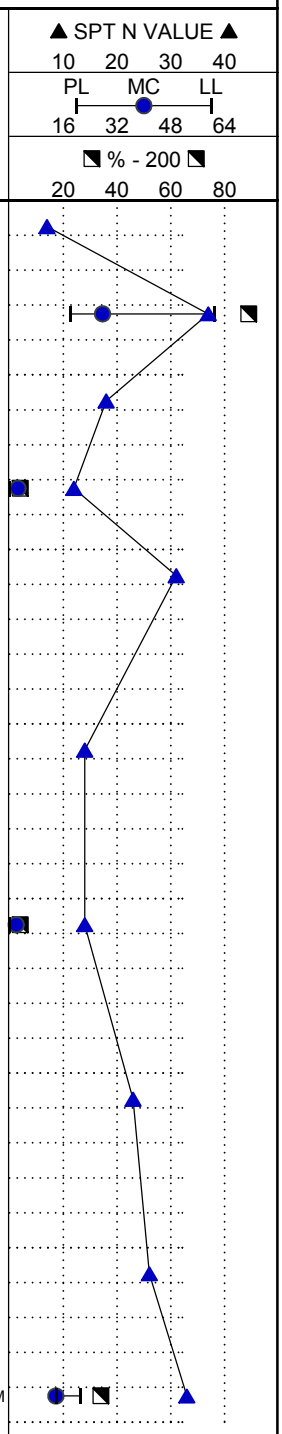
BORING NUMBER B-10

CLIENT Conde, Inc.
PROJECT NAME El Paso Water-Coors Channel Drainage Improvs Project
PROJECT NUMBER AGCQC22-008
PROJECT LOCATION Gateway Blvd. East and Euclid St., El Paso, Texas
DATE STARTED 4/12/22 **COMPLETED** 4/12/22
GROUND ELEVATION Ext. Grade **HOLE SIZE** 9 inches
DRILLING CONTRACTOR CQC **DRILLED BY** SC
GROUND WATER LEVELS:
DRILLING METHOD CME-75 w/ 4-1/4" ID HSA
AT TIME OF DRILLING ---
LOGGED BY JC **CHECKED BY** JLA
AT END OF DRILLING ---
NOTES Boring Location: See Attached Boring Location Plan, Sheet A1-1.
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	BLOW COUNTS (N VALUE)	% Moisture Content	% - 4	% - 200	PI (LL-PL)	Pocket Pen. (tsf)	USCS
0	SS 1		FAT CLAY, Highly Plastic, Dark Brown to Tannish Brown, Medium Stiff to Stiff, Slightly Moist to Moist with traces of sand.	3-3-4 (7)					2.5	
	SS 2			4-12-25 (37)	27.7	100	89	43	3.0	CH
			SAND, Fine Grained, Poorly Graded, Tannish Brown to Multicolored, Medium Dense, Dry to Slightly Moist.							
5	SS 3			4-12-6 (18)						
	SS 4			5-5-7 (12)	2.5	100	4	NP		SP
10	SS 5		- Dense at approx. 10 feet.	4-13-18 (31)						
			- Poorly Graded sands shall be susceptible to sloughing and collapse when unconfined during excavation.							
15	SS 6			6-7-7 (14)						
			- Cave-in at approx. 17-1/2 feet after removal of hollow stem augers.							
20			- Fine to medium grained sands at approx. 20 feet.							
	SS 7		- Apparent orange stained soil sample was encountered at approx. 25 feet.	6-7-7 (14)	2.0	100	4	NP		
25	SS 8			14-13-10 (23)					1.5	
			LEAN CLAY, Sandy, Low Plasticity to Moderate Plasticity, Reddish Brown to Tannish Brown, Very Stiff, Slightly Moist with traces of gravel.							
30	SS 9		SAND, Fine to Medium Grained, Silty, Tannish Brown to Multicolored, Dense, Slightly Moist with traces of clay particles.	11-12-14 (26)						
35	SS 10		SAND, Fine to Medium Grained, Silty, Clayey, Reddish Brown to Tannish Brown, Dense, Moist with some gravel.	14-12-21 (33)	13.8	91	34	7		SC-SM
			NOTE: SS- Split Spoon Sample.							
			Bottom of borehole at 35.0 feet.							



THE INFORMATION PRESENTED SHOULD NOT BE SEPARATED FROM THE GEOTECHNICAL REPORT

CQC STANDARD LOG W/ POCKET PEN 22-008_LOGS.GPJ GINT STD US LAB.GDT

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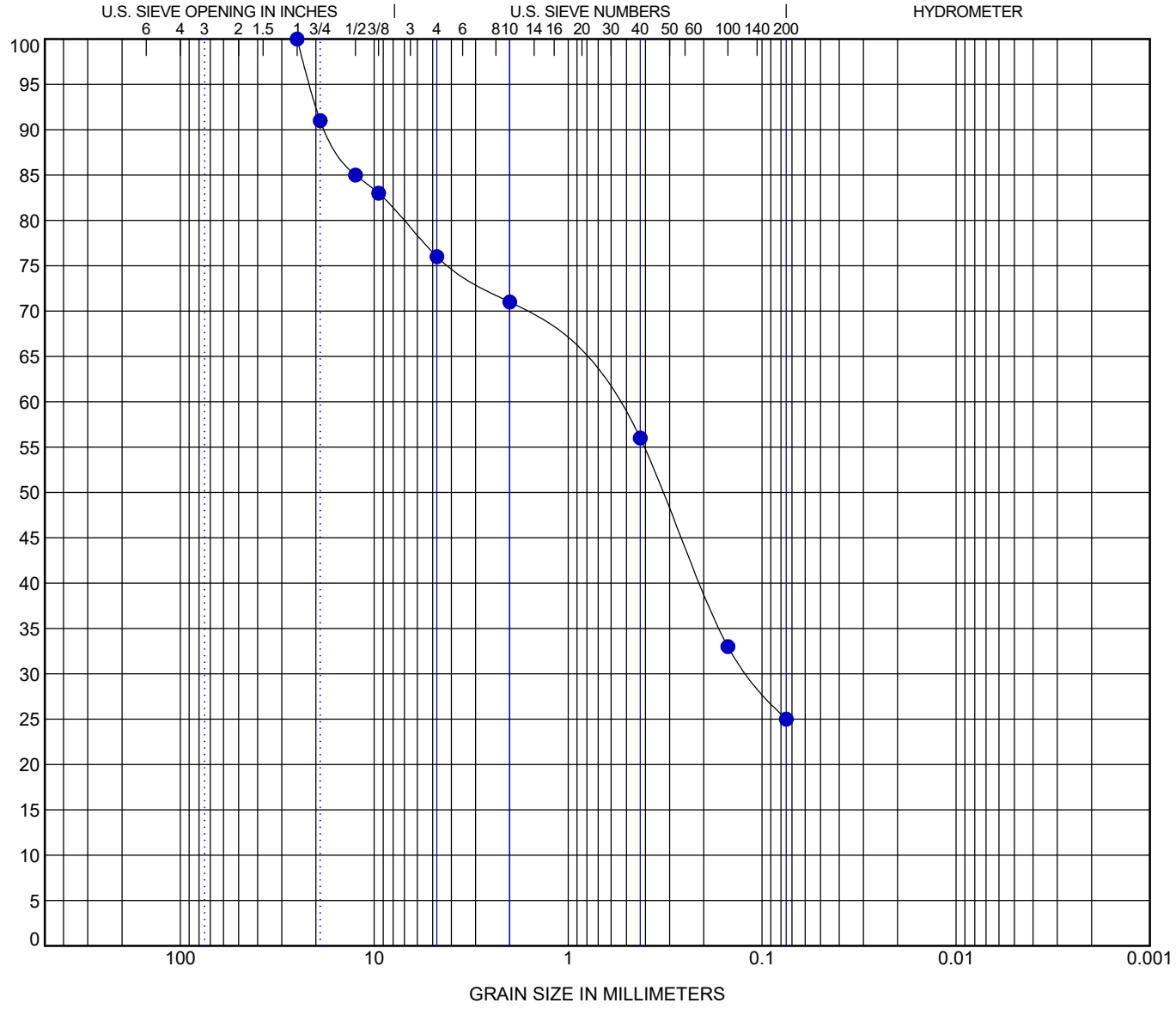
SOIL PARTICLE SIZE ANALYSIS TESTS

Test Method: ASTM D6913

CLIENT Conde, Inc. **PROJECT NAME** El Paso Water-Coors Channel Drainage Improvs Project

PROJECT NUMBER AGCQC22-008 **PROJECT LOCATION** Gateway Blvd. East and Euclid St., El Paso, Texas



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
HAB-1	1.5 - 2.0	SILTY SAND with GRAVEL(SM)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
HAB-1	1.5 - 2.0	25	0.642	0.116		24.0	51.0	25.0	

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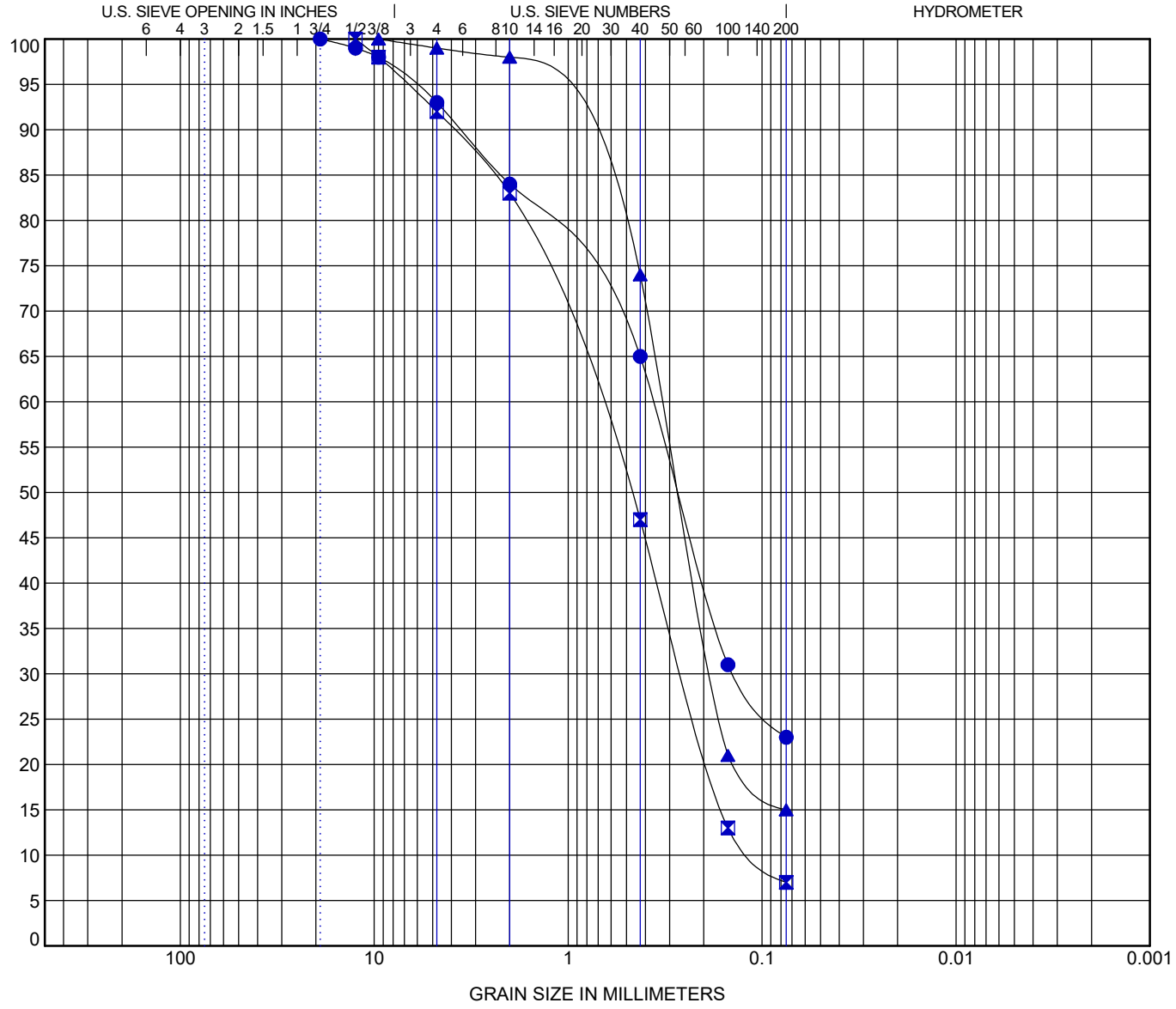

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE		DEPTH	Classification	LL	PL	PI	Cc	Cu
●	HAB-2	3.5 - 4.0	SILTY SAND(SM)	NP	NP	NP		
⊠	HAB-2	7.0 - 7.5	POORLY GRADED SAND with SILT(SP-SM)	NP	NP	NP	0.81	7.01
▲	HAB-2	9.5 - 10.0	SILTY SAND(SM)	NP	NP	NP		

BOREHOLE		DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	HAB-2	3.5 - 4.0	19	0.365	0.138		7.0	70.0	23.0	
⊠	HAB-2	7.0 - 7.5	12.5	0.744	0.252	0.106	8.0	85.0	7.0	
▲	HAB-2	9.5 - 10.0	9.5	0.323	0.179		1.0	84.0	15.0	

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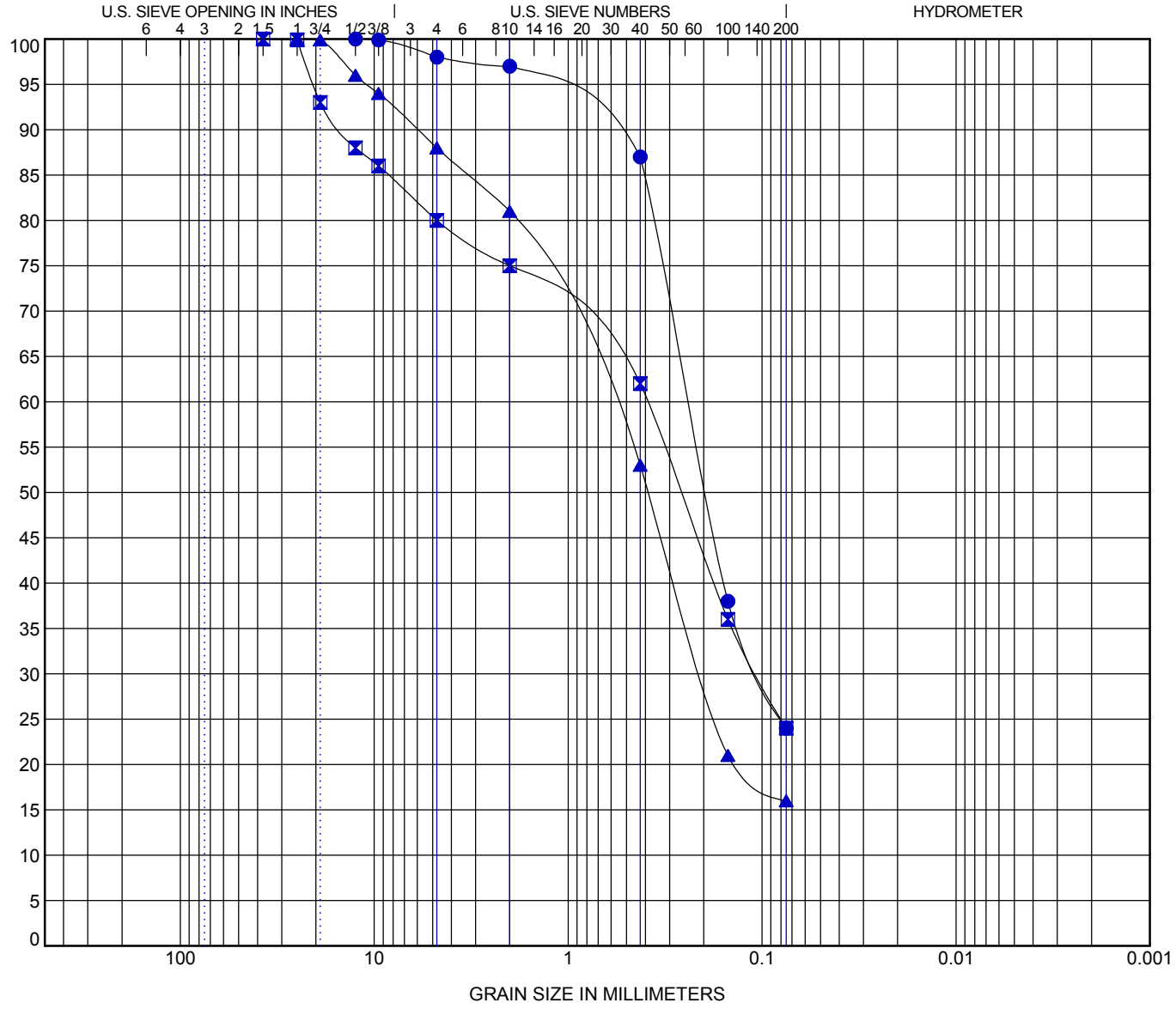

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE		DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-3	0.2 - 1.7	SILTY SAND(SM)	NP	NP	NP		
⊠	B-3	2.5 - 4.0	SILTY, CLAYEY SAND with GRAVEL(SC-SM)	21	16	5		
▲	B-3	7.5 - 9.0	SILTY SAND(SM)	NP	NP	NP		

BOREHOLE		DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-3	0.2 - 1.7	12.5	0.239	0.101		2.0	74.0	24.0	
⊠	B-3	2.5 - 4.0	37.5	0.392	0.106		20.0	56.0	24.0	
▲	B-3	7.5 - 9.0	25	0.626	0.201		12.0	72.0	16.0	

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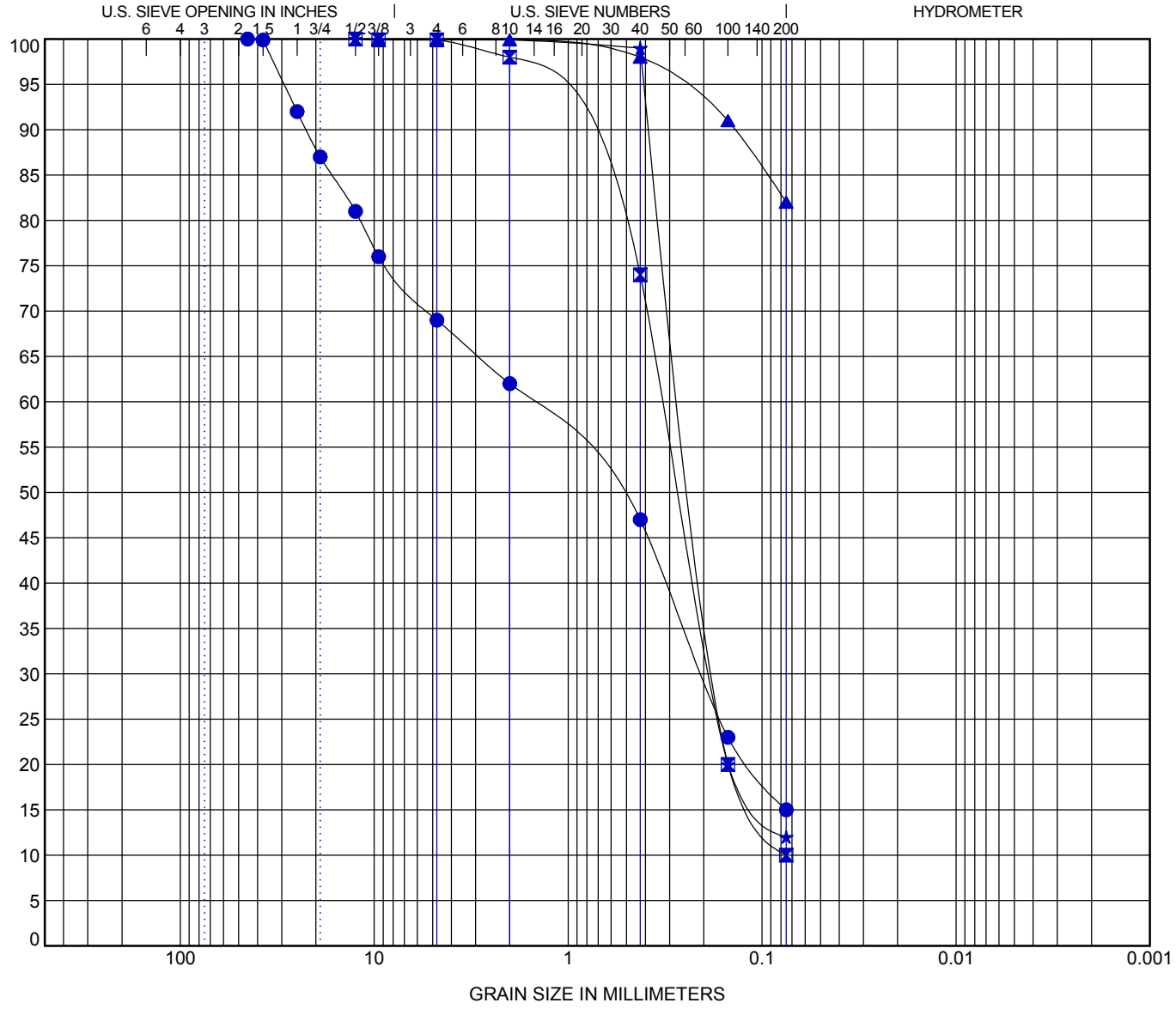

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● B-4	0.0 - 1.5	SILTY SAND with GRAVEL(SM)	NP	NP	NP		
⊠ B-4	2.5 - 4.0	POORLY GRADED SAND with SILT(SP-SM)	NP	NP	NP	1.36	4.33
▲ B-4	7.5 - 9.0	LEAN CLAY with SAND(CL)	28	13	15		
★ B-4	10.0 - 11.5	POORLY GRADED SAND with SILT(SP-SM)	NP	NP	NP	1.83	4.03

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-4	0.0 - 1.5	45	1.627	0.203		31.0	54.0	15.0	
⊠ B-4	2.5 - 4.0	12.5	0.324	0.182	0.075	0.1	89.9	10.0	
▲ B-4	7.5 - 9.0	9.5				0.1	17.9	82.0	
★ B-4	10.0 - 11.5	12.5	0.254	0.171		0.1	87.9	12.0	

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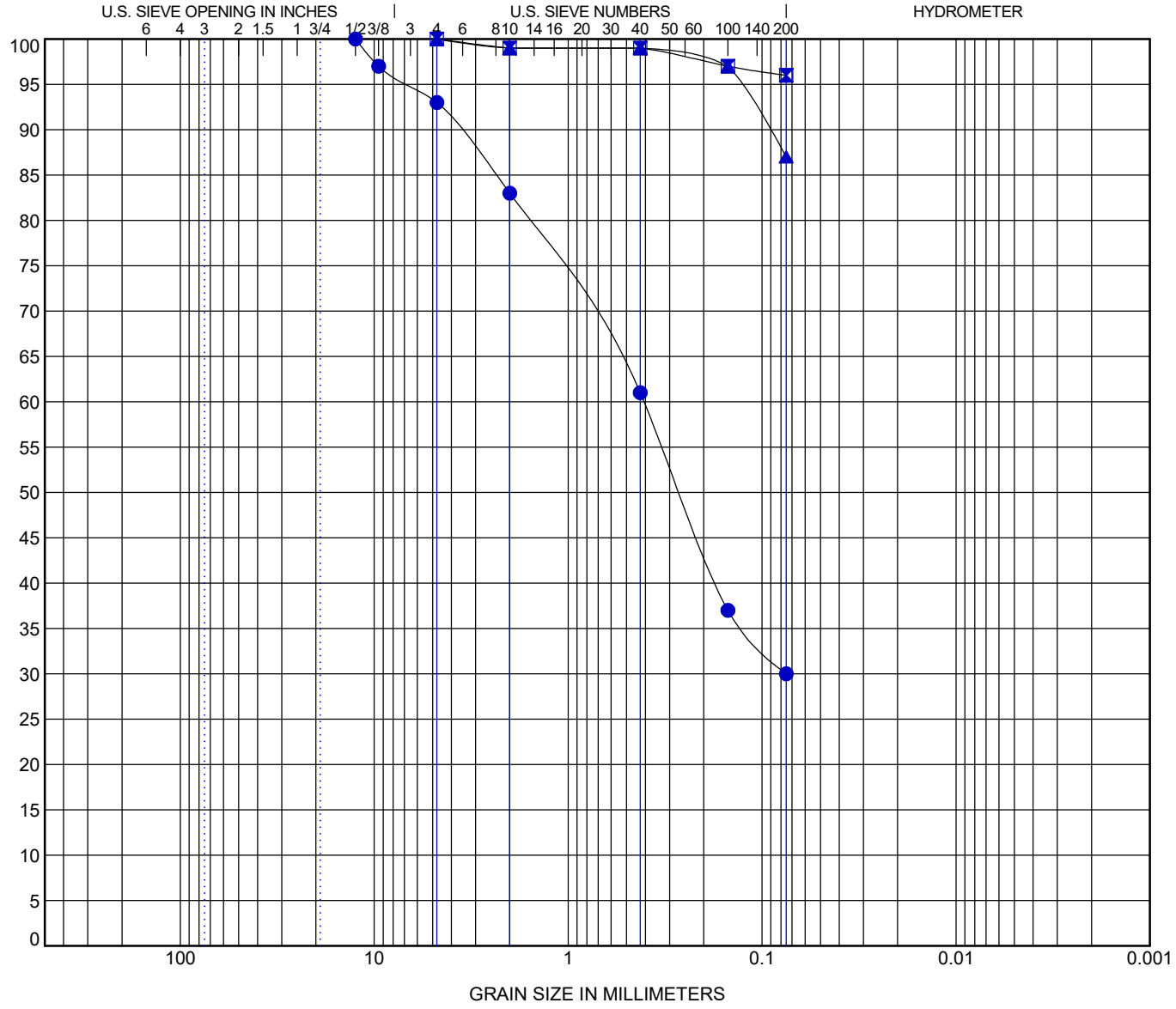

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● B-5	2.5 - 4.0	SILTY SAND(SM)	NP	NP	NP		
⊠ B-5	5.0 - 6.5	FAT CLAY(CH)	82	21	61		
▲ B-5	7.5 - 9.0	SILT(ML)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-5	2.5 - 4.0	12.5	0.407	0.075		7.0	63.0	30.0	
⊠ B-5	5.0 - 6.5	4.75				0.0	4.0	96.0	
▲ B-5	7.5 - 9.0	4.75				0.0	13.0	87.0	

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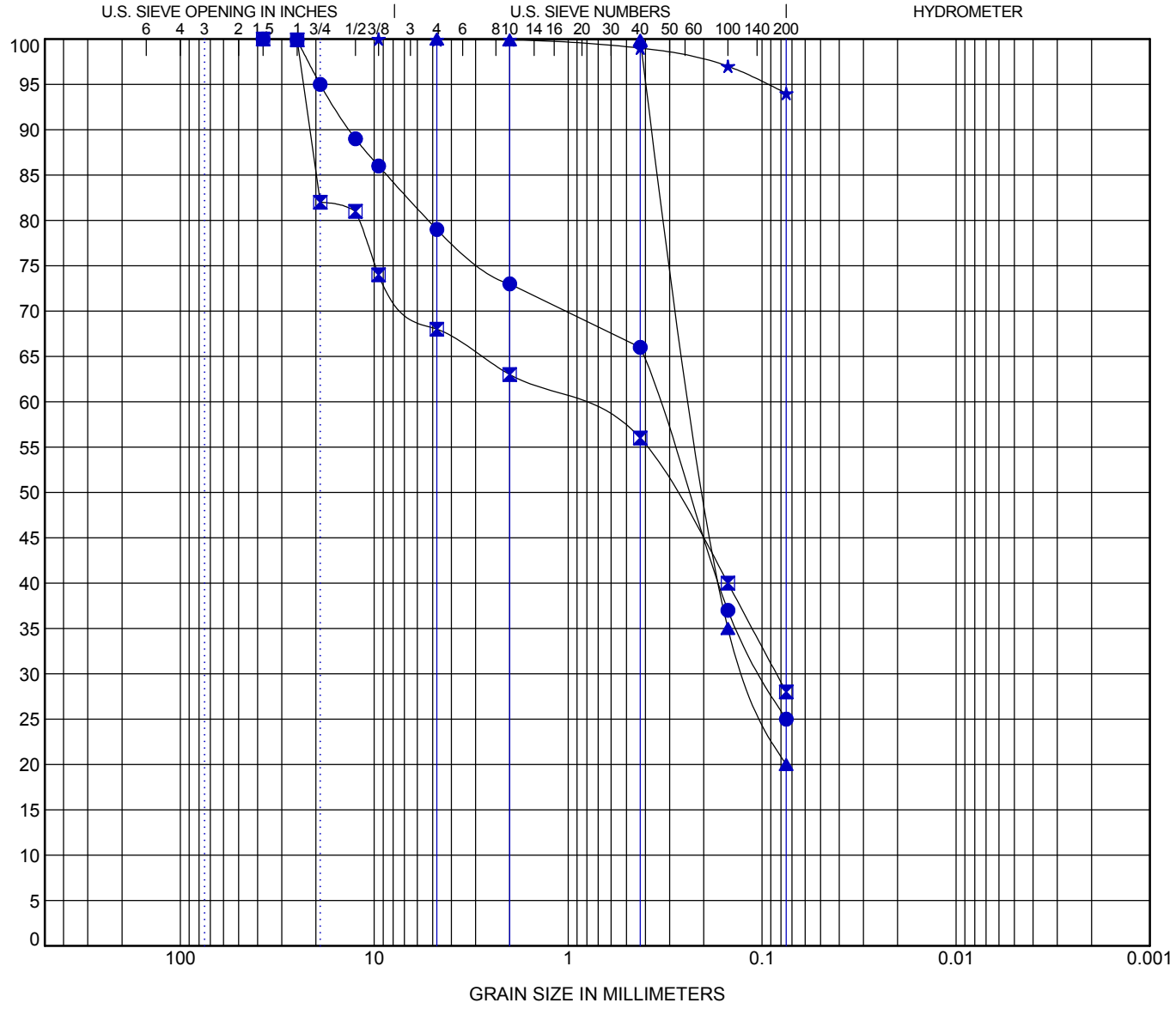

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-6	0.0 - 1.5	SILTY SAND with GRAVEL(SM)	NP	NP	NP		
⊠	B-6	7.5 - 9.0	SILTY SAND with GRAVEL(SM)	NP	NP	NP		
▲	B-6	10.0 - 11.5	SILTY SAND(SM)	NP	NP	NP		
★	B-6	13.5 - 15.0	LEAN CLAY(CL)	27	17	10		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-6	0.0 - 1.5	37.5	0.343	0.1		21.0	54.0	25.0	
⊠	B-6	7.5 - 9.0	37.5	1.03	0.084		32.0	40.0	28.0	
▲	B-6	10.0 - 11.5	4.75	0.224	0.119		0.0	80.0	20.0	
★	B-6	13.5 - 15.0	9.5				0.1	5.9	94.0	

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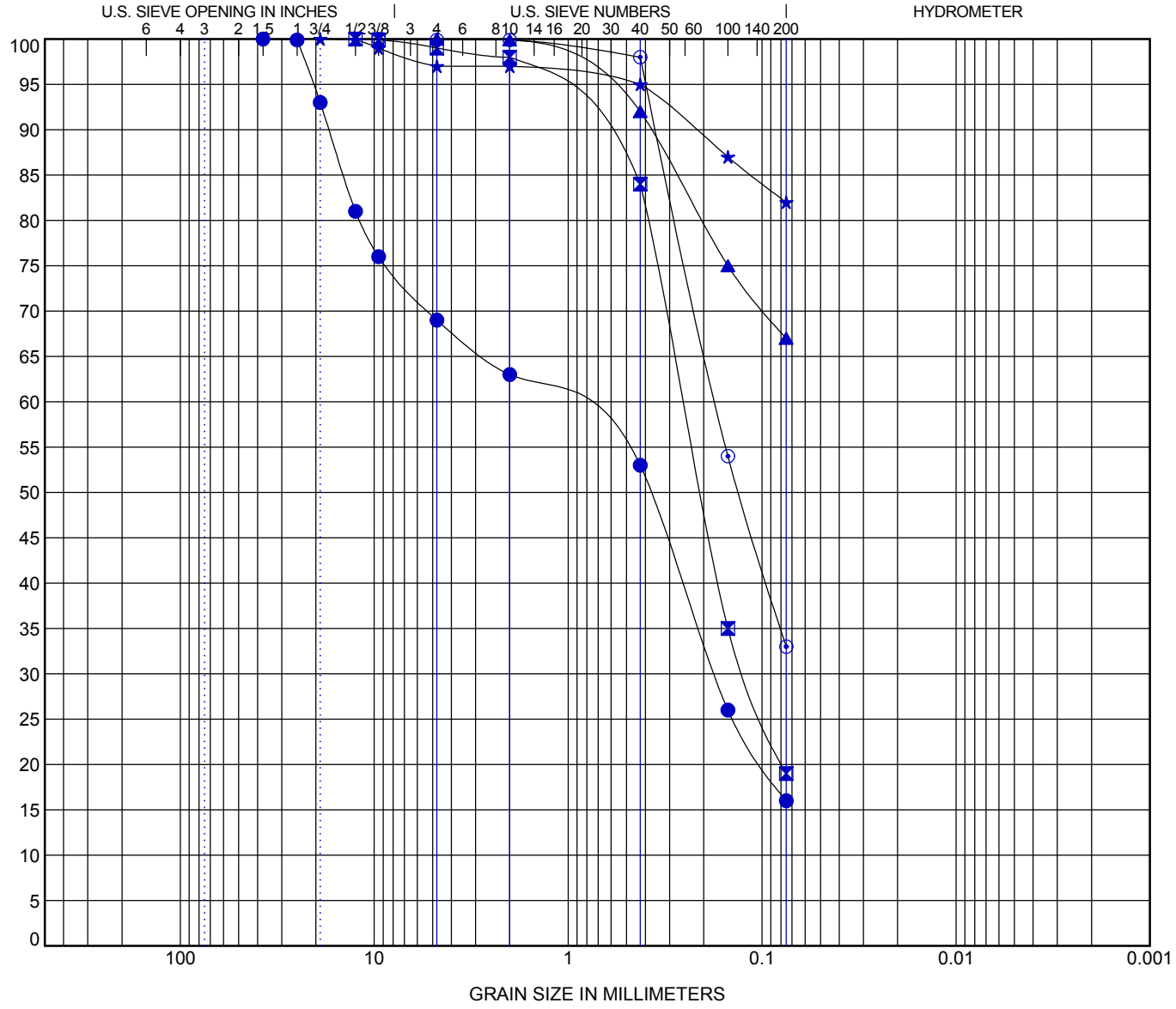

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-7	0.0 - 1.5	SILTY SAND with GRAVEL(SM)	NP	NP	NP		
⊠	B-7	2.5 - 4.0	SILTY SAND(SM)	NP	NP	NP		
▲	B-7	7.5 - 9.0	SANDY LEAN CLAY(CL)	31	13	19		
★	B-7	10.0 - 11.5	LEAN CLAY with SAND(CL)	33	12	21		
⊙	B-7	13.5 - 15.0	SILTY SAND(SM)	NP	NP	NP		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-7	0.0 - 1.5	37.5	1.257	0.175		31.0	53.0	16.0	
⊠	B-7	2.5 - 4.0	12.5	0.255	0.121		1.0	80.0	19.0	
▲	B-7	7.5 - 9.0	4.75				0.0	33.0	67.0	
★	B-7	10.0 - 11.5	19				3.0	15.0	82.0	
⊙	B-7	13.5 - 15.0	9.5	0.173			0.1	66.9	33.0	

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SOIL PARTICLE SIZE ANALYSIS TESTS

Test Method: ASTM D6913

CLIENT Conde, Inc.

PROJECT NAME El Paso Water-Coors Channel Drainage Improvs Project

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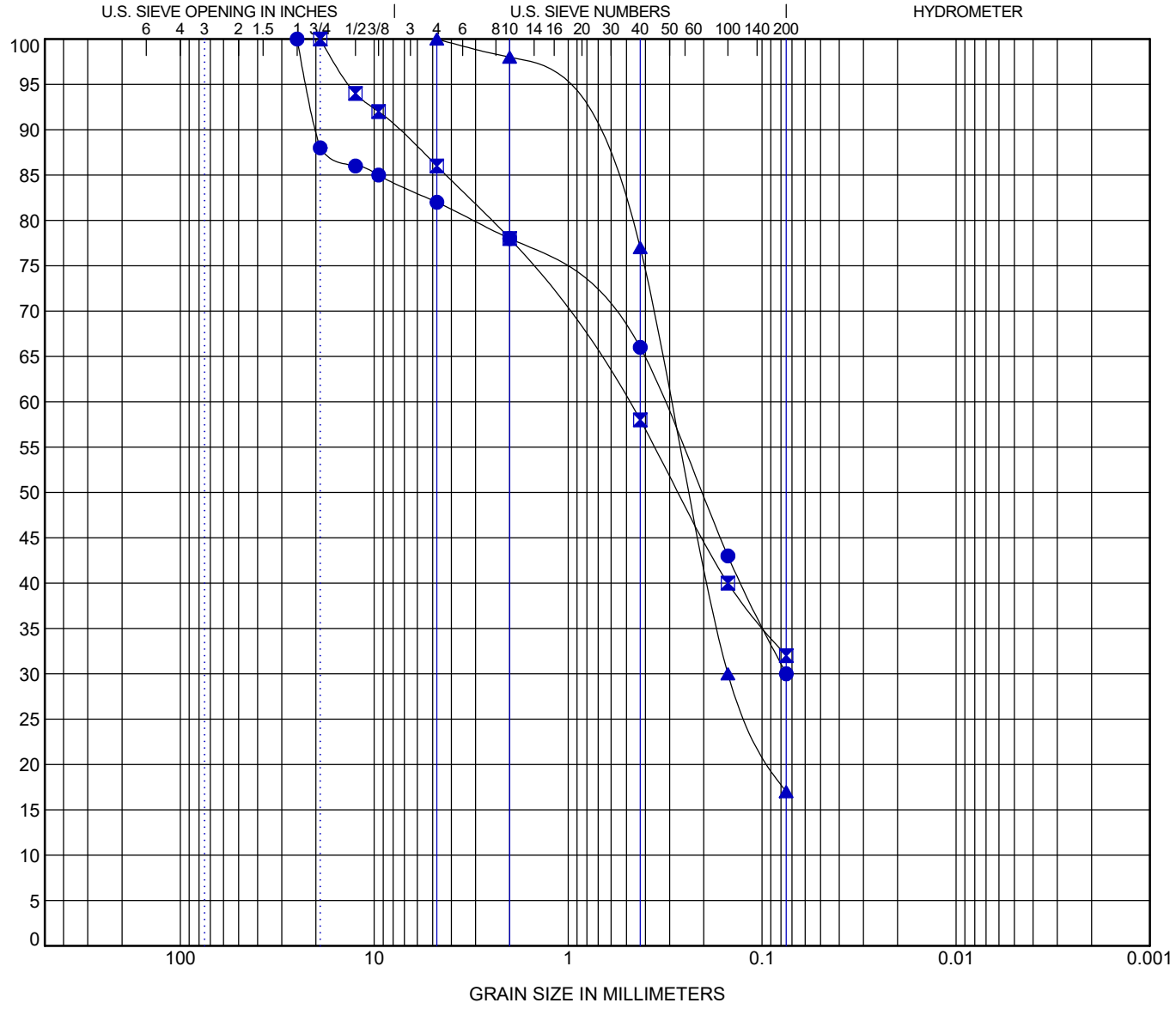
PROJECT LOCATION Gateway Blvd. East and Euclid St., El Paso, Texas



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
B-8	2.5 - 4.0	CLAYEY SAND with GRAVEL(SC)	38	16	22		
B-8	5.5 - 7.0	SILTY SAND(SM)	NP	NP	NP		
B-8	18.5 - 20.0	SILTY SAND(SM)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-8	2.5 - 4.0	25	0.324	0.075		18.0	52.0	30.0	
B-8	5.5 - 7.0	19	0.496			14.0	54.0	32.0	
B-8	18.5 - 20.0	4.75	0.292	0.15		0.0	83.0	17.0	

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Test Method: ASTM D6913

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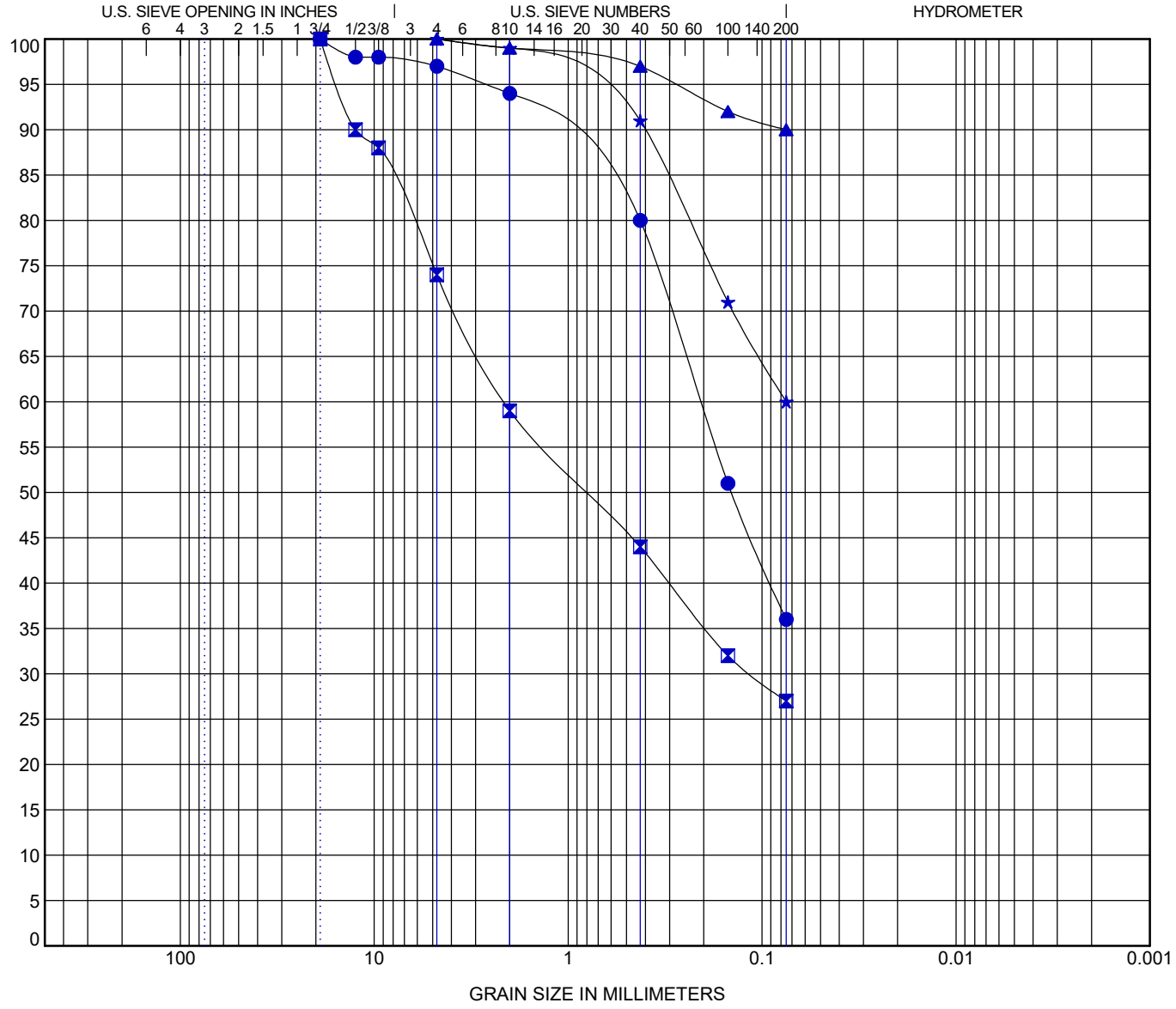

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE		DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-9	0.0 - 1.5	SILTY SAND(SM)	NP	NP	NP		
⊠	B-9	2.5 - 4.0	SILTY SAND with GRAVEL(SM)	NP	NP	NP		
▲	B-9	10.0 - 11.5	FAT CLAY(CH)	83	24	59		
★	B-9	18.5 - 20.0	SANDY LEAN CLAY(CL)	28	11	17		

BOREHOLE		DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-9	0.0 - 1.5	19	0.207			3.0	61.0	36.0	
⊠	B-9	2.5 - 4.0	19	2.119	0.114		26.0	47.0	27.0	
▲	B-9	10.0 - 11.5	4.75				0.0	10.0	90.0	
★	B-9	18.5 - 20.0	4.75	0.075			0.0	40.0	60.0	

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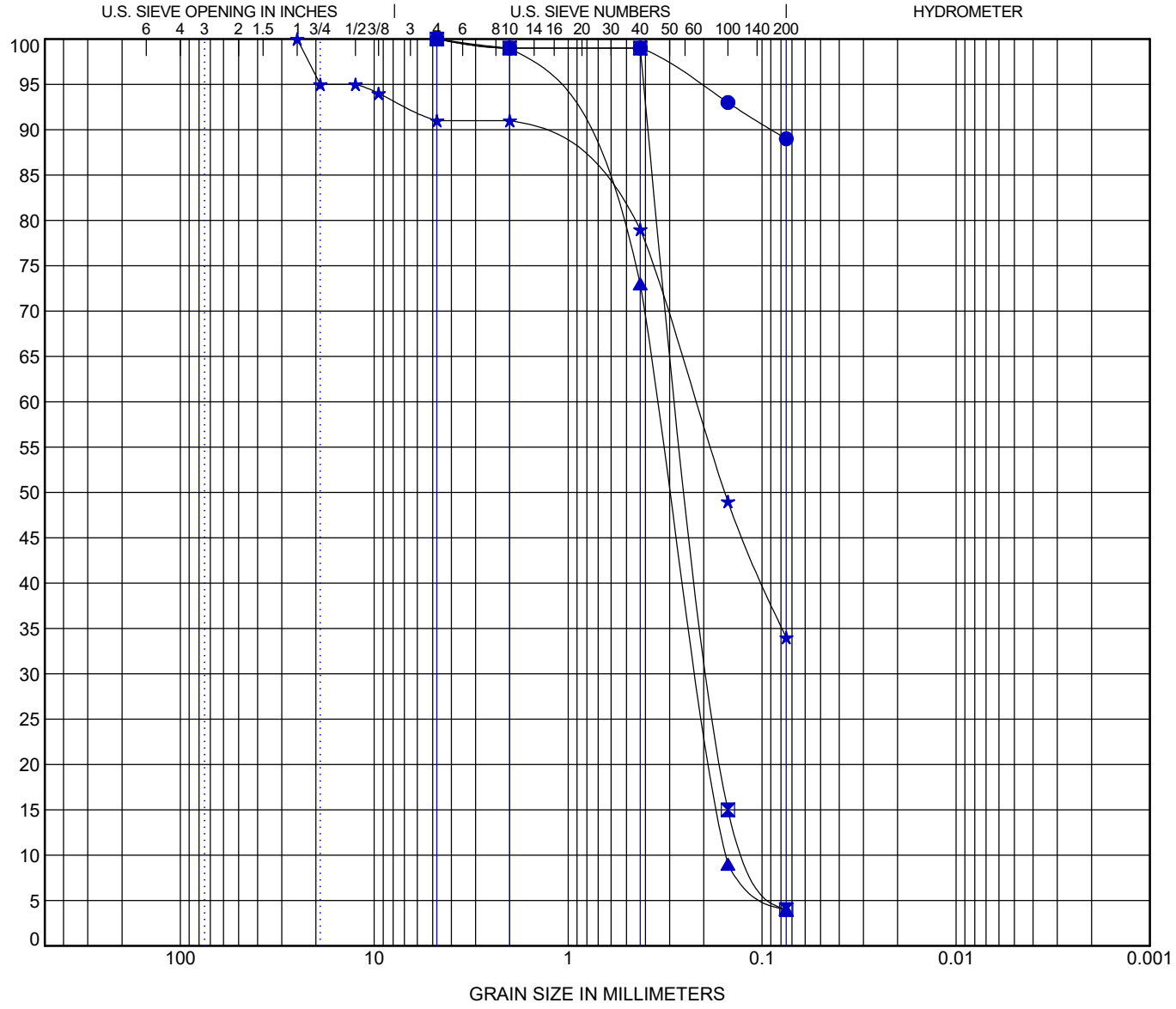

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE		DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-10	2.5 - 4.0	FAT CLAY(CH)	61	18	43		
⊠	B-10	7.5 - 9.0	POORLY GRADED SAND(SP)	NP	NP	NP	1.14	2.39
▲	B-10	20.0 - 21.5	POORLY GRADED SAND(SP)	NP	NP	NP	0.85	2.26
★	B-10	33.5 - 35.0	SILTY, CLAYEY SAND(SC-SM)	21	14	7		

BOREHOLE		DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-10	2.5 - 4.0	4.75				0.0	11.0	89.0	
⊠	B-10	7.5 - 9.0	4.75	0.262	0.181	0.109	0.0	96.0	4.0	
▲	B-10	20.0 - 21.5	4.75	0.344	0.211	0.152	0.0	96.0	4.0	
★	B-10	33.5 - 35.0	25	0.22			9.0	57.0	34.0	

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SUMMARY OF LABORATORY ENGINEERING SOIL CLASSIFICATION TEST RESULTS

CLIENT Conde, Inc. **PROJECT NAME** El Paso Water-Coors Channel Drainage Improvs Project

PROJECT NUMBER AGCQC22-008 **PROJECT LOCATION** Gateway Blvd. East and Euclid St., El Paso, Texas

Borehole	Depth	N - Value	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 4	% Passing No. 200	Pocket Pen. (tsf)	Total Unit Weight (pcf)	Classification
B-3	0.2- 1.7	29	8.1	NP	NP	NP	98	24			SM
	2.5- 4.0	12	9.4	21	16	5	80	24			SC-SM
	5.0- 6.5	12									
	7.5- 9.0	17	10.5	NP	NP	NP	88	16			SM
	10.0- 11.5	13									
B-4	0.0- 1.5	42	4.5	NP	NP	NP	69	15			SM
	2.5- 4.0	23	2.1	NP	NP	NP	100	10			SP-SM
	5.0- 6.5	14									
	7.5- 9.0	15	18.2	28	13	15	100	82	4.5		CL
	10.0- 11.5	21	1.0	NP	NP	NP	100	12			SP-SM
	13.5- 15.0	12									
B-5	0.0- 1.5	18									
	2.5- 4.0	13	15.1	NP	NP	NP	93	30			SM
	5.0- 6.5	17	31.2	82	21	61	100	96	3.0		CH
	7.5- 9.0	7	26.4	NP	NP	NP	100	87	1.0		ML
	10.0- 11.5	32									
	13.5- 15.0	25									
B-6	0.0- 1.5	19	3.9	NP	NP	NP	79	25			SM
	2.5- 4.0	13									
	5.0- 6.5	28									
	7.5- 9.0	13	5.1	NP	NP	NP	68	28			SM
	10.0- 11.5	17	1.5	NP	NP	NP	100	20			
	13.5- 15.0	25	30.9	27	17	10	100	94	0.5		CL
B-7	0.0- 1.5	24	2.7	NP	NP	NP	69	16			SM
	2.5- 4.0	22	4.0	NP	NP	NP	99	19			
	5.0- 6.5	17									
	7.5- 9.0	23	16.4	31	13	19	100	67	4.5		CL
	10.0- 11.5	19	17.6	33	12	21	97	82	4.5		
	13.5- 15.0	12	3.5	NP	NP	NP	100	33			SM
B-8	0.0- 1.5	32									
	2.5- 4.0	22	6.9	38	16	22	82	30			SC
	5.0- 6.5	27									
	5.5- 7.0		8.5	NP	NP	NP	86	32			SM
	7.5- 9.0	16									
	10.0- 11.5	26									
	15.0- 16.5	17									
	18.5- 20.0	25	4.9	NP	NP	NP	100	17			SM
B-9	0.0- 1.5	19	6.4	NP	NP	NP	97	36			SM

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SUMMARY OF LABORATORY ENGINEERING SOIL CLASSIFICATION TEST RESULTS

CLIENT Conde, Inc. **PROJECT NAME** El Paso Water-Coors Channel Drainage Improvs Project

PROJECT NUMBER AGCQC22-008 **PROJECT LOCATION** Gateway Blvd. East and Euclid St., El Paso, Texas

Borehole	Depth	N - Value	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 4	% Passing No. 200	Pocket Pen. (tsf)	Total Unit Weight (pcf)	Classification
	2.5- 4.0	33	3.6	NP	NP	NP	74	27			
	5.0- 6.5	37									
	7.5- 9.0	16							3.0		
	10.0- 11.5	12	28.7	83	24	59	100	90	3.0		CH
	15.0- 16.5	13									
	18.5- 20.0	15	18.8	28	11	17	100	60	3.0		CL
B-10	0.0- 1.5	7							2.5		
	2.5- 4.0	37	27.7	61	18	43	100	89	3.0		CH
	5.0- 6.5	18									
	7.5- 9.0	12	2.5	NP	NP	NP	100	4			SP
	10.0- 11.5	31									
	15.0- 16.5	14									
	20.0- 21.5	14	2.0	NP	NP	NP	100	4			
	25.0- 26.5	23							1.5		
	30.0- 31.5	26									
	33.5- 35.0	33	13.8	21	14	7	91	34			SC-SM
HAB-1	1.5- 3.0		9.9	NP	NP	NP	76	25			SM
HAB-2	3.5- 5.0		6.3	NP	NP	NP	93	23			SM
	7.0- 8.5		2.8	NP	NP	NP	92	7			SP-SM
	9.5- 11.0		3.5	NP	NP	NP	99	15			SM

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SOIL MOISTURE - DENSITY RELATIONSHIP TEST RESULTS

PROJECT NO.: AGCQC22-008

PROJECT NAME: **General Geotechnical Subsurface Soils Evaluation**
EPW - Coors Channel Drainage Improvements Project
Intersection of Gateway Boulevard East and Euclid Street
El Paso, El Paso County, Texas

SAMPLE INFORMATION

PROCTOR NO.: 1 **SAMPLED BY:** JC

SOIL SAMPLE LOCATION: HAB-2 **SAMPLE DATE:** 3/29/2022

SOIL SAMPLE APPROX. DEPTH: 0'-10'

SOIL TYPE/DESCRIPTION: Composite Soil Sample/ SAND, Fine to Coarse Grained, Silty, Dark Brown to Tannish Brown with gravel.

SAMPLE TEST RESULTS

Sieve Analysis Test
Test Method: ASTM D 6913

Sieve Size/No.	Percent Retained	Percent Passing
3"	0	100
2-1/2"	0	100
1-1/2"	0	100
1"	0	100
3/4"	0	100
1/2"	3	97
3/8"	4	96
No. 4	12	88
No. 10	19	81
No. 40	39	61
No. 100	76	24
No. 200	84.4	15.6

NS- Not Specified

Atterberg Limits Test
Test Method: ASTM D 4318

Limit Test	Index Test Result
LL	NV
PL	NV
PI	NPT

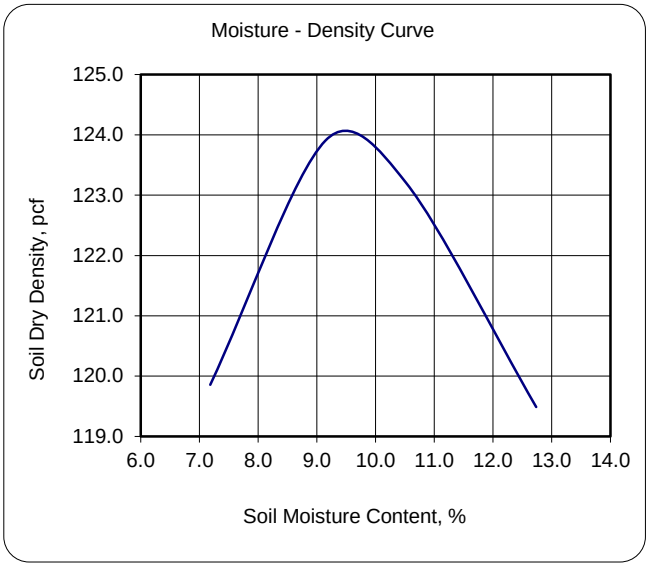
NPT-Non Plastic

Soil Classification: **SM**
Test Method: ASTM D 2487

Moisture-Density Relationship Test
Test Method: ASTM D 1557, Method "B"

Test Sample No.	Moisture Content (%)	Sample Dry Density (pcf)
1	7.2	119.9
2	9.1	123.9
3	10.5	123.2
4	12.7	119.5

Maximum Dry Density, pcf: **124.1**
Optimum Moisture Content, %: **9.5**



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SOIL MOISTURE - DENSITY RELATIONSHIP TEST RESULTS

PROJECT NO.: AGCQC22-008

PROJECT NAME: **General Geotechnical Subsurface Soils Evaluation**
EPW - Coors Channel Drainage Improvements Project
Intersection of Gateway Boulevard East and Euclid Street
El Paso, El Paso County, Texas

SAMPLE INFORMATION

PROCTOR NO.: 2 **SAMPLED BY:** JC

SOIL SAMPLE LOCATION: B-4 **SAMPLE DATE:** 4/9/2022

SOIL SAMPLE APPROX. DEPTH: 0'-5'

SOIL TYPE/DESCRIPTION: Composite Soil Sample / SAND, Fine to Medium Grained, Silty, Light Brown to Tannish Brown with traces of gravel.

SAMPLE TEST RESULTS

Sieve Analysis Test
Test Method: ASTM D 6913

Sieve Size/No.	Percent Retained	Percent Passing
3"	0	100
2-1/2"	0	100
1-1/2"	0	100
1"	0	100
3/4"	1	99
1/2"	2	98
3/8"	3	97
No. 4	4	96
No. 10	9	91
No. 40	31	69
No. 100	75	25
No. 200	87.0	13.0

Atterberg Limits Test
Test Method: ASTM D 4318

Limit Test	Index Test Result
LL	NV
PL	NV
PI	NP

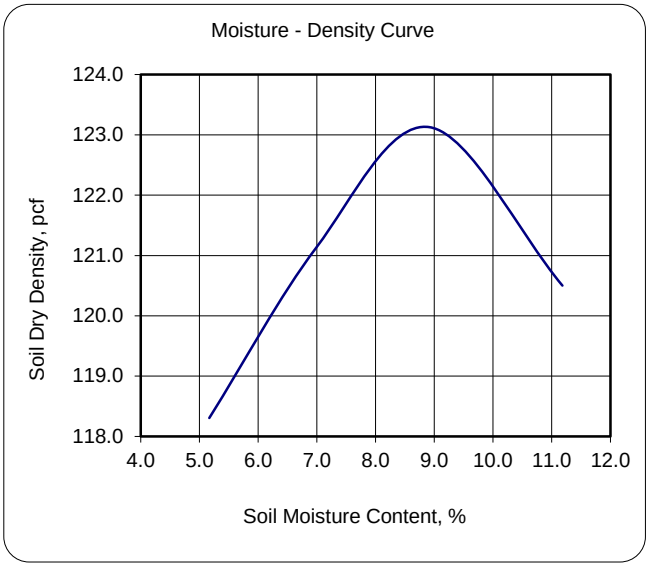
NPT-Non Plastic

Soil Classification: **SM**
Test Method: ASTM D 2487

Moisture-Density Relationship Test
Test Method: ASTM D 1557, Method "A"

Test Sample No.	Moisture Content (%)	Sample Dry Density (pcf)
1	5.2	118.3
2	7.0	121.1
3	8.9	123.1
4	11.2	120.5

Maximum Dry Density, pcf: **123.1**
Optimum Moisture Content, %: **8.8**



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SOIL MOISTURE - DENSITY RELATIONSHIP TEST RESULTS

PROJECT NO.: AGCQC22-008

PROJECT NAME: **General Geotechnical Subsurface Soils Evaluation**
EPW - Coors Channel Drainage Improvements Project
Intersection of Gateway Boulevard East and Euclid Street
El Paso, El Paso County, Texas

SAMPLE INFORMATION

PROCTOR NO.: 3 **SAMPLED BY:** JC

SOIL SAMPLE LOCATION: B-7 **SAMPLE DATE:** 4/9/2022

SOIL SAMPLE APPROX. DEPTH: 0'-5'

SOIL TYPE/DESCRIPTION: Composite Soil Sample / GRAVEL, Fine, Sandy, Poorly Graded, Tannish Brown to Light Brown with silt.

SAMPLE TEST RESULTS

Sieve Analysis Test
Test Method: ASTM D 6913

Sieve Size/No.	Percent Retained	Percent Passing
3"	0	100
2-1/2"	0	100
1-1/2"	3	97
1"	8	92
3/4"	16	84
1/2"	43	57
3/8"	46	54
No. 4	53	47
No. 10	56	44
No. 40	63	37
No. 100	82	18
No. 200	88.7	11.3

Atterberg Limits Test
Test Method: ASTM D 4318

Limit Test	Index Test Result
LL	NV
PL	NV
PI	NP

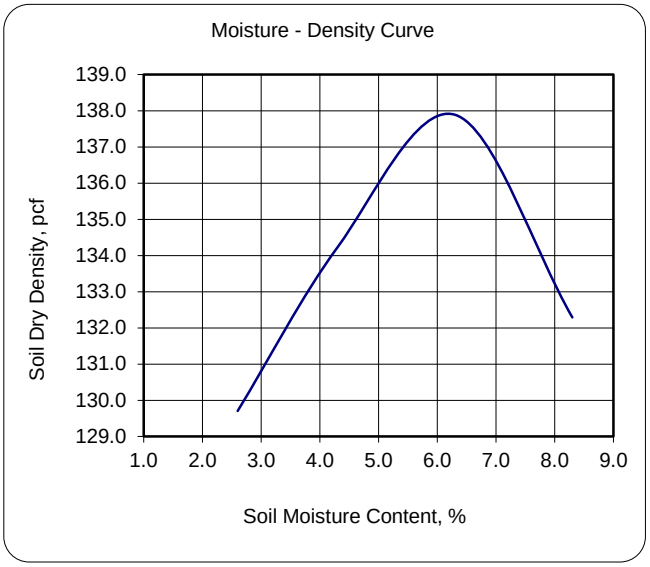
NP-Non Plastic

Soil Classification: **GP-GM**
Test Method: ASTM D 2487

Moisture-Density Relationship Test
Test Method: ASTM D 1557, Method "C"

Test Sample No.	Moisture Content (%)	Sample Dry Density (pcf)
1	2.6	129.7
2	4.3	134.2
3	6.3	137.9
4	8.3	132.3

Maximum Dry Density, pcf: **137.9**
Optimum Moisture Content, %: **6.3**



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SOIL MOISTURE - DENSITY RELATIONSHIP TEST RESULTS

PROJECT NO.: AGCQC22-008

PROJECT NAME: **General Geotechnical Subsurface Soils Evaluation**
EPW - Coors Channel Drainage Improvements Project
Intersection of Gateway Boulevard East and Euclid Street
El Paso, El Paso County, Texas

SAMPLE INFORMATION

PROCTOR NO.: 4 **SAMPLED BY:** JC

SOIL SAMPLE LOCATION: B-10 **SAMPLE DATE:** 4/12/2022

SOIL SAMPLE APPROX. DEPTH: 0'-3'

SOIL TYPE/DESCRIPTION: Composite Soil Sample / FAT CLAY, Highly Plastic, Dark Brown to Tannish Brown with some sand.

SAMPLE TEST RESULTS

Sieve Analysis Test
Test Method: ASTM D 6913

Sieve Size/No.	Percent Retained	Percent Passing
3"	0	100
2-1/2"	0	100
1-1/2"	0	100
1"	0	100
3/4"	0	100
1/2"	0	100
3/8"	0	100
No. 4	1	99
No. 10	1	99
No. 40	2	98
No. 100	4	96
No. 200	6.3	93.7

NS- Not Specified

Atterberg Limits Test
Test Method: ASTM D 4318

Limit Test	Index Test Result
LL	66
PL	18
PI	48

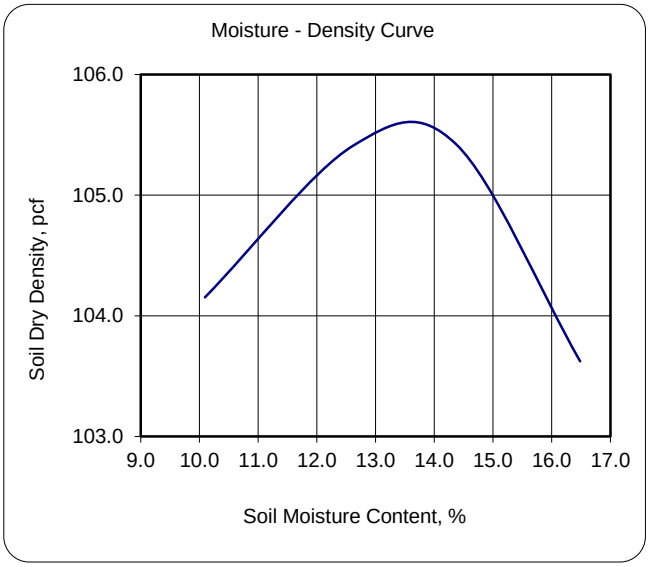
NPT-Non Plastic by Test

Soil Classification: **CH**
Test Method: ASTM D 2487

Moisture-Density Relationship Test
Test Method: ASTM D 1557, Method "A"

Test Sample No.	Moisture Content (%)	Sample Dry Density (pcf)
1	10.1	104.2
2	12.6	105.4
3	14.4	105.4
4	16.5	103.6

Maximum Dry Density, pcf: **105.6**
Optimum Moisture Content, %: **13.6**



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DYNAMIC CONE PENETROMETER TEST RESULTS

CQC PROJECT NO.: AGCQC22-008 **TEST DATE:** 3/29/2022

PROJECT NAME: **EPW - Coors Channel Drainage Improvements Project** **CLIENT:** Conde, Inc.
Intersection of Gateway Blvd. East and Euclid St.
El Paso, El Paso County, Texas

REMARK: Testing commenced in the encountered soil beneath the exisitng ground surface elevation.

DCP	No. of	Penetration (mm)			Hammer	DCP	CBR	K	Bearing Capacity		Depth	
No.	Blows	Accumulative	per Set	per Blow	Blow Factor	Index	(%)	(pci)	(psf)	(psf) FS=2	(in)	(ft)
DCP-1 (HAB-1)	0	0	--	--	--	--	0	0	0	0	0	0.0
	8	150	150	18.8	1	18.8	11	152	2,923	1,461	5.9	0.5
	11	300	150	13.6	1	13.6	16	200	3,656	1,828	11.8	1.0
	4	450	150	37.5	1	37.5	5	83	1,758	879	17.7	1.5
	5	600	150	30.0	1	30.0	6	101	2,077	1,038	23.6	2.0
	5	750	150	30.0	1	30.0	6	101	2,077	1,038	29.5	2.5
	10	900	150	15.0	1	15.0	14	184	3,421	1,711	35.4	3.0
	9	1050	150	16.7	1	16.7	13	168	3,177	1,589	41.3	3.4
	8	1200	150	18.8	1	18.8	11	152	2,923	1,461	47.2	3.9
	13	1350	150	11.5	1	11.5	19	232	4,101	2,051	53.1	4.4
	12	1500	150	12.5	1	12.5	17	216	3,882	1,941	59.1	4.9
	9	1650	150	16.7	1	16.7	13	168	3,177	1,589	65.0	5.4
	7	1800	150	21.4	1	21.4	9	135	2,656	1,328	70.9	5.9
	7	1950	150	21.4	1	21.4	9	135	2,656	1,328	76.8	6.4
	8	2100	150	18.8	1	18.8	11	152	2,923	1,461	82.7	6.9
	12	2250	150	12.5	1	12.5	17	216	3,882	1,941	88.6	7.4
	12	2400	150	12.5	1	12.5	17	216	3,882	1,941	94.5	7.9
	18	2550	150	8.3	1	8.3	27	308	5,108	2,554	100.4	8.4
	15	2700	150	10.0	1	10.0	22	263	4,520	2,260	106.3	8.9
	16	2850	150	9.4	1	9.4	24	278	4,721	2,360	112.2	9.4
	19	3000	150	7.9	1	7.9	29	323	5,294	2,647	118.1	9.8
DCP-2 (HAB-2)	0	0	--	--	--	--	0	0	0	0	0	0.0
	4	150	150	37.5	1	37.5	5	83	1,758	879	5.9	0.5
	9	300	150	16.7	1	16.7	13	168	3,177	1,589	11.8	1.0
	11	450	150	13.6	1	13.6	16	200	3,656	1,828	17.7	1.5
	9	600	150	16.7	1	16.7	13	168	3,177	1,589	23.6	2.0
	9	750	150	16.7	1	16.7	13	168	3,177	1,589	29.5	2.5
	8	900	150	18.8	1	18.8	11	152	2,923	1,461	35.4	3.0
	10	1050	150	15.0	1	15.0	14	184	3,421	1,711	41.3	3.4
	13	1200	150	11.5	1	11.5	19	232	4,101	2,051	47.2	3.9
	17	1350	150	8.8	1	8.8	25	293	4,917	2,458	53.1	4.4
	21	1500	150	7.1	1	7.1	32	352	5,656	2,828	59.1	4.9
	18	1650	150	8.3	1	8.3	27	308	5,108	2,554	65.0	5.4
	8	1800	150	18.8	1	18.8	11	152	2,923	1,461	70.9	5.9
	8	1950	150	18.8	1	18.8	11	152	2,923	1,461	76.8	6.4
	8	2100	150	18.8	1	18.8	11	152	2,923	1,461	82.7	6.9
	7	2250	150	21.4	1	21.4	9	135	2,656	1,328	88.6	7.4
	7	2400	150	21.4	1	21.4	9	135	2,656	1,328	94.5	7.9
	8	2550	150	18.8	1	18.8	11	152	2,923	1,461	100.4	8.4
	9	2700	150	16.7	1	16.7	13	168	3,177	1,589	106.3	8.9
	9	2850	150	16.7	1	16.7	13	168	3,177	1,589	112.2	9.4
	7	3000	150	21.4	1	21.4	9	135	2,656	1,328	118.1	9.8

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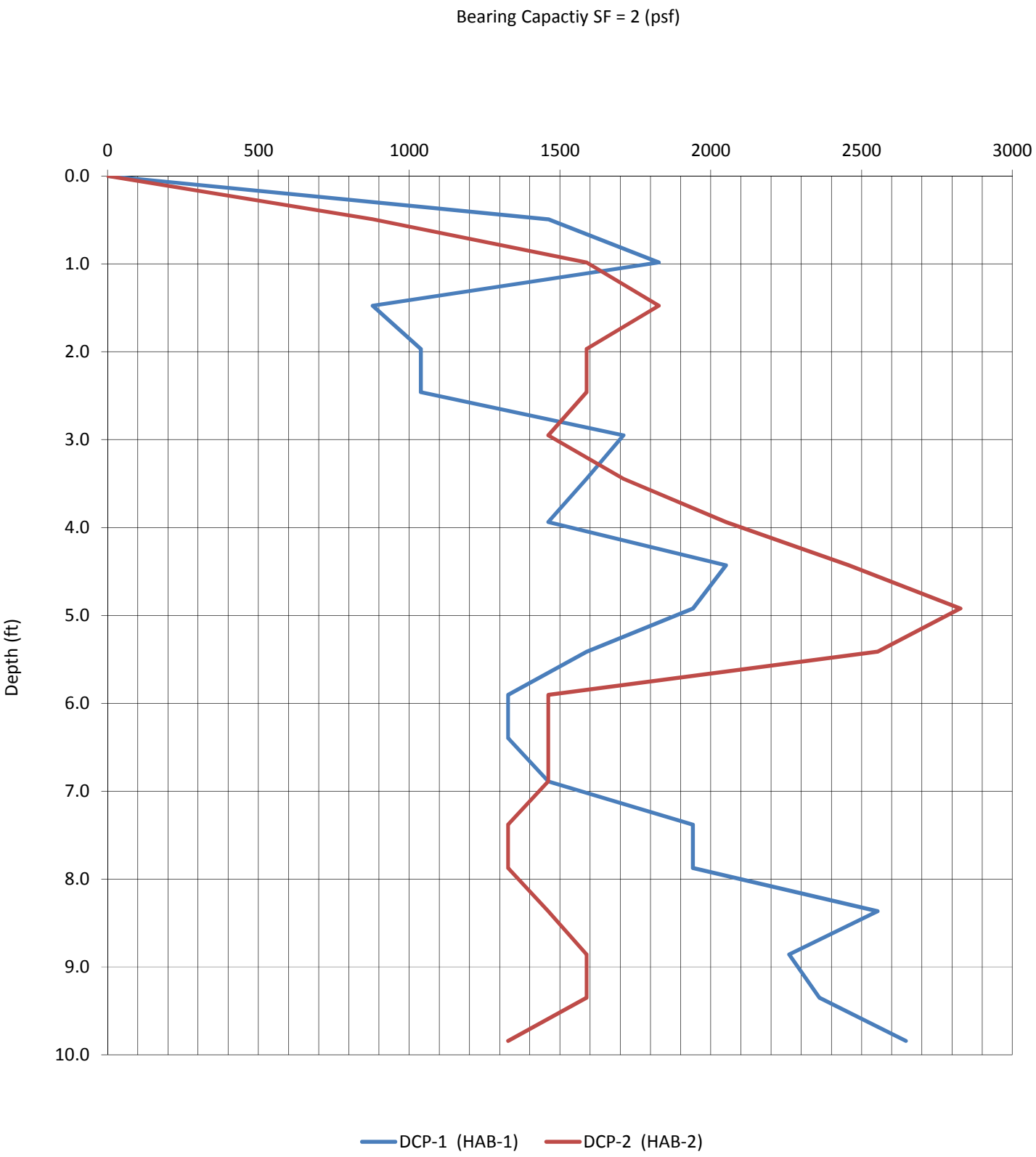
DYNAMIC CONE PENETROMETER TEST RESULTS



SOIL PERCOLATION TEST RESULTS

CQC PROJECT NO.: AGCQC22-008

PROJECT NAME: **El Paso Water- Coors Channel Drainage Improvements Project**
Intersection of Gateway Boulevard East and Euclid Street
El Paso, El Paso County, Texas

TEST INFORMATION

TEST DATE: 5/6/2022
TEST HOLE CLOSURE: Backfilled with Existing Soil Material
GROUNDWATER DEPTH: None Observed
P-1: READING INTERVAL / TOTAL TEST TIME: 10 minutes / 60 minutes

Hole No.	Approx. Test Depth (ft.)	Soil Description at Bottom of Borehole	Estimated Percolation Rate at Test Depth: min./in.
P-1	26	SAND, Fine to Medium Grained, Poorly Graded, Tannish Brown to Multicolored.	25

1. Test bore hole was saturated for a period of at least 3 hours before testing.
2. A minimum of 2 inches of fine gravel was placed at the bottom of the test hole.
3. The percolation test was performed within the approximate location indicated on the General Geotechnical Boring Location aerial Plan, Sheet A1.
4. Please note that a percolation test may not serve as an accurate test to model the infiltration rate of collected storm water, especially due to the build-up of sediments and suspended particles of soil when surface water has accumulated within the pond.

Remarks: Based on our percolation test results, the tested subsurface soils exhibited a relatively slow to moderate infiltration rate into the subsurface soils. Please note that the presence of clay increases the necessary time for fluids to seep through the subsurface soils. In addition, it should be noted that normal and steady water infiltration through the subsurface soils is highly dependent on the degree of sediment built-up at the bottom, which shall ultimately decrease the infiltration rate. A clay layer was encountered below the percolation test depth (see boring B-10). The overexcavation and replacement of this clay layer may be required at the time of construction. We highly recommend to consider a minimum soil percolation value of 60 minutes per inch in the civil design of proposed pond, as required. It is highly recommended that our Client considers the specification of a soil percolation or infiltration test to be performed once the areas have been cut to the design invert elevation. The delineation of the lateral extent or lateral seepage of water infiltration and impacts to adjacent structures or properties was beyond our scope of work, but should be considered by the owner.

APPENDIX B

GEOTECHNICAL REPORT
TECHNICAL REFERENCE INFORMATION

DEFINITION OF DESCRIPTIVE TERMS

DENSITY OF GRANULAR SOILS

SPT N Value	Relative Density
< 4	Very Loose
4 – 10	Loose
11 – 30	Med. Dense
31 – 50	Dense
50 – 80	Very Dense
> 80	Hard

CONSISTENCY OF COHESIVE SOILS

SPT N Value	Consistency
< 2	Very Soft
2 – 4	Soft
5 – 8	Medium Stiff
9 – 15	Stiff
16 – 50	Very Stiff
> 80	Very Hard

DEGREE OF PLASTICITY

Nonplastic –	Has no cohesion; will not roll into a thread.
Trace of Plasticity –	Barely hold its shape when rolled into a thread.
Low Plasticity –	Has sufficient cohesion to form a thread but will quickly rupture when deformed.
Med. Plasticity –	Has considerable cohesion. Can be molded into a thread and will withstand considerable deformation without rupture.
High Plasticity –	Can be kneaded like dough without trace of rupture.

MOISTURE DESCRIPTIONS

	GRANULAR SOILS	COHESIVE SOILS
Dry	No Apparent Moisture	No Apparent Moisture
Slightly Moist	< Than 3% by Weight	< Less Than Plastic Limit
Moist	3% to 9% by Weight	Approximately Plastic Limit
Very Moist	> 9% by Weight	> than PL but < than LL
Wet	Submerged or Saturated	Submerged or Saturated

PLASTICITY

Cohesion TSF	Plasticity Index	Degree of Plasticity
0-0.125	0-5	None
0.125-0.25	5-10	Low
0.25-0.5	10-20	Moderate
0.5-1.0	20-40	Plastic
1.0-2.0	> 40	Highly Plastic
> 2.0		

ABBREVIATIONS

V. – Very	Fl. – Fairly	Sl. – Slightly	Med. – Medium
Tr. – Trace	< - Less Than	> - Greater Than	PL – Plastic Limit
Mod. – Moderately			

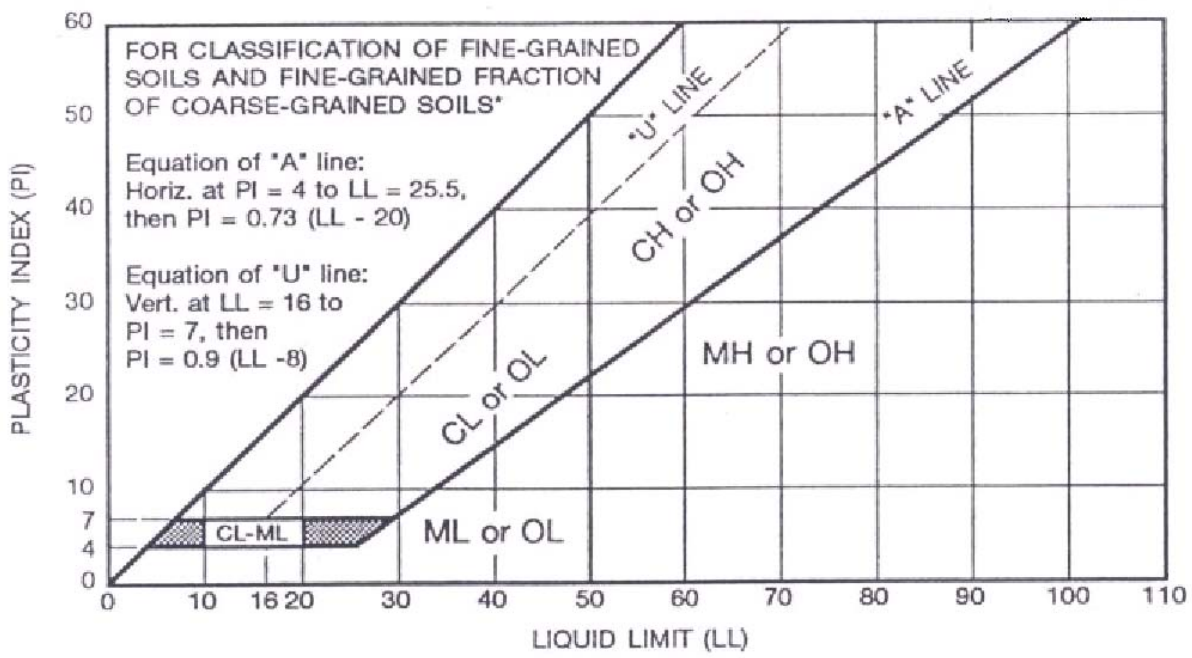
SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

GEOTECHNICAL REPORT
SOIL CLASSIFICATION REFERENCE INFORMATION

Cohesive Soil Classification Chart



U.S. STANDARD SIEVE

12"	3"	¾"	4	10	40	200		
BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		
152	76.2	19.1	4.76	2.00	0.420	0.074	0.002	

SOIL GRAIN SIZE IN MILLIMETERS

Laboratory Test Methods:

Moisture Content Tests:

Moisture Contents are determined from representative portions of a soil sample. The samples initial weight is recorded and it is then dried to a constant weight. From this data the moisture content is calculated.

Atterberg Limit Tests:

Liquid Limit (LL), Plastic Limit (PL) and Shrinkage Limit (SL) tests are performed to aid in the classification of soils and to determine the plasticity and volume change characteristics of the materials. The Liquid Limit is the minimum moisture content at which a soil will flow as a heavy viscous fluid. The Plastic Limit is the minimum moisture content at which the soil behaves as a plastic material. The Shrinkage Limit is the moisture content below which no further volume change will take place with continued drying. The Plasticity Index (PI) is the numeric difference between the Liquid Limit and the Plastic Limit and indicates the range of moisture content over which a soil remains plastic.

Grain Size Distribution Test (Particle Size Analysis, Sieve Analysis):

The distribution of soils finer than the No. 200 sieve is determined by passing a representative soil sample through a standard set of nested sieves. The weight of material retained on each sieve is determined and the percentage passing (or retained) is calculated. For determination of the percentage of material finer than the No. 200 sieve, the specimen is first washed through the sieve. The distribution of the materials finer than the No. 200 is determined by use of the different size particles while suspended in water.

APPENDIX C

CLIENT: **Conde, Inc.**
PROJECT NAME: **El Paso Water – Coors Channel Drainage Improvements Project**
Intersection of Gateway Boulevard East and Euclid Street.
El Paso, El Paso County, Texas

PHOTO NO. 1 General north view of existing concrete channel conditions.

PHOTO NO. 2: General south view of existing concrete channel and embankment slope conditions.

PHOTO NO. 3: General southeast view of existing concrete channel conditions.

PHOTO NO. 4: General southeast view of existing concrete channel conditions and manhole.

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PROJECT NAME: **El Paso Water – Coors Channel Drainage Improvements Project**
Intersection of Gateway Boulevard East and Euclid Street.
El Paso, El Paso County, Texas

PHOTO NO. 5 General west view of project site existing conditions along future box culvert.

PHOTO NO. 6: General southwest view of box culvert route and existing conditions at vertical boring HAB-2.

PHOTO NO. 7: General north view of box culvert route and existing conditions at vertical boring B-3.

PHOTO NO. 8: General north view of box culvert route and existing conditions at vertical boring B-4.

CLIENT: **Conde, Inc.**
PROJECT NAME: **El Paso Water – Coors Channel Drainage Improvements Project**
Intersection of Gateway Boulevard East and Euclid Street.
El Paso, El Paso County, Texas

PHOTO NO. 9 General east view of box culvert route and existing conditions at vertical boring B-5.

PHOTO NO. 10: General southeast view of box culvert route and existing conditions at vertical boring B-6.

PHOTO NO. 11: General east view of box culvert route and existing conditions at vertical boring B-7.

PHOTO NO. 12: General north view of existing ponding area conditions.

CLIENT: **Conde, Inc.**
PROJECT NAME: **El Paso Water – Coors Channel Drainage Improvements Project**
Intersection of Gateway Boulevard East and Euclid Street.
El Paso, El Paso County, Texas

PHOTO NO. 13 General north view of existing ponding area conditions.

PHOTO NO. 14: General southeast view of existing ponding area conditions at vertical boring B-10.

PHOTO NO. 15: General southwest view of existing ponding area slope conditions.

PHOTO NO. 16: General northeast view of existing ponding area conditions.

CLIENT: **Conde, Inc.**
PROJECT NAME: **El Paso Water – Coors Channel Drainage Improvements Project**
Intersection of Gateway Boulevard East and Euclid Street.
El Paso, El Paso County, Texas

PHOTO NO. 17 General view of coring activities at vertical boring HAB-1.

PHOTO NO. 18: General view of our DCP test at HAB-2 / DCP-2.

PHOTO NO. 19: General view of encountered trash and pieces of decomposing clothing and fabric at vertical boring B-3.

PHOTO NO. 20: General view of subsurface drilling operations at vertical boring B-5.

CLIENT: **Conde, Inc.**
PROJECT NAME: **El Paso Water – Coors Channel Drainage Improvements Project**
Intersection of Gateway Boulevard East and Euclid Street.
El Paso, El Paso County, Texas

PHOTO NO. 21 General view of subsurface drilling operations at vertical boring B-6.

PHOTO NO. 22: General view of subsurface drilling operations at vertical boring B-7.

PHOTO NO. 23: General view of subsurface drilling operations at vertical boring B-9.

PHOTO NO. 24: General view of subsurface drilling operations at vertical boring B-10.

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