Appendix D

GEOTECHNICAL INVESTIGATION

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GEOTECHNICAL INVESTIGATION
EAST WILLIAM STREET COMPLETE STREET PROJECT
CARSON CITY, NEVADA





CME CONSTRUCTION MATERIALS ENGINEERS, INC.




PREPARED FOR:

NCE

JUNE 2022
FILE: 2958

CME CONSTRUCTION MATERIALS ENGINEERS, INC.
300 Sierra Manor Drive, Suite 1
Reno, NV 89511

June 17, 2022
File: 2958

Ms. Angie Hueftle, PE
NCE
1885 S. Arlington Ave. Suite 111
Reno, Nevada 89509

RE: Geotechnical and Pavement Subgrade Investigation
Carson City East William Street Complete Street Project
North Carson Street to I-580
Carson City, Nevada

Dear Ms. Hueftle:

Construction Materials Engineers Inc. (CME) is pleased to submit our geotechnical investigation report for the proposed subsurface utility installations and structural section rehabilitation for the East William Street Complete Street Project located in Carson City, Nevada.

The following report includes the results of our subsurface investigation, laboratory testing and presents our recommendations for the design and construction of the project. We wish to thank you for the opportunity to provide our services and look forward to working on future endeavors together.

Please feel free to call us should you have any questions or require additional information.

Sincerely,

CONSTRUCTION MATERIALS ENGINEERS, INC.

Stella Hardy

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GEOTECHNICAL INVESTIGATION

East William Street Complete Street Project
Carson City, Nevada

1.0 INTRODUCTION

This geotechnical investigation is a joint effort between CME and NCE. This report transmits the scope of work performed by CME and provides recommendations for design and construction of the proposed subsurface infrastructure installation associated with the East William Street Complete Street Project located in Carson City, Nevada. NCE will provide design recommendations for the pavement rehabilitation/reconstruction and flatwork r within the project extents.

The area covered by this report is included on Plate A-1a (Exploration Location Map). This geotechnical investigation included subsurface exploration utilizing vertical test borings, pavement coring, laboratory testing, and engineering analysis to identify the physical and mechanical properties of the various on-site materials. Results of our subsurface exploration and testing program included in this report form the basis for all conclusions and recommendations contained herein.

2.0 SITE AND PROJECT DESCRIPTION

2.1 SITE DESCRIPTION

East William Street is an east-west, four lane paved minor arterial roadway with two-way traffic and a two-way center turn lane. The proposed project improvements are located within Carson City right-of-way (ROW) and will include roadway rehabilitation for a 1.4-mile-long section of East William Street extending from the intersection of North Carson Street to I-580. Subsurface infrastructure improvements will be located along a 1.1-mile section on East William Street extending from the intersection of North Carson Street and terminating at the Humboldt Lane intersection. The general project alignment and limits are presented on Figure 1 (General Project Extents).

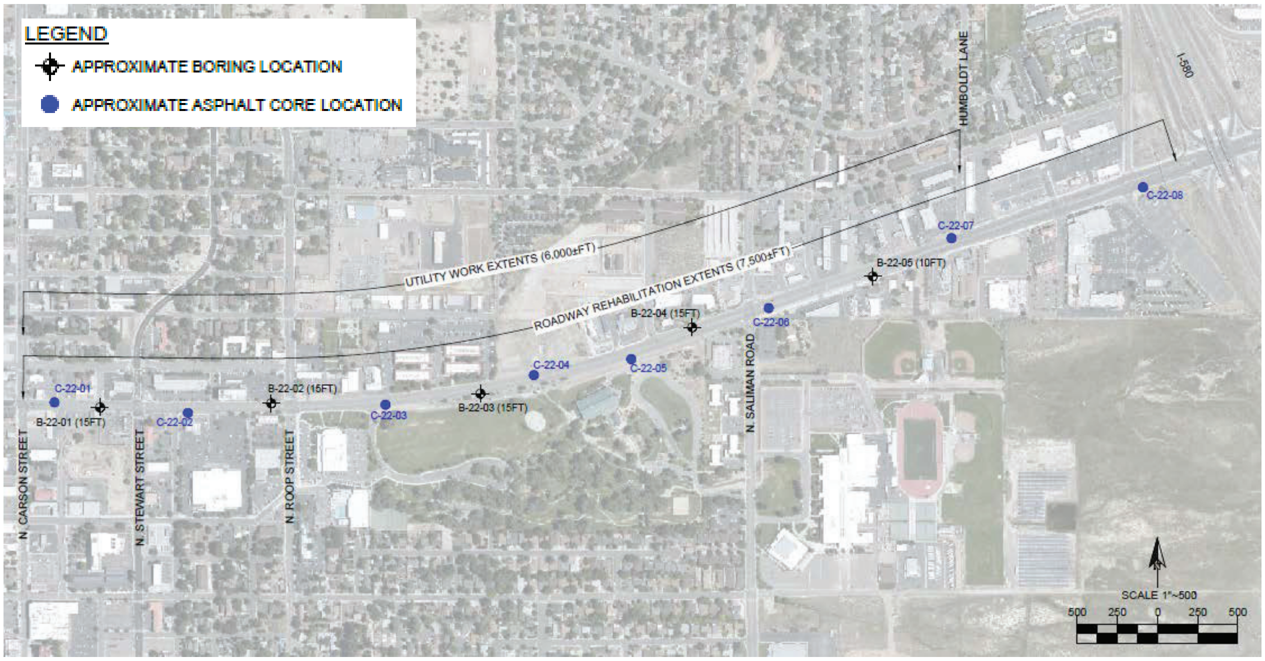

Figure 1: General Project Extents

2.2 PROJECT DESCRIPTION

The following presents a general summary of our understanding of the proposed project improvements:

- Installation of a new waterline located within the upper 5 feet of the subsurface profile;
- Installation of a new storm drain and sewer main. The proposed installations will be located within the upper 6 to 10 feet of the subsurface profile;
- Utility installations will be comprised of PVC, HDPE, or RCP. Pipe diameters will range from 6-inches to 36-inches.
- Pre-cast concrete manholes for the storm drain and sewer will be bottomed at depths of up to 12 feet below ground surface (bgs);
- Proposed utility and manhole installations will be performed using open-cut construction; and
- Rehabilitation or reconstruction of the existing pavement structural section and pedestrian improvements (design by NCE).

3.0 SUBSURFACE EXPLORATION

3.1 EXPLORATORY BORINGS

Five (5) vertical test borings were drilled on March 7th, 2022 to a depth of approximately 16½ feet below ground surface (bgs). Borings were drilled using a truck mounted CME 75 drill rig equipped both solid-stem and hollow-stem auger and automatic hammer.

Soil was generally sampled in-place at 2½ foot intervals using the sampler types indicated on the boring logs[1]. Bulk samples of aggregate base (where observed) and subgrade soil were collected at each boring.

Soil samples were visually examined and classified during exploration in general accordance with ASTM D2488 and subsequently updated in general accordance with ASTM D2487 where applicable. The individual exploration locations are indicated by latitude and longitude on the boring logs (Plate A-2) with approximate locations shown on the exploration location map (Plate A-1a). The Unified Soil Classification System (USCS) chart is attached as Plate A-3.

3.2 ASPHALT CORING

Per NCE's request, a total of eight (8) asphalt cores were collected on March 10th, 2022. Asphalt cores were performed by Penhall using a hand operated core rig equipped with a 4-inch coring bit. The asphalt cores were hand delivered to NCE following CME documentation. Asphalt core logs are included as Plate A-2 in Appendix A.

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[1] The number of blows to drive the sampler the final 12 inches of an 18-inch penetration into undisturbed soil is an indication of the density and consistency of the material (Standard Penetration Test (SPT) - ASTM D1586).

4.0 LABORATORY TESTING

Soil testing performed in CME's laboratory was conducted in general accordance with ASTM standards and methodologies. Representative soil types were selected and analyzed to determine index properties and engineering properties. The following laboratory tests were completed as part of this investigation:

- In-situ moisture content (ASTM D2216);
- Grain size distribution (ASTM D6913);
- Plasticity index (ASTM D4318); and
- R-value (ASTM D2844).

In addition, our firm contracted with an outside laboratory to complete the following analytical testing for the corrosion potential of the site soil:

- Soluble Sulfates (ASTM C1580).

Laboratory test results for the subsurface exploration are included in Appendix A & B.

5.0 SUBSURFACE CONDITIONS

5.1 EXISTING STRUCTURAL SECTION

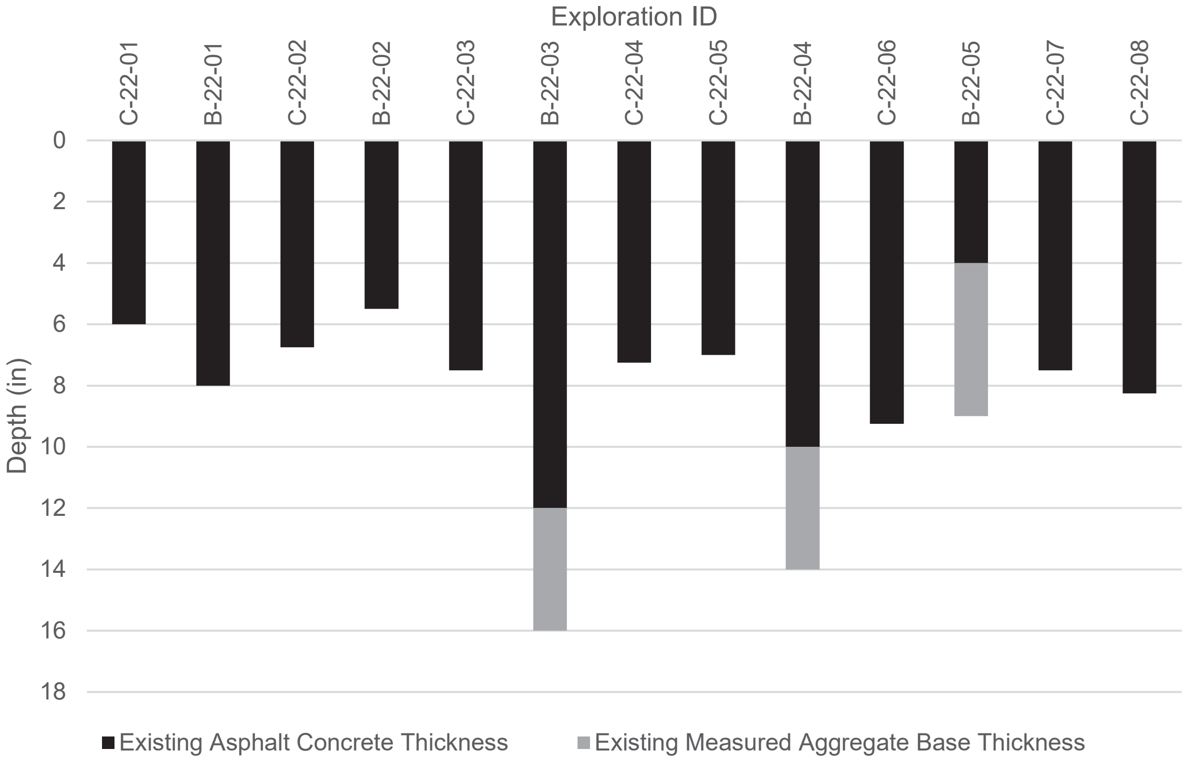
Existing structural section thicknesses encountered are presented on Table 1 and Graph 1, including results from both the exploratory borings and core locations.

Table 1: Existing Structural Section Thickness

Nearest Side Street	Exploration ID	Existing Asphalt Concrete Thickness (inches)	Existing Measured Aggregate Base Thickness (inches)	Total Measured Structural Section Thickness (inches)
N Carson Street	C-22-01	6.0	N.M.	
N Fall Street	B-22-01	8.0	N.E.	8.0
N Stewart Street	C-22-02	6.75	N.M.	
N Roop Street	B-22-02	5.5	N.E.	5.5
Oxoby Loop	C-22-03	7.5	N.M.	
	B-22-03	12.0	4.0	16.0
State Street	C-22-04	7.25	N.M.	
	C-22-05	7	N.M.	
	B-22-04	10.0	4.0	14.0
N Saliman Road	C-22-06	9.25	N.M.	
Rand Avenue	B-22-05	4.0	5.0	9.0
Humboldt Lane	C-22-07	7.5	N.M.	
I-580	C-22-08	8.25	N.M.	

NOTES:

1. Table 1 is intended to be a summary of the existing structural section thicknesses; for detailed information, please refer to Appendix A.
2. "N.M." = Not measured or observed as asphalt core locations
3. "N.E."= Not Encountered



Graph 1: Graphical Depiction of Measured Structural Section Thicknesses Observed

5.2 GENERAL SUBSURFACE PROFILE

Based on a review of the *Geologic Map of the Carson City Quadrangle, Nevada* (Trexler, D.T.) and the *Geologic Map of the New Empire Quadrangle* (Bingler, E.C.), the subject site is mapped as alluvial-plain deposits. In general, the subsurface profile appears to be consistent with the mapped site geology. The soil profile encountered consists predominantly of silty sand (**SM**), clayey sand (**SC**), silty, clayey sand (**SC-SM**) and poorly graded sand with silt (**SP-SM**).

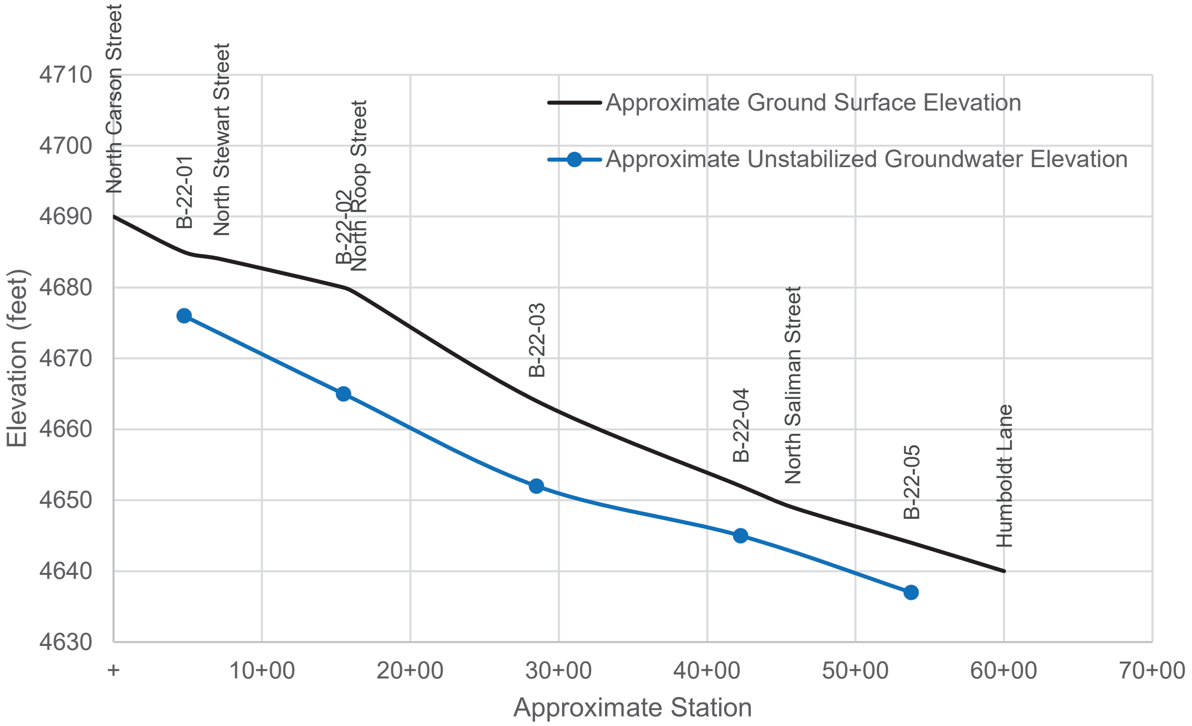
Based on the SPT blow counts, and abundance of granular low cohesion to cohesionless soil types encountered during exploration, there is an increased potential for caving and/or sidewall sloughing during trenching. Refer to Plate A-1b (Geologic Cross Section) for a more detailed description of anticipated subsurface materials and caving potential for each layer.

5.3 GROUNDWATER AND SOIL MOISTURE

Soil moisture content varied with depth and material type. Groundwater levels were recorded in all five (5) borings. Groundwater elevations and depths are considered "unstabilized[2]" and should be considered approximate. Table 2 and Graph 2 summarizes the groundwater depth and elevation for each boring.

Table 2: Encountered Groundwater Summary

Boring ID	Approximate Ground Surface Elevation (ft)	Approximate Groundwater Depth (ft)	Approximate Groundwater Elevation (ft)
B-22-01	4,685	9	4,676
B-22-02	4,680	15	4,665
B-22-03	4,664	12	4,652
B-22-04	4,652	7	4,645
B-22-05	4,644	7	4,637



Graph 2: Unstabilized Groundwater Depth/Elevation

Based on the anticipated depth of excavation required for the subsurface installations, groundwater will impact construction (refer to Table 2). Temporary dewatering of open cut excavations will be required, contractors performing the subsurface installations will need to be prepared for dewatering during construction of all subsurface installations extending to depths near or below the elevations shown on Graph 2.

Construction planning shall include the assumption that groundwater fluctuations may occur due to precipitation, temperature, runoff, adjacent irrigation, or where conduits such as utility trenches are present.

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[2] Borings were not left open a sufficient amount of time to allow groundwater levels to stabilize. Groundwater elevations may be higher than represented on Graph 2.

6.0 DISCUSSION AND RECOMMENDATIONS

6.1 GENERAL DISCUSSION

The following definitions are applicable for the general recommendations presented for design and construction of the project:

Table 3: General Definitions for Report Recommendations	
Fine Grained Soil	• Soil with more than 35 percent by weight passing the number 200 sieve and a plasticity index less than 15 (PI<15).
Clay Soil	• For the purposes of this report, clay soil may be defined as any soil having more than 15 percent by weight passing the number 200 sieve and a plasticity index equal to or greater than 15 (PI≥15).
Granular Soil	• Soil not meeting the requirement for a fine-grained or clay soil with: ○ Particle size of 4-inches or less, ○ Less than 35 percent passing the No. 200 sieve; ○ Less than 30 percent retained on the ¾-inch sieve; ○ Plasticity index less than 15 (PI<15). ○ Free of organics and/or other deleterious materials.
Structural Fill	• Soil generated from onsite grading may be reused as structural fill provided it meets the requirements of a granular soil; • Structural fill is the supporting soil placed in densified lifts below foundations, concrete slabs-on-grade, pavements, or any structural element that derives support from the underlying soil;
Structural Areas	• Includes all areas that will be used for the support of concrete slabs, flat work, foundations, and pavements.
Subgrade	• The elevation directly below the aggregate base layer for both concrete slabs-on-grade and pavements; • Bottom of excavation for foundations bottomed on native soil materials, and structural fill; and • The native soil surface elevation below structural fill.
Relative Compaction	• The dry density of soil in the field expressed as a percentage of the density of the soil after densification during placement. Relative compaction shall be in accordance with ASTM D1557.
Standard Specifications	• Work shall be performed in general conformance to the Orange Book Standard Specifications for Public Works Construction, 2016 (SSPWC, 2016).

6.2 CONSTRUCTION CONCERNS

Based on the results of our field and laboratory studies, the future pipeline installation as described in this report may be constructed as currently proposed. Table 4 (General Geotechnical Considerations and Overview Summary) provides a general summary of the construction and design considerations as they pertain to the project. Geotechnical recommendations for design and construction of the project are included as Section 7.0 (Recommendations).

Table 4: General Geotechnical Considerations and Overview Summary

Subject	Geotechnical Consideration
Groundwater/ Seasonal Runoff	• Groundwater was encountered at depths ranging from 7.0 to 15.0 feet below the existing grade elevation. The presence of shallow groundwater will impact subsurface installation. • Dewatering will be required. The most significant dewatering is anticipated for the deeper installations including storm drain, sewer main, and effluent manholes installation.
Caving Soil	• Granular low cohesion to cohesionless soil encountered above and below groundwater during the current exploration is considered susceptible to caving. • Open cut excavations will be impacted by caving and/or or sloughing during construction. Undercutting of trenches within the roadway may occur and it is the contractor's responsibility to maintain stability of all excavations during construction.
Reuse of Onsite Materials	• Majority of the on-site soil excavated is marginally acceptable to be reused as Class E trench backfill (refer to Section 7.2.3 Trench Backfill).
General Information	• This report shall be reviewed by the design team and contractor in its entirety.

7.0 RECOMMENDATIONS FOR SUBSURFACE INSTALLATIONS

7.1 TRENCH EXCAVATION

7.1.1 EXCAVATION DIFFICULTY

It is anticipated that trenching and confined excavations may be performed using conventional excavation equipment such as a standard backhoe, track mounted excavator, or similar equipment. As previously noted, caving and/or sloughing resulting in undercutting of open cut excavations should be expected and will need to be addressed by the contractor.

7.1.2 DEWATERING OF TRENCH EXCAVATION

A dewatering hydrogeologic study was not performed as part of the current scope of work. Based on the anticipated groundwater conditions and soil type, dewatering is anticipated to be required for deeper utility installations (e.g., storm drain, sewer, manholes). The method of dewatering will need to be determined by the contractor. Dewatering may require a series of well points, siphons, or sump pumps. The number of dewatering points required is a function of the length of open trench, depth of excavation, depth to groundwater, and permeability of the surrounding soil.

Discharge of water collected shall be in accordance with local governing standards. If release of water is permitted overland, it shall be performed in a manner as not to create sediment loading of streams or storm drains, contribute to runoff from the site, or erosion. The use of sediment bags, or other method for infiltration to limit release of sediments, shall be considered. The contractor is ultimately responsible for compliance with local governing standards while evaluating the method of dewatering operations to be implemented during construction at the site.

7.1.3 TRENCH STABILITY

All excavations regardless of depth shall be evaluated for stability including scaling trench wall to remove loose material prior to occupation by construction personnel. Shoring or sloping of trench walls may be required to protect construction personnel and provide temporary stability. In areas where temporary confined excavations may be unsafe for occupation of construction personnel, trench shields[3] may be used to provide safe ingress/egress.

Excavations shall comply with current OSHA safety requirements (Federal Register 29 CFR, Part 1926). Exposed materials are classified as either Stable Rock, Type A, B, or C. Each material classification requires different temporary excavation slope gradients. Maximum allowable slopes for excavations less than 20 feet deep are presented in Table 5 (Maximum Allowable Temporary Slopes).

Table 5: Maximum Allowable Temporary Slopes

Soil or Rock Type	Maximum Allowable Slopes[1] for Excavations (< 20 Feet)[2]	
Stable Rock	Vertical	90º
Type A	3H:4V	53º
Type B	1H:1V	45º
Type C	3H:2V	34º

NOTES:

1. Angles are expressed in degrees from the horizontal and have been rounded off.
2. Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.
3. For detailed description of the soil types outlined above visit the US Department of Labor Safety and Health Topics website at: https://www.osha.gov/SLTC/trenchingexcavation/construction.html

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[3] The excavated area between the outside of the trench box and the face of the trench should be as small as possible to prevent lateral movement of the trench sidewall resulting in deformation at the ground surface and below nearby structures.

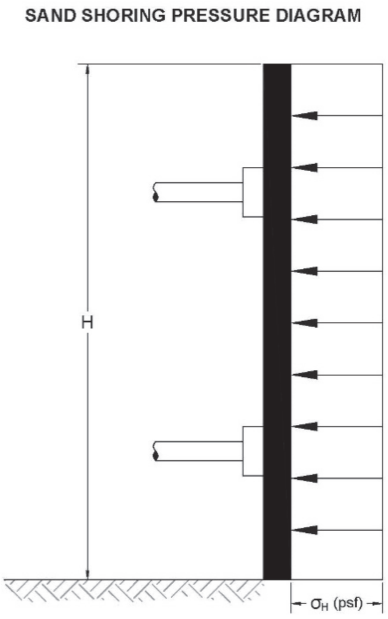
Ultimately, it is the contractor's responsibility to determine soil type in the field during trenching activities. Based on the soil conditions encountered during the subsurface exploration, it is anticipated that the trench excavations will comply with Type B and C conditions.

Trench excavations shall be protected from surface water/runoff which may include the use of temporary drainage swales and shallow diversions. Temporary drainage swales shall be excavated to divert surface flows into a collection area away from the open excavation. If subsurface water conditions differ from those encountered during our subsurface exploration, the geotechnical engineer should be notified immediately.

7.1.4 SHORING

Trench side wall stability will remain the responsibility of the contractor present at the site. Shoring or sloping of trench walls will be required to protect construction personnel and provide temporary stability during open cut excavations.

In areas where temporary confined excavations may be unstable, trench boxes should be used to provide safe ingress and egress for construction personnel. Due to the depth of installation and location of potential subsurface and surface conflicts, shoring may be required to limit the width of the excavation and permit access for construction. Shoring shall be designed to withstand soil loads, surcharge loads adjacent to the trench, live loads from traffic and construction equipment, and potential hydrostatic pressures due to groundwater and/or seepage forces. The subsurface profile is consistent with a granular soil; therefore, shoring pressure diagram based on material type is included as Figure 2 (Typical Granular Soil Load Pressure Diagram for Shoring Design).



Apparent Earth Pressure Distribution Granular Soil
(NAVFAC DM-7.2)

$$\sigma_H\ (psf) = 0.65 * k_a * \gamma * H$$

Where:

H is the height of the excavation (ft);
γ is the unit weight of soil (pcf);
k_a is the active earth pressure.

Figure 2: Typical Granular Soil Load Pressure Diagram for Shoring Design

Active earth pressure for shoring (σ_H) of temporary excavations is a function of the groundwater conditions and soil type encountered. The following provides general recommendations for active earth pressure for temporary excavations based on the soil type encountered:

- For granular soil above groundwater, we recommend a pressure (σ_H) of 25H (psf).
- For trenches below the groundwater level or where hydrostatic pressures are anticipated, we recommend a pressure (σ_H) of 75H (psf).

The pressure distribution does not include surcharge loading occurring at the top of the excavation. It is recommended that equipment, supply loading, or excavated spoils have a minimum horizontal distance away from the top of the trench that is equal to the trench vertical depth (1H:1V). If it is critical that surcharge loading is closer to the trench, loading should be evaluated to determine increased sidewall pressures for shoring design.

If subsurface water conditions differ from those encountered during our subsurface exploration, the geotechnical engineer should be notified immediately to assist with alternative dewatering recommendations.

7.2 RECOMMENDATIONS FOR TRENCH BEDDING AND BACKFILL

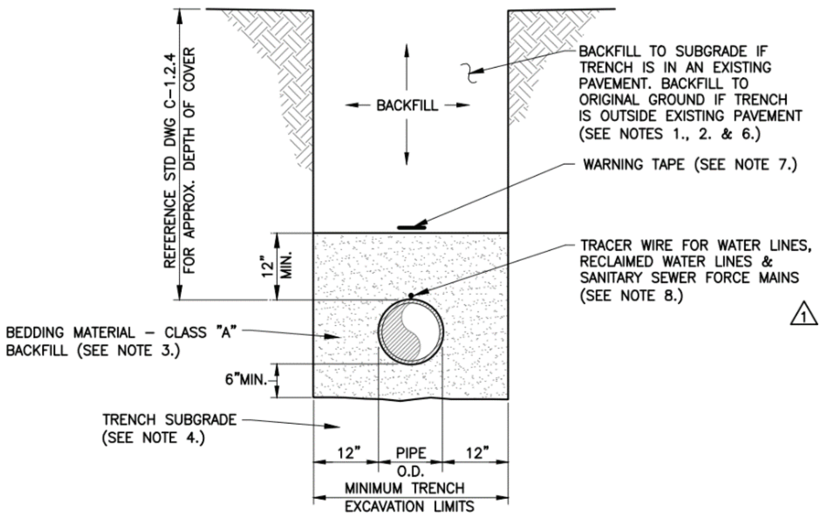


Figure 3: Carson City Standard Trench Detail

(Source: Carson City Standard Detail C-1.2.1 dated March 2022)

The proposed installations are anticipated to be performed in general accordance with Carson City Standard Detail C–1.2.1; an excerpt is included as Figure 3 (Carson City Standard Trench Detail).

Any material used as pipe bedding, pipe zone, or trench backfill shall meet the minimum requirements listed in the SSPWC.

Recommendations for bottom of trench preparation, pipe zone bedding, and pipe zone backfill are presented in Sections 7.2.1 (Bottom of Trench Preparation) 7.2.2 (Pipe Zone Bedding) 7.2.3 (Trench Backfill) respectively.

7.2.1 BOTTOM OF TRENCH PREPARATION

Bottom of trench preparation will be dependent on the soil and/or groundwater conditions encountered during construction. In general, for sewer, storm drain, and manhole installations, the majority of bottom of trench elevation are anticipated to be bottomed in saturated soil at or near groundwater elevation.

However, it should be noted that some utility installations (e.g., water) may be sufficiently above the groundwater elevation such that saturated soil conditions will not impact the proposed construction in that area. The extents of the unsaturated zone will need to be determined during construction.

Where above groundwater or in unsaturated soil conditions, trench preparation shall include scarifying to a depth of at least 8-inches, moisture conditioned to within 2 percent of optimum, and recompacting to at least 90 percent relative compaction per ASTM D1557.

Where below groundwater or in saturated soil conditions, the loose material at the bottom of the trench shall be removed and replaced with a non-woven geotextile and drain rock or slurry backfill as described in Section 7.2.2.

The resulting bottom of trench preparation should establish a firm and unyielding platform.

7.2.2 PIPE ZONE BEDDING

Pipe zone bedding is the trench backfill located immediately above and below the pipe.

Installations Above Groundwater	Above the groundwater table and/or where unsaturated soil is present, pipe zone bedding shall comply with Class A backfill (SSPWC Section 200.03.02).
Installations At or Below Groundwater	Below the groundwater table and/or where saturated soil is present, it is recommended that the pipe bedding material consist of Class C backfill (SSPWC Section 200.03.04) or Type A (i.e., excavatable) Slurry Backfill (SSPWC Section 337.08). If Class C backfill is elected, Class C backfill shall be completely encapsulated in an AASHTO M288 Class 1 non-woven geotextile such as a Mirafi 180N or approved alternate.
Densification and Placement	Pipe zone bedding shall be placed in (loose) lifts not exceeding 8-inches thick for Class A backfill and 12-inches thick for Class C backfill. Pipe zone bedding shall be densified to a minimum of 90 percent relative compaction within two (2) percent of optimum moisture. Compaction equipment shall be carefully selected to avoid damage to the pipe.
Installations where utility conflicts or other conflicts interfere with densification	If existing utility conflicts prevent proper densification of the pipe zone bedding, a Type A Slurry Backfill may be used (SSPWC). Prior to placement of slurry backfill the trench shall be thoroughly dewatered or tremied to displace the water to prevent mixing of the slurry backfill and free water.

7.2.3 TRENCH BACKFILL

In accordance with Carson City Standard Detail C–1.2.4, the approximate depth of cover depends on the utility installation. Table 6 below provides the depth of backfill for each utility.

Table 6: Approximate Depth of Backfill per Utility

Utility	Depth (inches)
Storm Drain	24 (minimum)
Sanitary Sewer	84
Water Main	42

NOTES

1. Based on Carson City Standard Detail C-1.2.1

Trench backfill is the material located directly above the pipe zone bedding extending to the proposed finished subgrade or ground surface or structural section subgrade.

Installations Above Groundwater	Trench backfill shall comply with Class E backfill (SSPWC Section 200.03.06)
Installations At or Below Groundwater	Below the groundwater table and/or where saturated soil is present, it is recommended that the pipe bedding and trench backfill material consist of Class C backfill (SSPWC Section 200.03.04) or Type A (i.e., excavatable) Slurry Backfill (SSPWC Section 337.08). If Class C backfill is elected, Class C backfill shall be completely encapsulated in an AASHTO M288 Class 1 non-woven geotextile such as a Mirafi 180N or approved alternate.
Densification and Placement	Trench backfill shall be placed in (loose) lifts not exceeding 12-inches thick for Class E backfill and Class C backfill. Trench backfill shall be densified to a minimum of 90 percent relative compaction within two (2) percent of optimum moisture. Compaction equipment shall be carefully selected to avoid damage to the pipe.
Installations where utility conflicts or other conflicts interfere with densification	If existing utility conflicts prevent proper densification of the pipe zone bedding and trench backfill, a Type A Slurry Backfill may be used (SSPWC). Prior to placement of slurry backfill the trench shall be thoroughly dewatered or tremied to displace the water to prevent mixing of the slurry backfill and free water.

7.2.3.1 ONSITE SOIL COMPLIANCE WITH CLASS E TRENCH BACKFILL

Based on our laboratory testing, Table 7, Table 8, and Table 9 summarizes the native soil tested in relation to Class E backfill specification. Refer to Appendix B for a full summary of the test results.

Table 7: Class E Backfill Suitability of Native Soil From 0 to 5 Feet bgs

Metric	**Percent by Weight Passing Sieve**				
Sieve Size	**Class E Backfill Specification (SSPWC)**	**Sample ID**			
		B-22-01 1SG 1-5ft	**B-22-02 1SG 1-5ft**	**B-22-03 1SG 1-5ft**	**B-22-04 1SG 1-5ft**
4-inch	100	100.0	100.0	100.0	100.0
¾-inch	70 – 100	100.0	100.0	100.0	100.0
No. 40	10 – 50	66.9	65.3	69.3	64.1
No. 200	0 – 35	33.6	29.8	32.8	30.2
Index Requirements					
Liquid Limit (LL)	Max. 40	23	20	21	21
Plasticity Index (PI)	Max. 12	7	4	5	5
Suitability for Reuse as Class E Backfill					
In Compliance Class E Backfill		Marginal	Marginal	Marginal	Marginal

NOTES:

1. Red indicates out of specification.

Table 8: Class E Backfill Suitability of Native Soil From 5 to 10 Feet bgs

Metric	**Percent by Weight Passing Sieve**					
Sieve Size	**Class E Backfill Specification (SSPWC)**	**Sample ID**				
		B-22-01 1B 5-6.5ft	**B-22-02 2C 7.5-9.0ft**	**B-22-03 3C 7.5-9.0ft**	**B-22-04 4C 7.5-9.0ft**	**B-22-05 5C 7.5-9.0ft**
4-inch	100	100.0	100.0	100.0	100.0	100.0
¾-inch	70 – 100	100.0	100.0	100.0	100.0	100.0
No. 40	10 – 50	79.6	75.8	59.0	52.5	58.5
No. 200	0 – 35	43.6	32.7	20.7	16.4	12.3
Index Requirements						
Liquid Limit (LL)	Max. 40	29	32	24	21	NV
Plasticity Index (PI)	Max. 12	12	13	2	1	NP
Suitability for Reuse as Class E Backfill						
In Compliance Class E Backfill		No	No	Marginal	Marginal	Marginal

NOTES:

1. Red indicates out of specification.

Table 9: Class E Backfill Suitability of Native Soil From 10 to 15 Feet bgs

Metric	**Percent by Weight Passing Sieve**					
Sieve Size	**Class E Backfill Specification (SSPWC)**	**Sample ID**				
		B-22-01 1D 10.0-11.5ft	**B-22-02 2E 12.5-14.0ft**	**B-22-03 3E 12.5-14.0ft**	**B-22-04 4D 10.0-11.5ft**	**B-22-05 5E 12.5-14.0ft**
4-inch	100	100.0	100.0	100.0	100.0	100.0
¾-inch	70 – 100	100.0	100.0	100.0	100.0	100.0
No. 40	10 – 50	41.1	63.4	70.8	58.2	61.2
No. 200	0 – 35	13.5	18.7	31.1	11.3	20.2
Index Requirements						
Liquid Limit (LL)	Max. 40	-	-	-	-	NV
Plasticity Index (PI)	Max. 12	-	-	-	-	NP
Suitability for Reuse as Class E Backfill						
In Compliance Class E Backfill		Yes	Marginal	Marginal	Marginal	Marginal

NOTES:

1. "-" = not tested
2. Red indicates out of specification.

7.3 MANHOLE FOUNDATIONS

Manholes are anticipated to be precast concrete and lowered in place. Manhole foundation subgrade preparation shall be consistent with bottom of trench preparation outlined in Section 7.2.1 (Bottom of Trench Preparation).

During construction or their service life, manhole structures may be bottomed below groundwater. While below groundwater, a buoyant force will be applied on the manhole foundation equivalent to the weight of the water displaced (i.e., volume of manhole below groundwater times 62.4 pcf). The dead load of the manhole structure may be used to resist this buoyant force. If the dead load is insufficient, skin friction may be applied or use of a base extension shall be implemented to resist the additional buoyant force. If additional uplift resistance is required, please contact this office for design parameters.

7.3.1 SOLUBLE SULFATE TEST RESULTS

Soil chemistry test results are included in Appendix B and Table 10 (Soil Sulfate Content Results).

Table 10: Soil Sulfate Content Results

Exploration Designation	Sample ID	Sample Depth (ft)	Sulfate Content (%)	Severity of Potential Exposure	w/cm by mass, maximum	Permitted Cement Type
B-22-01	1B	5.0-6.5’	< 0.02	S0	No w/cm restriction	No type restriction
B-22-03	3C	7.5-9.0’	< 0.02	S0	No w/cm restriction	No type restriction
B-22-05	5D	10.0-11.5	< 0.02	S0	No w/cm restriction	No type restriction

NOTES:

1. Recommendations based on ACI 201.2R-16.

A corrosion specialist should be consulted to determine if the site soil conditions warrant further investigation or if proposed structures require corrosion protection.

8.0 TESTING AND DOCUMENTATION

The recommendations presented in this report are based on the assumption that the owner/project manager provides sufficient field testing and construction review during all phases of construction. These construction observations and testing services should include but not be limited to:

- Density testing during trench preparation and backfill;
- Density testing of pavement subgrade, base material, and asphalt concrete pavement; and
- Concrete testing and observation during placement for flat work.

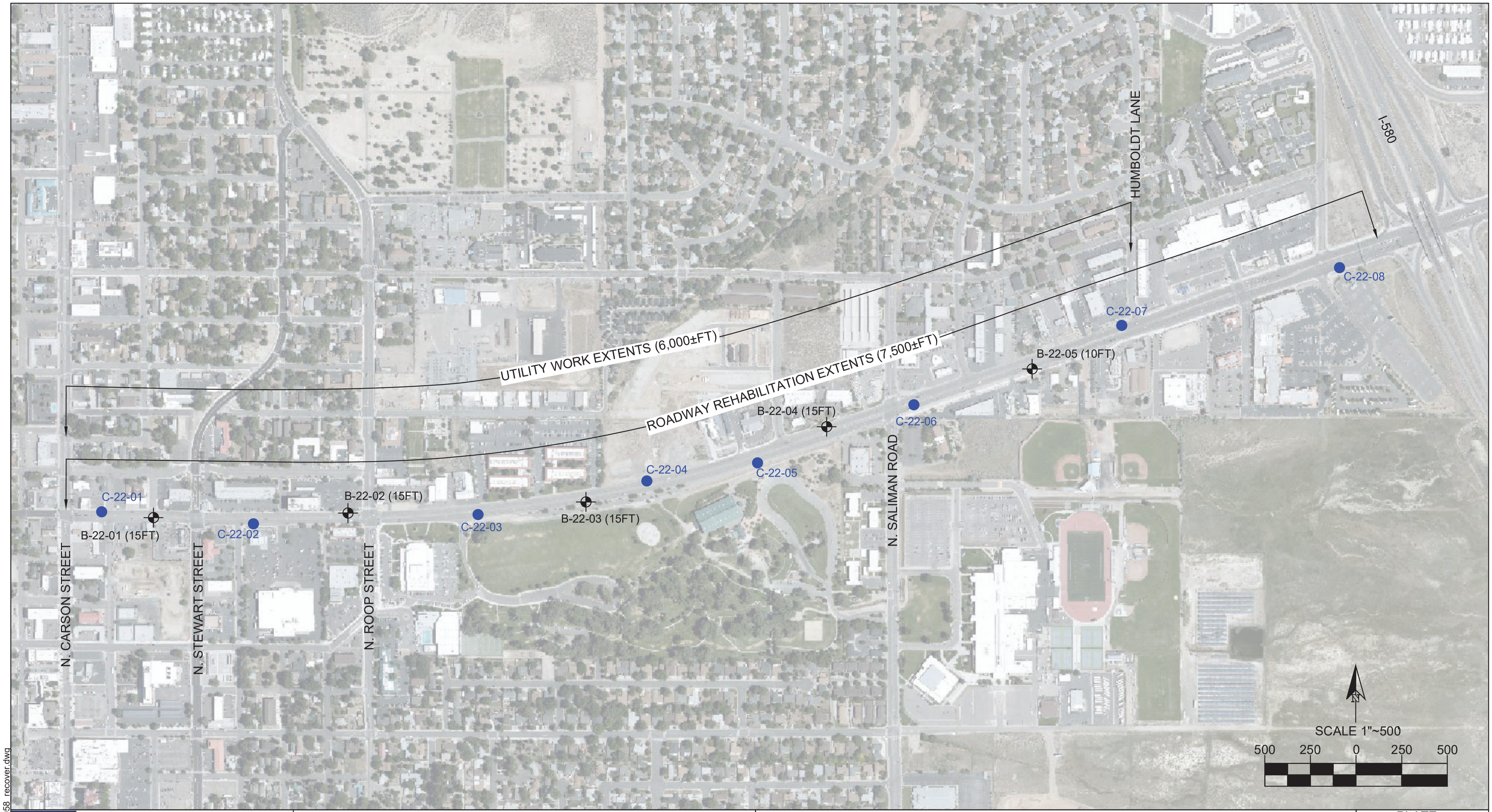
CME employs a large staff of certified inspectors and testers to provide these services. Prior to construction, the owner/project manager should schedule a preconstruction conference to include, but not be limited to: owner/project manager, project engineer, general contractor, earthwork and materials subcontractors, and geotechnical engineer. It is the owner's/project manager's responsibility to set-up this meeting and contact all responsible parties. The conference will allow parties to review the project plans, specifications, and recommendations presented in this report, and discuss applicable material quality and mix design requirements. All quality control reports should be submitted to the owner/project manager for review and distributed to the appropriate parties.

Additionally, all plans and specifications should be reviewed by the engineer responsible for this geotechnical report to determine if design aspects of the project are in accordance with the recommendations contained herein. It is the owner's/project manager's responsibility to provide the plans and specifications to the geotechnical engineer.

9.0 LIMITATIONS

Exploration Location and Geologic Variations	• This report has been prepared in accordance with generally accepted local geotechnical practices. The conclusions and recommendations of this report are provided for the design and construction of the proposed project as described in this report. The analyses and recommendations contained herein are based upon field exploration locations included on Plate A-1a. • Exploration locations included as part of this report should be considered accurate only to the degree implied by the methods used. This report does not reflect soil, rock, or groundwater variations that may become evident during the construction period, at which time re-evaluation of the recommendations may be necessary.
General Intent and Information Distribution	• The intent of this report is to provide geotechnical information related to construction and design of the project. The owner/project manager is responsible for distribution of this report to all designers and contractors whose work is affected by geotechnical recommendations provided. In the event of changes in the design, location, or ownership of the project prior to construction, our recommendations should be reviewed by our geotechnical representative. • If our engineer is not accorded the privilege of making this recommended review, then CME can assume no responsibility for misinterpretation or misapplication of the recommendations or their validity in the event changes have been made in the original design concept without our prior review.
Warranties	• CME makes no other warranties, either expressed or implied, as to the professional advice provided under the terms of this agreement and included in this report. Any use, reliance on, or decisions, which a third party makes based upon the information contained in this report, are the sole responsibility of such third parties. CME accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.
Clay Soil Clause	• Clay soil may be present in discontinuous areas below the proposed improvements. Clay soil may potentially shrink or swell (volume changes) in response to changes in the moisture content of the soil. Moisture changes in clay soil can occur as a result of seasonal variations in precipitation, poor site drainage, landscape irrigation, leaking underground pipes, capillary action, or from other sources. Volume changes in clay soil can cause differential movements in structural elements constructed in the sphere of influence or bearing on the clay soil. The project geotechnical engineer shall be notified where questionable soil is encountered.
Standard Owner Maintenance and Monitoring Responsibility	• All structures are subjected to deterioration from environmental and manmade exposures. As a result, all structures require frequent monitoring and regular maintenance to prevent damage and/or deterioration. Such monitoring and maintenance are the sole responsibility of the Owner. CME, Inc. shall have no responsibility for such issues or resulting damages.
Environmental Hazards Evaluation	• Any evaluation of the site for the presence of surface or subsurface hazardous substances is beyond the scope of this study. When suspected hazardous substances are encountered during routine geotechnical investigations, they are noted in the exploration logs and reported to the client.

APPENDIX A



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Reno, NV 89511

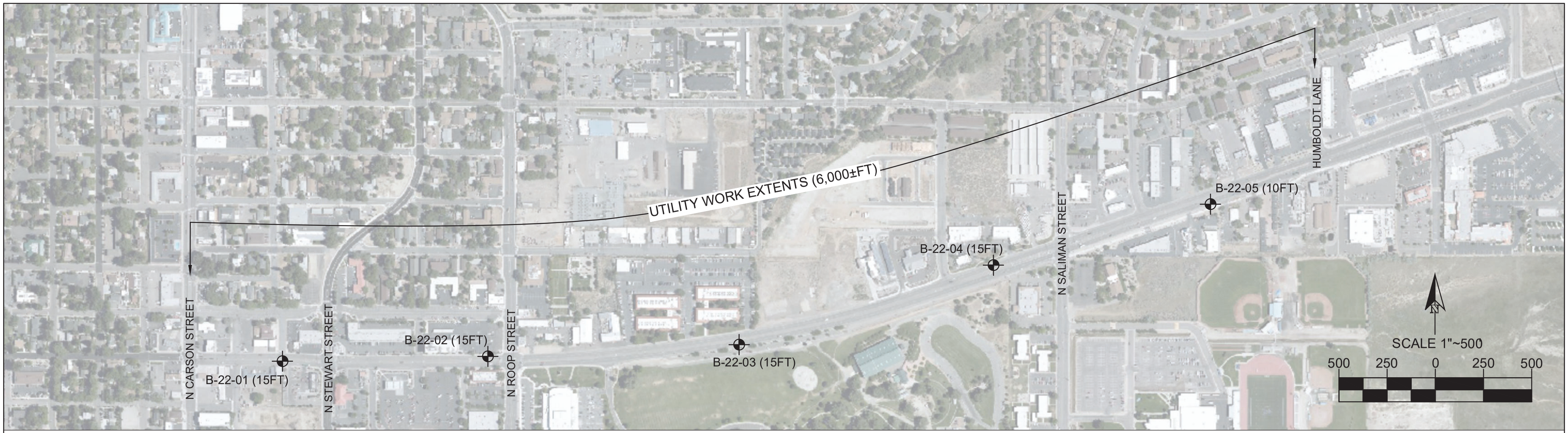
NCE
EAST WILLIAM STREET PROJECT
EXPLORATION LOCATION MAP
CARSON CITY, NV

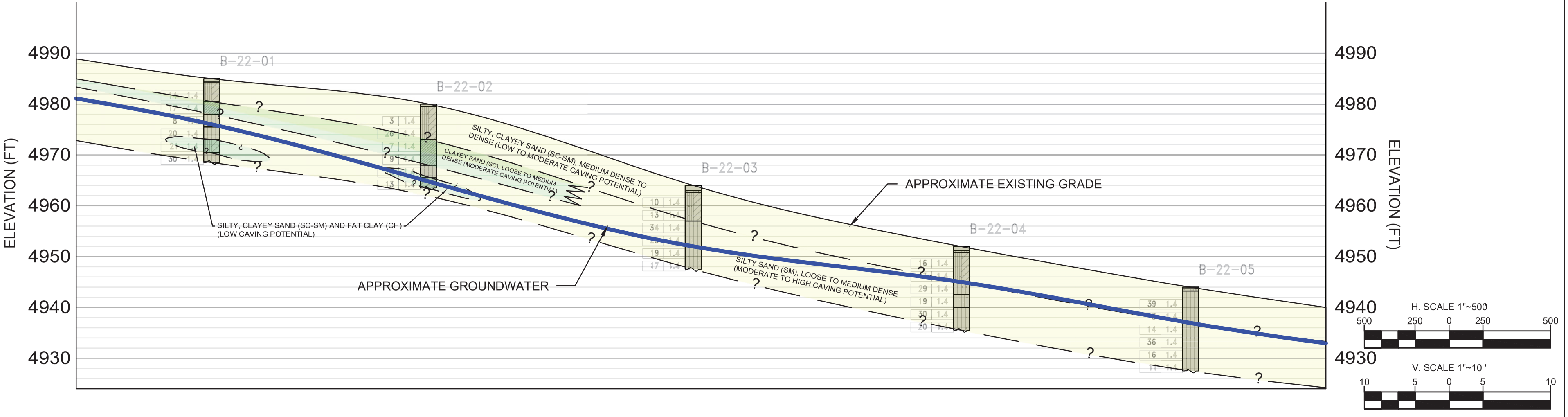
PROJECT NO.: 2958 DATE:2/17/2022

LEGEND
- ⌖ APPROXIMATE BORING LOCATION
- ● APPROXIMATE ASPHALT CORE LOCATION

PLATE
A-1a

V:\Active\2958\autocad\2958_recover.dwg





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Reno, NV 89511

NCE
EAST WILLIAM STREET PROJECT
GEOLOGIC CROSS SECTION
CARSON CITY, NV

PROJECT NO.: 2958
DATE:3/30/2022

LEGEND

PLATE
A-1b

V:\Active\2958\autocad\2958_recover_test.dwg

LOG OF BORING B-22-01

PROJECT NO: 2958	**DRILLING CONTRACTOR:** TABER	**BEGIN DATE:** 3/7/2022
PROJECT: EAST WILLIAM STREET PROJECT	**DRILLING METHOD:** SOLID-STEM AUGER	**COMPLETION DATE:** 3/7/2022
LOCATION: EASTBOUND #1 LANE, 39.17040, -119.76547	**DRILL RIG:** CME 75	**SURFACE ELEVATION:** 4685 (ft) (County GIS)
	SAMPLER TYPE & SIZE: BULK, SPT	**BACKFILL METHOD:** CUTTINGS, CONCRETE CAP
CLIENT: NCE	**HAMMER TYPE:** AUTO, 140 LB, 30 INCH	**WATER DEPTH:** 9.0 (ft)
LOGGED BY: CJJ	**HAMMER EFFICIENCY:**	**READING TAKEN:** 3/7/2022

		FIELD											LABORATORY					
DRILL METHOD	**CASING DEPTH**	**ELEVATION (ft)**	**DEPTH (ft)**	**SAMPLE**	**SAMPLE NO**	**BLOWS PER 6 IN.**	**BLOWS PER FOOT**	**POCKET PEN. (TSF)**	**GRAPHIC LOG**	**DESCRIPTION**	**RECOVERY(%)**	**RQD (%)**	**LIQUID LIMIT**	**PLASTICITY INDEX**	**MOISTURE (%)**	**D. DENSITY (PCF)**	**% PASSING 200 SIEVE**	**REMARKS**
										ASPHALT 0.0 - 8.0 INCHES. 0.7								
		4683	1 2	▨						**SILTY, CLAYEY SAND (SC-SM)**; dark brown and black; moist; about 65% coarse to fine SAND; about 35% low plasticity fines. 4.5								
			3	☒	SG 1A	10 6 8	14				83		23	7	9.4		33.6	
		4681	4	▨														
		4679	5 6	☒	1B	5 8 9	17			**CLAYEY SAND (SC)**; brown with gray and orange variegation; moist; about 55% coarse to fine SAND; about 45% low plasticity fines. 7.0	78		29	12	17.5		43.6	
			7															
		4677	8	☒	1C	3 4 4	8			**SILTY SAND (SM)**; grayish brown with olive and orange variegation; moist to wet; about 60% fine SAND; about 40% nonplastic fines. 9.5	78							
			▼ 9															
		4675	10 11	☒	1D	4 9 11	20			**SILTY SAND with GRAVEL (SM)**; brown with red, orange, and gray; moist to wet; about 25% fine, subangular to subrounded GRAVEL; about 60% coarse to fine, subangular to subrounded SAND; about 15% nonplastic fines; quartz within, mica within, redox staining. 12.0	44				11.3		13.5	
		4673	12															
			13	☒	1E	3 10 11	21			**SILTY, CLAYEY SAND (SC-SM)**; grayish brown with red streaks; wet; about 55% medium to fine SAND; about 45% low plasticity fines. 14.5	61							
		4671	14															
		4669	15 16	☒	1F	7 13 17	30			**SILTY SAND (SM)**; grayish brown with red streaks; wet; about 60% medium to fine SAND; about 40% nonplastic fines. 16.5								

Bottom of borehole at 16.5 ft bgs

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Reno, Nevada 89511
(775) 851-8205

PROJECT NUMBER: 2958
PROJECT: EAST WILLIAM STREET PROJECT
EXPLORATION: B-22-01
ENTRY BY: CJJ **PLATE:** A-2
CHECKED BY: NRA **SHEET** 1 of 1

LOG OF BORING B-22-02

PROJECT NO: 2958	**DRILLING CONTRACTOR:** TABER	**BEGIN DATE:** 3/7/2022
PROJECT: EAST WILLIAM STREET PROJECT	**DRILLING METHOD:** SOLID-STEM AUGER	**COMPLETION DATE:** 3/7/2022
LOCATION: WESTBOUND #2 LANE, 39.17046, -119.76156	**DRILL RIG:** CME 75	**SURFACE ELEVATION:** 4680 (ft) (County GIS)
	SAMPLER TYPE & SIZE: BULK, SPT	**BACKFILL METHOD:** CUTTINGS, CONCRETE CAP
CLIENT: NCE	**HAMMER TYPE:** AUTO, 140 LB, 30 INCH	**WATER DEPTH:** 15.0 (ft)
LOGGED BY: CJJ	**HAMMER EFFICIENCY:**	**READING TAKEN:** 3/7/2022

DRILL METHOD	CASING DEPTH	FIELD ELEVATION (ft)	DEPTH (ft)	SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	RQD (%)	LABORATORY LIQUID LIMIT	PLASTICITY INDEX	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE	REMARKS
										ASPHALT 0.0 - 5.5 INCHES. 0.5								
		4678	1 2							**SILTY, CLAYEY SAND (SC-SM)**; brown; dry to moist; about 70% coarse to fine, angular to subangular SAND; about 30% low plasticity fines [POSSIBLE FILL?].								
		4676	3 4		SG 2A	3 1 2	3				56		20	4	8.1		29.8	Hard, cemented piece in shoe.
		4674	5 6		2B	10 14 12	26			Light brown; about 5% fine, subangular to subrounded GRAVEL; about 65% subangular to subrounded SAND; granitic pieces. 7.0	78							
		4672	7 8		2C	2 3 4	7			**CLAYEY SAND (SC)**; brown; moist; about 65% medium to fine SAND; about 35% low plasticity fines; rootlet within sample.	78		32	13	17.4		32.7	
		4670	9 10 11		2D	4 4 5	9			Brown with orange streaks. 12.0	78							
		4668 4666	12 13 14		2E	6 5 7	12			**SILTY SAND (SM)**; brown; moist; about 80% coarse to fine, subangular SAND; about 20% nonplastic fines; interbedded silt and sand. 14.5	61				16.9		18.7	
		4664	15 16		2F	4 6 7	13	2.5		**Fat CLAY (CH)**; brown with black specks; moist to wet; about 10% fine SAND; about 90% medium to high plasticity fines. 16.5	78							

Bottom of borehole at 16.5 ft bgs

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(775) 851-8205

PROJECT NUMBER: 2958
PROJECT: EAST WILLIAM STREET PROJECT
EXPLORATION: B-22-02
ENTRY BY: CJJ **PLATE:** A-2
CHECKED BY: NRA **SHEET** 1 of 1

LOG OF BORING B-22-03

PROJECT NO: 2958	**DRILLING CONTRACTOR:** TABER	**BEGIN DATE:** 3/7/2022
PROJECT: EAST WILLIAM STREET PROJECT	**DRILLING METHOD:** HOLLOW-STEM AUGER	**COMPLETION DATE:** 3/7/2022
LOCATION: EASTBOUND #2 LANE, 39.17063, -119.75707	**DRILL RIG:** CME 75	**SURFACE ELEVATION:** 4664 (ft) (County GIS)
	SAMPLER TYPE & SIZE: BULK, SPT	**BACKFILL METHOD:** CUTTINGS, CONCRETE CAP
CLIENT: NCE	**HAMMER TYPE:** AUTO, 140 LB, 30 INCH	**WATER DEPTH:** 12.0 (ft)
LOGGED BY: CJJ	**HAMMER EFFICIENCY:**	**READING TAKEN:** 3/7/2022

ELEVATION (ft)	DEPTH (ft)	SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)	DESCRIPTION	RECOVERY(%)	RQD (%)	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE	REMARKS
	0 – 1						**ASPHALT** 0.0 - 12.0 INCHES. 1.0								
	1	▨	BASE				**AGGREGATE BASE** 12.0 - 16.0 INCHES. 1.3								
4662	2	▨					**SILTY, CLAYEY SAND (SC-SM)**; dark brown; dry to moist; about 65% coarse to fine, subangular to subrounded SAND; about 35% low plasticity fines.								
	3	☒	SG 3A	9 5 5	10			67		21	5	1.7		32.8	
4660	4	▨													
	5 – 6	☒	3B	7 6 7	13		Brown; subangular SAND.	44							
4658	6 – 7						7.0								
4656	8	☒	3C	11 15 19	34		**SILTY SAND (SM)**; orangish brown with streaks of dark orange; moist; about 80% coarse to fine, subangular to subrounded SAND; about 20% low plasticity fines; pockets of silt, mica flakes within.	78		24	2	8.9		20.7	
4654	9 – 10														
	11	☒	3D	13 13 12	25		Brown with gray and orange variegation; about 70% medium to fine SAND; about 30% nonplastic fines.	50							
4652	▼ 12														
	13	☒	3E	10 10 9	19		Orangish brown with dark orange; moist to wet; subangular to subrounded SAND.	50				15.8		31.1	
4650	14 – 15														
4648	16	☒	3F	8 8 9	17		Brown with gray and orange variegation; moist to wet; about 85% SAND; about 15% fines; mica flakes within. 16.5	72							

Bottom of borehole at 16.5 ft bgs

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(775) 851-8205

PROJECT NUMBER: 2958
PROJECT: EAST WILLIAM STREET PROJECT
EXPLORATION: B-22-03
ENTRY BY: CJJ **PLATE:** A-2
CHECKED BY: NRA **SHEET** 1 of 1

LOG OF BORING B-22-04

PROJECT NO: 2958	**DRILLING CONTRACTOR:** TABER	**BEGIN DATE:** 3/7/2022
PROJECT: EAST WILLIAM STREET PROJECT	**DRILLING METHOD:** SOLID-STEM AUGER	**COMPLETION DATE:** 3/7/2022
LOCATION: WESTBOUND #2 LANE, 39.17172, -119.75241	**DRILL RIG:** CME 75	**SURFACE ELEVATION:** 4652 (ft) (County GIS)
	SAMPLER TYPE & SIZE: BULK, SPT	**BACKFILL METHOD:** CUTTINGS, CONCRETE CAP
CLIENT: NCE	**HAMMER TYPE:** AUTO, 140 LB, 30 INCH	**WATER DEPTH:** 7.0 (ft)
LOGGED BY: CJJ	**HAMMER EFFICIENCY:**	**READING TAKEN:** 3/7/2022

FIELD													LABORATORY					
DRILL METHOD	CASING DEPTH	ELEVATION (ft)	DEPTH (ft)	SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	RQD (%)	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE	REMARKS
										ASPHALT 0.0 - 10.0 INCHES. 0.8								
			1	BASE						**AGGREGATE BASE** 10.0 - 14.0 INCHES. 1.2								
		4650	2							**SILTY, CLAYEY SAND (SC-SM)**; brown; moist; about 5% fine GRAVEL; about 65% coarse to fine, subangular to subrounded SAND; about 30% low plasticity fines.								
			3		SG 4A	8 8 8	16				83		21	5	7.9		30.2	
		4648	4															
		4646	5 6		4B	10 24 19	43			Grayish brown; moist to wet; about 70% SAND; mica flakes within.	78							
			▼ 7							7.0								
		4644	8		4C	6 13 16	29			**SILTY SAND (SM)**; grayish brown and dark orange; wet; about 5% fine GRAVEL; about 80% coarse to fine SAND; about 15% low plasticity fines; mica flakes within.	61		21	1	16.4		16.4	
			9							9.5								
		4642	10 11		4D	5 7 12	19			**Poorly graded SAND with SILT (SP-SM)**; grayish brown and dark orange; wet; about 5% fine GRAVEL; about 85% coarse to fine SAND; about 10% nonplastic fines; mica flakes within, pockets of silt.	56				20.5		11.3	
		4640	12							12.0								
		4638	13 14		4E	8 12 18	30			**SILTY SAND (SM)**; orangish brown with purple and gray; moist to wet; about 75% coarse to fine SAND; about 25% nonplastic fines; interbedded sand and silt.	61							
		4636	15 16		4F	7 10 10	20			Grayish brown; medium to fine SAND; mica flakes within. 16.5	67							

Bottom of borehole at 16.5 ft bgs

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PROJECT NUMBER: 2958
PROJECT: EAST WILLIAM STREET PROJECT
EXPLORATION: B-22-04
ENTRY BY: CJJ **PLATE:** A-2
CHECKED BY: NRA **SHEET** 1 of 1

LOG OF BORING B-22-05

PROJECT NO: 2958	**DRILLING CONTRACTOR:** TABER	**BEGIN DATE:** 3/7/2022
PROJECT: EAST WILLIAM STREET PROJECT	**DRILLING METHOD:** SOLID-STEM AUGER	**COMPLETION DATE:** 3/7/2022
LOCATION: EASTBOUND #2 LANE, 39.17264, -119.74835	**DRILL RIG:** CME 75	**SURFACE ELEVATION:** 4644 (ft) (County GIS)
	SAMPLER TYPE & SIZE: BULK, SPT	**BACKFILL METHOD:** CUTTINGS, CONCRETE CAP
CLIENT: NCE	**HAMMER TYPE:** AUTO, 140 LB, 30 INCH	**WATER DEPTH:** 7.0 (ft)
LOGGED BY: CJJ	**HAMMER EFFICIENCY:**	**READING TAKEN:** 3/7/2022

DRILL METHOD	CASING DEPTH	FIELD ELEVATION (ft)	DEPTH (ft)	SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	RQD (%)	LABORATORY LIQUID LIMIT	PLASTICITY INDEX	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE	REMARKS
										ASPHALT 0.0 - 4.0 INCHES. 0.3								
					BASE					**AGGREGATE BASE** grayish brown; dry; about 10% fine, angular to subangular GRAVEL; about 70% coarse to fine, subangular to subrounded SAND; about 20% nonplastic fines; 4.0 - 9.0 INCHES. 0.8								
		4642	1 2							**SILTY SAND (SM)**; brown; dry to moist; about 70% coarse to fine, subangular to subrounded SAND; about 30% nonplastic fines.								
		4640	3 4		SG 5A	9 18 21	39				56							
			5															
		4638	6		5B	3 1 2	3			Moist to wet; about 65% SAND; about 35% fines; mica flakes within.	50							
			7 ▼															
		4636	8		5C	6 7 7	14			Wet; about 85% angular to subangular SAND; about 15% fines; quartz within.	56		NV	NP	18.5		12.3	
			9															
		4634	10 11		5D	7 15 21	36			Moist to wet; about 75% medium to fine SAND; about 25% fines.	61							
		4632	12															
		4630	13 14		5E	5 4 12	16			About 80% coarse to fine, subangular to subrounded SAND; about 20% fines; mica flakes within.	44		NV	NP	14.7		20.2	
		4628	15 16		5F	5 5 6	11			About 60% medium to fine SAND; about 40% fines. 16.5	28							

Bottom of borehole at 16.5 ft bgs

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Reno, Nevada 89511
(775) 851-8205

PROJECT NUMBER: 2958
PROJECT: EAST WILLIAM STREET PROJECT
EXPLORATION: B-22-05
ENTRY BY: CJJ **PLATE:** A-2
CHECKED BY: NRA **SHEET** 1 of 1

PROJECT/LOCATION

Project No.	2958	**Client**	NCE
Project Name	East William Street Project	**Date**	3/10/2022
Location	WB #2 lane; east of Carson Street	**Logger**	NRA

CORE INFORMATION

Surface Material ☒ A.C.

Surface Distress Type at Core Location ☒ Raveling ☐ Rutting ☐ N/A ☐ Longitudinal ☒ Transverse ☐ Block ☐ Alligator ☐ N/A

Stripping ☐ Stripping ___ " thick ☒ N/A

CORE LAYER DATA

Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-22-01	AC	Type 3	1/2
		Type 2	2
		Type 3	1 1/4
		Type 2	2 1/4

Total Core Thickness 6 inches

OTHER OBSERVATIONS

Beneath asphalt concrete is sand (potentially subbase).

TOP

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Reno, Nevada 89511

CORING RESULTS

CORE

C-22-01

PROJECT/LOCATION

Project No.	2958	**Client**	NCE
Project Name	East William Street Project	**Date**	3/10/2022
Location	EB #2 lane; between N Stewart Street and N Roop Street	**Logger**	NRA

CORE INFORMATION

Surface Material ☒ A.C.

Surface Distress Type at Core Location ☒ Raveling ☐ Rutting ☐ N/A
☒ Longitudinal ☐ Transverse ☐ Block ☐ Alligator ☐ N/A

Stripping ☐ Stripping ___ " thick ☒ N/A

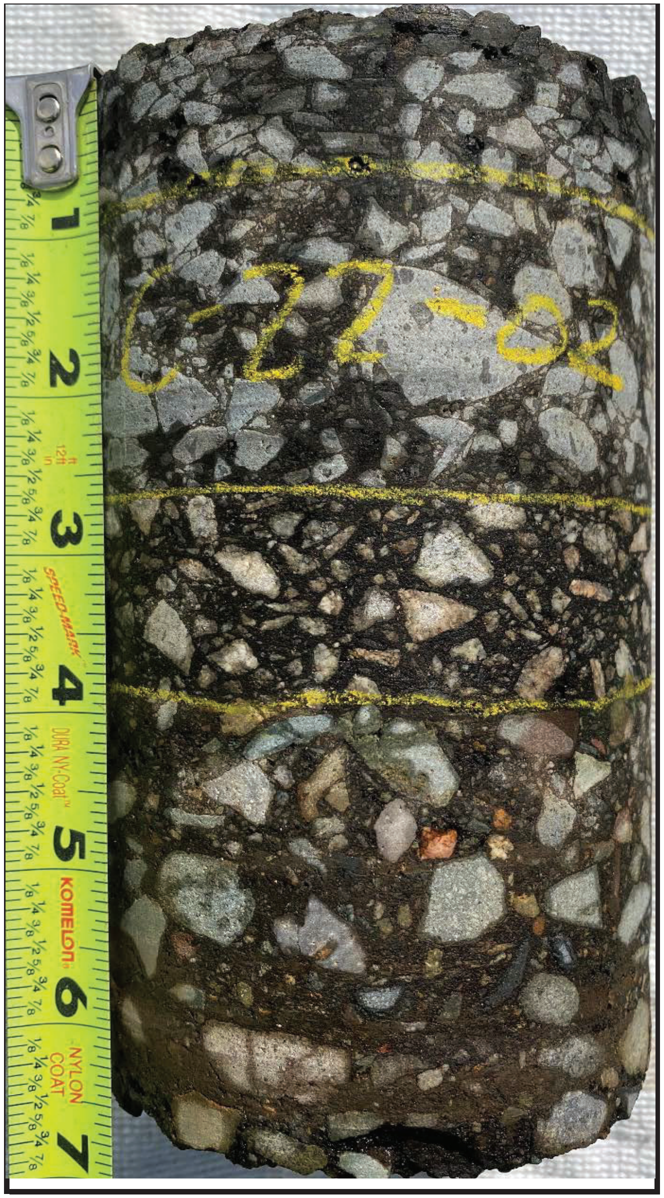
CORE LAYER DATA

Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-22-02	AC	Type 3	1
		Type 2	1 3/4
		Type 3	1 1/4
		Type 2	2 3/4

Total Core Thickness 6.75 inches

OTHER OBSERVATIONS

TOP



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CORING RESULTS

CORE

C-22-02

PROJECT/LOCATION

Project No.	2958	**Client**	NCE
Project Name	East William Street Project	**Date**	3/10/2022
Location	EB #2 lane; east of N Roop Street	**Logger**	NRA

CORE INFORMATION

Surface Material ☒ A.C.

Surface Distress Type at Core Location
☐ Raveling ☐ Rutting ☒ N/A
☒ Longitudinal ☒ Transverse ☐ Block ☐ Alligator ☐ N/A

Stripping ☐ Stripping ___ " thick ☒ N/A

CORE LAYER DATA

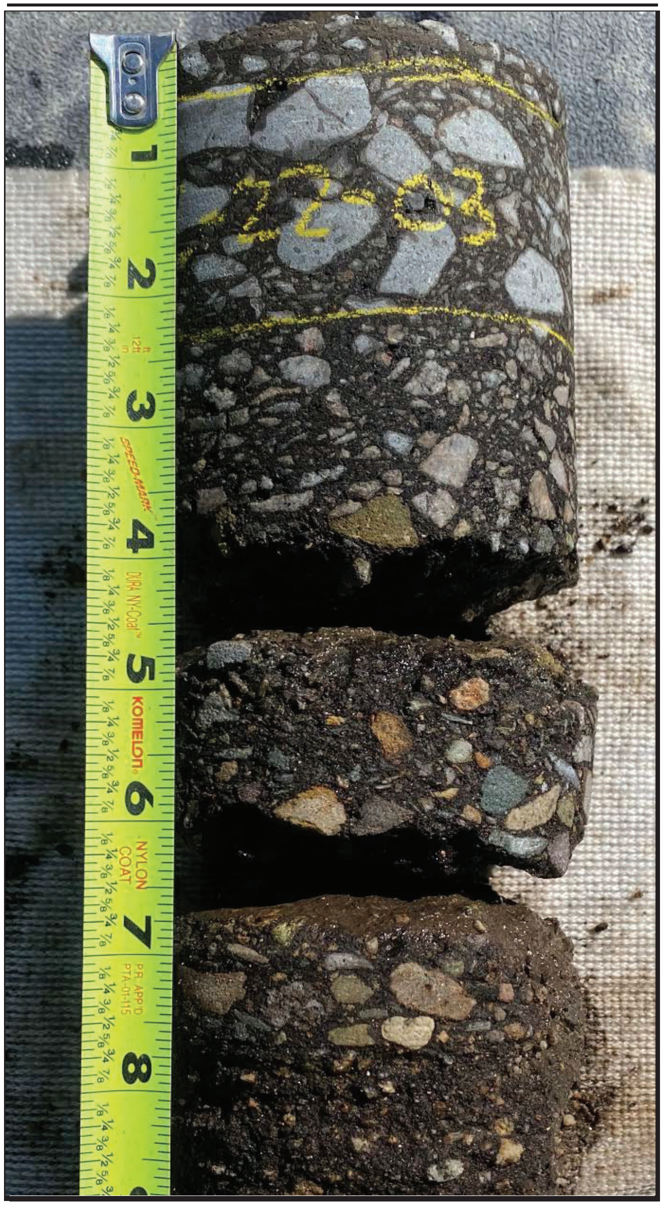
Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-22-03	AC	Type 3	1/2
		Type 2	1 3/4
		Type 3	2 1/2
		Type 2	2 3/4

Total Core Thickness 7.5 inches

OTHER OBSERVATIONS

Cored through crack. Crack penetrated through entire asphalt concrete section. Beneath asphalt concrete is a cemented sand (blade laid asphalt?) 3-inches thick.

TOP



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Reno, Nevada 89511

CORING RESULTS

CORE
C-22-03

PROJECT/LOCATION

Project No.	2958	**Client**	NCE
Project Name	East William Street Project	**Date**	3/10/2022
Location	WB #2 lane; between State Street and N Roop Street	**Logger**	NRA

CORE INFORMATION

Surface Material	☒ A.C.				
Surface Distress Type at Core Location	☒ Raveling	☐ Rutting	☐ N/A		
	☒ Longitudinal	☐ Transverse	☐ Block	☐ Alligator	☐ N/A
Stripping	☐ Stripping	___ " thick	☒ N/A		

CORE LAYER DATA

Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-22-04	AC	Type 3	1/2
		Type 2	2
		Type 3	2 1/4
		Type 2	2 1/2

Total Core Thickness 7.25 inches

OTHER OBSERVATIONS

Beneath asphalt concrete is a cemented coarse to medium grained sand layer (blade laid asphalt?) 2-1/2 inches in thickness.

TOP

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Reno, Nevada 89511

CORING RESULTS

CORE

C-22-04

PROJECT/LOCATION

Project No. 2958

Project Name East William Street Project

Location EB #2 lane; west of State Street

Client NCE

Date 3/10/2022

Logger NRA

CORE INFORMATION

Surface Material ☒ A.C.

Surface Distress Type at Core Location ☒ Raveling ☐ Rutting ☐ N/A
☒ Longitudinal ☒ Transverse ☐ Block ☐ Alligator ☐ N/A

Stripping ☐ Stripping ___ " thick ☒ N/A

CORE LAYER DATA

Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-22-05	AC	Type 3	1/2
		Type 2	2
		Type 3	3/4
		Type 3	1 1/2
		Blade laid asphalt	1 1/2
		Type 3?	3/4

Total Core Thickness 7 inches

OTHER OBSERVATIONS

CORING RESULTS

CORE

C-22-05

PROJECT/LOCATION

Project No.	2958	**Client**	NCE
Project Name	East William Street Project	**Date**	3/10/2022
Location	EB #2 lane; east of N Saliman Road	**Logger**	NRA

CORE INFORMATION

Surface Material	☒ A.C.				
Surface Distress Type at Core Location	☒ Raveling	☐ Rutting	☐ N/A		
	☐ Longitudinal	☒ Transverse	☐ Block	☐ Alligator	☐ N/A
Stripping	☒ Stripping	1 " thick	☐ N/A		

CORE LAYER DATA

Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-22-06	AC	Type 3	1/2
		Type 2	1 3/4
		Type 3	1
		Type 2	3/4
		Type 2	2 3/4
		Blade laid asphalt	3/4
		Type 2	1 3/4
Total Core Thickness			9.25 inches

OTHER OBSERVATIONS

TOP

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Reno, Nevada 89511

CORING RESULTS

CORE

C-22-06

PROJECT/LOCATION

Project No. 2958

Project Name East William Street Project

Location WB #2 lane; west of Humboldt Lane

Client NCE

Date 3/10/2022

Logger NRA

CORE INFORMATION

Surface Material ☒ A.C.

Surface Distress Type at Core Location ☐ Raveling ☐ Rutting ☒ N/A
☐ Longitudinal ☐ Transverse ☐ Block ☐ Alligator ☒ N/A

Stripping ☐ Stripping ___ " thick ☒ N/A

CORE LAYER DATA

Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-22-07	AC	Type 3	1
		Type 2	1 1/2
		Type 3	1 1/4
		Type 2	3 3/4

Total Core Thickness 7.5 inches

OTHER OBSERVATIONS

Beneath asphalt concrete is base.

TOP

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300 Sierra Manor Drive, Suite 1
Reno, Nevada 89511

CORING RESULTS

CORE

C-22-07

PROJECT/LOCATION

Project No.	2958	**Client**	NCE
Project Name	East William Street Project	**Date**	3/10/2022
Location	EB #3 lane; west of the EB to SB I-580 on ramp	**Logger**	NRA

CORE INFORMATION

Surface Material ☒ A.C.

Surface Distress Type at Core Location
☐ Raveling ☐ Rutting ☒ N/A
☒ Longitudinal ☐ Transverse ☐ Block ☐ Alligator ☐ N/A

Stripping ☐ Stripping ___ " thick ☒ N/A

CORE LAYER DATA

Core No.	Layer Type	Layer Description	Layer Thickness (in)
C-22-08	AC	Type 3	2 1/2
		Type 2	5 3/4
Total Core Thickness			8.25 inches

OTHER OBSERVATIONS

TOP

CME CONSTRUCTION MATERIALS ENGINEERS, INC.
300 Sierra Manor Drive, Suite 1
Reno, Nevada 89511

CORING RESULTS

CORE
C-22-08

CME CONSTRUCTION MATERIALS ENGINEERS, INC.

SOIL CLASSIFICATION CHART

PLATE

A-3

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL CLASSIFICATION NAMES
			GRAPH	LETTER	
Course grained soils More than 50% of the material is larger than No. 200 sieve size	Gravel and gravelly soils	Clean gravels	🟥	GW	Well-graded gravels, gravel-sand mixtures, few or no fines
			🟥	GP	Poorly-graded gravels, gravel-sand mixtures, few or no fines
		Gravels with fines	🟥	GM	Silty gravels, gravel-sand-silt mixtures
			🟥	GC	Clayey gravels, gravel-sand-clay mixtures
	Sand and sandy soils	Clean sands	🟨	SW	Well-graded sands, gravelly sands, few or no fines
			🟨	SP	Poorly-graded sands, gravelly sands, few or no fines
		Sands with fines	🟨	SM	Silty sands, sand-silt mixtures
			🟨	SC	Clayey sands, sand-clay mixtures
Fine grained soils More than 50% of the 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 with slight plasticity
			🟩	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			🟧	OL	Organic silts and organic silt-clays of low plasticity
		Liquid Limit greater than 50	🟩	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			🟩	CH	Inorganic clays of medium to high plasticity
			🟧	OH	Organic clays of medium to high plasticity
			🟧	PT	Peat or other highly organic soils

NOTES:
1. Dual classifications may occur (e.g. SP-SM, CL-ML, GP-GC)

PARTICLE ANGULARITY

Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Particles are similar to angular, but have rounded edges
Subrounded	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded	Particles have smoothly curved sides and no edges

PARTICLE SHAPE

Flat	Particles with width/thickness >3
Elongated	Particles with length/width >3
Flat and Elongated	Particles meet criteria for both flat and elongated

MOISTURE

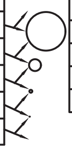
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

CEMENTATION

Weak	Crumbles or breaks with handling or light finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

PARTICLE SIZE, Ps

Boulders		$Ps > 12"$
Cobbles		$3" < Ps \leq 12"$
Gravel	coarse	$\frac{3}{4}" < Ps \leq 3"$
	fine	$\frac{1}{5}" < Ps \leq \frac{3}{4}"$
Sand	coarse	$\frac{1}{16}" < Ps \leq \frac{1}{5}"$
	medium	$\frac{1}{64}" < Ps \leq \frac{1}{16}"$
	fine	$\frac{1}{300}" < Ps \leq \frac{1}{64}"$
Fines		$Ps \leq \frac{1}{300}"$



PERCENT OF SOIL, Pp

Trace	$Pp < 5\%$
Few	$5 \leq Pp \leq 15\%$
Little	$15 \leq Pp \leq 30\%$
Some	$30 \leq Pp \leq 50\%$
Mostly	$50 \leq Pp \leq 100\%$

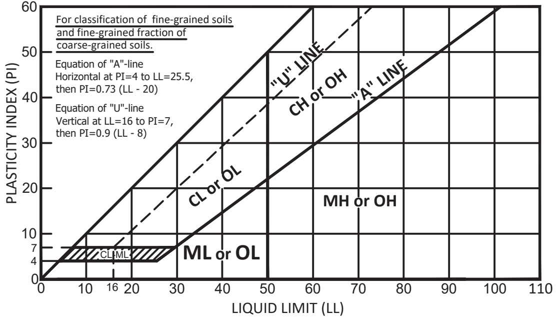
SOIL SAMPLE TYPES

▩	Bulk Sample
☒	Standard Penetration Test (2.0" OD, 1.42" ID)
⧗	California Modified Sampler (3.0" OD, 2.42" ID)
▯	Thin walled Shelby Tube (3.0" OD)
▥	Rock Core

GROUNDWATER SYMBOLS

▽	Water level during drilling
▼	Water level after drilling

PLASTICITY CHART



APPARENT DENSITY OF COHESIONLESS SOIL

	SPT (1.4" ID) N_{60}
Very Loose	< 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

Based on 60% energy ratio (ER_i). $N_{60} = N_{measured} * (ER_i/60)$

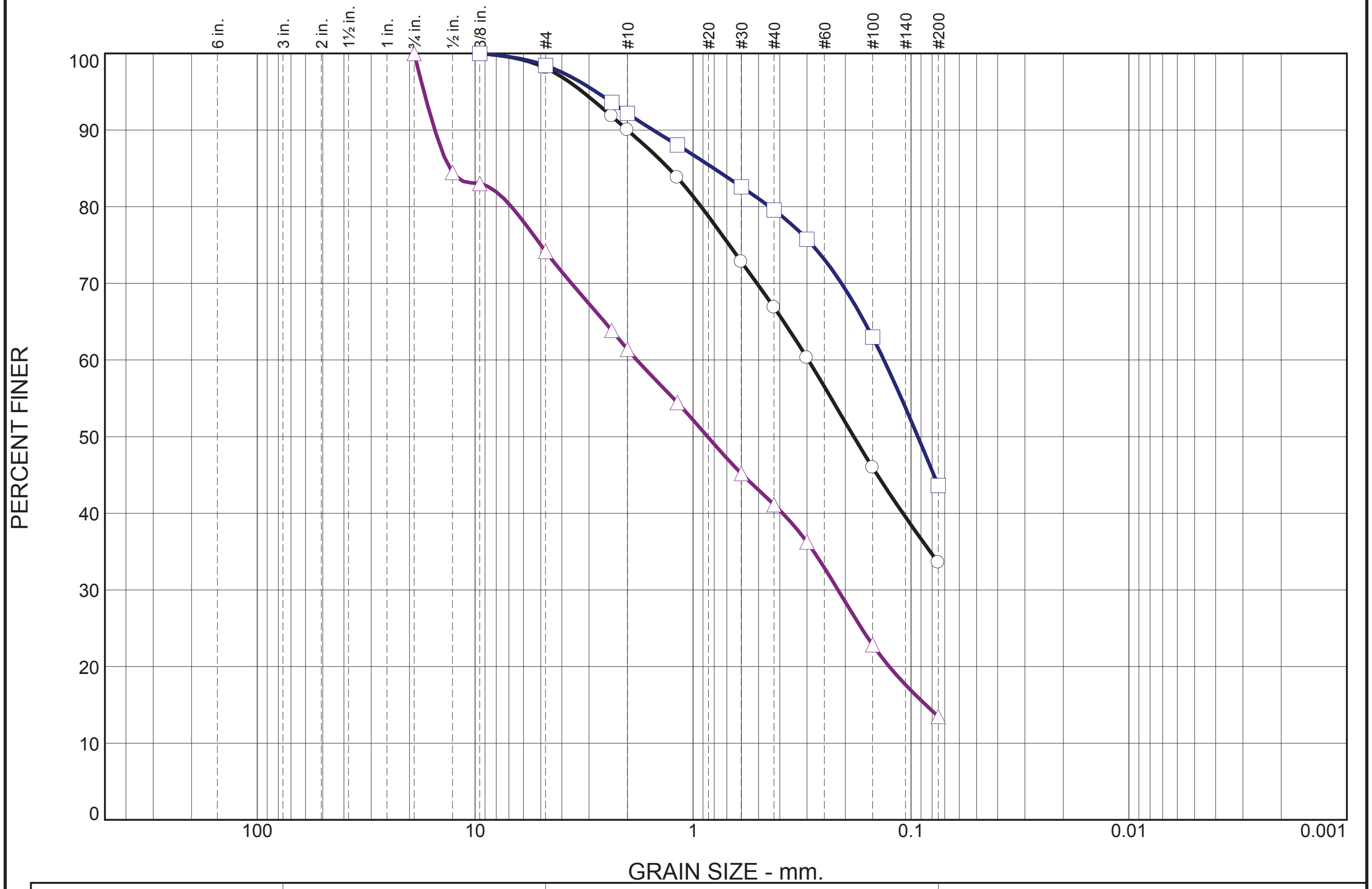
California Modified Sampler can be corrected to SPT by multiplying by 0.62

CONSISTENCY OF COHESIVE SOIL

	SPT (1.4"ID) N_{60}	Unconfined Compressive Strength (psf)	Pocket Penetrometer (tsf)
Very Soft	0 - 1	< 500	< 0.25
Soft	2 - 4	500 - 1,000	0.25 - 0.5
Medium Stiff	5 - 8	1,000 - 2,000	0.5 - 1.0
Stiff	9 - 15	2,000 - 4,000	1.0 - 2.0
Very Stiff	16 - 30	4,000 - 8,000	2.0 - 4.0
Hard	31 - 60	8,000 - 16,000	> 4.0
Very Hard	> 60	> 16,000	

APPENDIX B

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.9	8.1	23.1	33.3	33.6	
□	0.0	0.0	1.6	6.2	12.6	36.0	43.6	
△	0.0	0.0	25.8	12.8	20.3	27.6	13.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	23	16	1.2931	0.2958	0.1830					
□	29	17	0.8021	0.1331	0.0930					
△			13.0545	1.8112	0.8576	0.2161	0.0855			

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ silty, clayey sand	3/18/22	SC-SM	9.4
□ clayey sand	3/17/22	SC	17.5
△	3/16/22		11.3

Project No. 2958 **Client:** NCE

Project: E WILLIAM STREET PROJECT

○ **Source of Sample:** B-22-01 **Depth:** 0.0-5.0' **Sample Number:** SG
□ **Source of Sample:** B-22-01 **Depth:** 5.0-6.5' **Sample Number:** 1B
△ **Source of Sample:** B-22-01 **Depth:** 10.0-11.5' **Sample Number:** 1D

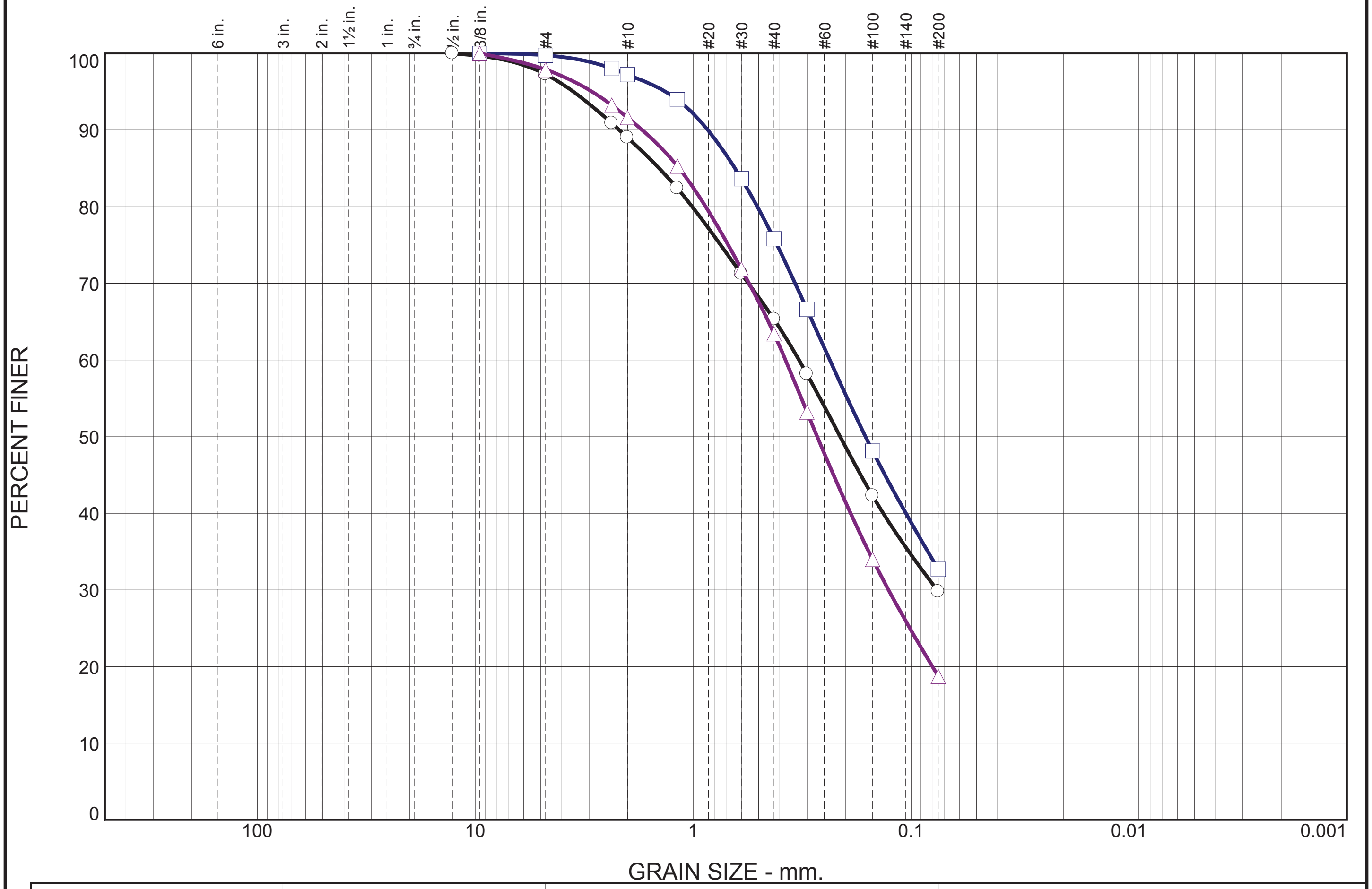
Remarks:

CME CONSTRUCTION MATERIALS ENGINEERS, INC.

PLATE B-1

Tested By: J. MILLER **Checked By:** C. JONES

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.7	8.3	23.7	35.5	29.8	
□	0.0	0.0	0.2	2.6	21.4	43.1	32.7	
△	0.0	0.0	2.1	6.3	28.2	44.7	18.7	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	20	16	1.4286	0.3264	0.2113	0.0760				
□	32	19	0.6417	0.2358	0.1617					
△			1.1575	0.3765	0.2693	0.1268				

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ silty, clayey sand	3/21/22	SC-SM	8.1
□ clayey sand	3/16/22	SC	17.4
△	3/17/22		16.9

Project No. 2958 **Client:** NCE

Project: E WILLIAM STREET PROJECT

○ **Source of Sample:** B-22-02 **Depth:** 0.0-5.0' **Sample Number:** SG

□ **Source of Sample:** B-22-02 **Depth:** 7.5-9.0' **Sample Number:** 2C

△ **Source of Sample:** B-22-02 **Depth:** 12.5-14.0' **Sample Number:** 2E

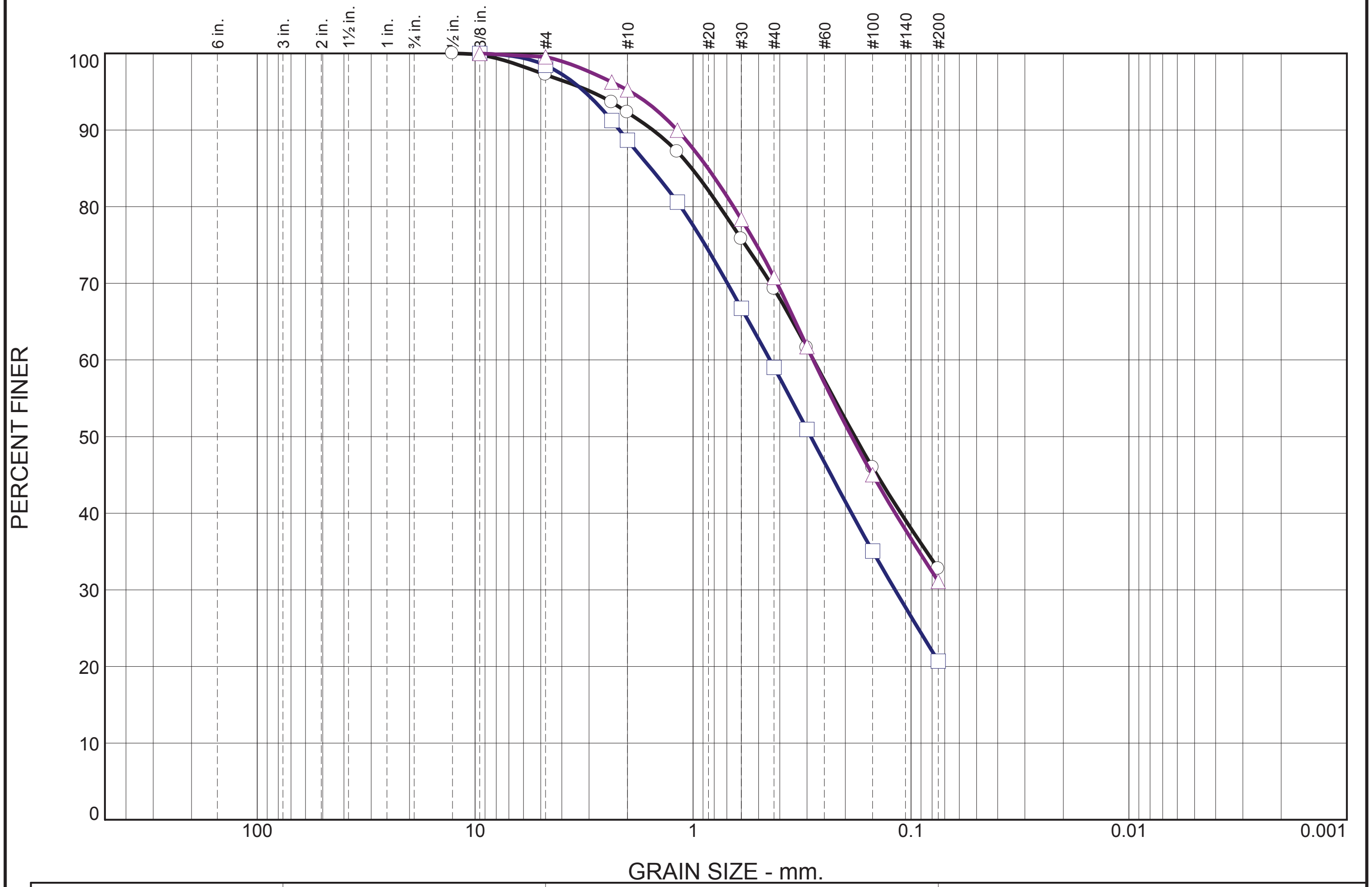
CME CONSTRUCTION MATERIALS ENGINEERS, INC.

Remarks:

PLATE B-1

Tested By: J. MILLER **Checked By:** C. JONES

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.8	4.9	23.0	36.5	32.8	
□	0.0	0.0	1.5	9.8	29.7	38.3	20.7	
△	0.0	0.0	0.4	4.4	24.4	39.7	31.1	

╳	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21	16	1.0134	0.2801	0.1810					
□	24	22	1.5618	0.4436	0.2882	0.1183				
△			0.8541	0.2807	0.1871					

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ silty, clayey sand	3/21/22	SC-SM	1.7
□ silty sand	3/17/22	SM	8.9
△	3/18/22		15.8

Project No. 2958 **Client:** NCE

Project: E WILLIAM STREET PROJECT

○ **Source of Sample:** B-22-03 **Depth:** 0.0-5.0' **Sample Number:** SG
□ **Source of Sample:** B-22-03 **Depth:** 7.5-9.0' **Sample Number:** 3C
△ **Source of Sample:** B-22-03 **Depth:** 12.5-14.0' **Sample Number:** 3E

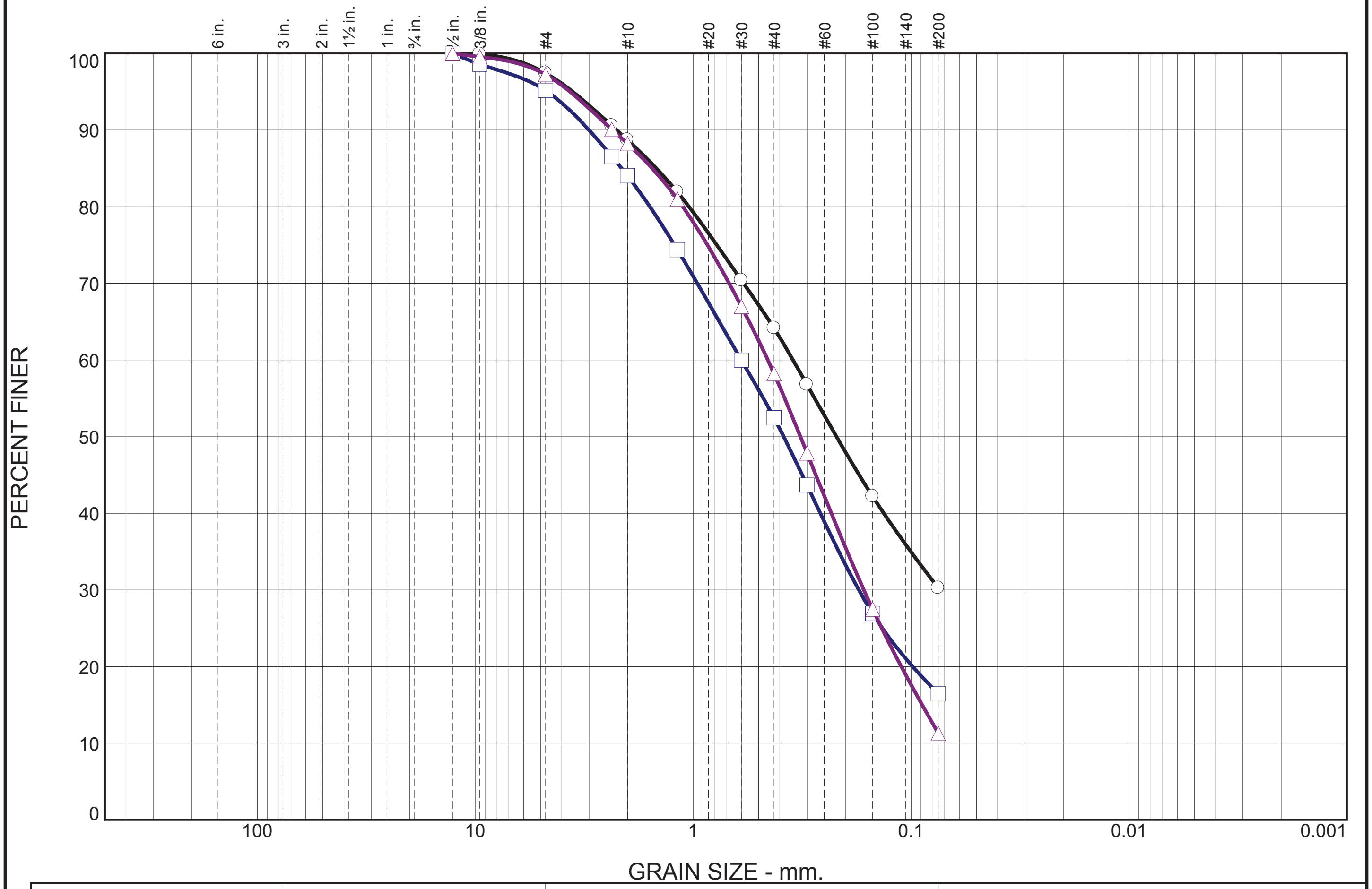
CME CONSTRUCTION MATERIALS ENGINEERS, INC.

Remarks:

PLATE B-1

Tested By: J. MILLER **Checked By:** C. JONES

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.6	8.7	24.6	33.9	30.2	
□	0.0	0.0	4.8	11.2	31.5	36.1	16.4	
△	0.0	0.0	2.8	9.0	30.0	46.9	11.3	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21	16	1.4725	0.3478	0.2197					
□	21	20	2.1262	0.6006	0.3837	0.1736				
△			1.5401	0.4538	0.3216	0.1646	0.0888			

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ silty, clayey sand	3/22/22	SC-SM	7.9
□ silty sand	3/17/22	SM	16.4
△	3/17/22		20.5

Project No. 2958 **Client:** NCE

Project: E WILLIAM STREET PROJECT

○ **Source of Sample:** B-22-04 **Depth:** 0.0-5.0' **Sample Number:** SG
□ **Source of Sample:** B-22-04 **Depth:** 7.5-9.0' **Sample Number:** 4C
△ **Source of Sample:** B-22-04 **Depth:** 10.0-11.5' **Sample Number:** 4D

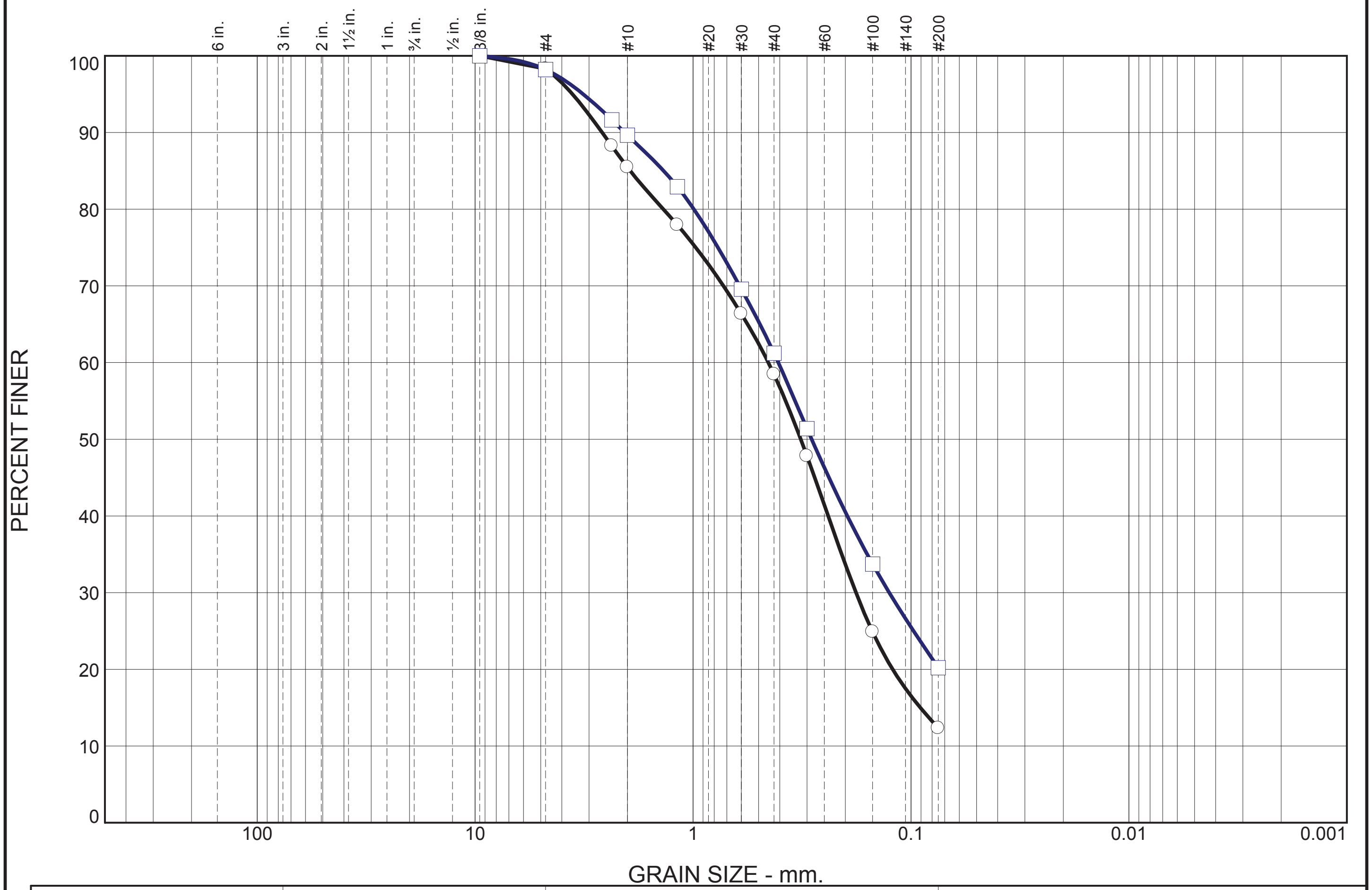
CME CONSTRUCTION MATERIALS ENGINEERS, INC.

Remarks:

PLATE B-1

Tested By: ○ S. SCHWEITZER □ J. MILLER △ J. MILLER **Checked By:** C. JONES

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.7	12.8	27.0	46.2	12.3	
☐	0.0	0.0	1.8	8.6	28.4	41.0	20.2	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	1.9423	0.4513	0.3204	0.1788	0.0905			
☐	NV	NP	1.3639	0.4062	0.2856	0.1258				

	MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○	silty sand	3/17/22	SM	18.5
☐	silty sand	3/18/22	SM	14.7

Project No. 2958 **Client:** NCE

Project: E WILLIAM STREET PROJECT

○ **Source of Sample:** B-22-05 **Depth:** 7.5-9.0' **Sample Number:** 5C

☐ **Source of Sample:** B-22-05 **Depth:** 12.5-14.0' **Sample Number:** 5E

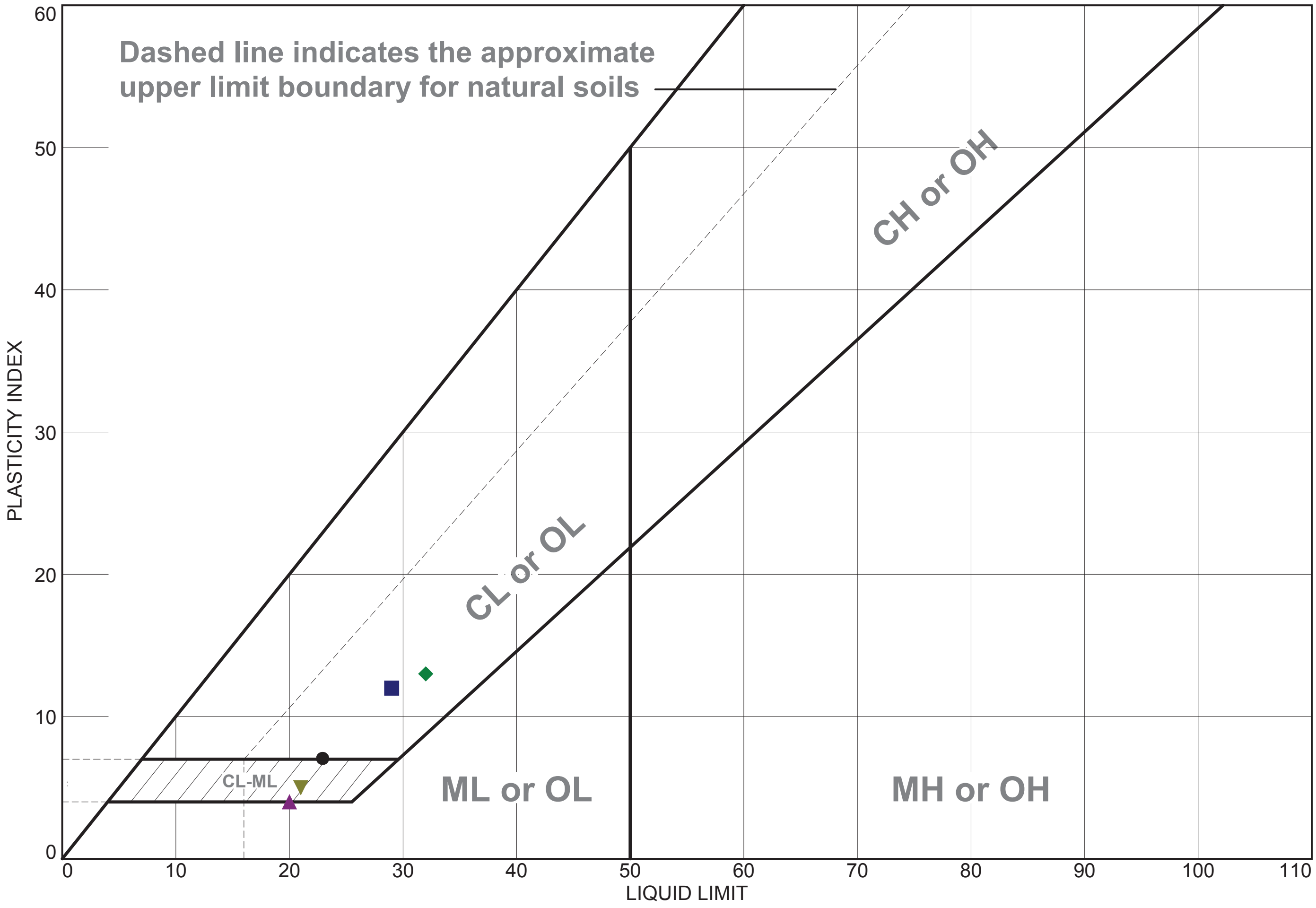
Remarks:

CME CONSTRUCTION MATERIALS ENGINEERS, INC.

PLATE B-1

Tested By: J. MILLER **Checked By:** C. JONES

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	silty, clayey sand	23	16	7	66.9	33.6	SC-SM
■	clayey sand	29	17	12	79.6	43.6	SC
▲	silty, clayey sand	20	16	4	65.3	29.8	SC-SM
◆	clayey sand	32	19	13	75.8	32.7	SC
▼	silty, clayey sand	21	16	5	69.3	32.8	SC-SM

Project No. 2958 **Client:** NCE

Project: E WILLIAM STREET PROJECT

●**Source of Sample:** B-22-01 **Depth:** 0.0-5.0' **Sample Number:** SG
■**Source of Sample:** B-22-01 **Depth:** 5.0-6.5' **Sample Number:** 1B
▲**Source of Sample:** B-22-02 **Depth:** 0.0-5.0' **Sample Number:** SG
◆**Source of Sample:** B-22-02 **Depth:** 7.5-9.0' **Sample Number:** 2C
▼**Source of Sample:** B-22-03 **Depth:** 0.0-5.0' **Sample Number:** SG

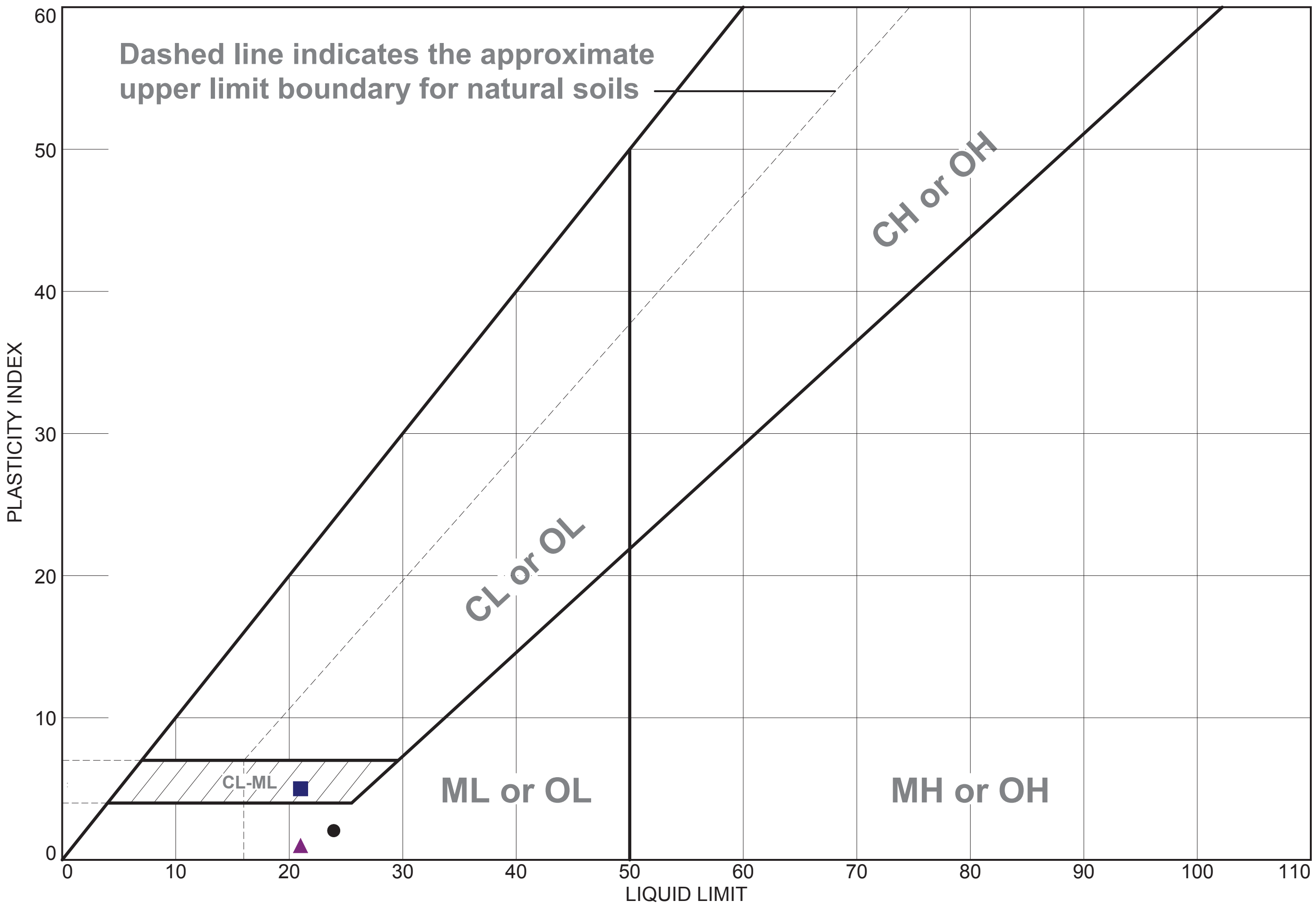
CME CONSTRUCTION MATERIALS ENGINEERS, INC.

Remarks:

PLATE B-2

Tested By: ○ R. VELARDEZ □ V. GONZALEZ △ R. VELARDEZ ◇ R. VELARDEZ ▽ R. VELARDEZ **Checked By:** C. JONES

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	silty sand	24	22	2	59.0	20.7	SM
■	silty, clayey sand	21	16	5	64.1	30.2	SC-SM
▲	silty sand	21	20	1	52.5	16.4	SM
◆	silty sand	NV	NP	NP	58.5	12.3	SM
▼	silty sand	NV	NP	NP	61.2	20.2	SM

Project No. 2958 **Client:** NCE

Project: E WILLIAM STREET PROJECT

●**Source of Sample:** B-22-03 **Depth:** 7.5-9.0' **Sample Number:** 3C
■**Source of Sample:** B-22-04 **Depth:** 0.0-5.0' **Sample Number:** SG
▲**Source of Sample:** B-22-04 **Depth:** 7.5-9.0' **Sample Number:** 4C
◆**Source of Sample:** B-22-05 **Depth:** 7.5-9.0' **Sample Number:** 5C
▼**Source of Sample:** B-22-05 **Depth:** 12.5-14.0' **Sample Number:** 5E

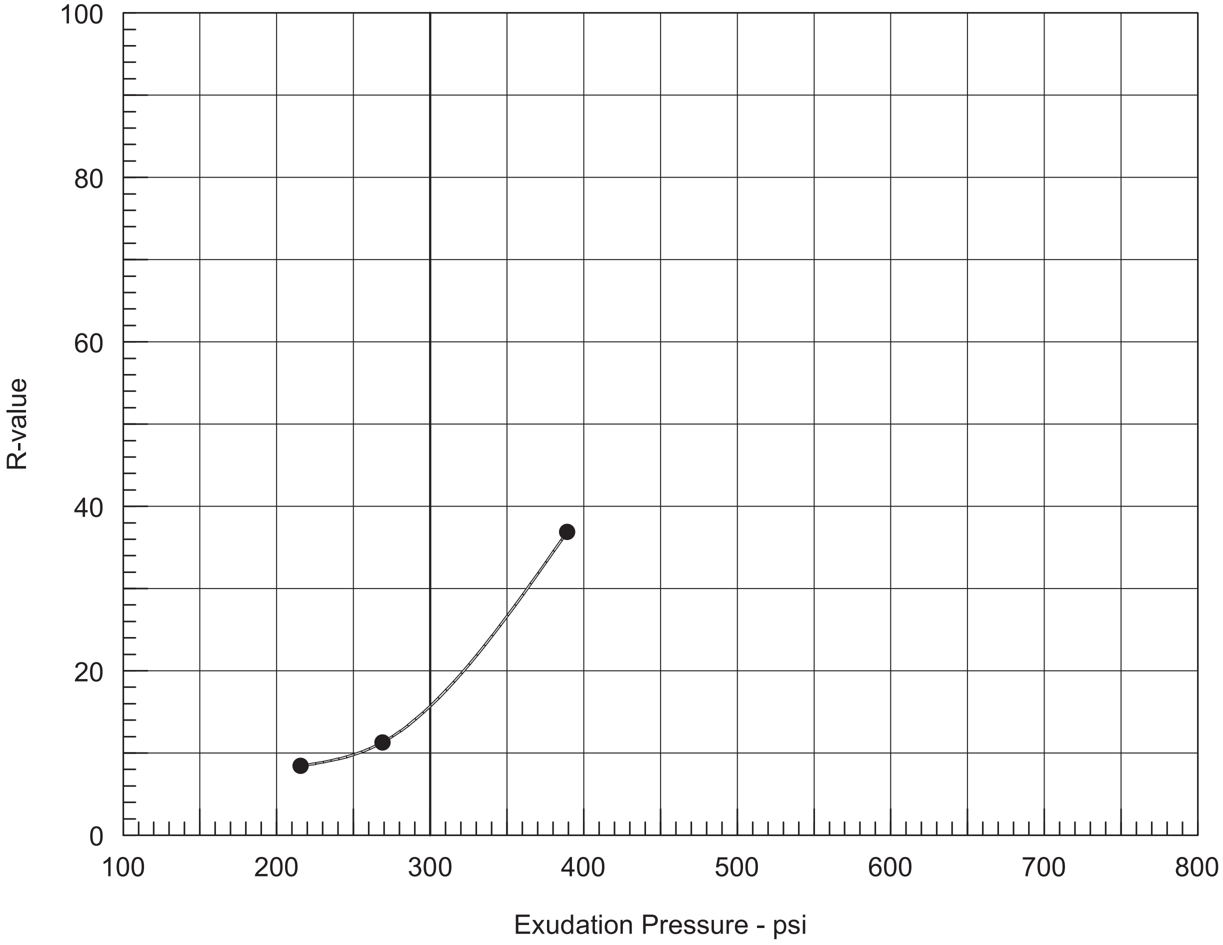
CME CONSTRUCTION MATERIALS ENGINEERS, INC.

Remarks:

PLATE B-2

Tested By: ○ R. VELARDEZ □ R. VELARDEZ △ V. GONZALEZ ◇ V. GONZALEZ ▽ R. VELARDEZ **Checked By:** C. JONES

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	150	123.7	11.2	0.00	80	2.50	389	37	37
2	100	119.3	13.8	0.00	128	2.50	269	11	11
3	75	118.8	14.6	0.00	135	2.50	215	8	8

Test Results	Material Description
R-value at 300 psi exudation pressure = 16	silty, clayey sand

Project No.: 2958

Project: E WILLIAM STREET PROJECT

Source of Sample: B-22-01 **Depth:** 0.0-5.0'

Sample Number: SG

Date: 3/24/2022

CME CONSTRUCTION MATERIALS ENGINEERS, INC.

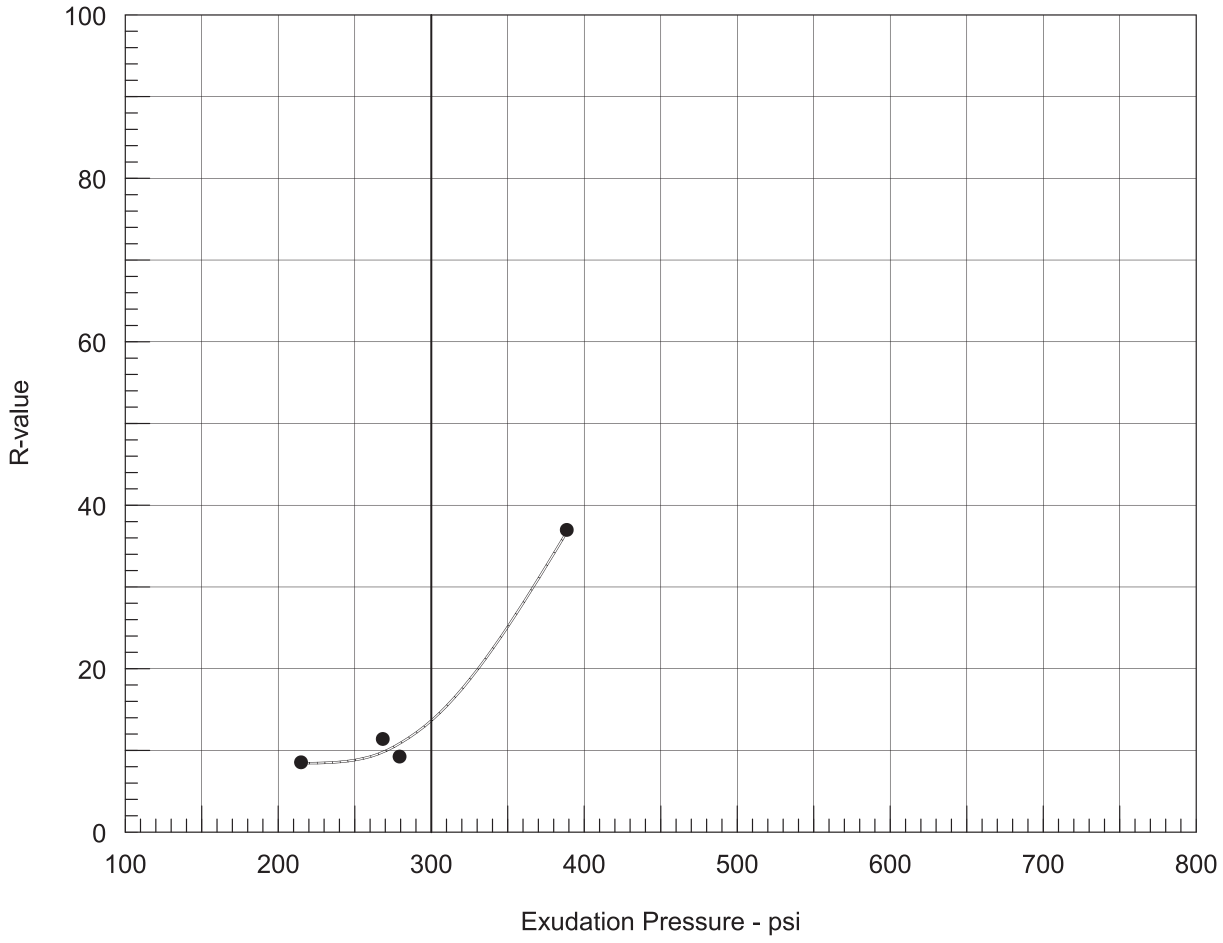
Tested by: M. PONTONI

Checked by: C. JONES

Remarks:

PLATE B-3

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	150	123.7	11.2	0.00	80	2.50	389	37	37
2	100	119.3	13.8	0.00	128	2.50	269	11	11
3	75	118.8	14.6	0.00	135	2.50	215	8	8
4	100	122.2	13.3	0.00	134	2.45	280	9	9

Test Results	Material Description
R-value at 300 psi exudation pressure = 14	silty, clayey sand

Project No.: 2958

Project: E WILLIAM STREET PROJECT

Source of Sample: B-22-01 **Depth:** 0.0-5.0'

Sample Number: SG

Date: 3/28/2022

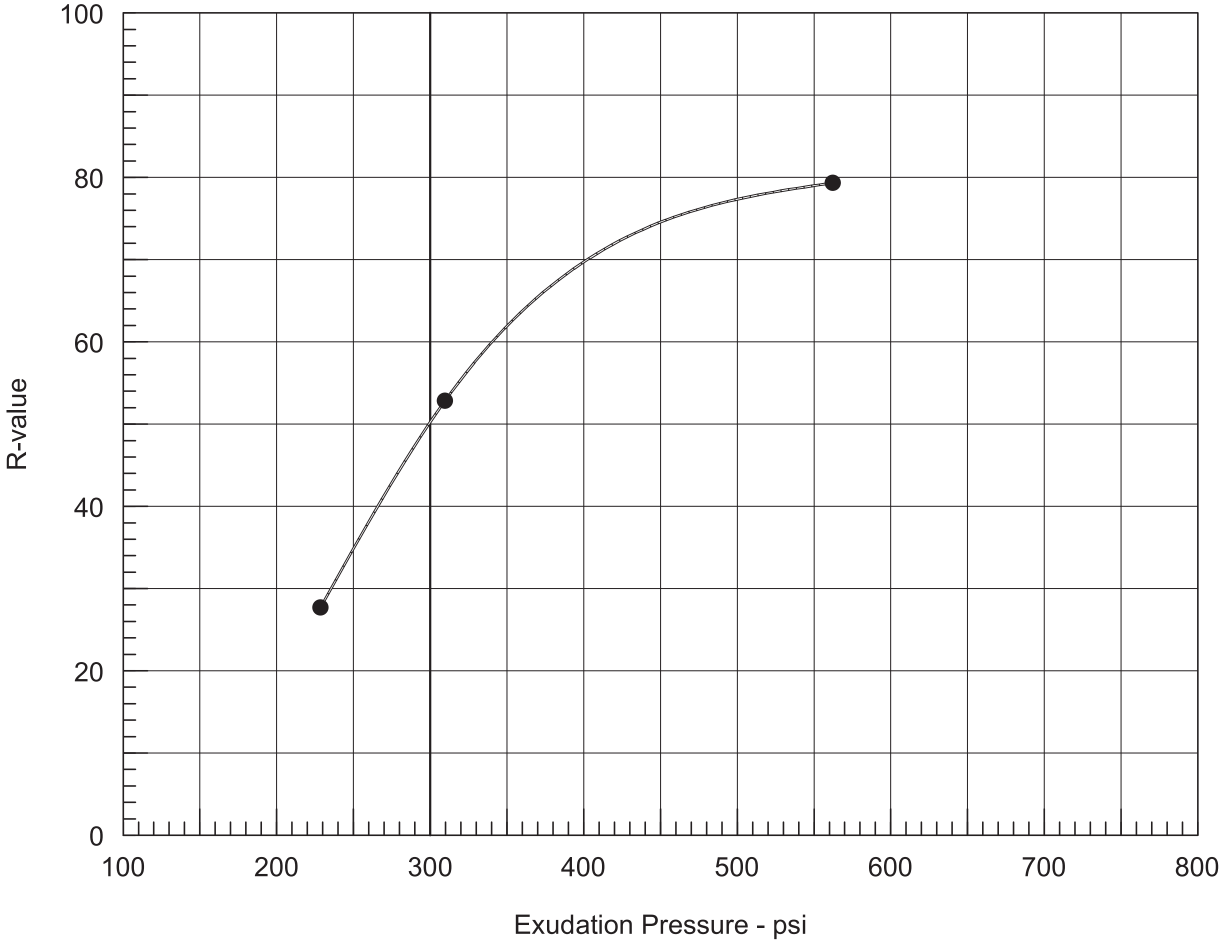
CME CONSTRUCTION MATERIALS ENGINEERS, INC.

Tested by: M. PONTONI
Checked by: C. JONES

Remarks:

PLATE B-3

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	250	129.1	8.4	0.00	20	2.50	562	79	79
2	250	127.6	9.6	0.00	50	2.50	310	53	53
3	200	127.6	10.5	0.00	90	2.45	229	28	28

Test Results	Material Description
R-value at 300 psi exudation pressure = 50	silty, clayey sand

Project No.: 2958

Project: E WILLIAM STREET PROJECT

Source of Sample: B-22-02 **Depth:** 0.0-5.0'

Sample Number: SG

Date: 3/24/2022

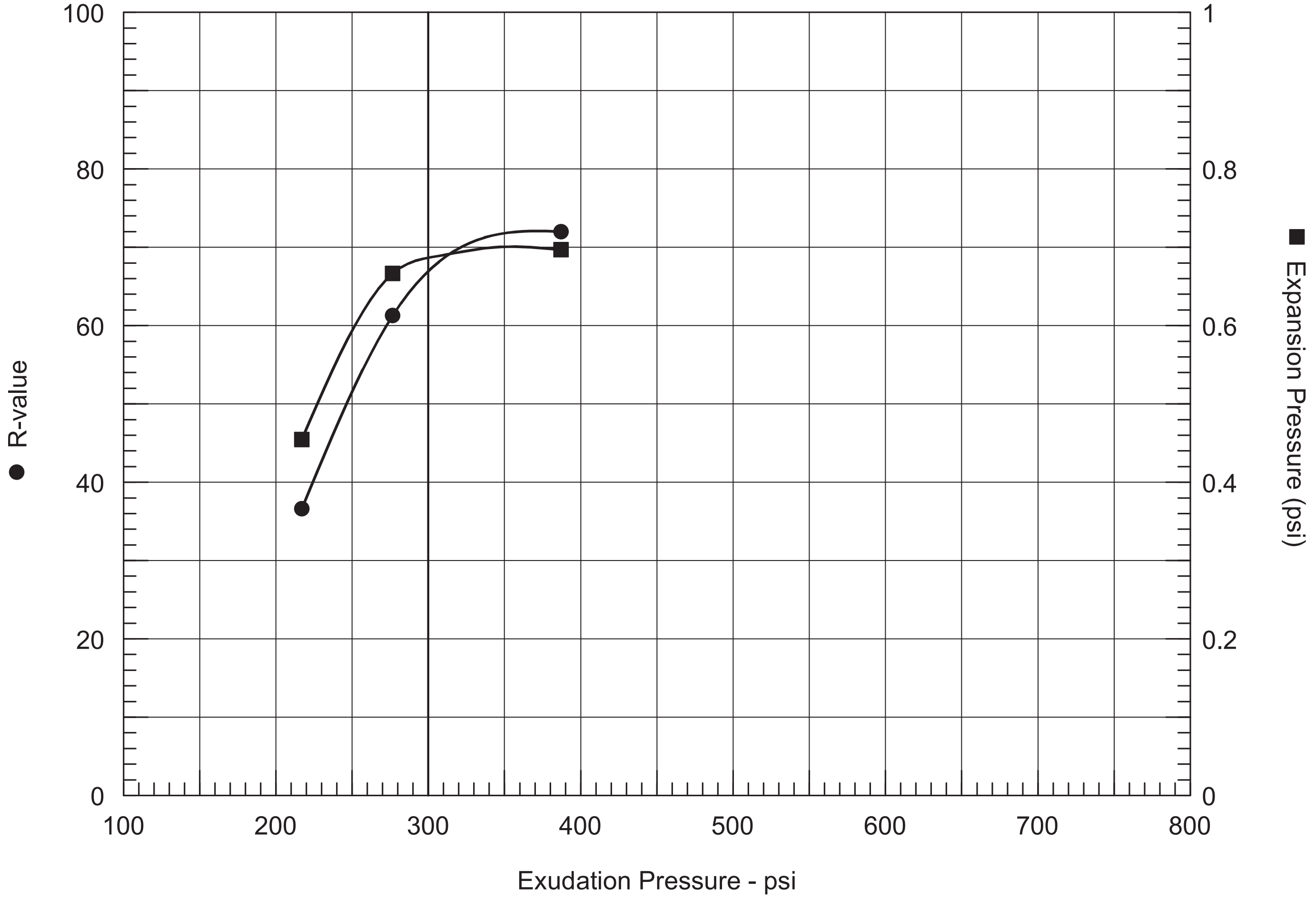
CME CONSTRUCTION MATERIALS ENGINEERS, INC.

Tested by: M. PONTONI
Checked by: C. JONES

Remarks:

PLATE B-3

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	250	127.8	8.5	0.70	29	2.50	387	72	72
2	250	126.5	9.4	0.67	38	2.50	277	61	61
3	250	124.2	10.6	0.45	69	2.50	217	37	37

Test Results	Material Description
R-value at 300 psi exudation pressure = 67 **Exp. pressure at 300 psi exudation pressure =** 0.69 psi	silty, clayey sand

Project No.: 2958

Project: E WILLIAM STREET PROJECT

Source of Sample: B-22-03 **Depth:** 0.0-5.0'

Sample Number: SG

Date: 3/24/2022

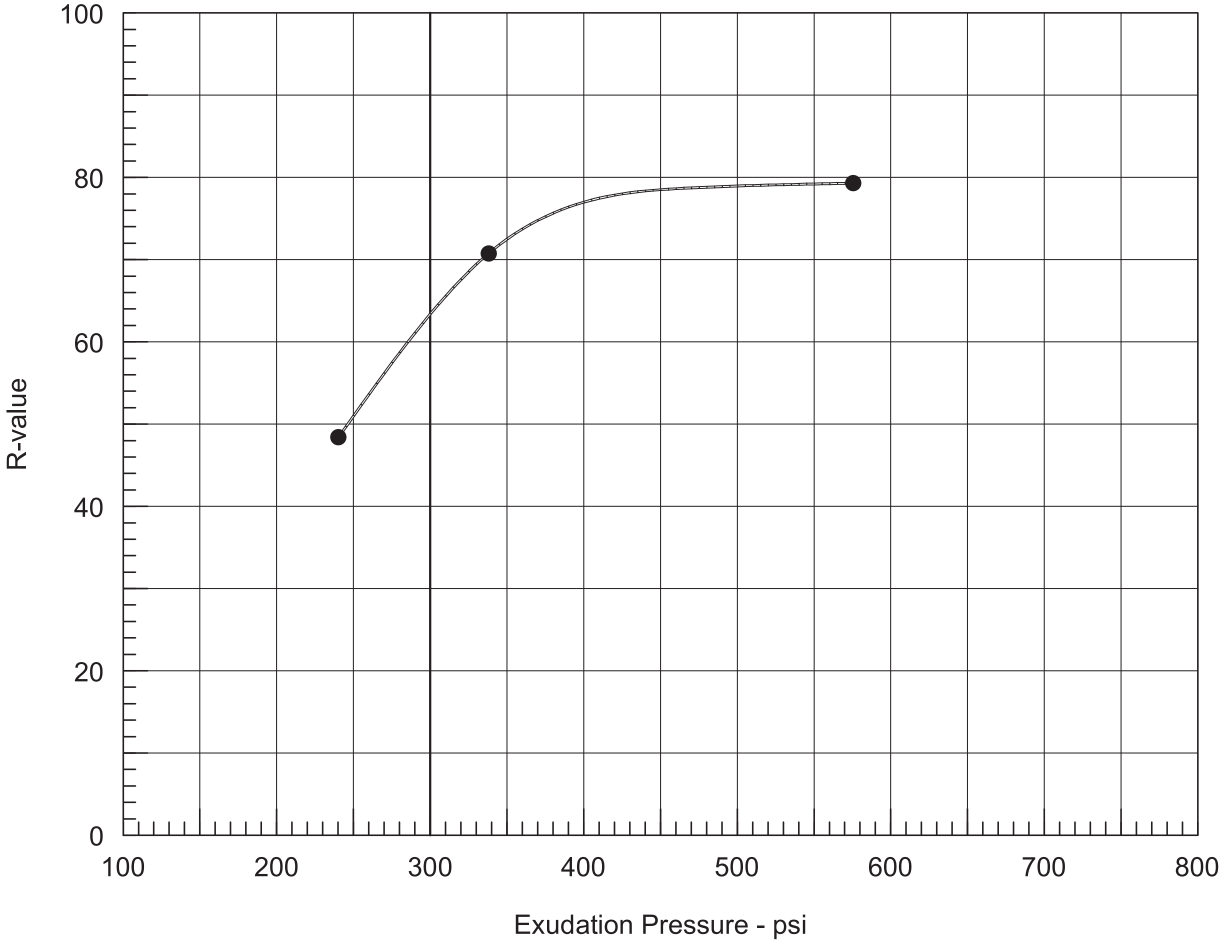
CME CONSTRUCTION MATERIALS ENGINEERS, INC.

Tested by: M. PONTONI
Checked by: C. JONES

Remarks:

PLATE B-3

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	250	129.4	7.7	0.00	20	2.50	576	79	79
2	250	128.6	8.8	0.00	28	2.50	338	71	71
3	250	128.0	9.6	0.00	54	2.45	240	48	48

Test Results	Material Description
R-value at 300 psi exudation pressure = 63	silty, clayey sand

Project No.: 2958

Project: E WILLIAM STREET PROJECT

Source of Sample: B-22-04 **Depth:** 0.0-5.0'

Sample Number: SG

Date: 3/24/2022

CME CONSTRUCTION MATERIALS ENGINEERS, INC.

Tested by: M. PONTONI

Checked by: C. JONES

Remarks:

Analytical Report

Workorder#: **22030874**
Date Reported: **3/28/2022**

Client: CME-Construction Materials Engineers, Inc
Sampled By: Client
Project Name: 2958/ East William Street/ B-22-01 1B @ 5-6.5 FT
PO #: 2958

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22030874-01	B-22-01 1B @ 5-6.5 FT	03/07/2022 0:00	3/15/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Sulfate	ASTM 1580C	< 0.02	%	0.02	AC	03/25/2022 10:20	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22030874-02	B-22-03 3C @ 7.5-9 FT	03/07/2022 0:00	3/15/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Sulfate	ASTM 1580C	< 0.02	%	0.02	AC	03/25/2022 10:20	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22030874-03	B-22-05 5D @ 10-11.5 FT	03/07/2022 0:00	3/15/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Sulfate	ASTM 1580C	< 0.02	%	0.02	AC	03/25/2022 10:20	