May 28, 2021

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

Tech Contractors
3575 Kenyon Street, Ste 200
San Diego, California 92110

Attn: Raul Guzman

Re: Additional Investigation, Road Subgrade Conditions
Meridian Ranch – Rolling Hills Ranch, Filings 1 through 4
SE of Sunrise Ridge Drive and Rex Road
El Paso County, Colorado

Ref: Entech Engineering, Inc., *Soil, Geology and Geologic Hazard Evaluation - Meridian Ranch – Rolling Hills Ranch, Filings 1 through 4, El Paso County, Colorado*, Dated September 20, 2019, Entech Job No. 190300

Dear Mr. Guzman:

As requested, personnel of Entech Engineering, Inc. have investigated the soils/groundwater conditions at Test Borings 24 and 33. The purpose of drilling was to evaluate the conditions with respect to shallow groundwater encountered in the original investigation.

The recent test borings encountered water at 12 and 15 feet, in Test Borings 24 and 33, respectively. Test Boring 24, when originally drilled, had water at 10 feet. Subsequent observation several days after drilling showed water at 2 feet. The shallow water noted on June 6, 2019 is believed to be the result of recent precipitation events running into the boring prior to the reading and not the active groundwater level. The original water depths during drilling and the recent water depths are believed to be the actual conditions.

We trust that this report has provided you with all the information that you required. Should you have any questions or require additional information, please do not hesitate to contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

COLORADO LICENSED
JOSEPH COLLIN GOODE
23725
PROFESSIONAL ENGINEER
5/28/21

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

JCG/am

Encl.
Entech Job No. 190300
AAprojects/2019/190300 road subgrade

TEST BORING NO. 24 A
DATE DRILLED 5/26/2021
Job # 190300

REMARKS

WATER @ 12', 5/26/21

SAND, SILTY, TAN

SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST TO VERY MOIST

* - BULK SAMPLE TAKEN

Depth (ft)	Blows per foot	Watercontent %
5	50/5"	6.9
10	50/6"	9.5
15	*	13.7
20		

TEST BORING NO. 33 A
DATE DRILLED 5/26/2021
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 14', 5/26/21

SAND, SILTY, TAN

CLAY, SANDY, BROWN, VERY STIFF, MOIST

CLAYSTONE, SANDY, GREEN BROWN, HARD, VERY MOIST

* - BULK SAMPLE TAKEN

Depth (ft)	Blows per foot	Watercontent %
5	34	13.1
10	50/7"	13.7
15	*	15.3
20		

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

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:

JOB NO. 190300
FIG NO. A- 1

ENTECH
ENGINEERING, INC.
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SUBSURFACE SOIL INVESTIGATION
MERIDIAN RANCH - ROLLING HILLS RANCH, FILINGS 1 - 4
EL PASO COUNTY, COLORADO

Prepared for:

Tech Contractors
3575 Kenyon Street, Suite 200
San Diego, California 92110

Attn: Mr. Raul Guzman

July 15, 2019
Revised April 29, 2020

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Daniel P. Stegman

Reviewed by:

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

COLORADO LICENSED
JOSEPH COLLIN GOODE JR
23725
4/30/2020
PROFESSIONAL ENGINEER

DPS/ts

Encl.

Entech Job No. 190300
AAprojects/2019/190300/190300 SSI

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SUBSURFACE SOIL INVESTIGATION
MERIDIAN RANCH - ROLLING HILLS RANCH, FILINGS 1 - 4
EL PASO COUNTY, COLORADO

1.0 INTRODUCTION

The project consists of the development of the site for the construction of single-family residences in Rolling Hills Ranch Filings 1 - 4. Development is expected to include site grading, installation of subsurface utilities, roadways, and drainage structures. The subdivision is in Meridian Ranch in the northern portion of El Paso County, Colorado. The approximate location of the project site is shown on the Vicinity Map, Figure 1. The test boring locations are shown on Figure 2, the Test Boring Location Plan, with the approximate delineation of soil types and potential groundwater areas depicted on the figures.

This report describes the subsurface investigation conducted for the site and provides recommendations for development design and construction. The Subsurface Soil Investigation included the drilling of forty-nine test borings across the site, 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 17.0.

2.0 PROJECT AND SITE DESCRIPTION

The project will consist of developing the site for single family residential structures. The planned lots are located in the Rolling Hills Ranch subdivision in Meridian Ranch. The investigation was performed at predetermined locations designated based on the roadway alignment and proposed grading on the site plan provided to us. At the time of drilling, the site was vacant and not developed. The site is not graded for the planned development. Site grading plans were provided to us with proposed cuts up to 13 feet and fills up to 15 feet. The majority of the cuts and fills are in the 2 to 10-foot range. The site has a gradual slope towards the southeast. Vegetation consisted of grasses and weeds. Existing residences and Falcon High School were located to the west and south of the site, undeveloped land immediately north, and Eastonville Road to the east. Natural earthen drainage trends to the southeast traversing the property from near the intersection of Rex Road and Sunrise Ridge Drive towards Eastonville Road at a point approximately 2000 feet northeast of Falcon High School. Fill piles of soil encompass approximately 3 acres in the northwest quadrant of the proposed subdivision, and approximately 20-acres of land south of this area was previously excavated, likely for nearby developments. The large area of soil removals and fill piles are not depicted on the topographic mapping for this site. Other smaller piles of manmade materials and straw bales were noted south and west of the natural drainage.

3.0 SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

Subsurface conditions on the site were explored by drilling forty-nine test borings at the approximate locations shown on Figure 2. The boring locations were determined and staked by others. The borings were drilled within the proposed roadway alignments. The borings were drilled to depths of 20 to 25 feet below the existing ground surface (bgs). The drilling was performed using a truck-mounted, continuous flight auger-drilling rig 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. Volume change testing was performed on selected samples using the Swell/Consolidation Test (ASTM D-4546) and the FHA Swell Test in order to evaluate potential expansion/compression characteristics of the soil and bedrock. 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 soil type and two bedrock types were encountered in the test borings drilled for the subsurface investigation: Type 1: native slightly silty to silty sand, clayey to very clayey sand, and sand (SM-SW, SM, SC, SW), Type 2: slightly silty to silty sandstone and clayey to very clayey sandstone (SM-SW, SM, SC), and Type 3: sandy to very sandy claystone (CL). The soil and bedrock were classified in accordance with the Unified Soil Classification System (USCS) and American Association of State Highway and Transportation Officials (AASHTO) System 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, clayey to very clayey sand, and sand (SM-SW, SM, SC, SW). The sand was encountered in all of the test borings at the existing ground surface and extending to depth ranging from 1 to 14 feet below ground surface (bgs). Standard Penetration Testing conducted on the sand resulted in SPT N-values ranging from 4 to 48 blows per foot (bpf), indicating loose to dense states. Water content and grain size testing of selected soil samples resulted in a water content range of 1 to 21 percent, and 5 to 48 percent of the soil particles passing the No. 200 sieve. Atterberg limits testing resulted in Liquid Limits of 26, 29, and no value and Plastic Indexes of 16, 10, and non-plastic, respectively. FHA Swell testing resulted in swell pressure between 70 and 2970 psf, indicating low to high expansion potentials. Swell/Consolidation testing on a sample of silty sand resulted in a volume change of -1.2 percent, indicating a low to moderate consolidation potential. Sulfate testing resulted in 0.00, less than 0.01, and 0.01 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 and clayey to very clayey sandstone (SM-SW, SM, SC). The sandstone was encountered in all test borings, but Test Boring No. 31, underlying Soil Types 1 and 3 at depths ranging from 1 to 20 feet bgs and extending to depths ranging from 12 to 24 feet bgs and to the termination of the borings (20 to 25 feet). Standard Penetration Testing conducted on the sandstone resulted in SPT N-values from 27 to greater than 50 bpf, which indicates medium dense to very dense states. Water content and grain size testing resulted in a water content range of 2 to 30, and 7 to 50 percent of the soil particles passing the No. 200 sieve. Atterberg Limits testing resulted in Liquid Limit between 26 and 41 and no value with Plastic Indexes between 12 and 20 and non-plastic. Swell/Consolidation testing on the sandstone resulted in volume changes of -1.9 to 3.2 percent, indicating low to moderate consolidation potentials and moderate to high expansion potentials. Sulfate testing on the sandstone resulted in 0.00 and less than 0.01 percent sulfate by weight indicating the sandstone exhibits a negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 3 classified as sandy to very sandy claystone (CL). The claystone was encountered in Test Boring Nos. 2, 4, 5, 15, 16, 19 thru 24, 27, 31 thru 39, 41, 43, 46, and 48 underlying Soil Types 1 and 2 at depths ranging from 1 to 24 feet bgs and extending to depths ranging from 4

to 24 feet bgs or to the termination of the borings (20 to 25 feet). Standard Penetration Testing conducted on the claystone resulted in SPT N-values of 45 to greater than 50 bpf, which indicates very stiff to hard consistencies. Water content and grain size testing resulted in a water content range of 9 to 19, and 51 to 81 percent the soil size particles passing the No. 200 sieve. Atterberg limits testing resulted in Liquid Limits between 34 and 42 and Plastic Indexes between 15 and 20. FHA Swell testing resulted in a swell pressure of 90 psf, indicating a low expansion potential. Swell/Consolidation testing on the claystone resulted in volume changes of -2.0 to 2.5 percent, indicating moderate to high consolidation and expansion potentials. Sulfate testing on the claystone resulted in 0.00 percent sulfate by weight indicating the claystone exhibits negligible degradation to concrete due to sulfate attack.

4.2 Groundwater

Depth to groundwater was measured in each of the borings at the conclusion of drilling and subsequent to drilling. Groundwater was encountered in thirty-eight of the forty-nine test borings, ranging from depths of 2 to 23 feet bgs. Groundwater may affect building foundation excavations, roadway and utilities construction on this site. It should be noted that groundwater levels could change due to seasonal variations, changes in land runoff characteristics and future development including nearby areas. Table 2 presents the estimated depths to bedrock and groundwater.

5.0 PRELIMINIARY DEVELOPMENT CONSIDERATIONS

The following discussion is based on the subsurface conditions encountered in the test borings drilled at the site. This investigation is for the site discussed in 2.0 Project and Site Description. 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.

Subsurface soil conditions encountered in the test borings drilled on the site generally consisted of native slightly silty to silty sand, clayey to very clayey sand, and sand overlying slightly silty to silty sandstone, clayey to very clayey sandstone, and sandy to very sandy claystone. Bedrock was encountered at depths ranging from 1 to 14 feet bgs. Depths to bedrock are indicated on

the test boring plan and in Table 2. Consideration should be given to several conditions on this site in planning and excavating the development including groundwater, expansive soils and sandstone/claystone materials.

5.1 Groundwater

Groundwater may impact the development. Table 2 presents the depth to groundwater measured in each boring. Subsequent to completion of overlot grading cuts per the grading plan presented to us, the measured water levels will be less than 10 feet in some areas of the site. Groundwater was measured as shallow as two feet in Test Boring No. 24. Fill is proposed in this area. The area may require stabilization prior to placing fill. Claystone was encountered at 4 feet. Unstable conditions should be expected where groundwater is shallow or close to excavated depths. Procedures and equipment to mitigate groundwater impact during and after construction should be anticipated. Pumps, cofferdams, wide area and localized drain systems and other procedures and equipment may be necessary. Shotrock and geotextiles may be appropriate for stabilizing excavations. An underdrain system can be considered for long term groundwater mitigation. Frequently, groundwater levels rise following development as result of increased irrigation and decreased potential area of evaporation.

5.2 Expansive Soils

Expansive soils [clayey sand, claystone, and potentially clay (not encountered in the test borings)] are present on the site exhibiting expansion potential from low to high. Expansive soils where encountered will require mitigation for residential construction. Damage to structures can occur due to expansive soils; occurrence and severity of distress can be reduced by moisture treatments and overexcavation mitigation approaches.

5.3 Sandstone and Claystone

Sandstone and claystone were encountered at shallow depths across the site. Excavation of sandstone and claystone should be expected to be moderate to difficult. Track type equipment likely will be needed to accomplish excavations particularly where harder materials or lenses are present. Upon completion of site grading per the plan provided to us, sandstone is expected to be exposed across the majority of the areas tested.

6.0 SITE GRADING

Shallow bedrock was encountered in approximately half of the test borings. Depth to bedrock in each boring is indicated on the Test Boring Plan, Figure 2. Excavation of dense and hard materials on site is expected to be moderate to difficult with heavy duty earthmoving equipment. Claystone and sandstone materials may require track equipment and ripping teeth. For conditions with no groundwater seepage, cut and fill slopes no steeper than 3 to 1 (horizontal to vertical) should be considered. If seepage occurs, then flatter slopes or a drain system should be considered. Recommendations may be subject to change depending upon particular field conditions.

6.1 Stripping

Debris, topsoil and organic materials should be stripped from the ground surface of areas to be filled. Any uncontrolled fill materials should be completely removed. The materials may be used as fill pending approval if they are free of organic material and debris. Although soft areas are not expected any soft or loose soils should be stabilized or removed to expose suitable material prior to placement of fill. Topsoil may be stored in stock piles and placed at the surface in landscape areas.

6.2 Fill Preparation

Surfaces which will receive fill should be scarified to depths of 6 inches, moisture conditioned to within 0 to 3 percent of optimum moisture, and compacted to minimum of 95 percent of Standard Proctor Dry Density (ASTM D-698) for cohesive materials and within 2 percent of optimum moisture, and compacted to minimum of 95 percent of Modified Proctor Dry Density (ASTM D-1557) for cohesionless soils. On-site natural soils and bedrock are anticipated to be used as site grading fill. Bedrock must be processed and broken down to small gravel-sized materials where placed in the fill. Expansive materials used for fill should be placed at sufficient moisture content to mitigate potential swell. The fill quality will influence the performance of foundations, slabs-on-grade, and pavements. Fill settlement can be minimized by placing thin lifts at suitable moisture content and by verification of compaction with frequent density tests.

6.3 Compaction

Overlot grading fill consisting of granular soils should be placed in lifts to exceed 6 inches following compaction and compacted to at least 95 percent of the maximum dry density determined by Modified Proctor (ASTM D-1557). Clay materials should be placed in compacted lifts less than 6 inches thick compacted to at least 95 percent of maximum Standard Proctor (ASTM D 698) dry density. Fills below 10 feet in depth should be moisture conditioned as above and compacted to 98 percent of Standard Proctor dry density (ASTM D 698) for cohesive materials or 98 percent of maximum modified Proctor Dry Density (ASTM D 1557) for granular materials. The soil materials should be placed at a moisture content conducive to adequate compaction, usually within ±2 percent of optimum moisture content. Fill placement and compaction should be observed and tested by Entech during construction to verify that adequate moisture and density has been achieved.

7.0 POND EMBANKMENT CONSTRUCTION

Test Borings 38 and 39 were drilled in the detention pond located in Tract G. The soils generally consisted of 9 to 10 feet of silty gravelly sand over claystone. The upper sandy soils were encountered at loose to medium dense states. Groundwater was measured at 11 to 18 feet after drilling. In general, the site soils encountered in the pond area are suitable for construction of the proposed pond structures and embankment. Based on the grading plan cuts and fills will be required to construct the pond. Cuts and fills range from 4 to 10 feet. It appears that the pond detention area will be above the groundwater levels. If excavations encroach on the groundwater level unstable soil conditions may be encountered.

Any areas to receive fill should have all topsoil, organic material or debris removed. Fill must be properly benched and compacted to minimize potentially unstable conditions in slope areas. Fill slopes should be 3:1 or flatter. The proposed plans show 4:1 embankment slopes. The subgrade should be scarified and moisture conditioned to within 2% of optimum moisture content and compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557, prior to placing new fill. Loose areas encountered at the embankment subgrade will require removal and recompaction prior to placing new fill. Areas receiving fill may require stabilization with rock or fabric if shallow groundwater conditions are encountered.

New fill should be placed in thin lifts not to exceed 6 inches after compaction while maintaining at least 95% of its maximum Modified Proctor Dry Density, ASTM D-1557. These materials should be placed at a moisture content conducive to compaction, usually 0 to ±2% of Proctor optimum moisture content. The placement and compaction of fill should be observed and tested by Entech during construction. Entech should approve any import materials prior to placing or hauling them to the site.

8.0 UNDERGROUND UTILITY CONSTRUCTION

Generally, excavation is expected to be moderate to difficult utilizing heavy-duty track hoes. Rock buckets and rock teeth will likely be required where excavations extend into very hard sandstone or cemented materials. Special procedures or equipment may be required to remove water and/or achieve stability in utility trenches where excavations approach or intercept groundwater.

Utilities including water and sewer lines are usually constructed beneath paved roads. Placement of fill and degree of compaction applied to trench backfill will influence performance of overlying structures including pavements. Fill placed into utility trenches should be compacted according to requirements of the local jurisdiction. Fill should be placed in horizontal lifts having compacted thickness of six inches or less and at a water content conducive adequate compaction, usually within ±2 percent of optimum water content. Typical compaction specifications would be similar to specifications in the Site Grading section. Mechanical methods should be used for fill placement;
however, heavy equipment should be kept at a distance away from structures to avoid damage. No water flooding techniques of any type should be used for compaction or placement of utility trench backfill.

Trench backfill should be performed in accordance with El Paso County specifications and requirements. Excavations and excavation shoring/bracing should be performed in accordance with OSHA guidelines.

9.0 UNDERDRAIN SYSTEM

Depending on final site grading anticipated depths of excavations and structure foundations relative to groundwater occurrence, an underdrain system may be considered to be included as part of sewer system design and installation. The underdrain system drain pipe shall consist of smooth wall non perforated rigid PVC pipe placed at a minimum slope of 2 percent. Shallower pipe grades can be considered for larger diameter underdrain pipes and areas to daylight the drainage systems. Concrete or clay material fill may be strategically placed at the manhole locations to slow the water flow down the trench. The underdrain below sewer should be constructed with adequate depth to allow connection of residence foundation drain systems. Drain elements should be of appropriate slopes and sizes for anticipated flows. Maintenance of the underdrain system should be anticipated. Gravity outlet should be planned such that other developments and properties are not adversely affected.

10.0 PAVEMENT CONSIDERATIONS

Materials exposed at pavement subgrade elevations will be dependent upon native materials exposed at final overlot grading and the specific materials placed as fill at and near finish grade elevations. The predominate materials are generally expected to be silty sand, sandstone, clayey sand, and clay. Materials anticipated at subgrade elevation generally would be rated as good, but some areas likely would be rated as poor AASHTO classifications of A-1-b, A-2-6, and A-4 were determined for the sandstone and upper granular soils. Based on depth to claystone and estimated cut, claystone with AASHTO classification of A-6 and associated poor rating is likely not to be encountered. The claystone classifies as A-6 which has poor asphalt support characteristics. Thickness of asphalt pavements to be anticipated generally range between 4 to 5 inches of asphalt overlying 6 to 10 inches of basecourse depending on specific subgrade materials and Roadway Classification of each particular street. Cement treated subgrade thickness of 10 to 12 inches are common. Actual thickness may exceed anticipated thickness at some areas. For specific thickness determinations, a subsurface investigation and pavement design should be completed after completion of overlot grading.

11.0 ANTICIPATED RESIDENTIAL FOUNDATION SYSTEMS

Subsurface soil conditions consisted of granular materials with some areas of expansive clayey soils and claystone materials. We anticipate conventional spread footing foundation systems will be appropriate for residences constructed on the majority of the site. Where expansive materials are encountered at or near foundation grades, use of spread footings with overexcavation and replacement with non-expansive fill should be expected. Drilled pier foundations may be a suitable alternative where expansive soils are encountered. A Subsurface Soils Investigation report should be prepared after completion of overlot grading to address appropriate foundation systems. Perimeter below grade drain systems should be anticipated for all structures with basements. Overexcavation drains may also be recommended. Figures 3 and 4 present typical details. Shallow groundwater was encountered in numerous test borings. Temporary and permanent dewatering systems may be necessary at various foundation excavations. Shotrock and geotextiles may be appropriate for stabilizing excavations. An area wide subdrain may be considered for discharge of collected water.

12.0 RESIDENCE ON-GRADE FLOOR SLABS

On-grade floor slabs for the planned structures could be supported by on-site non-expansive soils or compacted, non-expansive, structural fill. Loose or expansive soils encountered at or near floor slab grade should be penetrated or overexcavated a distance below slab subgrade and replaced with a non-expansive structural fill to improve floor slab performance. If slab movement and cracks cannot be tolerated a structural floor system should be used. Evaluation of subgrade materials should be included within a Subsurface Soils Investigation for each specific lot.

13.0 CONCRETE DEGRADATION DUE TO SULFATE ATTACK

Sulfate solubility testing was conducted on eight samples recovered from the test borings to evaluate the potential for sulfate attack on concrete placed below surface grade. The test results indicated 0.00 to 0.01 percent soluble sulfate (by weight). The test results indicate the sulfate component of the in-place soils presents a negligible exposure threat to concrete placed below the site grade. Type II cement is recommended for the on-site soils. Additional testing should be conducted following completion of overlot grading.

14.0 EXCAVATION STABILITY

Excavation walls must be properly sloped/benched or otherwise supported in order to maintain stable conditions. All excavation openings and work execution shall conform to OSHA standards as in CFR 29, Part 1926.650-652 (Subport D).

15.0 SURFACE AND SUBSURFACE DRAINAGE

Surface drainage will influence performance of structures at the site including streets and residences. Drainage is recommended around each building perimeter at a minimum slope of 5 percent in the first 10 feet adjacent to exterior foundation walls and for unpaved areas, where possible. For paved areas and other impervious surfaces, a minimum slope of 2 percent is recommended. Drainage should be planned to avoid ponding of water. Collected water and irrigation should discharge well beyond foundation backfill zones. Surface runoff should be designed to avoid sheet flow and erosion. Slopes should be protected from erosion by materials such as mulch or appropriate plants or other methods. All fills and backfills should be properly compacted. Unprotected surfaces may be subject to undesirable, heavy erosion.

16.0 WINTER CONSTRUCTION

In the event construction occurs during winter, concrete and soil materials 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 soil subgrades should not be allowed to freeze. During grading operations and subgrade preparation, care should be taken to avoid burial of snow, ice or frozen material within the planned construction area.

17.0 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 foundation perimeter drains (if installed).
- Placement/compaction of fill materials.
- Placement/compaction of utility bedding and trench backfill.

18.0 CLOSURE

The subsurface investigation, geotechnical evaluation and preliminary recommendations presented in this report are intended for use by Tech Contractors with application to the planned development of the single-family residential project site located in the Rolling Hills Ranch Filings 1 - 4 subdivision in Meridian Ranch in northern El Paso County, Colorado. In conducting the subsurface soil 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. Additional subsurface investigations and testing are recommended to further evaluate the individual sites and roadways after final development plans are prepared and after the site has been graded. 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.

TABLES

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS
JOB NO. 190300

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	AASHTO CLASS.	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASS.	SOIL DESCRIPTION
1	6	2-3			8.1	NV	NP	<0.01	A-1-b			SM-SW	SAND, SLIGHTLY SILTY
1	8	5			6.1							SM-SW	SAND, SLIGHTLY SILTY
1	10	5			14.0	29	16	0.01	A-2-6			SC	SAND, CLAYEY
1	11	2-3			15.2					370		SM	SAND, SILTY
1	2	2-3			8.4							SM-SW	SAND, SLIGHTLY SILTY
1	23	2-3			17.0	NV	NP	0.00	A-1-b			SM	SAND, SILTY
1	24	2-3			18.0							SM	SAND, SILTY
1	32	10			15.6							SM	SAND SILTY
1	27	5			48.3					460		SC	SAND, VERY CLAYEY
1	1	2-3			4.7	NV	NP		A-1-b			SW	SAND
1	5	2-3			13.3	26	10		A-2-4			SC	SAND, CLAYEY
1	13	2-3			4.8							SW	SAND
1	14	5			13.2	NV	NP		A-1-b			SM	SAND, SILTY
1	16	5			5.9					70		SM-SW	SAND, SLIGHTLY SILTY
1	19	2-3	10.0	112.9	34.7						-1.2	SM	SAND, SILTY
1	26	5			11.5	NV	NP		A-1-b			SM-SW	SAND, SLIGHTLY SILTY
1	28	2-3			4.9	NV	NP		A-1-b			SW	SAND
1	30	2			12.1							SC	SAND, CLAYEY
1	30	3								2970		CL	CLAY, SANDY
1	30	5			6.9							SM-SW	SAND, SLIGHTLY SILTY
1	31	5			5.4							SM-SW	SAND, SLIGHTLY SILTY
1	38	2-3			8.6	NV	NP		A-1-b			SM-SW	SAND, SLIGHTLY SILTY
1	39	5			17.8							SM	SAND, SILTY
1	42	5			19.6							SM	SAND, SILTY
1	43	2-3			6.0	NV	NP		A-1-b			SM-SW	SAND, SLIGHTLY SILTY
1	47	2-3			20.7					220		SM	SAND, SILTY
1	49	5			7.3							SM-SW	SAND, SLIGHTLY SILTY
2	7	10			18.6	32	14		A-2-6			SC	SANDSTONE, CLAYEY
2	17	10			7.3	NV	NP		A-1-b			SM-SW	SANDSTONE, SLIGHTLY SILTY
2	18	5			14.2							SM	SANDSTONE, SILTY
2	20	5			17.1	37	20		A-2-6			SC	SANDSTONE, CLAYEY
2	21	10			12.5							SM	SANDSTONE, SILTY
2	41	10			16.0							SM	SANDSTONE, SILTY
2	44	10			14.3							SM	SANDSTONE, SILTY
2	6	20			38.9	26	13	<0.01	A-6			SC	SANDSTONE, VERY CLAYEY
2	9	15			17.5	NV	NP	<0.01	A-1-b			SM	SANDSTONE, SILTY

TABLE 1 (cont.)

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	AASHTO CLASS.	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASS.	SOIL DESCRIPTION
2	12	10			15.5							SM	SANDSTONE, SILTY
2	3	5			26.1							SM	SANDSTONE, SILTY
2	37	5	11.4	116.5	35.4			0.00			-0.4	SC	SANDSTONE, CLAYEY
2	40	10			12.3	NV	NP	<0.01	A-1-b			SM	SANDSTONE, SILTY
2	25	15			28.7	NV	NP		A-2-4			SM	SANDSTONE, SILTY
2	23	10			11.6							SM-SW	SANDSTONE, SLIGHTLY SILTY
2	35	5			10.1							SM-SW	SANDSTONE, SLIGHTLY SILTY
2	27	10			16.2							SM	SANDSTONE, SILTY
2	1	15			15.5							SM	SANDSTONE, SILTY
2	4	20	9.3	110.3	20.3	29	12		A-2-6		-1.9	SC	SANDSTONE, CLAYEY
2	5	25			48.5	31	14		A-6			SC	SANDSTONE, VERY CLAYEY
2	14	20			17.8							SM	SANDSTONE, SILTY
2	15	15			19.9							SC	SANDSTONE, CLAYEY
2	20	20	7.4	84.0	49.7	28	14		A-6		3.2	SC	SANDSTONE, VERY CLAYEY
2	21	25			21.2							SM	SANDSTONE, SILTY
2	28	15			28.3	41	17		A-2-6			SC	SANDSTONE, CLAYEY
2	29	10	4.5	119.9	49.6						-0.4	SC	SANDSTONE, VERY CLAYEY
2	39	15			41.1							SC	SANDSTONE, VERY CLAYEY
2	45	20			13.4							SM	SANDSTONE, SILTY
2	46	15			45.5							SC	SANDSTONE, VERY CLAYEY
3	19	5			65.1							CL	CLAYSTONE, SANDY
3	15	10	7.2	126.8	56.1						1.0	CL	CLAYSTONE, VERY SANDY
3	16	20	9.5	120.5	58.8						0.0	CL	CLAYSTONE, VERY SANDY
3	22	10	12.7	99.3	54.2	34	15		A-6			CL	CLAYSTONE, VERY SANDY
3	38	15			59.6	34	17		A-6			CL	CLAYSTONE, VERY SANDY
3	48	20	12.5	103.3	51.1						-0.7	CL	CLAYSTONE, VERY SANDY
3	36	15			59.7							CL	CLAYSTONE, VERY SANDY
3	24	5			63.6					90		CL	CLAYSTONE, SANDY
3	34	10	11.5	114.3	56.0						0.7	CL	CLAYSTONE, VERY SANDY
3	33	10	16.5	115.0	80.8	42	20		A-7-6		2.5	CL	CLAYSTONE, SANDY

Table 2: Summary of Test Borings and Water Measurements*

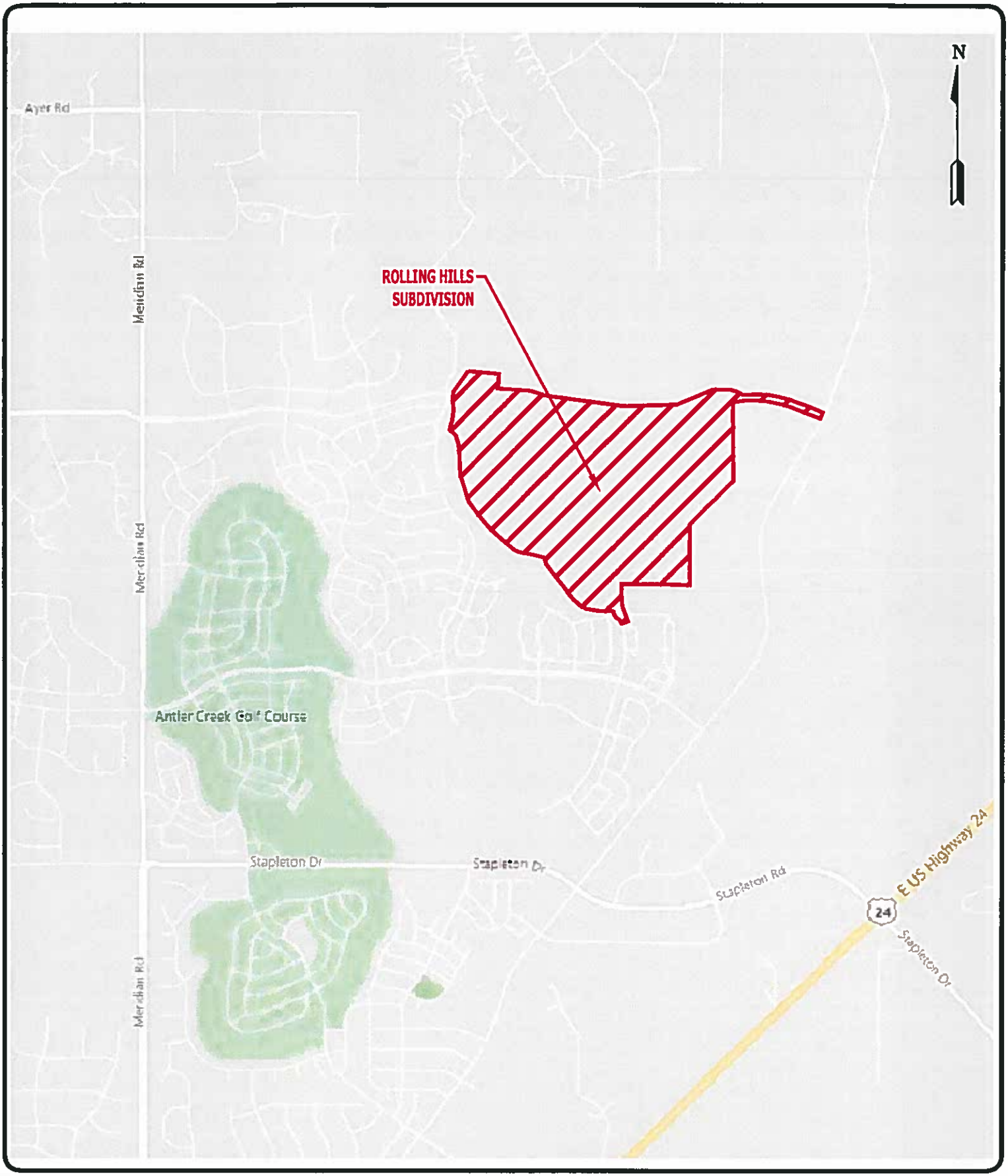
Test Boring No.	Depth of Boring (ft.)	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)	Cut & Fill** (-/+, ft.)	Estimated Ground Elevation	Estimated Groundwater Elevation
1	20.0	9.0	9.0	0 to -2	7021.3	7012.3
2	25.0	9.0	13.0	-2 to -4	7031.5	7018.5
3	25.0	1.0	15.0	-2 to -4	7032.3	7017.3
4	20.0	1.0	dry	-2 to -4	7044.0	dry
5	25.0	4.0	14.0	-2 to -4	7044.8	7030.8
6	25.0	14.0	10.0	0 to +2	7054.7	7044.7
7	20.0	1.0	16.5	+2 to +4	7058.6	7042.6
8	20.0	9.0	13.0	0 to -2	7060.1	7047.1
9	20.0	14.0	10.0	+4 to +6	7069.7	7059.7
10	20.0	14.0	14.0	0 to -2	7077.5	7063.5
11	20.0	9.0	9.0	0 to +2	7071.6	7062.6
12	20.0	9.0	14.0	0 to -2	7087.3	7073.3
13	20.0	9.0	14.0	0 to -2	7092.0	7078.0
14	25.0	14.0	18.5	-6 to -8	7105.3	7086.8
15	20.0	9.0	18.0	0 to -2	7108.4	7090.4
16	25.0	9.0	16.0	0 to -2	7110.9	7094.9
17	20.0	1.0	17.5	0 to -2	7121.7	7104.2
18	20.0	4.0	dry	0 to +2	7120.7	dry
19	20.0	4.0	dry	+2 to +4	7126.5	dry
20	20.0	1.0	dry	outside cut/fill	7125.4	dry
21	25.0	1.0	10.0	-6 to -8	7105.7	7095.7
22	20.0	4.0	18.5	-6 to -8	7106.0	7087.5
23	20.0	9.0	dry	+2 to +4	7092.3	dry
24	25.0	4.0	2.0	0 to +2	7072.9	7070.9

Table 2: (Continued)

Test Boring No.	Depth of Boring (ft.)	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)	Cut & Fill** (-/+, ft.)	Est. Ground Elevation	Estimated Groundwater Elevation
25	20.0	1.0	12.0	0 to +2	7068.8	7056.8
26	20.0	1.0	17.0	-6 to -8	7049.2	7032.2
27	20.0	9.0	8.0	0 to +2	7071.2	7063.2
28	20.0	9.0	13.5	0 to -2	7082.9	7069.4
29	25.0	4.0	12.0	outside cut/fill	7084.4	7072.4
30	20.0	10.0	8.0	0 to +2	7066.7	7058.7
31	20.0	14.0	dry	0 to -2	7057.5	dry
32	25.0	14.0	13.0	0 to -2	7045.4	7032.4
33	25.0	9.0	7.0	0 to -2	7052.7	7045.7
34	20.0	1.0	9.0	+2 to +4	7042.0	7033.0
35	20.0	3.0	dry	0 to -2	7065.4	dry
36	25.0	1.0	23.0	-6 to -8	7049.4	7026.4
37	20.0	1.0	dry	-2 to -4	7038.8	dry
38	25.0	12.0	10.0	-6 to -8	7032.4	7022.4
39	20.0	9.0	4.0	-6 to -8	7032.5	7028.5
40	20.0	9.0	10.0	+12 to +14	7032.1	7022.1
41	20.0	1.0	17.0	outside cut/fill	7039.1	7022.1
42	25.0	9.0	14.0	outside cut/fill	7046.0	7032.0
43	25.0	4.0	19.0	outside cut/fill	7049.0	7030.0
44	20.0	1.0	dry	outside cut/fill	7064.0	dry
45	25.0	4.0	11.0	outside cut/fill	7072.1	7061.1
46	25.0	4.0	22.0	outside cut/fill	7065.0	7043.0
47	20.0	1.0	dry	outside cut/fill	7058.7	dry
48	20.0	1.0	dry	outside cut/fill	7047.6	dry
49	25.0	14.0	12.0	outside cut/fill	7029.5	7017.5

* - Measurement taken subsequent to drilling
** - Cut and Fill estimates based on map provided by the client

FIGURES



ENTECH ENGINEERING, INC.
555 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

VICINITY MAP
ROLLING HILLS RANCH
EL PASO COUNTY, CO
FOR: TECH CONTRACTORS

DRAWN BY:	DATE DRAWN:	DESIGNED BY:	CHECKED:
SC	04/18/19	SC	SC

JOB NO.: 190300
FIG. NO.: 1

TB-20 (1)
TB-19 (4)
TB-21 (1)
TB-18 (4)
TB-29 (4)
TB-45 (4)
TB-48 (1)
TB-49 (14)
TB-46 (4)
TB-47 (1)
TB-17 (1)
TB-16 (9)
TB-22 (4)
TB-28 (9)
TB-44 (1)
TB-43 (4)
TB-30 (10)
TB-41 (1)
TB-15 (9)
TB-14 (14)
TB-23 (9)
TB-24 (4)
TB-27 (9)
TB-31 (14)
TB-42 (9)
TB-40 (9)
TB-12 (9)
TB-32 (14)
TB-39 (9)
TB-13 (9)
TB-25 (1)
TB-26 (1)
TB-33 (9)
TB-11 (9)
TB-38 (12)
TB-34 (1)
TB-10 (14)
TB-35 (3)
TB-8 (9)
TB-7 (1)
TB-37 (1)
TB-9 (14)
TB-36 (1)
TB-5 (4)
TB-3 (1)
TB-4 (1)
TB-6 (14)
TB-2 (9)
TB-1 (9)

REX ROAD

N

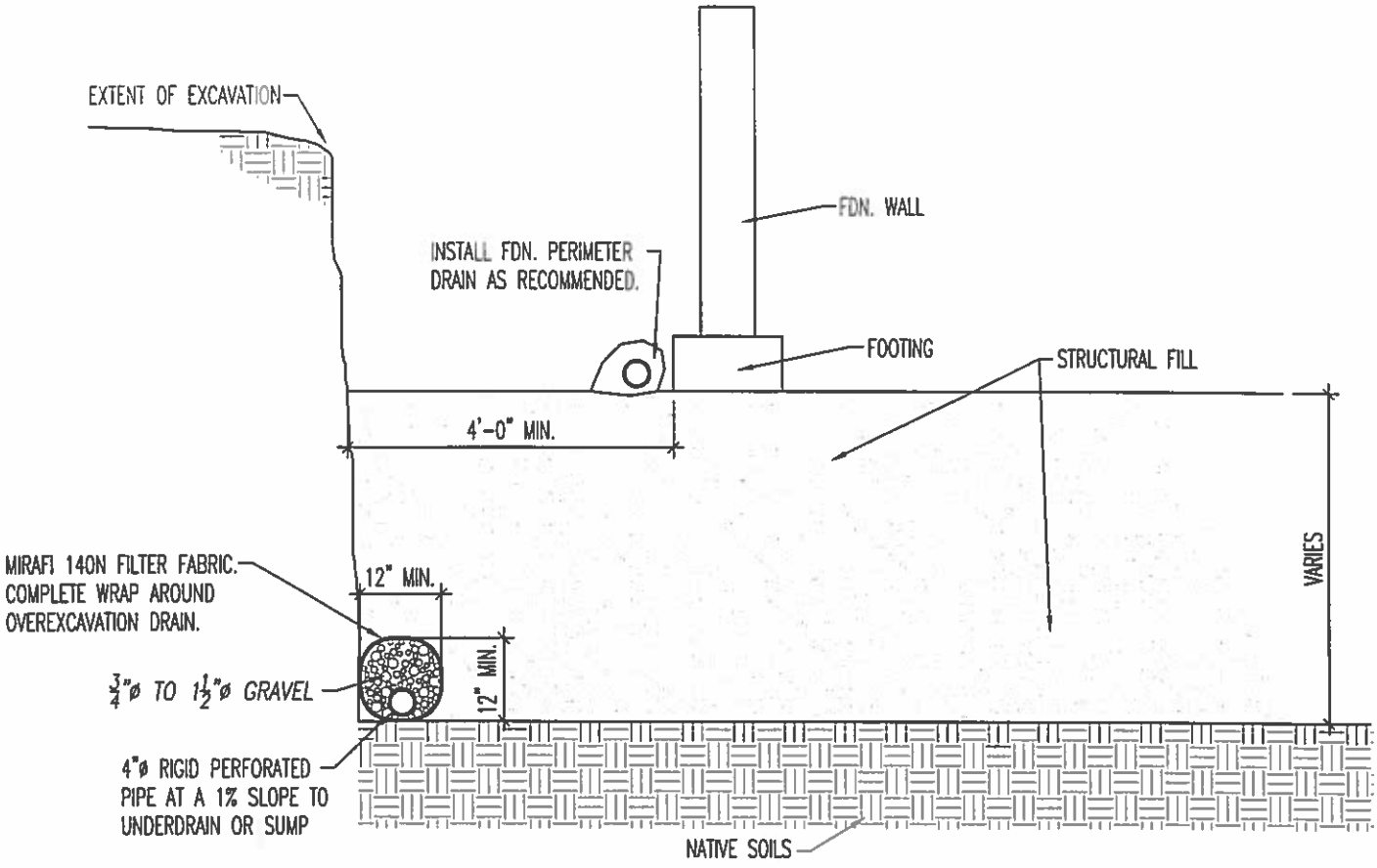
TB-2 (2) : APPROXIMATE TEST BORING LOCATION AND NUMBER (DEPTH TO BEDROCK)

REVISIONS	BY:

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

TEST BORING LOCATION PLAN
ROLLING HILLS RANCH
EL PASO COUNTY, CO
FOR: TECH CONTRACTORS

DRAWN BY:	SCC
DESIGNED BY:	SCC
CHECKED BY:	
DATE:	04/18/19
SCALE:	AS SHOWN
JOB NO.:	190300
FIGURE NO.:	2



OVEREXCAVATION DRAIN DETAIL

N.T.S.

NOTE:

EXTEND DRAIN TO SUMP AS REQ'D.

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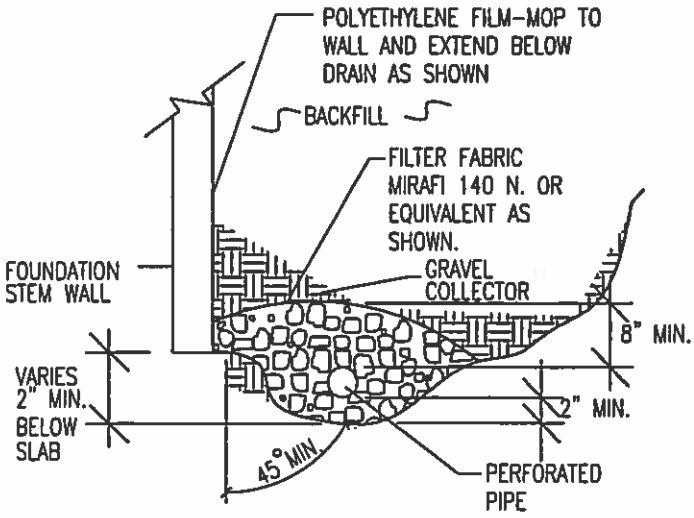
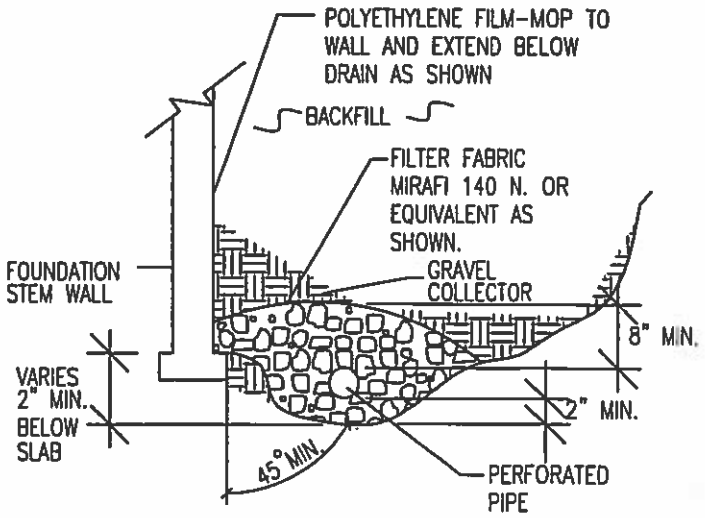
COLORADO SPRINGS, CO. 80907 (719) 531-5599

OVEREXCAVATION DRAIN DETAIL			
DRAWN BY: M. WELLS	DATE DRAWN:	DESIGNED BY: D. STECMAN	CHECKED:

JOB NO.: 190300

FIG. NO.: 3





NOTES:

-GRAVEL SIZE IS RELATED TO DIAMETER OF PIPE PERFORATIONS-85% GRAVEL GREATER THAN 2x PERFORATION DIAMETER.

-PIPE DIAMETER DEPENDS UPON EXPECTED SEEPAGE. 4-INCH DIAMETER IS MOST OFTEN USED.

-ALL PIPE SHALL BE PERFORATED PLASTIC. THE DISCHARGE PORTION OF THE PIPE SHOULD BE NON-PERFORATED PIPE.

-FLEXIBLE PIPE MAY BE USED UP TO 8 FEET IN DEPTH, IF SUCH PIPE IS DESIGNED TO WITHSTAND THE PRESSURES. RIGID PLASTIC PIPE WOULD OTHERWISE BE REQUIRED.

-MINIMUM GRADE FOR DRAIN PIPE TO BE 1% OR 3 INCHES OF FALL IN 25 FEET.

-DRAIN TO BE PROVIDED WITH A FREE GRAVITY OUTFALL, IF POSSIBLE. A SUMP AND PUMP MAY BE USED IF GRAVITY OUT FALL IS NOT AVAILABLE.

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PERIMETER DRAIN DETAIL

DRAWN:	DATE:	DESIGNED:	CHECKED:

JOB NO.: 190300

FIG NO.: 4

APPENDIX A: Test Boring Logs

TEST BORING NO. 1
DATE DRILLED 6/19/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 9', 6/19/19						
3" TOPSOIL SAND, CLEAN TO SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				14	8.3	1
	5			23	7.0	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST TO WET	10			50/9"	12.4	2
	15			50/10"	11.9	2
	20			50/7"	12.7	2

TEST BORING NO. 2
DATE DRILLED 3/11/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 13', 3/11/19						
SAND, GRAVELLY, SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST				22	12.5	1
	5			28	9.3	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN TO GRAY BROWN, VERY DENSE, MOIST TO WET	10			50/10"	7.8	2
	15			50/9"	14.6	2
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	20			50/9"	11.9	3
	25			50/6"	12.4	3

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300
FIG NO.: A- 1

TEST BORING NO. 3
DATE DRILLED 3/11/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 15', 3/11/19						
SAND, SILTY, TAN						1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST				50 / 11"	4.4	2
	5			50 / 8"	7.3	2
SANDSTONE, CLAYEY, FINE TO MEDIUM GRAINED, GRAY BROWN, VERY DENSE, MOIST TO WET	10			50 / 4"	11.4	2
	15			50 / 6"	11.6	2
	20			50 / 8"	30.4	2
	25			50 / 3"	24.1	2

TEST BORING NO. 4
DATE DRILLED 6/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 6/7/19						
6" TOPSOIL, SAND, SILTY, TAN						1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST				50 / 7"	7.8	2
	5			50 / 7"	5.7	2
FINE GRAINED LENSES	10			50 / 6"	8.7	2
CLAYSTONE, SANDY, TAN, HARD, MOIST	15			50 / 9"	17.0	3
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	20			50 / 5"	8.4	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		h	7/1/19

JOB NO.: 190300
FIG NO.: A- 2

TEST BORING NO. 5
DATE DRILLED 5/29/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 14', 5/29/19						
3" TOPSOIL SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				14	9.6	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO MEDIUM DENSE, MOIST	5			40	5.4	2
	10			50/6"	9.3	2
	15			50/5"	6.5	2
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	20			50/4"	13.8	3
SANDSTONE, VERY CLAYEY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST	25			50/7"	14.6	2

TEST BORING NO. 6
DATE DRILLED 3/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 10', 3/7/19						
6" TOPSOIL, SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED BROWN TO TAN, MEDIUM DENSE TO LOOSE, MOIST TO WET				28	2.4	1
	5			21	4.2	1
	10			9	15.7	1
WEATHERED TO FORMATIONAL SANDSTONE, CLAYEY TO VERY CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, DENSE TO VERY DENSE, MOIST	15			48	13.3	2
	20			50/10"	11.7	2
	25			45	15.4	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED: L	DATE: 7/1/19

JOB NO.: 190300
FIG NO.: A- 3

TEST BORING NO. 7
DATE DRILLED 5/29/2019
Job # 190300

WATER @ 16.5', 5/29/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	REMARKS
					1	6" TOPSOIL, SAND, SILTY, TAN
						WEATHERED SANDSTONE,
						SILTY, FINE TO COARSE
			46	4.8	2	GRAINED, DENES, MOIST
5			45	9.0	2	
						SANDSTONE, CLAYEY TO
10			50/6"	8.1	2	SILTY, FINE TO COARSE
						GRAINED, TAN, VERY DENSE,
						MOIST TO WET
15			50/3"	10.7	2	FINE GRAINED LENSES
20			50/6"	11.1	2	

TEST BORING NO. 8
DATE DRILLED 3/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

WATER @ 13', 3/7/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	REMARKS
						6" TOPSOIL, SAND, SLIGHTLY
						SILTY, FINE TO COARSE GRAINED,
			23	4.1	1	BROWN, MEDIUM DENSE, MOIST
5			11	6.0	1	
						SANDSTONE, SILTY, FINE TO
10			50/9"	8.5	2	COARSE GRAINED, TAN, VERY
						DENSE, MOIST TO WET
15			50/7"	17.8	2	
20			50/6"	16.6	2	

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300
FIG NO.: A- 4

TEST BORING NO. 9
DATE DRILLED 3/7/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 10', 3/7/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, DRY TO MOIST				16	2.7	1
	5			11	6.6	1
SAND, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, LOOSE, WET	10			5	18.0	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	15			50/7"	8.7	2
	20			50/6"	10.9	2

TEST BORING NO. 10
DATE DRILLED 3/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 14', 3/7/19						
6" TOPSOIL, SAND, SILTY TO CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				26	6.2	1
	5			19	7.8	1
	10			27	12.4	1
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, BRPOWN, VERY DENSE TO DENSE, WET	15			50/10"	12.5	2
WEATHERED ZONE	20			45	13.8	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300
FIG NO.: A- 5

TEST BORING NO. 11
DATE DRILLED 3/7/2019
Job # 190300

TEST BORING NO. 12
DATE DRILLED 3/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 9', 3/7/19						
SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, VERY MOIST				7	21.3	1
	5			16	15.1	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, WET	10			50/11"	17.5	2
	15			50/8"	12.6	2
	20			50/7"	12.7	2

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 14', 3/7/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, BROWN, LOOSE TO MEDIUM DENSE, MOIST				6	3.6	1
	5			23	8.6	1
WEATHERED TO FORMATIONAL SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, DENSE TO VERY DENSE, MOIST TO WET	10			36	11.3	2
CLAYEY LENSES	15			50/11"	20.2	2
	20			50/7"	12.8	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 7/17/19

JOB NO.: 190300
FIG NO.: A- 6

TEST BORING NO. 13
DATE DRILLED 5/29/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 14', 5/29/19						
6" TOPSOIL, SAND, CLEAN TO SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, MOIST				11	1.4	1
	5			14	6.3	1
WEATHERED TO FORMATIONAL SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO VERY DENSE, MOIST TO WET	10			45	8.4	2
	15			48	8.9	2
	20			50/5"	11.5	2

TEST BORING NO. 14
DATE DRILLED 5/29/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 18.5', 5/29/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, DRY TO MOIST				13	1.8	1
	5			7	2.3	1
FINE GRAINED LENSES	10			24	9.1	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST TO WET	15			50/11"	6.7	2
	20			50/11"	10.6	2
	25			50/9"	12.6	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/17/19

JOB NO.: 190300
FIG NO.: A- 7

TEST BORING NO. 15
DATE DRILLED 5/29/2019
Job # 190300

REMARKS

WATER @ 18', 5/29/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			43	3.2	2
5			34	9.9	2
10			50/7"	11.4	3
15			50/4"	11.0	2
20			50/11"	14.2	2

6" TOPSOIL SAND, SILTY, TAN
WEATHERED SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST

CLAYSTONE, VERY SANDY, GRAY BROWN, HARD, MOIST

SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST

TEST BORING NO. 16
DATE DRILLED 5/29/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 16', 5/29/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			11	1.2	1
5			21	1.8	1
10			50/9"	7.0	2
15			50/6"	8.3	2
20			50	15.0	3
25			B	8.9	3

6" TOPSOIL, SAND, SLIGHTLY SILTY, FINE TO COARSE GRASINED, TAN, MEDIUM DENSE, DRY

SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST

CLAYSTONE, VERY SANDY, BROWN, HARD, MOIST

B - BOUNCE

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300
FIG NO.: A- 8

TEST BORING NO. 17
DATE DRILLED 5/29/2019
Job # 190300

REMARKS

WATER @ 17.5', 5/29/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			50/10"	1.7	2
5			50/8"	1.8	2
10			50/6"	6.9	2
15			50/7"	8.0	2
20			50/6"	10.1	2

6" TOPSOIL, SAND, SILTY, TAN
SANDSTONE, SILTY, FINE TO
COARSE GRAINED, TAN,
VERY DENSE, DRY TO MOIST

TEST BORING NO. 18
DATE DRILLED 6/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

DRY TO 20', 6/7/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			12	2.7	1
5			42	5.0	2
10			50/6"	8.9	2
15			50/7"	4.9	2
20			50/6"	7.0	2

6" TOPSOIL, SAND, SILTY,
FINE TO COARSE GRAINED,
BROWN, MEDIUM DENSE, DRY

WEATHERED TO FORMATIONAL
SANDSTONE, SILTY, FINE TO
COARSE GRAINED, TAN,
DENSE TO VERY DENSE, MOIST

FINE GRAINED LENSES

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300
FIG NO.: A- 9

TEST BORING NO. 19
DATE DRILLED 6/7/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 6/7/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, MEDIUM DENSE, MOIST				21	7.8	1
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	5			50/9"	10.9	3
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	10			50/8"	7.8	2
	15			50/8"	5.7	2
	20			50/6"	8.9	2

TEST BORING NO. 20
DATE DRILLED 5/30/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 5/30/19 CAVED TO 19', 6/6/19, DRY						
6" TOPSOIL, SAND, SILTY, TAN SANDSTONE, SILTY TO CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, DRY TO MOIST				50/10"	4.8	2
	5			50/9"	8.6	2
	10			50/9"	6.5	2
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	15			50/7"	10.4	3
SANDSTONE, VERY CLAYEY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	20			50/2"	8.0	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300
FIG NO.: A- 10

TEST BORING NO. 21
DATE DRILLED 5/30/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
6" TOPSOIL, SAND, SILTY, TAN						1
WEATHERED SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST				40	3.0	2
	5			42	6.2	2
6/6/19 ▼ WATER @ 18', 5/30/19 WATER @ 10', 6/6/19						
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	10			50/10"	6.5	2
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	15			50	13.1	3
5/30/19 ▼						
SANDSTONE LENSE	20			50	12.3	3
SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST	25			50/6"	8.8	2

TEST BORING NO. 22
DATE DRILLED 4/25/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				25	7.2	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	5			50/10"	6.3	2
CLAYSTONE, VERY SANDY, TAN, HARD, MOIST	10			50/8"	12.1	3
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	15			50/6"	3.4	2
▼ WATER @ 18.5', 6/6/19						
	20			50/6"	9.7	2

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TEST BORING LOG

DRAWN	DATE	CHECKED: h	DATE: 7/1/19

JOB NO.: 190300
FIG NO.: A- 11

TEST BORING NO. 23
DATE DRILLED 3/12/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 3/12/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE, MOIST				4	3.3	1
	5			7	4.5	1
SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	10			50/10"	12.1	2
CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST	15			50/8"	12.5	3
	20			50/11"	13.3	3

TEST BORING NO. 24
DATE DRILLED 3/12/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 9', 3/12/19 WATER @ 2', 6/6/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST 6/6/19				45	11.4	1
CLAYSTONE, SANDY, TAN, HARD, MOIST	5			50/7"	16.8	3
3/12/19 SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, WET	10			50/11"	21.0	2
	15			50/7"	8.3	2
CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST	20			50/9"	10.4	2
	25			50/5"	16.1	3

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7.12.19

JOB NO.: 190300
FIG NO.: A- 12

TEST BORING NO. 25
DATE DRILLED 3/12/2019
Job # 190300

REMARKS

WATER @ 12', 7/9/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
					1	SAND, SILTY, TAN
						SANDSTONE, CLAYEY TO SILTY,
			50/3"	9.4	2	FINE TO COARSE GRAINED, TAN
5			50/9"	8.6	2	TO GRAY BROWN, VERY DENSE,
						MOIST TO WET
10			50/7"	6.6	2	
15			50/11"	17.0	2	
20			50/5"	14.6	2	

TEST BORING NO. 26
DATE DRILLED 6/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 11', 7/9/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
					1	6" TOPSOIL, SAND, SILTY, TAN
						SANDSTONE, SLIGHTLY
			50/7"	5.5	2	SILTY TO SILTY, FINE TO
5			50/6"	4.2	2	COARSE GRAINED, BROWN
						TO TAN, VERY DENSE, MOIST
						TO WET
10			50/7"	6.4	2	
15			50/6"	10.3	2	
20			50/5"	11.5	2	

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7.12.19

JOB NO.: 190300
FIG NO.: A- 13

TEST BORING NO. 27
DATE DRILLED 3/12/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 18', 3/12/19 WATER @ 8', 6/6/19						
6" TOPSOIL SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, DRY				22	2.7	1
SAND, VERY CLAYEY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST	5			23	13.6	1
6/6/2019 ▼						
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	10			50/8"	8.7	2
	15			50/7"	9.6	2
3/12/2019 ▼						
CLAYSTONE, SANDY, BROWN, HARD, MOIST	20			50/6"	15.9	3

TEST BORING NO. 28
DATE DRILLED 4/25/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 13.5', 4/25/19						
6" TOPSOIL, SAND, SILTY TO CLEAN, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST				18	2.4	1
	5			26	5.2	1
SANDSTONE, SILTY TO CLAYEY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST TO WET	10			50/11"	7.7	2
▼	15			50/6"	17.1	2
	20			50/5"	8.1	2

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TEST BORING LOG

DRAWN	DATE	CHECKED	DATE
			7.12.19

JOB NO. 190300
FIG NO. A- 14

TEST BORING NO. 29
DATE DRILLED 5/30/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 19', 5/30/19 WATER @ 12', 6/11/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				20	6.6	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	5			50/11"	8.5	2
SANDSTONE, CLAYEY TO VERY CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST	10			50/6"	11.2	2
6/6/19	15			50/6"	7.7	2
5/30/2019	20			50/6"	9.0	2
FINE GRAINED LENSES	25			50/6"	15.4	2

TEST BORING NO. 30
DATE DRILLED 4/25/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 8', 4/25/19						
6" TOPSOIL, SAND, SILTY TO SLIGHTLY SILTY WITH CLAY LENSES, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, DRY TO MOIST				10	1.7	1
	5			30	4.4	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, WET	10			39	9.5	1
	15			50	12.8	2
B - BOUNCE	20			B		2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 7-12-19

JOB NO.: 190300
FIG NO.: A- 15

TEST BORING NO. 31
DATE DRILLED 5/29/2019
Job # 190300

REMARKS

DRY TO 20', 5/29/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			32	2.0	1
5			30	3.0	1
10			34	9.8	1
15			50 11"	14.8	3
20			50 7"	14.7	3

6" TOPSOIL, SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, DENSE, DRY TO MOIST

CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST

TEST BORING NO. 32
DATE DRILLED 3/12/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 13', 3/12/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			5	1.4	1
5			6	1.3	1
10			11	10.7	1
15			50 10"	11.8	2
20			50 7"	11.0	2
25			50 8"	14.8	3

6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, BROWN, LOOSE TO MEDIUM DENSE, DRY TO MOIST

SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST

CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/12/19

JOB NO.: 190300
FIG NO.: A- 16

TEST BORING NO. 33
DATE DRILLED 3/12/2019
Job # 190300

REMARKS

WATER @ 17', 3/12/19
WATER @ 7', 6/6/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			13	2.4	1
5			15	4.1	1
10			45	17.4	3
15			50 9"	13.1	3
20			50 8"	18.0	3
25			50 5"	14.3	2

6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, DRY TO MOIST

6/6/2019

WEATHERED TO FORMATIONAL CLAYSTONE, SANDY, GRAY BROWN, VERY STIFF TO HARD, MOIST

3/12/2019

SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, VERY MOIST

TEST BORING NO. 34
DATE DRILLED 3/12/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 9', 3/12/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			50 7"	6.1	2
5			50 10"	8.2	2
10			50 9"	12.8	3
15			50 5"	9.7	2
20			50 5"	15.9	3

6" TOPSOIL, SAND, SILTY, BROWN

SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST

CLAYSTONE, VERY SANDY, GRAY BROWN, HARD, MOIST

SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST

CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST

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TEST BORING LOG

DRAWN:	DATE	CHECKED:	DATE:
			7/12/19

JOB NO.: 190300
FIG NO.: A- 17

TEST BORING NO. 35
DATE DRILLED 3/12/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 3/12/19						
6" TOPSOIL SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST				48	3.6	1
SANDSTONE, SLIGHTLY SILTY TO SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	5			50	6.0	2
	10			50/9"	8.9	2
	15			50	9.7	2
CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST	20			50/6"	11.7	3

TEST BORING NO. 36
DATE DRILLED 3/11/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 13.5', 7/9/19						
SAND, SILTY, TAN						1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST				50/7"	3.1	2
	5			50/6"	3.7	2
	10			50/6"	10.9	2
CLAYSTONE, VERY SANDY, BLUE GRAY, HARD, MOIST	15			50/6"	12.2	3
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN TO BROWN, VERY DENSE, MOIST TO WET	20			50/10"	13.4	2
	25			50/7"	16.8	2

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TEST BORING LOG

DRAWN	DATE	CHECKED	DATE
			7/12/19

JOB NO: 190300
FIG NO: A- 18

TEST BORING NO. 37
DATE DRILLED 3/12/2019
Job # 190300

REMARKS

DRY TO 20', 3/12/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			50/11"	11.6	3
5			50/10"	10.1	2
10			50/7"	11.3	2
15			50/7"	9.2	2
20			50/6"	9.3	2

SAND, SILTY, BROWN

CLAYSTONE, SANDY, BROWN, HARD, MOIST

SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST

TEST BORING NO. 38
DATE DRILLED 6/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 18', 7/9/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			4	1.7	1
5			12	0.7	1
10			*	7.6	1
15			*	19.1	3
20			50/5"	12.1	2
25			B	9.4	3

6" TOPSOIL, SAND, GRAVELLY, SILTY TO SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, LOOSE TO MEDIUM DENSE, MOIST

CLAYSTONE, SANDY, BROWN, MOIST

SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST

CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST

* - BULK SAMPLE TAKEN

B - BOUNCE

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/12/19

JOB NO.: 190300
FIG NO.: A- 19

TEST BORING NO. 39
DATE DRILLED 5/29/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 11', 7/9/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST TO WET				13	10.7	1
	5			21	11.7	1
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	10			50	10.2	3
SANDSTONE, VERY CLAYEY, FINE TO COARSE GRAINED, BROWN, WET	15			*	14.8	2
CLAYSTONE, SANDY, BROWN, WET	20			*	18.4	3

TEST BORING NO. 40
DATE DRILLED 3/12/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 10', 3/12/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO MEDIUM DENSE, MOIST				32	4.8	1
	5			27	6.2	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST TO WET	10			50/9"	12.9	2
CLAYEY LENSES	15			50/8"	12.9	2
	20			50/9"	15.2	2

* - BULK SAMPLE TAKEN

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/12/19

JOB NO.: 190300
FIG NO.: A- 20

TEST BORING NO. 41
DATE DRILLED 6/7/2019
Job # 190300

REMARKS

WATER @ 17', 6/7/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			50 / 7"	5.2	2
5			50 / 6"	10.3	3
10			50 / 6"	10.1	2
15			50 / 7"	11.9	2
20			50 / 6"	15.5	2

6" TOPSOIL, SAND, SILTY, TAM
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST
CLAYSTONE, SANDY, BROWN, HARD, MOIST

SANDSTONE, CLAYEY TO SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST TO WET

TEST BORING NO. 42
DATE DRILLED 3/12/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 14', 6/7/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			10	9.2	1
5			29	7.8	1
10			50 / 10"	10.0	2
15			50 / 6"	10.2	2
20			50 / 6"	9.3	2
25			50 / 6"	14.0	2

6" TOPSOIL, SAND, CLAYEY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST

SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST TO WET

CLAYEY LENSES

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TEST BORING LOG

DRAWN:	DATE	CHECKED:	DATE:
			7/12/19

JOB NO.: 190300
FIG NO.: A- 21

TEST BORING NO. 43
DATE DRILLED 5/30/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 19', 5/30/19						
6" TOPSOIL, SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				14	3.4	1
WEATHERED SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, DENSE, MOIST	5			32	8.3	2
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	10			50/7"	14.1	3
	15			50/8"	12.5	3
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	20			50/5"	12.2	2
CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST	25			50/6"	16.8	3

TEST BORING NO. 44
DATE DRILLED 5/30/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 5/30/19						
6" TOPSOIL, SAND, SILTY, TAN WEATHERED SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST				32	3.0	2
CLAYEY LENSES	5			35	10.3	2
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	10			50/11"	9.8	2
	15			50/8"	8.8	2
CLAYEY LENSES	20			50/7"	10.6	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 7/11/19

JOB NO.: 190300
FIG NO.: A- 22

TEST BORING NO. 45
DATE DRILLED 5/30/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 13', 5/30/19 WATER @ 11', 6/6/19						
6" TOPSOIL, SAND, CLAYEY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST				22	11.2	1
SANDSTONE, SILTY TO CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST TO WET	5			50/5"	6.9	2
6/6/2019	10			50/11"	9.0	2
5/30/2019	15			50/7"	8.7	2
	20			50/8"	13.4	2
	25			50/7"	13.4	2

TEST BORING NO. 46
DATE DRILLED 5/30/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 22', 5/30/19						
6" TOPSOIL, SAND, CLAYEY, FINE TO COARSE GRAINED, LIGHT BROWN, MEDIUM DENSE, MOIST				10	14.2	1
SANDSTONE, CLAYEY TO VERY CLAYEY, FINE TO COARSE GRAINED, TAN TO GRAY BROWN, VERY DENSE, MOIST	5			50/11"	7.9	2
	10			50/6"	7.9	2
	15			50/6"	8.4	2
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	20			50/6"	12.9	3
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST	25			50/6"	14.3	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300
FIG NO.: A- 23

TEST BORING NO. 47
DATE DRILLED 5/30/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 5/30/19						
6" TOPSOIL, SAND, SILTY, TAN						1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST				50/9"	9.0	2
	5			50/10"	8.7	2
	10			50/10"	9.4	2
	15			50/10"	8.8	2
	20			50/7"	8.5	2

TEST BORING NO. 48
DATE DRILLED 6/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 6/7/19						
CAVED TO 14', 7/9/19, DRY						
6" TOPSOIL, SAND, SILTY, TAN						1
SANDSTONE, CLAYEY TO SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST				32	8.9	2
	5			27	7.8	2
CLAYSTONE, SANDY, BROWN, HARD, MOIST	10			50/9"	9.6	3
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	15			50/8"	5.4	2
CLAYSTONE, VERY SANDY, GRAY BROWN, HARD, MOIST	20			50/9"	9.4	3

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/12/19

JOB NO.: 190300
FIG NO.: A- 24

TEST BORING NO. 49
DATE DRILLED 6/7/2019
Job # 190300

TEST BORING NO.
DATE DRILLED
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 12', 6/7/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Description
			15	5.2	1	6" TOPSOIL, SAND, SLIGHTLY SILTY TO SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, MOIST
5			20	10.3	1	
10			33	10.1	1	
15			50/9"	11.9	2	SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST TO WET
20			50/6"	15.5	2	
25			50/5"	15.5	2	

REMARKS

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5					
10					
15					
20					
25					

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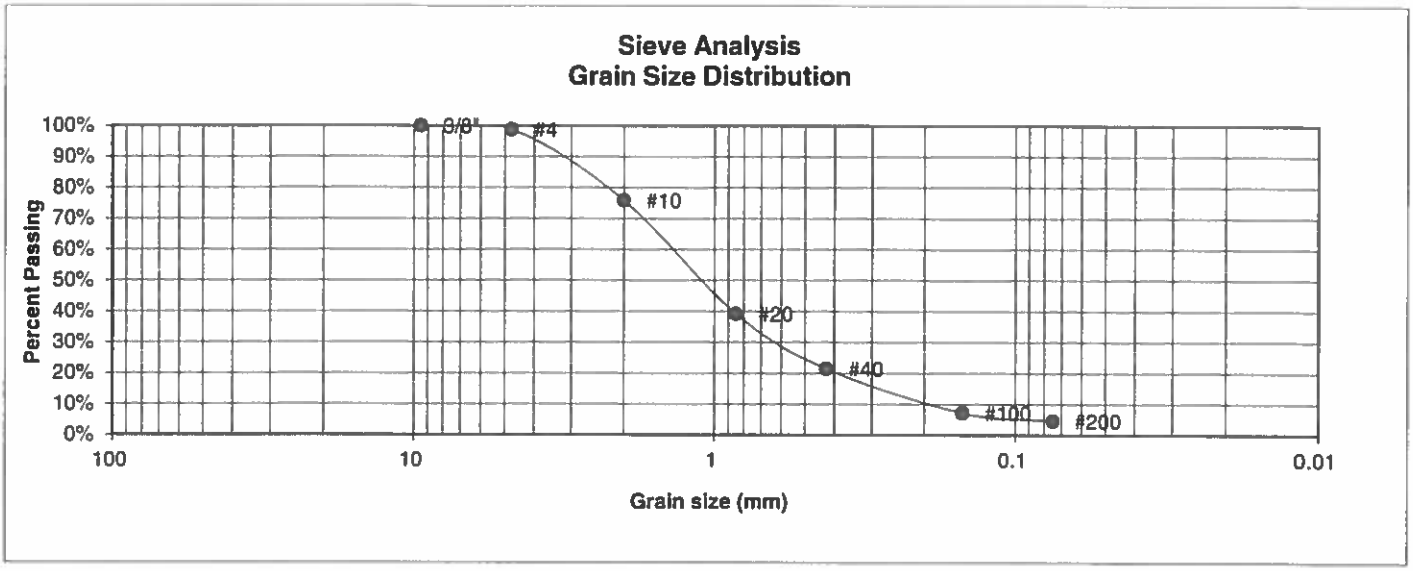
TEST BORING LOG

DRAWN	DATE	CHECKED	DATE
			7/12/19

JOB NO. 190300
FIG NO. A- 25

APPENDIX B: Laboratory Test Results

UNIFIED CLASSIFICATION	SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	1	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.7%
10	75.9%
20	39.2%
40	21.4%
100	7.2%
200	4.7%

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)	

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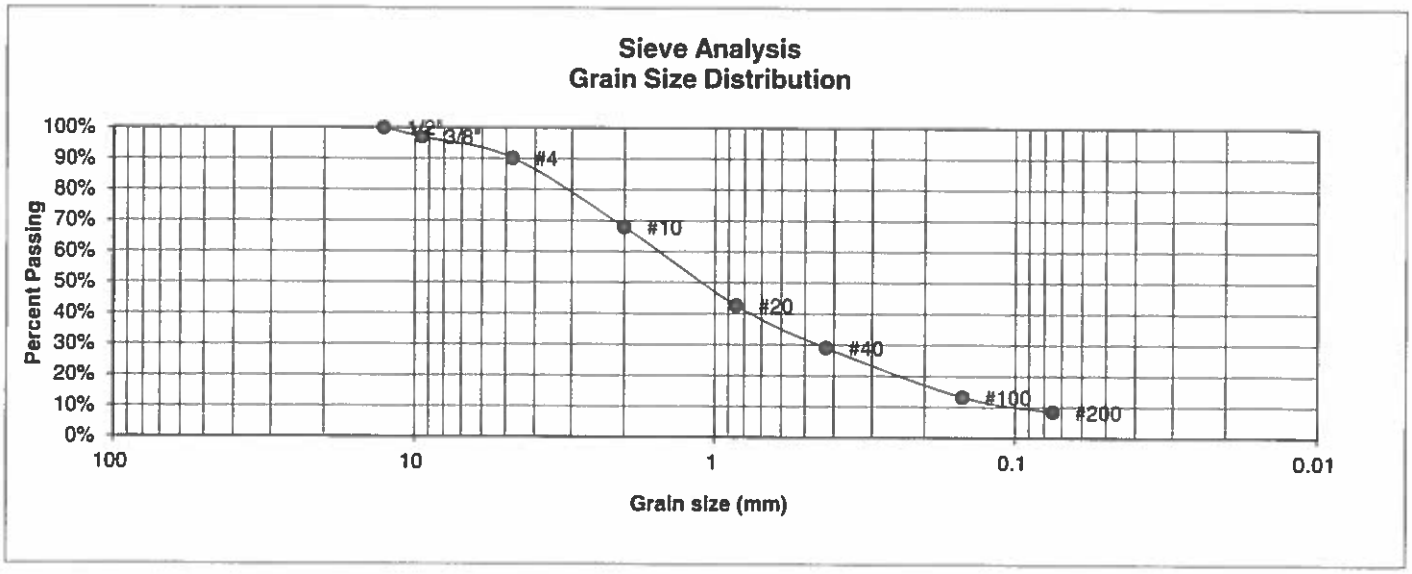
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	2	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.0%
4	90.2%
10	67.9%
20	42.7%
40	29.0%
100	13.2%
200	8.4%

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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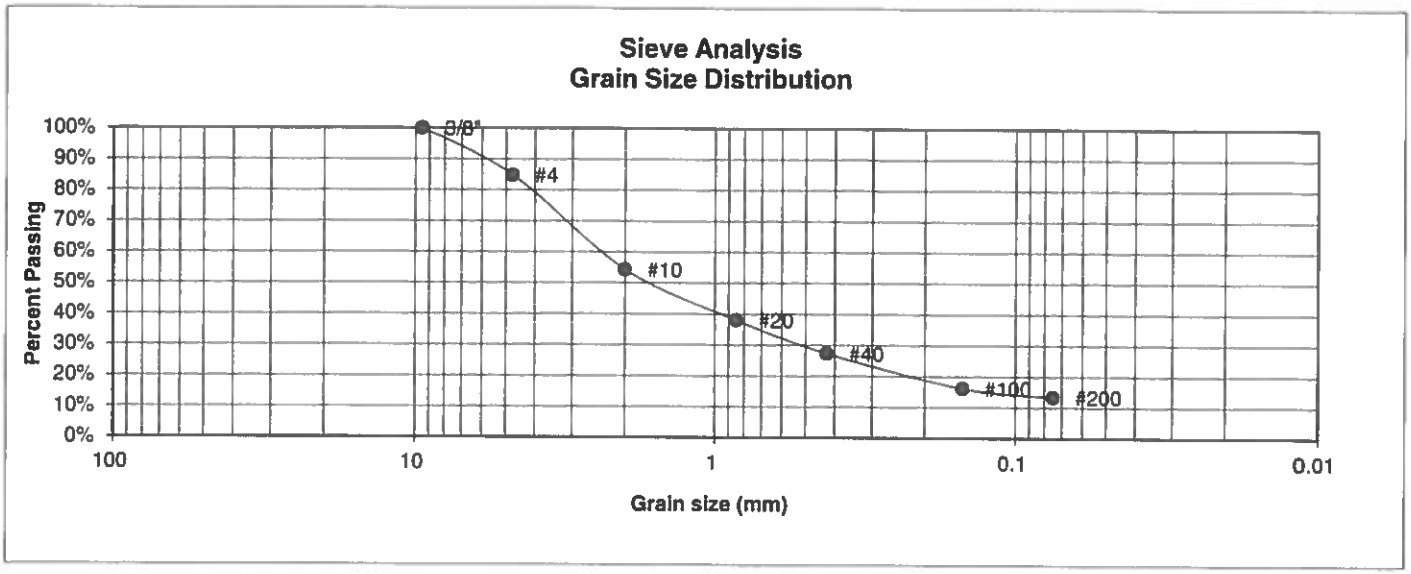
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		h	7/1/19

JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	5	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	84.9%
10	54.4%
20	38.1%
40	27.3%
100	16.2%
200	13.3%

Atterberg Limits	
Plastic Limit	16
Liquid Limit	26
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:
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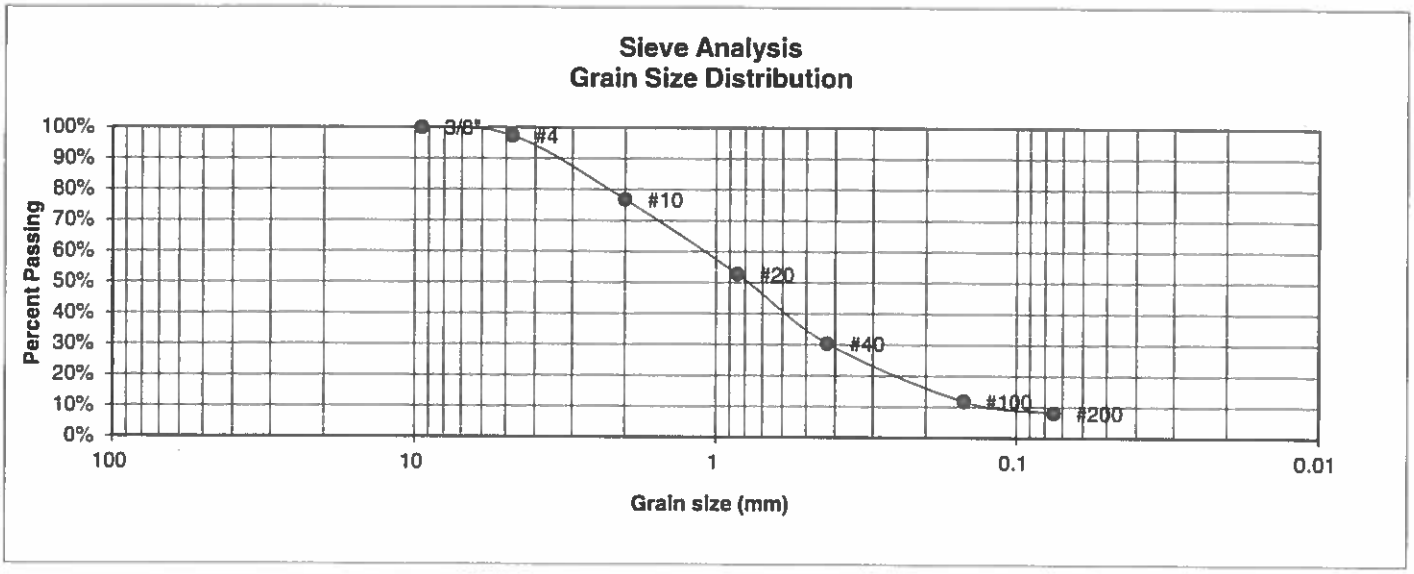
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	6	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.3%
10	76.8%
20	52.8%
40	30.4%
100	11.8%
200	8.1%

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)

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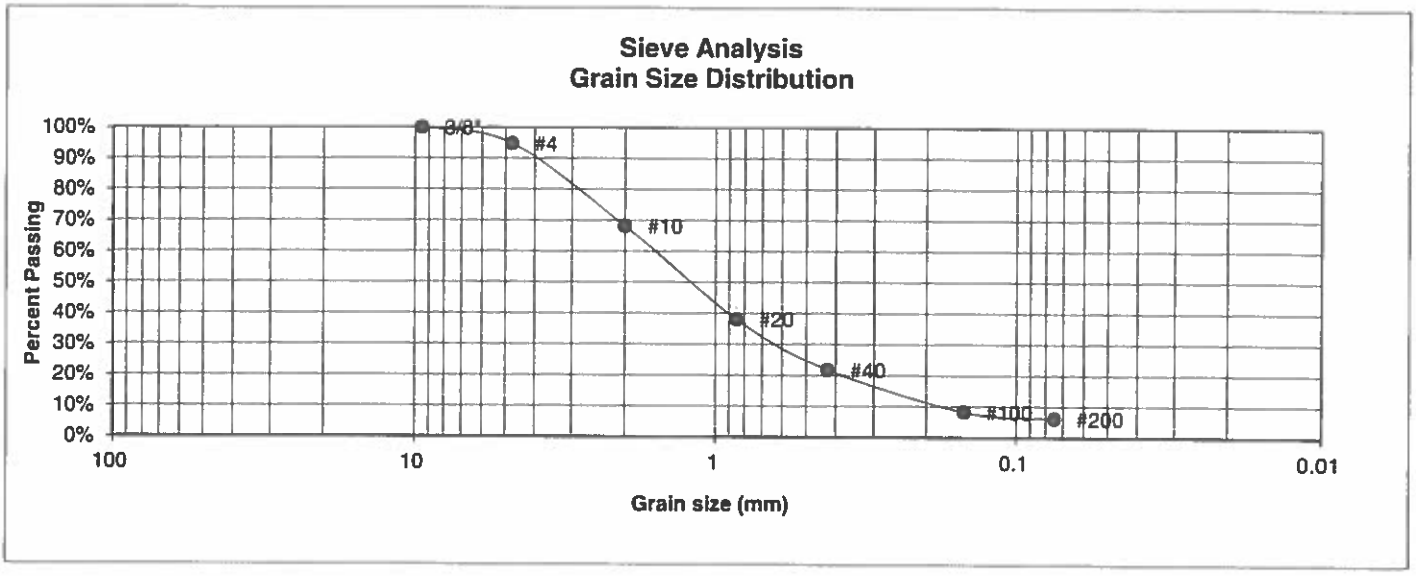
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	8	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.8%
10	68.1%
20	38.0%
40	21.8%
100	8.2%
200	6.1%

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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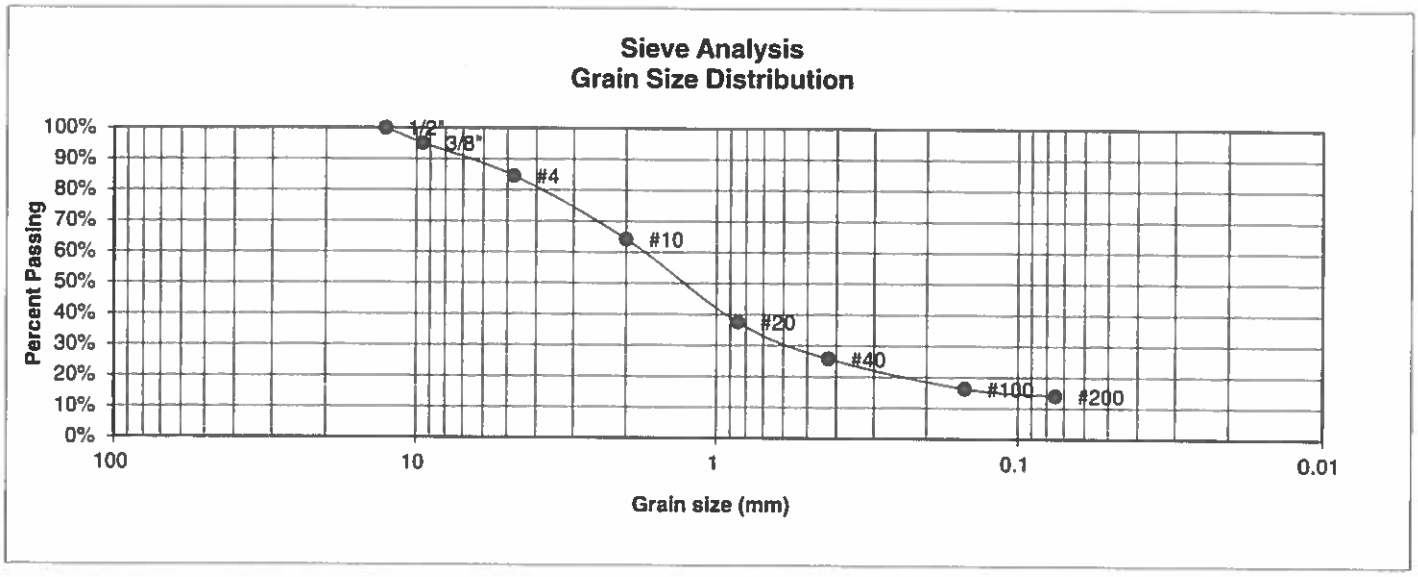
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		h	7/1/19

JOB NO: 190300

FIG NO:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	10	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.1%
4	84.6%
10	64.3%
20	37.5%
40	25.8%
100	16.3%
200	14.0%

Atterberg Limits

Plastic Limit	13
Liquid Limit	29
Plastic Index	16

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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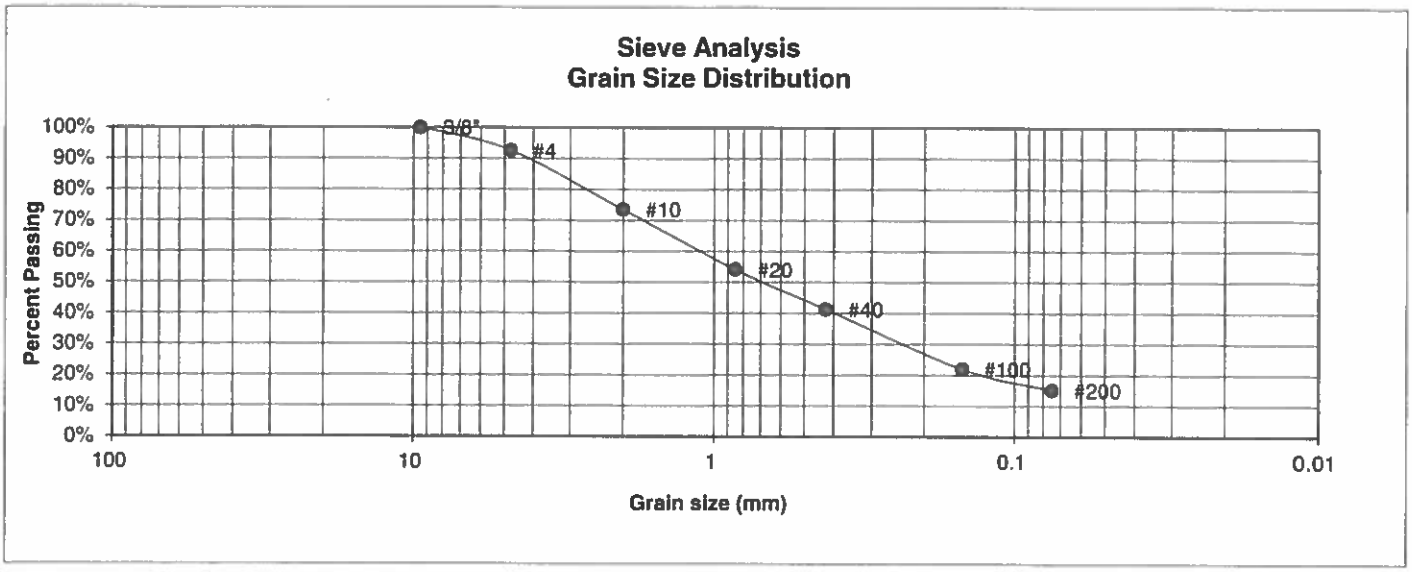
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	11	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	92.6%
10	73.5%
20	54.1%
40	41.3%
100	22.0%
200	15.2%

Atterberg Limits

Plastic Limit	
Liquid Limit	
Plastic Index	

Swell

Moisture at start	12.1%
Moisture at finish	19.1%
Moisture increase	6.9%
Initial dry density (pcf)	110
Swell (psf)	370

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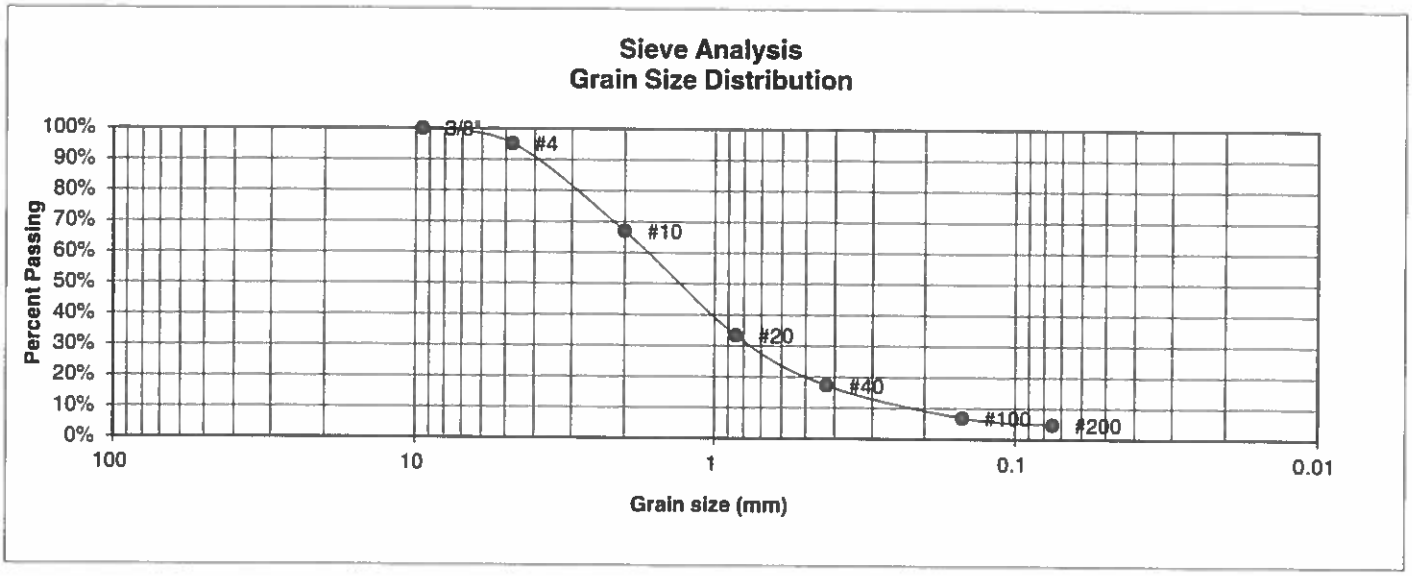
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	13	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.2%
10	67.0%
20	33.4%
40	17.3%
100	7.0%
200	4.8%

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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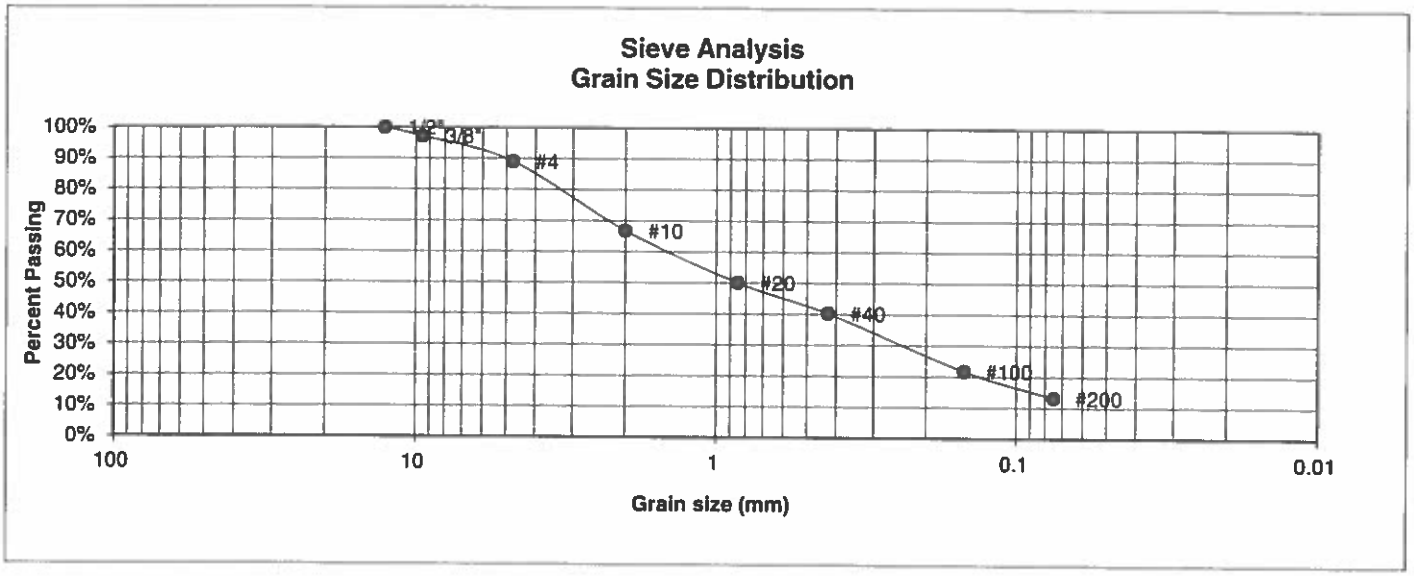
LABORATORY TEST RESULTS

DRAWN	DATE	CHECKED	DATE
			7/1/19

JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	14	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.2%
4	89.0%
10	66.8%
20	50.1%
40	40.2%
100	21.8%
200	13.2%

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)

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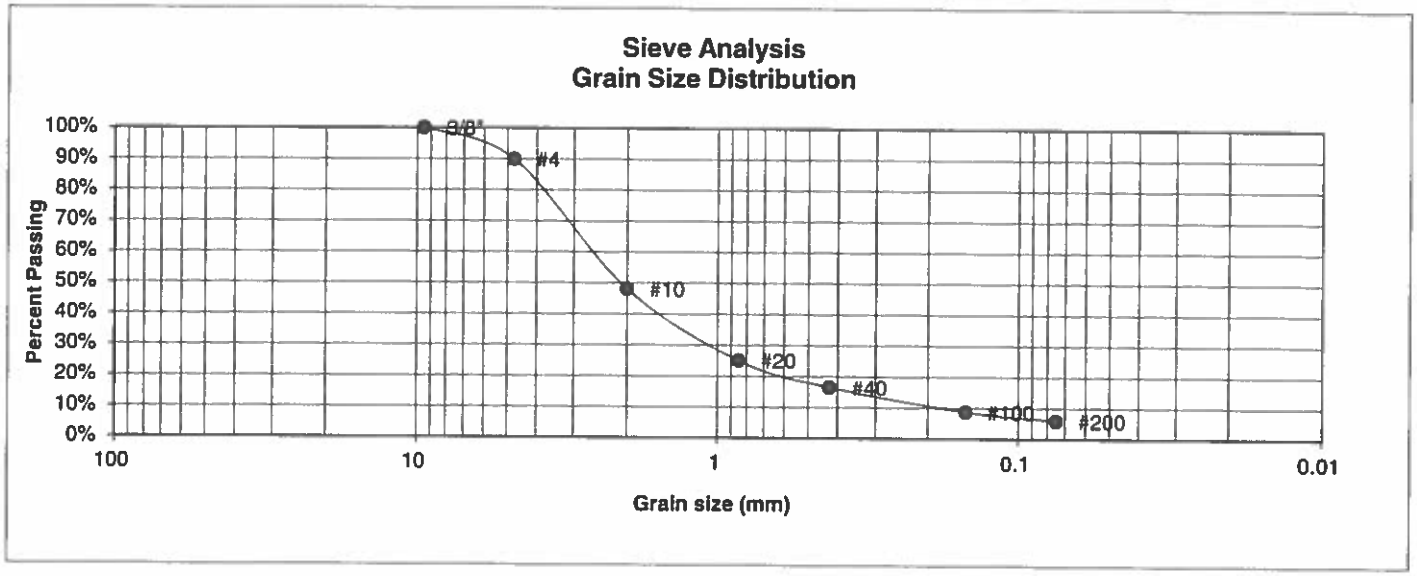
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE: 7/1/19

JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	16	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	89.9%
10	48.1%
20	25.1%
40	16.5%
100	8.7%
200	5.9%

Atterberg Limits

Plastic Limit	
Liquid Limit	
Plastic Index	

Swell

Moisture at start	13.5%
Moisture at finish	21.9%
Moisture increase	8.4%
Initial dry density (pcf)	100
Swell (psf)	70

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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
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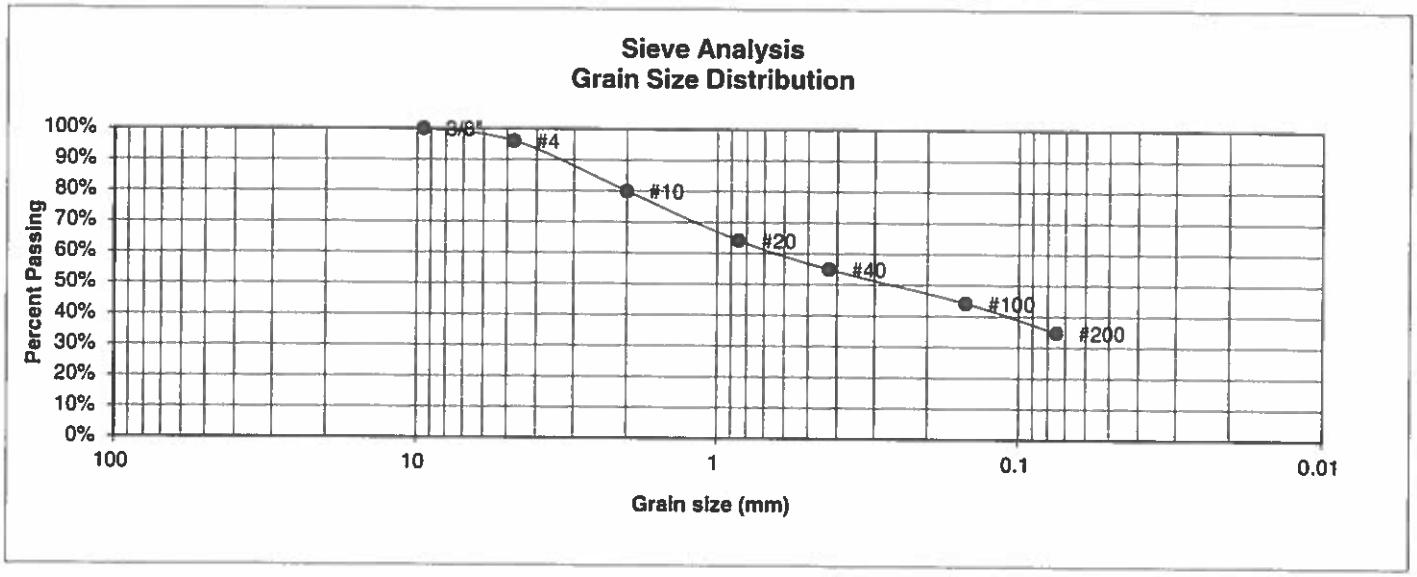
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	19	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.1%
10	80.0%
20	64.1%
40	55.0%
100	44.2%
200	34.7%

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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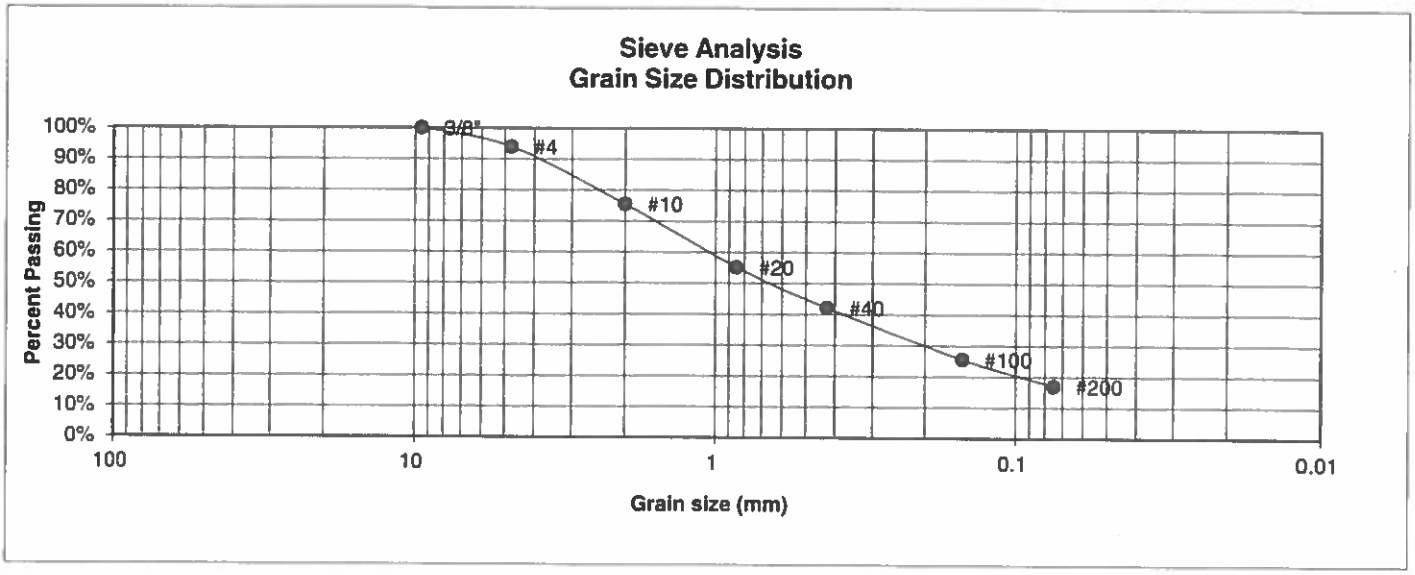
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED	DATE:
			7/1/19

JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	23	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.0%
10	75.5%
20	55.2%
40	42.1%
100	25.6%
200	17.0%

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)

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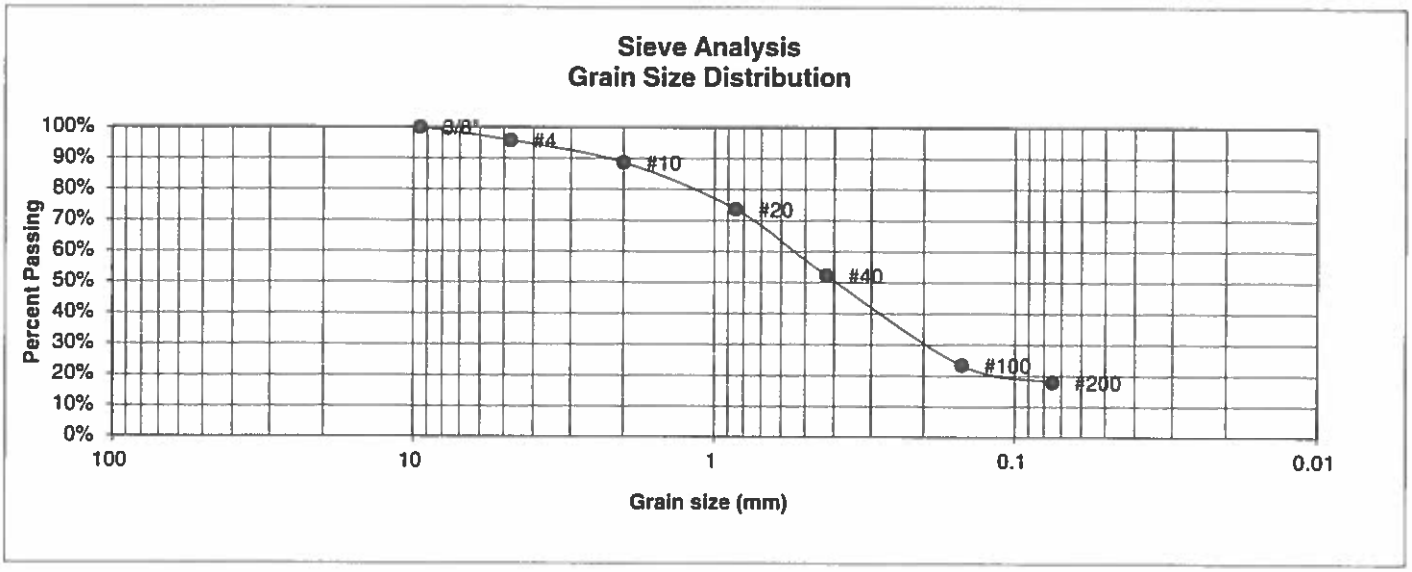
LABORATORY TEST RESULTS

DRAWN	DATE	CHECKED	DATE
		h	7/1/19

JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	24	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.8%
10	88.7%
20	73.6%
40	52.3%
100	23.5%
200	18.0%

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:
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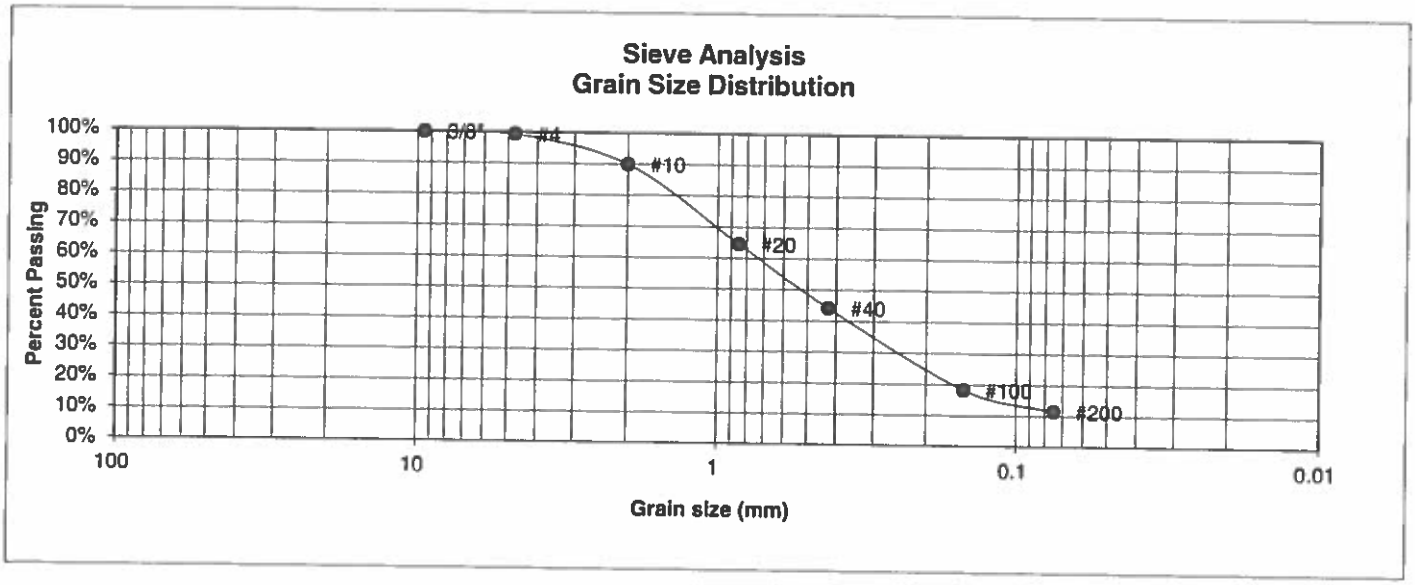
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	26	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.3%
10	90.0%
20	64.6%
40	44.2%
100	18.3%
200	11.5%

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)

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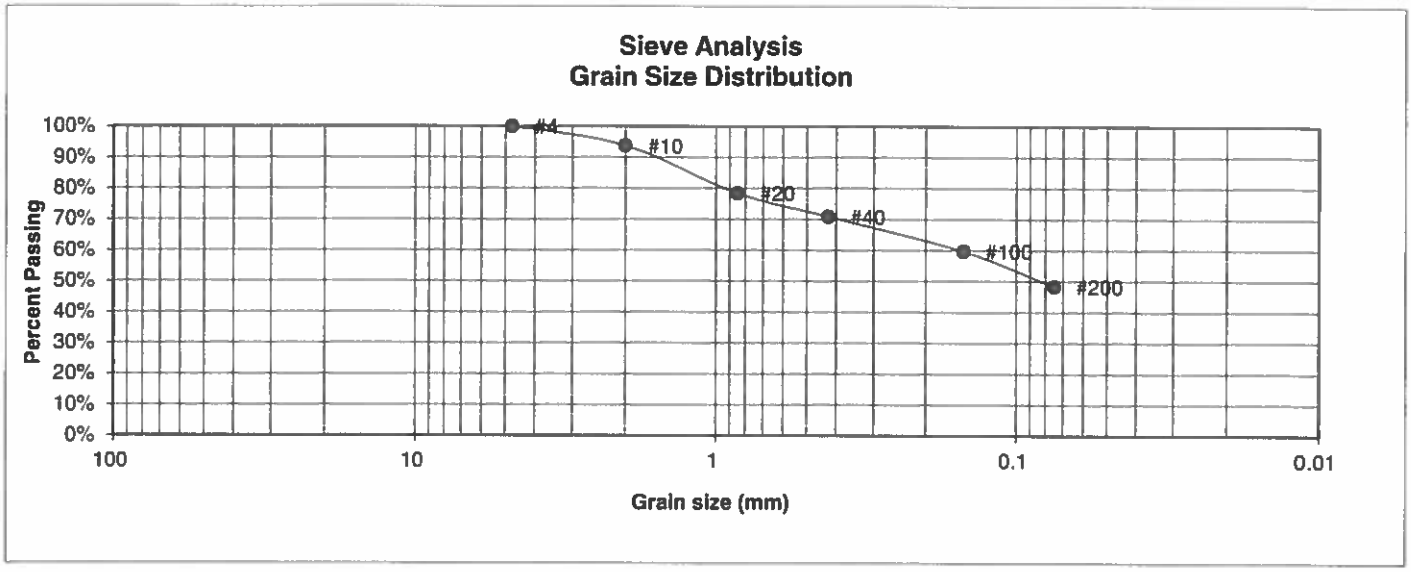
FIG NO.:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	27	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	93.7%
20	78.5%
40	70.9%
100	59.7%
200	48.3%

Atterberg Limits

Plastic Limit

Liquid Limit

Plastic Index

Swell

Moisture at start	14.0%
Moisture at finish	20.9%
Moisture increase	6.9%
Initial dry density (pcf)	103
Swell (psf)	460

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LABORATORY TEST RESULTS

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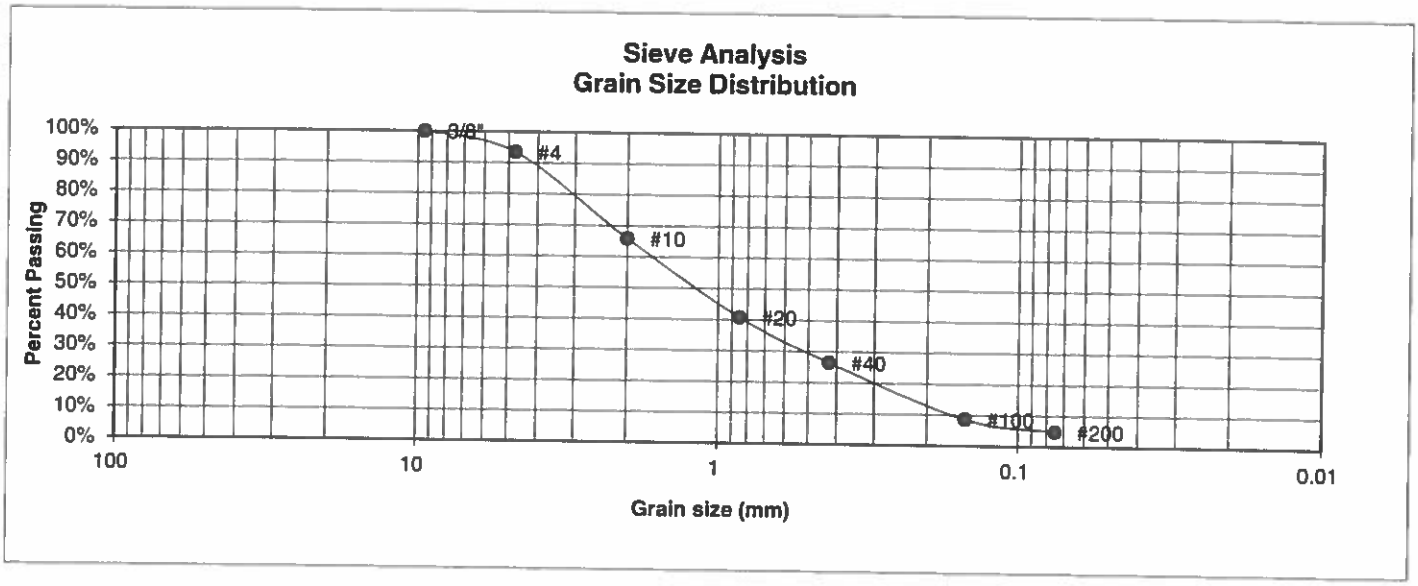
FIG NO.:

UNIFIED CLASSIFICATION	SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	28	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	93.4%
10	65.9%
20	40.8%
40	26.4%
100	8.7%
200	4.9%

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)

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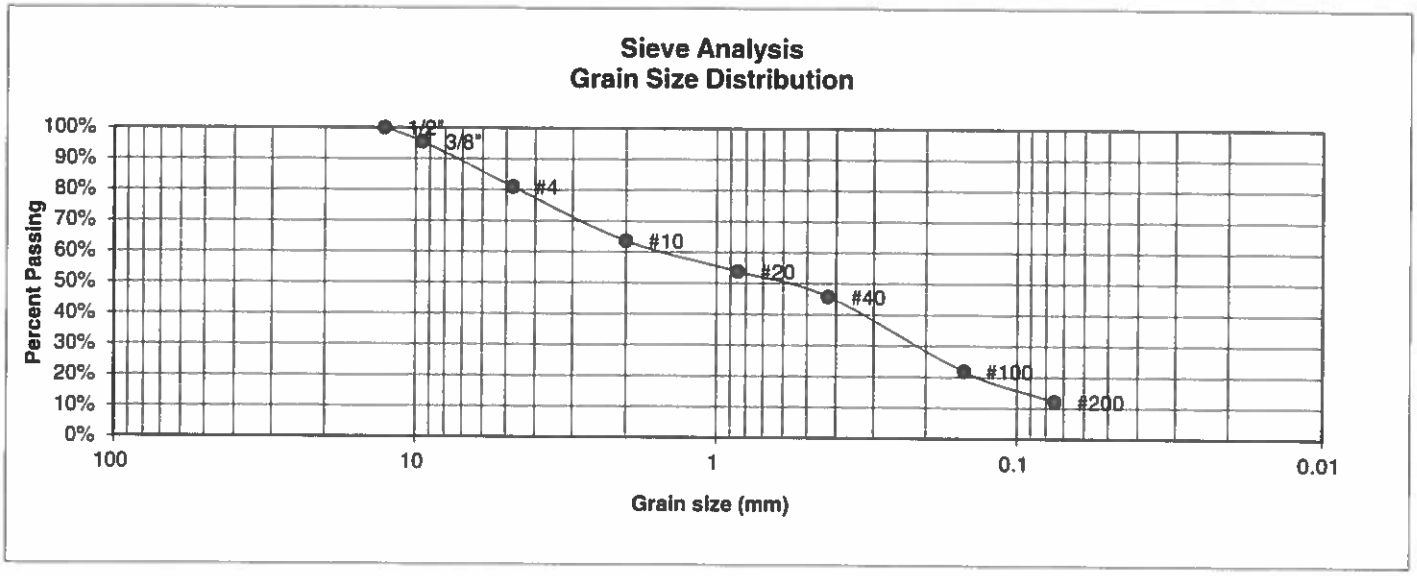
FIG NO.:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	30	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.5%
4	81.0%
10	63.6%
20	53.9%
40	45.8%
100	21.9%
200	12.1%

Atterberg Limits

Plastic Limit	
Liquid Limit	
Plastic Index	

Swell

Moisture at start	13.1%
Moisture at finish	19.6%
Moisture increase	6.5%
Initial dry density (pcf)	97
Swell (psf)	2970

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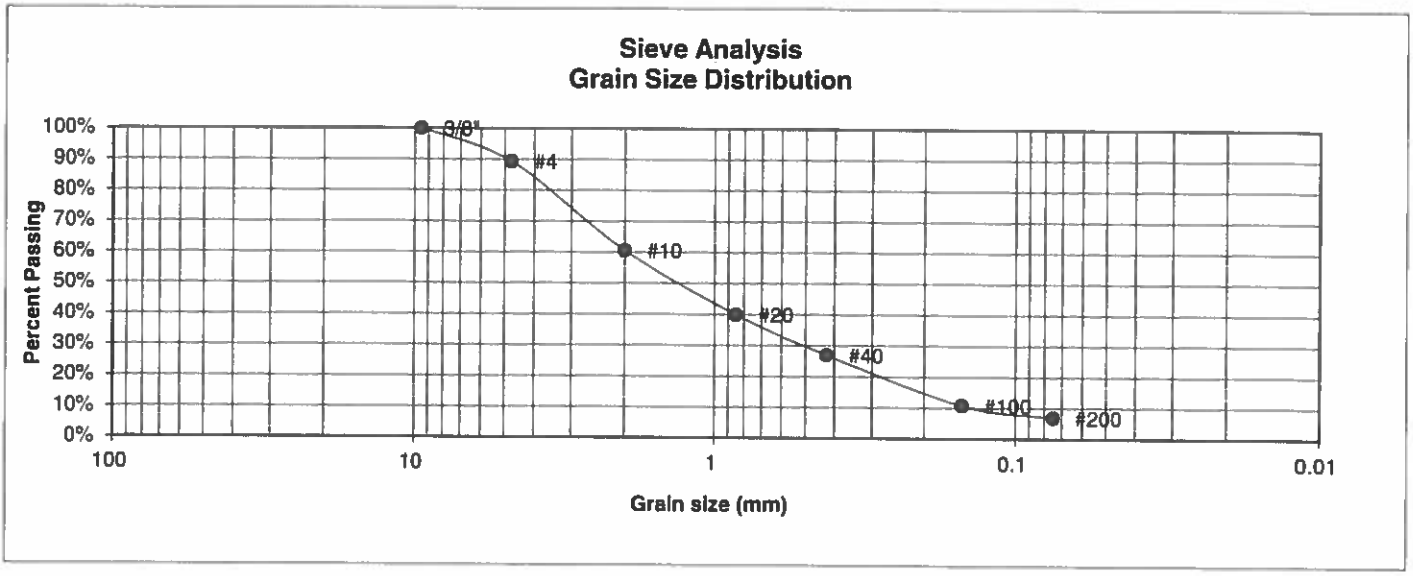
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	30	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	89.3%
10	60.6%
20	40.0%
40	26.9%
100	10.8%
200	6.9%

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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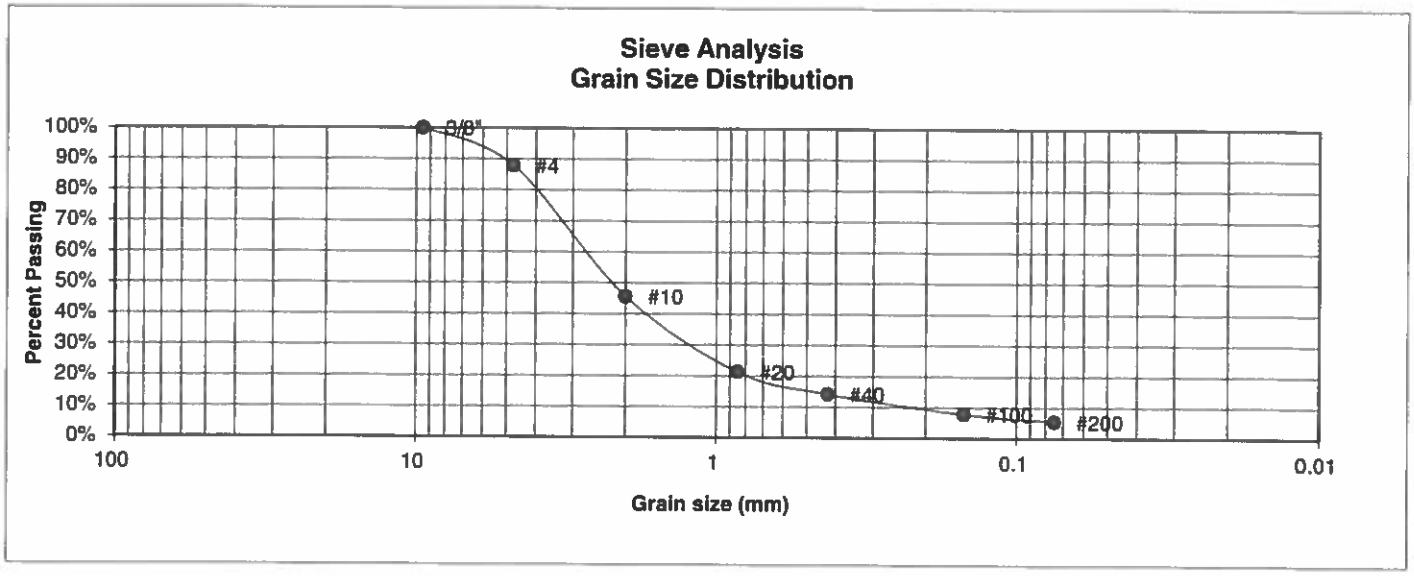
FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	31	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	87.9%
10	45.6%
20	21.3%
40	14.2%
100	7.8%
200	5.4%

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

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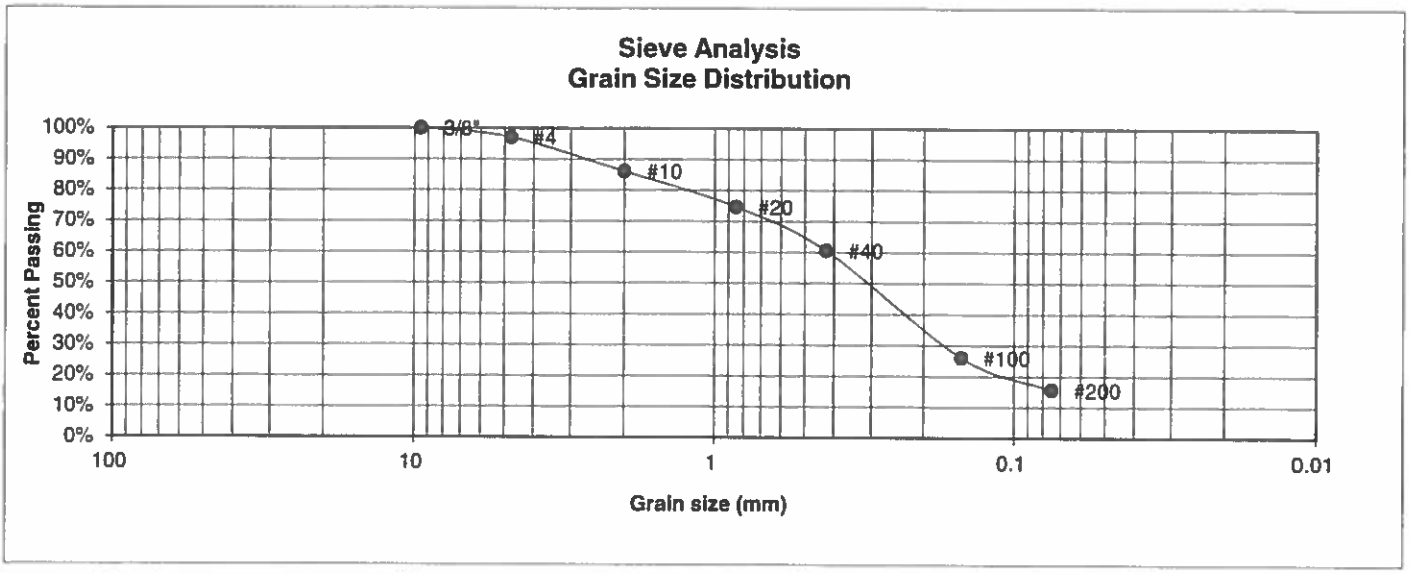
FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	32	JOB NO.	190300
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.1%
10	86.1%
20	74.7%
40	60.6%
100	26.1%
200	15.6%

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:
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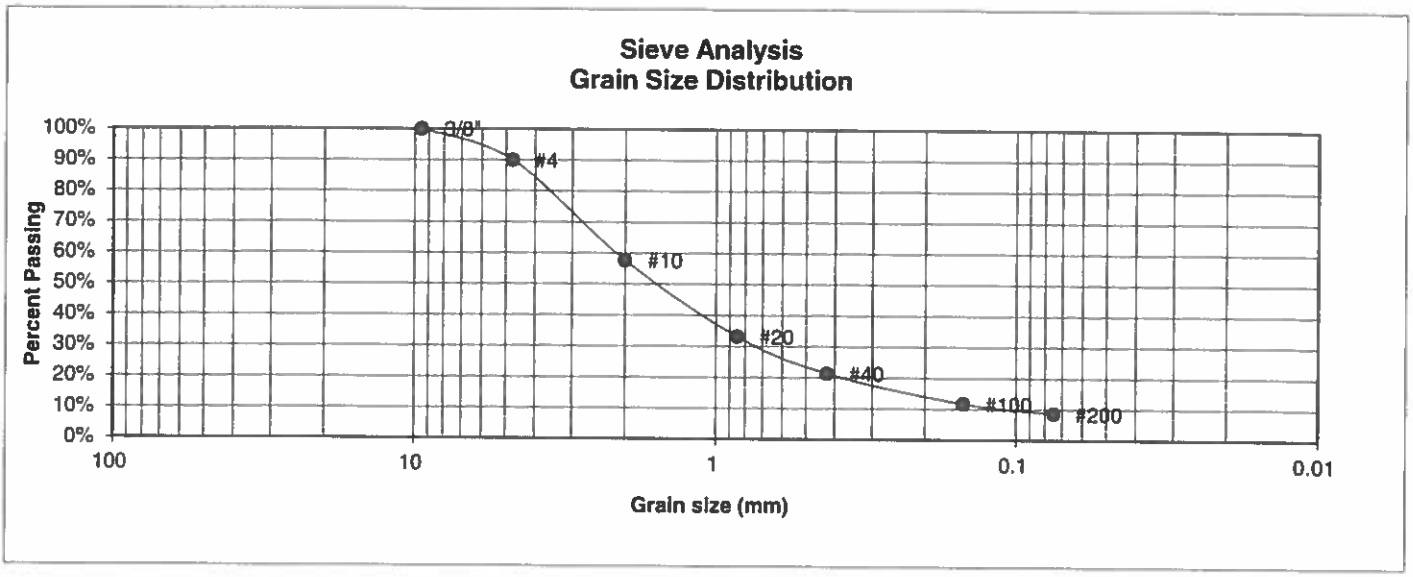
FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	38	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	90.0%
10	57.7%
20	33.2%
40	21.4%
100	11.7%
200	8.6%

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)

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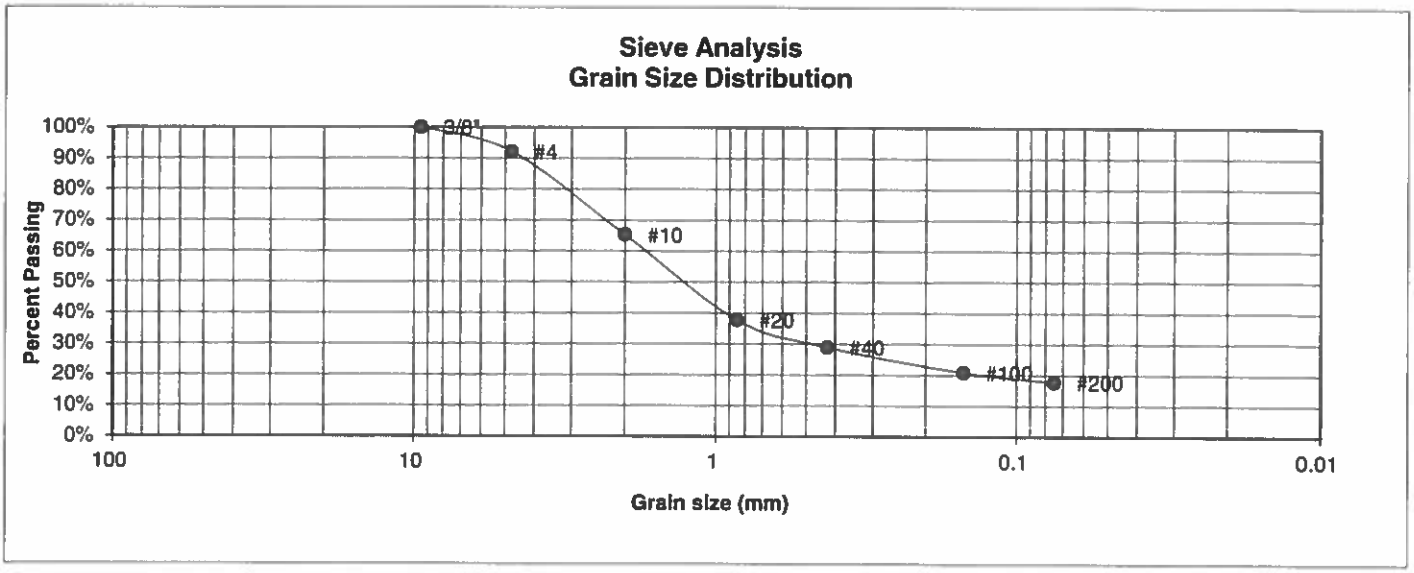
FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	39	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	92.2%
10	65.3%
20	37.7%
40	29.0%
100	20.8%
200	17.8%

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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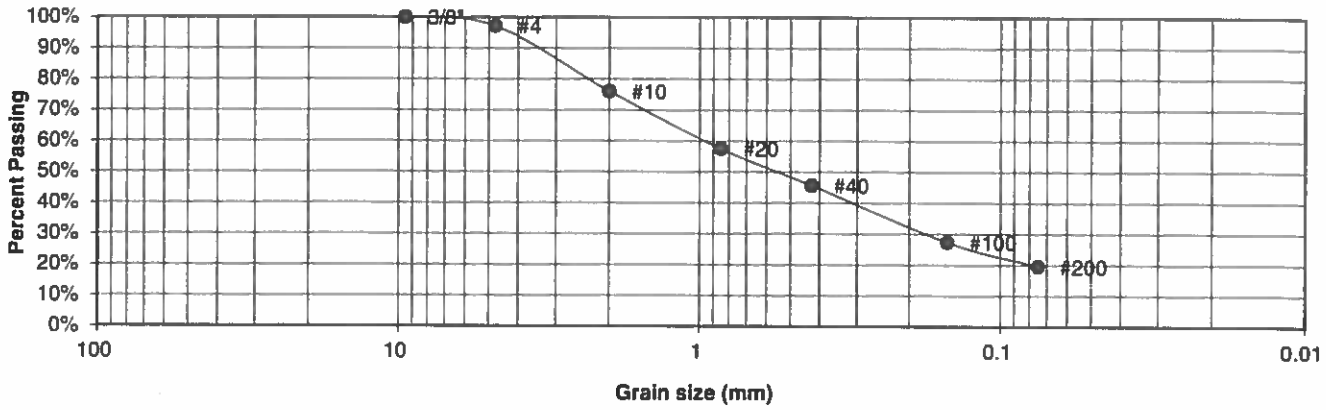
FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	42	JOB NO.	190300
DEPTH (FT)	5	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	97.2%
10	76.1%
20	57.5%
40	45.6%
100	27.4%
200	19.6%

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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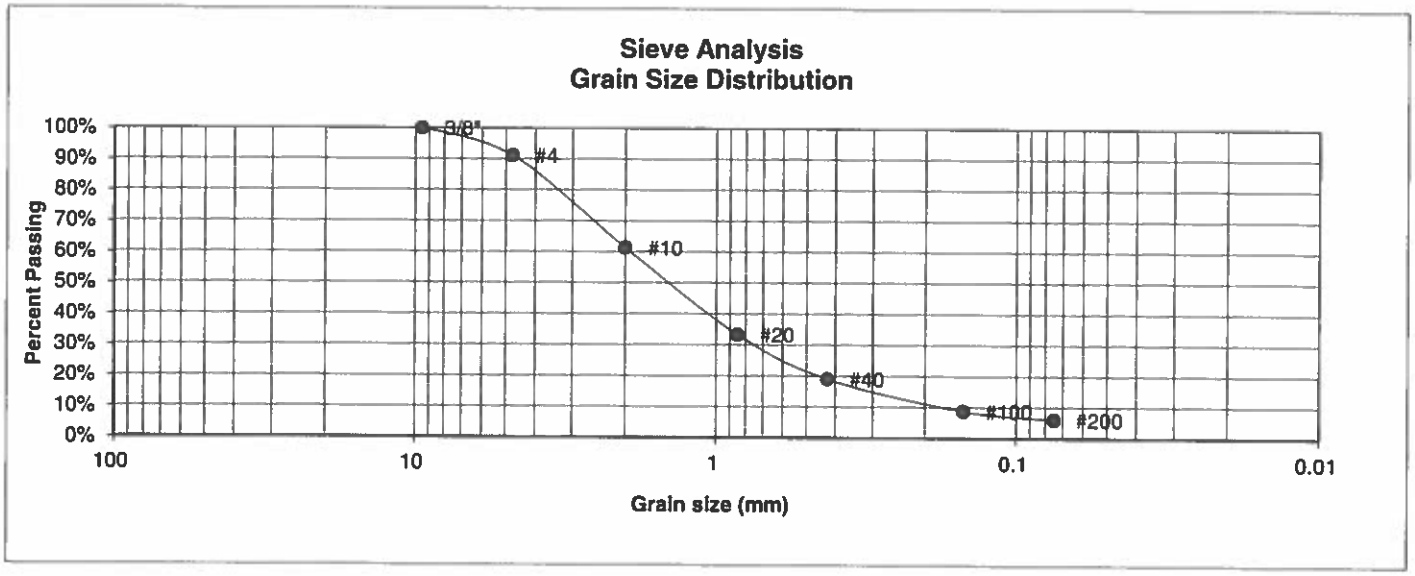
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE: 7/1/19

JOB NO.: 190300
FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	43	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	91.1%
10	61.3%
20	33.3%
40	19.0%
100	8.7%
200	6.0%

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)

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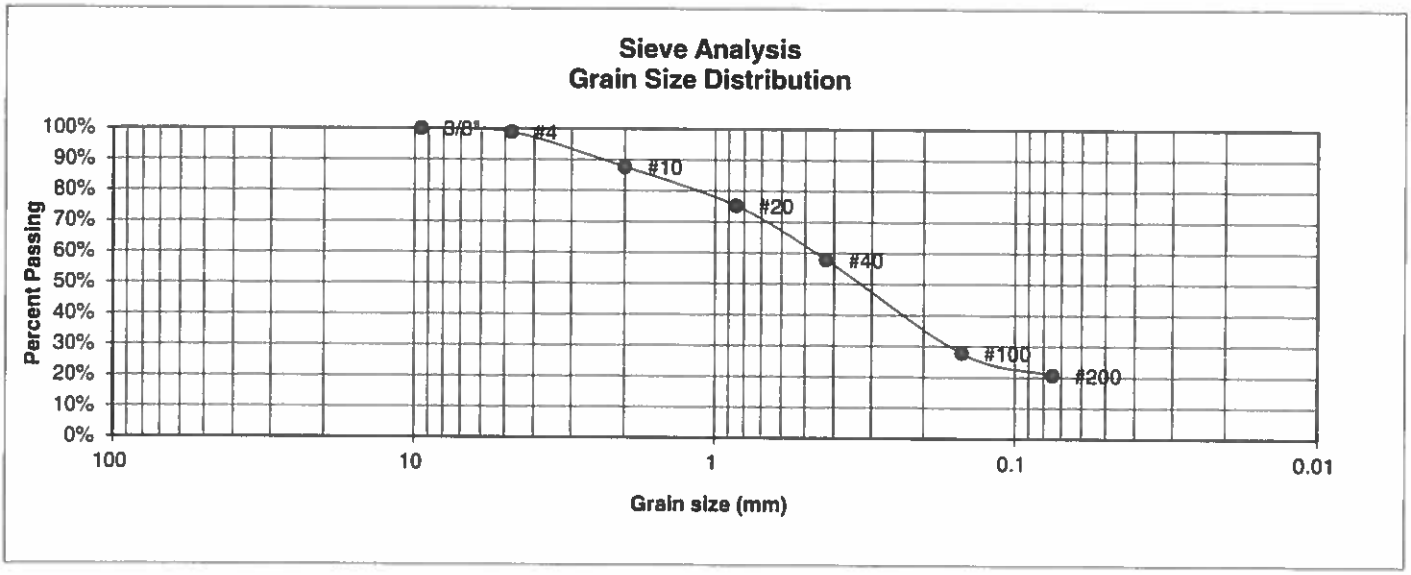
FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	47	JOB NO.	190300
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.8%
10	87.7%
20	75.2%
40	57.8%
100	27.8%
200	20.7%

Atterberg Limits

Plastic Limit	
Liquid Limit	
Plastic Index	

Swell

Moisture at start	13.9%
Moisture at finish	18.6%
Moisture increase	4.8%
Initial dry density (pcf)	103
Swell (psf)	220

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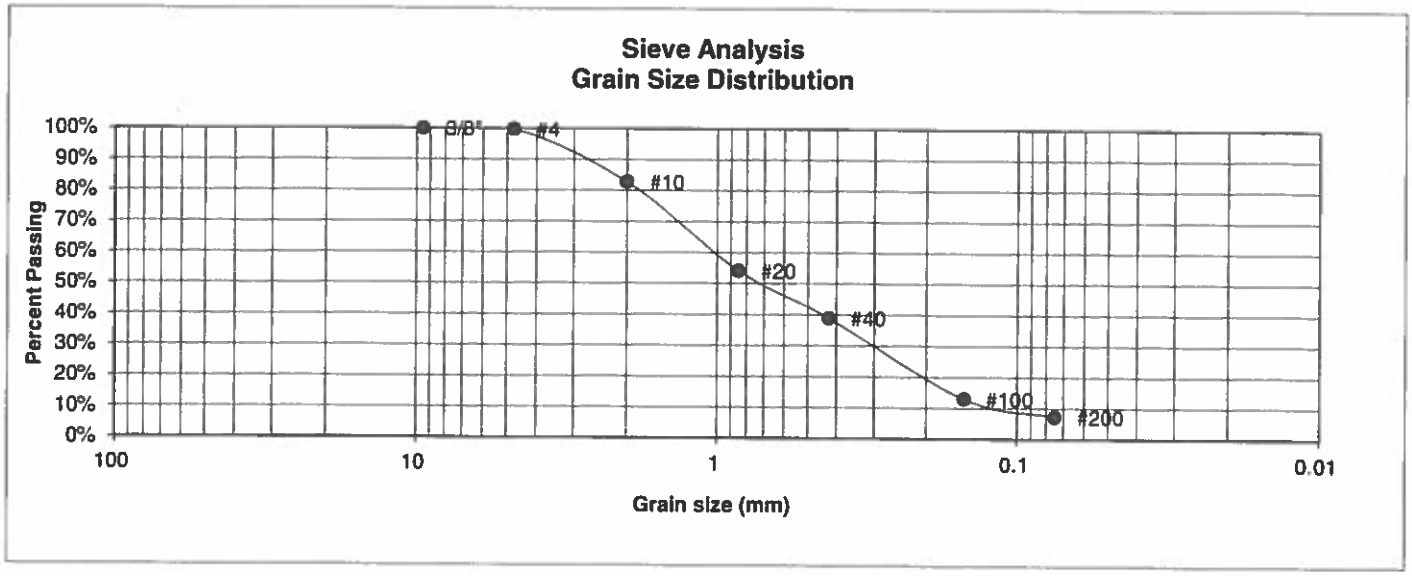
FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	1	PROJECT	ROLLING HILLS
TEST BORING #	49	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.8%
10	82.8%
20	54.2%
40	38.9%
100	13.0%
200	7.3%

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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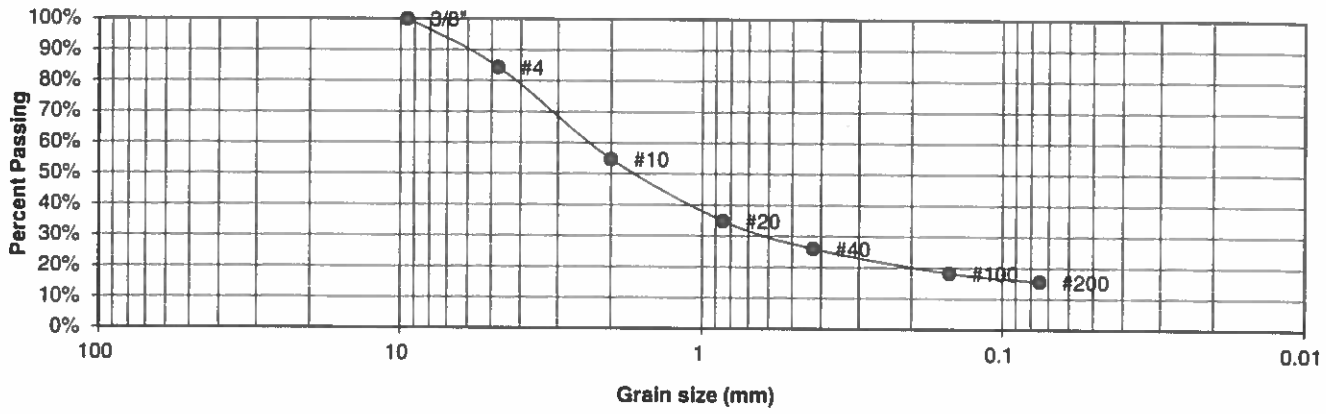
FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	1	JOB NO.	190300
DEPTH (FT)	15	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	84.4%
10	54.8%
20	34.9%
40	26.0%
100	18.2%
200	15.5%

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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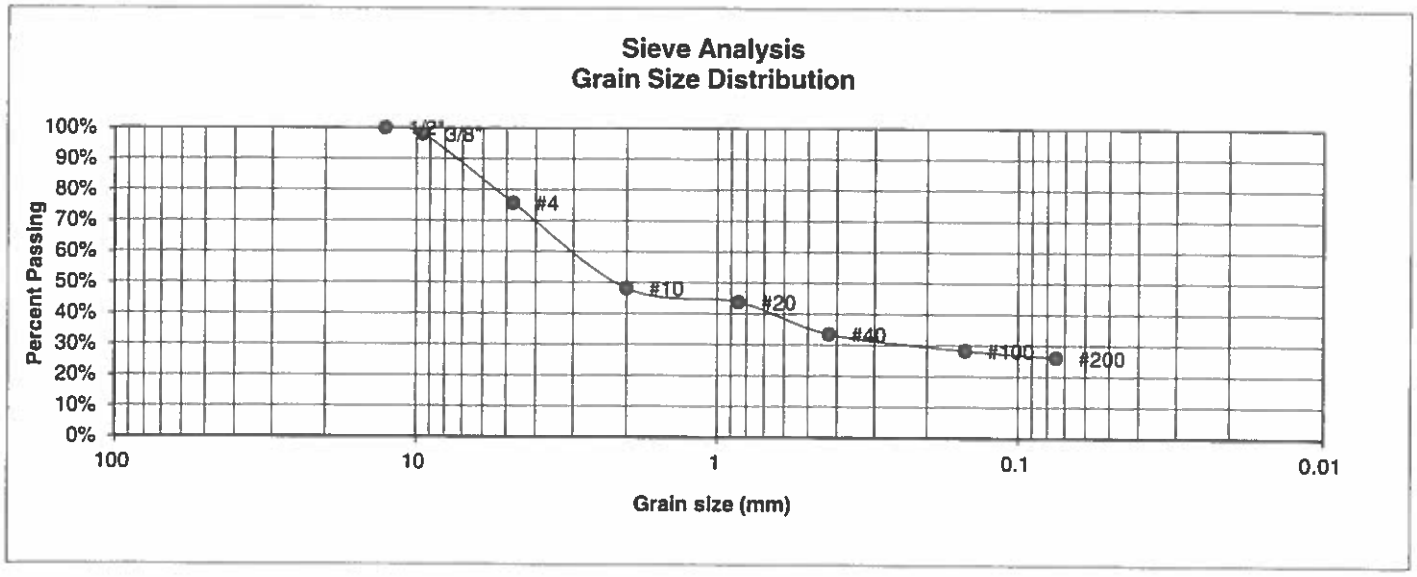
FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	3	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	98.0%
4	75.7%
10	48.2%
20	43.8%
40	33.5%
100	28.3%
200	26.1%

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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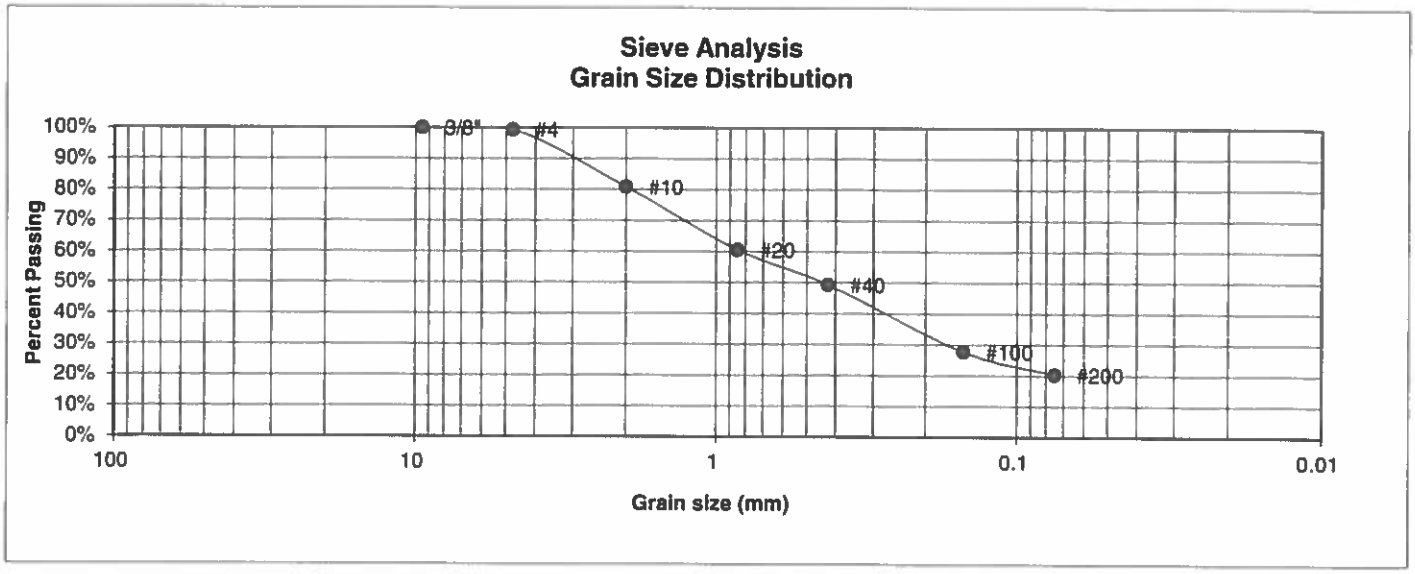
FIG NO.:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	4	JOB NO.	190300
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.4%
10	80.9%
20	60.6%
40	49.3%
100	27.7%
200	20.3%

Atterberg Limits

Plastic Limit	17
Liquid Limit	29
Plastic Index	12

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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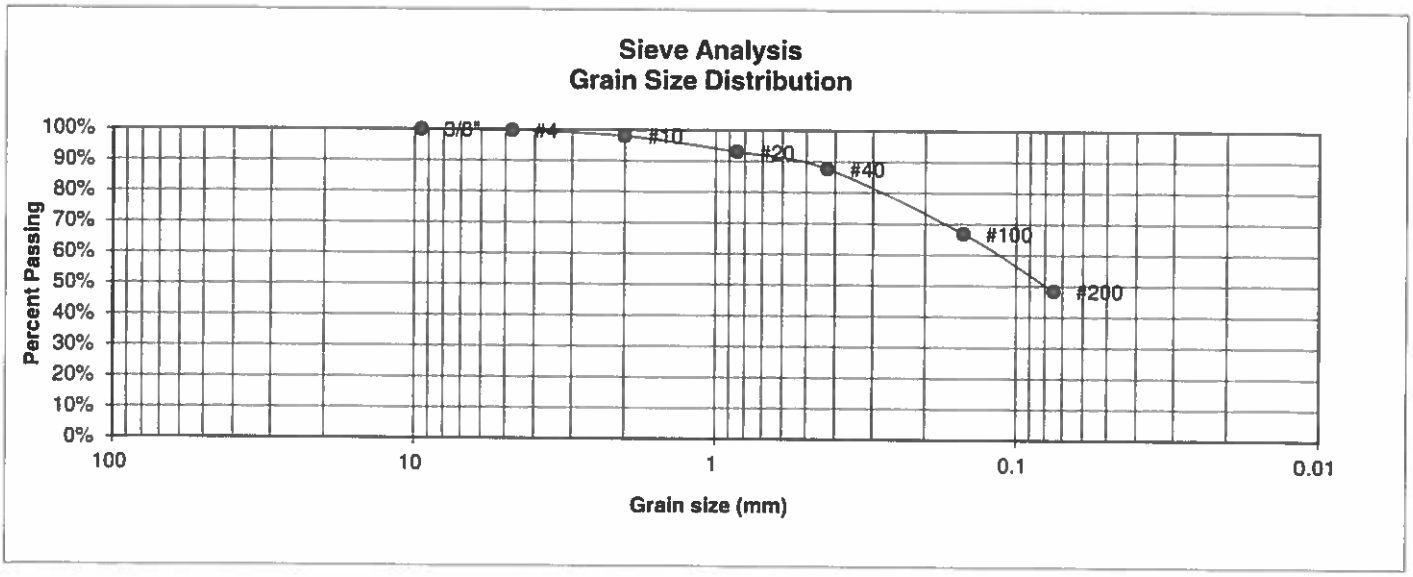
FIG NO.:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	5	JOB NO.	190300
DEPTH (FT)	25	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.7%
10	98.0%
20	93.0%
40	87.6%
100	67.0%
200	48.5%

Atterberg Limits

Plastic Limit	17
Liquid Limit	31
Plastic Index	14

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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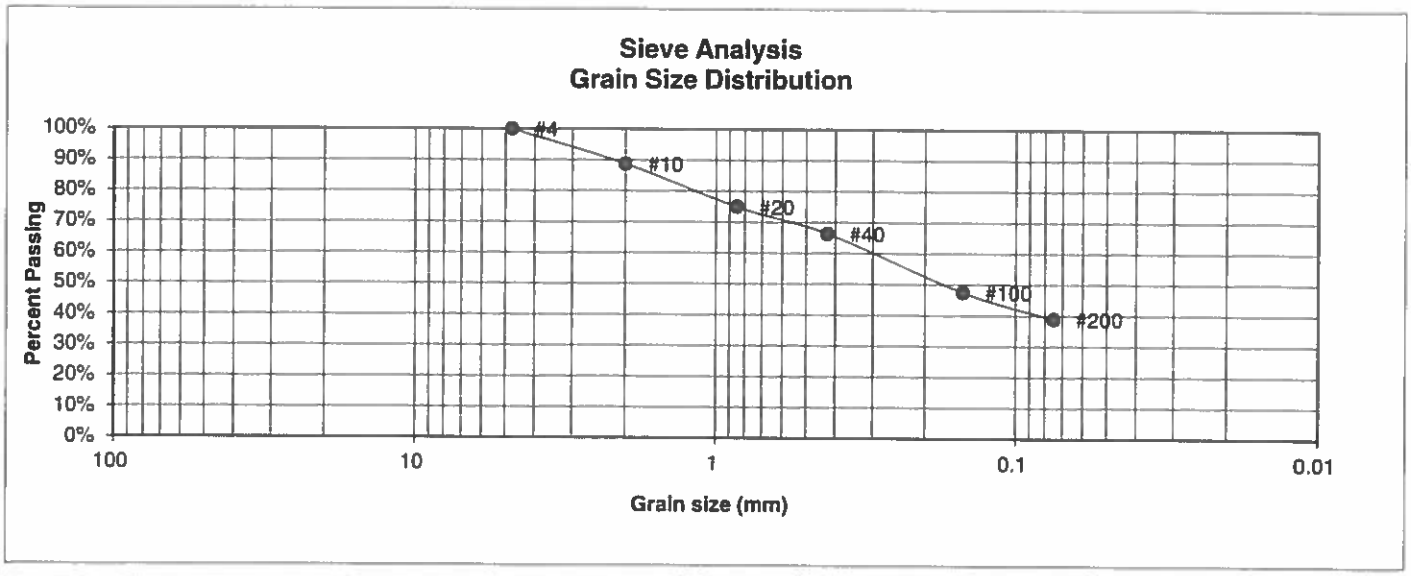
FIG NO.

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	6	JOB NO.	190300
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	88.7%
20	75.0%
40	66.3%
100	47.5%
200	38.9%

Atterberg Limits	
Plastic Limit	13
Liquid Limit	26
Plastic Index	13

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:
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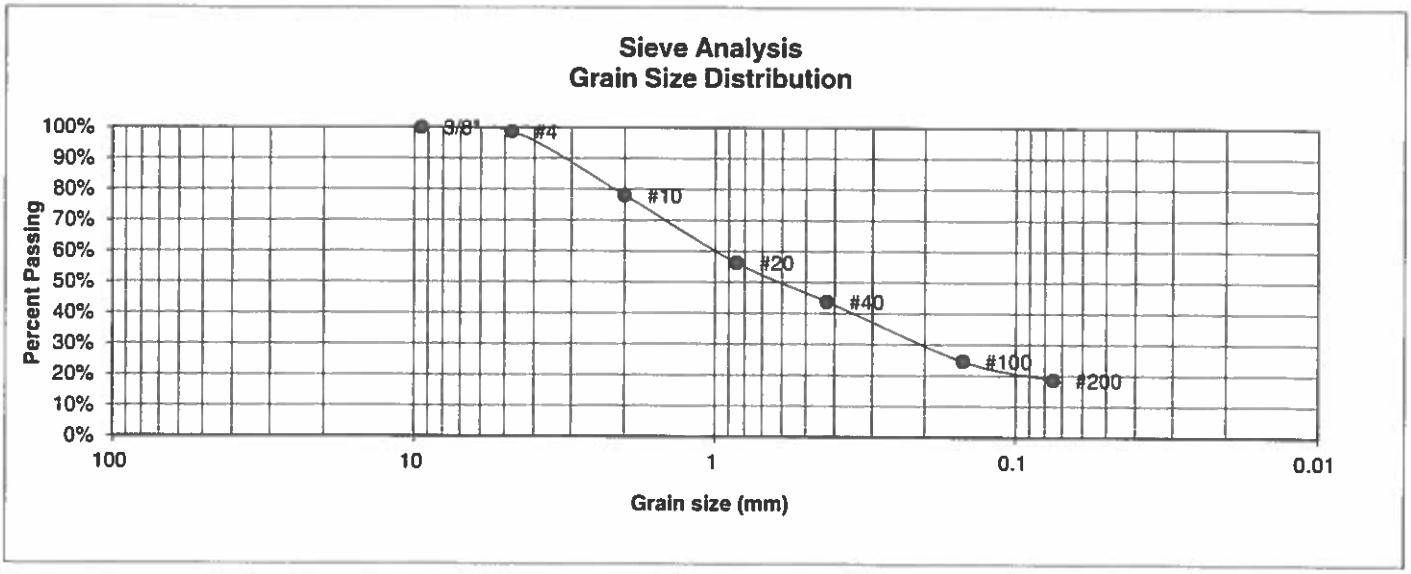
JOB NO: 190300

FIG NO:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	7	JOB NO.	190300
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.7%
10	78.1%
20	56.3%
40	43.8%
100	24.6%
200	18.6%

Atterberg Limits

Plastic Limit	18
Liquid Limit	32
Plastic Index	14

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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LABORATORY TEST RESULTS

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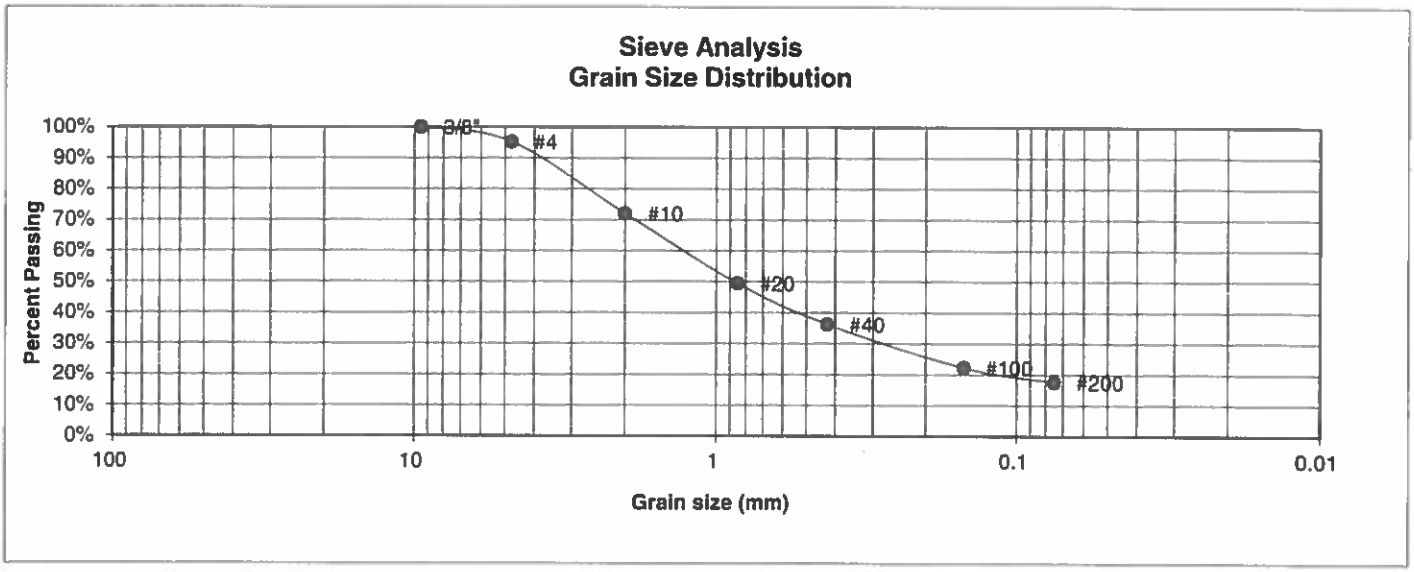
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	9	JOB NO.	190300
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.3%
10	72.0%
20	49.5%
40	36.2%
100	22.3%
200	17.5%

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.
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LABORATORY TEST RESULTS

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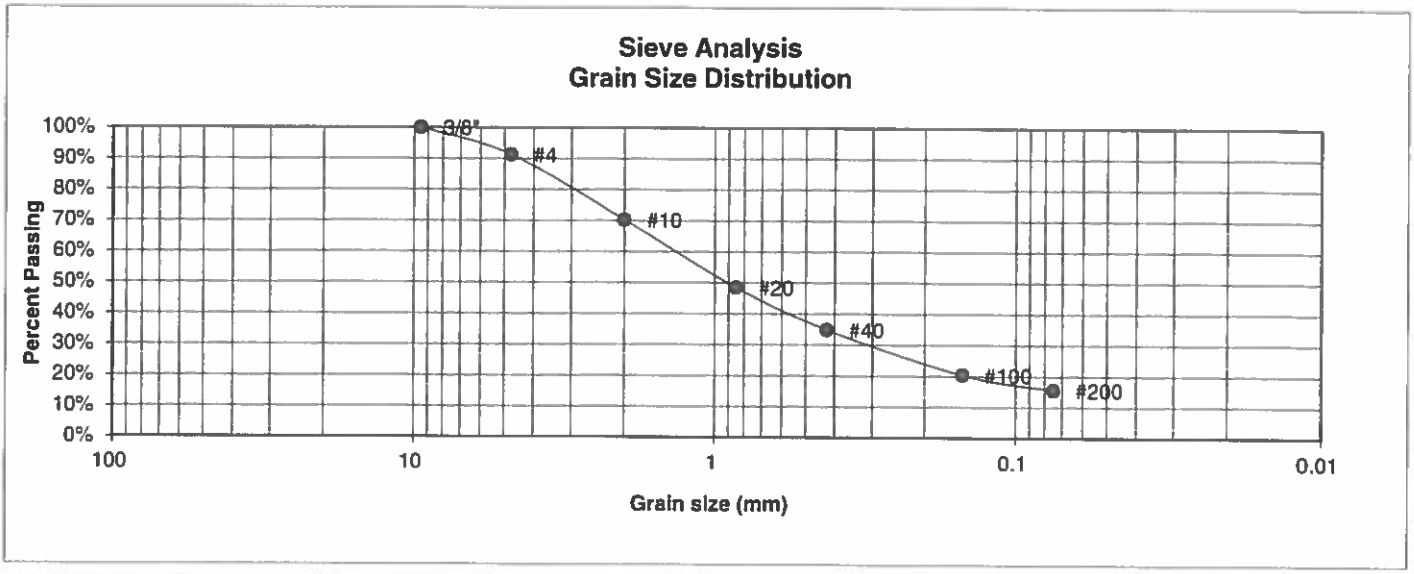
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	12	JOB NO.	190300
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	91.3%
10	70.3%
20	48.5%
40	34.9%
100	20.4%
200	15.5%

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

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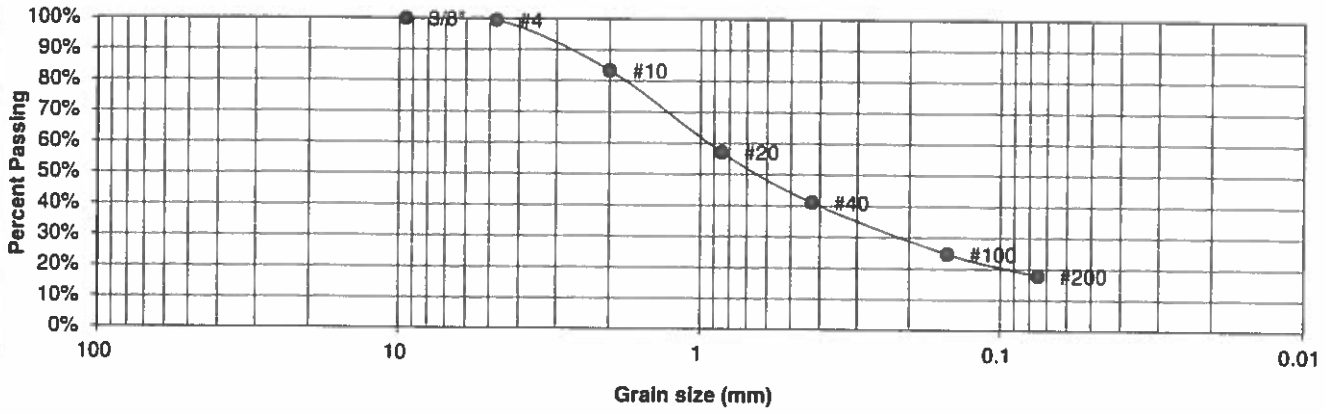
FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	14	JOB NO.	190300
DEPTH (FT)	20	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	99.5%
10	83.3%
20	57.2%
40	41.1%
100	24.8%
200	17.8%

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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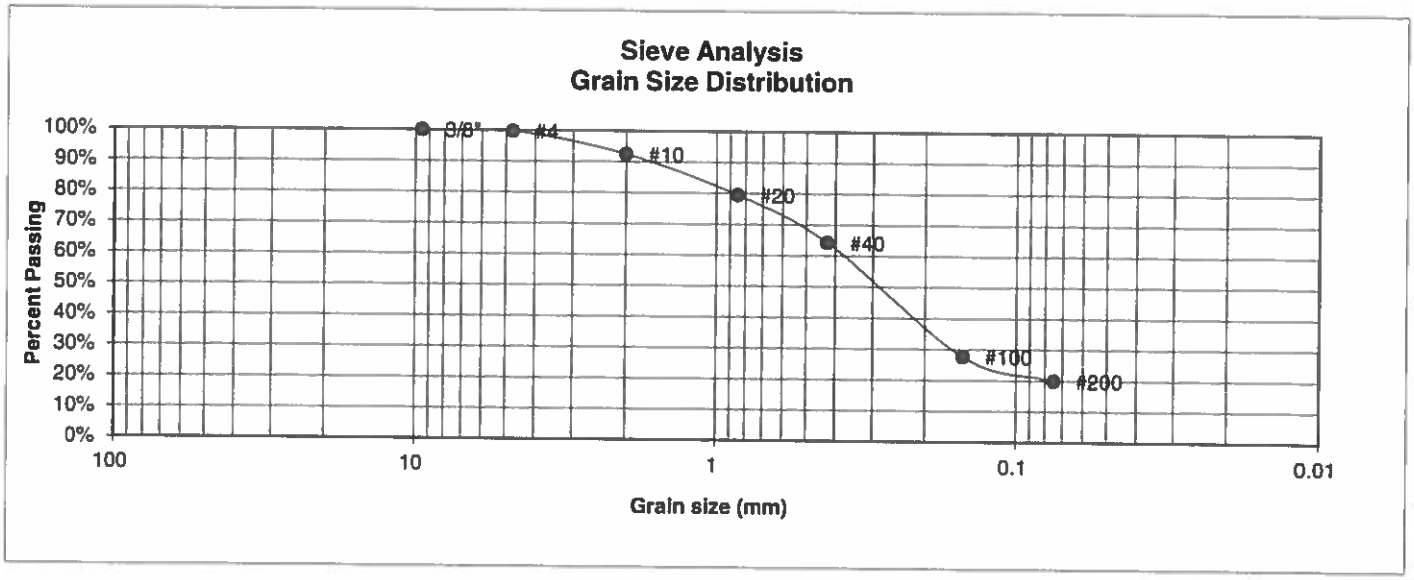
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE: 7/1/19

JOB NO. 190300

FIG NO.:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	15	JOB NO.	190300
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.7%
10	92.5%
20	79.5%
40	64.2%
100	27.7%
200	19.9%

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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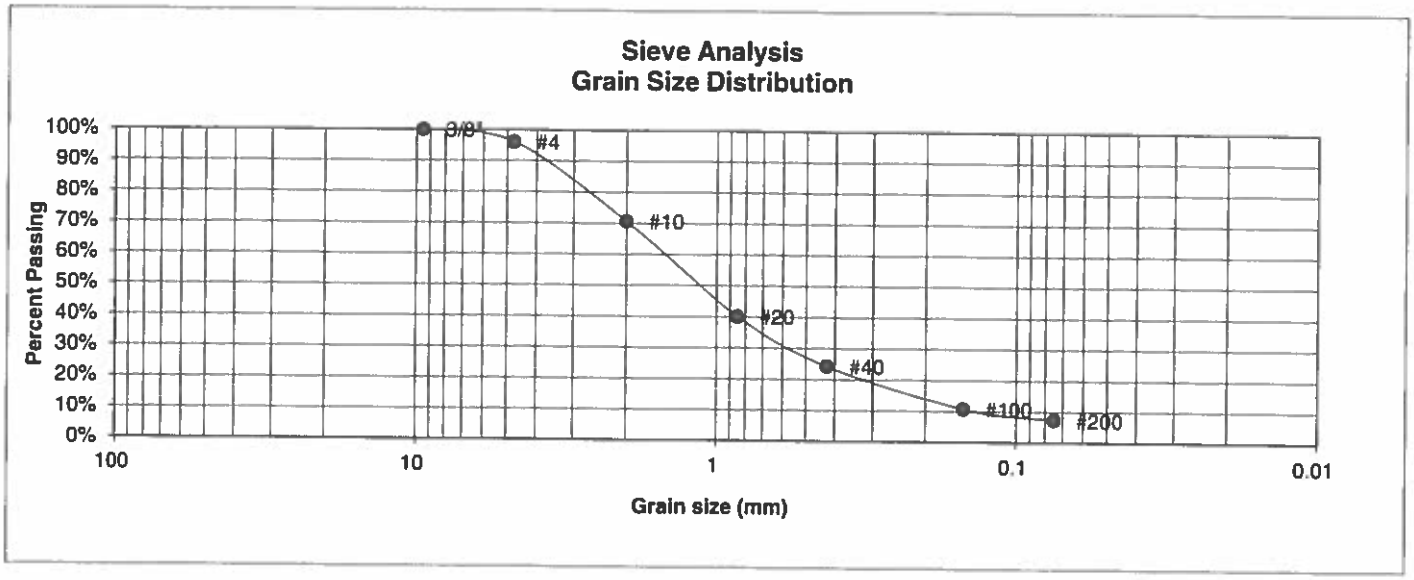
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	17	JOB NO.	190300
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.1%
10	70.6%
20	40.1%
40	24.3%
100	10.8%
200	7.3%

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)

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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
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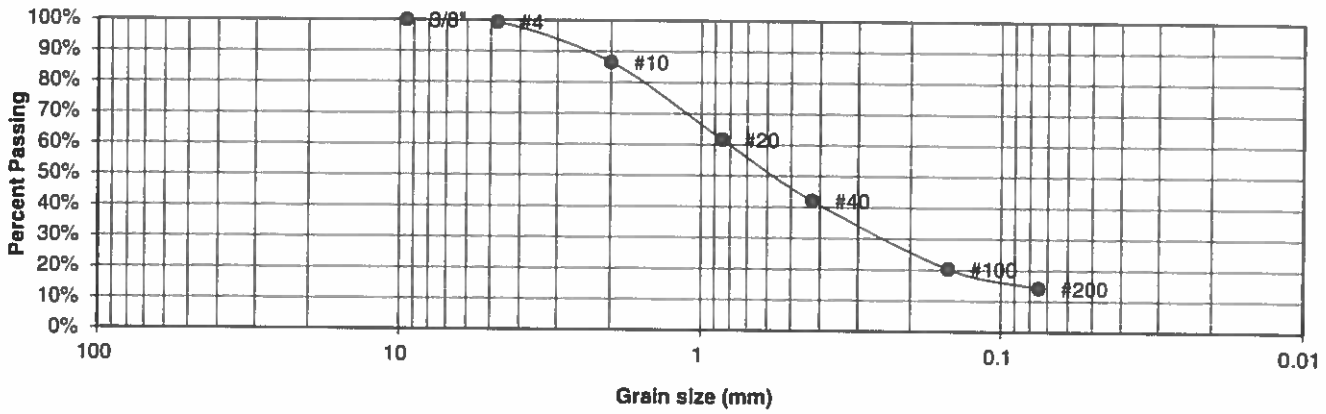
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	18	JOB NO.	190300
DEPTH (FT)	5	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	99.4%
10	86.5%
20	61.7%
40	42.1%
100	20.3%
200	14.2%

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:
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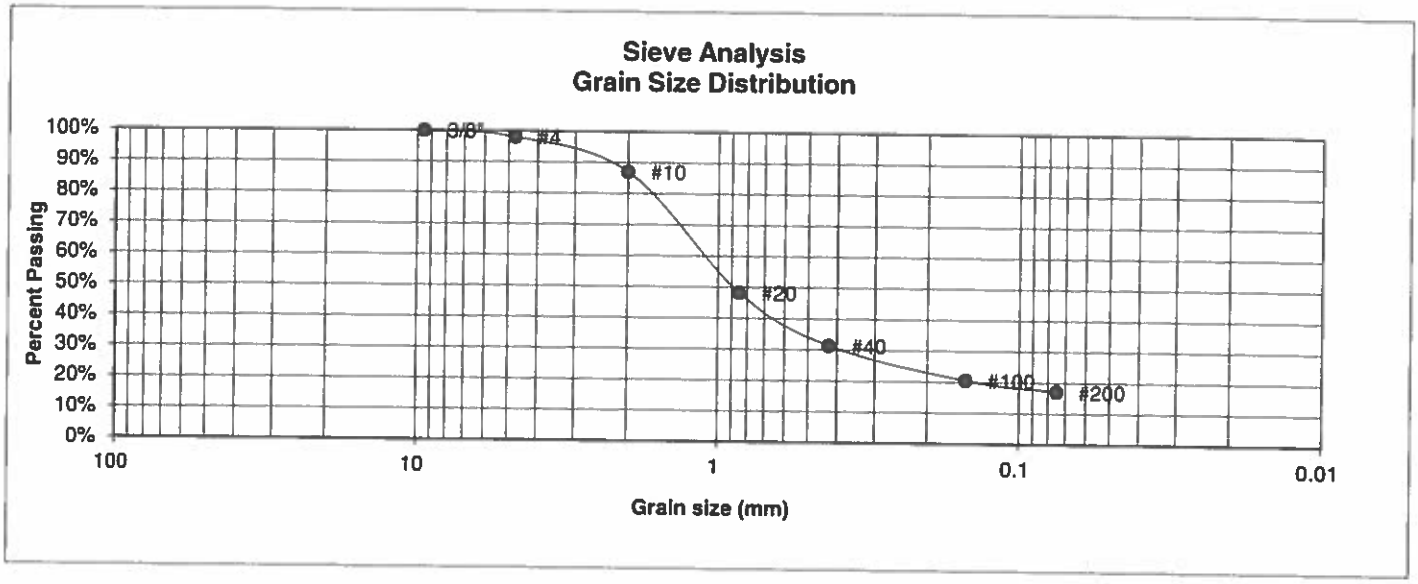
JOB NO: 190300

FIG NO:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	20	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.1%
10	87.0%
20	48.2%
40	31.3%
100	20.5%
200	17.1%

Atterberg Limits

Plastic Limit	17
Liquid Limit	37
Plastic Index	20

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

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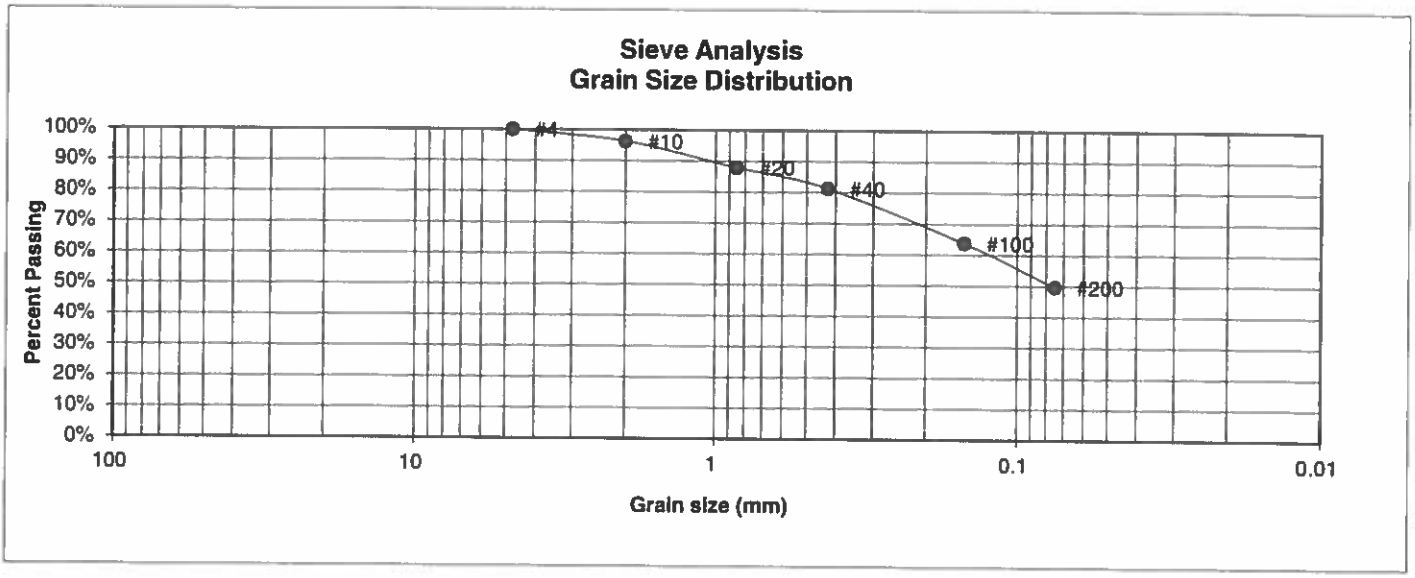
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	20	JOB NO.	190300
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	96.3%
20	88.0%
40	81.3%
100	63.8%
200	49.7%

Atterberg Limits

Plastic Limit	14
Liquid Limit	28
Plastic Index	14

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: 7/11/19

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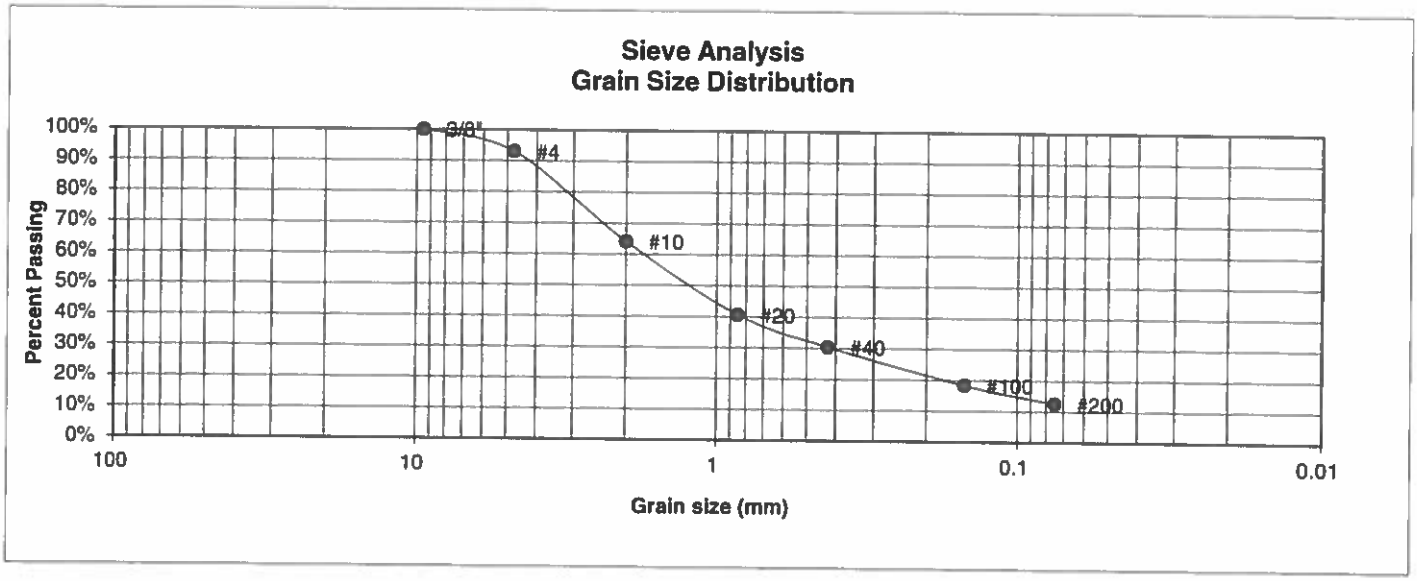
FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	21	JOB NO.	190300
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	93.0%
10	64.1%
20	40.6%
40	30.4%
100	18.4%
200	12.5%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

ENTECH ENGINEERING, INC.
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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
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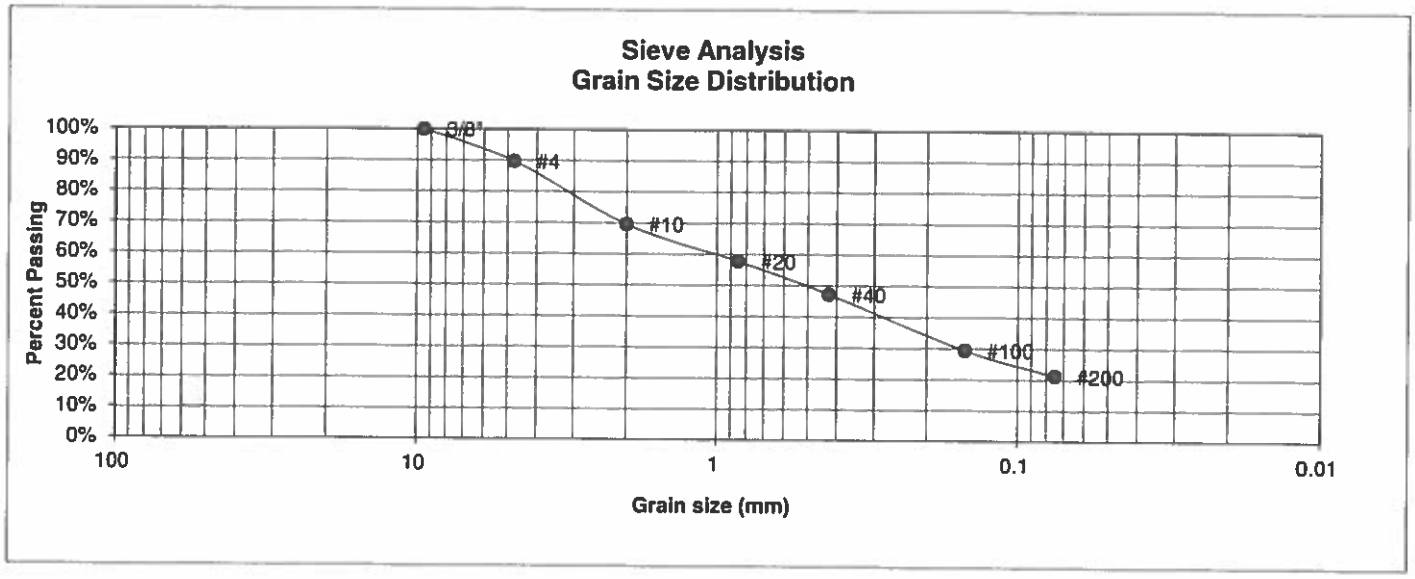
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	21	JOB NO.	190300
DEPTH (FT)	25	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	89.6%
10	69.6%
20	57.7%
40	47.2%
100	29.5%
200	21.2%

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

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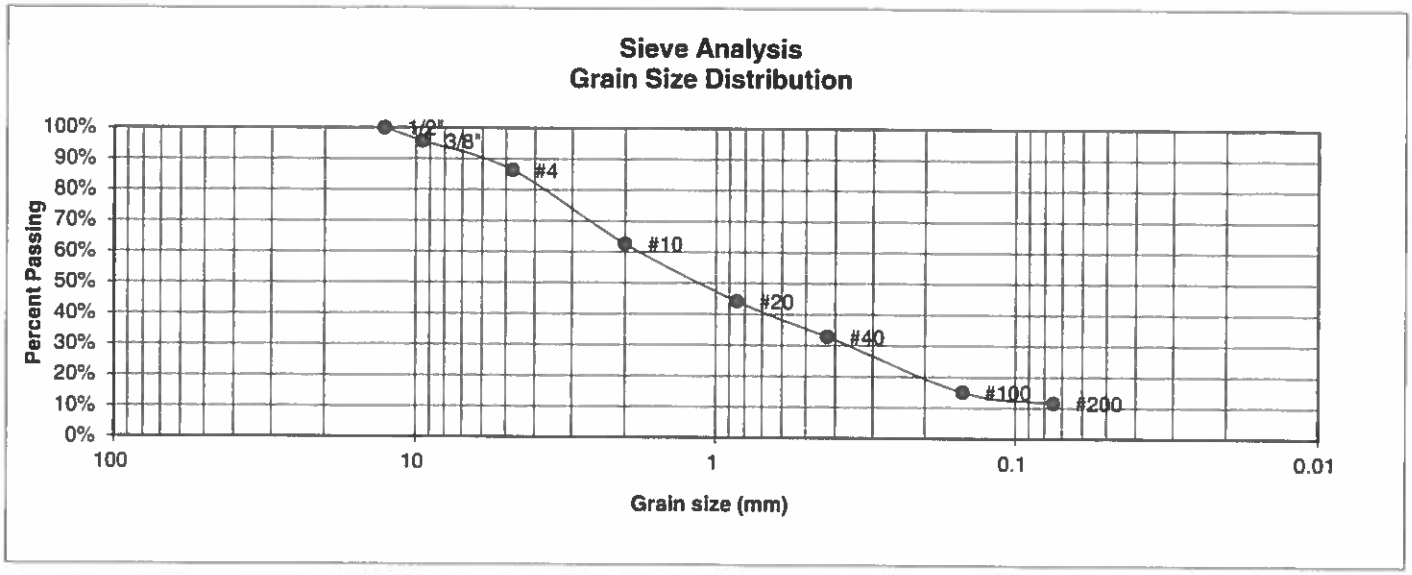
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	23	JOB NO.	190300
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.7%
4	86.4%
10	62.6%
20	44.2%
40	32.8%
100	15.0%
200	11.6%

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:	DATE:
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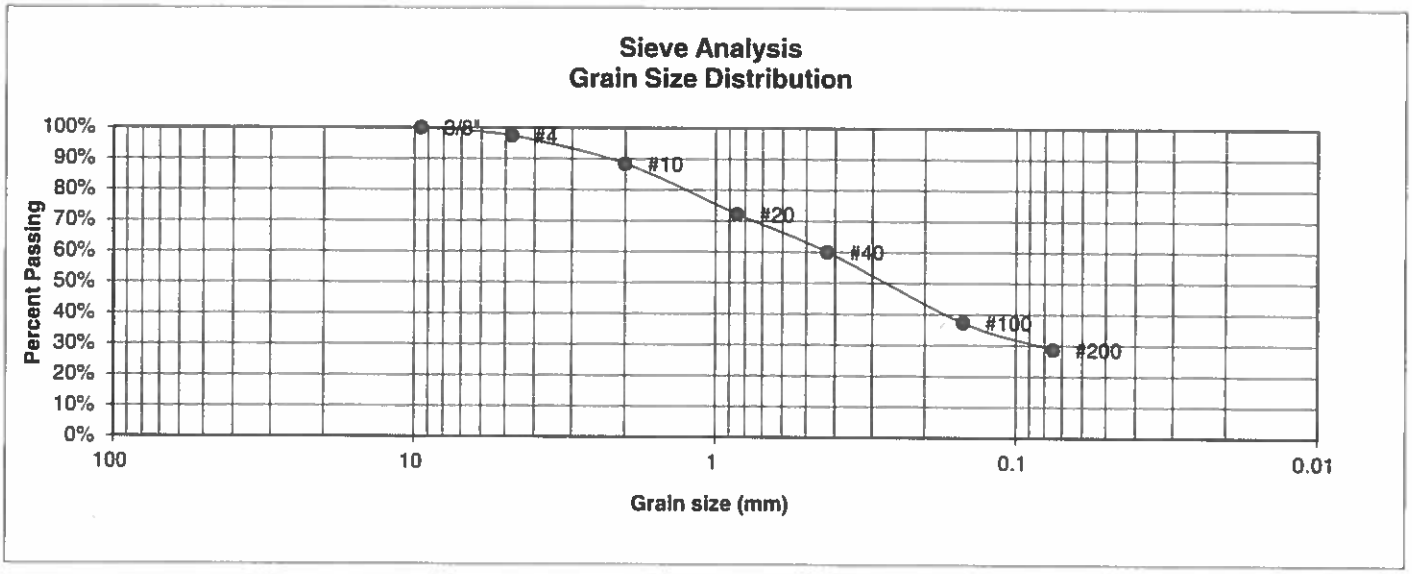
FIG NO:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	25	JOB NO.	190300
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.4%
10	88.4%
20	72.2%
40	60.1%
100	37.4%
200	28.7%

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)	

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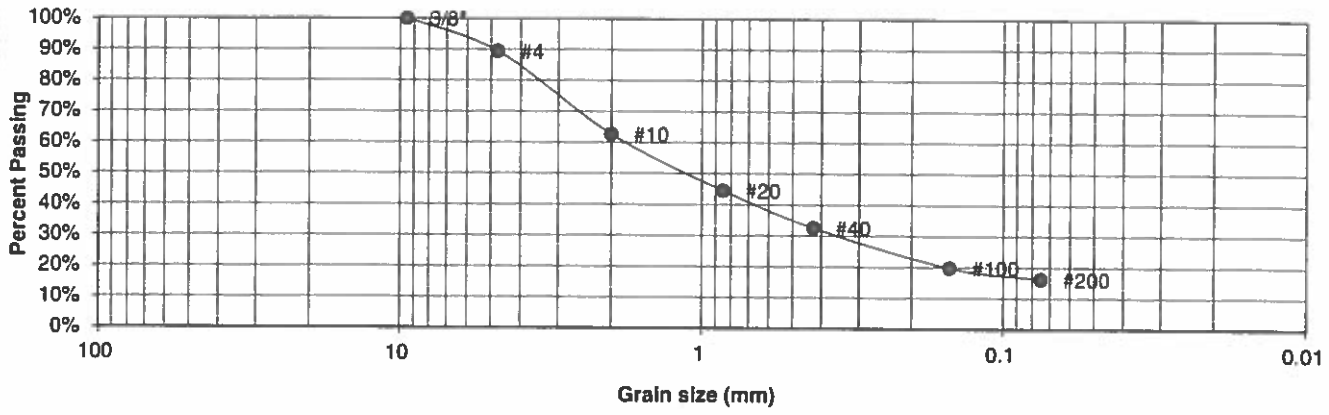
FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	27	JOB NO.	190300
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	89.4%
10	62.7%
20	44.5%
40	32.5%
100	19.8%
200	16.2%

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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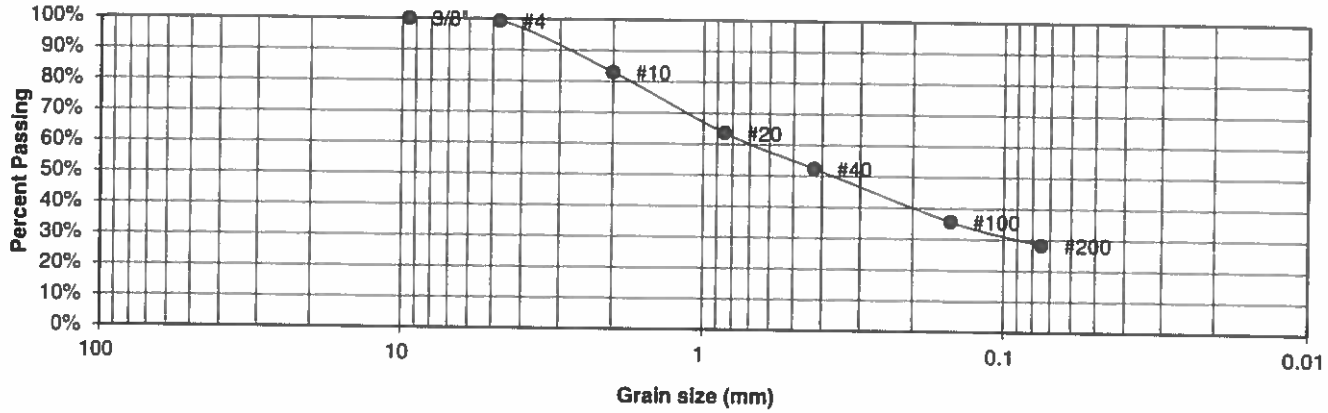
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/11/19

JOB NO.: 190300
FIG NO.:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	28	JOB NO.	190300
DEPTH (FT)	15	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	99.4%
10	83.0%
20	63.6%
40	52.4%
100	35.7%
200	28.3%

Atterberg Limits

Plastic Limit	24
Liquid Limit	41
Plastic Index	17

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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LABORATORY TEST RESULTS

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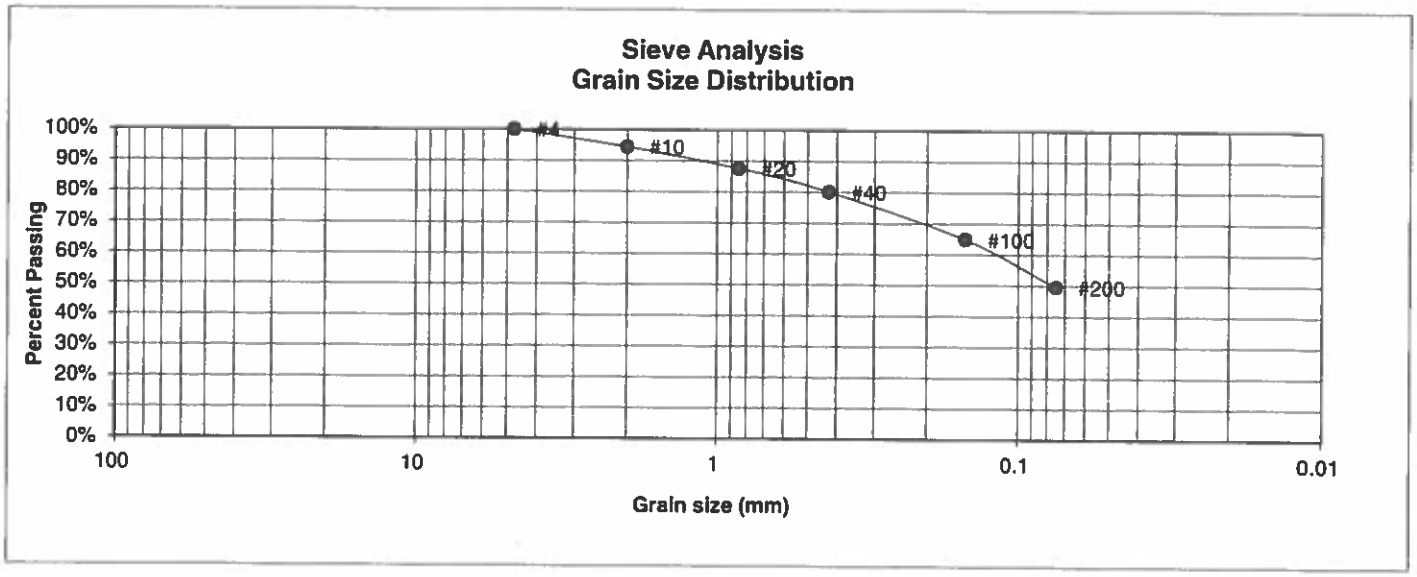
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	29	JOB NO.	190300
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	94.5%
20	87.6%
40	80.1%
100	64.9%
200	49.6%

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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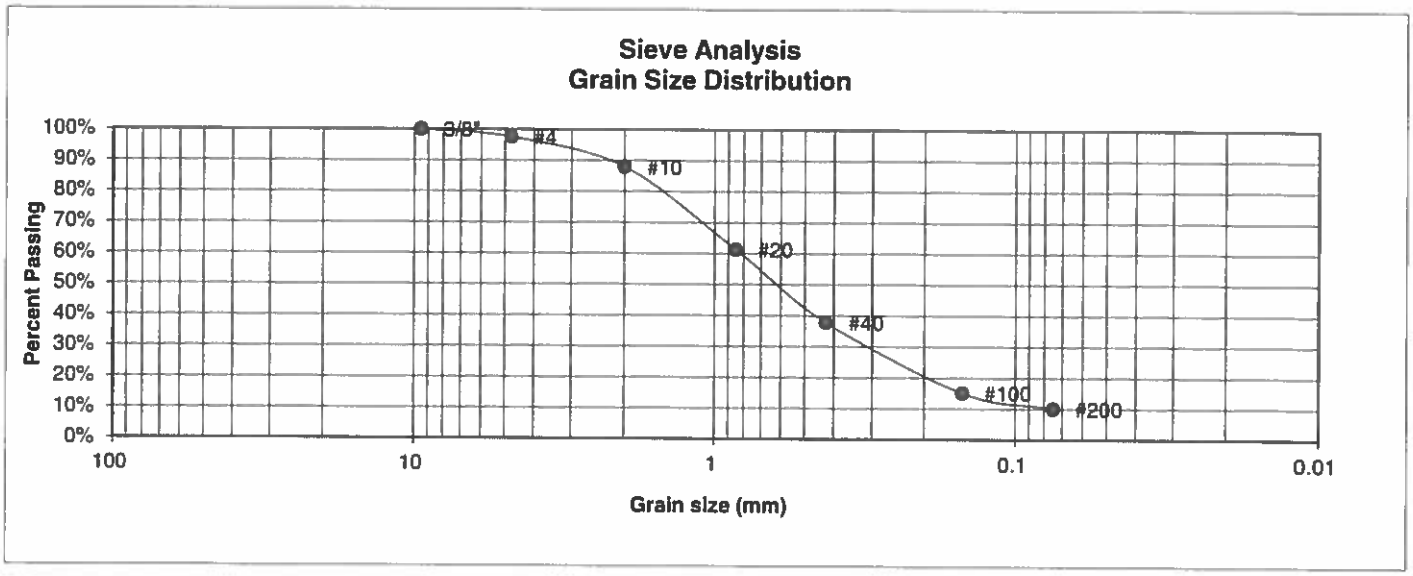
FIG NO.:

UNIFIED CLASSIFICATION	SM-SW	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	35	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.5%
10	87.9%
20	61.3%
40	37.8%
100	15.2%
200	10.1%

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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ENGINEERING, INC.
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COLORADO SPRINGS, COLORADO 80907

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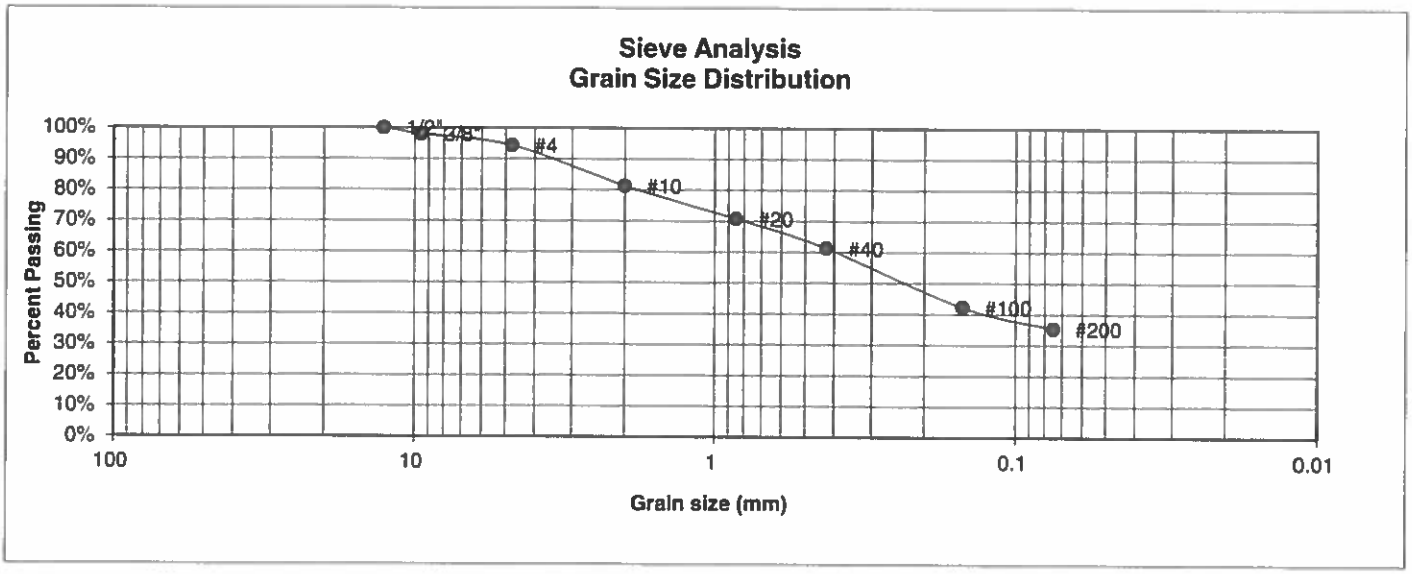
FIG NO.:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	37	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	98.1%
4	94.3%
10	81.4%
20	70.8%
40	61.3%
100	42.3%
200	35.4%

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

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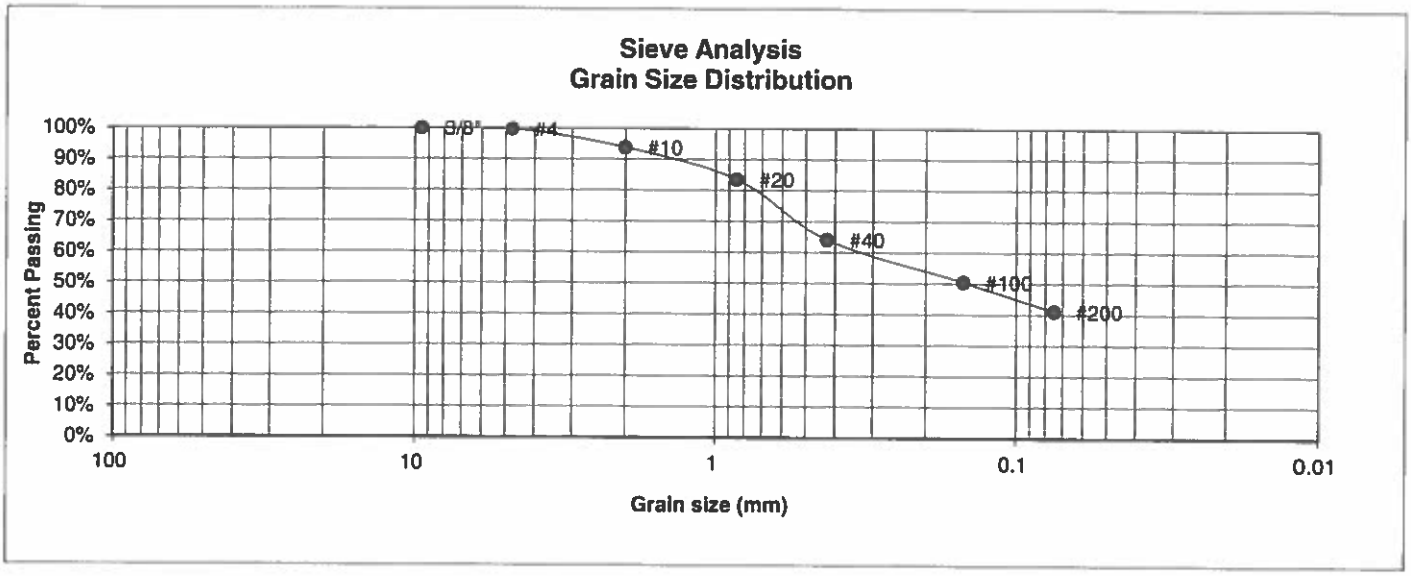
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	39	JOB NO.	190300
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.7%
10	93.8%
20	83.5%
40	64.1%
100	50.5%
200	41.1%

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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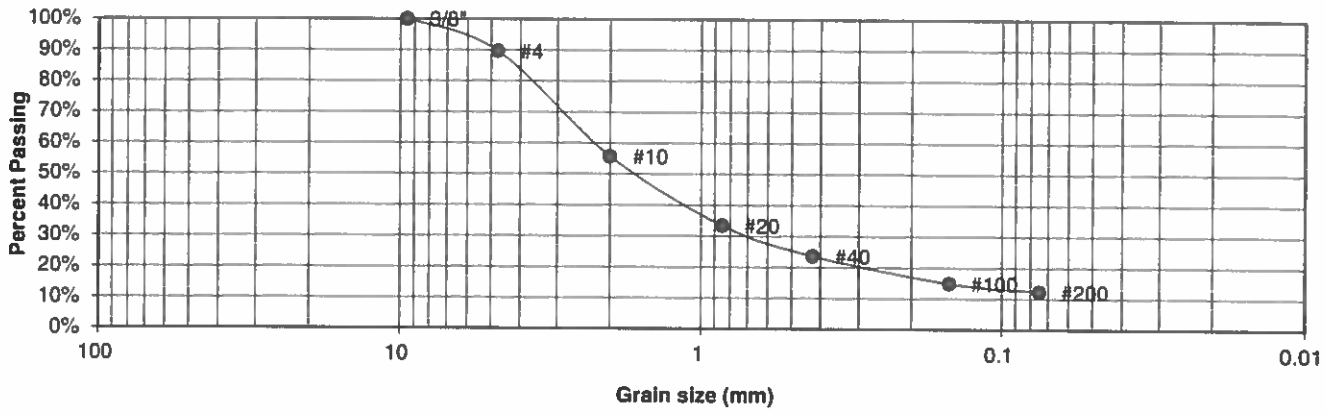
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	40	JOB NO.	190300
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	89.7%
10	55.7%
20	33.4%
40	23.7%
100	14.9%
200	12.3%

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)

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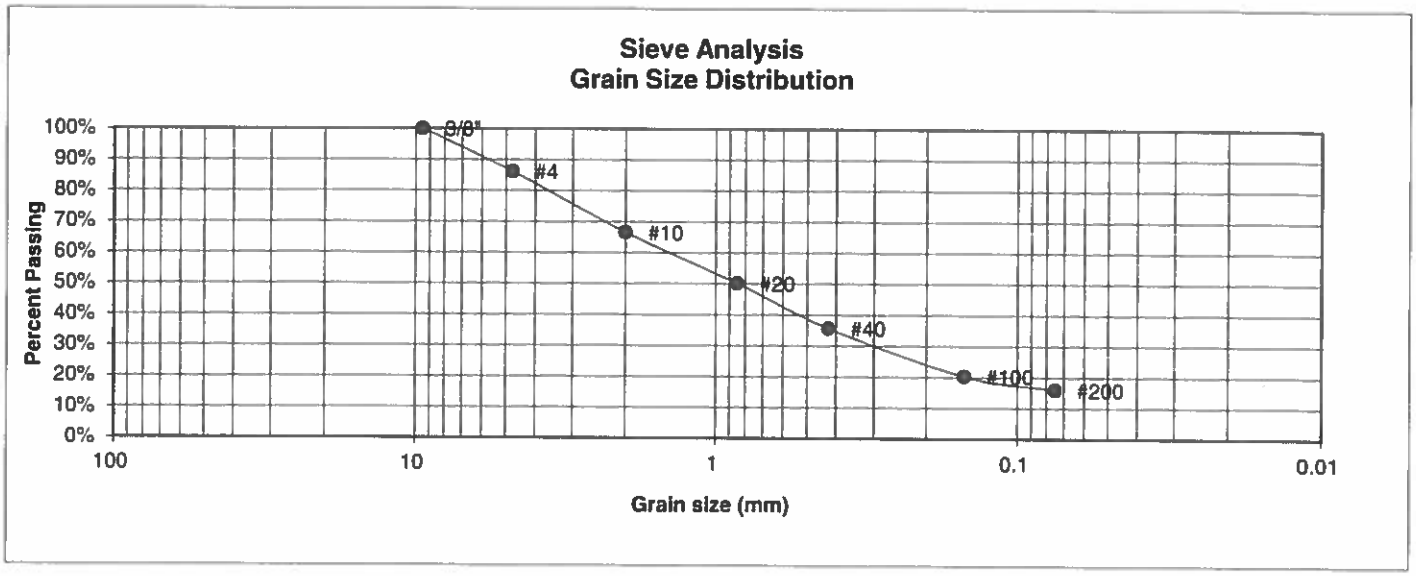
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	41	JOB NO.	190300
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	86.2%
10	66.5%
20	50.2%
40	35.7%
100	20.3%
200	16.0%

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

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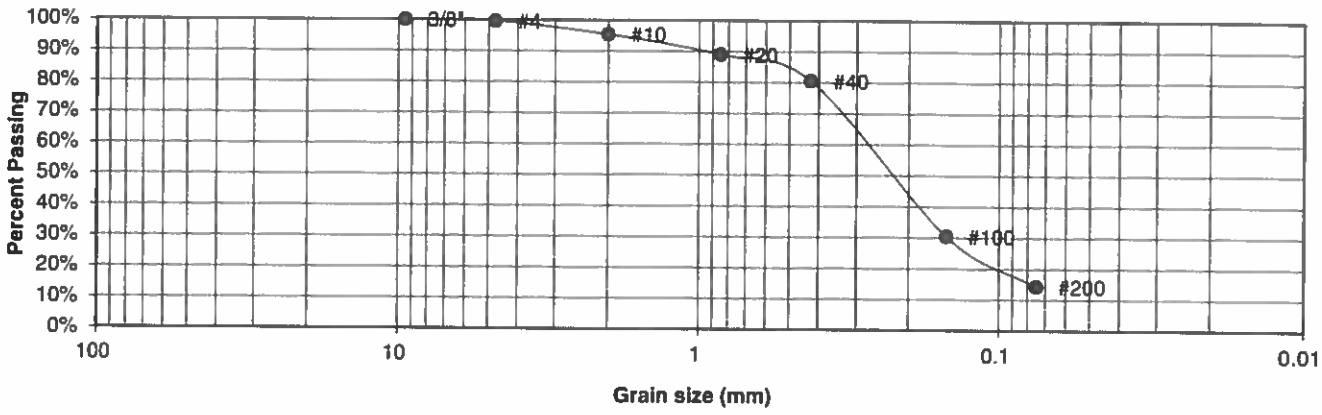
JOB NO: 190300

FIG NO:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	44	JOB NO.	190300
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	99.6%
10	95.4%
20	89.0%
40	80.6%
100	30.5%
200	14.3%

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

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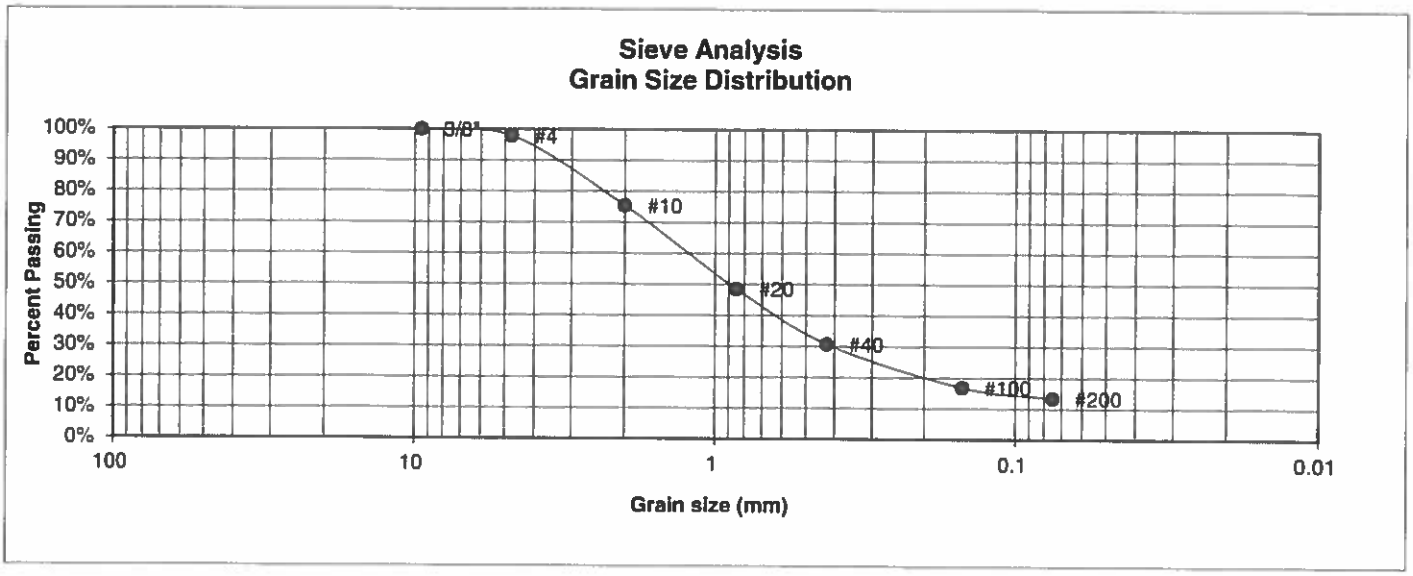
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SM	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	45	JOB NO.	190300
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.9%
10	75.4%
20	48.6%
40	30.7%
100	16.9%
200	13.4%

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:
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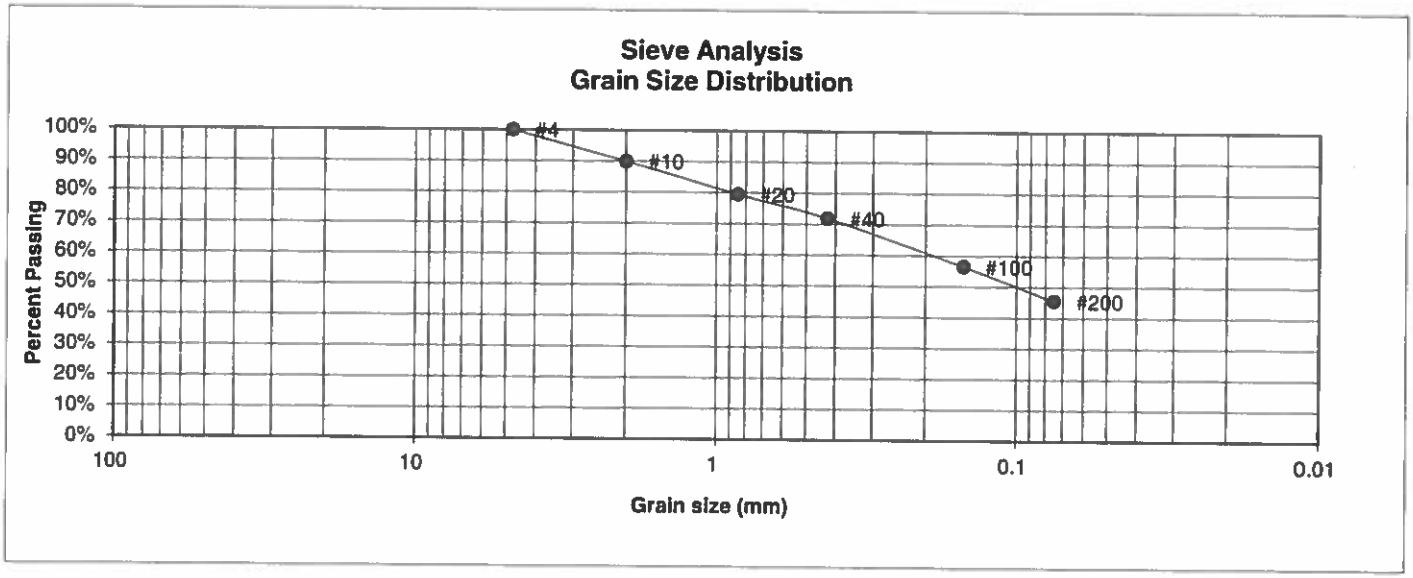
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	SC	CLIENT	TECH CONTRACTORS
SOIL TYPE #	2	PROJECT	ROLLING HILLS
TEST BORING #	46	JOB NO.	190300
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	89.9%
20	79.5%
40	71.8%
100	56.5%
200	45.5%

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:
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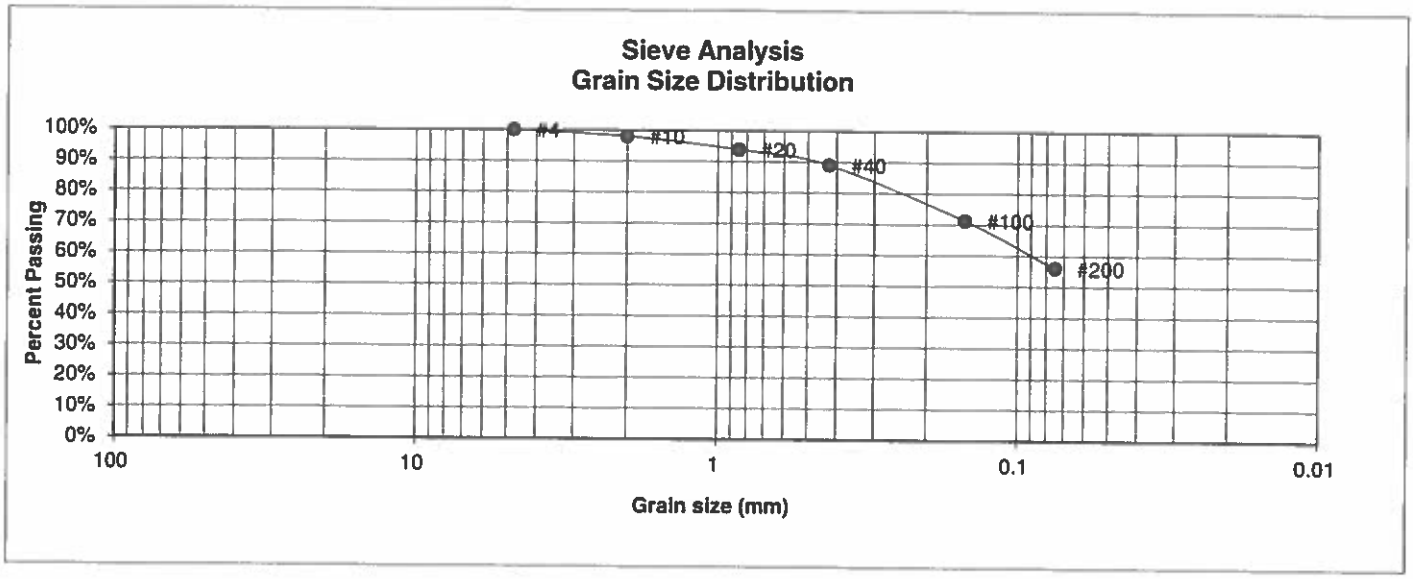
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	CL	CLIENT	TECH CONTRACTORS
SOIL TYPE #	3	PROJECT	ROLLING HILLS
TEST BORING #	15	JOB NO.	190300
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.1%
20	93.9%
40	89.0%
100	71.3%
200	56.1%

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

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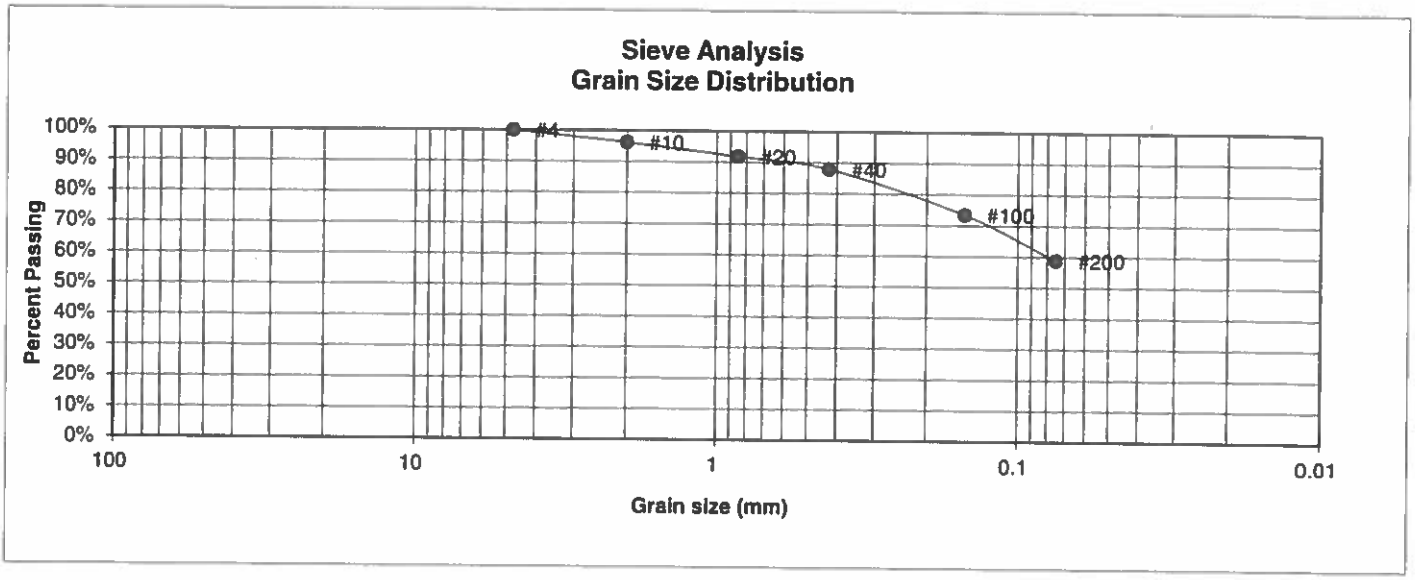
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	CL	CLIENT	TECH CONTRACTORS
SOIL TYPE #	3	PROJECT	ROLLING HILLS
TEST BORING #	16	JOB NO.	190300
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	96.2%
20	91.8%
40	87.9%
100	73.5%
200	58.8%

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

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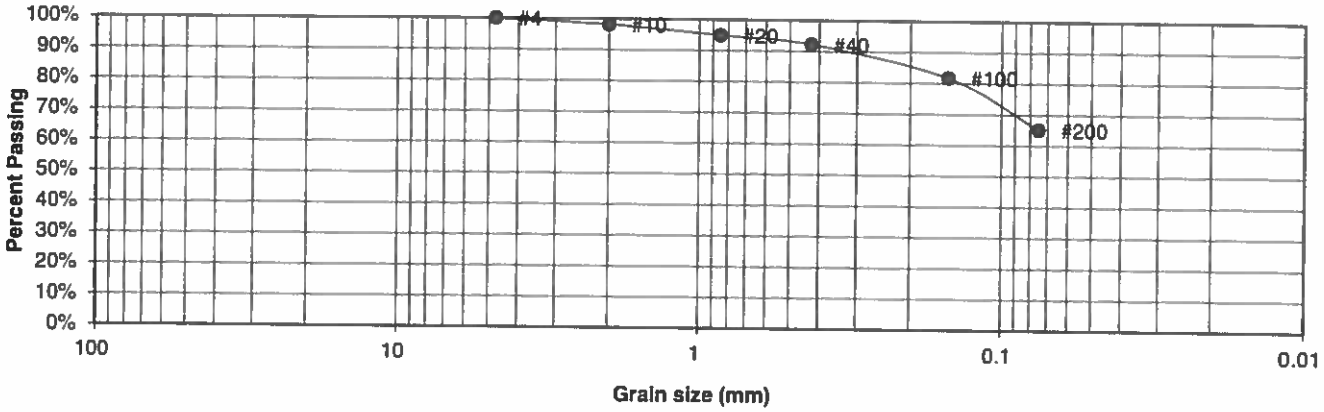
FIG NO.:

UNIFIED CLASSIFICATION	CL	CLIENT	TECH CONTRACTORS
SOIL TYPE #	3	PROJECT	ROLLING HILLS
TEST BORING #	19	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.2%
20	95.0%
40	92.2%
100	81.7%
200	65.1%

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

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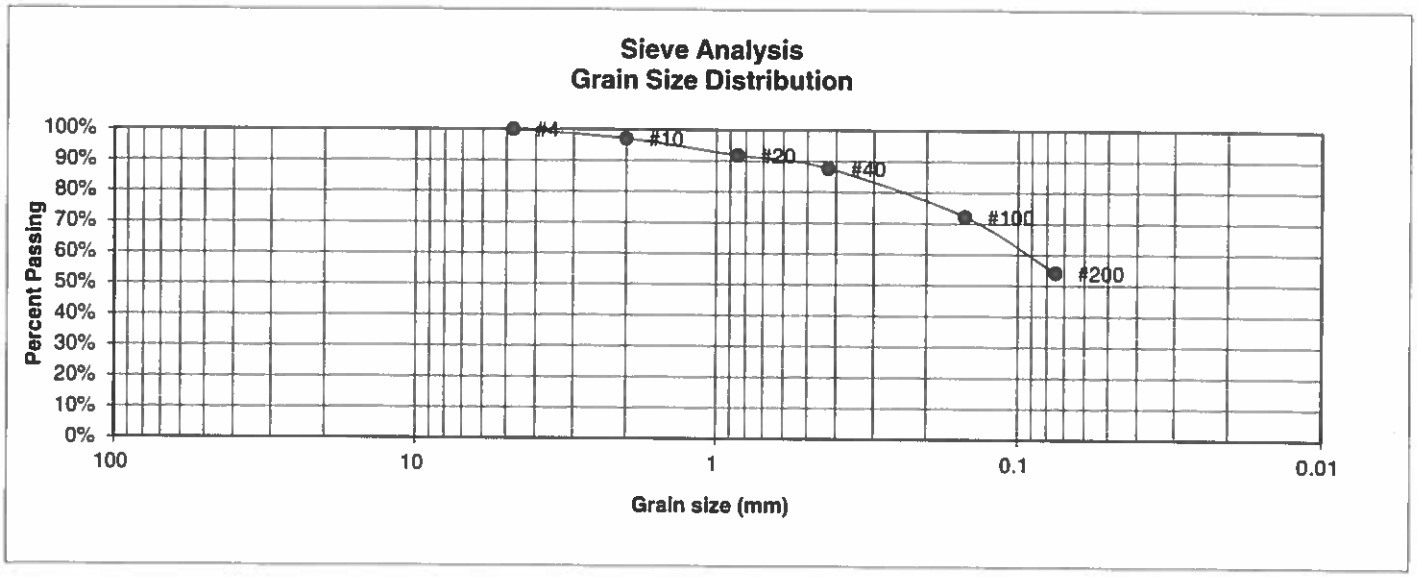
FIG NO.:

UNIFIED CLASSIFICATION	CL	CLIENT	TECH CONTRACTORS
SOIL TYPE #	3	PROJECT	ROLLING HILLS
TEST BORING #	22	JOB NO.	190300
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	97.1%
20	91.9%
40	87.7%
100	72.3%
200	54.2%

Atterberg Limits

Plastic Limit	19
Liquid Limit	34
Plastic Index	15

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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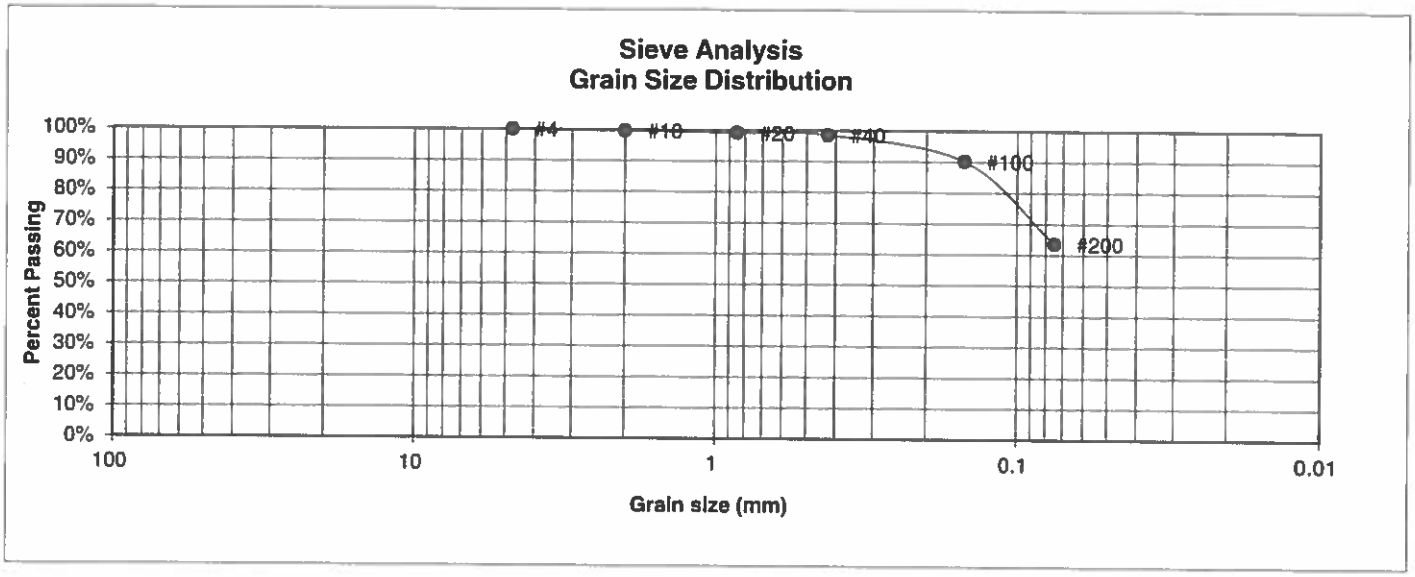
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE: 7/1/19

JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	CL	CLIENT	TECH CONTRACTORS
SOIL TYPE #	3	PROJECT	ROLLING HILLS
TEST BORING #	24	JOB NO.	190300
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.7%
20	99.1%
40	98.5%
100	90.2%
200	63.6%

Atterberg Limits

Plastic Limit

Liquid Limit

Plastic Index

Swell

Moisture at start	14.5%
Moisture at finish	24.3%
Moisture increase	9.8%
Initial dry density (pcf)	90
Swell (psf)	90

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LABORATORY TEST RESULTS

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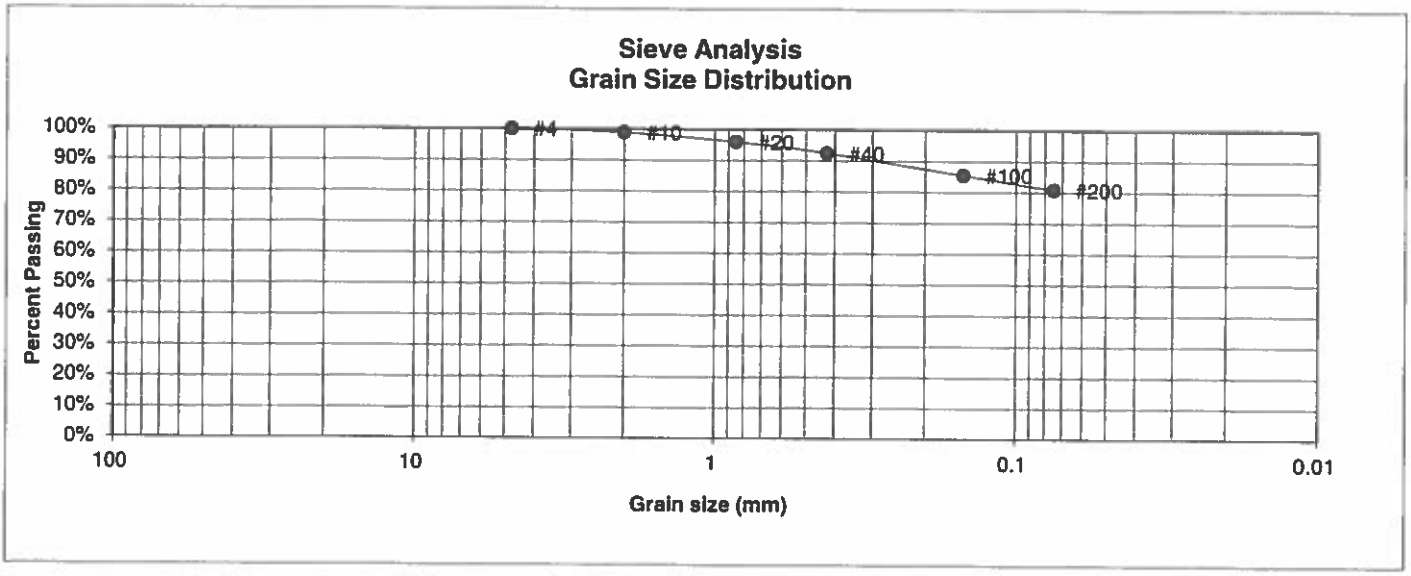
JOB NO: 190300

FIG NO:

UNIFIED CLASSIFICATION	CL	CLIENT	TECH CONTRACTORS
SOIL TYPE #	3	PROJECT	ROLLING HILLS
TEST BORING #	33	JOB NO.	190300
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.0%
20	96.0%
40	92.5%
100	85.5%
200	80.8%

Atterberg Limits	
Plastic Limit	22
Liquid Limit	42
Plastic Index	20

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

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LABORATORY TEST RESULTS

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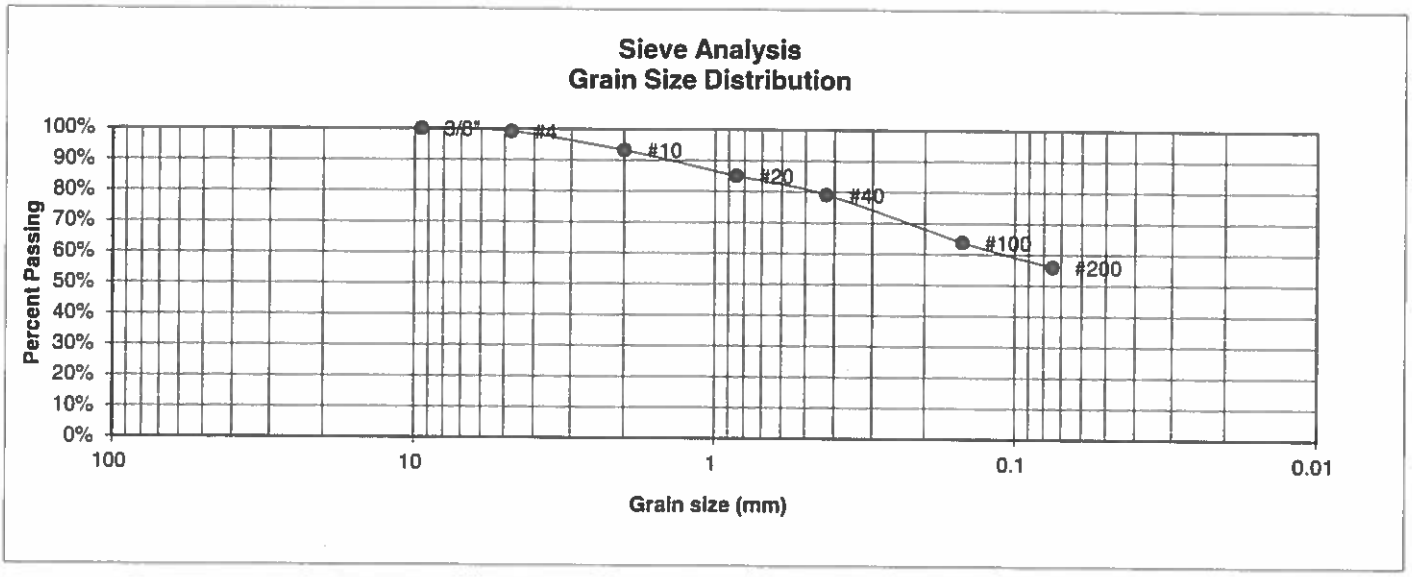
FIG NO.:

UNIFIED CLASSIFICATION	CL	CLIENT	TECH CONTRACTORS
SOIL TYPE #	3	PROJECT	ROLLING HILLS
TEST BORING #	34	JOB NO.	190300
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.2%
10	93.2%
20	85.1%
40	79.1%
100	63.9%
200	56.0%

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

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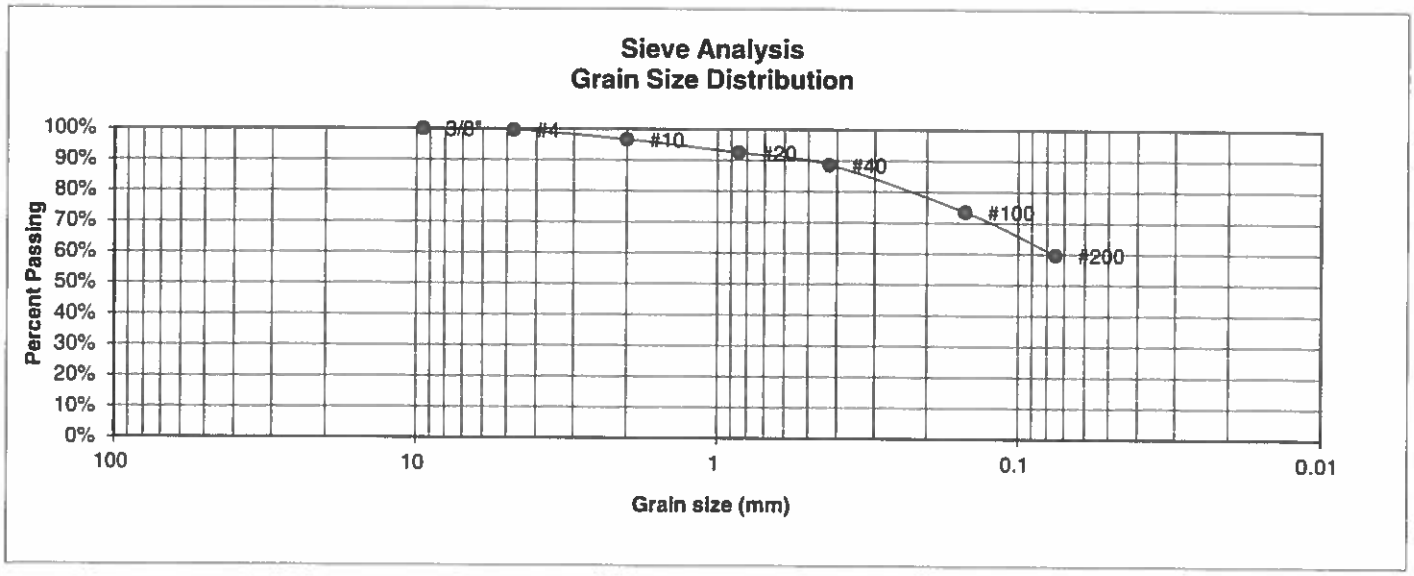
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	CL	CLIENT	TECH CONTRACTORS
SOIL TYPE #	3	PROJECT	ROLLING HILLS
TEST BORING #	36	JOB NO.	190300
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.6%
10	96.7%
20	92.5%
40	88.6%
100	73.6%
200	59.7%

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

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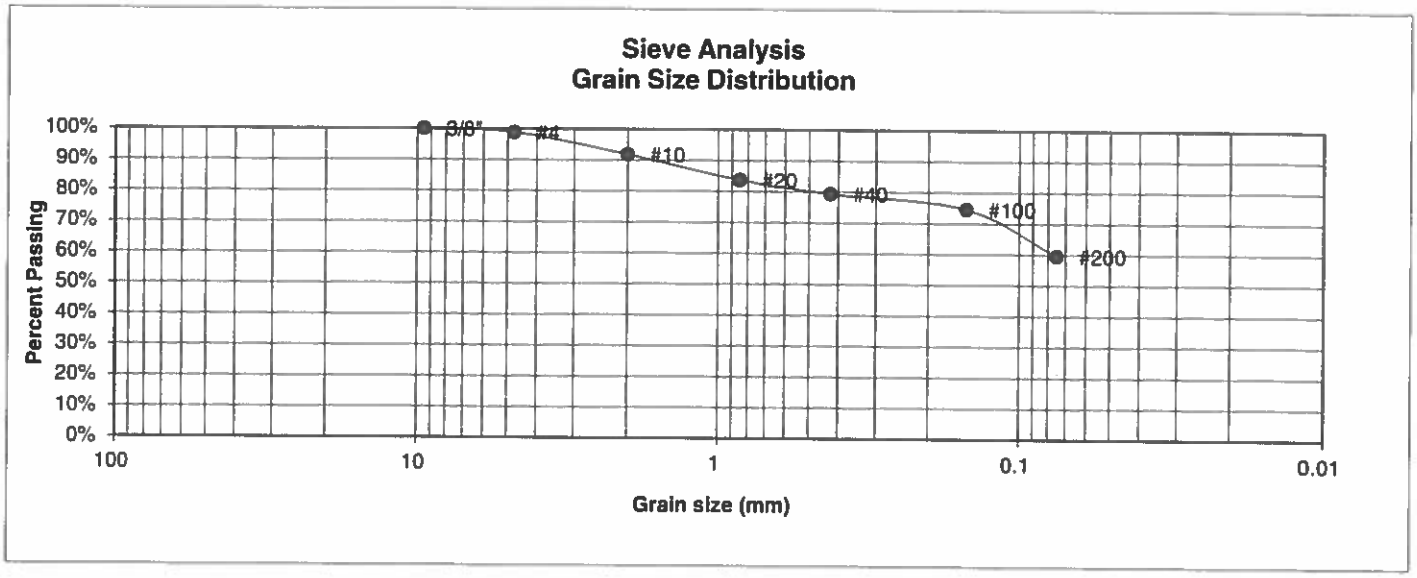
			7/1/19

JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	CL	CLIENT	TECH CONTRACTORS
SOIL TYPE #	3	PROJECT	ROLLING HILLS
TEST BORING #	38	JOB NO.	190300
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.9%
10	91.9%
20	83.7%
40	79.3%
100	74.6%
200	59.6%

Atterberg Limits

Plastic Limit	17
Liquid Limit	34
Plastic Index	17

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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LABORATORY TEST RESULTS

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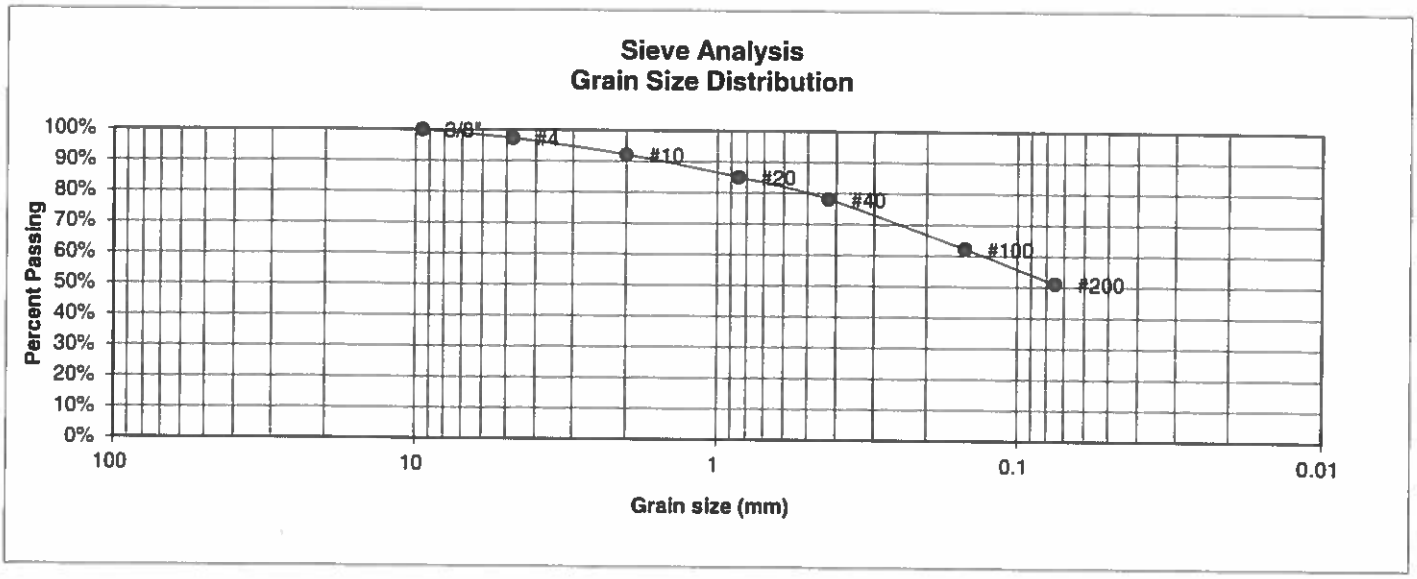
JOB NO.: 190300

FIG NO.:

UNIFIED CLASSIFICATION	CL	CLIENT	TECH CONTRACTORS
SOIL TYPE #	3	PROJECT	ROLLING HILLS
TEST BORING #	48	JOB NO.	190300
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.3%
10	92.1%
20	85.1%
40	78.1%
100	62.2%
200	51.1%

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

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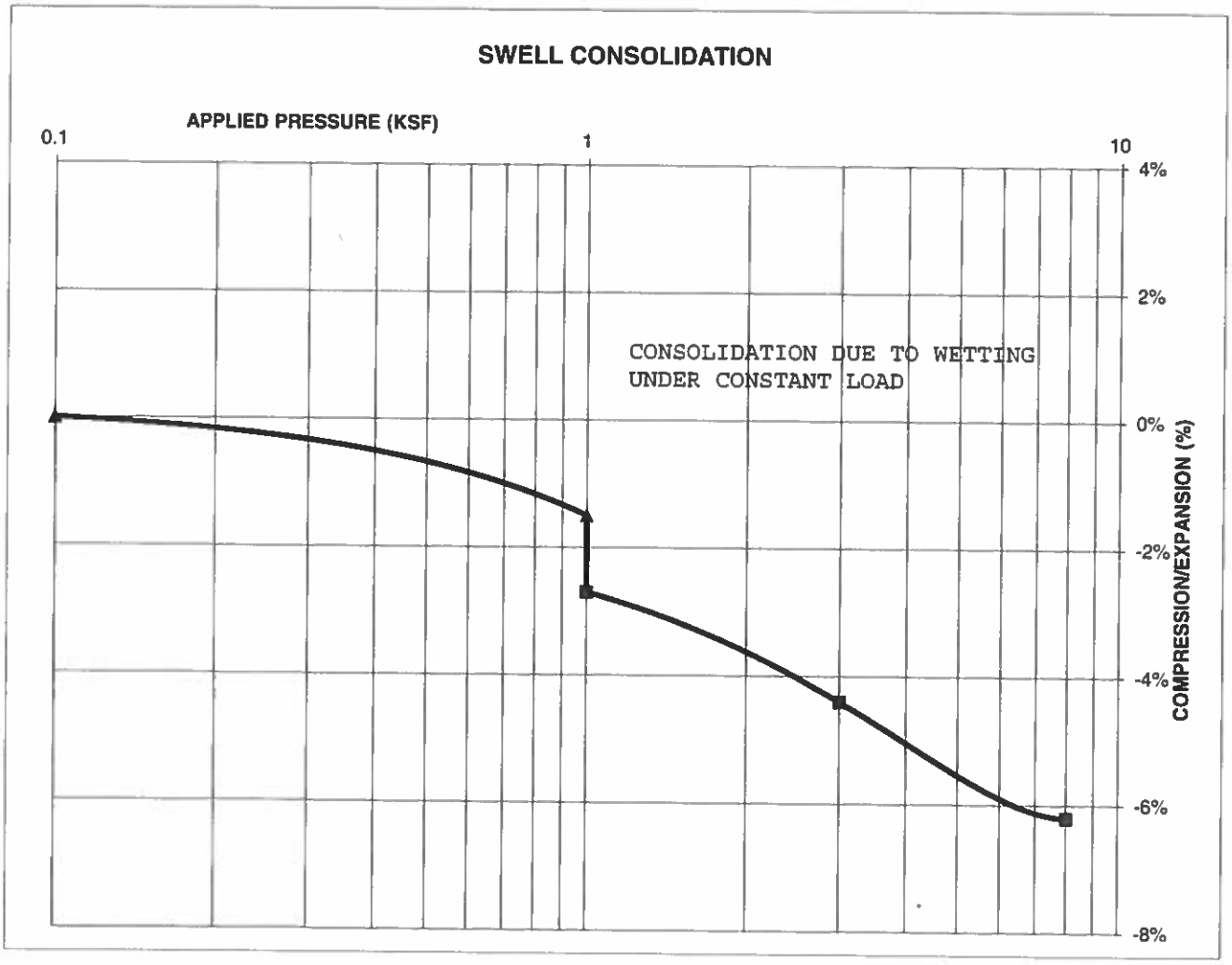
JOB NO. 190300

FIG NO.:

CONSOLIDATION TEST RESULTS

TEST BORING #	19	DEPTH(ft)	2-3
DESCRIPTION	SM	SOIL TYPE	1
NATURAL UNIT DRY WEIGHT (PCF)			113
NATURAL MOISTURE CONTENT			10.0%
SWELL/CONSOLIDATION (%)			-1.2%

JOB NO. 190300
CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS



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SWELL CONSOLIDATION
TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
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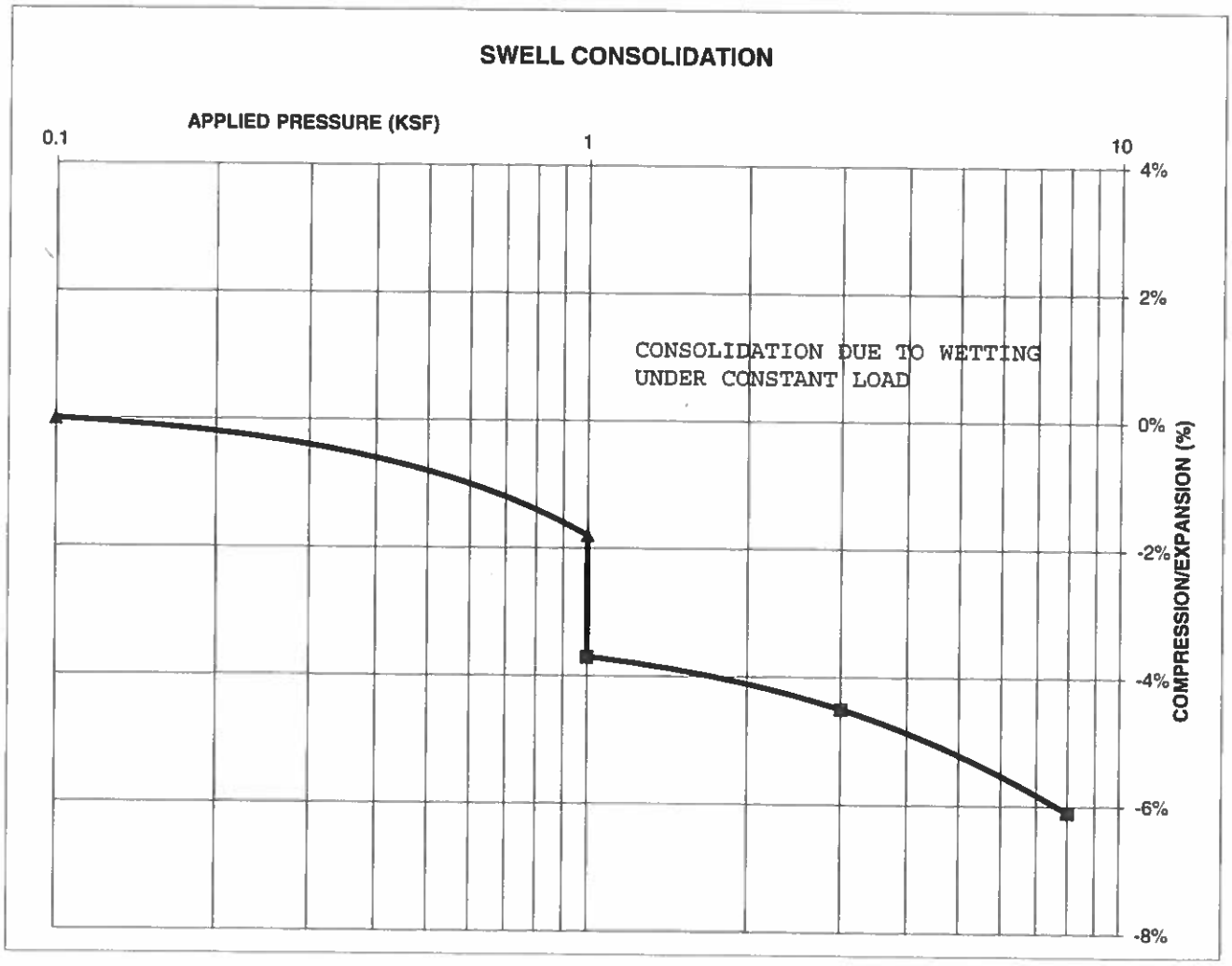
JOB NO.: 190300
FIG NO.:

CONSOLIDATION TEST RESULTS

TEST BORING #	4	DEPTH(ft)	20
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			110
NATURAL MOISTURE CONTENT			9.3%
SWELL/CONSOLIDATION (%)			-1.9%

JOB NO. 190300
CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS



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COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
TEST RESULTS

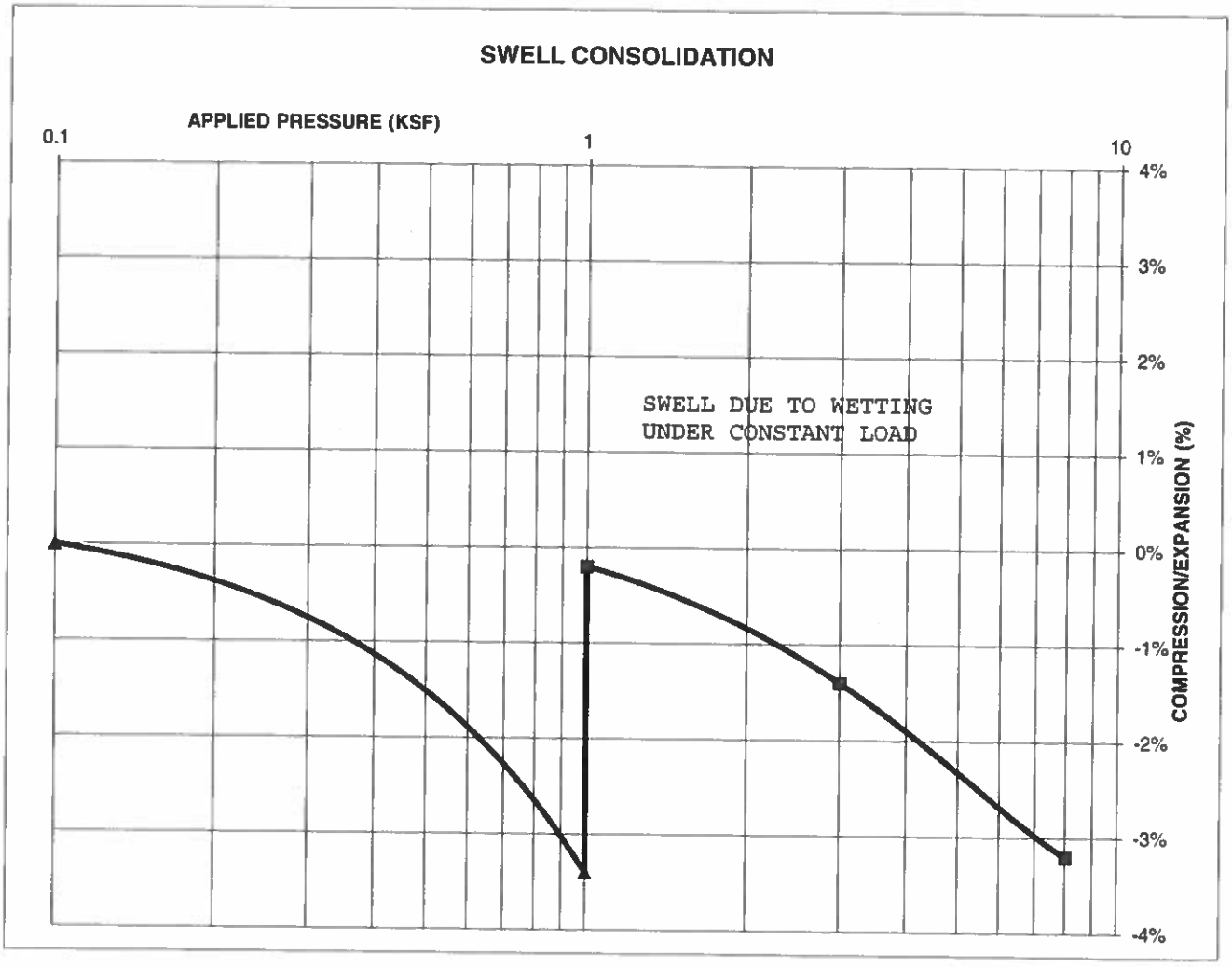
DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300
FIG NO.:

CONSOLIDATION TEST RESULTS

TEST BORING #	20	DEPTH(ft)	20
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			84
NATURAL MOISTURE CONTENT			7.4%
SWELL/CONSOLIDATION (%)			3.2%

JOB NO. 190300
CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS



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

SWELL CONSOLIDATION
TEST RESULTS

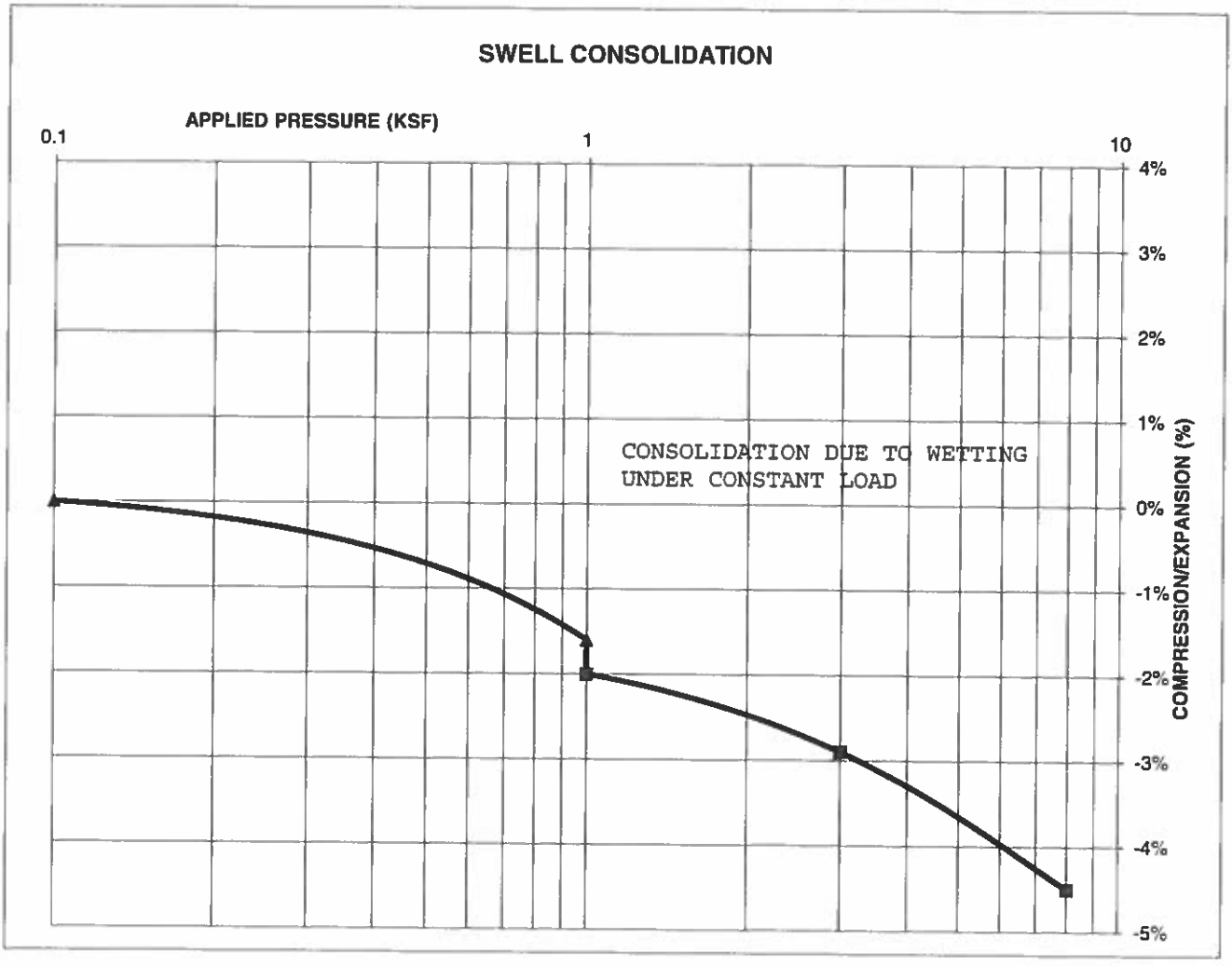
DRAWN:	DATE:	CHECKED:	DATE: 7/1/19

JOB NO.: 190300
FIG NO.:

CONSOLIDATION TEST RESULTS

TEST BORING #	29	DEPTH(ft)	10
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			120
NATURAL MOISTURE CONTENT			4.5%
SWELL/CONSOLIDATION (%)			-0.4%

JOB NO. 190300
CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS



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SWELL CONSOLIDATION
TEST RESULTS

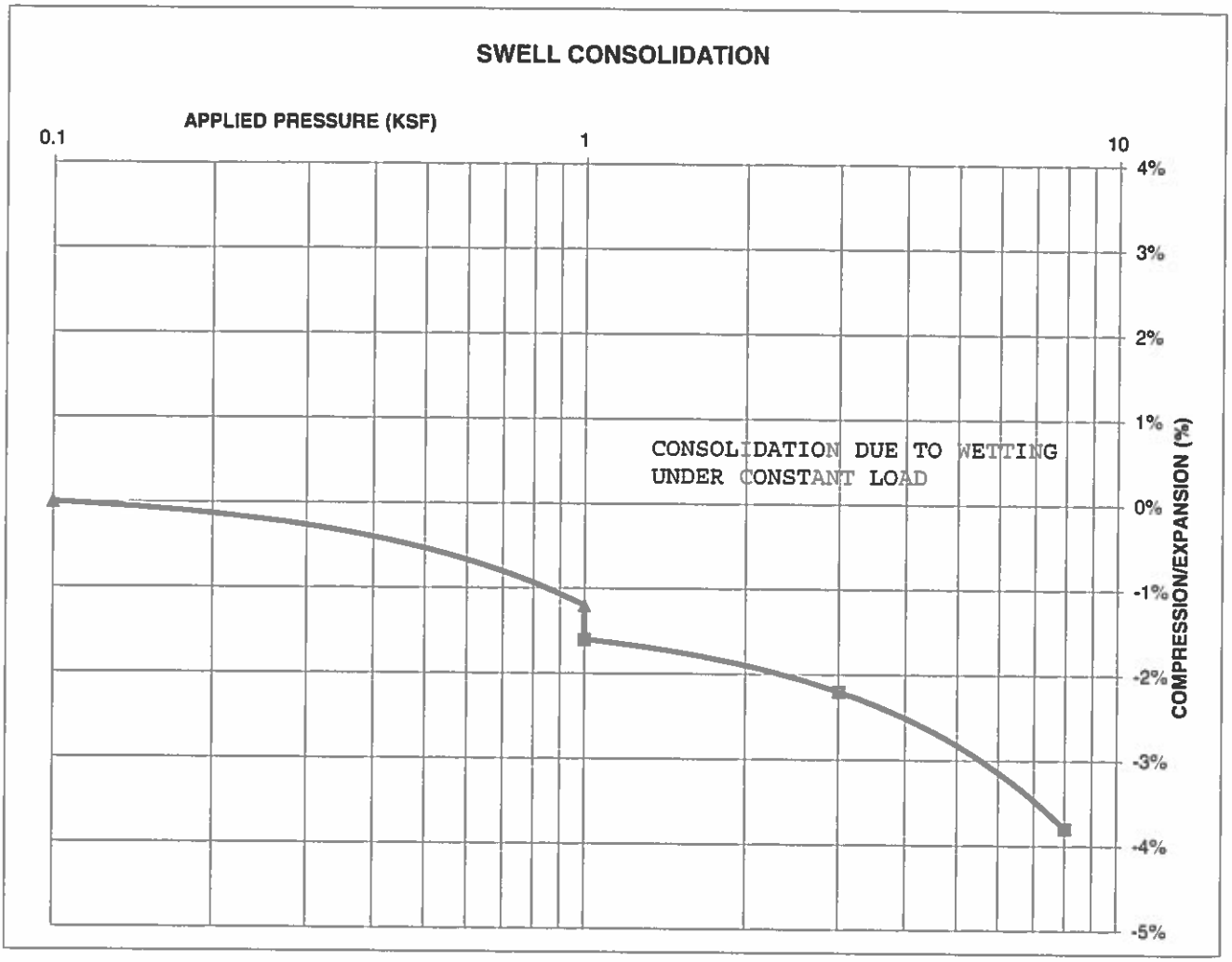
DRAWN:	DATE:	CHECKED:	DATE:
			7/14/19

JOB NO.: 190300
FIG NO.:

CONSOLIDATION TEST RESULTS

TEST BORING #	37	DEPTH(ft)	5
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			117
NATURAL MOISTURE CONTENT			11.4%
SWELL/CONSOLIDATION (%)			-0.4%

JOB NO. 190300
CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS



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TEST RESULTS

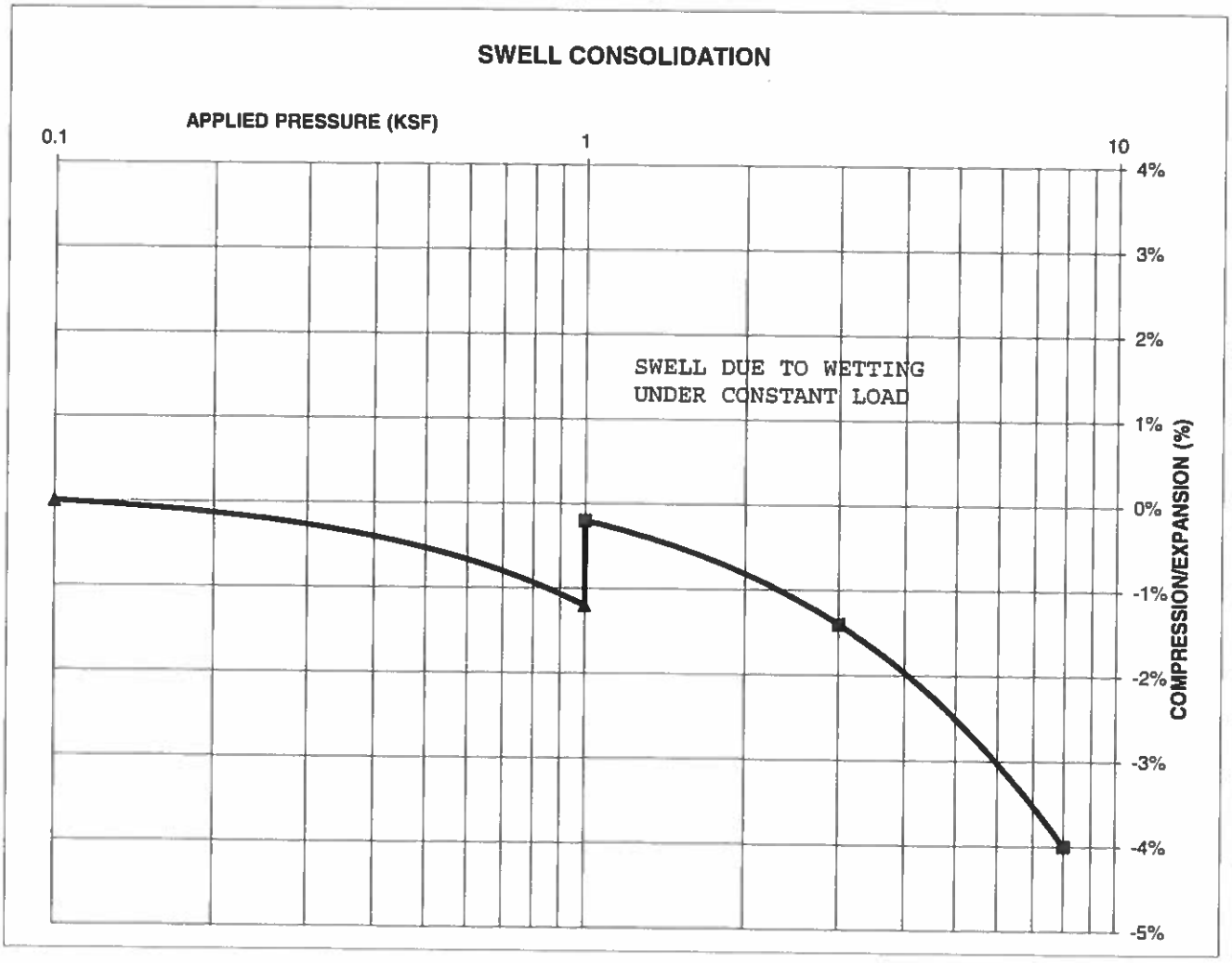
DRAWN:	DATE	CHECKED:	DATE:
		h	7/1/19

JOB NO.: 190300
FIG NO.:

CONSOLIDATION TEST RESULTS

TEST BORING #	15	DEPTH(ft)	10
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			127
NATURAL MOISTURE CONTENT			7.2%
SWELL/CONSOLIDATION (%)			1.0%

JOB NO. 190300
CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS



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TEST RESULTS

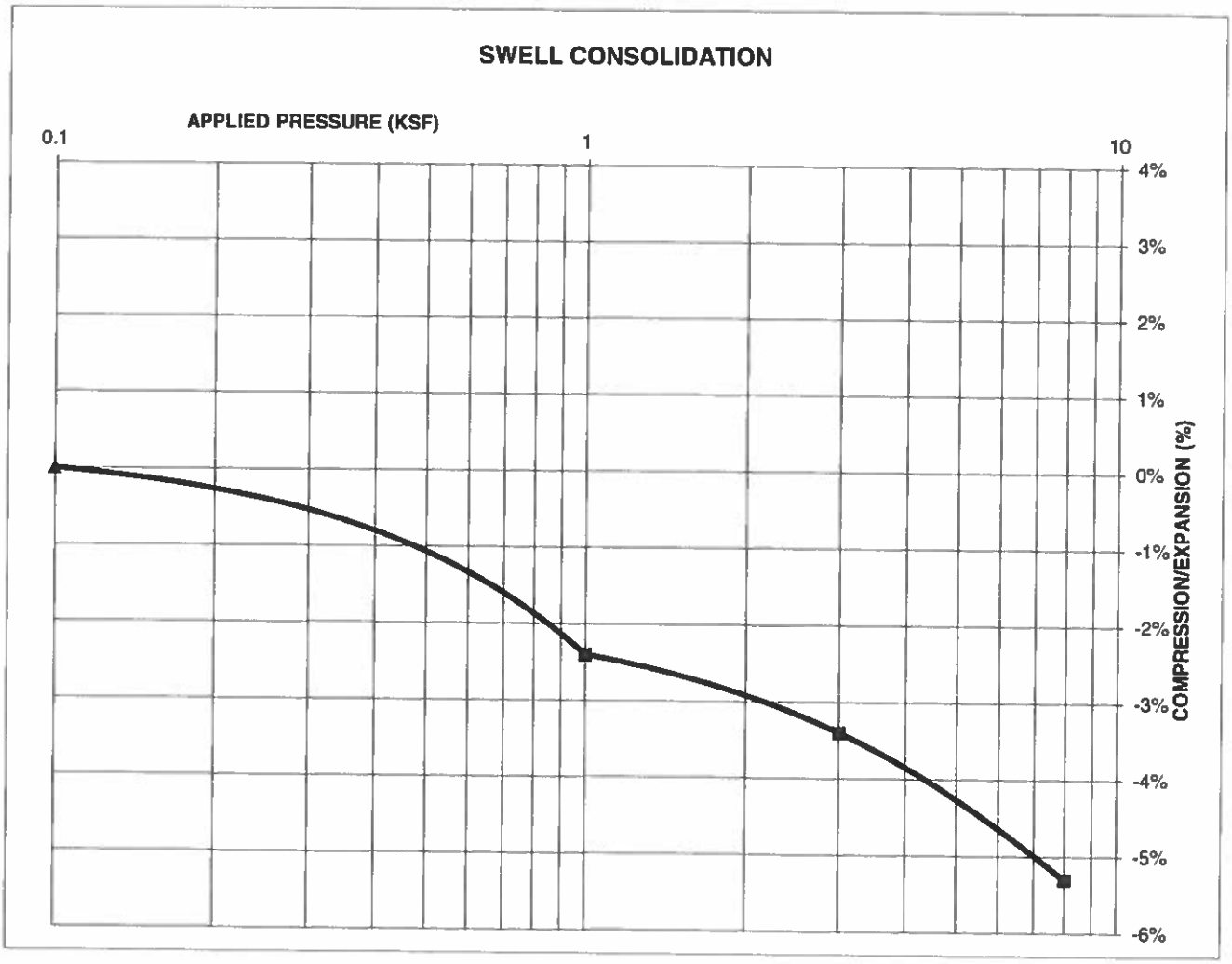
DRAWN:	DATE:	CHECKED:	DATE: 7/1/19

JOB NO.: 190300
FIG NO.:

CONSOLIDATION TEST RESULTS

TEST BORING #	16	DEPTH(ft)	20
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			121
NATURAL MOISTURE CONTENT			9.5%
SWELL/CONSOLIDATION (%)			0.0%

JOB NO. 190300
CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS



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SWELL CONSOLIDATION
TEST RESULTS

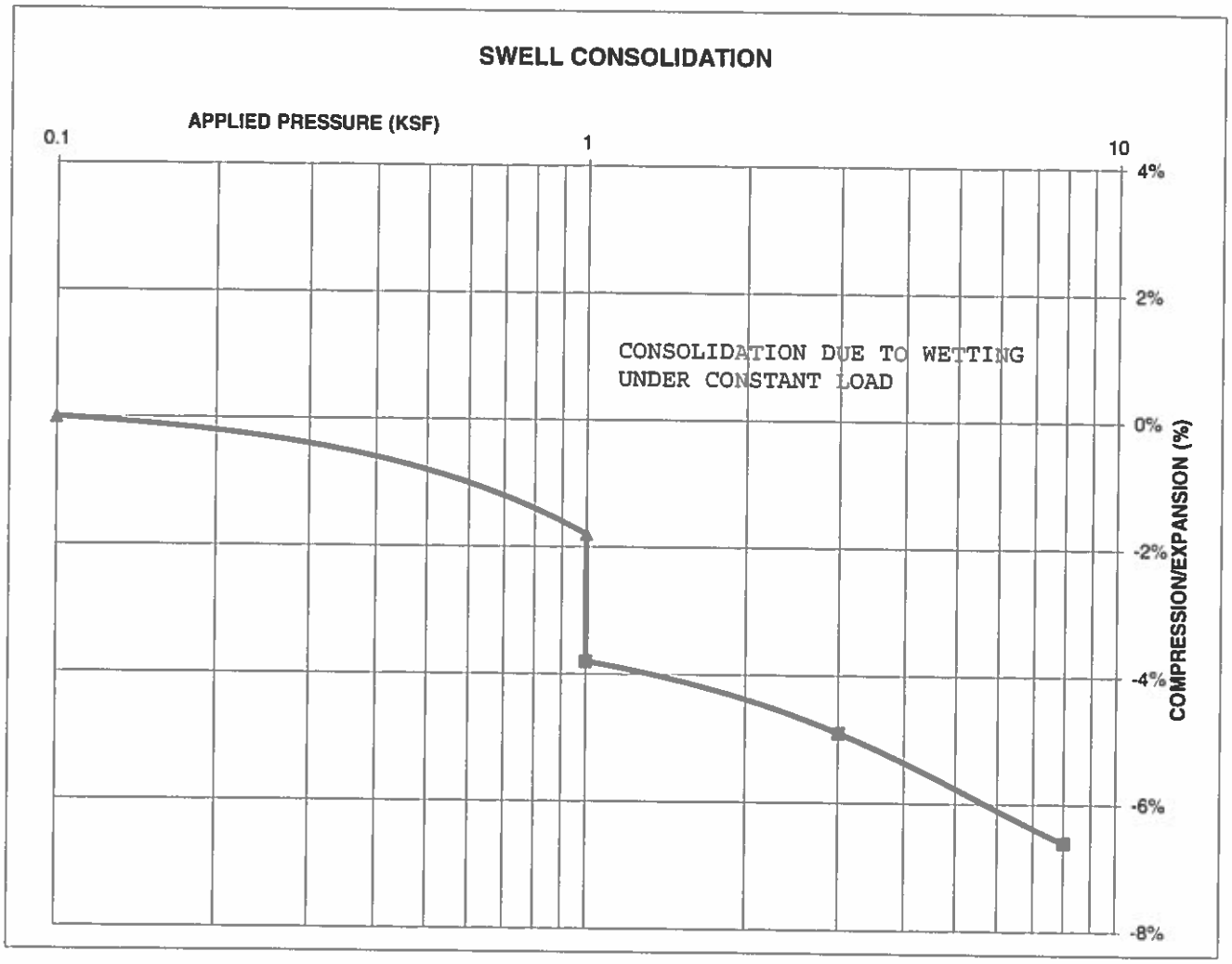
DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300
FIG NO.:

CONSOLIDATION TEST RESULTS

TEST BORING #	22	DEPTH(ft)	10
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			99
NATURAL MOISTURE CONTENT			12.7%
SWELL/CONSOLIDATION (%)			-2.0%

JOB NO. 190300
CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS



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SWELL CONSOLIDATION
TEST RESULTS

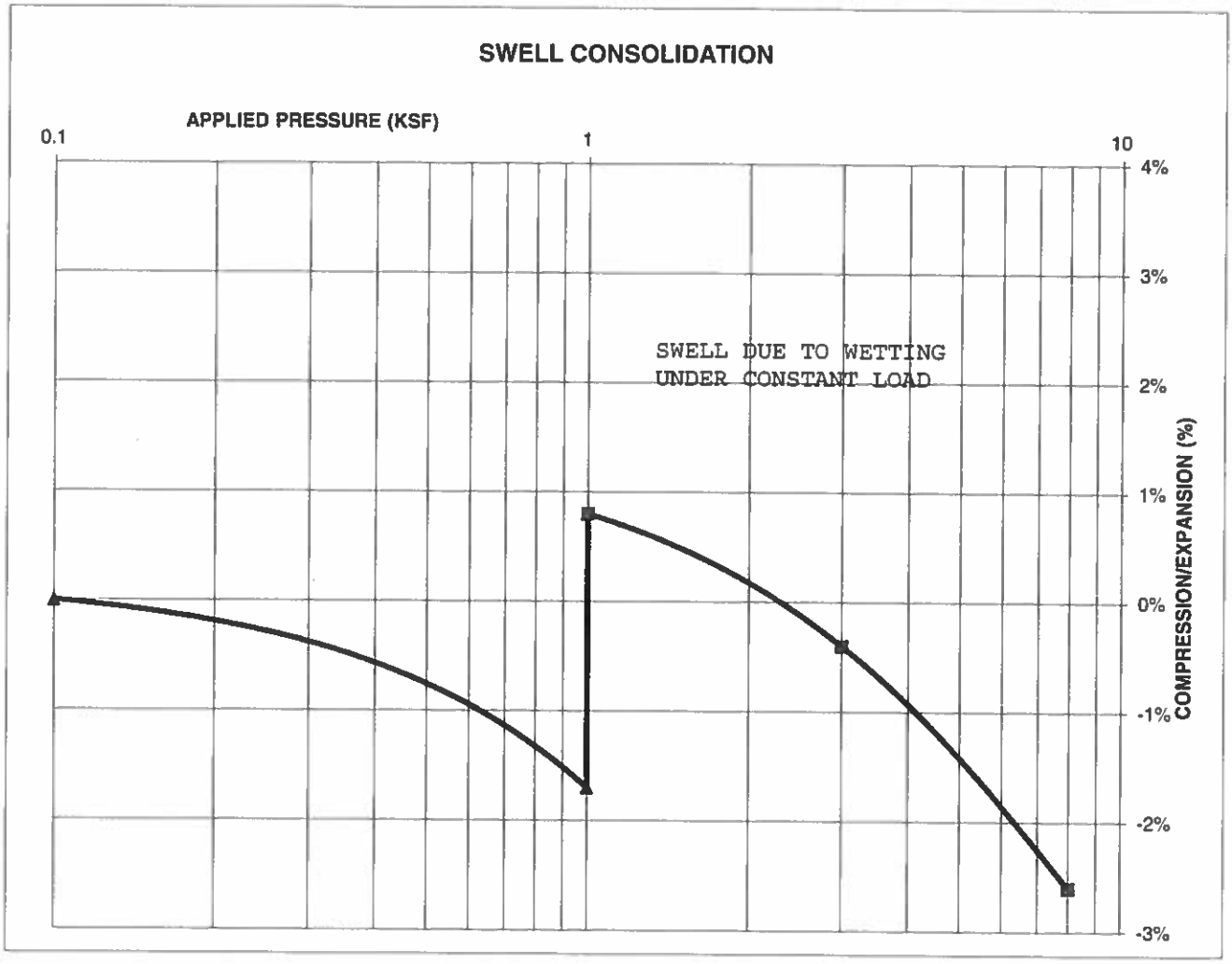
DRAWN:	DATE:	CHECKED:	DATE: 7/11/19

JOB NO.: 190300
FIG NO.:

CONSOLIDATION TEST RESULTS

TEST BORING #	33	DEPTH(ft)	10
DESCRIPTION	0	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			115
NATURAL MOISTURE CONTENT			16.5%
SWELL/CONSOLIDATION (%)			2.5%

JOB NO. 190300
CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS



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SWELL CONSOLIDATION
TEST RESULTS

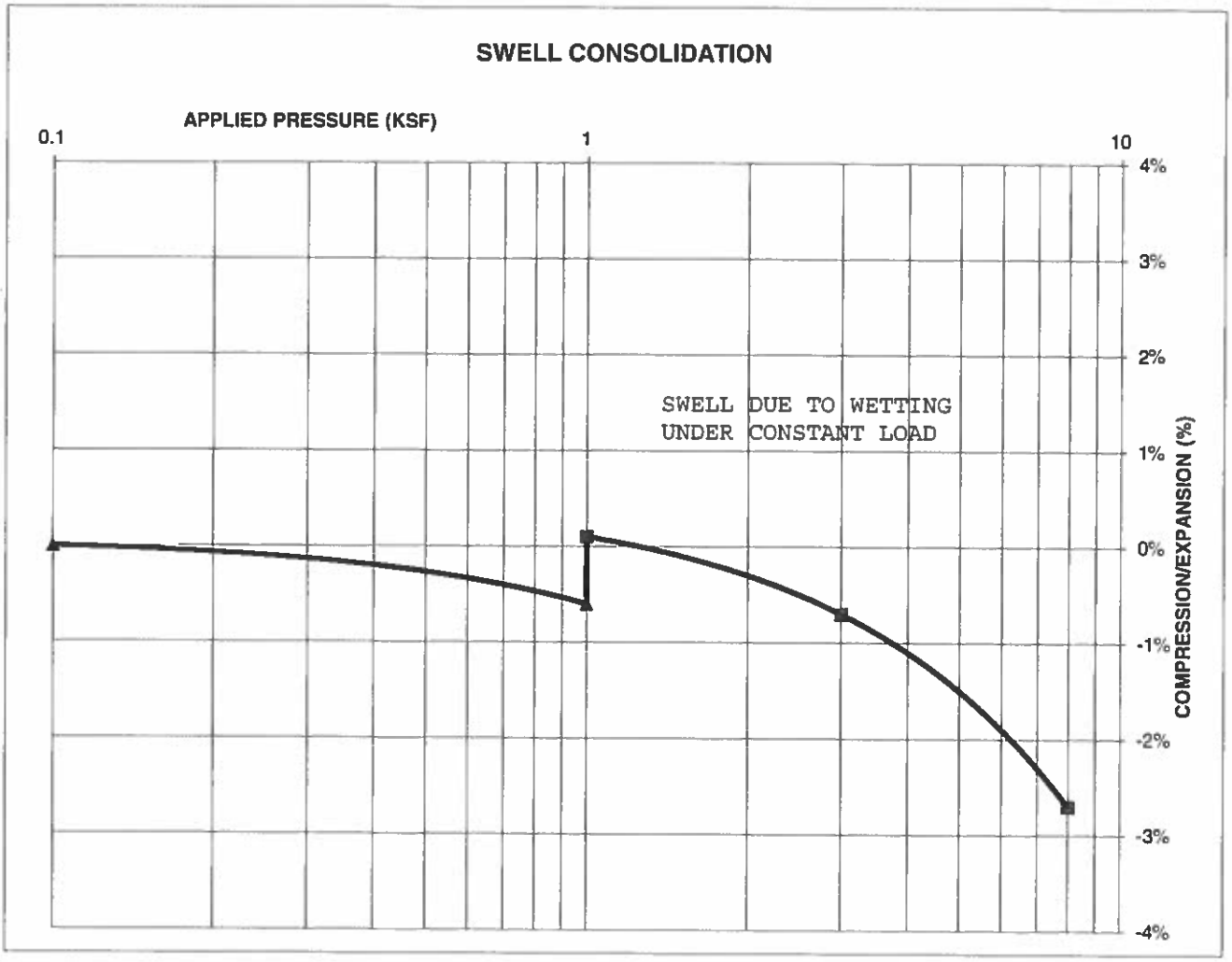
DRAWN:	DATE:	CHECKED:	DATE:
			7/17/19

JOB NO. 190300
FIG NO.:

CONSOLIDATION TEST RESULTS

TEST BORING #	34	DEPTH(ft)	10
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			114
NATURAL MOISTURE CONTENT			11.5%
SWELL/CONSOLIDATION (%)			0.7%

JOB NO. 190300
CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS



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SWELL CONSOLIDATION
TEST RESULTS

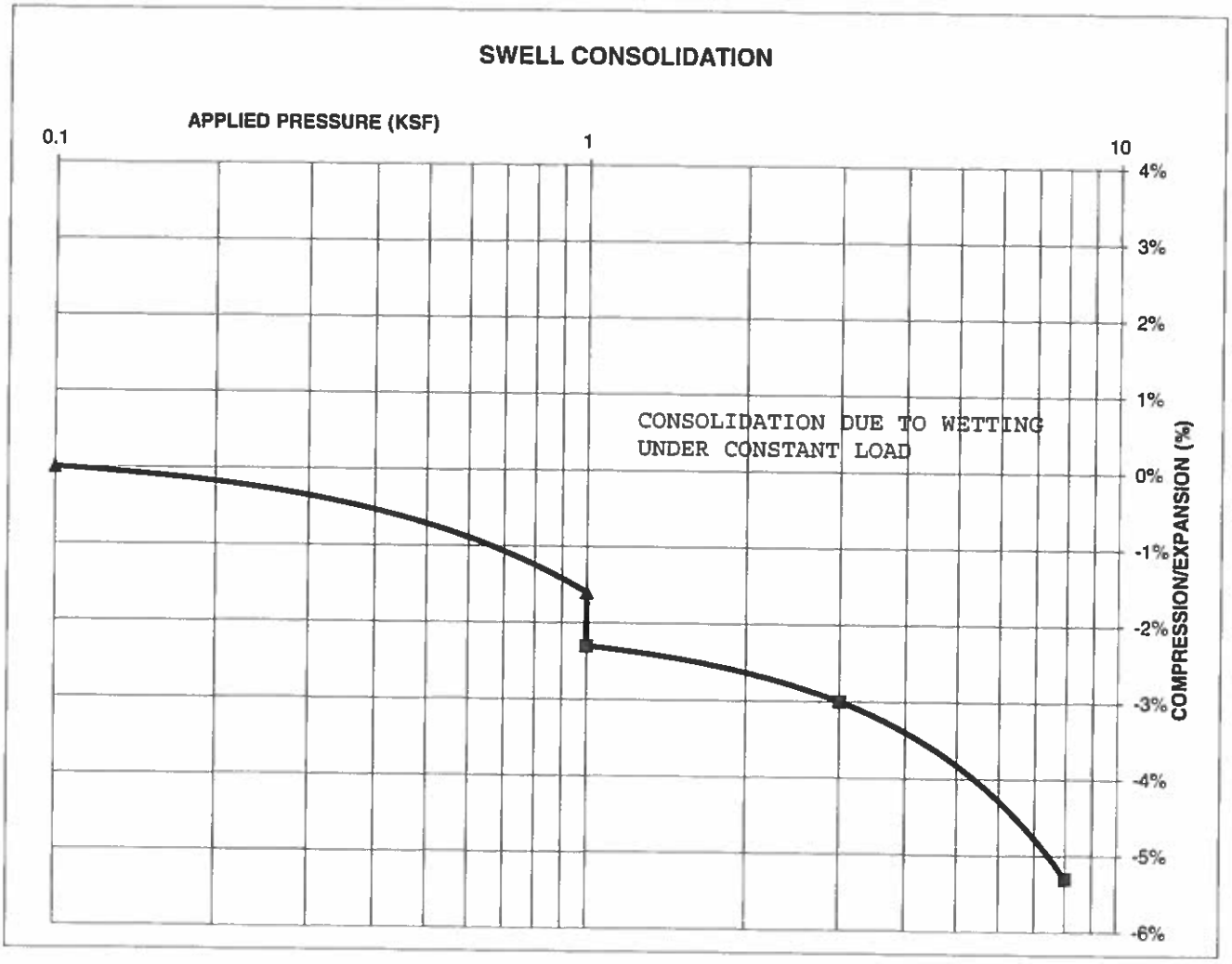
DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300
FIG NO.:

CONSOLIDATION TEST RESULTS

TEST BORING #	48	DEPTH(ft)	20
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			103
NATURAL MOISTURE CONTENT			12.5%
SWELL/CONSOLIDATION (%)			-0.7%

JOB NO. 190300
CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS



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SWELL CONSOLIDATION
TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300
FIG NO.:

CLIENT	TECH CONTRACTORS	JOB NO.	190300
PROJECT	ROLLING HILLS	DATE	3/28/2019
LOCATION	ROLLING HILLS	TEST BY	BL

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-6	2-3	1	SM-SW	<0.01
TB-10	5	1	SC	0.01
TB-6	20	2	SC	<0.01
TB-9	15	2	SM	<0.01
TB-23	2-3	1	SM	0.00
TB-37	5	2	SC	0.00
TB-40	10	2	SM	<0.01
TB-13	2-3	1	SW	0.00
TB-14	20	2	SM	<0.01
TB-15	10	3	CL	<0.01
TB-31	5	1	SM-SW	<0.01
TB-39	5	1	SM	<0.01
TB-39	15	2	SC	<0.01
TB-22	10	3	CL	<0.01
TB-28	2-3	1	SW	<0.01
TB-28	15	2	SC	0.00
TB-26	5	1	SM-SW	<0.01
TB-38	2-3	1	SM-SW	<0.01
TB-38	15	3	CL	0.03
TB-48	20	3	CL	0.00

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST
SULFATE RESULTS

DRAWN:	DATE:	CHECKED:	DATE: 7/1/19

JOB NO.: 190300
FIG NO.:

SUBSURFACE SOIL INVESTIGATION
MERIDIAN RANCH - ROLLING HILLS RANCH
EL PASO COUNTY, COLORADO

Prepared for:

Tech Contractors
3575 Kenyon Street, Suite 200
San Diego, California 92110

Attn: Mr. Raul Guzman

July 15, 2019

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Daniel P. Stegman

Reviewed by:

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

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7.18.19
PROFESSIONAL ENGINEER

DPS/ts

Encl.

Entech Job No. 190300
AAprojects/2019/190300/190300 SSI

September 20, 2019

ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

Tech Contractors
3575 Kenyon Street, Ste 200
San Diego, California 92110

Attn: Raul Guzman

Re: Soil, Geology and Geologic Hazard Evaluation
Meridian Ranch – Rolling Hills Ranch, Filings 1 through 4
SE of Sunrise Ridge Drive and Rex Road
El Paso County, Colorado

Dear Mr. Guzman:

As requested, personnel of Entech Engineering, Inc. have investigated the above referenced site to evaluate the conditions with respect to geology and geologic hazards affecting development of the site. The subsurface soil conditions were investigated by Entech Engineering, Inc., Test Boring Logs (Appendix A) and Summary of Laboratory Testing Results are included with this report.

The project consists of single-family residential development on an approximate 250–acre site. The site lies in El Paso County, Colorado, approximately 4 miles north of Falcon, Colorado. The approximate location of the site is shown on the Vicinity Location Map, Figure 1.

The topography of the site is gently to moderately sloping rolling hills that generally slope in a southeasterly direction. Minor drainages exist on the site that trend in south-southeasterly directions. The drainages were dry at the time of this investigation. The site lies in portions of S½ of Section 20, and Northern portion of Section 29 Township 12 South, Range 64 West of the 6th Principal Meridian in El Paso County, Colorado. The site is currently vacant. The Site Plan/Proposed Grading is presented in Figure 3.

Forty-nine test borings were drilled on the site as a part of a Subsurface Soil Investigation dated July 15, 2019, (Reference 1). The Test Boring Logs are included in Appendix A. Laboratory Test Results are summarized in Table 1. Information from this report was used evaluating the site.

The scope of this report includes a geologic analysis/evaluation of the site utilizing published geologic data, available subsurface soils information and site-specific mapping of major geologic features, and identification of geologic hazards with respect to the development with recommended mitigation techniques. The Natural Resource Conservation Service (NRCS), previously the Soil Conservation Service (SCS) Survey was also reviewed to evaluate the site.

SOIL AND GEOLOGIC CONDITIONS

Soil Survey

The Natural Resource Conservation Service (NRCS) (Reference 2, Figure 3), previously the Soil Conservation Service (Reference 3) has mapped two soil types on the site. Complete descriptions of the soils are presented in Appendix B. In general, the soils consist of gravelly, sandy loam and sandy loam. The soils are described as follows:

Type	Description
19	Columbine gravelly sand loam, 0-3% slopes
83	Stapleton sandy loam, 3-8% slopes

Soils

The soils encountered in the test borings from Subsurface Soil Investigation consisted of slightly silty to silty sand, clayey sand, and clean sand overlying slightly silty to silty sandstone, clayey to very clayey sandstone with interbedded layers of sandy to very sandy claystone. The upper soils were encountered at medium dense to dense states and moist conditions. The upper sands have low expansion potential, however, the claystone and very clayey sandstone have moderate to high expansion potential.

Groundwater

Groundwater was encountered at depths ranging from 2 to 23 feet in thirty-eight of the test borings drilled on this site (Reference 1). Areas of potentially seasonal shallow and seasonal shallow groundwater have been mapped on the site and are discussed later in this report. Fluctuations in groundwater conditions may occur due to variations in rainfall or other factors not readily apparent at this time. Isolated sand layers within the soil profile can carry water in the subsurface. Contractors should be cognizant of the potential for the occurrence of subsurface water features during construction.

Geology

Approximately 16 miles west of the site is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within a large structural feature known as the Denver Basin. Bedrock in the area is typically gently dipping in a northwesterly direction (Reference 4). The bedrock underlying the site consists of the Dawson Arkose Formation of Tertiary Age. The Dawson Formation typically consists of coarse-grained arkosic sandstone with interbedded layers of fine-grained sandstone, siltstone or claystone. Overlying the Dawson are deposits of alluvial, residual, and man-made soils.

The geology of the site was evaluated using the *Geologic Map of the Falcon Quadrangle,* by Morgan and White in 2012, (Reference 5, Figure 4). The geology of the site is indicated in Figure 5. Five mappable units were identified on this site which are described as follows:

Qaf **Artificial Fill of Quaternary Age:** These are man-made fill deposits associated with recent on-site grading and stockpiles.

Qal **Recent Alluvium of Quaternary Age:** These are recent stream deposits associated with the defined drainages on site. They generally consist of silty to clayey sands and may contain highly organic soil.

Qa_2 **Alluvium Two of Quaternary Age:** These are water deposited as stream terrace deposits that typically consist of silty to clayey sands and may contain clay layers. The Alluvium two correlates with the Piney Creek Alluvium.

Qa_3 **Alluvium Three of Quaternary Age:** These are water deposited as stream terrace deposits that typically consist of silty to clayey sands and may contain clay layers. The Alluvium Three correlates with the Broadway Alluvium.

Tda **Dawson Arkose Formation of Tertiary Age:** The Dawson Formation typically consists of arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone. Overlying this formation is a variable layer of residual soil. The residual soils were derived from the in-situ weathering of the bedrock materials on-site. These soils consisted of silty sands and may contain layers of sandy clays.

ENGINEERING GEOLOGIC HAZARDS

Mapping has been performed on this site to identify areas where various geologic conditions exist of which developers should be cognizant during the planning, design and construction stages should new construction be proposed. The engineering geologic hazards identified on this site include artificial fill, potentially seasonal shallow groundwater areas, and shallow groundwater areas (Figure 6). Areas of shallow bedrock will also be encountered on this site. These hazards and recommended mitigation techniques are discussed as follows:

Artificial Fill

An area of fill was mapped on the site in the northeastern portion associated with a dam, and in the north central portion that is associated with a large fill pile that is considered uncontrolled, and areas of fill may exist that are not mapped due to on-going site grading.

Mitigation: It is anticipated the uncontrolled fill piles will be removed during site grading. Any uncontrolled fill encountered beneath foundations should be removed and recompacted at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557.

Loose Soils

Loose soils were encountered in some of the borings drilled on site. Loose soils if encountered beneath the foundation or floor slabs will require mitigation.

Mitigation: Should loose soils be encountered beneath foundations or floor slabs, mitigation will be necessary. Overexcavation and recompaction at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. An overexcavation depth of 2 to 3 feet is anticipated for loose soils.

Expansive Soils

Expansive soils were encountered in some of the test borings drilled on-site. These occurrences are typically sporadic; therefore, none have been indicated on the maps. These clays and claystones, if encountered beneath foundations, can cause differential movement in the structure foundation. These occurrences should be identified and dealt with on an individual basis.

Mitigation: Should expansive soils be encountered beneath the foundation, mitigation will be necessary. Mitigation of expansive soils will require special foundation design. Overexcavation and replacement with non-expansive soils at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Another alternative in areas of highly expansive soils is the use of drilled pier foundation systems. Typical minimum pier depths are on the order of 25 feet and requiring penetration into the bedrock material a minimum of 4 to 6 feet, depending upon building loads. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. The use of structural floors should be considered for basement construction on highly expansive clays. Final recommendations should be determined after additional investigation of each building site.

Potentially Seasonal Shallow and Seasonal Shallow Groundwater Area

Drainages are located along the western, northern and southeastern portions of the site. In these areas, the potential for periodically high subsurface moisture conditions and frost heave potential exists. In these areas, the potential exists for shallow groundwater during high moisture periods. The drainages will be avoided or regraded during site development, and the seasonal shallow groundwater area will be avoided by the proposed development.

Mitigation: Foundations must have a minimum 30-inch depth for frost protection. In areas where high subsurface moisture conditions are anticipated periodically, subsurface perimeter drains are recommended to help prevent the intrusion of water into areas below grade. It is anticipated much of these areas would be filled during site grading further raising foundations above the groundwater level. Any grading in these areas should be done to direct surface flow around construction to avoid areas of ponded water. All organic material would be completely removed prior to fill placement. Specific recommendations concerning the affects of groundwater on site

grading and construction are included in the Subsurface Soil Investigation (Reference 1). Further investigation will be necessary to determine the groundwater depth after final grading. The site does not lie within any floodplain zones according to the FEMA Map No. 08041CO552G, dated December 7, 2018 (Figure 7, Reference 6). Exact locations of floodplain and specific drainage studies are beyond the scope of this report. Finished floor levels must be located a minimum of one foot above floodplain levels.

RELEVANCE OF GEOLOGIC CONDITIONS TO LAND USE PLANNING

As mentioned, the proposed development will be single-family residential. The existing geologic and engineering geologic conditions will impose some constraints on development and construction. The geologic conditions on the site include artificial fill, expansive or loose soils, and potentially seasonal shallow groundwater areas which can be satisfactorily mitigated through proper engineering design and construction practices or regrading and avoidance.

The upper granular soils encountered in the borings drilled on the site were generally encountered at medium dense to very dense states. Loose or uncontrolled fill soils, if encountered in roads or beneath foundations, will require recompaction. Expansive layers may also be encountered in the soil on this site. Expansive soils, if encountered, will require special foundation design. These soils will not prohibit development.

An area of fill was mapped on the site in the northeastern portion that is associated with the road and pond embankment, and a large fill pile is located in the northern portion of the site. Other minor areas associated with small fill piles that are considered uncontrolled, and areas of fill may exist. It is anticipated the fill piles would be removed during site grading. Any uncontrolled fill encountered beneath foundations and floor slabs will require removal and recompaction at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557.

Areas of shallow bedrock will be encountered on this site. Shallow bedrock will likely be encountered in those areas mapped as Tda-Dawson Formation, or Soil Types 2 or 3 on Figure 2. Bedrock depths are indicated on Table 2 and in Figures 3 and 6. Difficult excavation should be anticipated in areas of shallow bedrock. Higher allowable bearing capacities will also be expected in areas of shallow bedrock.

Groundwater was encountered at 2 to 23 feet in the thirty-eight of the forty-nine test borings. Groundwater depths are indicated on Table 2. Areas of potentially seasonal shallow and seasonally shallow groundwater have been mapped on this site. (Figure 6). These areas can be avoided by construction or are being regraded. Specific recommendations concerning the effects of groundwater on site grading and construction are discussed in the Subsurface Soil Investigation (Reference 1). The site should not be affected by any delineated 100-year FEMA floodplains (Figure 7, Reference 6).

Tech Contractors
Soil, Geology and Geologic Hazard Evaluation
Meridian Ranch – Rolling Hills Ranch, Filing Nos. 1 – 4
SE of Sunrise Ridge Drive and Rex Road
El Paso County, Colorado

In summary, the site granular soils will likely provide suitable support for roads and shallow foundations. The geologic conditions encountered on site can be mitigated with proper engineering and construction practices. Specific recommendations have been made in the Subsurface Soil Investigation (Reference 1).

CLOSURE

It should be pointed out that because of the nature of data obtained by random sampling of such variable nonhomogeneous materials as soil and rock, it is important that we be informed of any differences observed between surface and subsurface conditions encountered in construction and those assumed in the body of this report. Construction and design personnel should be made familiar with the contents of this report. Specific site recommendations have been made in the Preliminary Subsurface Soil Investigation (Reference 1). Specific construction and foundation recommendations will be provided when investigations are completed for new construction after overlot grading.

This report has been prepared for Tech Contractors for application to the proposed development in accordance with generally accepted geologic, soil and engineering practices. No other warranty expresses or implied is made.

We trust that this report has provided you with all the information that you required. Should you have any questions or require additional information, please do not hesitate to contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P. G.
Engineering Geologist

LLL/hg

Encl.Entech Job No. 190300
AAprojects/2019/190300 sg&ghs

Reviewed by:

Joseph C. Goodwin, P.E.
President

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JOSEPH COLLIN GOODWIN
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PROFESSIONAL ENGINEER

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1. Entech Engineering, Inc., July 15, 2019. *Preliminary Subsurface Soil Investigation, Meridian Ranch – Rolling Hills Ranch, Filing Nos. 1 – 4, El Paso County, Colorado.* Entech Job No. 190300.

2. Natural Resources Conservation Service. September 23, 2016. *Web Soil Survey.* United States Department of Agriculture. http:/websoilsurvey.sc.egov..usda.gov.

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5. Morgan, Matthew L. and White, Jonathan L. 2012. *Falcon Quadrangle Geologic Map, El Paso County, Colorado. Colorado Geological Survey.* Open-File Report 12-05.

6. Federal Emergency Management Agency. December 7, 2018. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado.* Map Number 08041CO552G.

FIGURES

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT TECH CONTRACTORS
PROJECT ROLLING HILLS
JOB NO. 190300

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	AASHTO CLASS.	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASS.	SOIL DESCRIPTION
1	6	2-3			8.1	NV	NP	<0.01	A-1-b			SM-SW	SAND, SLIGHTLY SILTY
1	8	5			6.1							SM-SW	SAND, SLIGHTLY SILTY
1	10	5			14.0	29	16	0.01	A-2-6			SC	SAND, CLAYEY
1	11	2-3			15.2					370		SM	SAND, SILTY
1	2	2-3			8.4							SM-SW	SAND, SLIGHTLY SILTY
1	23	2-3			17.0	NV	NP	0.00	A-1-b			SM	SAND, SILTY
1	24	2-3			18.0							SM	SAND, SILTY
1	32	10			15.6							SM	SAND SILTY
1	27	5			48.3					460		SC	SAND, VERY CLAYEY
1	1	2-3			4.7	NV	NP		A-1-b			SW	SAND
1	5	2-3			13.3	26	10		A-2-4			SC	SAND, CLAYEY
1	13	2-3			4.8							SW	SAND
1	14	5			13.2	NV	NP		A-1-b			SM	SAND, SILTY
1	16	5			5.9					70		SM-SW	SAND, SLIGHTLY SILTY
1	19	2-3	10.0	112.9	34.7						-1.2	SM	SAND, SILTY
1	26	5			11.5	NV	NP		A-1-b			SM-SW	SAND, SLIGHTLY SILTY
1	28	2-3			4.9	NV	NP		A-1-b			SW	SAND
1	30	2			12.1							SC	SAND, CLAYEY
1	30	3								2970		CL	CLAY, SANDY
1	30	5			6.9							SM-SW	SAND, SLIGHTLY SILTY
1	31	5			5.4							SM-SW	SAND, SLIGHTLY SILTY
1	38	2-3			8.6	NV	NP		A-1-b			SM-SW	SAND, SLIGHTLY SILTY
1	39	5			17.8							SM	SAND, SILTY
1	42	5			19.6							SM	SAND, SILTY
1	43	2-3			6.0	NV	NP		A-1-b			SM-SW	SAND, SLIGHTLY SILTY
1	47	2-3			20.7					220		SM	SAND, SILTY
1	49	5			7.3							SM-SW	SAND, SLIGHTLY SILTY
2	7	10			18.6	32	14		A-2-6			SC	SANDSTONE, CLAYEY
2	17	10			7.3	NV	NP		A-1-b			SM-SW	SANDSTONE, SLIGHTLY SILTY
2	18	5			14.2							SM	SANDSTONE, SILTY
2	20	5			17.1	37	20		A-2-6			SC	SANDSTONE, CLAYEY
2	21	10			12.5							SM	SANDSTONE, SILTY
2	41	10			16.0							SM	SANDSTONE, SILTY
2	44	10			14.3							SM	SANDSTONE, SILTY
2	6	20			38.9	26	13	<0.01	A-6			SC	SANDSTONE, VERY CLAYEY
2	9	15			17.5	NV	NP	<0.01	A-1-b			SM	SANDSTONE, SILTY

TABLE 1 (cont.)

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	AASHTO CLASS.	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASS.	SOIL DESCRIPTION
2	12	10			15.5							SM	SANDSTONE, SILTY
2	3	5			26.1							SM	SANDSTONE, SILTY
2	37	5	11.4	116.5	35.4			0.00			-0.4	SC	SANDSTONE, CLAYEY
2	40	10			12.3	NV	NP	<0.01	A-1-b			SM	SANDSTONE, SILTY
2	25	15			28.7	NV	NP		A-2-4			SM	SANDSTONE, SILTY
2	23	10			11.6							SM-SW	SANDSTONE, SLIGHTLY SILTY
2	35	5			10.1							SM-SW	SANDSTONE, SLIGHTLY SILTY
2	27	10			16.2							SM	SANDSTONE, SILTY
2	1	15			15.5							SM	SANDSTONE, SILTY
2	4	20	9.3	110.3	20.3	29	12		A-2-6		-1.9	SC	SANDSTONE, CLAYEY
2	5	25			48.5	31	14		A-6			SC	SANDSTONE, VERY CLAYEY
2	14	20			17.8							SM	SANDSTONE, SILTY
2	15	15			19.9							SC	SANDSTONE, CLAYEY
2	20	20	7.4	84.0	49.7	28	14		A-6		3.2	SC	SANDSTONE, VERY CLAYEY
2	21	25			21.2							SM	SANDSTONE, SILTY
2	28	15			28.3	41	17		A-2-6			SC	SANDSTONE, CLAYEY
2	29	10	4.5	119.9	49.6						-0.4	SC	SANDSTONE, VERY CLAYEY
2	39	15			41.1							SC	SANDSTONE, VERY CLAYEY
2	45	20			13.4							SM	SANDSTONE, SILTY
2	46	15			45.5							SC	SANDSTONE, VERY CLAYEY
3	19	5			65.1							CL	CLAYSTONE, SANDY
3	15	10	7.2	126.8	56.1						1.0	CL	CLAYSTONE, VERY SANDY
3	16	20	9.5	120.5	58.8						0.0	CL	CLAYSTONE, VERY SANDY
3	22	10	12.7	99.3	54.2	34	15		A-6			CL	CLAYSTONE, VERY SANDY
3	38	15			59.6	34	17		A-6			CL	CLAYSTONE, VERY SANDY
3	48	20	12.5	103.3	51.1						-0.7	CL	CLAYSTONE, VERY SANDY
3	36	15			59.7							CL	CLAYSTONE, VERY SANDY
3	24	5			63.6					90		CL	CLAYSTONE, SANDY
3	34	10	11.5	114.3	56.0						0.7	CL	CLAYSTONE, VERY SANDY
3	33	10	16.5	115.0	80.8	42	20		A-7-6		2.5	CL	CLAYSTONE, SANDY

Table 2: Summary of Test Borings and Water Measurements*

Test Boring No.	Depth of Boring (ft.)	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)	Cut & Fill** (-/+, ft.)	Estimated Ground Elevation	Estimated Groundwater Elevation
1	20.0	9.0	9.0	0 to -2	7021.3	7012.3
2	25.0	9.0	13.0	-2 to -4	7031.5	7018.5
3	25.0	1.0	15.0	-2 to -4	7032.3	7017.3
4	20.0	1.0	dry	-2 to -4	7044.0	dry
5	25.0	4.0	14.0	-2 to -4	7044.8	7030.8
6	25.0	14.0	10.0	0 to +2	7054.7	7044.7
7	20.0	1.0	16.5	+2 to +4	7058.6	7042.6
8	20.0	9.0	13.0	0 to -2	7060.1	7047.1
9	20.0	14.0	10.0	+4 to +6	7069.7	7059.7
10	20.0	14.0	14.0	0 to -2	7077.5	7063.5
11	20.0	9.0	9.0	0 to +2	7071.6	7062.6
12	20.0	9.0	14.0	0 to -2	7087.3	7073.3
13	20.0	9.0	14.0	0 to -2	7092.0	7078.0
14	25.0	14.0	18.5	-6 to -8	7105.3	7086.8
15	20.0	9.0	18.0	0 to -2	7108.4	7090.4
16	25.0	9.0	16.0	0 to -2	7110.9	7094.9
17	20.0	1.0	17.5	0 to -2	7121.7	7104.2
18	20.0	4.0	dry	0 to +2	7120.7	dry
19	20.0	4.0	dry	+2 to +4	7126.5	dry
20	20.0	1.0	dry	outside cut/fill	7125.4	dry
21	25.0	1.0	10.0	-6 to -8	7105.7	7095.7
22	20.0	4.0	18.5	-6 to -8	7106.0	7087.5
23	20.0	9.0	dry	+2 to +4	7092.3	dry
24	25.0	4.0	2.0	0 to +2	7072.9	7070.9

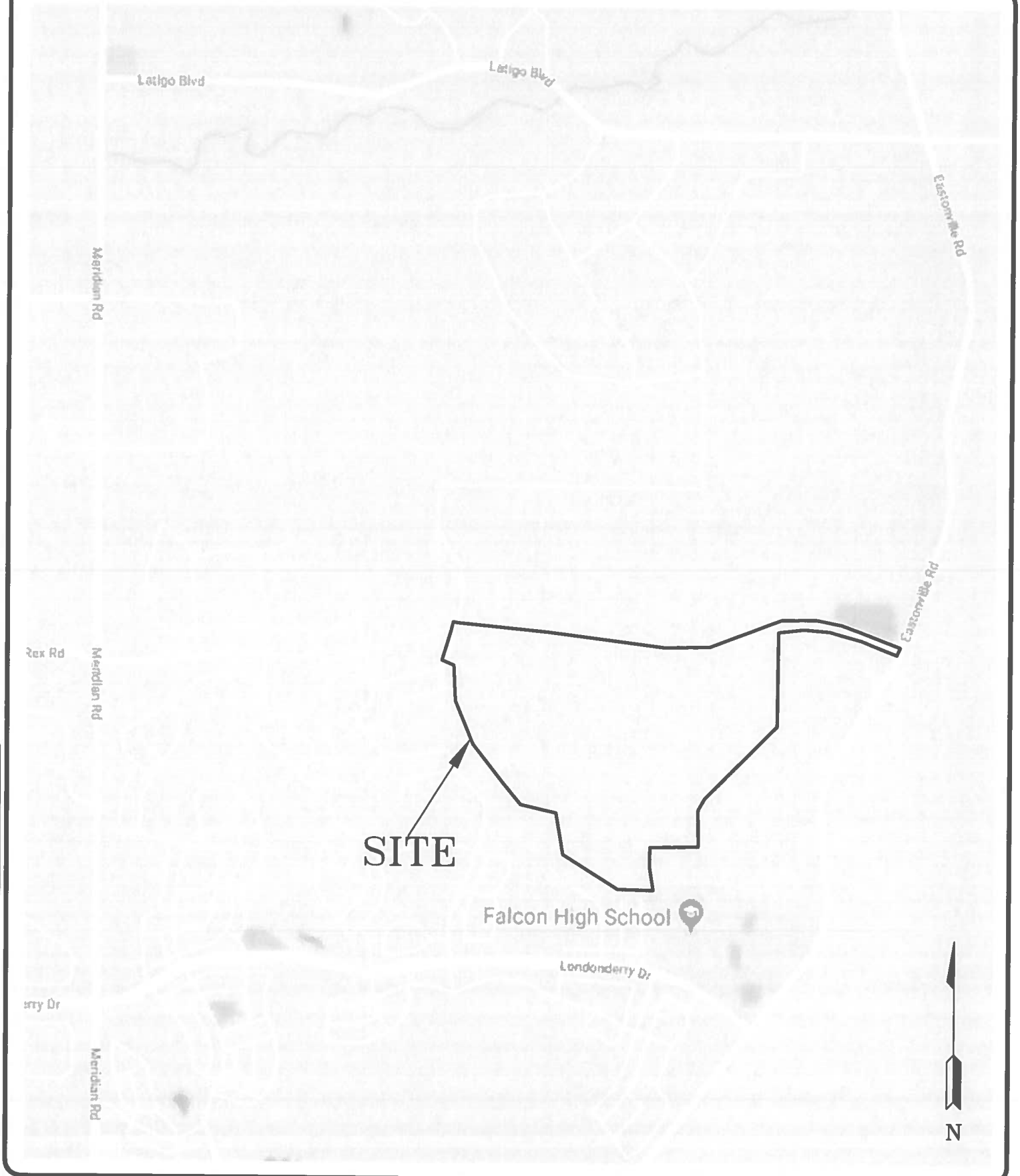
Table 2: (Continued)

Test Boring No.	Depth of Boring (ft.)	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)	Cut & Fill** (-/+, ft.)	Est. Ground Elevation	Estimated Groundwater Elevation
25	20.0	1.0	12.0	0 to +2	7068.8	7056.8
26	20.0	1.0	17.0	-6 to -8	7049.2	7032.2
27	20.0	9.0	8.0	0 to +2	7071.2	7063.2
28	20.0	9.0	13.5	0 to -2	7082.9	7069.4
29	25.0	4.0	12.0	outside cut/fill	7084.4	7072.4
30	20.0	10.0	8.0	0 to +2	7066.7	7058.7
31	20.0	14.0	dry	0 to -2	7057.5	dry
32	25.0	14.0	13.0	0 to -2	7045.4	7032.4
33	25.0	9.0	7.0	0 to -2	7052.7	7045.7
34	20.0	1.0	9.0	+2 to +4	7042.0	7033.0
35	20.0	3.0	dry	0 to -2	7065.4	dry
36	25.0	1.0	23.0	-6 to -8	7049.4	7026.4
37	20.0	1.0	dry	-2 to -4	7038.8	dry
38	25.0	12.0	10.0	-6 to -8	7032.4	7022.4
39	20.0	9.0	4.0	-6 to -8	7032.5	7028.5
40	20.0	9.0	10.0	+12 to +14	7032.1	7022.1
41	20.0	1.0	17.0	outside cut/fill	7039.1	7022.1
42	25.0	9.0	14.0	outside cut/fill	7046.0	7032.0
43	25.0	4.0	19.0	outside cut/fill	7049.0	7030.0
44	20.0	1.0	dry	outside cut/fill	7064.0	dry
45	25.0	4.0	11.0	outside cut/fill	7072.1	7061.1
46	25.0	4.0	22.0	outside cut/fill	7065.0	7043.0
47	20.0	1.0	dry	outside cut/fill	7058.7	dry
48	20.0	1.0	dry	outside cut/fill	7047.6	dry
49	25.0	14.0	12.0	outside cut/fill	7029.5	7017.5

* - Measurement taken subsequent to drilling

** - Cut and Fill estimates based on map provided by the client

TABLES



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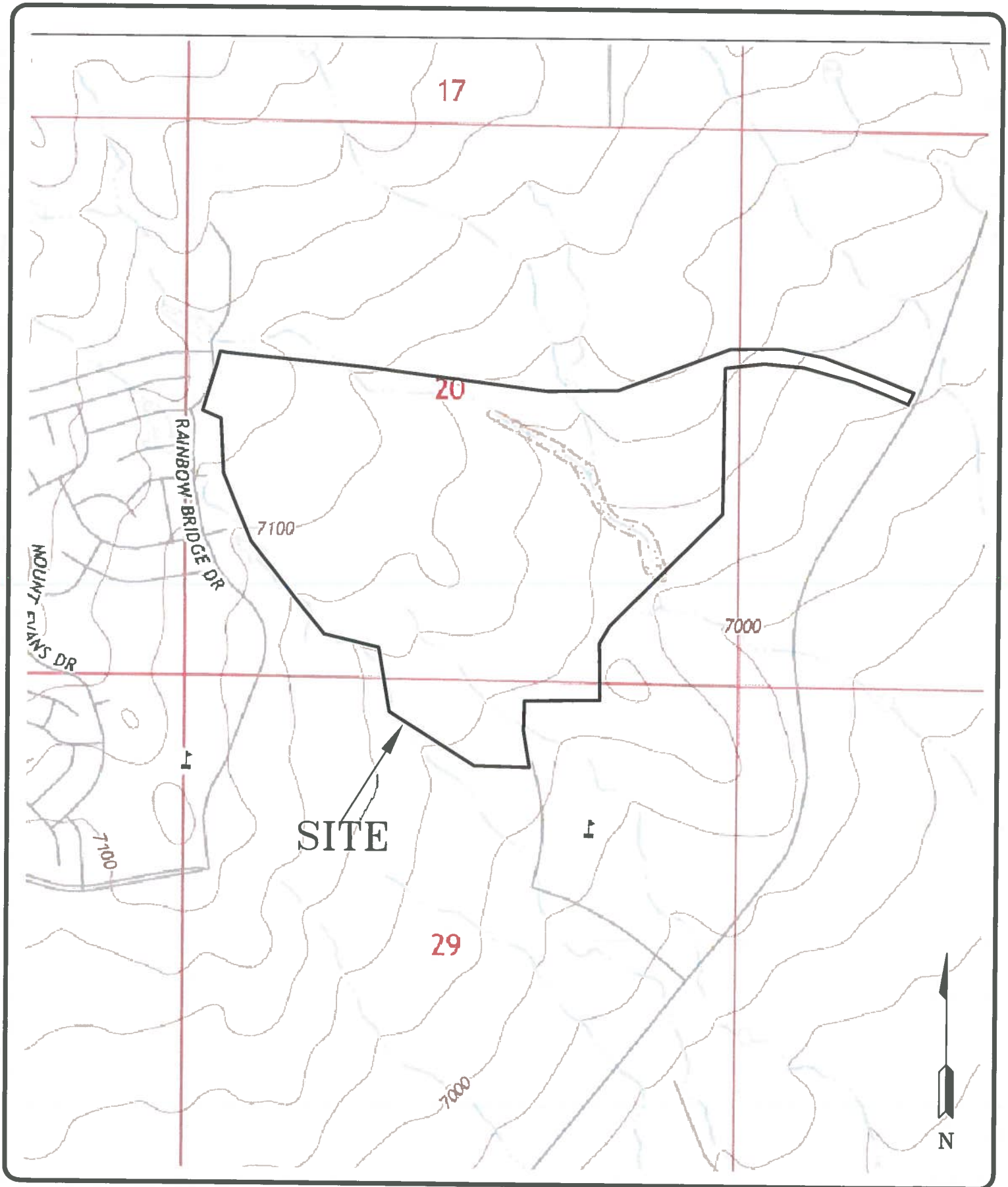
VICINITY MAP
MERIDIAN RANCH – ROLLING HILLS RANCH FILINGS 1 – 4
EL PASO COUNTY, CO.
FOR: TECH CONTRACTORS

DRAWN:	DATE:	CHECKED:	DATE:
LLL	9/18/19		

JOB NO.: 190300

FIG NO.: 1



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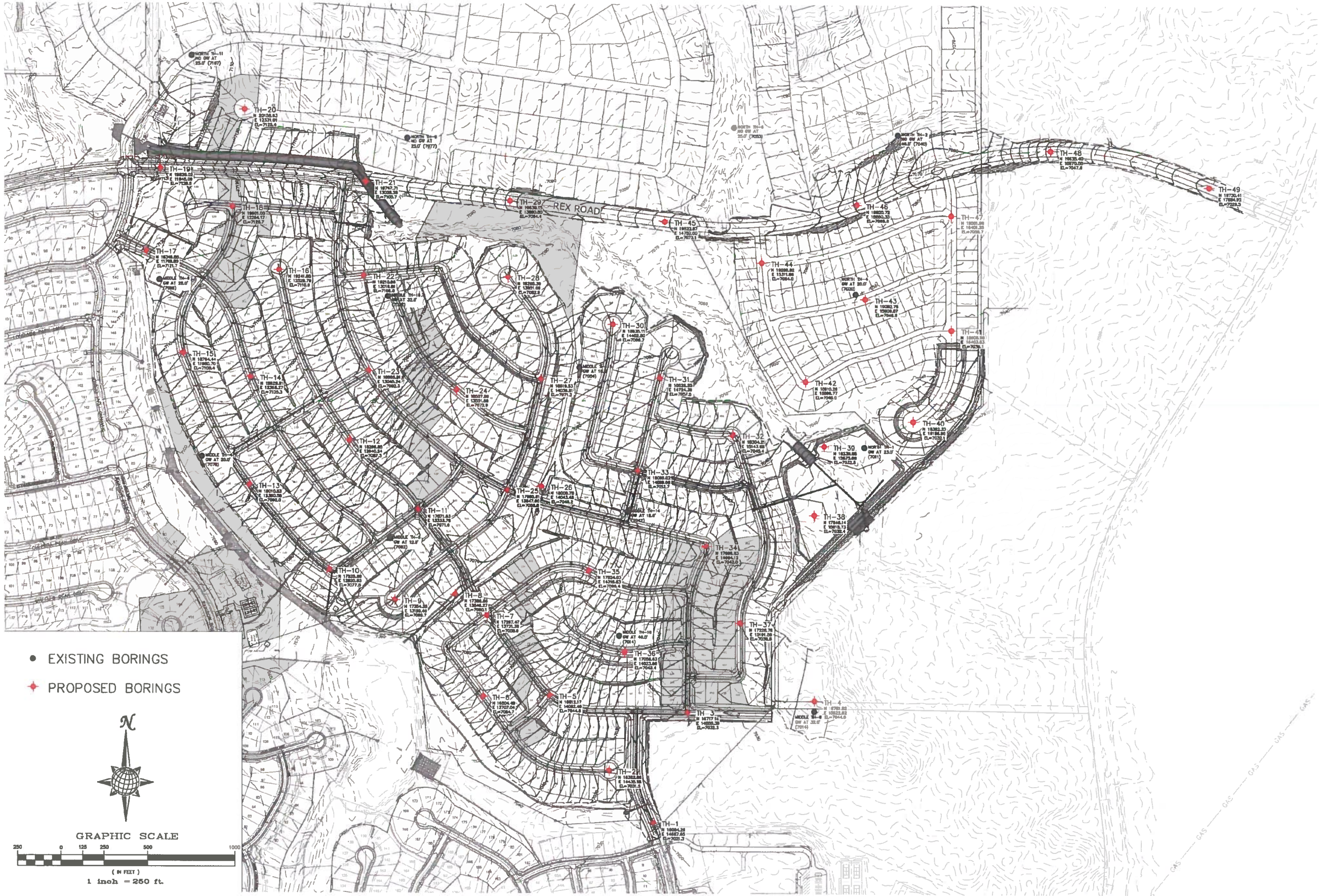
USGS MAP
MERIDIAN RANCH – ROLLING HILLS RANCH
FILINGS 1 – 4
EL PASO COUNTY, CO.
FOR: TECH CONTRACTORS

DRAWN:	DATE:	CHECKED:	DATE:
LLL	9/18/19		

JOB NO.: 190300

FIG NO.: 2



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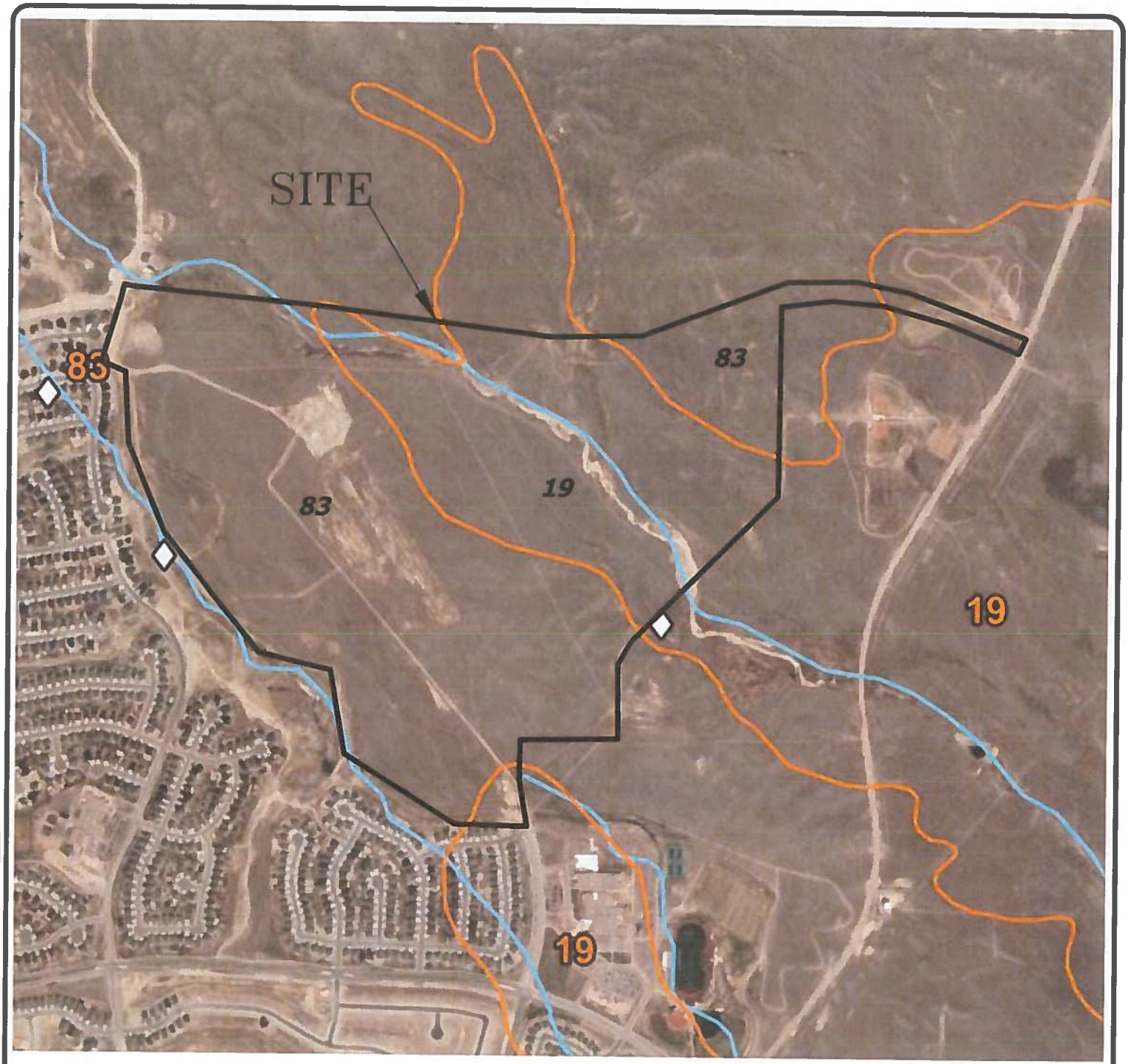
SITE PLAN/PROPOSED GRADING
MERIDIAN RANCH – ROLLING HILLS RANCH
FILINGS 1 – 4
EL PASO COUNTY, CO.
FOR: TECH CONTRACTORS

DRAWN	I.I.I.
CHECKED	
DATE	9/18/19
SCALE	AS SHOWN
JOB NO.	190300
FIGURE No.	3



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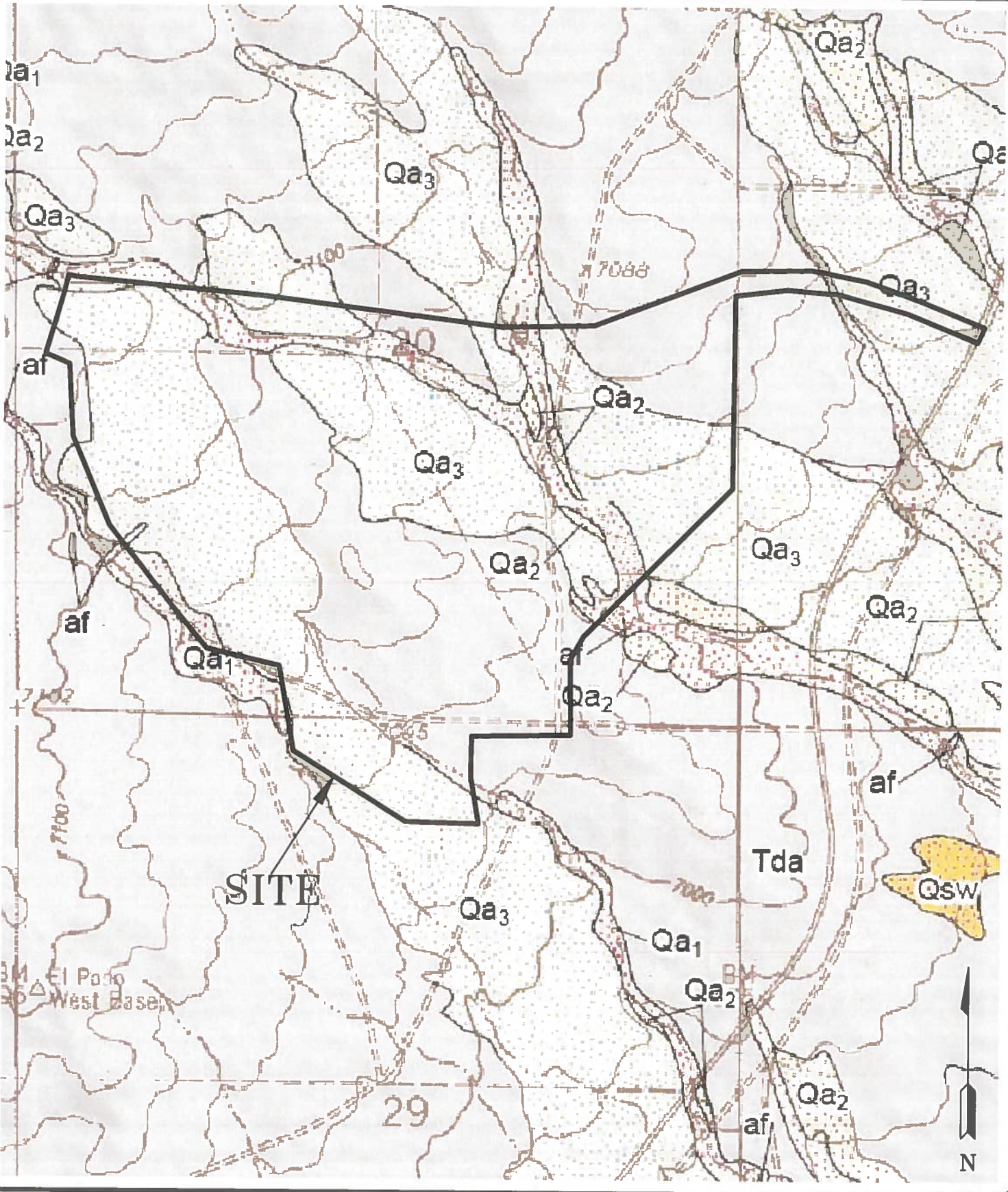
SOIL SURVEY MAP
MERIDIAN RANCH – ROLLING HILLS RANCH
FILINGS 1 – 4
EL PASO COUNTY, CO.
FOR: TECH CONTRACTORS

DRAWN:	DATE:	CHECKED:	DATE:
LLL	9/18/19		

JOB NO.: 190300

FIG NO.: 4



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FALCON QUADRANGLE GEOLOGIC MAP
MERIDIAN RANCH – ROLLING HILLS RANCH FILINGS 1 – 4
EL PASO COUNTY, CO.
FOR: TECH CONTRACTORS

DRAWN:	DATE:	CHECKED:	DATE:
LLL	9/18/19		

JOB NO.: 190300

FIG NO.: 5

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COLORADO SPRINGS, CO. 80907

ENGINEERING GEOLOGY MAP
MERIDIAN RANCH – ROLLING HILLS RANCH
FILINGS 1 – 4
EL PASO COUNTY, CO.
FOR: TECH CONTRACTORS

REX ROAD
LONGVIEW PARK LANE
CULEBRA PEAK DRIVE
WHEELER PEAK DRIVE
RAINBOW BRIDGE

Qaf
Qal,sw
Qal, psw
Qa 2
Qa 3
Tda

TH-1 TH-2 TH-3 TH-4 TH-5 TH-6 TH-7 TH-8 TH-9 TH-10 TH-11 TH-12 TH-13 TH-14 TH-15 TH-16 TH-17 TH-18 TH-19 TH-20 TH-21 TH-22 TH-23 TH-24 TH-25 TH-26 TH-27 TH-28 TH-29 TH-30 TH-31 TH-32 TH-33 TH-34 TH-35 TH-36 TH-37 TH-38 TH-39 TH-40 TH-41 TH-42 TH-43 TH-44 TH-45 TH-46 TH-47 TH-48

- EXISTING BORINGS
- PROPOSED BORINGS

N

GRAPHIC SCALE

250 0 125 250 500 1000
(IN FEET)
1 inch = 250 ft.

LEGEND:

Qaf- Artificial Fill of Holocene Age:
man-made fill deposits

Qal- Recent Alluvium of Holocene Age:
recent water deposited materials

Qa_2- Alluvium Two of early Holocene Age:
stream terrace deposited sands (Piney Creek Alluvium)

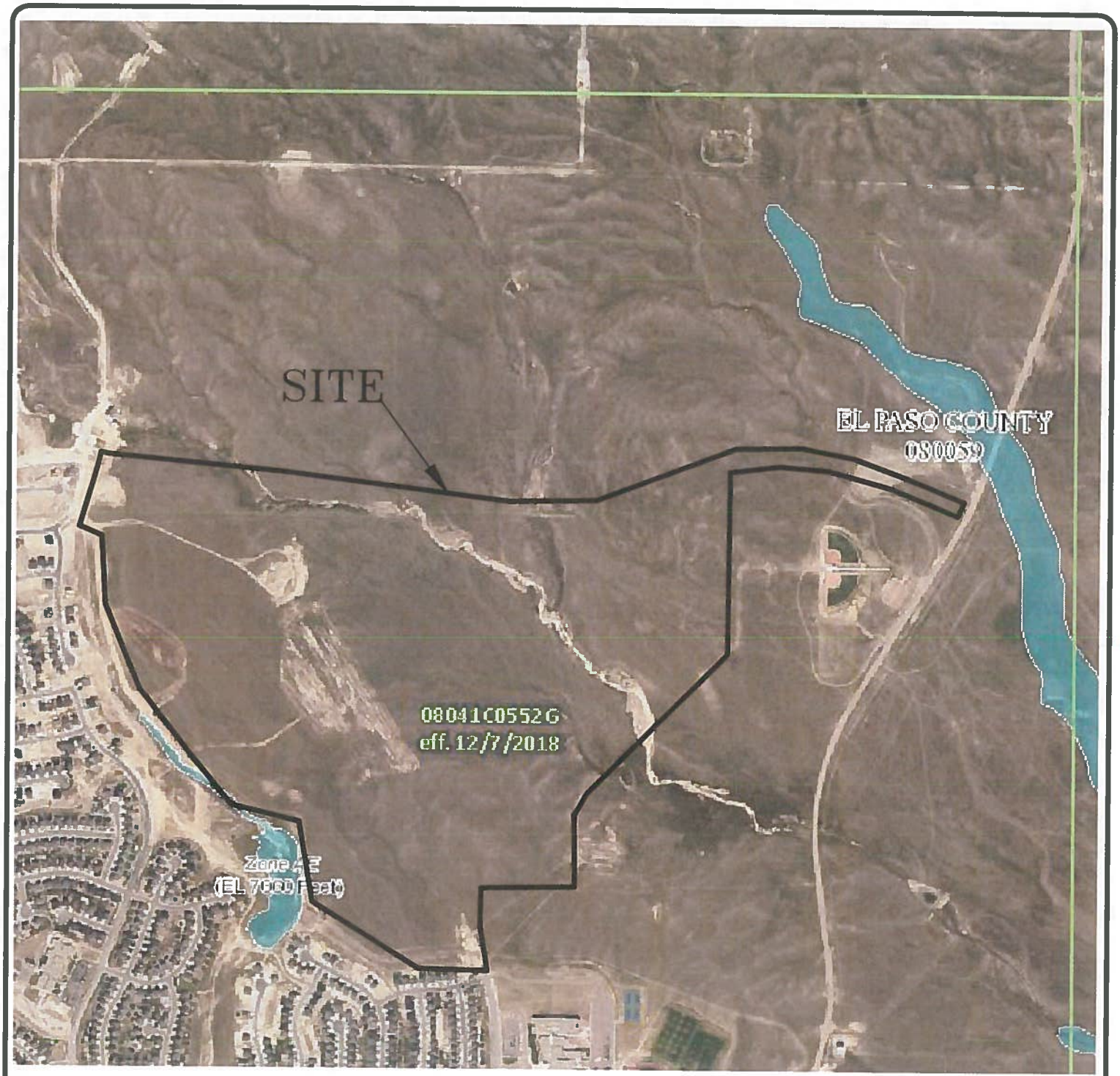
Qa_3- Alluvium Three of Pleistocene Age:
stream terrace deposited sands (Broadway Alluvium)

Tda- Dawson Arkose of Tertiary Age:
arkosic sandstone with siltstone and claystone lenses

psw- potential seasonal shallow groundwater area
sw- seasonal shallow groundwater area

TB-1 Approximate Test Boring Location (Depth to Bedrock)

DRAWN	LLL
CHECKED	
DATE	9/18/19
SCALE	AS SHOWN
JOB NO.	190300
FIGURE No.	6



N

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FEMA FLOODPLAIN MAP
MERIDIAN RANCH – ROLLING HILLS RANCH FILINGS 1 – 4
EL PASO COUNTY, CO.
FOR: TECH CONTRACTORS

DRAWN:	DATE:	CHECKED:	DATE:
LLL	9/18/19		

JOB NO.: 190300

FIG NO.: 7

APPENDIX A: Test Boring Logs

TEST BORING NO. 1
DATE DRILLED 6/19/2019
Job # 190300

REMARKS

WATER @ 9', 6/19/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			14	8.3	1	3" TOPSOIL SAND, CLEAN TO SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
5			23	7.0	1	
10			50/9"	12.4	2	SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST TO WET
15			50/10"	11.9	2	
20			50/7"	12.7	2	

TEST BORING NO. 2
DATE DRILLED 3/11/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 13', 3/11/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			22	12.5	1	SAND, GRAVELLY, SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST
5			28	9.3	1	
10			50/10"	7.8	2	SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN TO GRAY BROWN, VERY DENSE, MOIST TO WET
15			50/9"	14.6	2	
20			50/9"	11.9	3	CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST
25			50/6"	12.4	3	

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/11/19

JOB NO.: 190300
FIG NO.: A- 1

TEST BORING NO. 3
DATE DRILLED 3/11/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 15', 3/11/19						
SAND, SILTY, TAN						1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST				50/11"	4.4	2
	5			50/8"	7.3	2
SANDSTONE, CLAYEY, FINE TO MEDIUM GRAINED, GRAY BROWN, VERY DENSE, MOIST TO WET	10			50/4"	11.4	2
	15			50/6"	11.6	2
	20			50/8"	30.4	2
	25			50/3"	24.1	2

TEST BORING NO. 4
DATE DRILLED 6/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 6/7/19						
6" TOPSOIL, SAND, SILTY, TAN						1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST				50/7"	7.8	2
	5			50/7"	5.7	2
FINE GRAINED LENSES	10			50/6"	8.7	2
CLAYSTONE, SANDY, TAN, HARD, MOIST	15			50/9"	17.0	3
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	20			50/5"	8.4	2

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TEST BORING LOG

DRAWN.	DATE:	CHECKED:	DATE:
		h	7/1/19

JOB NO. 190300
FIG NO. A- 2

TEST BORING NO. 5
DATE DRILLED 5/29/2019
Job # 190300

REMARKS

WATER @ 14', 5/29/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			14	9.6	1
5			40	5.4	2
10			50 6"	9.3	2
15			50 5"	6.5	2
20			50 4"	13.8	3
25			50 7"	14.6	2

3" TOPSOIL SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST

SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO MEDIUM DENSE, MOIST

CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST

SANDSTONE, VERY CLAYEY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST

TEST BORING NO. 6
DATE DRILLED 3/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 10', 3/7/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			28	2.4	1
5			21	4.2	1
10			9	15.7	1
15			48	13.3	2
20			50 10"	11.7	2
25			45	15.4	2

6" TOPSOIL, SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED BROWN TO TAN, MEDIUM DENSE TO LOOSE, MOIST TO WET

WEATHERED TO FORMATIONAL SANDSTONE, CLAYEY TO VERY CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, DENSE TO VERY DENSE, MOIST

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TEST BORING LOG

DRAWN:	DATE:	CHECKED: L	DATE: 7/11/19

JOB NO. 190300
FIG NO A- 3

TEST BORING NO. 7
DATE DRILLED 5/29/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 16.5', 5/29/19						
6" TOPSOIL, SAND, SILTY, TAN						1
WEATHERED SANDSTONE, SILTY, FINE TO COARSE GRAINED, DENES, MOIST				46	4.8	2
	5			45	9.0	2
SANDSTONE, CLAYEY TO SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST TO WET	10			50/6"	8.1	2
FINE GRAINED LENSES	15			50/3"	10.7	2
	20			50/6"	11.1	2

TEST BORING NO. 8
DATE DRILLED 3/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 13', 3/7/19						
6" TOPSOIL, SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST				23	4.1	1
	5			11	6.0	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST TO WET	10			50/9"	8.5	2
	15			50/7"	17.8	2
	20			50/6"	16.6	2

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TEST BORING LOG

DRAWN:	DATE	CHECKED	DATE:
		L	7/1/19

JOB NO.: 190300
FIG NO.: A- 4

TEST BORING NO. 9
DATE DRILLED 3/7/2019
Job # 190300

REMARKS

WATER @ 10', 3/7/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			16	2.7	1	6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, DRY TO MOIST
5			11	6.6	1	
10			5	18.0	1	SAND, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, LOOSE, WET
15			50/7"	8.7	2	SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
20			50/6"	10.9	2	

TEST BORING NO. 10
DATE DRILLED 3/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 14', 3/7/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			26	6.2	1	6" TOPSOIL, SAND, SILTY TO CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
5			19	7.8	1	
10			27	12.4	1	
15			50/10"	12.5	2	SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, BRPOWN, VERY DENSE TO DENSE, WET
20			45	13.8	2	WEATHERED ZONE

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 7/1/19

JOB NO 190300
FIG NO A- 5

TEST BORING NO. 11
DATE DRILLED 3/7/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 9', 3/7/19						
SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, VERY MOIST				7	21.3	1
	5			16	15.1	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, WET	10			50 11"	17.5	2
	15			50 8"	12.6	2
	20			50 7"	12.7	2

TEST BORING NO. 12
DATE DRILLED 3/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 14', 3/7/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, BROWN, LOOSE TO MEDIUM DENSE, MOIST				6	3.6	1
	5			23	8.6	1
WEATHERED TO FORMATIONAL SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, DENSE TO VERY DENSE, MOIST TO WET	10			36	11.3	2
CLAYEY LENSES	15			50 11"	20.2	2
	20			50 7"	12.8	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE
			7/17/19

JOB NO. 190300
FIG NO. A- 6

TEST BORING NO. 13
DATE DRILLED 5/29/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 14', 5/29/19						
6" TOPSOIL, SAND, CLEAN TO SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, MOIST				11	1.4	1
	5			14	6.3	1
WEATHERED TO FORMATIONAL SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO VERY DENSE, MOIST TO WET	10			45	8.4	2
	15			48	8.9	2
	20			50/5"	11.5	2

TEST BORING NO. 14
DATE DRILLED 5/29/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 18.5', 5/29/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, DRY TO MOIST				13	1.8	1
	5			7	2.3	1
FINE GRAINED LENSES	10			24	9.1	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST TO WET	15			50/11"	6.7	2
	20			50/11"	10.6	2
	25			50/9"	12.6	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/17/19

JOB NO.: 190300
FIG NO.: A- 7

TEST BORING NO. 15
DATE DRILLED 5/29/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 18', 5/29/19						
6" TOPSOIL SAND, SILTY, TAN						1
WEATHERED SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST				43	3.2	2
	5			34	9.9	2
CLAYSTONE, VERY SANDY, GRAY BROWN, HARD, MOIST	10			50 7"	11.4	3
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	15			50 4"	11.0	2
	20			50 11"	14.2	2

TEST BORING NO. 16
DATE DRILLED 5/29/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 16', 5/29/19						
6" TOPSOIL, SAND, SLIGHTLY SILTY, FINE TO COARSE GRASINED, TAN, MEDIUM DENSE, DRY				11	1.2	1
	5			21	1.8	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	10			50 9"	7.0	2
	15			50 6"	8.3	2
CLAYSTONE, VERY SANDY, BROWN, HARD, MOIST	20			50	15.0	3
	25			B	8.9	3

B - BOUNCE

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO.: 190300
FIG NO.: A- 8

TEST BORING NO. 17
DATE DRILLED 5/29/2019
Job # 190300

REMARKS

WATER @ 17.5', 5/29/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			50 / 10"	1.7	2
5			50 / 8"	1.8	2
10			50 / 6"	6.9	2
15			50 / 7"	8.0	2
20			50 / 6"	10.1	2

6" TOPSOIL, SAND, SILTY, TAN
SANDSTONE, SILTY, FINE TO
COARSE GRAINED, TAN,
VERY DENSE, DRY TO MOIST

TEST BORING NO. 18
DATE DRILLED 6/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

DRY TO 20', 6/7/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			12	2.7	1
5			42	5.0	2
10			50 / 6"	8.9	2
15			50 / 7"	4.9	2
20			50 / 6"	7.0	2

6" TOPSOIL, SAND, SILTY,
FINE TO COARSE GRAINED,
BROWN, MEDIUM DENSE, DRY

WEATHERED TO FORMATIONAL
SANDSTONE, SILTY, FINE TO
COARSE GRAINED, TAN,
DENSE TO VERY DENSE, MOIST

FINE GRAINED LENSES

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 7/1/19

JOB NO.: 190300
FIG NO.: A- 9

TEST BORING NO. 19
DATE DRILLED 6/7/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 6/7/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, MEDIUM DENSE, MOIST				21	7.8	1
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	5			50/9"	10.9	3
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	10			50/8"	7.8	2
	15			50/8"	5.7	2
	20			50/6"	8.9	2

TEST BORING NO. 20
DATE DRILLED 5/30/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 5/30/19 CAVED TO 19', 6/6/19, DRY						
6" TOPSOIL, SAND, SILTY, TAN						1
SANDSTONE, SILTY TO CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, DRY TO MOIST				50/10"	4.8	2
	5			50/9"	8.6	2
	10			50/9"	6.5	2
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	15			50/7"	10.4	3
SANDSTONE, VERY CLAYEY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	20			50/2"	8.0	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO. 190300
FIG NO. A- 10

TEST BORING NO. 21
DATE DRILLED 5/30/2019
Job # 190300

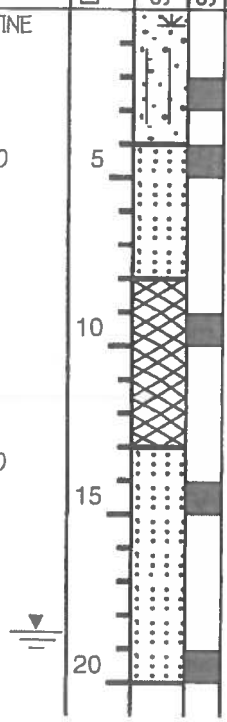
REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
6" TOPSOIL, SAND, SILTY, TAN						1
WEATHERED SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST				40	3.0	2
	5			42	6.2	2
6/6/19	10			50 10"	6.5	2
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST						
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	15			50	13.1	3
5/30/19						
SANDSTONE LENSE	20			50	12.3	3
SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST	25			50 6"	8.8	2

WATER @ 18', 5/30/19
WATER @ 10', 6/6/19

TEST BORING NO. 22
DATE DRILLED 4/25/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				25	7.2	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	5			50 10"	6.3	2
CLAYSTONE, VERY SANDY, TAN, HARD, MOIST	10			50 8"	12.1	3
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	15			50 6"	3.4	2
	20			50 6"	9.7	2

WATER @ 18.5', 6/6/19



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TEST BORING LOG

DRAWN:	DATE	CHECKED:	DATE:
			7/1/19

JOB NO. 190300
FIG NO. A- 11

TEST BORING NO. 23
DATE DRILLED 3/12/2019
Job # 190300

REMARKS

DRY TO 20', 3/12/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			4	3.3	1
5			7	4.5	1
10			50 10"	12.1	2
15			50 8"	12.5	3
20			50 11"	13.3	3

6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE, MOIST

SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST

CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST

TEST BORING NO. 24
DATE DRILLED 3/12/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 9', 3/12/19
WATER @ 2', 6/6/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			45	11.4	1
5			50 7"	16.8	3
10			50 11"	21.0	2
15			50 7"	8.3	2
20			50 9"	10.4	2
25			50 5"	16.1	3

6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST 6/6/19

CLAYSTONE, SANDY, TAN, HARD, MOIST

3/12/19
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, WET

CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST

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TEST BORING LOG

DRAWN	DATE:	CHECKED:	DATE: 7.12.19

JOB NO.: 190300
FIG NO.: A- 12

TEST BORING NO. 25
DATE DRILLED 3/12/2019
Job # 190300

REMARKS

WATER @ 12', 7/9/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			50 3"	9.4	2
5			50 9"	8.6	2
10			50 7"	6.6	2
15			50 11"	17.0	2
20			50 5"	14.6	2

SAND, SILTY, TAN
SANDSTONE, CLAYEY TO SILTY, FINE TO COARSE GRAINED, TAN TO GRAY BROWN, VERY DENSE, MOIST TO WET

TEST BORING NO. 26
DATE DRILLED 6/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 11', 7/9/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			50 7"	5.5	2
5			50 6"	4.2	2
10			50 7"	6.4	2
15			50 6"	10.3	2
20			50 5"	11.5	2

6" TOPSOIL, SAND, SILTY, TAN
SANDSTONE, SLIGHTLY SILTY TO SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, VERY DENSE, MOIST TO WET

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		h	7.12.19

JOB NO.: 190300
FIG NO: A- 13

TEST BORING NO. 27
DATE DRILLED 3/12/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
6" TOPSOIL SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, DRY				22	2.7	1
SAND, VERY CLAYEY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST	5			23	13.6	1
WATER @ 18', 3/12/19 WATER @ 8', 6/6/19 6/6/2019						
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	10			50/8"	8.7	2
	15			50/7"	9.6	2
3/12/2019						
CLAYSTONE, SANDY, BROWN, HARD, MOIST	20			50/6"	15.9	3

TEST BORING NO. 28
DATE DRILLED 4/25/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
6" TOPSOIL, SAND, SILTY TO CLEAN, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST				18	2.4	1
	5			26	5.2	1
WATER @ 13.5', 4/25/19						
SANDSTONE, SILTY TO CLAYEY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST TO WET	10			50/11"	7.7	2
	15			50/6"	17.1	2
	20			50/5"	8.1	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 7.12.19

JOB NO.: 190300
FIG NO.: A- 14

TEST BORING NO. 29
DATE DRILLED 5/30/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 19', 5/30/19 WATER @ 12', 6/11/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				20	6.6	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	5			50 / 11"	8.5	2
SANDSTONE, CLAYEY TO VERY CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST	10			50 / 6"	11.2	2
6/6/19	15			50 / 6"	7.7	2
5/30/2019	20			50 / 6"	9.0	2
FINE GRAINED LENSES	25			50 / 6"	15.4	2

TEST BORING NO. 30
DATE DRILLED 4/25/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 8', 4/25/19						
6" TOPSOIL, SAND, SILTY TO SLIGHTLY SILTY WITH CLAY LENSES, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, DRY TO MOIST				10	1.7	1
	5			30	4.4	1
	10			39	9.5	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, WET	15			50	12.8	2
B - BOUNCE	20			B		2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 7.12.19

JOB NO. 190300
FIG NO. A- 15

TEST BORING NO. 31
DATE DRILLED 5/29/2019
Job # 190300

REMARKS

DRY TO 20', 5/29/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			32	2.0	1	6" TOPSOIL, SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, DENSE, DRY TO MOIST
5			30	3.0	1	
10			34	9.8	1	
15			50 11"	14.8	3	CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST
20			50 7"	14.7	3	

TEST BORING NO. 32
DATE DRILLED 3/12/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 13', 3/12/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			5	1.4	1	6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, BROWN, LOOSE TO MEDIUM DENSE, DRY TO MOIST
5			6	1.3	1	
10			11	10.7	1	
15			50 10"	11.8	2	SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST
20			50 7"	11.0	2	
25			50 8"	14.8	3	CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 7/12/19

JOB NO: 190300
FIG NO: A- 16

TEST BORING NO. 33
DATE DRILLED 3/12/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, DRY TO MOIST				13	2.4	1
	5			15	4.1	1
6/6/2019 ▼						
WEATHERED TO FORMATIONAL CLAYSTONE, SANDY, GRAY BROWN, VERY STIFF TO HARD, MOIST	10			45	17.4	3
	15			50/9"	13.1	3
3/12/2019 ▼						
	20			50/8"	18.0	3
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, VERY MOIST						
	25			50/5"	14.3	2

WATER @ 17', 3/12/19
WATER @ 7', 6/6/19

TEST BORING NO. 34
DATE DRILLED 3/12/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
6" TOPSOIL, SAND, SILTY, BROWN						1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST				50/7"	6.1	2
	5			50/10"	8.2	2
CLAYSTONE, VERY SANDY, GRAY BROWN, HARD, MOIST ▼	10			50/9"	12.8	3
SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST	15			50/5"	9.7	2
CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST	20			50/5"	15.9	3

WATER @ 9', 3/12/19

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/12/19

JOB NO.: 190300
FIG NO.: A- 17

TEST BORING NO. 35
DATE DRILLED 3/12/2019
Job # 190300

REMARKS

DRY TO 20', 3/12/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						6" TOPSOIL SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST
			48	3.6	1	SANDSTONE, SLIGHTLY SILTY TO SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST
5			50	6.0	2	
10			50/9"	8.9	2	
15			50	9.7	2	
						CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST
20			50/6"	11.7	3	

TEST BORING NO. 36
DATE DRILLED 3/11/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 13.5', 7/9/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
					1	SAND, SILTY, TAN
			50/7"	3.1	2	SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
5			50/6"	3.7	2	
10			50/6"	10.9	2	
15			50/6"	12.2	3	CLAYSTONE, VERY SANDY, BLUE GRAY, HARD, MOIST
20			50/10"	13.4	2	SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN TO BROWN, VERY DENSE, MOIST TO WET
25			50/7"	16.8	2	

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TEST BORING LOG

DRAWN:	DATE	CHECKED:	DATE
			7/12/19

JOB NO 190300
FIG NO A- 18

TEST BORING NO. 37
DATE DRILLED 3/12/2019
Job # 190300

REMARKS

DRY TO 20', 3/12/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			50/11"	11.6	3
5			50/10"	10.1	2
10			50/7"	11.3	2
15			50/7"	9.2	2
20			50/6"	9.3	2

SAND, SILTY, BROWN

CLAYSTONE, SANDY, BROWN, HARD, MOIST

SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST

TEST BORING NO. 38
DATE DRILLED 6/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 18', 7/9/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			4	1.7	1
5			12	0.7	1
10			*	7.6	1
15			*	19.1	3
20			50/5"	12.1	2
25			B	9.4	3

6" TOPSOIL, SAND, GRAVELLY, SILTY TO SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, LOOSE TO MEDIUM DENSE, MOIST

CLAYSTONE, SANDY, BROWN, MOIST

SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST

CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST

* - BULK SAMPLE TAKEN

B - BOUNCE

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 7/12/19

JOB NO. 190300
FIG NO. A- 19

TEST BORING NO. 39
DATE DRILLED 5/29/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 11', 7/9/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST TO WET				13	10.7	1
	5			21	11.7	1
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST ▼	10			50	10.2	3
SANDSTONE, VERY CLAYEY, FINE TO COARSE GRAINED, BROWN, WET	15			*	14.8	2
CLAYSTONE, SANDY, BROWN, WET	20			*	18.4	3

TEST BORING NO. 40
DATE DRILLED 3/12/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 10', 3/12/19						
6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO MEDIUM DENSE, MOIST				32	4.8	1
	5			27	6.2	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST TO WET ▼	10			50/9"	12.9	2
CLAYEY LENSES	15			50/8"	12.9	2
	20			50/9"	15.2	2

* - BULK SAMPLE TAKEN

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TEST BORING LOG

DRAWN:	DATE.	CHECKED	DATE
			7/12/19

JOB NO. 190300
FIG NO A- 20

TEST BORING NO. 41
DATE DRILLED 6/7/2019
Job # 190300

REMARKS

WATER @ 17', 6/7/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
					1	6" TOPSOIL, SAND, SILTY, TAM
						SANDSTONE, SILTY, FINE
			50/7"	5.2	2	TO COARSE GRAINED, BROWN,
						VERY DENSE, MOIST
5			50/6"	10.3	3	CLAYSTONE, SANDY, BROWN,
						HARD, MOIST
10			50/6"	10.1	2	SANDSTONE, CLAYEY TO
						SILTY, FINE TO COARSE
						GRAINED, BROWN, VERY
						DENSE, MOIST TO WET
15			50/7"	11.9	2	
20			50/6"	15.5	2	CLAYEY LENSES

TEST BORING NO. 42
DATE DRILLED 3/12/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 14', 6/7/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						6" TOPSOIL, SAND, CLAYEY,
			10	9.2	1	FINE TO COARSE GRAINED,
						BROWN, MEDIUM DENSE,
						MOIST
5			29	7.8	1	
10			50/10"	10.0	2	SANDSTONE, SILTY, FINE TO
						COARSE GRAINED, BROWN,
						VERY DENSE, MOIST TO WET
15			50/6"	10.2	2	
20			50/6"	9.3	2	
25			50/6"	14.0	2	

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE
			7/12/19

JOB NO. 190300
FIG NO. A- 21

TEST BORING NO. 43
DATE DRILLED 5/30/2019
Job # 190300

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 19', 5/30/19						
6" TOPSOIL, SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				14	3.4	1
WEATHERED SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, DENSE, MOIST	5			32	8.3	2
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	10			50/7"	14.1	3
	15			50/8"	12.5	3
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	20			50/5"	12.2	2
CLAYSTONE, SANDY, BLUE GRAY HARD, MOIST	25			50/6"	16.8	3

TEST BORING NO. 44
DATE DRILLED 5/30/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 5/30/19						
6" TOPSOIL, SAND, SILTY, TAN						1
WEATHERED SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST				32	3.0	2
CLAYEY LENSES	5			35	10.3	2
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	10			50/11"	9.8	2
	15			50/8"	8.8	2
CLAYEY LENSES	20			50/7"	10.6	2

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TEST BORING LOG

DRAWN	DATE:	CHECKED:	DATE:
			7/1/19

JOB NO: 190300
FIG NO: A- 22

TEST BORING NO. 45
DATE DRILLED 5/30/2019
Job # 190300

REMARKS

WATER @ 13', 5/30/19
WATER @ 11', 6/6/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			22	11.2	1
5			50 5"	6.9	2
10			50 11"	9.0	2
15			50 7"	8.7	2
20			50 8"	13.4	2
25			50 7"	13.4	2

6" TOPSOIL, SAND, CLAYEY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST

SANDSTONE, SILTY TO CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST TO WET

6/6/2019 ▼

5/30/2019 ▼

TEST BORING NO. 46
DATE DRILLED 5/30/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

WATER @ 22', 5/30/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			10	14.2	1
5			50 11"	7.9	2
10			50 6"	7.9	2
15			50 6"	8.4	2
20			50 6"	12.9	3
25			50 6"	14.3	2

6" TOPSOIL, SAND, CLAYEY, FINE TO COARSE GRAINED, LIGHT BROWN, MEDIUM DENSE, MOIST

SANDSTONE, CLAYEY TO VERY CLAYEY, FINE TO COARSE GRAINED, TAN TO GRAY BROWN, VERY DENSE, MOIST

CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST ▼

SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST

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TEST BORING LOG

DRAWN:	DATE	CHECKED:	DATE:
			7/1/19

JOB NO: 190300
FIG NO: A- 23

TEST BORING NO. 47
DATE DRILLED 5/30/2019
Job # 190300

REMARKS

DRY TO 20', 5/30/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
					1	6" TOPSOIL, SAND, SILTY, TAN
			50/9"	9.0	2	SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST
5			50/10"	8.7	2	
10			50/10"	9.4	2	
15			50/10"	8.8	2	
20			50/7"	8.5	2	

TEST BORING NO. 48
DATE DRILLED 6/7/2019
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS

DRY TO 20', 6/7/19
CAVED TO 14', 7/9/19, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
					1	6" TOPSOIL, SAND, SILTY, TAN
			32	8.9	2	SANDSTONE, CLAYEY TO SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE,
5			27	7.8	2	MOIST
10			50/9"	9.6	3	CLAYSTONE, SANDY, BROWN, HARD, MOIST
15			50/8"	5.4	2	SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
20			50/9"	9.4	3	CLAYSTONE, VERY SANDY, GRAY BROWN, HARD, MOIST

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/12/19

JOB NO.: 190300
FIG NO.: A- 24

TEST BORING NO. 49
DATE DRILLED 6/7/2019
Job # 190300

TEST BORING NO.
DATE DRILLED
CLIENT TECH CONTRACTORS
LOCATION ROLLING HILLS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 12', 6/7/19						
6" TOPSOIL, SAND, SLIGHTLY SILTY TO SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, MOIST				15	5.2	1
	5			20	10.3	1
	10			33	10.1	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST TO WET	15			50/9"	11.9	2
	20			50/6"	15.5	2
	25			50/5"	15.5	2

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	5					
	10					
	15					
	20					
	25					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 7/12/19

JOB NO.: 190300
FIG NO.: A- 25

APPENDIX B: Soil Survey Descriptions

El Paso County Area, Colorado

19—Columbine gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367p
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Columbine and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Columbine

Setting

Landform: Flood plains, fan terraces, fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: gravelly sandy loam
C - 14 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Gravelly Foothill (R049BY214CO)
Hydric soil rating: No

Minor Components

Fluvaquentic haplaquolls

Percent of map unit:
Landform: Swales

Hydric soil rating: Yes

Pleasant

Percent of map unit:
Landform: Depressions
Hydric soil rating: Yes

Other soils

Percent of map unit:
Hydric soil rating: No

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 16, Sep 10, 2018

El Paso County Area, Colorado

83—Stapleton sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 369z
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Stapleton and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stapleton

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium derived from arkose

Typical profile

A - 0 to 11 inches: sandy loam
Bw - 11 to 17 inches: gravelly sandy loam
C - 17 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Gravelly Foothill (R049BY214CO)
Hydric soil rating: No

Minor Components

Pleasant
Percent of map unit:
Landform: Depressions
Hydric soil rating: Yes

Fluvaquentic haplaquolls
Percent of map unit:
Landform: Swales
Hydric soil rating: Yes

Other soils
Percent of map unit:
Hydric soil rating: No

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 16, Sep 10, 2018