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SUBSURFACE SOIL INVESTIGATION
RETREAT AT TIMBERRIDGE, FILING NO. 3
SAND CREEK CHANNEL IMPROVEMENTS
BOX CULVERT – ARROYA LANE
EL PASO COUNTY, COLORADO

Prepared for:

TimberRidge Development Group
2138 Flying Horse Club Drive
Colorado Springs, Colorado 80921

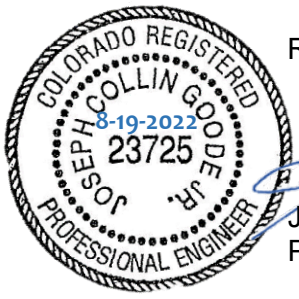
Attn: Mr. Loren Moreland

August 19, 2022

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Stuart Wood
Geologist



Reviewed by:

Joseph C. Goode, Jr., P.E.
President

SW/sc

Encl.

Entech Job No. 221106
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SUBSURFACE SOIL INVESTIGATION
RETREAT AT TIMBERRIDGE, FILING NO. 2
SAND CREEK CHANNEL IMPROVEMENTS BOX CULVERT – ARROYA LANE
EL PASO COUNTY, COLORADO

1.0 INTRODUCTION

TimberRidge Development Group, LLC is planning a culvert crossing over Sand Creek for Arroya Lane at the north side of the Retreat at TimberRidge Subdivision, Filing No. 3. The site is located in El Paso County, Colorado, southeast of Vollmer Road at Arroya Lane. The approximate location of the site is shown on the Vicinity Map, Figure 1. The general locations of the Culvert Crossing are shown on Figure 2, the Test Boring Location Plan.

This report describes the subsurface investigation conducted for the planned culvert crossing. The subsurface soil investigation included drilling four test borings, collecting samples of soil, and conducting a geotechnical evaluation of the investigation findings. All drilling and subsurface investigation activities were performed by Entech Engineering, Inc. (Entech). The contents of this report, including the geotechnical evaluation and recommendations are subject to the limitations and assumptions presented in Section 6.0.

2.0 PROJECT AND SITE DESCRIPTION

It is Entech's understanding that the project will consist of the construction of Sand Creek channel improvements, to include a culvert crossing over Sand Creek for Arroya Lane in the Retreat at TimberRidge subdivision, Filing No. 3. Sand Creek flows to the south with land on each side of the existing creek sloping gently toward the creek. The side banks of the creek are moderately to steeply sloping. Vegetation consists of grasses and weeds with trees, shrubs, and wetland vegetation common to Sand Creek. Existing rural residential properties and undeveloped land are located west, north, and east with the Sterling Ranch development to the south.

3.0 SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

Subsurface conditions on the site were explored by drilling four test borings at the approximate locations shown on Figure 2. The boring locations were controlled by access constraints. Borings were drilled in the stream channel (Test Boring Nos. 1 and 4) and on the stream banks (Test Boring Nos 2 and 3). The borings were drilled to depths of 10 to 20 feet below the existing ground surface (bgs). The drilling was performed using a truck-mounted, continuous flight auger-drilling rig and a skid steer supplied and operated by Entech. Boring logs descriptive of the subsurface conditions encountered during drilling are presented in Appendix A. At the conclusion and subsequent to drilling, observations for groundwater levels were made in each of the open boreholes.

Soil and bedrock samples were obtained from the borings utilizing the Standard Penetration Test (ASTM D-1586) using 2-inch O.D. split-barrel and California samplers. Results of the Standard Penetration Test (SPT) are included on the boring logs in terms of N-values expressed in blows per foot (bpf). Soil and bedrock samples recovered from the borings were visually classified and recorded on the boring logs. The soil and bedrock classifications were later verified utilizing laboratory testing and grouped by soil type. The soil and bedrock type numbers are included on the boring logs. It should be understood that the soil and bedrock descriptions shown on the boring logs may vary between boring location and sample depth. It should also be noted that the lines of stratigraphic separation shown on the boring logs

represent approximate boundaries between soil and bedrock types and the actual stratigraphic transitions may be more gradual or variable with location.

Water content testing (ASTM D-2216) was performed on the samples recovered from the borings, and the results are shown on the boring logs. Grain-Size Analysis (ASTM D-422) and Atterberg Limits testing (ASTM D-4318) were performed on selected samples to assist in classifying the materials encountered in the borings. Soluble sulfate testing was performed on select soil samples to evaluate the potential for below grade degradation of concrete due to sulfate attack. The Laboratory Testing Results are summarized on Table 1 and are presented in Appendix B.

4.0 SUBSURFACE CONDITIONS

One primary soil type and one bedrock type were encountered in the test borings drilled for the subsurface investigation: Type 1: native slightly silty to silty to clayey sand (SM-SW, SM, SC) and Type 2: slightly silty to silty sandstone bedrock (SM-SW, SM). The soil and bedrock were classified in accordance with the Unified Soil Classification System (USCS) using the laboratory testing results and the observations made during drilling.

4.1 Soil and Bedrock

Soil Type 1 classified as native slightly silty to silty sand and clayey sand (SM-SW, SM, SC). The sand was encountered in all of the test borings at the existing ground surface and extending to depths ranging from 4 to 14 feet or to the termination of the borings 20 feet in Test Boring No. 3. Standard Penetration Testing conducted on the sand resulted in N-values ranging from 7 to 24 blows per foot (bpf), indicating loose to medium dense states. Water content and grain size testing of selected soil samples resulted in a water content range of 2 to 27 percent, and 12 to 22 percent of the soil particles passing the No. 200 sieve. Atterberg Limits testing on a sample of the clayey sand from Test Boring No. 1 at a depth of 2 to 3 feet resulted in a liquid limit of 28 percent and a plastic index of 10 percent. The native sand is anticipated to exhibit low to negligible expansion/compression characteristics. Sulfate testing resulted in 0.00 percent soluble sulfate by weight, which indicates a negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 2 classified as slightly silty to silty sandstone bedrock (SM-SW, SM). The sandstone was encountered in Test Boring Nos. 1, 2, and 4 between 4 and 16 feet bgs and extending to the termination of the borings (10 to 20 feet). Standard Penetration Testing conducted on the sandstone resulted in N-values of greater than 50 bpf, which indicates to very dense states. Water content and grain size testing resulted in a water content range of 9 to 16, and 9 to 13 percent of the soil particles passing the No. 200 sieve. Atterberg Limits testing resulted in non-plastic results. Sulfate testing on the sandstone resulted in less than 0.01 percent sulfate by weight, indicating the sandstone exhibits a negligible potential for below grade concrete degradation due to sulfate attack.

4.2 Groundwater

Groundwater was encountered at depths ranging from 3 to 10 feet bgs in the test borings. Groundwater will affect the construction of the box culvert within the creek. Dewatering or diversion of the crossing will be needed during construction. Unstable conditions may be encountered where excavations approach the water table. Stabilization using shot rock or geogrids may be necessary. It should be noted that groundwater levels observed at the time of the subsurface investigation will change due to seasonal precipitation variations, changes in land runoff characteristics, and future development of adjacent properties.

5.0 GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

The following discussion is based on the subsurface conditions encountered in the borings drilled at the drop structure and detention pond areas. If subsurface conditions different from those described herein are encountered during construction or if the project elements change from those described, Entech Engineering, Inc. should be notified so that the evaluation and recommendations presented can be reviewed and revised, if necessary.

The construction will consist of a culvert crossing over Sand Creek at Arroya Lane. The proposed crossing is expected to utilize a reinforced concrete box culvert with riprap soil protection.

Subsurface soil conditions encountered in the test borings drilled for the Sand Creek channel improvements consisted of clayey to silty sand overlying sandstone. Bedrock was encountered in three of the test borings at depths of 4 to 16 feet. The test borings in the channel encountered bedrock at 4 feet north of Arroya Lane and at 9 feet on the south side of Arroya Lane. The surficial sands were encountered in loose to medium dense states and dry to wet conditions. The underlying sandstone was encountered at very dense states. Loose to medium dense saturated soils were encountered in the channel.

Groundwater and loose soil conditions will impact construction of the channel improvements. Water diversions during construction will likely be required. Groundwater was encountered at shallow depths in the stream channel. Excavations below the groundwater levels may be required. Dewatering during construction and soil stabilization will be required.

Loose low bearing sand soils will require removal/recompaction or stabilization within the channel, if concrete structures/footings are proposed. The subgrade for the culvert structure must be scarified and stabilized prior to placing any fill. Overexcavation and recompaction may be required if loose or saturated sands are exposed in the excavation or in close proximity of foundation members.

Saturated unstable soil conditions will most likely be encountered in a majority of the channel improvement area. Stabilization materials and procedures, drainage systems, and dewatering will likely be required. Stabilization for footings within the creek channel may include rock and/or geogrids. Excavations of wet soils will be difficult with rubber-tired equipment and may require track-mounted equipment.

5.1 Channel Improvement Recommendations

The subsurface investigation was performed to provide soil and bedrock information for the channel improvements, for use in providing foundation recommendations and design values. Recommendations for the culvert crossing and main channel improvements are provided.

5.2 Shallow Foundation Parameters

Structures associated with the culvert crossing can be supported with shallow foundations resting on a uniform bearing pad of structural fill or reworked on site sand or extend to dense sandstone bedrock. It should be noted that due to shallow groundwater on this site and the active Sand Creek, extensive subgrade improvements/stabilization are anticipated if shallow foundations are used. The foundation members should bear on uniform pad (minimum 2 to 3 feet thick) of structural fill/site granular soils or onsite medium dense sand placed according to the "Structural Fill" paragraph. The culvert wall footings can also be extended to bear on the sandstone. If footings bear on the sandstone, stabilization will likely not be required.

Any topsoil or highly organic soils must be removed and the existing subgrade cleared of any debris prior to excavation. Loose soils beneath foundation components will require removal and recompaction. Any expansive soils encountered beneath the foundation will require removal and replacement with non-expansive structural fill compacted according to the "Structural Fill" paragraph. Any new fill should be placed to the requirements of the "Structural Fill" paragraph. On-site granular sands may be used as structural fill as approved by Entech. Any import material should be approved by Entech prior to hauling to the site. It is anticipated that large rock (8 to 12 inches) may be required to stabilize the subgrade. Geogrid may also be required to establish a stable subgrade in the creek bed.

Provided the above recommendations are followed, an allowable bearing pressure of 2500 psf is recommended for recompacted site sands and for imported granular structural fill. An allowable bearing capacity of 4000 psf is recommended, if the footings bear on the sandstone. Footings should extend a minimum of 30 inches below the adjacent exterior surface grade for frost protection. Following the above foundation subgrade preparation recommendations and adhering to the recommended maximum allowable bearing pressure, it is expected to result in foundation designs which should limit total and differential vertical movements to one inch and ½ inch, respectively.

Foundation excavations are recommended to extend at least 3 feet horizontally beyond the foundation limits in order to provide adequate space for installation of drain materials (if necessary) and placement of controlled fill. All foundation excavation side slopes should be

inclined at angles of 1½ horizontal to 1 vertical or flatter, as necessary, to provide for excavation sidewall stability during construction or as required by OSHA regulations.

Entech should observe overexcavated subgrades as well as the overall foundation excavation subgrade and evaluate if the exposed conditions are consistent with those described in this report. Entech should also provide recommendations for overexcavation depth and other subgrade improvements, if necessary, and the need for drain systems based on the excavation conditions observed at that time.

5.3 Retaining Wall Parameters

The following values are recommended for use in designing retaining walls with unbalanced lateral loading that may be associated with this project. Roadway/Vehicle surcharge loading is required for wall design.

Recommended Design Values – Lateral Loading

Equivalent fluid density for lateral earth pressure (active) (site granular soils)	45 pcf
Equivalent fluid density for lateral earth pressure (passive)	300 pcf
Equivalent fluid density for lateral earth pressure (at rest)	60 pcf
Unit weight of native overburden sand	120 pcf
Unit weight of native overburden sandy clay-silt	115 pcf
Unit weight of sandstone bedrock	125 pcf
Angle of Internal Friction (loose silty sand)	26°
Angle of Internal Friction (compacted silty sand)	34°
Coefficient of sliding between concrete and silty sand	0.30

*Note: The above lateral loading design values are for level back slope angles and no surcharge loads. If wall backfill is submerged, water pressures must be taken into account as additional wall loading. If backfill slope angles are greater than zero degrees, or if the backfill is surcharged, the design values must be adjusted to account for additional lateral loading.

5.4 Site Seismic Classification

Based on the subsurface conditions encountered at the site and in accordance with Section 1613 of the 2015 International Building Code (IBC), the site meets the conditions of a Site Class D.

5.5 Concrete Degradation Due to Sulfate Attack

Soluble sulfate testing was conducted on each soil type to evaluate the potential for sulfate attack on concrete placed below the surface grade. The test results indicated 0.00 to less than 0.01 percent soluble sulfate by weight for the site soils. The test results indicate the sulfate component of the in-place site soils present a negligible exposure threat to concrete placed below grade that comes into contact with the site soils.

Type II cement is recommended for concrete at this site. To further avoid concrete degradation during construction it is recommended that concrete not be placed on frozen or wet ground. Care should be taken to prevent the accumulation or ponding of water in foundation excavations prior to the placement of concrete. If standing water is present in the foundation excavations, it should be removed by ditching to sumps and pumping the water away from the foundation area prior to concrete placement. If concrete is placed during periods of cold temperatures, the concrete must be kept from freezing. This may require covering the concrete with insulated blankets and adding heat to prohibit freezing.

5.6 Foundation Excavation Observations

Subgrade preparation for foundations and associated improvements should be observed by Entech Engineering prior to construction of the foundation elements in order to verify that (1) no anomalies are present, (2) materials of the proper bearing capacity have been encountered or placed, and (3) no soft, loose, uncontrolled fill material, expansive soil or debris are present in the foundation area prior to concrete placement or backfilling. Sheet pile driving should be observed to verify proper embedment or refusal. Piles should be driven a minimum of 10 feet below the drop structures or refusal into bedrock. Entech should make final recommendations for over-excavation or stabilization, if required, at the time of excavation observation, if necessary.

5.7 Structural Fill

Areas to receive fill should have all topsoil, organic material or debris removed. Fill must be properly benched. The surface should be scarified and moisture conditioned to within ±2 percent of its optimum moisture content and compacted to 95 percent of its maximum Modified Proctor Dry Density (ASTM D-1557) prior to placing new fill. New fill should be non-expansive and be placed in thin lifts not to exceed 6 inches after compaction while maintaining at least 95 percent of its maximum Modified Proctor Dry Density (ASTM D-1557). These materials should be placed at a moisture content conducive to compaction, usually ±2 percent of Proctor optimum moisture content. The placement and compaction of fill should be observed and tested by Entech Engineering, Inc. Imported soils should be approved by Entech Engineering, Inc. prior to being hauled to the site and on-site granular soils prior to placement.

Compacted, non-expansive granular soil, free of organics, debris and cobbles greater than 3-inches in diameter, is recommended for filling foundation components. All fill placed within the foundation areas should be non-expansive and be compacted to a minimum of 95 percent of the soils maximum dry density as determined by the Modified Proctor Test (ASTM D-1557). Fill material should be compacted to a minimum of 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557. Fill material should be placed in horizontal lifts such that each finished lift has a compacted thickness of six inches or less. Fill should be placed at water contents conducive to achieving adequate compaction, usually within ±2 percent of the optimum water content as determined by ASTM D-1557. Mechanical methods can be used for placement and compaction of fill; however, heavy equipment should be kept at distance from foundation walls and below slab infrastructure to avoid overstressing. No water flooding techniques of any type should be used for compaction or placement of foundation or slab fill material.

5.8 General Backfill

Any areas to receive fill outside the foundation limits should have all topsoil, organic material, and debris removed. Fill must be properly benched into existing slopes in order to be adequately compacted. The fill receiving surface should be scarified to a depth of 12-inches and moisture conditioned to ± 2 percent of the optimum water content, and compacted to a

minimum of 95 percent of the ASTM D-1557 maximum dry density before the addition of new fill. Fill should be placed in thin lifts not to exceed 6 inches in thickness after compaction while maintaining at least 95 percent of the ASTM D-1557 maximum dry density. Fill material should be free of vegetation and other unsuitable material and shall not contain rocks or fragments greater than 3-inches. Topsoil and strippings should be segregated from all other fill sources on the site. Fill placement and compaction beneath and around foundations, in utility trenches, beneath roadways or other structural features of the project should be observed and tested by Entech during construction.

5.9 Excavation Stability

Excavation sidewalls must be properly sloped, benched and/or otherwise supported in order to maintain stable conditions. All excavation openings and work completed therein shall conform to OSHA Standards as put forward in CFR 29, Part 1926.650-652, (Subpart P).

5.10 Winter Construction

In the event construction of the planned facility occurs during winter, foundations and subgrades should be protected from freezing conditions. Concrete should not be placed on frozen soil and once concrete has been placed, it should not be allowed to freeze. Similarly, once exposed, the foundation subgrade should not be allowed to freeze. During site grading and subgrade preparation, care should be taken to avoid burial of snow, ice or frozen material within the planned construction area.

5.11 Construction Observations

It is recommended that Entech observe and document the following activities during construction of the building foundations.

- Excavated subgrades and subgrade preparation.
- Placement of drains (if installed).
- Placement/compaction of fill material for the foundation components and retaining walls.
- Placement/compaction of utility bedding and trench backfill.
- Installation of sheet piles.

6.0 CLOSURE

The subsurface investigation, geotechnical evaluation and recommendations presented in this report are intended for use by TimberRidge Development Group, LLC with application to the proposed Sand Creek box culvert crossing at Arroya Lane, and associated site improvements for the Retreat at TimberRidge, Filing No. 3, in the northern portion of El Paso County, Colorado. In conducting the subsurface investigation, laboratory testing, engineering evaluation and reporting, Entech Engineering, Inc. endeavored to work in accordance with generally accepted professional geotechnical and geologic practices and principles consistent with the level of care and skill ordinarily exercised by members of the geotechnical profession currently practicing in same locality and under similar conditions. No other warranty, expressed or implied is made. During final design and/or construction, if conditions are encountered which appear different from those described in this report, Entech Engineering, Inc. requests that it be notified so that the evaluation and recommendations presented herein can be reviewed and modified as appropriate.

If there are any questions regarding the information provided herein or if Entech Engineering, Inc. can be of further assistance, please do not hesitate to contact us.

TABLE

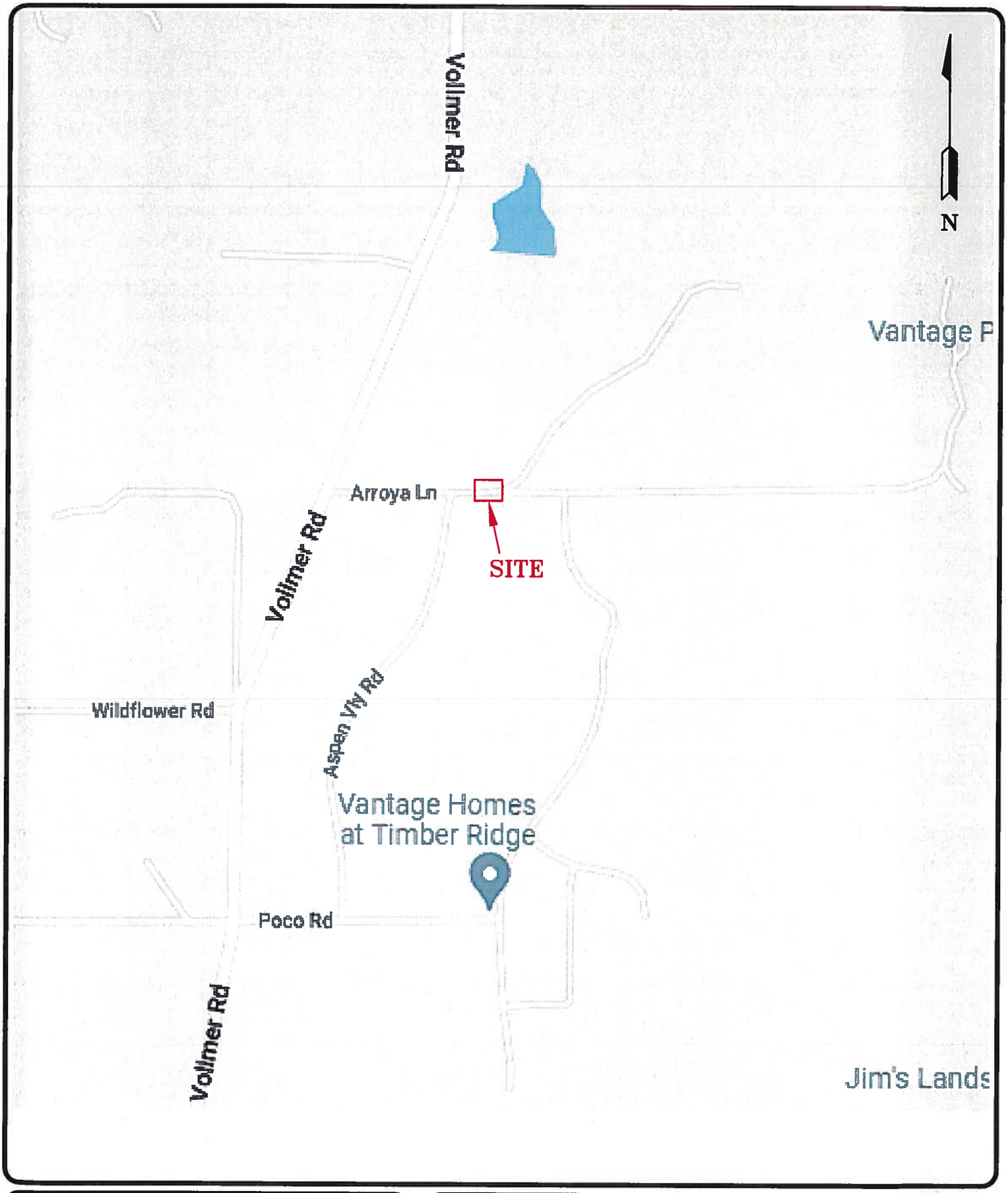
TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT TIMBERRIDGE
PROJECT TIMBERRIDGE, F-3, CULVERT
JOB NO. 221106

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	2-3			21.7	28	10	0.00			SC	SAND,CLAYEY
1	3	10			11.9						SM-SW	SAND, SLIGHTLY SILTY
2	2	20			12.9	NV	NP	<0.01			SM	SANDSTONE, SILTY
2	4	10			9.2						SM-SW	SANDSTONE, SLIGHTLY SILTY

FIGURES



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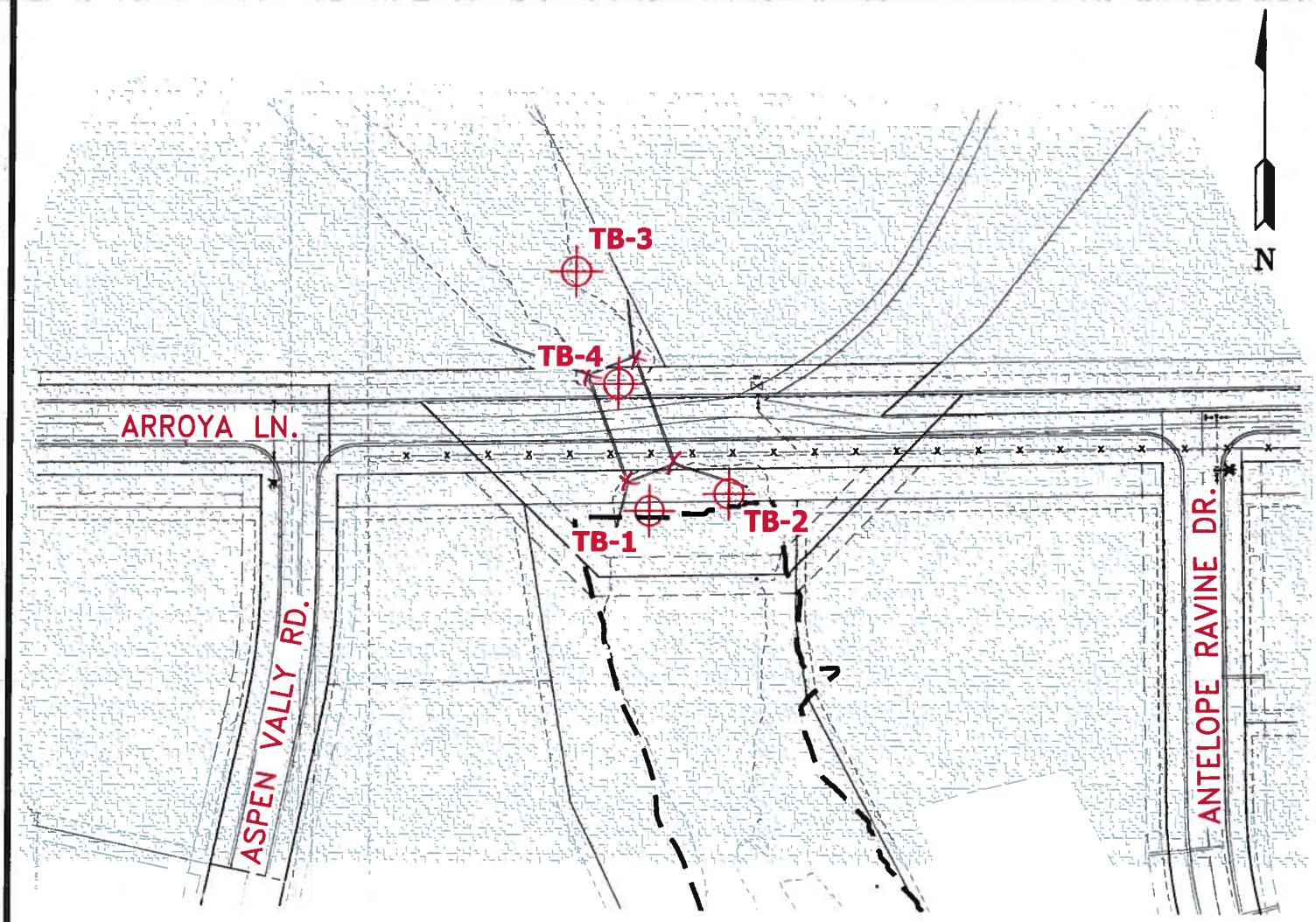
VICINITY MAP
TIMBERRIDGE FILING 3 (CULVERT)
COLORADO SPRINGS, CO.
FOR: TIMBERRIDGE DEVELOPMENT GROUP, LLC

DRAWN:	DATE:	CHECKED:	DATE:
JAC	8/8/22	DPS	

JOB NO.: 221106

FIG NO.: 1



TB- APPROXIMATE TEST BORING LOCATION AND NUMBER

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COLORADO SPRINGS, CO. 80907 (719) 531-5599

TEST BORING LOCATION MAP
TIMBERRIDGE FILING 3 (CULVERT)
COLORADO SPRINGS, CO.
FOR: TIMBERRIDGE DEVELOPMENT GROUP, LLC

DRAWN:	DATE:	CHECKED:	DATE:
JAC	8/8/22	DPS	

JOB NO.: 221106

FIG NO.: 2

APPENDIX A: Test Boring Logs

TEST BORING NO. 1
DATE DRILLED 7/20/2022
Job # 221106

REMARKS

WATER @ 3', 7/25/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						SAND, CLAYEY, FINE TO MEDIUM GRAINED, BROWN, MEDIUM DENSE, MOIST
			17	5.7	1	
5			10	12.1	1	
10			50/5"	8.6	2	SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST
15			50/5"	14.1	2	
20						

TEST BORING NO. 2
DATE DRILLED 7/20/2022
CLIENT TIMBERRIDGE
LOCATION TIMBERRIDGE, F-3, CULVERT

REMARKS

WATER @ 10', 7/25/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO LOOSE, DRY TO MOIST
			25	2.6	1	
5			15	2.3	1	
10			7	3.1	1	
15			9	15.6	2	
						SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST
20			50/5"	12.0	2	

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TEST BORING LOG

DRAWN:	DATE:	CHECKED: SW	DATE: 8-1-22

JOB NO.: 221106
FIG NO.: A- 1

TEST BORING NO. 3
DATE DRILLED 7/20/2022
Job # 221106

REMARKS

WATER @ 10', 7/25/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY TO SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO LOOSE, MOIST TO WET		16	3.5	1
5			24	11.5	1
10	▼		11	11.6	1
15			9	17.4	1
20			15	26.9	1

TEST BORING NO. 4
DATE DRILLED 7/20/2022
CLIENT TIMBERRIDGE
LOCATION TIMBERRIDGE, F-3, CULVERT

REMARKS

WATER @ 4', 7/25/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST		20	3.2	1
5	SANDSTONE, SLIGHTLY SILTY, ▼ FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST		50/9"	10.1	2
10			50/8"	15.5	2
15					
20					

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TEST BORING LOG

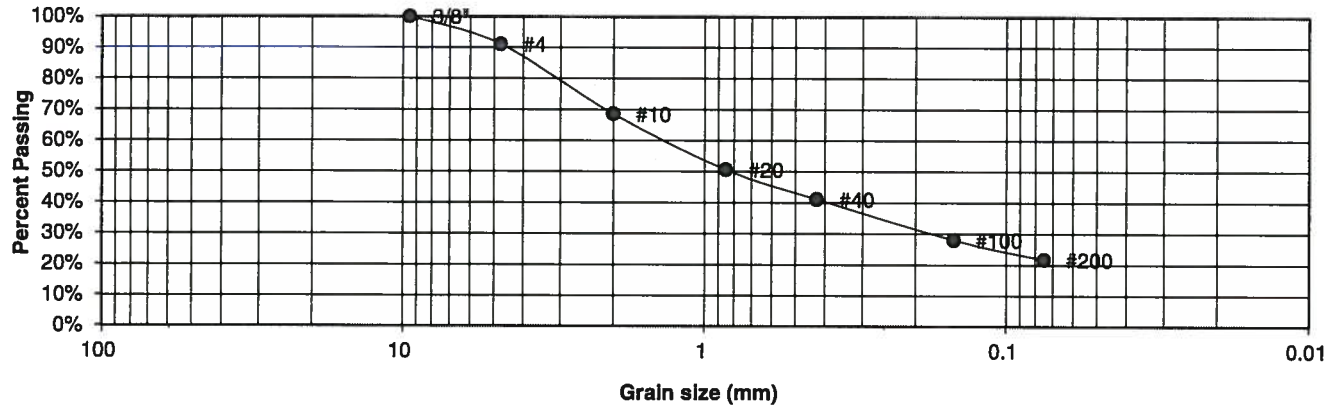
DRAWN:	DATE:	CHECKED: SW	DATE: 8-1-22

JOB NO.: 221106
FIG NO.: A- 2

APPENDIX B: Laboratory Testing Results

UNIFIED CLASSIFICATION	SC	CLIENT	TIMBERRIDGE
SOIL TYPE #	1	PROJECT	TIMBERRIDGE, F-3, CULVERT
TEST BORING #	1	JOB NO.	221106
DEPTH (FT)	2-3	TEST BY	BL

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	91.0%
10	68.5%
20	50.6%
40	41.1%
100	28.0%
200	21.7%

Atterberg Limits	
Plastic Limit	18
Liquid Limit	28
Plastic Index	10

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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LABORATORY TEST RESULTS

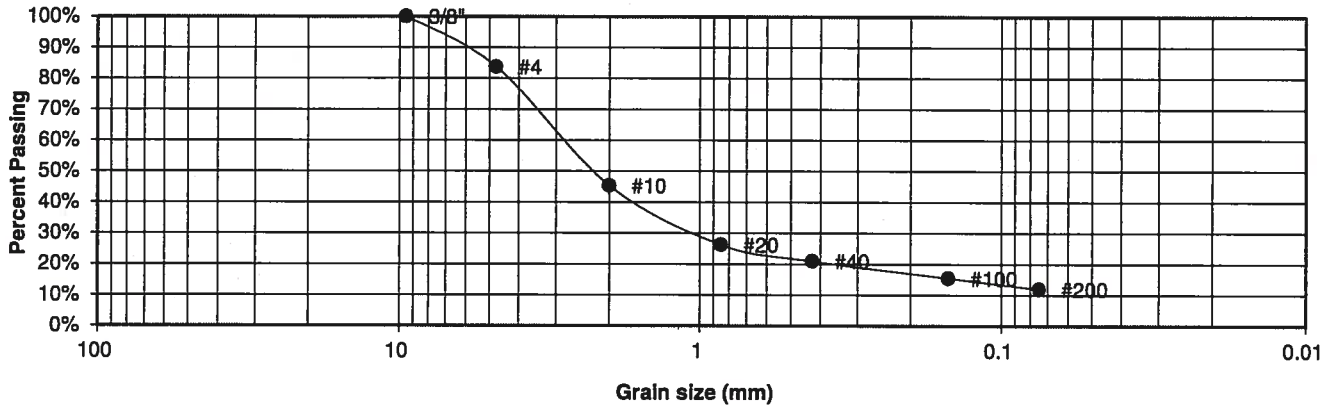
DRAWN:	DATE:	CHECKED:	DATE:
		SW	8-1-22

JOB NO.: 221106

FIG NO.: B-1

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TIMBERRIDGE
SOIL TYPE #	1	PROJECT	TIMBERRIDGE, F-3, CULVERT
TEST BORING #	3	JOB NO.	221106
DEPTH (FT)	10	TEST BY	BL

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	83.8%
10	45.3%
20	26.2%
40	20.9%
100	15.5%
200	11.9%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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COLORADO SPRINGS, COLORADO 80907

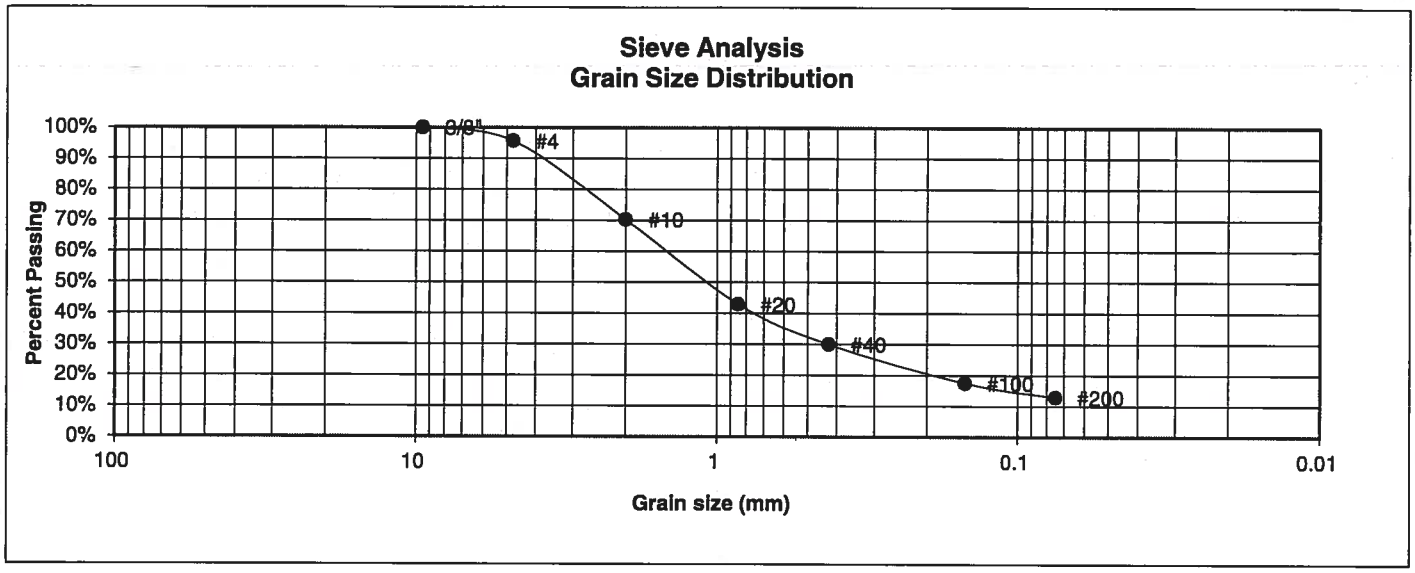
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SW	DATE: 8-1-22

JOB NO.: 221106

FIG NO.: B-2

UNIFIED CLASSIFICATION	SM	CLIENT	TIMBERRIDGE
SOIL TYPE #	2	PROJECT	TIMBERRIDGE, F-3, CULVERT
TEST BORING #	2	JOB NO.	221106
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.6%
10	70.2%
20	42.8%
40	29.9%
100	17.4%
200	12.9%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

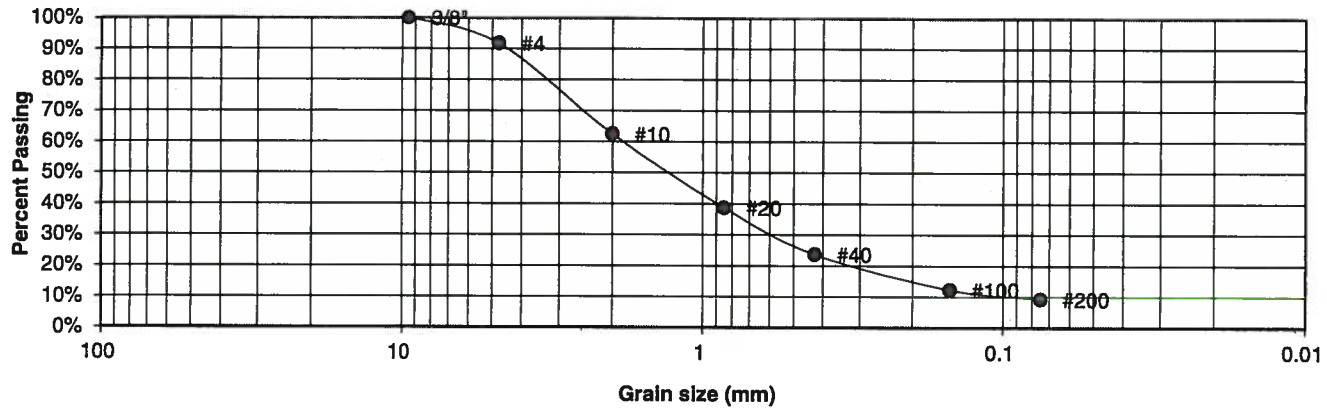
DRAWN:	DATE:	CHECKED:	DATE:
		3W	8-1-22

JOB NO.: 221106

FIG NO.: B-3

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TIMBERRIDGE
SOIL TYPE #	2	PROJECT	TIMBERRIDGE, F-3, CULVERT
TEST BORING #	4	JOB NO.	221106
DEPTH (FT)	10	TEST BY	BL

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	91.7%
10	62.4%
20	38.7%
40	23.6%
100	12.2%
200	9.2%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SW	8-1-22

JOB NO.: 221106

FIG NO.: B-4

CLIENT	TIMBERRIDGE	JOB NO.	221106
PROJECT	TIMBERRIDGE, F-3, CULVERT	DATE	7/27/2022
LOCATION	TIMBERRIDGE, F-3, CULVERT	TEST BY	BL

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-1	2-3	1	SC	0.00
TB-2	20	2	SM	<0.01

QC BLANK PASS

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LABORATORY TEST
SULFATE RESULTS

DRAWN:	DATE:	CHECKED: SW	DATE: 8-1-22

JOB NO.: 221106

FIG NO.: B-5