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INCORPORATED

PRELIMINARY GEOTECHNICAL INVESTIGATION
GRANDVIEW RESERVE
EASTONVILLE ROAD AND U.S. HIGHWAY 24
FALCON, COLORADO

Prepared For:

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Attention: Michael Bird

Project No. CS19345-115

December 23, 2020

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SCOPE

This report presents the results of our Preliminary Geotechnical Investigation for the proposed Grandview Reserve development. The proposed development is located east of Eastonville Road, west of U.S. Highway 24, and north of Stapleton Road in Falcon, Colorado (Fig. 1). We understand you are assessing the land for the construction of single-family residences. The purpose of our investigation was to evaluate the subsurface conditions to assist in planning of residential construction. The report includes descriptions of the subsurface conditions encountered in our exploratory borings, and discussions of construction as influenced by geotechnical considerations. The scope was described in our Proposal (CS-20-0171) dated November 9, 2020. Evaluation of the property for the presence of potentially hazardous materials (Environmental Site Assessment) was not included in our scope.

This report is based on our understanding of the planned construction, subsurface conditions disclosed by exploratory borings, results of field and laboratory tests, engineering analysis, and our experience. It contains descriptions of the soil and bedrock conditions and groundwater levels found in our exploratory borings, and preliminary design and construction criteria for foundations, floor systems, and surface and subsurface drainage. The discussions of foundation and floor systems are intended for planning purposes only. As development plans progress, we recommend additional future preliminary investigations with closer spaced borings. A brief summary of our conclusions and recommendations follows, with more detailed discussion in the report.

SUMMARY OF CONCLUSIONS

1. We did not identify geotechnical or geologic constraints at this site that we believe precludes construction of single-family residences. The primary geotechnical concerns are the presence of lenses of expansive claystone layers sporadically present within the predominantly sandstone bedrock and shallow groundwater. We believe these concerns can be mitigated with proper planning, engineering, design, and construction.

2. Strata encountered in our exploratory borings consisted of natural silty to clayey sand underlain by sandstone and claystone bedrock to the maximum depths explored of 20 to 30 feet. Testing and our experience indicates the near-surface soils are generally non-expansive. The underlying bedrock is predominantly non-expansive to low swelling sandstone. Claystone layers are intermittently present within the bedrock.

3. Groundwater was encountered in six of our borings during drilling at depths between 8 and 17 feet. Groundwater was measured approximately 7 days after drilling in each of the twelve borings at depths ranging from 5.5 to 15 feet below the existing ground surface. Groundwater elevations will vary with seasonal precipitation and landscaping irrigation.

4. The presence of expansive bedrock on the site constitutes a geologic hazard. There is risk that these materials may heave and damage slabs-on-grade and foundations. We believe the risk of damage can be mitigated through typical engineering practices employed in the region. Slabs-on-grade and in some instances, foundations, may be damaged. Where claystone is encountered within excavations, sub-excavation may be appropriate.

5. We believe spread footings designed and constructed to apply a minimum deadload will be appropriate if underlain by natural sand, sandstone bedrock, or new, moisture conditioned and densely compacted fill.

6. Control of surface drainage will be critical to the performance of foundations and slabs-on-grade. Overall surface drainage should be designed to provide rapid removal of surface runoff away from the proposed residences. Conservative irrigation practices should be followed to avoid excessive wetting.

SITE CONDITIONS

The proposed Grandview Reserve development consists of approximately 768 acres of undeveloped land located east of Eastonville Road, west of U.S. Highway 24, and north of Stapleton Road in the unincorporated community of Falcon, Colorado. The site location and approximate extents are shown in Fig. 1. At the time of our investigation, the ground surface was largely undisturbed with the exception of some unimproved dirt roads and a gas line easement that traverses the western portion of the property in a general southwest to northeast direction. Additionally, a small dam is present in the southwestern portion of the site. A few natural drainages cross the property in a general northwest to southeast direction. The largest and easternmost contained drainage water (mostly frozen) at the time of our field exploration. Site topography is gently rolling with a gentle descent to the southeast. Moderate slopes are present along drainages. Historically the land has been used for agriculture and grazing. Vegetation consists of prairie grasses and weeds.

PROPOSED DEVELOPMENT

The proposed Grandview Reserve development may include primarily residential development varying from low to high density, as well as a community park, church, school and about 16 acres of commercial parcels adjacent to U.S. Highway 24. An extension of Rex Road is planned to extend through the development in a general northwest to southeast direction and intersect with U.S. Highway 24. A network of additional collector and residential streets will provide access to the various residential neighborhoods and commercial sites.

PREVIOUS INVESTIGATION BY ENTECH

In January 2019, Entech Engineering, Inc. performed a Preliminary Soil, Geology, Geologic Hazard, and Wastewater Study for the Grand Reserve site (Entech Job No. 181951). Entech advanced ten borings at the site in late November 2018.

We were provided with a copy of the Entech report for review and utilized the subsurface information to supplement the information obtained during our investigation.

INVESTIGATION

Subsurface conditions at the site were investigated by our firm by drilling 12 very widely spaced exploratory borings across the site, to depths between 20 and 30 feet. The boring locations were established by the client's surveyor and elevations were provided to us. The approximate locations of the borings are shown in Fig. 1. Our representative observed the drilling operations, logged the subsurface conditions found in the borings, and obtained samples for laboratory testing. Graphical logs of the borings, including the results of field penetration resistance tests, and some laboratory test data are presented in Appendix A. Soil samples obtained during drilling were visually classified and laboratory testing was assigned to representative samples. Swell-consolidation and gradation test results are presented in Appendix B. Laboratory test data are summarized in Table B-1.

SUBSURFACE CONDITIONS

Strata encountered in our exploratory borings consisted of natural silty to clayey sand underlain by sandstone and claystone bedrock to the maximum depths explored of 20 to 30 feet. Some of the pertinent engineering characteristics of the soil and bedrock are described in the following paragraphs.

Natural Soils

Two to sixteen feet of natural, predominantly sand overburden soils were encountered at the surface. The sand varies from slightly silty to silty and slightly clayey to clayey and was encountered at the ground surface in ten of the twelve borings. Very sandy clay was encountered at the ground surface in the remaining two borings and was also encountered by Entech at deeper depths. The sand was medium dense to dense based on field penetration resistance testing and our observations during drilling. Six samples of the sand tested in our laboratory contained 5 to 29 percent silt and clay-sized particles (passing the No. 200 sieve). The silty sand is judged to be non-expansive. The clayey sand is judged to be stiff to very stiff, and non-expansive to low swelling.

Bedrock

Bedrock was encountered in each of the borings underlying the natural soils, at depths of between 2 and 16 feet below the ground surface. The predominate sandstone bedrock contained sporadic layers of sandy to very sandy claystone. The bedrock was hard to very hard. Eight samples of the sandstone contained 11 to 43 percent silt and clay-sized particles. Four samples of the sandstone exhibited measured swells between 1.0 to 2.0 percent, and one sample compressed 0.1 percent when wetted under estimated overburden pressure.

Sandy to very sandy claystone bedrock was encountered in six of our borings at varying depths and was also encountered by Entech in four of the ten borings advanced during their study. Three samples of the claystone tested in our laboratory contained 57 to 68 percent silt and clay-sized particles. Three samples of the claystone exhibited measured swells between 0.1 and 4.8 percent when wetted under estimated overburden pressure.

Groundwater

Groundwater was encountered in six of our borings during drilling at depths between 8 and 17 feet. Groundwater was measured on December 8, 2020 in each of the twelve borings at depths ranging from 5.5 to 15 feet below the existing ground surface. It is noted that Entech drilled ten borings at the site in November 2018 and encountered groundwater in seven of the borings at depths between 4.5 and 19 feet. Groundwater may develop and fluctuate seasonally and rise in response to development, precipitation, and landscape irrigation.

GEOLOGIC HAZARDS

Geologic hazards at the site include expansive soils and bedrock and areas of shallow groundwater. No geologic hazards that we believe would preclude development were noted. It is our opinion potential hazards can be mitigated with proper engineering, design, and construction practices, as discussed in this report.

Expansive Soils

Colorado is a challenging location to practice geotechnical engineering. The climate is relatively dry, and the near-surface soils are typically dry and comparatively stiff. These soils and related sedimentary bedrock formations react to changes in moisture conditions. Some of the soils swell as they increase in moisture and are referred to as expansive soils. Other soils can compress significantly upon wetting and are identified as compressible or collapsible soils. Much of the land available for development east of the Front Range is underlain by expansive clay or claystone bedrock near the surface. The soils that exhibit compressible behavior are more likely west of the Continental Divide; however, both types of soils occur throughout the state.

Covering the ground with structures, streets, driveways, patios, etc., coupled with lawn irrigation and changing drainage patterns, leads to an increase in subsurface moisture conditions. As a result, some soil movement due to heave or settlement is inevitable. Expansive and compressible soils and expansive bedrock (collectively referred to as expansive soils) are present at this site, which constitutes a geologic hazard. There is risk that foundations and slab-on-grade floors will experience heave or settlement and damage. It is critical that precautions are taken to increase the chances that the foundations and slabs-on-grade will perform satisfactorily. Engineered planning, design and construction of grading, pavements, foundations, slabs-on-grade, and drainage can mitigate, but not eliminate, the effects of expansive and compressible soils. Sub-excavation is a ground improvement method that can be used to reduce the impacts of swelling soils.

<u>Shallow Groundwater</u>

Groundwater was encountered in six of our borings during drilling at depths between 8 and 17 feet. Groundwater was measured on December 8, 2020 in each of the twelve borings at depths ranging from 5.5 to 15 feet below the existing ground surface. It is noted that Entech drilled ten borings at the site in November 2018 and encountered groundwater in seven of the borings at depths between 4.5 and 19 feet. It should be understood that the area has been in severe drought for the past couple of years and rises in groundwater should be expected.

Fluctuations up to 5 feet are considered as typical in this area. Our borings were drilled in late Fall when groundwater levels are typically starting to lower from seasonal highs. The presence of shallow groundwater can impact basement level as well as crawlspace level construction. Depending on design finish grade elevations shallow groundwater may necessitate raising grades in some areas or utilizing crawl space construction. In some cases, shallow groundwater conditions can be mitigated through use of foundation drains and active underdrains (if allowed and installed by the developer).

ESTIMATED POTENTIAL HEAVE

Based on the subsurface profiles, swell-consolidation test results and our experience, we calculated potential heave at the existing ground surface for each test hole. The analysis involves dividing the soil profile into layers and modeling the heave of each layer from representative swell tests. We estimate potential ground heave may range from less than 0.5-inch to 2.5 inches, with half of the borings exhibiting less than 0.5 inches of ground heave, one of the borings greater than 2 inches, and the remaining borings between 1 and 2 inches. A depth of wetting of 24 feet below existing grades was considered for the analysis. This depth of wetting is typically used for irrigated residential sites. Variations from our estimates should be anticipated. It is not certain whether the estimated heave will occur.

The heave estimates are summarized in the table below. We judge there is a relatively low risk of problems due to expansive soils and bedrock for much of the site; however, it should be understood that our borings were very widely spaced. As such, significant areas of moderately expansive claystone may be present

ESTIMATED POTENTIAL GROUND HEAVE BASED ON
24 FEET DEPTH OF WETTING

BORING	ESTIMATED POTENTIAL GROUND HEAVE (INCHES)
TH-1	<0.5
TH-2	<0.5
TH-3	1.5
TH-4	<0.5
TH-5	<0.5
TH-6	1.6
TH-7	<0.5
TH-8	1.1
TH-9	2.5
TH-10	1.6
TH-11	1.6
TH-12	0.7

Sub-Excavation

Our investigation indicates soils with nil to moderate expansion potential are present at shallow depths likely to influence the performance of shallow foundations and slabs-on-grade. We estimated total potential ground heave could be up to about 2.5 inches. Our experience suggests performance of structures constructed on clay-stone bedrock materials can be erratic. Where present near foundation levels, sub-excavation of up to 4 feet in thickness may be appropriate. Localized areas of deeper sub-excavation may be necessary. This condition is not expected to be present at most of the lots investigated, and the need for sub-excavation should be evaluated at the time of the lot specific soils and foundation investigation.

Sub-excavation has been used in the Colorado Springs area with satisfactory performance for most of the sites where this ground modification method has been completed. We have seen isolated instances where settlement of sub-excavation fill has led to damage to houses supported on footings. In most cases, the settlement was caused by wetting associated with poor surface drainage or seepage, and/or poorly compacted fill placed at the horizontal limits of excavation. Wetting of the fill may cause softening and settlement.

There can be cases where the sub-excavation limits and depth are not adequate to encompass an entire building footprint including deck, patio and porch. As a result, the building must be founded on deep foundations. Proper planning of the sub-excavation limits and depth based on the largest model plan and as-built surveying of the limits and depth during the sub-excavation is important to reduce this risk.

The excavation slopes should meet OSHA, state, and local safety standards. The bottom of the sub-excavated area should extend laterally at least 5 feet and outside the largest possible foundation footprints to ensure foundations are constructed over moisture-conditioned fill.

The excavation contractor should be chosen carefully to assure they have experience with fill placement at over-optimum moisture and have the necessary compaction equipment. In order for the procedure to be performed properly, close contractor control of fill placement to specifications is required. The sub-excavated material may be reused as backfill. Sub-excavation fill should be moisture-conditioned between 0 and 4 percent above optimum moisture content for clay or within 2 percent of optimum for sand. Fill should be compacted at least 95 percent of standard Proctor maximum dry density (ASTM D 698).

Special precautions should be taken for compaction of fill at corners, access ramps, and along the perimeters of the sub-excavation as large compaction equipment cannot easily reach these areas. Our representative should observe placement procedures and test compaction of the fill on a nearly full-time basis.

If the fill dries excessively prior to construction, it may be necessary to rework the upper drier materials just prior to constructing foundations. We estimate the fill should retain adequate moisture for about three years.

Sub-excavation will likely allow use of spread footing foundations. Sub-excavation will also enhance performance of concrete flatwork (driveways and sidewalks) and pavements, potentially reducing maintenance costs.

BUILDING CONSTRUCTION CONSIDERATIONS

Foundations

Our investigation indicates variable materials will be present at foundation elevations. Expansive claystone is present at varying depths. If claystone is encountered at foundation depths, sub-excavation will likely be appropriate to reduce the risk of poor performance. Typically, sub-excavation depths in this formation are 4 to 5 feet in thickness where these lenses are present; however, significant layers of moderately expansive claystone that extend to deeper depths could locally require sub-excavations up to 10 feet. We expect spread footing foundations designed to apply minimum deadload will likely be appropriate for the lots. We estimate maximum allowable pressures of about 3,000 psf will be appropriate for the lots included in this investigation. Detailed soils and foundation investigations should be performed to determine the appropriate foundation types and to provide design criteria on a lot-specific basis.

Floor Construction

We expect slab-on-grade basement floors and garage floors will be appropriate for the site. The site will likely have a low to moderate risk of poor slab-on-grade performance, although sub-excavation may be required where claystone lenses are identified near floor elevations. Structural floors should be used in non-basement, finished living areas. A structural floor is supported by the foundation system. Design and construction issues associated with structural floors include ventilation and lateral loads. Where structurally supported floors are installed in basements or over a crawlspace, the required air space depends on the materials used to construct the floor and the potential expansion of the underlying soils. The performance of floor slabs, driveways, sidewalks, and other surface flatwork may be poor where expansive soils are present, unless sub-excavation is performed.

Subsurface Drainage

Surface water can penetrate relatively permeable loose backfill soils located adjacent to residences and collect at the bottom of relatively impermeable foundation excavations, causing wet or moist conditions after construction. Foundation walls and grade beams should be designed to resist lateral earth pressures. Foundation drains should be constructed around the lowest excavation levels of basement and/or crawlspace areas. Where locally high groundwater is present, below slab drainage layers may be appropriate. These drains could be connected to an underdrain system (if present) to provide a gravity outlet. Sump pits should be provided so pumps can be installed as a backup if underdrains do not perform as intended.

Surface Drainage

The performance of foundations, floors, and other improvements is affected by moisture changes within the soil. This is largely influenced by surface drainage. When developing an overall drainage scheme, consideration should be given by the developer to drainage around each residence. The ground surface around the residences should be sloped to provide positive drainage away from the foundations. We recommend a slope of at least 10 percent for the first 10 feet surrounding each building, where practical. If the distance between buildings is less than 20 feet, the slope in this area should be 10 percent to the swale between houses. Variation from these criteria is acceptable in some areas. For example, for lots graded to direct drainage from the rear yard to the front, it is difficult to achieve the recommended slope at the high point behind the house. We believe it is acceptable to use a slope of about 6 inches in the first 10 feet (5 percent) at this location. A 5 percent slope can also be used adjacent to residences without basements. Roof downspouts and other water collection systems should discharge beyond the limits of backfill around structures.

Concrete

Concrete in contact with soil can be subject to sulfate attack. We measured the water-soluble sulfate concentration in two samples from this site at less than 0.1 percent. For this level of sulfate concentration, ACI 332-08 *Code Requirements for Residential Concrete* indicates there are no special requirements for sulfate resistance.

Superficial damage may occur to the exposed surfaces of highly permeable concrete, even though sulfate levels are relatively low. To control this risk and to resist freeze-thaw deterioration, the water-to-cementitious materials ratio should not exceed 0.50 for concrete in contact with soils that are likely to stay moist due to surface drainage or high water tables. Concrete exposed to freeze/thaw conditions should be air entrained. We recommend foundation walls and grade beams surrounding living areas that are in contact with the subsoils be damp-proofed.

RECOMMENDED FUTURE INVESTIGATIONS

We recommend the following investigations and services:

1. Additional targeted Preliminary Geotechnical Investigations with less widely spaced borings;
2. Pavement Subgrade Investigations;
3. Design-level Soils and Foundation Investigations for each individual lot; and
4. Foundation installation observations.

CONSTRUCTION OBSERVATIONS

This report has been prepared for the exclusive use of D.R. Horton and your team to provide geotechnical design and construction criteria for development. The information, conclusions, and recommendations presented herein are based upon consideration of many factors including, but not limited to, the type of structures proposed, the geologic setting, and the subsurface conditions encountered.

We recommend that CTL | Thompson, Inc. provide construction observation services to allow us the opportunity to verify whether soil conditions are consistent with those found during this investigation. If others perform these observations, they must accept responsibility to judge whether the recommendations in this report remain appropriate.

GEOTECHNICAL RISK

The concept of risk is an important aspect with any geotechnical evaluation primarily because the methods used to develop geotechnical recommendations do not comprise an exact science. We never have complete knowledge of subsurface conditions. Our analysis must be tempered with engineering judgment and experience. Therefore, the recommendations presented in any geotechnical evaluation should not be considered risk-free. Our recommendations represent our judgment of those measures that are necessary to increase the chances that the structures will perform satisfactorily. It is critical that all recommendations in this report are followed during construction.

LIMITATIONS

Our borings were very widely spaced to provide a general picture of subsurface conditions for due diligence and preliminary planning of residential construction. Variations from our borings should be anticipated. We believe this investigation was conducted in a manner consistent with that level of care and skill ordinarily used by geotechnical engineers practicing under similar conditions. No warranty, express or implied, is made.

If we can be of further service in discussing the contents of this report or analysis of the influence of subsurface conditions on the project, please call.

CTL | THOMPSON, INC.

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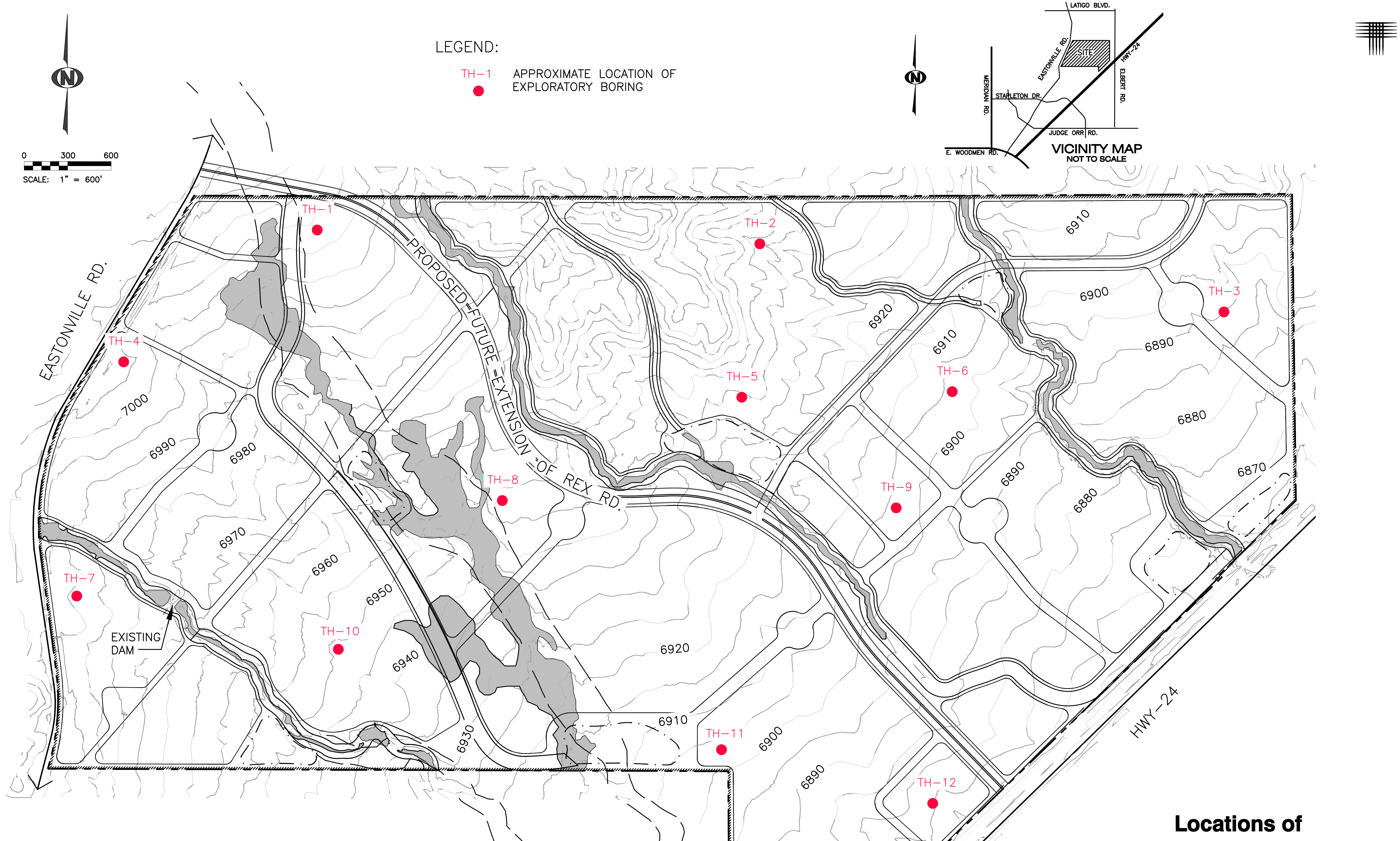

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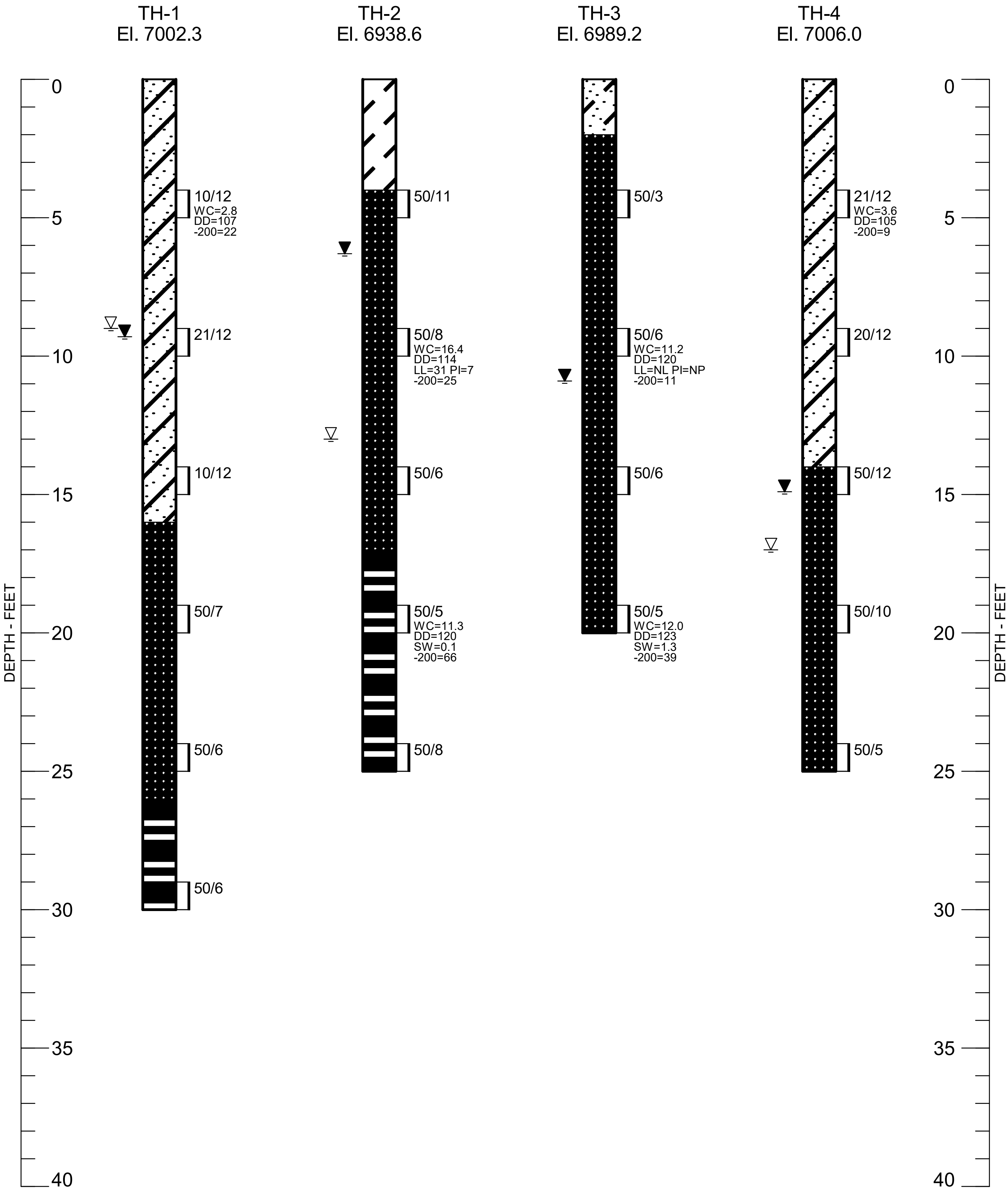
Locations of Exploratory Borings

Fig. 1

APPENDIX A

SUMMARY LOGS OF EXPLORATORY BORINGS



SUMMARY LOGS OF EXPLORATORY BORINGS

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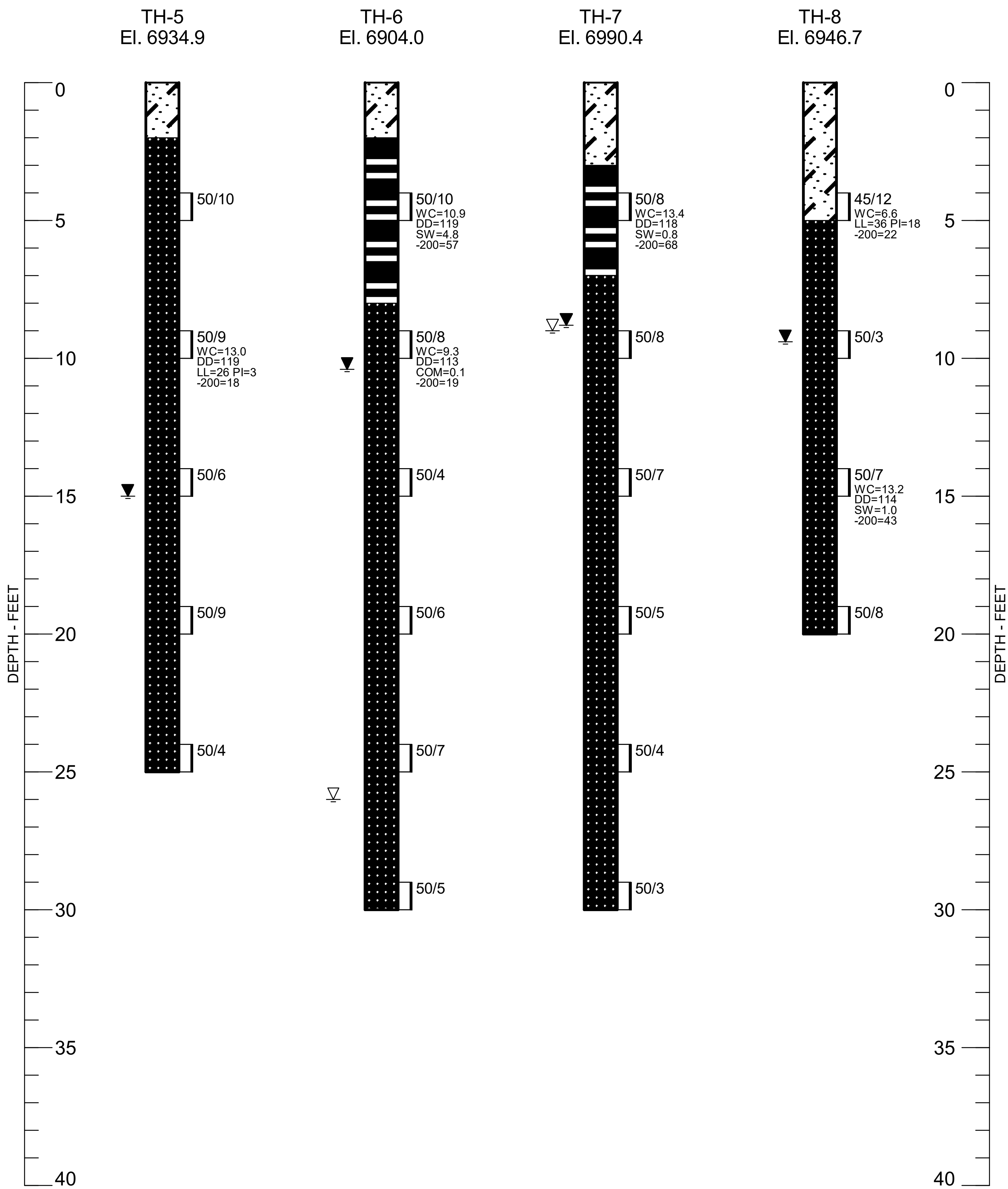
FIG. A- 1



SUMMARY LOGS OF EXPLORATORY BORINGS

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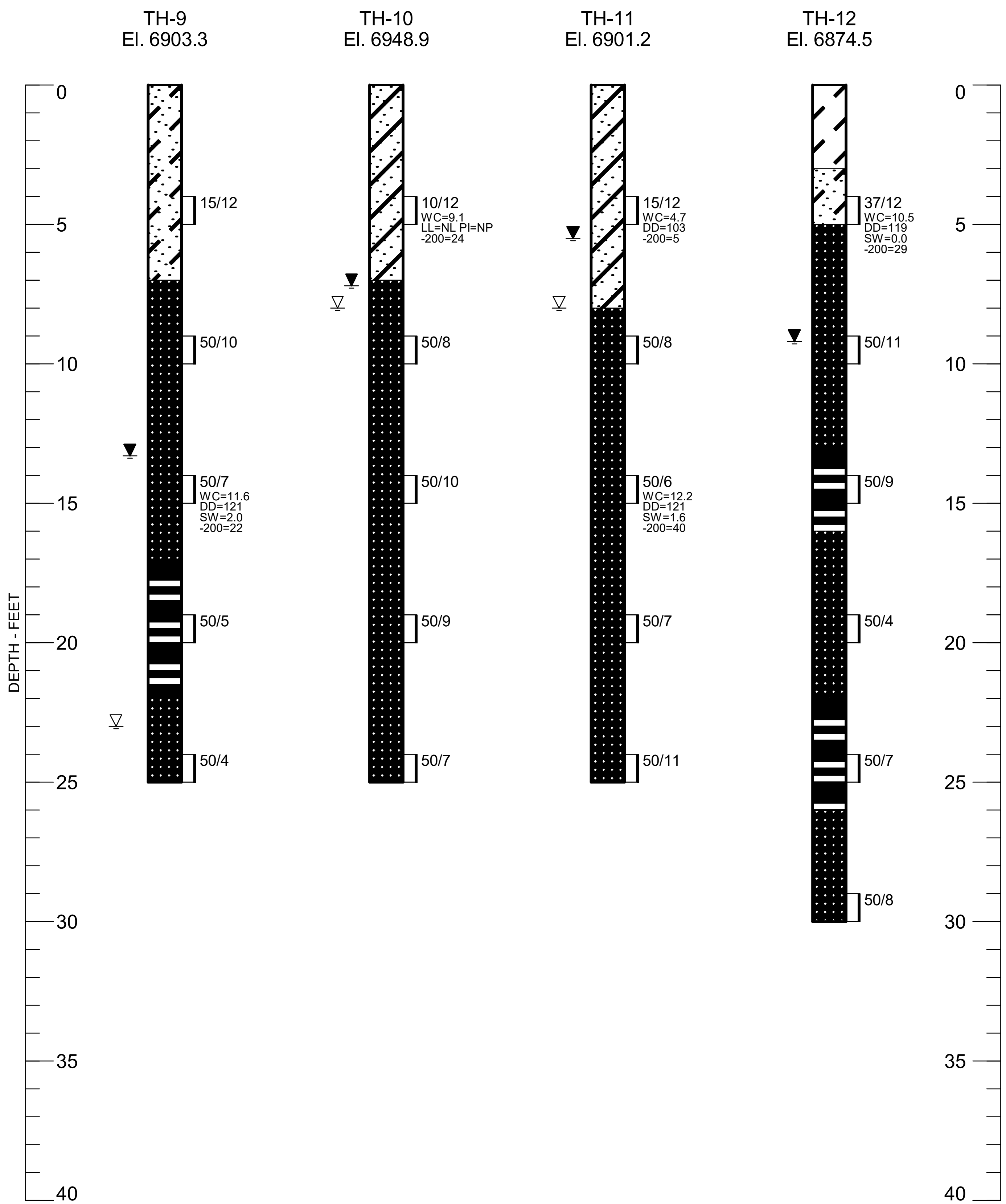
FIG. A- 2



SUMMARY LOGS OF EXPLORATORY BORINGS

LEGEND:

CLAY, SANDY, STIFF, SLIGHTLY MOIST, DARK BROWN (CL).

SAND, CLAYEY, DENSE, SLIGHTLY MOIST, BROWN, LIGHT BROWN (SC, SP-SC).

SAND, SLIGHTLY SILTY TO SILTY, MEDIUM DENSE, SLIGHTLY MOIST TO MOIST, LIGHT BROWN, OLIVE, BROWN (SM, SP-SM).

BEDROCK, CLAYSTONE, SANDY TO VERY SANDY, HARD, SLIGHTLY MOIST, LIGHT TO DARK GRAY.

BEDROCK, SANDSTONE, SILTY TO CLAYEY, VERY HARD, SLIGHTLY MOIST, LIGHT BROWN TO GRAY.

DRIVE SAMPLE. THE SYMBOL 10/12 INDICATES 10 BLOWS OF AN AUTOMATIC 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.5-INCH O.D. SAMPLER 12 INCHES.

WATER LEVEL MEASURED AT TIME OF DRILLING.

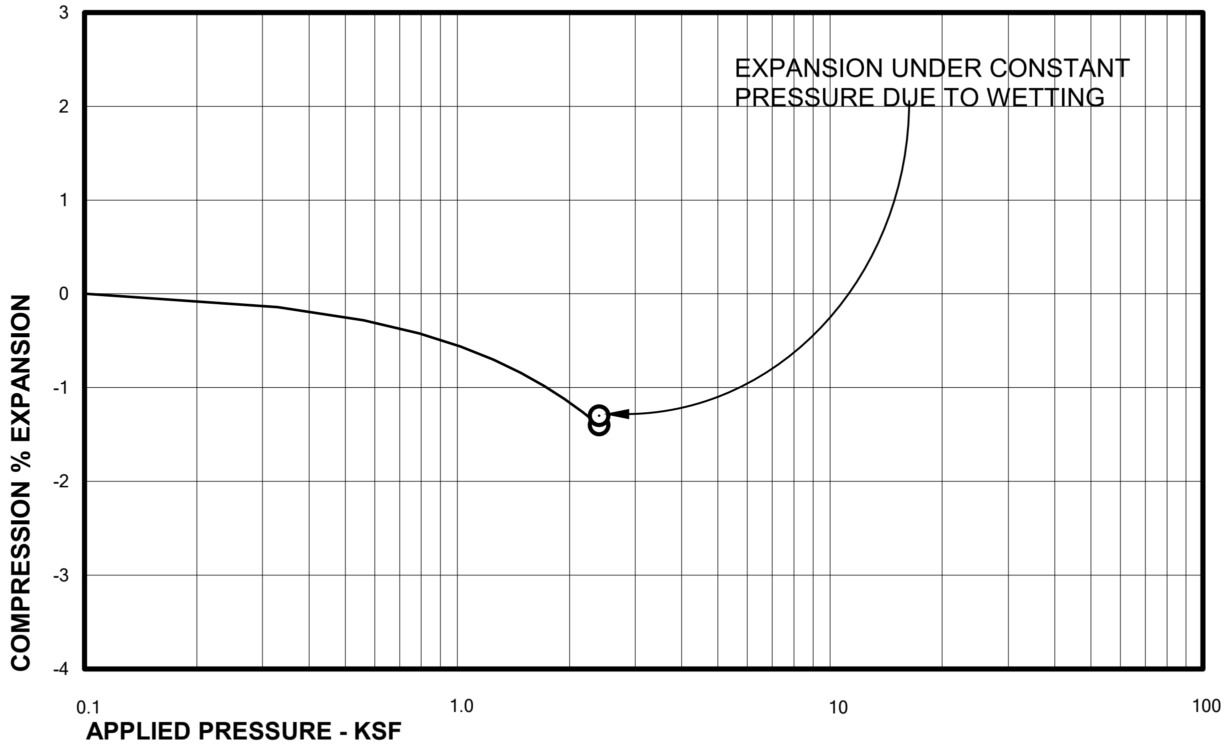
WATER LEVEL MEASURED AFTER DRILLING ON DECEMBER 8, 2020.

NOTES:

1. THE BORINGS WERE DRILLED ON DECEMBER 1 AND 2, 2020 USING 4-INCH DIAMETER, CONTINUOUS-FLIGHT SOLID-STEM AUGER AND TRUCK-MOUNTED CME-45 DRILL RIG.
2. WC - INDICATES MOISTURE CONTENT (%).
   DD - INDICATES DRY DENSITY (PCF).
   SW - INDICATES SWELL WHEN WETTED UNDER APPLIED PRESSURE (%).
   COM - INDICATES COMPRESSION WHEN WETTED UNDER APPLIED PRESSURE (%).
   LL - INDICATES LIQUID LIMIT.
   PI - INDICATES PLASTICITY INDEX.
   -200 - INDICATES PASSING NO. 200 SIEVE (%).
3. THESE LOGS ARE SUBJECT TO THE EXPLANATIONS, LIMITATIONS AND CONCLUSIONS CONTAINED IN THIS REPORT.
4. TEST HOLE LOCATIONS AND GROUND SURFACE ELEVATIONS WERE ESTABLISHED BY THE CLIENT'S SURVEYOR.

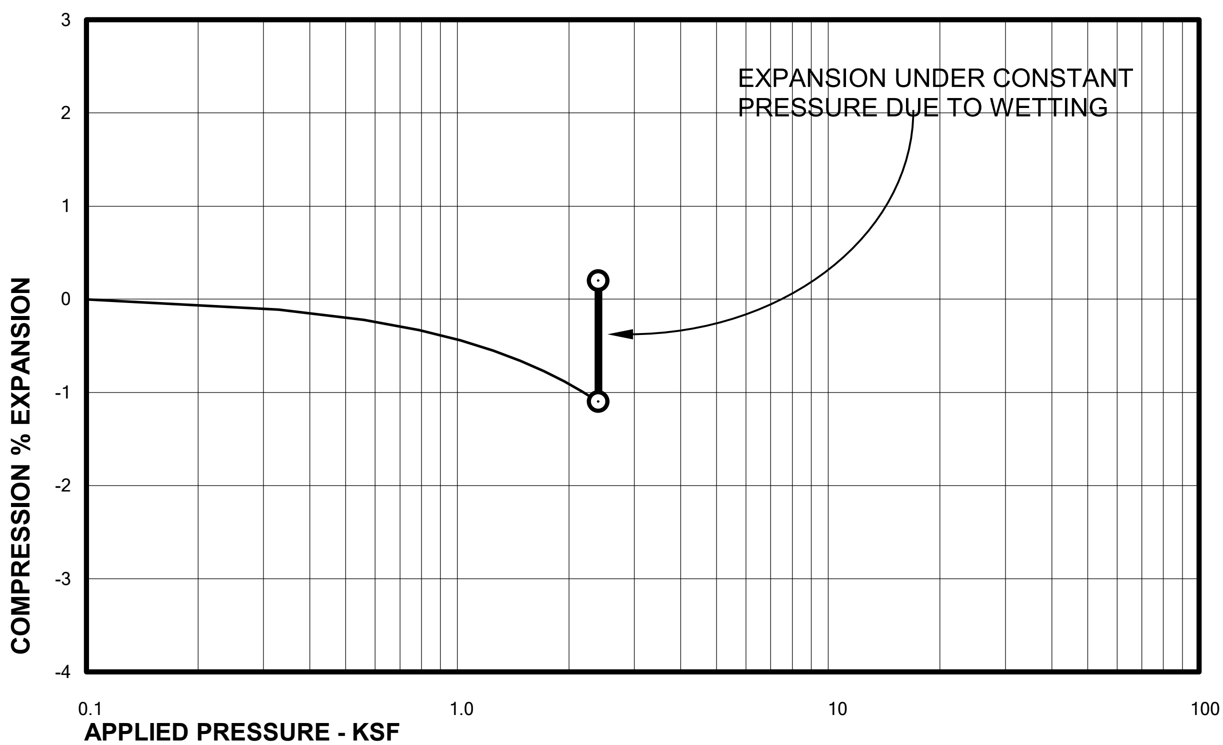
APPENDIX B

LABORATORY TEST RESULTS
TABLE B-I – SUMMARY OF LABORATORY TEST RESULTS



Sample of CLAYSTONE, SANDY
From TH-2 AT 19 FEET

DRY UNIT WEIGHT= 120 PCF
MOISTURE CONTENT= 11.3 %



Sample of SANDSTONE, VERY CLAYEY
From TH-3 AT 19 FEET

DRY UNIT WEIGHT= 123 PCF
MOISTURE CONTENT= 12.0 %

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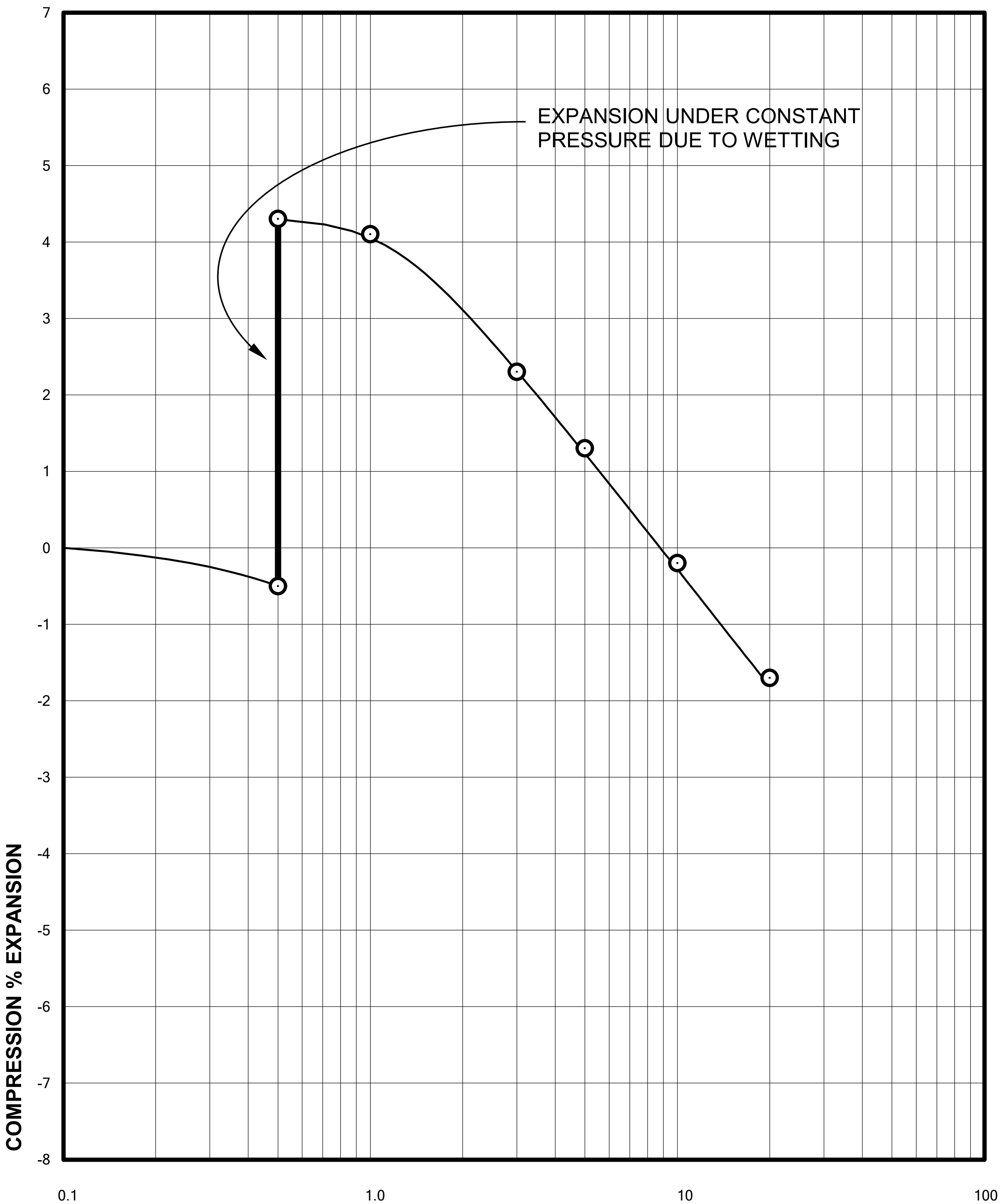
Swell Consolidation Test Results

FIG. B-1



Sample of CLAYSTONE, VERY SANDY

From TH-6 AT 4 FEET

DRY UNIT WEIGHT= 119 PCF

MOISTURE CONTENT= 10.9 %

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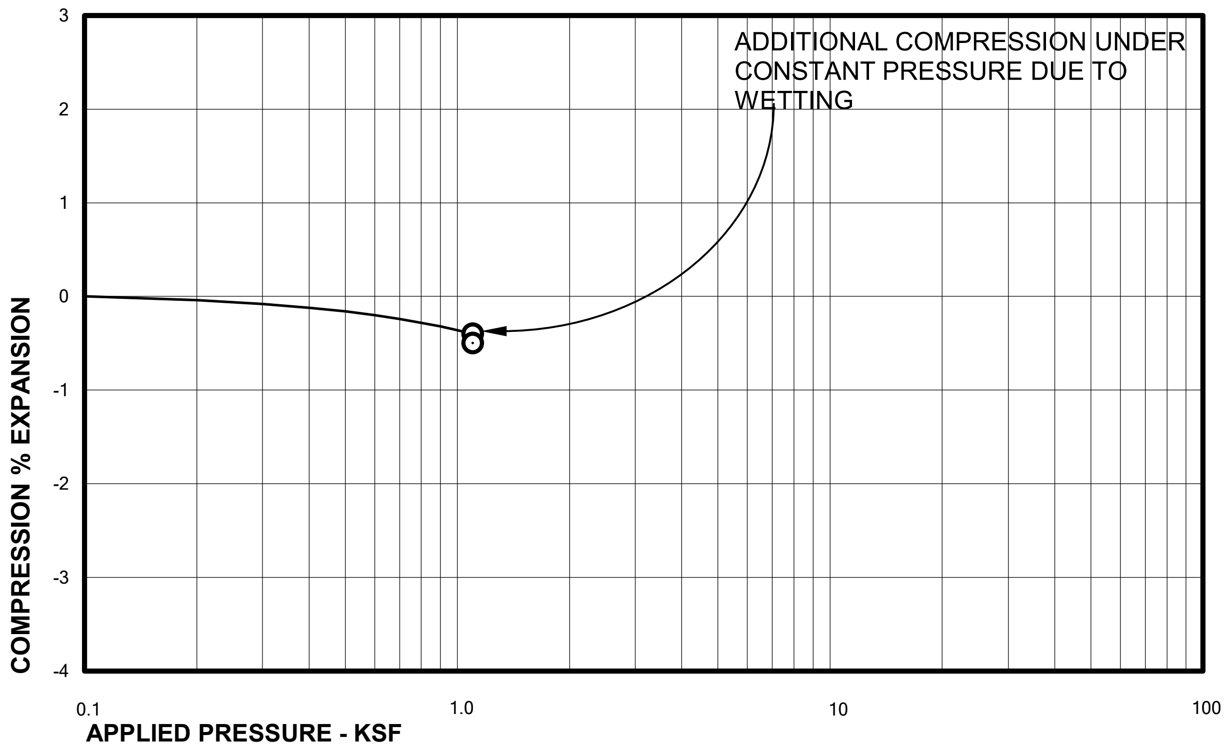
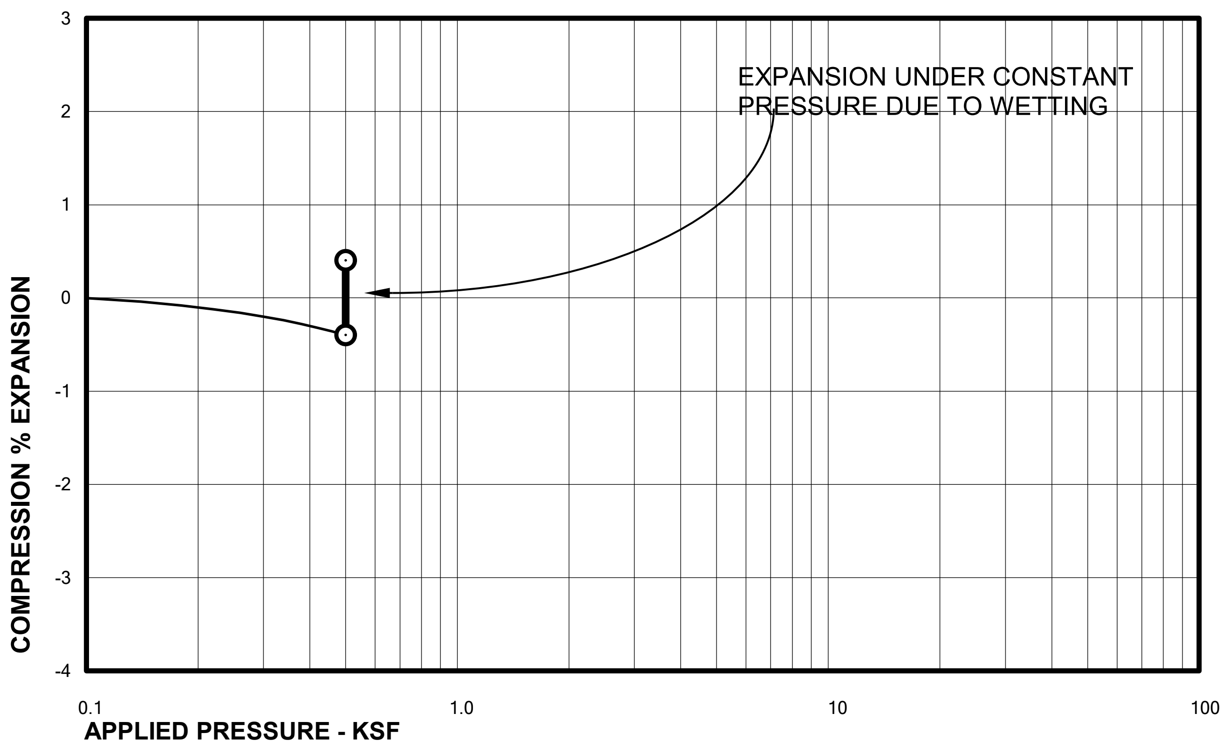
Swell Consolidation Test Results

FIG. B-2



Sample of SANDSTONE, SILTY
From TH-6 AT 9 FEET

DRY UNIT WEIGHT= 113 PCF
MOISTURE CONTENT= 9.3 %



Sample of CLAYSTONE, SANDY
From TH-7 AT 4 FEET

DRY UNIT WEIGHT= 118 PCF
MOISTURE CONTENT= 13.4 %

Swell Consolidation Test Results

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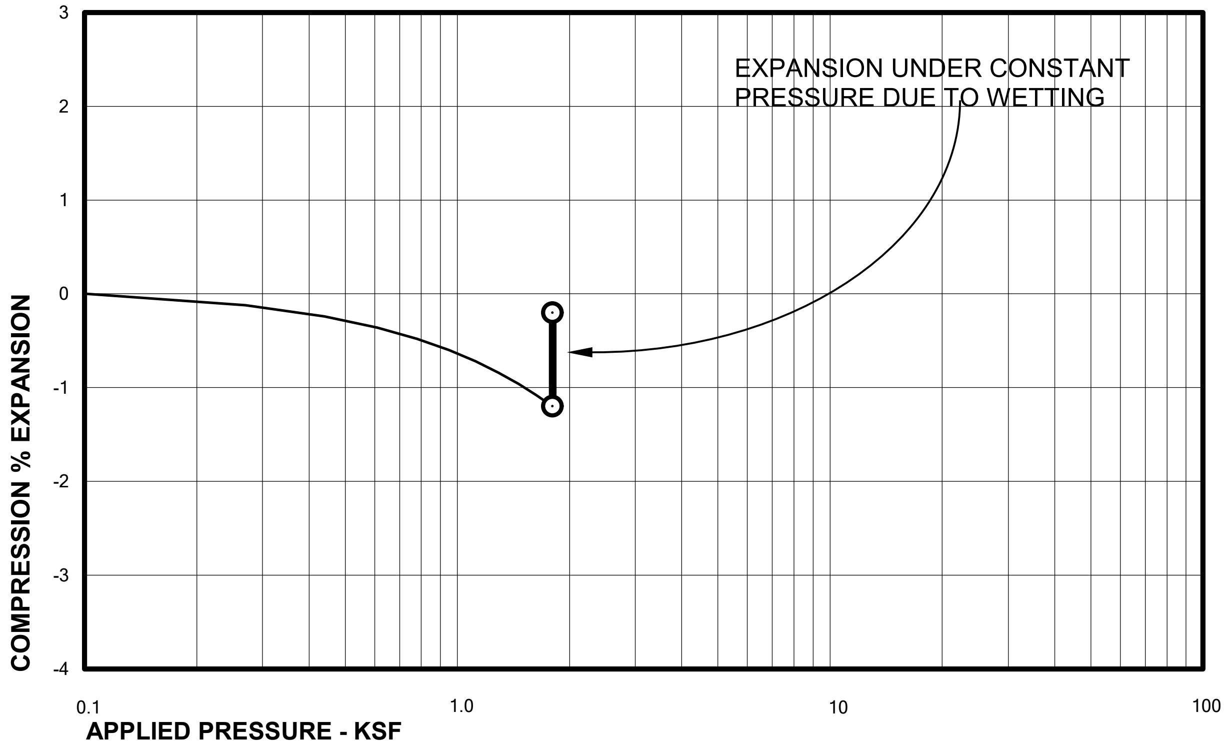
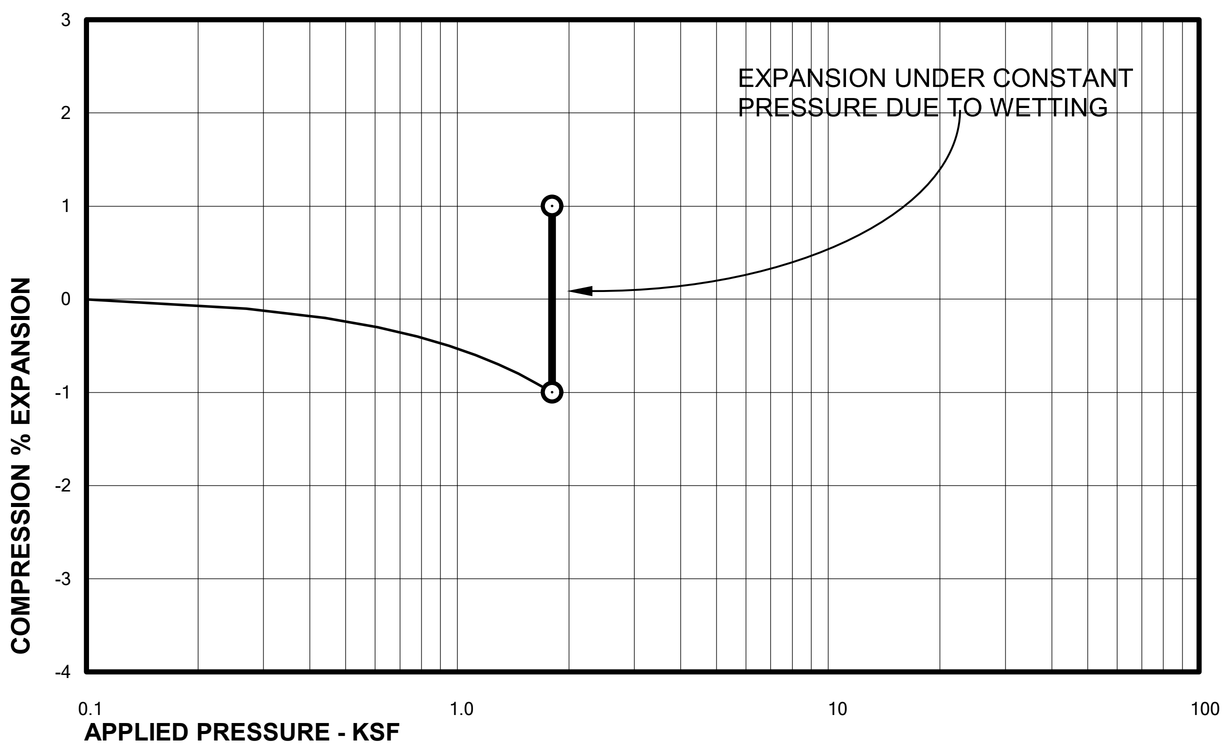
FIG. B-3



Sample of	SANDSTONE, VERY CLAYEY	DRY UNIT WEIGHT=	114	PCF
From	TH-8 AT 14 FEET	MOISTURE CONTENT=	13.2	%



Sample of	SANDSTONE, CLAYEY	DRY UNIT WEIGHT=	121	PCF
From	TH-9 AT 14 FEET	MOISTURE CONTENT=	11.6	%

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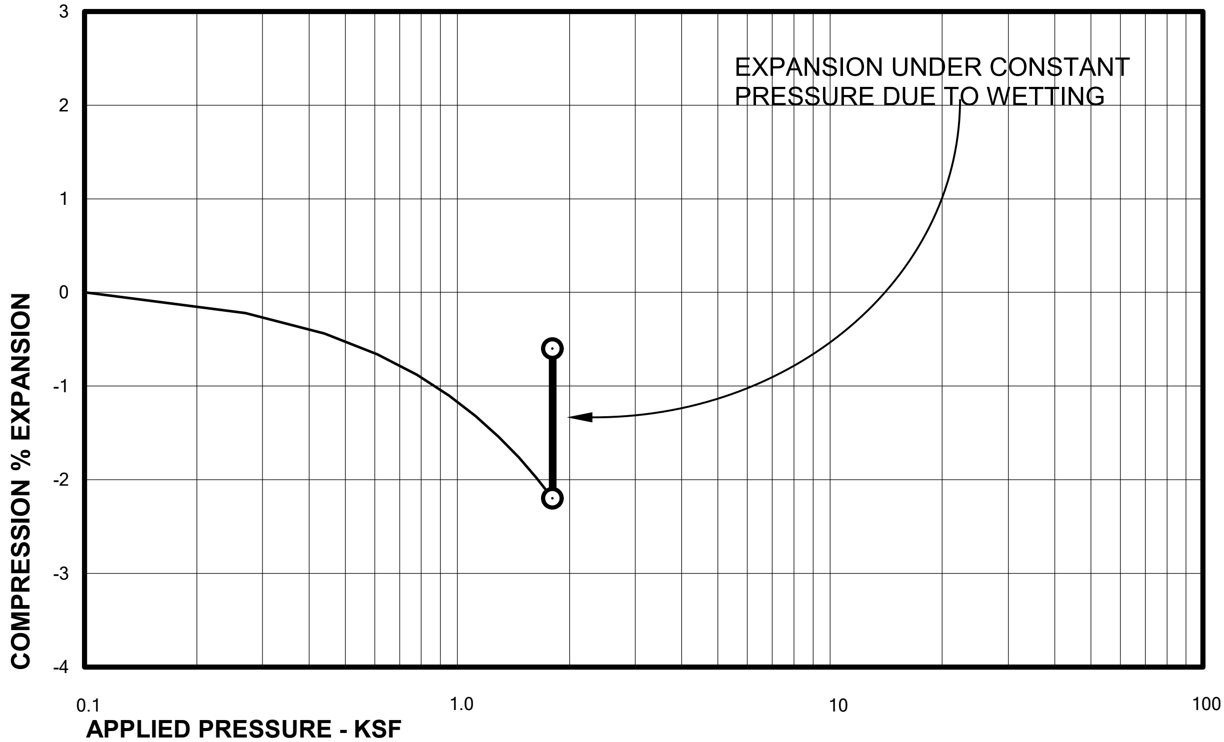
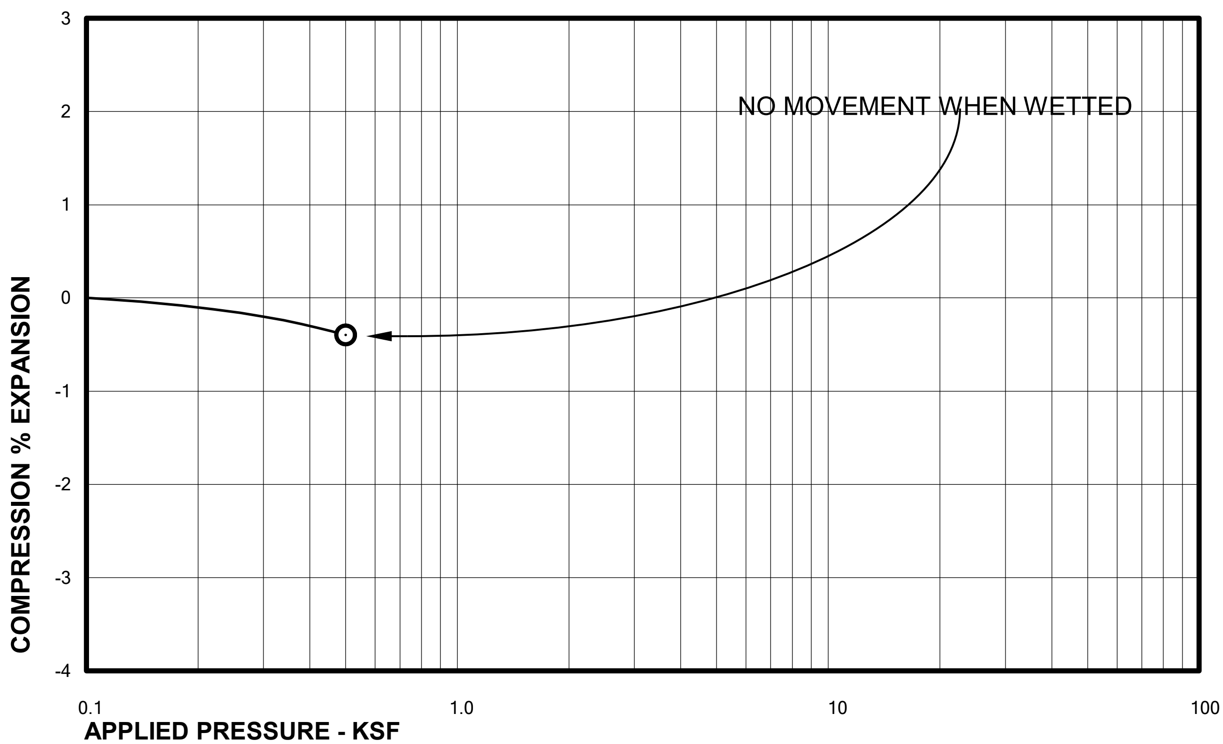
Swell Consolidation Test Results

FIG. B-4



Sample of SANDSTONE, VERY CLAYEY
From TH-11 AT 14 FEET

DRY UNIT WEIGHT= 121 PCF
MOISTURE CONTENT= 12.2 %



Sample of SAND, CLAYEY (SC)
From TH-12 AT 4 FEET

DRY UNIT WEIGHT= 119 PCF
MOISTURE CONTENT= 10.5 %

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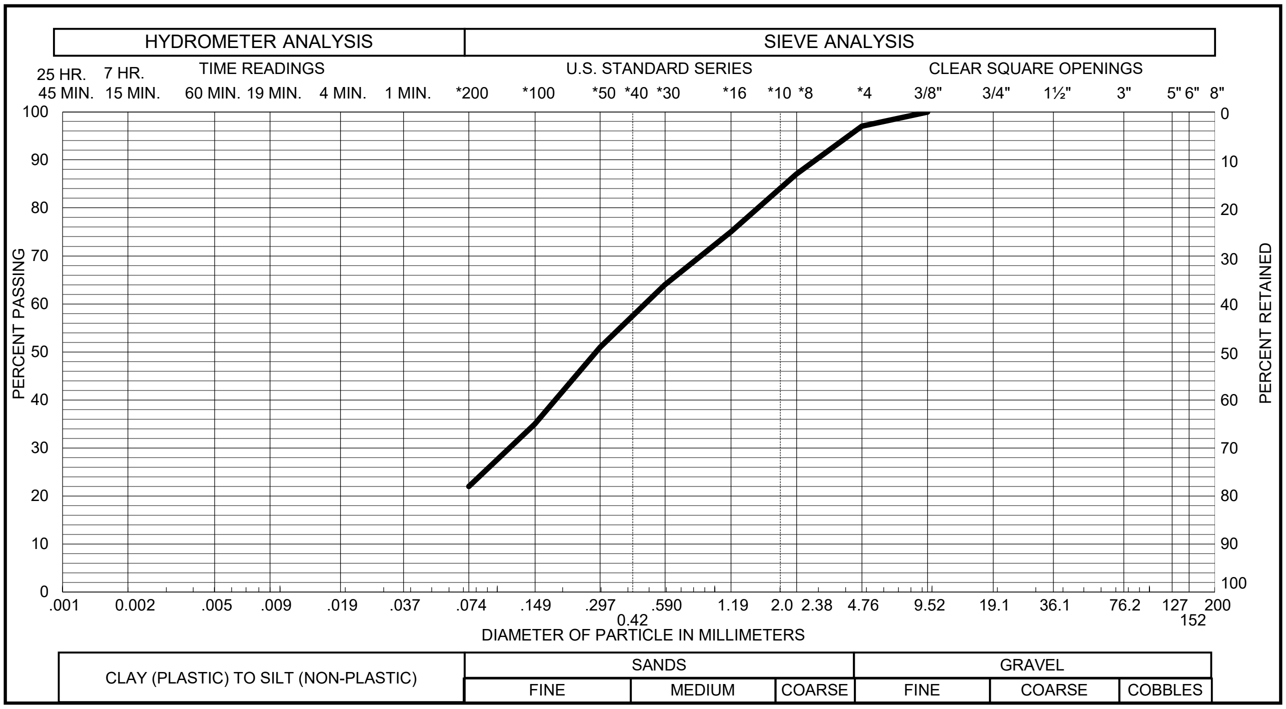
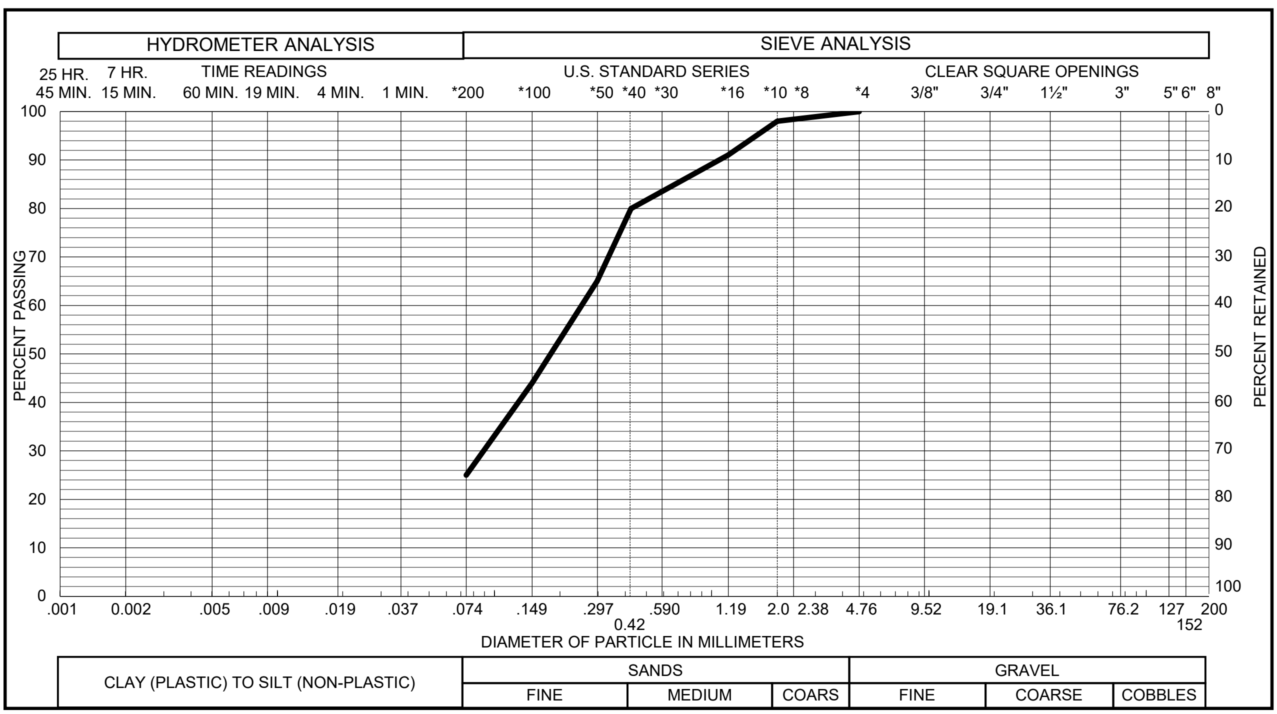
Swell Consolidation Test Results

FIG. B-5



Sample of	SAND, SILTY (SM)	GRAVEL 3 %	SAND 75 %
From	TH - 1 AT 4 FEET	SILT & CLAY 22 %	LIQUID LIMIT
		PLASTICITY INDEX	

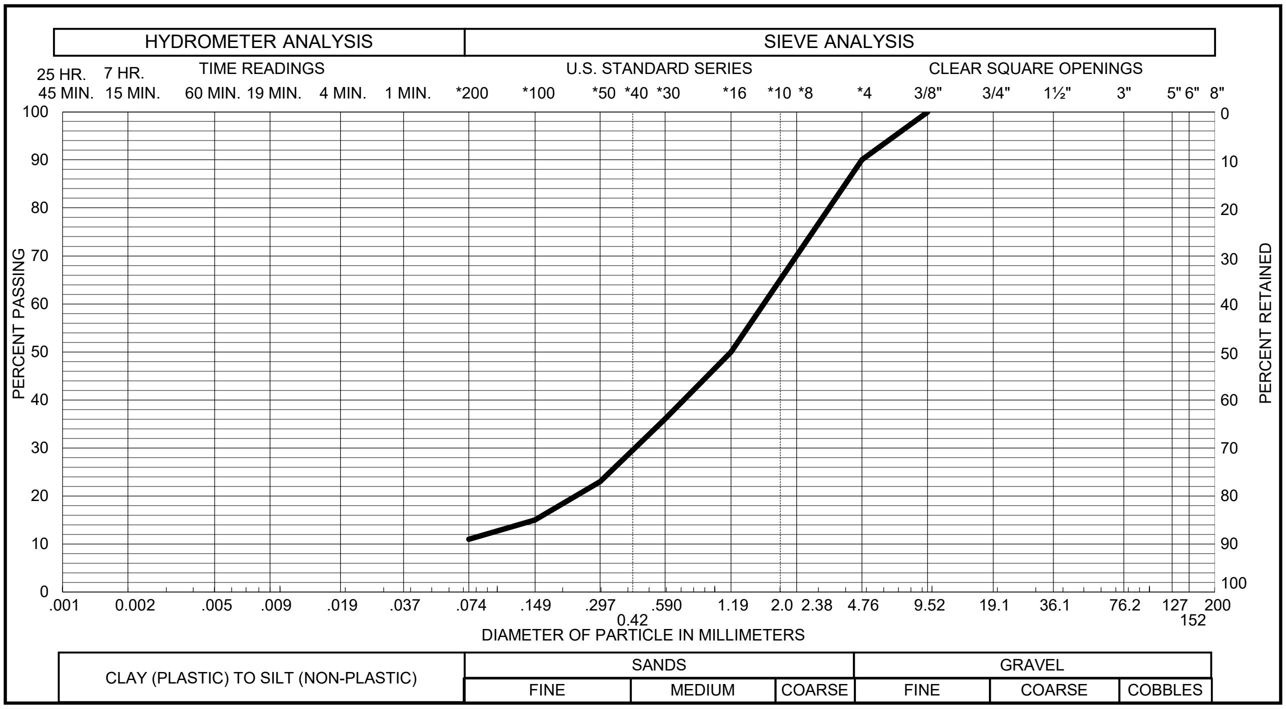


Sample of	SANDSTONE, SILTY	GRAVEL 0 %	SAND 75 %
From	TH - 2 AT 9 FEET	SILT & CLAY 25 %	LIQUID LIMIT 31
		PLASTICITY INDEX 7	

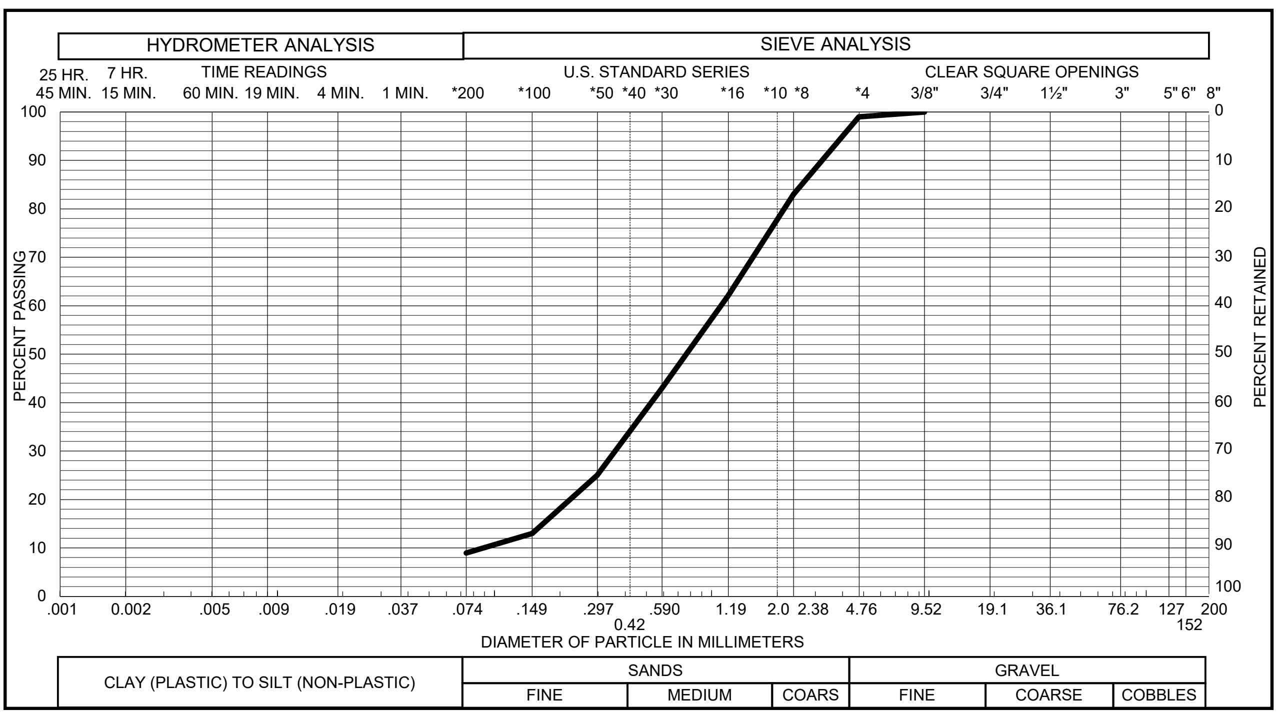
Gradation Test Results

FIG. B-6

D.R. HORTON
GRANDVIEW RESERVE
CTL|T PROJECT NO. CS19345-115



Sample of	SANDSTONE, SLIGHTLY SILTY	GRAVEL 10 %	SAND 79 %
From	TH - 3 AT 9 FEET	SILT & CLAY 11 %	LIQUID LIMIT NL
		PLASTICITY INDEX	NP

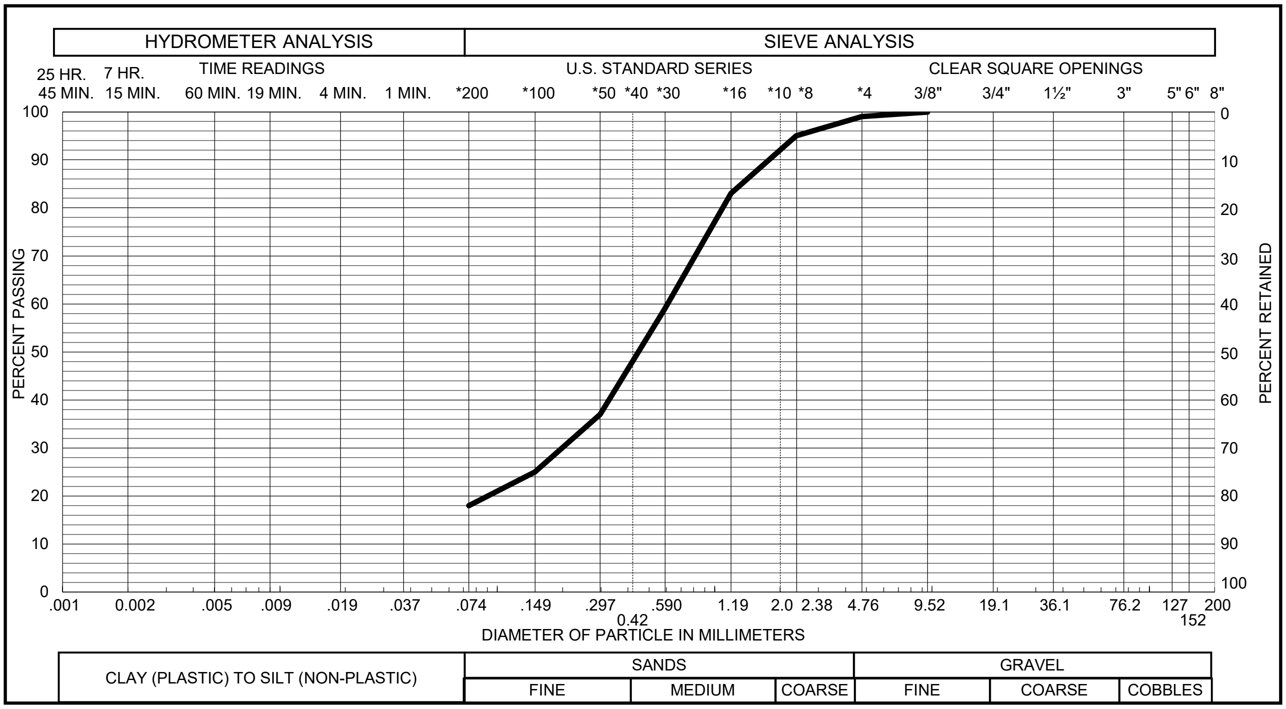


Sample of	SAND, SLIGHTLY SILTY (SP-SM)	GRAVEL 1 %	SAND 90 %
From	TH - 4 AT 4 FEET	SILT & CLAY 9 %	LIQUID LIMIT
		PLASTICITY INDEX	

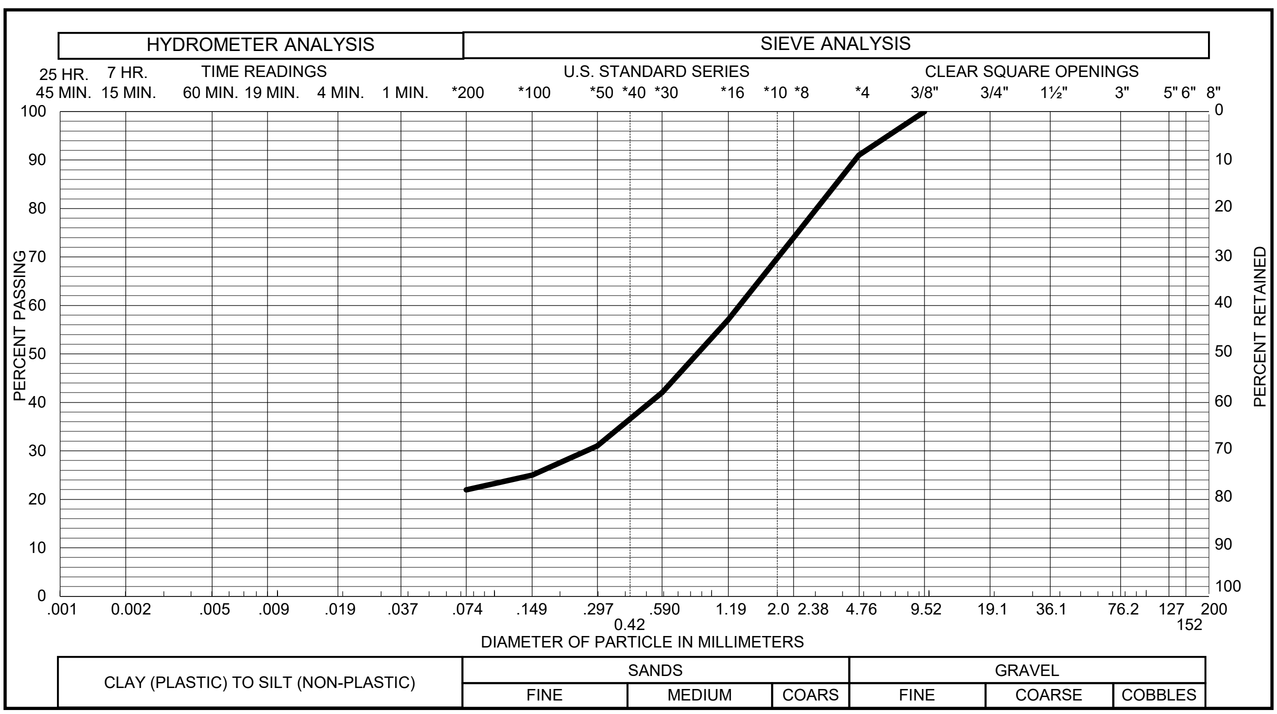
Gradation Test Results

FIG. B-7

D.R. HORTON
GRANDVIEW RESERVE
CTL|T PROJECT NO. CS19345-115



Sample of	SANDSTONE, SILTY	GRAVEL	1 %	SAND	81 %
From	TH - 5 AT 9 FEET	SILT & CLAY	18 %	LIQUID LIMIT	26
		PLASTICITY INDEX			3

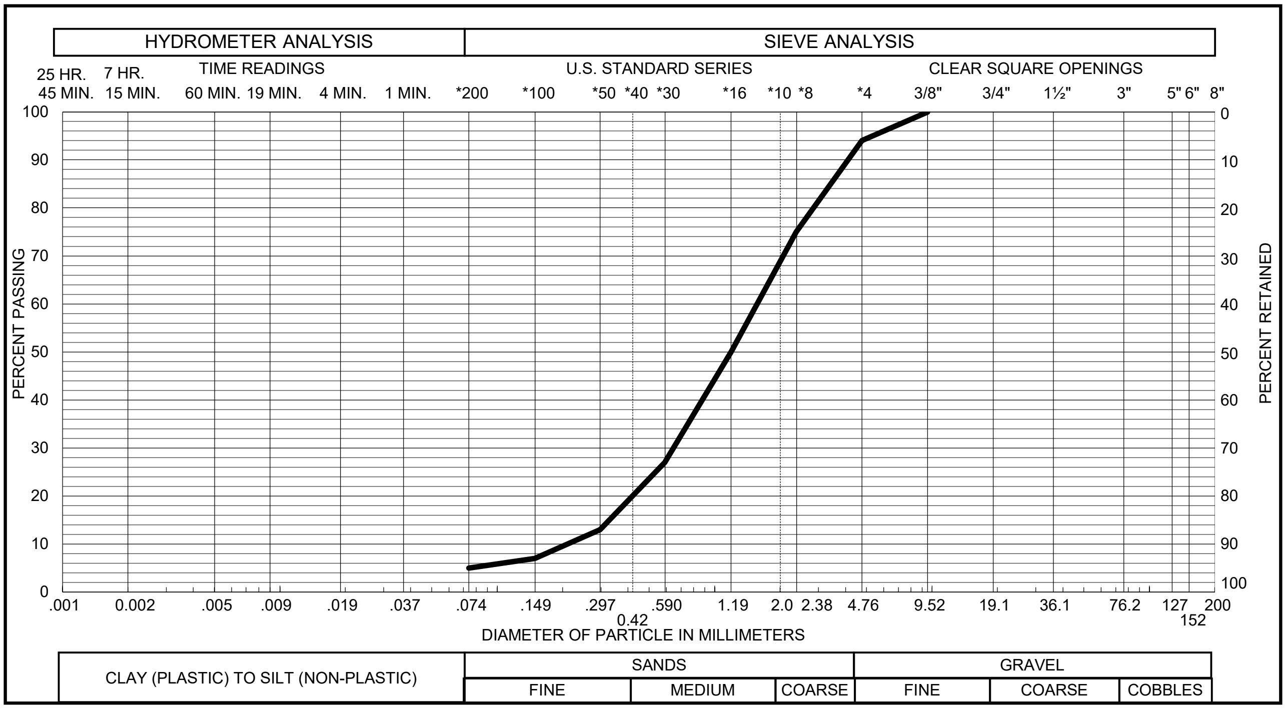


Sample of	SAND, CLAYEY (SC)	GRAVEL	9 %	SAND	69 %
From	TH - 8 AT 4 FEET	SILT & CLAY	22 %	LIQUID LIMIT	36
		PLASTICITY INDEX			18

Gradation Test Results

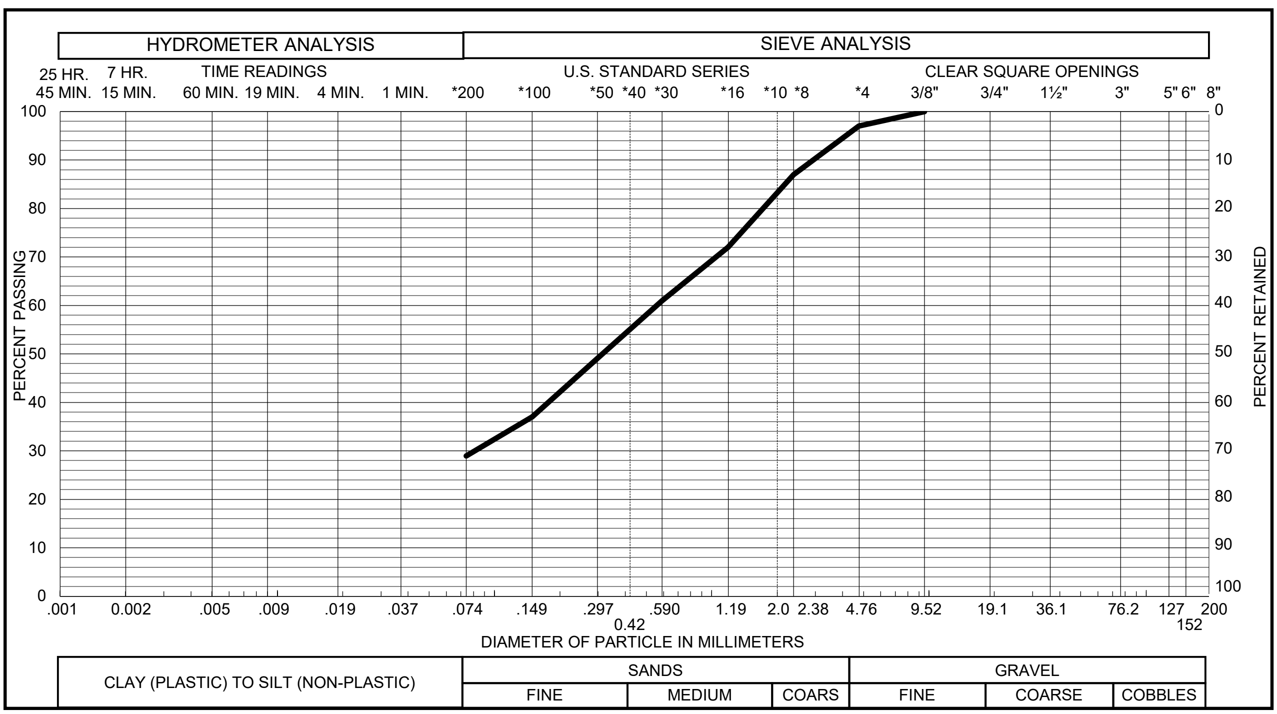
FIG. B-8

D.R. HORTON
GRANDVIEW RESERVE
CTL|T PROJECT NO. CS19345-115



Sample of SAND, SLIGHTLY SILTY (SP-SM)
From TH - 11 AT 4 FEET

GRAVEL 6 % SAND 89 %
SILT & CLAY 5 % LIQUID LIMIT
PLASTICITY INDEX



Sample of SAND, CLAYEY (SC)
From TH - 12 AT 4 FEET

GRAVEL 3 % SAND 68 %
SILT & CLAY 29 % LIQUID LIMIT
PLASTICITY INDEX

Gradation Test Results

FIG. B-9

D.R. HORTON
GRANDVIEW RESERVE
CTL|T PROJECT NO. CS19345-115

TABLE B - I

SUMMARY OF LABORATORY TEST RESULTS

BORING	DEPTH (ft)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL TEST DATA				ATTERBERG LIMITS		PASSING NO. 200 SIEVE (%)	SOIL TYPE
				SWELL (%)	COMPRESSION (%)	APPLIED PRESSURE (psf)	SWELL PRESSURE (psf)	LIQUID LIMIT	PLASTICITY INDEX		
TH-1	4	2.8	107							22	SAND, SILTY (SM)
TH-2	9	16.4	114					31	7	25	SANDSTONE, SILTY
TH-2	19	11.3	120	0.1		2,400				66	CLAYSTONE, SANDY
TH-3	9	11.2	120					NL	NP	11	SANDSTONE, SLIGHTLY SILTY
TH-3	19	12.0	123	1.3		2,400				39	SANDSTONE, VERY CLAYEY
TH-4	4	3.6	105							9	SAND, SLIGHTLY SILTY (SP-SM)
TH-5	9	13.0	119					26	3	18	SANDSTONE, SILTY
TH-6	4	10.9	119	4.8		500	12,000			57	CLAYSTONE, VERY SANDY
TH-6	9	9.3	113		0.1	1,100				19	SANDSTONE, SILTY
TH-7	4	13.4	118	0.8		500				68	CLAYSTONE, SANDY
TH-8	4	6.6						36	18	22	SAND, CLAYEY (SC)
TH-8	14	13.2	114	1.0		1,800				43	SANDSTONE, VERY CLAYEY
TH-9	14	11.6	121	2.0		1,800				22	SANDSTONE, CLAYEY
TH-10	4	9.1						NL	NP	24	SAND, SILTY (SM)
TH-11	4	4.7	103							5	SAND, SLIGHTLY SILTY (SP-SM)
TH-11	14	12.2	121	1.6		1,800				40	SANDSTONE, VERY CLAYEY
TH-12	4	10.5	119	0.0		500				29	SAND, CLAYEY (SC)