Project No. GS 8201
July 22, 2019

PRELIMINARY GEOTECHNICAL & GEOLOGICAL EVALUATION REPORT FOR PROPOSED INDIAN HILLS CEMETERY IN EDEN MEMORIAL PARK 11500 SEPULVEDA BOULEVARD MISSION HILLS, CALIFORNIA 91345

PREPARED FOR
Mr. Dann Narveson
SCI

TABLE OF CONTENTS

Introduction

This report presents the results of a geotechnical investigation performed at Eden Memorial Park in the Mission Hills area of Los Angeles, California. The area investigated is designated as the Indian Hills Cemetery Site. The project site comprises 28 acres of land, located to the east of the existing memorial park and adjacent the west side of the Golden State Freeway that is currently used primarily for agricultural purposes.

The purpose of our investigation was to investigate and evaluate existing geologic and soil conditions at the site and to provide recommendations for the planned grading of the future cemetery.

Our investigation was based on conceptual grading study plans, at a scale of one-inch to 80 feet, dated February 13, 2019. The plan has been utilized as the base map for our Geotechnical Map and Test Pit Location Plan, Plate 1.

The conclusions are based on our observations, subsurface exploration, laboratory testing, engineering analysis, and our experience with similar sites and conditions and are in accordance with generally accepted principles and practice in the field of geotechnical engineering.

Location

Eden Memorial Park is located at 11500 Sepulveda Boulevard in Mission Hills of Los Angeles. The proposed Indian Hills Cemetery land is between the Golden State (5) Freeway and the existing memorial park, as shown on Figures 1 & 1a, in Appendix A.

Purpose and Scope of Services

The purpose of our investigation was to explore and evaluate the existing soil and geologic condition at the site, and based on our findings, provide our conclusions and recommendations regarding grading of the burial site areas, construction of the proposed roadways, as well as other miscellaneous grading and construction activities not specified on the conceptual plans at this time.

The scope of services utilized to conduct this investigation included the following tasks:

1. Review of published and unpublished maps and reports pertinent to the site (see References).
2. Field investigation including 10 backhoe pits to evaluate soil and bedrock conditions.
3. Laboratory testing of representative soil and bedrock samples to provide recommendations for proposed grading and proposed construction of roadways.
4. Geologic and Geotechnical analyses.
5. Preparation of the following report to present our findings, conclusions, and recommendations.

Proposed Construction

Grading will include shallow cuts and fills to re-contour the existing gentle topography to create lawn burial areas and memorial park roadways, as indicated on the Conceptual Grading Plan/Geotechnical Map, Plate 1, in Appendix A. The maximum depth of planned cuts and fills will be on the order of 10 feet from the existing ground contours. Existing and proposed topographic contours, as well as the locations of the proposed roadways are indicated on the Geotechnical Plan, Plate I.

Site Conditions

The project site consists of approximately 28 acres of land between the Golden State (5) Freeway and the existing memorial park in the Mission Hills area of Los Angeles, (see Figures 1 & 1a).

The site is east and adjacent to the existing Eden Memorial Park and will represent an expansion to re-contour the property for construction of access roadways, and lawn areas for burial sites.

As indicated on the Conceptual Grading Plan, the property is irregularly shaped and consists of a northern area of gentle, relatively flat terrain that is currently utilized for cultivation of row crops, and a southern area that adjoins Mission Hills Road that has been developed for various uses, including a YMCA facility, single family residences, hospital facilities, and parking areas.

The property is bordered by the Golden State Freeway on the east and northeast, existing memorial park burial areas to the north and northwest, vacant land and existing memorial park property to the west, and existing developed properties and Mission Hills Road to the south.

Field Investigation

Our field investigation consisted of excavation of 10 backhoe pits, to depths ranging from 3 to 10.5 feet. The locations of the test pits are indicated on the Geotechnical Plan, Plate I, in Appendix A. Logs of the test pits are presented in Appendix B.

The test pits were logged by an engineering geologist and soil engineer. Samples were obtained of representative soil and bedrock for laboratory testing.

Geologic and Subsurface Conditions

Eden Memorial Park is located in the foothills of the eastern end of the Santa Susana Mountains, near the northern margin of the San Fernando Valley, at its junction with the mountain ranges that form the boundary of the valley.

Published geologic maps of the site, (Barrows, et.al.,1974), indicate that geologic conditions at the site are relatively simple, as shown on Figure 2, Regional Geologic Map. As mapped, the

northern area, currently used for agricultural purposes, is underlain by alluvium deposited over bedrock of the Modelo formation. The southern area north and adjacent to Mission Hills Road, is mapped as underlain by Older Flood Plain deposits.

Our subsurface investigation generally confirmed geologic conditions shown on published maps. Test Pits 1-5, and 8, excavated in the northern portion of the site, encountered native soils, up to 10 feet thick, overlying bedrock of the Modelo formation as well as Older Floodplain Deposits. Although these deposits are mapped as alluvium, they could just as appropriately be classified as residual soil or colluvium as they appear to be weathering products of the underlying bedrock and floodplain deposits rather than of fluvial origin. These deposits consisted primarily of dark brown, clayey sand. Test Pits 6,7, 9 and 10 were excavated in the southern portion of the property and generally encountered granular alluvium mapped as Older Floodplain Deposits. These deposits are clearly fluvial in origin and consist of clayey fine-coarse sand with rounded gravel and cobbles, overlain by thin soil deposits.

The distribution of soil and geologic units indicated by our subsurface investigation is shown on the attached Geotechnical Map, Plate I. A brief description of bedrock and soil materials encountered in our subsurface investigation follows.

Surficial Units:

Fill Soils: Limited fill deposits were encountered on the property and all are considered to be undocumented. Mapped fill deposits consist of oversize rock and concrete rubble, trash, metal fragments, and organic debris.

Alluvium: (map symbol Qal) Deposits mapped as alluvium consist of dark brown, clayey sand that overlie the underlying Modelo formation and Older Floodplain Deposits. These soils were generally loose and porous to depths of 3 to 5 feet, then gradually become tighter with depth.

Older Floodplain Deposits (Map Symbol Qos): As indicated on the Geotechnical Map, Plate 1, these deposits occur primarily in the southern portion of the property adjacent and north of Mission Hills Road. These deposits consist of clayey, fine-coarse sand with rounded gravel and cobbles and are dense to very dense.

Bedrock Units:

Modelo Formation: (Map Symbol Tm)
The Modelo formation was found at depth below the alluvial deposits and consisted of siltstone and diatomaceous shale that is gray to light brown, as well as nearly white when weathered.

<u>Fault Zone and Earthquake Induced Liquefaction Potential</u>

Based on the Seismic Hazard Zones Map published by the state of California, a portion of the new land mapped as alluvium is within an Alquist-Priolo Earthquake Fault Zone and is also

zoned with the potential for earthquake induced liquefaction. Since currently the property is planned for lawn burial sites, these potential hazards are not a constraint to the proposed development.

Laboratory Testing

Laboratory tests were performed on representative soil samples obtained to determine their physical properties. These tests included direct shear, maximum dry density, sieve analysis, expansion index, Atterberg Limit, R-value, corrosivity and moisture density determinations. The procedures and results of these tests are presented in Appendix C.

Determination of contamination by hazardous material is beyond the scope of this study.

Stability Analyses

Currently, most of the property gently slopes towards the south with gradient of gentler than 10:1 (Horizontal to Vertical). Proposed grading may involve cut and fill operations with gradient of 6:1 for lawn burials. Stability analysis was not performed at this phase due to the gentle gradient of the property. Stability analyses may be required when final development plans are available.

Conclusions and Recommendations

General:

The proposed grading is feasible from a geotechnical standpoint, provided the recommendations in this report are implemented in design and construction.

Fill Placement:

Fill materials will be derived from cuts in bedrock and previously placed fill as well as from removals in native soils. All fill materials must consist of clean soils that are free of vegetation and other debris. In accordance with City of Los Angeles Grading Codes, the compaction standard for fill materials placed in cemeteries can be less than the 90 percent relative compaction standard used for other engineered grading. Accordingly, fill placed in lawn burial and other such areas could be compacted to at least 85 percent of the maximum dry density. Fill placed to construct 2:1 slope and steeper and roadways as well as below any future structures, should be compacted to 90 percent relative compaction. All fill must be placed in 6 to 8-inch-thick lifts at near optimum moisture content and compacted.

Existing Fills:

Limited fill deposits were encountered on the property and all are considered to be undocumented. Mapped fill deposits consist of oversize rock and concrete rubble, trash, metal

fragments, and organic debris. The existing fill should be removed, cleared from rocks larger than 8 inches, concrete rubble, trash and organic debris, before using as compacted fill.

Fill Slopes:

Our recommendations for grading of slopes are provided in the following sections.

2:1 Fill Slopes:

In general, fill slopes graded at an inclination of 2:1 will require construction of a toe key, excavated into bedrock and/ or dense native soil, with a minimum width of 15 feet. The fill slope should be compacted to a minimum relative compaction of 90 percent. In areas where slopes are constructed over native soils, removal of a minimum of 2 feet of the native soils, prior to fill placement, will be required.

3:1 to 6:1 Fill Slopes:

Fill placed in areas with a planned slope gradient of gentler than 2:1 can be placed with a minimum relative compaction of 85 percent.

Roadways:

Any fill exists below roadways, and to a distance of 5 feet beyond the edge of pavement should be removed cleared of debris as recommended above and placed as compacted fill.

Roadways should be underlain by a uniform blanket of at least 2 feet of compacted fill, compacted to a minimum relative compaction of 90 percent, refer to Grading Specification section. The subgrade (below the base) should be compacted to 95 percent relative compaction, per ASTM D1557-91.

The bottom of the overexcavation should be observed and approved by the geotechnical engineer or geologist prior to backfill and compaction.

Pavement Design:

A representative soil sample was tested for R-Value. The R-value test result of the fill soil is 15, native soil is 23 and bedrock is 57. Design of pavement section based on variable Traffic Index is provided in Appendix A. Minimum asphalt thickness is 3 inches. During grading of the site, if different materials are used as subgrade soils, R-Value tests could be performed for the soils within the upper 3 feet of the roadways, and design section will be revised accordingly.

Utility Trench Backfill:

All excavations for utility trenches should be backfilled and compacted to 90 percent relative

compaction per ASTM D1557-91.

Expansiveness of Soils:

The on-site soils are clayey and have a low to high potential for expansion. Slabs should be reinforced as recommended in this report.

Seismic Parameters:

Based on the conceptual plans, no structures are proposed for this phase of development.

Temporary Excavations:

All temporary excavations should be observed by the geologist to evaluate the possible hazard posed by adverse conditions.

Temporary excavations may be made up to 4 feet in height. Excavation over 4 feet in height should be laid back to 1:1.

All excavations must comply with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards. Construction site safety is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. Excavations and temporary slopes should be protected from surficial erosion and the effects of inclement weather by the project contractor. Protective measures such as plastic or jute mesh may be used to protect against the potential for surficial sloughing.

Flatwork and Walkways:

Flatwork and walkways should be supported either on native soils, bedrock and/ or compacted fill. As a minimum, flatwork and walkways should be 4 inches thick, and reinforced with No. 3 bars placed at mid-height at 18 inches on-center. Flatwork should be kept a minimum of 5 feet from nearby slopes. The thickness and reinforcement of concrete slabs should reflect the anticipated use and be designed by a structural or civil engineer.

Walkways and slabs should be provided with joints. These joints and separations should be filled with plastic joint filler and should be maintained

Site Drainage:

All surface and drainage water should be collected and drained to a suitable location using non-erodible drainage devices.

Geotechnical Observation and Testing:

As indicated earlier, this is a preliminary geotechnical exploration and evaluation. Once development plans are available, additional evaluation will be required.

A final set of grading plans should be submitted to this office for review prior to submitting to the building officials. This office shall be promptly notified if any conditions substantially differing from those exposed by the exploratory test pits are encountered during grading. All grading and compaction work shall be observed by a representative of this office to confirm compliance with the recommendations in this report and with local ordinances. All excavations and temporary excavations shall be observed by the geotechnical engineer.

Limitations

This section describes the limits of our liability and warranties for data contained in this report. The report, exploration logs, and other materials resulting from Geotechnical Soilutions Inc., efforts were prepared exclusively for use by SCI and his consultants in designing the proposed development. The report is not intended to be suitable for reuse on extensions or modifications of the project or for use on any project other than the currently proposed development, as it may not contain sufficient or appropriate information for such uses. If this report or portions of this report are provided to contractors or included in specifications, it should be understood that they are provided for information only. This report cannot be utilized by another entity without the express written permission of GSI. This report is an instrument of our services and remains the property of GSI.

This office shall be promptly notified if any conditions substantially differing from those exposed by the exploratory excavations are encountered during construction. Soil deposits may vary in type, strength, and many other important properties between points of exploration due to non-uniformity of the geologic formations or to man-made cut and fill operations. While we cannot evaluate the consistency of the properties of materials in areas not explored, the conclusions drawn in this report are based on the assumption that the data obtained in the field and laboratory are reasonably representative of field conditions and are conducive to interpolation and extrapolation.

Our recommendations were developed with the assumption that a proper level of field observation and construction review will be provided during excavation and foundation construction by GSI.

If construction phase services are performed by others, they must accept full responsibility (as Project Geotechnical Engineer of record) for all geotechnical aspects of the project including this report.

Our investigation and evaluations were performed using generally accepted engineering approaches and principles available at this time and the degree of care and skill

ordinarily exercised under similar circumstances by reputable Geotechnical Engineers practicing in this area. No other representation, either express or implied, is included or intended in our report.

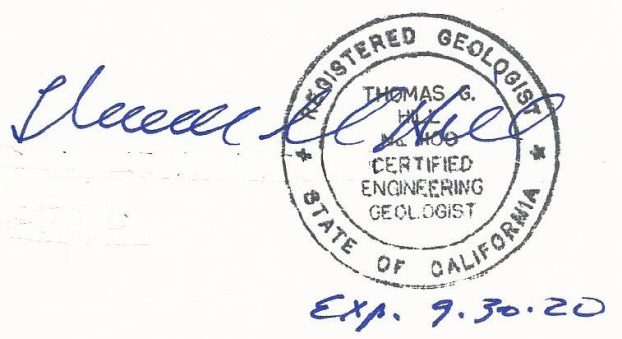
If you have any questions regarding the content of this report, please do not hesitate to contact us.

This opportunity to be of professional service is greatly appreciated.

Respectfully Submitted,
Geotechnical Soilutions, Inc.

Mesrop A. Mesrop
Senior Geotechnical Engineer
GGE 2561

Tom Hill
Senior Engineering Geologist
CEG 1100



References:

1. Oakeshott, G.B., February 1958, Geology and Mineral Deposits of the San Fernando Quadrangle
Los Angeles County, California. California Division of Mines Bulletin 172. Map Scale 1:62,500.
2. Barrows, A.G., et.al, 1974, Geologic Map, San Fernando Earthquake Area, in G.B. Oakeshott,
editor, San Fernando, California, Earthquake of 9 February, 1971, California. Division of Mines and Geology Bulletin 196, Plate 2, Map Scale 1:18,000.
3. United States Geological Survey, 1971, The San Fernando, California Earthquake of February 9,
1971. Geological Survey Professional Paper 733.
4. Dibblee, T.W.Jr., 1991, Geologic Map of the San Fernando and Van Nuys (North ½) Quadrangles, Los Angeles County, California. Dibblee Geological Foundation Map #DF-33. Scale 1:24,00.
5. California Division of Mines and Geology January 1, 1979, Office, San Fernando Quadrangle.
California Department of Conservation, Division of Mines and Geology. Scale 1:24,000.
6. Clark and Green, February 4, 2008, Eden Memorial Park, Garden of Moses Master Plan, Conceptual Grading Study. Scale 1-inch: 40 feet.
7. Hitchcock, C.S., and Wills, C.J., 2000, Quaternary Geology of the San Fernando Valley Los Angeles County, California. Scale 1:48,000.
8. California Division of Mines and Geology, March 25, 1999, Seismic Hazard Zones, San Fernando
Quadrangle, Scale1:24,000.
9. California Division of Mines and Geology, 1998, Seismic Hazard Zone Report for the San Fernando 7.5 Minute Quadrangle, Los Angeles County, California. Seismic Hazard Zone Report 015.

Grading Specifications

1. General Description

1.1 These specifications have been prepared for the grading and site development. The geotechnical engineer should be consulted prior to any site work connected with site development to ensure compliance with these specifications.

1.2 The geotechnical engineer should be notified prior to any site clearing or grading operations on the property in order to coordinate the work with the grading contractor in the field.

1.3 This item shall consist of all clearing, excavating or grubbing, preparation of land to be filled, filling of the land, spreading, compaction and control of the fill, and all subsidiary work necessary to complete the grading of the filled areas to conform with the lines and grades, as shown on the accepted plans. The geotechnical engineer is not responsible for determining line, grade elevations, or slope gradients. The property owner, or his representative shall designate the person or organizations that will be responsible for these items of work.

1.4 Contents of these specifications shall be integrated with the geotechnical report of which they are a part, therefore, they shall not be used as a self-contained document.

2. Tests

2.1 The standard test used to define maximum densities of all compaction work shall be the ASTM Procedure D1557-91. All densities shall be expressed as a relative compaction in terms of the maximum dry density obtained in the laboratory by the foregoing standard procedure.

3. Clearing, Grubbing and Preparing Areas to be Filled

3.1 All fill, roots, and debris shall be removed from all structural areas. The depth of the excavations will be determined in the field by the geotechnical engineer.

4. Materials Used for Fill

4.1 The soils existing on the site are suitable for use as compacted engineered fill after removal of the debris and after the approval of the geotechnical engineer.

4.2 Should import material be required, it must be approved by the geotechnical engineer prior to transporting it to the project and must meet the following requirements.

1. R-Value not less than 25

2. Should not contain rocks larger than 8 inches.

5. Placing, Spreading and Compacting Fill Material

5.11 The fill materials shall be p laced in uniform lifts of not more than 8 inches in uncompacted thickness. Each layer shall be spread evenly and shall be thoroughly blade mixed during the spreading to obtain uniformity of material in each layer. Before compaction begins, the fill shall be brought to a water content that will permit proper compaction by either (i) aerating the material if it is too wet; or (ii) spraying the material with water if it is too dry.

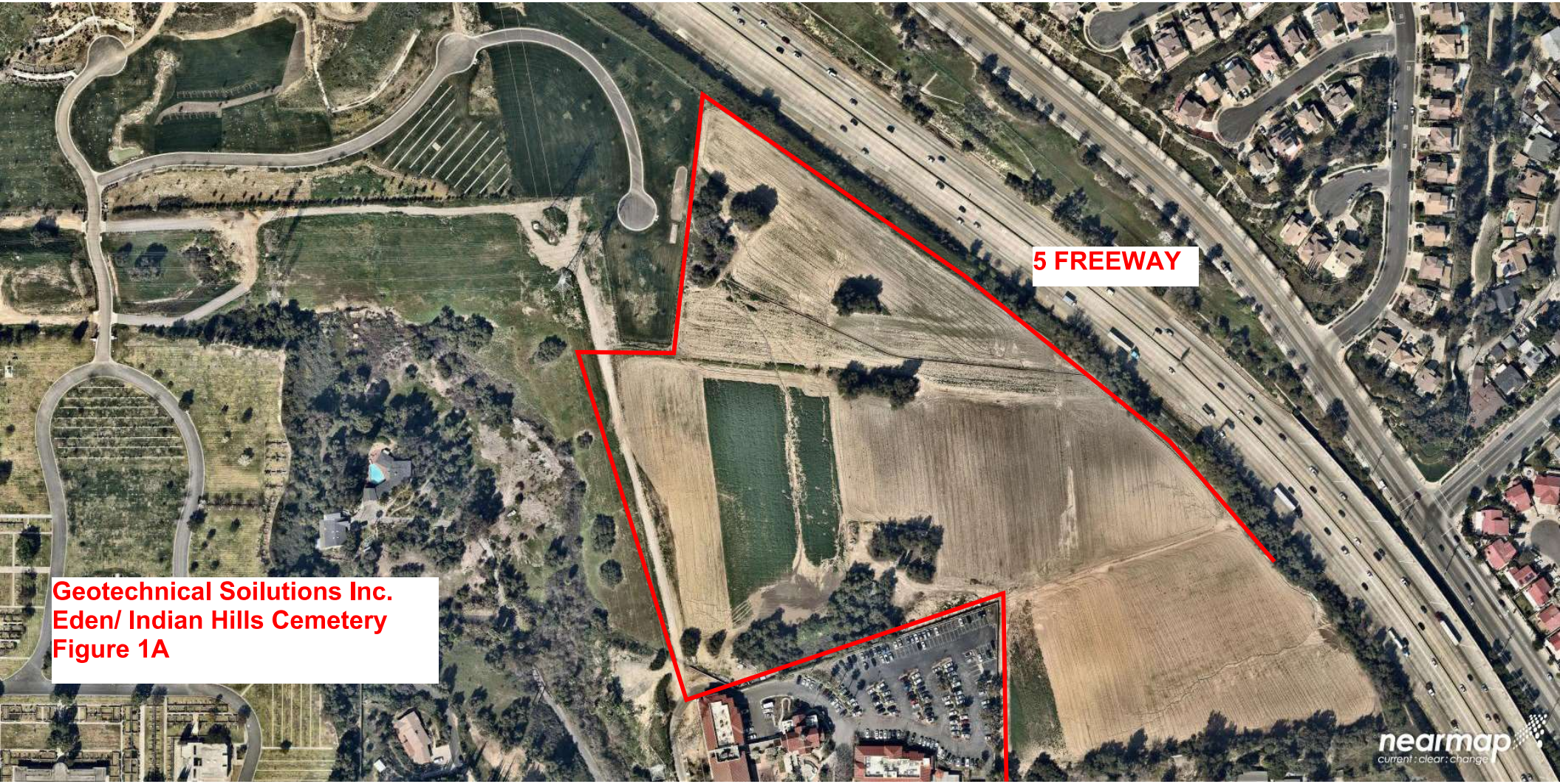
5.13 Compaction shall be by sheepsfoot rollers, multiple pneumatic tired rollers or other types of acceptable compacting rollers. Rollers shall be of such design that they will be able to compact the fill to the specified density. Rolling shall be accomplished while the fill material is within the specified moisture content range. Rolling of each layer shall be continuous over its entire area and the roller shall make sufficient trips to ensure that the required density has been obtained. No ponding or jetting will be permitted.

5.14 Field density tests shall be made in each compacted layer by the geotechnical engineer in accordance with ASTM Test Procedure D1556-91. When sheepsfoot rollers are used for compaction, the density tests shall be taken in the compacted material below the surface disturbed by the roller. When these tests indicate that the density of any layer of fill, or portion thereof, is below the required compaction, the particular layer, or portion thereof, shall be reworked until the required compaction has been obtained.

5.15 No soil shall be placed or compacted during periods of rain nor on ground which is not drained of all free water. Soil which has been soaked and wetted by rain or any other cause, shall not be compacted until completely drained and until the moisture content is within the limits herein before described or approved by the geotechnical engineer. Prior approval by the geotechnical engineer shall be obtained before continuing the grading operations.

APPENDIX A - FIGURES

Geotechnical Soilutions Inc.
Eden / Indian Hills Cemetery
Figure 1


5 FREEWAY
Geotechnical Soilutions Inc.
Eden/ Indian Hills Cemetery
Figure 1A
nearmap
current : clear : change

GEOLOGIC MAP OF THE SAN FERNANDO EARTHQUAKE AREA

1974

by A. G. Barrows, J. E. Kahle, R. B. Saul and F. H. Weber, Jr.

EXPLANATION

SEDIMENTARY AND VOLCANIC ROCKS

af — *Artificial fill;* Some was locally faulted and cracked during San Fernando earthquake; structures built wholly or partly on fill commonly damaged.

Qls — *Bedrock landslides (uncolored);* most commonly are slumps; probably range in age from Holocene to Pleistocene; slides caused by or reactived by earthquakes are also shown on surface break map, plate 3, as are rockfalls. Arrows denote direction of movement where known; red arrows indicate renewed activity during earthquake. In western area of map Qls (colored) denotes colluvial deposits of probable landslide origin (Saul, text).

Qal — *Younger alluvium and colluvium (undifferentiated);* mostly unconsolidated to poorly consolidated fine to coarse sand and gravel; includes deposits of present stream channels, alluvial fans, and flood plains (now mostly controlled by flood control dams); deposits generally are finer grained in western area of map, and coarser grained in central and eastern parts (east of Mission Hills). Deposits were faulted, uplifted, and tilted by San Fernando earthquake. Includes following varieties where differentiated:

Qos — *Older flood plain deposits;* of the Mission Hills and Sylmar area. (Weber, text).

TQs (TQsu / Tsr) — *Saugus Formation* (undivided, eastern area; TQs); mostly sandstone and conglomerate; moderately well consolidated to poorly cemented; constituents are mostly subangular to subrounded fragments of such rocks as anorthosite which are north of the present mountain front. (Barrows, text).

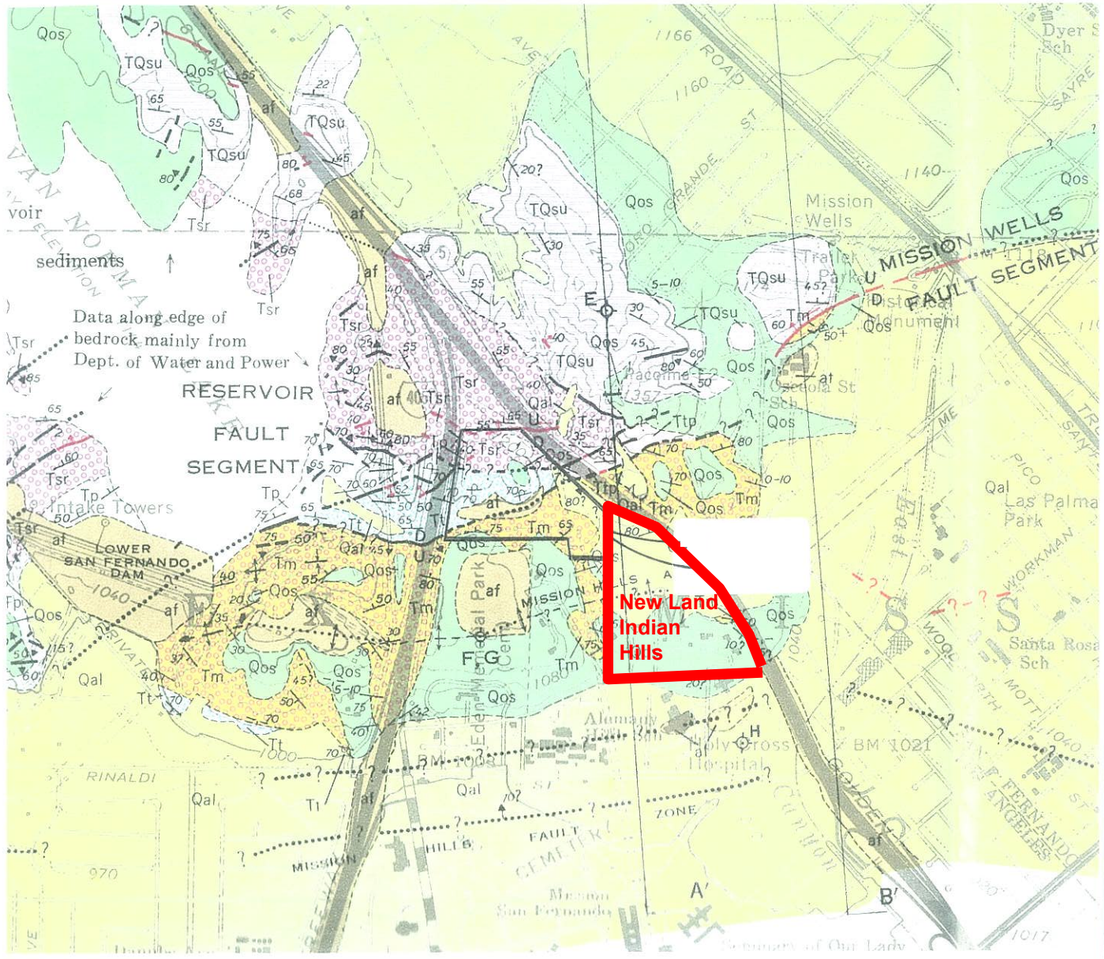
Saugus Formation (divided, western area): Upper member (TQsu); generally similar to undivided portion to east; upper member grades downward into lower Sunshine Ranch Member (Tsr), which thickens westward from a point below alluvium in the Sylmar area; Sunshine Ranch Member typically consists of greenish or reddish-gray, clay-bearing siltstone and sandstone, along with coarser sandstone and less common conglomerate layers (Saul, text; Weber, text).

Tp — *Pico Formation;* generally pale-gray resistant sandstone and conglomerate, with minor shale and siltstone; fossiliferous; grades downward into Towsley Formation from which it has been distinguished relatively arbitrarily (Saul, text).

Ttp — *Towsley and/or Pico Formations* (undifferentiated); central and eastern part of area.

Tt — *Towsley Formation;* (Winterer and Durham, 1962);similar to Repetto Formation, used formerly by workers in area. Pale- to medium-gray sandstone and conglomerate; commonly massively bedded; locally intraformational breccia beds; petroliferous sandstone; some siltstone and silty shale, especially in western part of area (Saul, text).

Tm — *Modelo Formation;* diatomaceous to cherty shale and siltstone; sandstone and conglomerate in upper part, which is somewhat gradational with Towsley Formation. Unit is resistant to weakly resistant; landslides common.



Eden Memorial Park **Indian Hills (New Land)**		
Scale: 1"=18,000'	**Date: July 2019**	**Drawn By: MAK**
Regional Geologic Map CDMG Bulletin 196		
Geotechnical Soilutions, Inc. ***323-937 1097***		**FIGURE 2**

TREES, STOCKPILED ROCKS,
ORGANIC DEBRIS, TRASH

PROPERTY LINE

PROPOSED ROAD

TREES, ROCKS, DEBRIS

PROPERTY LINE

GOLDEN STATE FREEWAY
(INTERSTATE 5)

TP-1

TP-2

TP-3

TP-4

TP-5

TP-6

TP-7

TP-8

TP-9

TP-10

Qal

Qos

Tm

1120

1115

1110

1105

1100

1095

1090

1085

1080

1075

1070

1065

1060

DWP EASEMENT

DWP EASEMENT

PROPERTY LINE

TREES, ORGANIC
DEBRIS, ROCKS

PROPERTY LINE

TREES, ROCKS, AND
METAL DEBRIS

EXPLANATION:

Af - UNCOMPACTED FILL (NOT MAPPED)

Qal - VALLEY DEPOSITS, INCLUDES RESIDUAL SOIL AND COLLUVIUM.

Qos - OLDER FLOODPLAIN DEPOSITS

Tm - MONTEREY FORMATION

TP-10 - APPROXIMATE TEST PIT LOCATION

0' 100' 200'

SCALE: 1" = 200'

REVISIONS	BY

PROJECT:
PROPOSED INDIAN HILLS CEMETERY SITE
11430 INDIAN HILLS ROAD
15015 WEST MISSION HILLS ROAD
MISSION HILLS, CA 91345

PREPARED BY: **Geotechnical Soilutions, Inc.**
11080 TUXFORD STREET,
SUNVALLEY, CA 91352
TEL: 323-937-1097

PLOT PLAN WITH PROPOSED GRADING AND TEST PITS

DATE 7 - 18 - 19
SCALE 1" = 200'
JOB NO. GS 8201

PLATE -1

CALTRANS METHOD OF FLEXIBLE PAVEMENT DESIGN: *GRAVEL EQUIVALENT APPROACH*

Project: Eden/ Indian Hills **Client:** Clark and Green
No: GS 8201 **Date:** 7/22/2019

Base Type: 2
Base Type: "Untreated A. B."
Base Gf: 1.1

Base R-Value: 78

A.C. FS: 0.2
Full A.C. Sect FS: 0.1

TI	G_f	Base Types	G_f	Types
0	2.50	1	1.0	"Aggregate Subbase"
5	2.50	2	1.1	"Untreated A. B."
6	2.32	3	1.2	"Lime Treated Base"
7	2.14	4	1.7	Class A CTB
8	2.01	5	1.5	Class B CTB
9	1.89	6	1.2	Class C CTB
10	1.79	7	1.4	ATPB
11	1.71			
12	1.64			
13	1.57			
14	1.52			

TI	Subgrade R-Value	GE_t (feet)	GE_{ac} (feet)	G_f	Minimum T_{ac} (feet)	Use T_{ac} (inches)	Actual GE_{ac} (feet)	GE_b (feet)	Minimum T_b (feet)	Use T_b (inches)	Full Sect T_{ac} (feet)	Use Full Sect T_{ac} (inches)
4	23	0.99	0.48	2.50	0.19	**2.5**	0.52	0.46	0.42	**5.5**	0.43	**5.5**
4.5	23	1.11	0.52	2.50	0.21	**2.5**	0.52	0.59	0.53	**6.5**	0.48	**6.0**
5	23	1.23	0.55	2.50	0.22	**3.0**	0.63	0.61	0.55	**7.0**	0.53	**6.5**
5.5	23	1.36	0.59	2.32	0.25	**3.5**	0.68	0.68	0.62	**7.5**	0.63	**8.0**
6	23	1.48	0.62	2.32	0.27	**3.5**	0.68	0.80	0.73	**9.0**	0.68	**8.5**
6.5	23	1.60	0.66	2.14	0.31	**4.0**	0.71	0.89	0.81	**10.0**	0.80	**10.0**
7	23	1.72	0.69	2.14	0.32	**4.0**	0.71	1.01	0.92	**11.5**	0.85	**10.5**
8	23	1.97	0.76	2.01	0.38	**5.0**	0.84	1.13	1.03	**12.5**	1.03	**12.5**
9	23	2.22	0.83	1.89	0.44	**5.5**	0.87	1.35	1.23	**15.0**	1.23	**15.0**
10	23	2.46	0.90	1.79	0.51	**6.5**	0.97	1.49	1.36	**16.5**	1.43	**17.5**
11	23	2.71	0.97	1.71	0.57	**7.0**	1.00	1.71	1.56	**19.0**	1.64	**20.0**
12	23	2.96	1.04	1.64	0.64	**8.0**	1.09	1.86	1.69	**20.5**	1.86	**22.5**
13	23	3.20	1.12	1.57	0.71	**9.0**	1.18	2.03	1.84	**22.5**	2.10	**25.5**

A P P E N D I X B – FIELD EXPLORATION

FIELD EXPLORATION

The field investigation included the excavation of ten test pits to maximum depth of 10.5 feet below existing grade. All of the excavations were backfilled following logging, and obtaining bulk and relatively undisturbed samples for laboratory testing.

The relatively undisturbed soil samples, consisting of 2.5-inch ring samples.

The soils encountered were logged by our field engineer and relatively undisturbed and bulk samples were collected for laboratory inspection and testing. The logs of our test pits are presented in the Appendix. The samples were classified in accordance with the Uniform Soil Classification Method (USCS).

TEST PIT LOG

No. TP-1

DESCRIPTION:

SAMPLES:

0-26” Fill

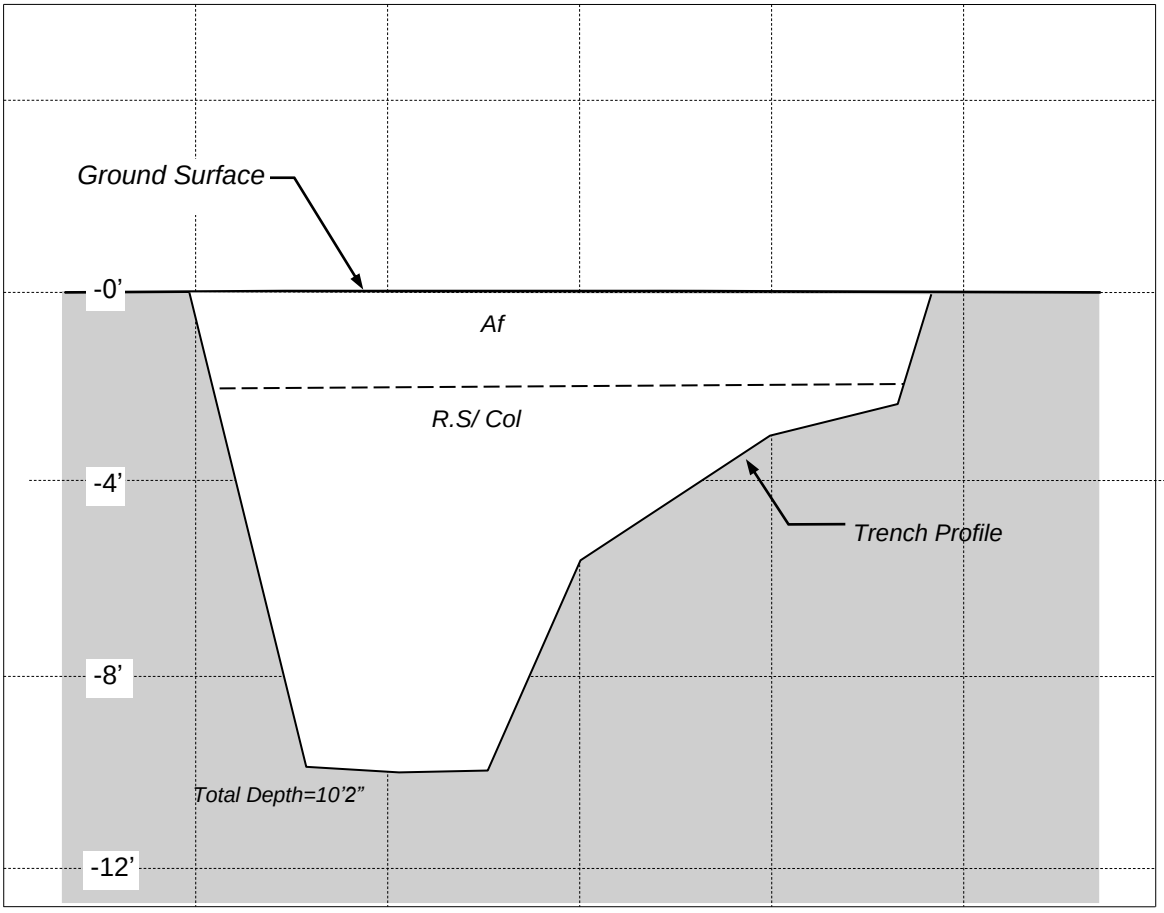
Mottled brown and yellow brown, clayey sand, includes some plastic and organic debris, moist, soft, porous.

26-126” Native: Residual soil/ Colluvium.

Brown and yellow brown, clayey sand, moist- very moist, firm.

Atterberg
Expansion
Sieve
Max
R-Value

SKETCH:



PROJECT: Indian Hills/ Eden Memorial PROJECT NO: GS 8201

DATE: 5-9-19

LOGGED BY: TGH

Geotechnical Soilutions, Inc.

PLATE 1

TEST PIT LOG

No. TP-2

DESCRIPTION:

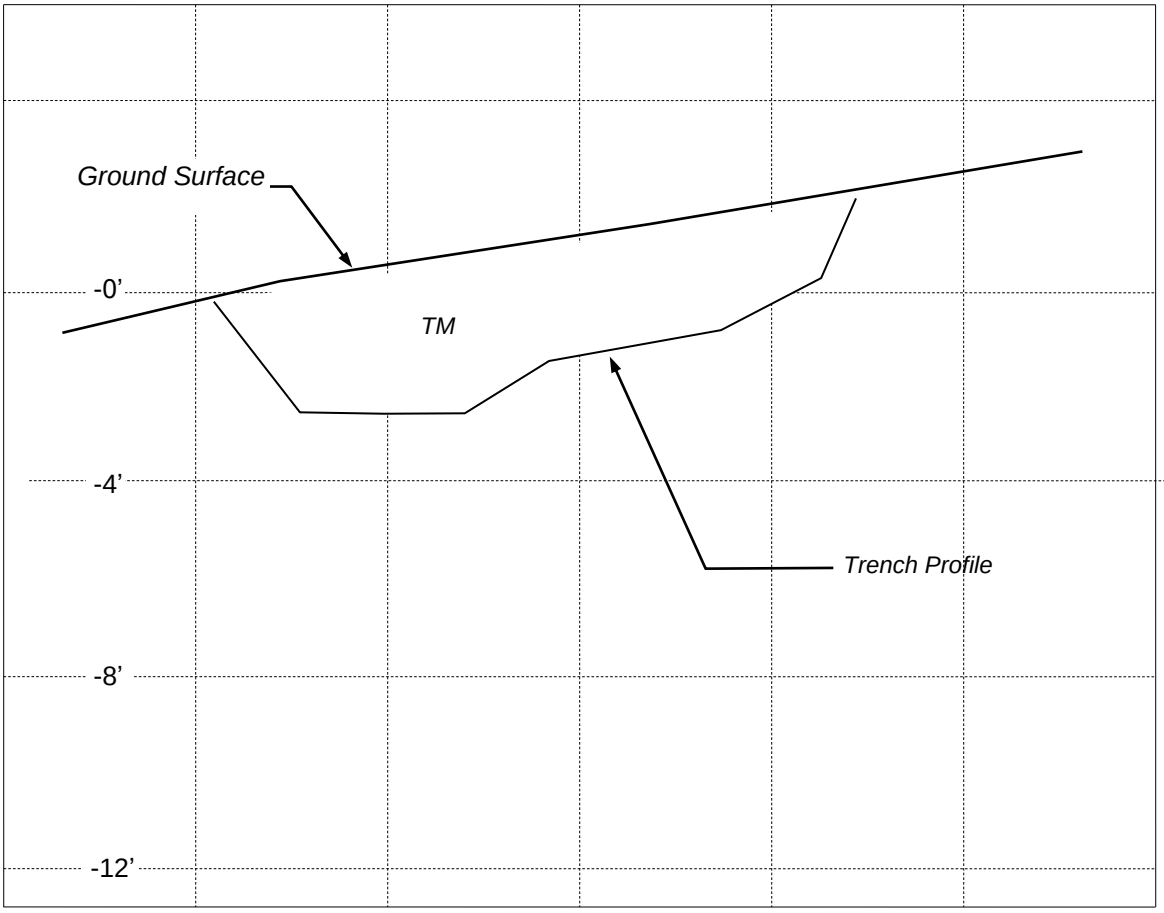
SAMPLES:

0-30” Bedrock: Modelo Fm (Tm)

Light brown, sandy, siltstone, massive, slightly-moderately fractured.

Sieve
Max
R-Value

SKETCH:



PROJECT: Indian Hills/ Eden Memorial PROJECT NO: GS 8201

DATE: 5-9-19

LOGGED BY: TGH

Geotechnical Soilutions, Inc.

PLATE 2

TEST PIT LOG

No. TP-3

DESCRIPTION:

SAMPLES:

0-6.5’ Native: Residual Soil/ Colluvium.

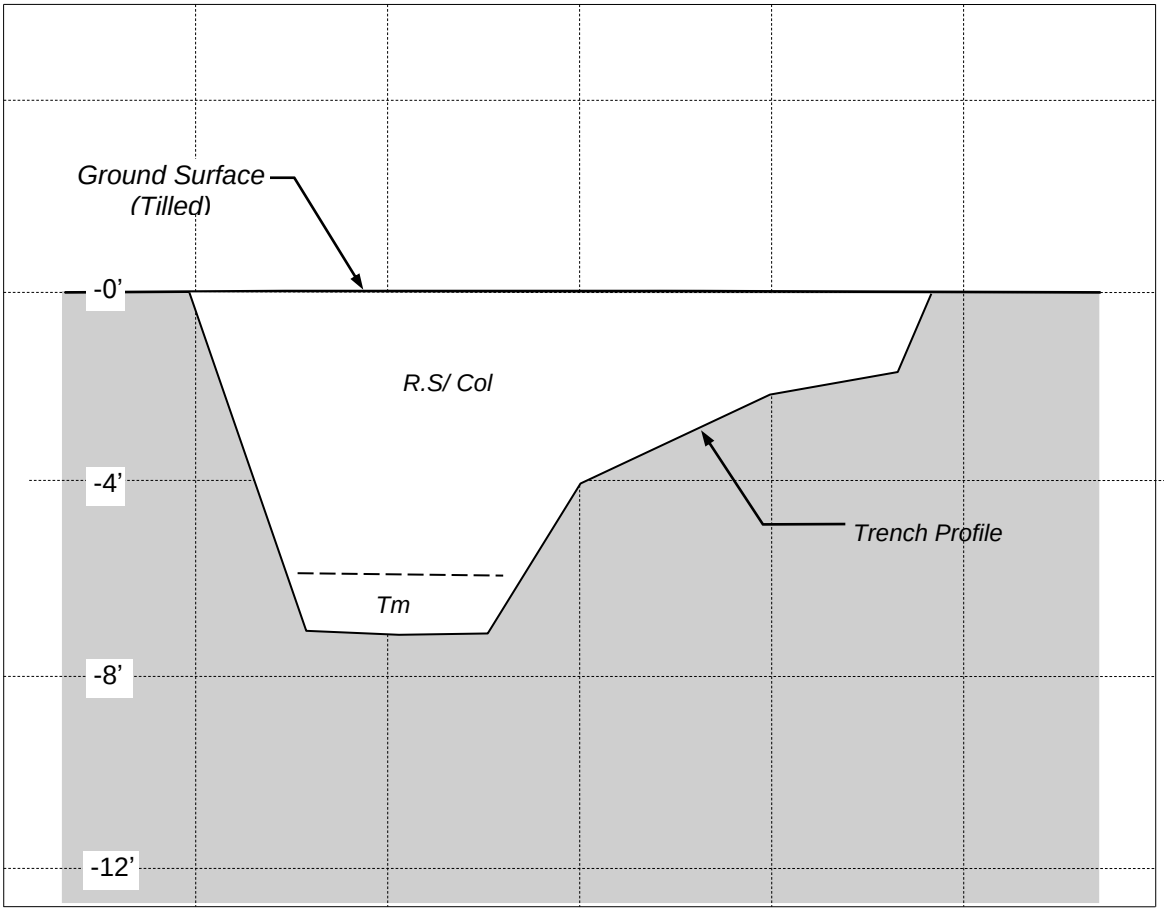
Dark brown, clayey sand, soft, porous to 18” then moist, firm.

Shear

6.5-7.5’ Bedrock: Modelo Fm (Tm).

Gray and yellow brown, shale siltstone, thin bedded, diatomaceous, moderately fractured.

SKETCH:



PROJECT: Indian Hills/ Eden Memorial PROJECT NO: GS 8201

DATE: 5-9-19

LOGGED BY: TGH

Geotechnical Soilutions, Inc.

PLATE 3

TEST PIT LOG

No. TP-4

DESCRIPTION:

SAMPLES:

Sieve
Atterberg
Max
Shear
R-Value

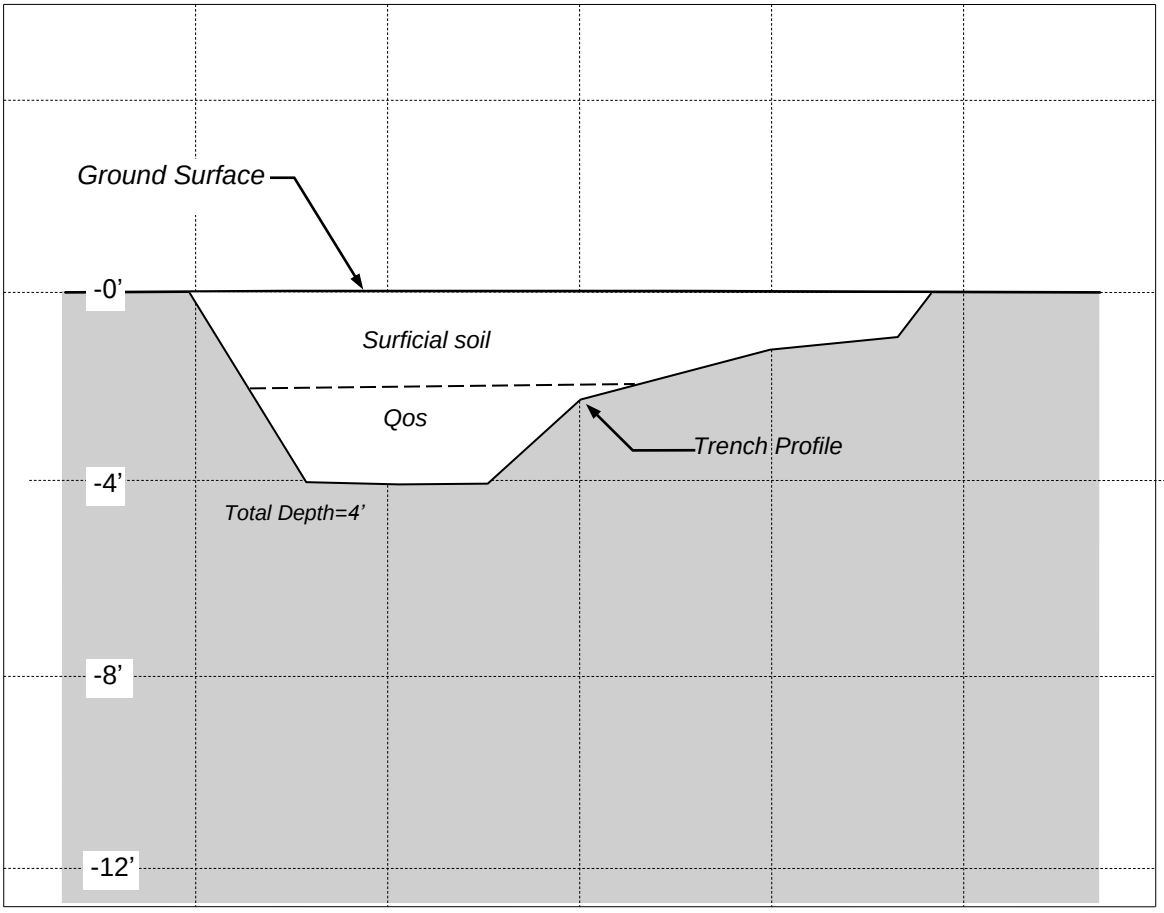
0-27” Native soil:

Dark brown, clayey sand, moist, soft- firm, porous.

27-48” Native: Older Flood, Plain Deposits.

Reddish and olive brown, clayey sand with rounded gravel and cobble, moist, massive.

SKETCH:



PROJECT: Indian Hills/ Eden Memorial PROJECT NO: GS 8201

DATE: 5-9-19

LOGGED BY: TGH

Geotechnical Soilutions, Inc.

PLATE 4

TEST PIT LOG

No. TP-5

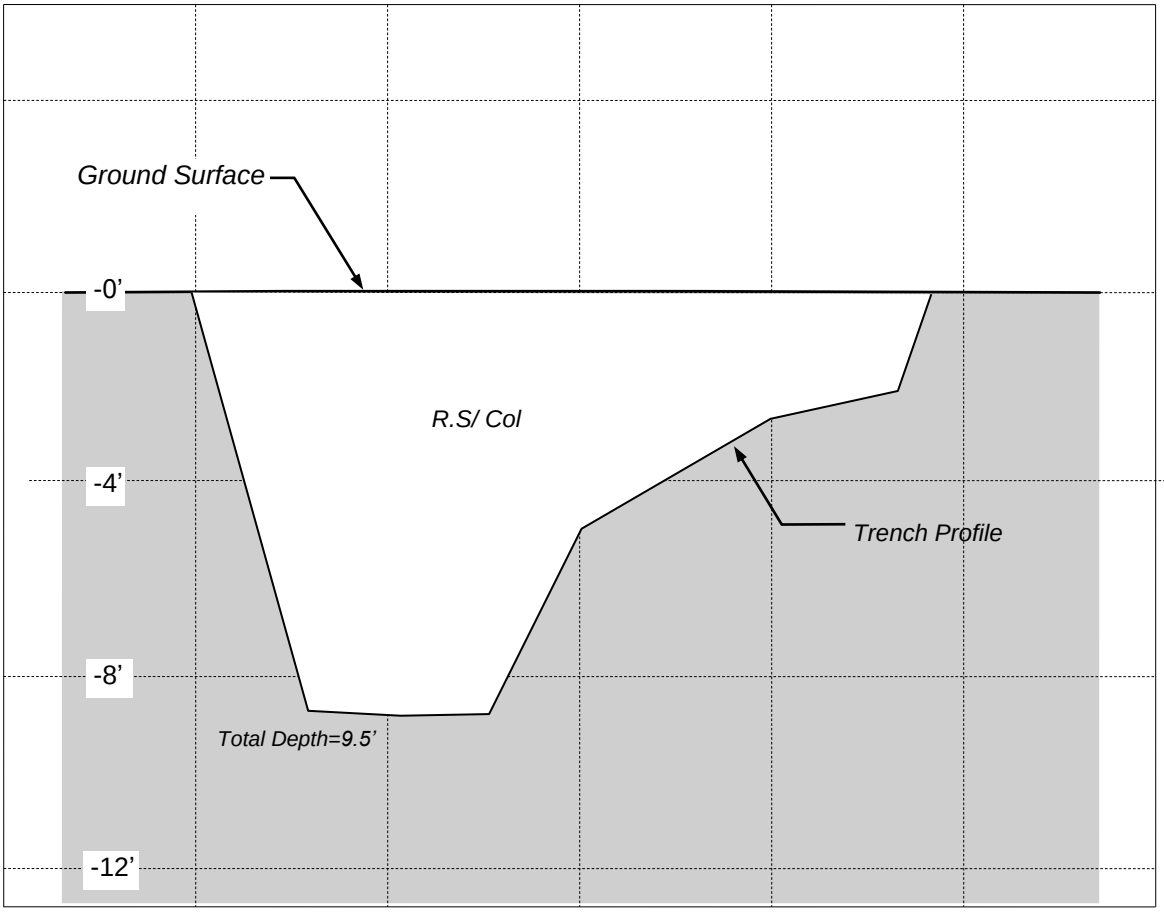
DESCRIPTION:

SAMPLES:

0-9.5' Native: Residual Soil/ Colluvium.

Dark brown, clayey sand, moist to very moist, loose to 12- 18", then firm, minor prismatic fracturing @ 3-4'

SKETCH:



PROJECT: Indian Hills/ Eden Memorial PROJECT NO: GS 8201

DATE: 5-9-19

LOGGED BY: TGH

Geotechnical Soilutions, Inc.

PLATE 5

TEST PIT LOG

No. TP-6

DESCRIPTION:

SAMPLES:

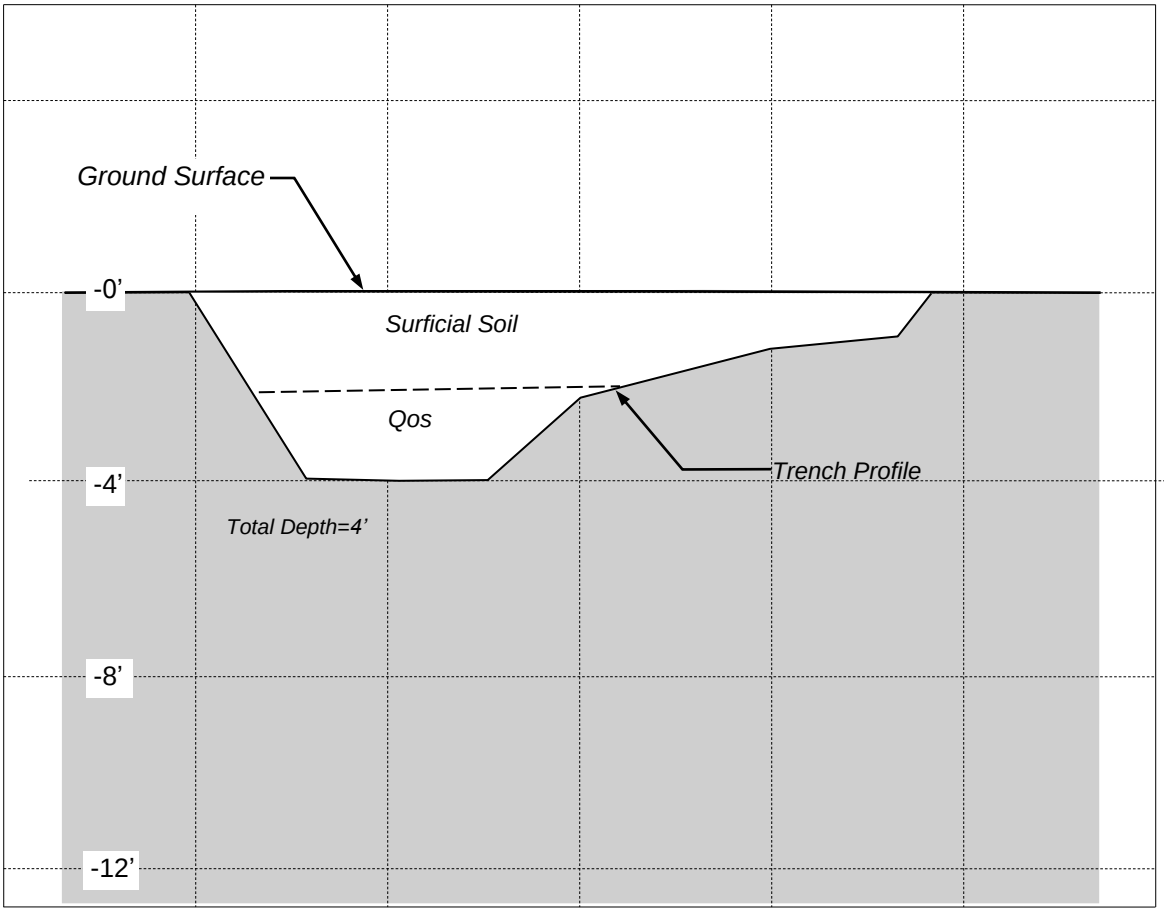
0-2.5’ Native: Surficial Soil

Dark brown, clayey sand, trace rounded gravel, moist, soft-firm porous.

2.5-4.0’ Native: Older Flood Plain Deposits (Qos).

Reddish brown, clayey, fine-coarse sand with rounded gravel and cobble, moist, dense with intervals of olive sand, sandy silt, massive, very stiff.

SKETCH:



PROJECT: Indian Hills/ Eden Memorial PROJECT NO: GS 8201

DATE: 5-9-19

LOGGED BY: TGH

Geotechnical Soilutions, Inc.

PLATE 6

TEST PIT LOG

No. TP-7

DESCRIPTION:

SAMPLES:

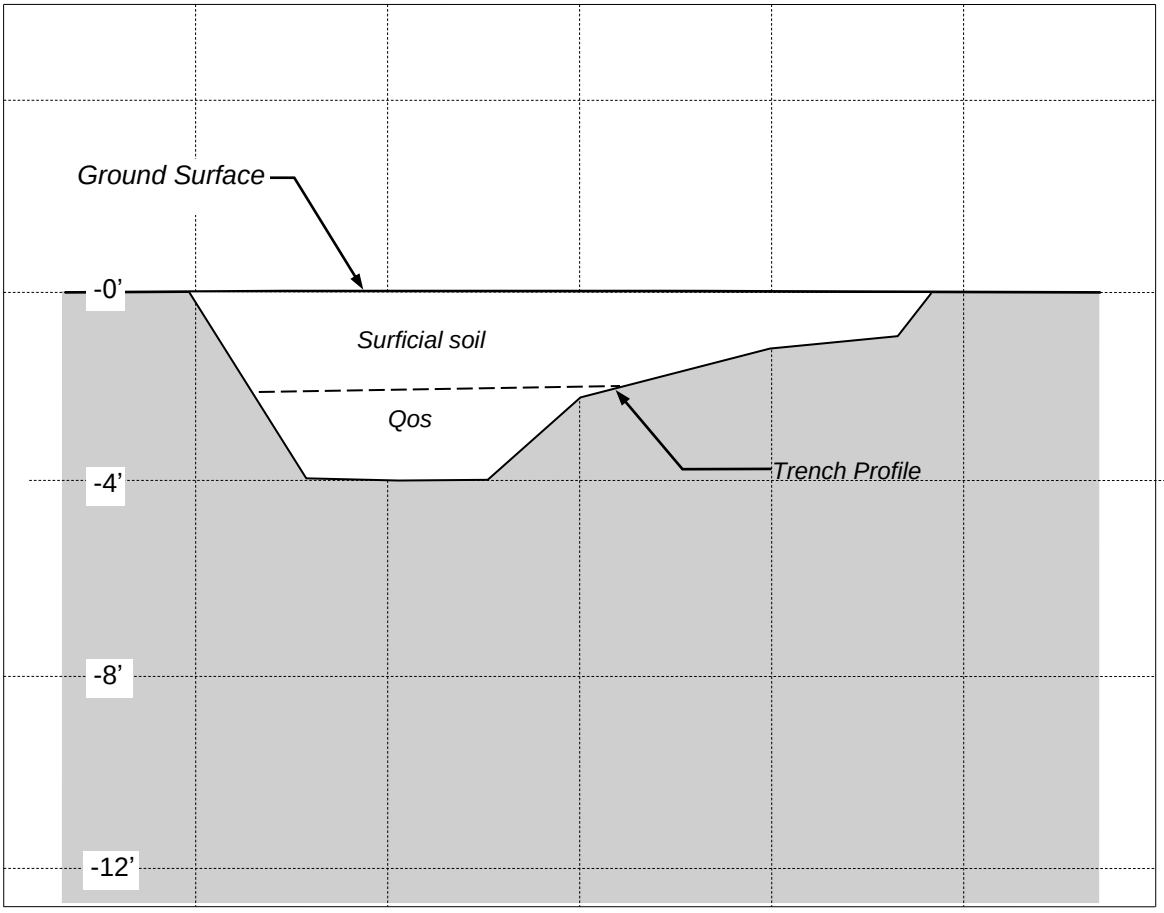
0-24” Native: Surficial Soil

Dark brown, sandy clay, moist, soft to 12” then firm.

2-4’ Native: Older Flood Plain Deposits (Qos).

Reddish brown, clayey, fine-coarse sand with rounded gravel and cobble, moist, dense.

SKETCH:



PROJECT: Indian Hills/ Eden Memorial PROJECT NO: GS 8201

DATE: 5-9-19

LOGGED BY: TGH

Geotechnical Soilutions, Inc.

PLATE 7

TEST PIT LOG

No. TP-8

DESCRIPTION:

SAMPLES:

0-7.5’ Native: Residual Soil

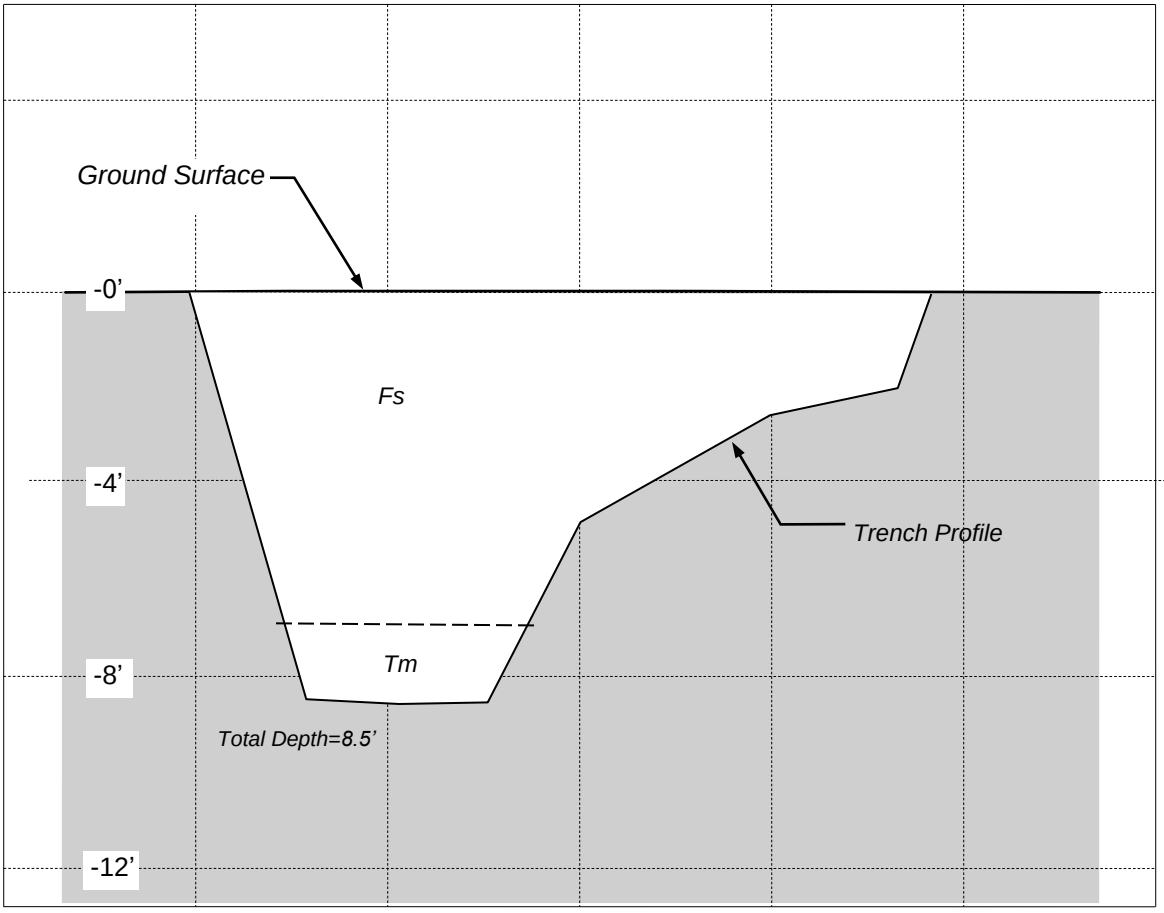
Dark brown, clay, very moist, soft to 12” then firm, minor porosity, few roots to 1-inch diameter.

Expansion

7.5-8.5’ Bedrock: Modelo Fm (Tm).

White, diatomaceous, shale thin bedded, weathered.

SKETCH:



PROJECT: Indian Hills/ Eden Memorial PROJECT NO: GS 8201

DATE: 5-9-19

LOGGED BY: TGH

Geotechnical Soilutions, Inc.

PLATE 8

TEST PIT LOG

No. TP-9

DESCRIPTION:

SAMPLES:

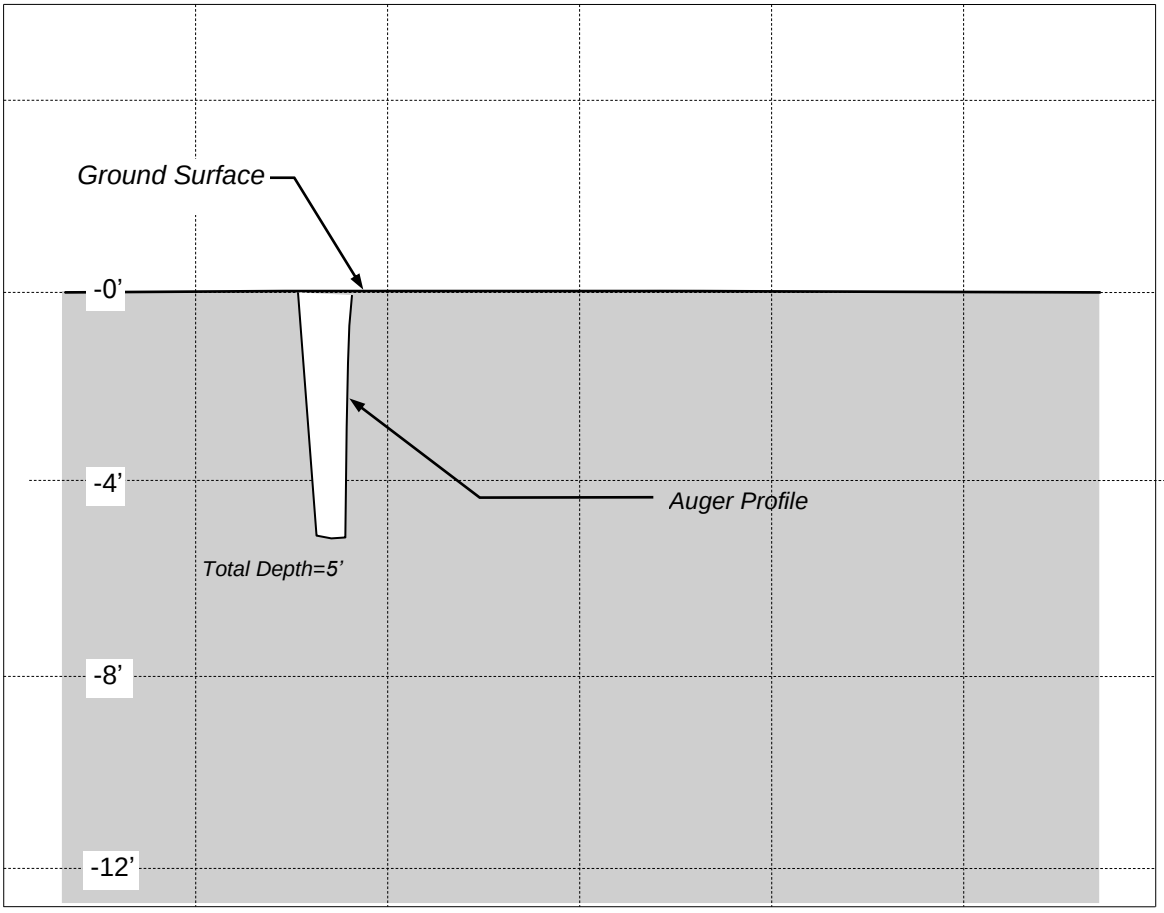
0-2’ Fill

Brown, clayey sand with gravel, slightly moist at surface then moist.

2-5’ Native: Older Flood Plain Deposits. (Qos)

Yellow and reddish brown, clayey sand with rounded gravel and cobbles, moist, dense.

SKETCH:



PROJECT: Indian Hills/ Eden Memorial PROJECT NO: GS 8201

DATE: 5-9-19

LOGGED BY: TGH

Geotechnical Soilutions, Inc.

PLATE 9

TEST PIT LOG

No. TP-10

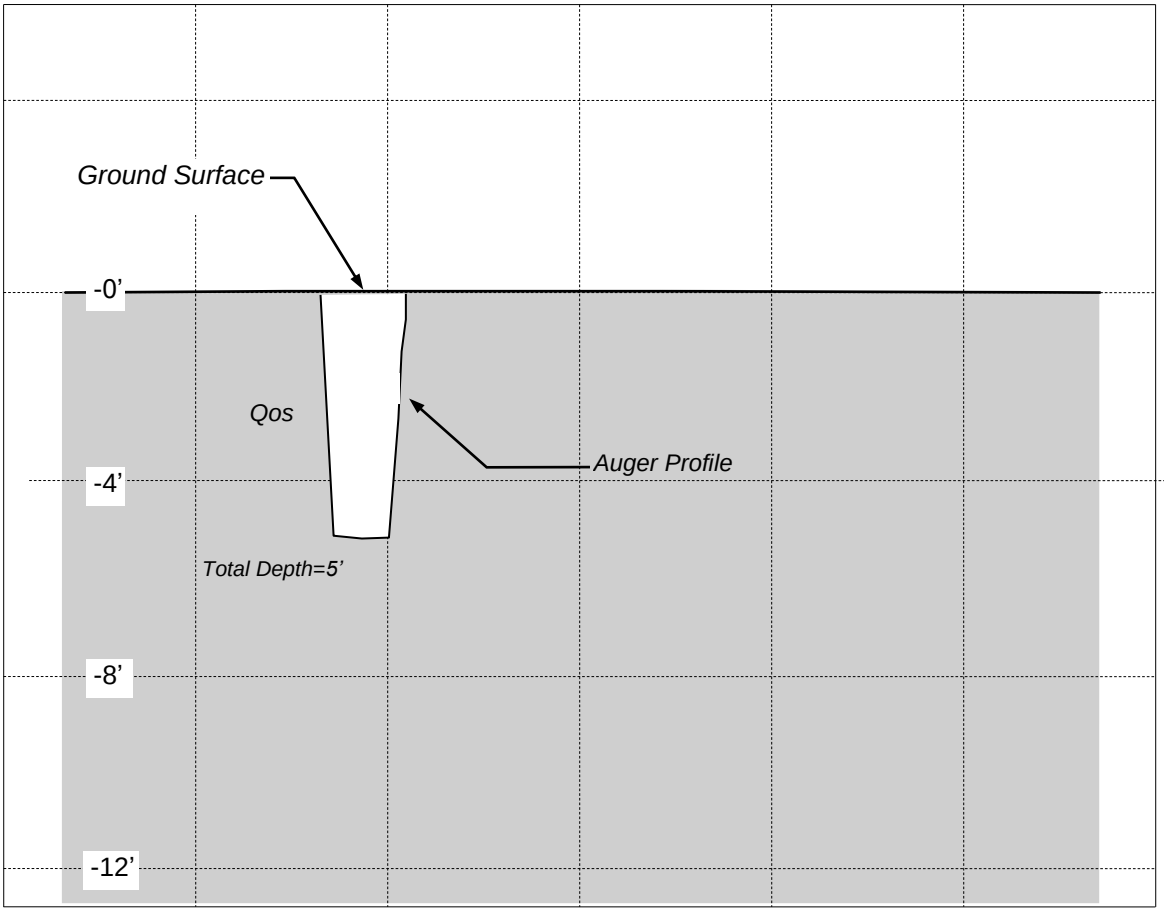
DESCRIPTION:

SAMPLES:

0-5’ Native: Older Flood Plain Deposits. (Qos)

Yellow and reddish brown, clayey fine-coarse sand with rounded gravel and cobbles to 3”, slightly moist to 12” then moist, dense.

SKETCH:



PROJECT: Indian Hills/ Eden Memorial PROJECT NO: GS 8201

DATE: 5-9-19

LOGGED BY: TGH

Geotechnical Soilutions, Inc.

PLATE 10

A P P E N D I X C – LABORATORY TESTING

LABORATORY TESTS

Maximum Density - Optimum Moisture Content

A bulk soil sample was tested in the laboratory to determine the dry density and optimum moisture content using the ASTM D1557-91 compaction test method. This test is made on the minus four (-4) fraction of the sample in a four inch diameter mold having 1/30-cubic foot volume, with 25 blows of a ten-pound hammer falling 18 inches on each of five layers.

Direct Shear

Direct shear tests (ASTM D 3080) was made on remolded 2.5 inch diameter samples of the fill to determine the strength at 90 percent relative compaction. The samples were sheared at a rate of 0.01 inch per minute.

Consolidation

The apparatus used for the consolidation tests is designed to receive relatively undisturbed specimens in the field condition. Porous stones were placed in contact with the top and bottom of the specimen to permit the ready addition and release of water. Successive load increments were applied to the top of the specimen, and progressive final settlements under each load increment were recorded to an accuracy of 0.001 inch. The maximum stress during testing was nine ksf. The sample was unloaded to one ksf to check the rebound characteristics. The test was performed to the (ASTM D 2435).

Moisture-Density

The moisture-density information provides a summary of soil consistency for each stratum. The dry unit weight and field moisture content were determined for selected undisturbed samples. The results of the moisture-density tests are shown on the Boring and/ or Test Pit Logs.

Sieve Analysis

Sieve analyses were performed on selected samples of the materials encountered at the site to evaluate the grain size distribution of the soils and to aid in the classification. Tests were performed in general accordance with ASTM Test Method D-422.

Grain size analysis of the minus 200 sieve materials was also performed. The analysis was

performed using standard hydrometer methods in accordance with California Test Method 203.

Plasticity Index

Plasticity index testing was performed on selected samples of the soils to evaluate the plasticity characteristics and to aid in classification. The tests were performed in general accordance with ASTM Standard Test Method D 4318.

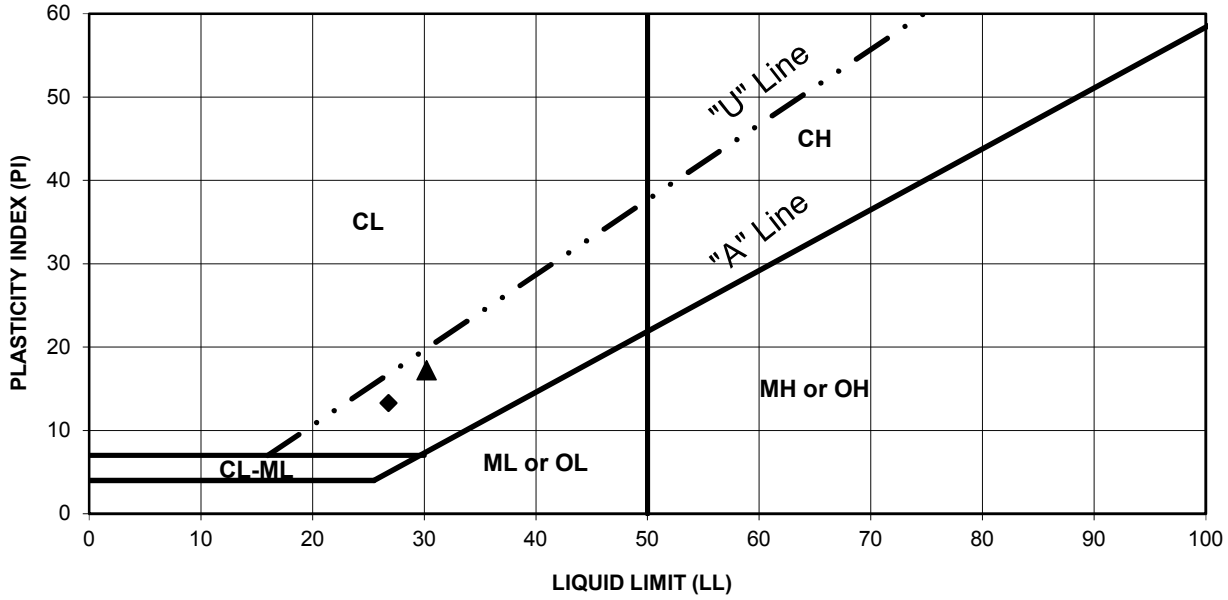
Expansion Potential

An expansion index test (ASTM D 4829) was performed to determine the expansion potential of the tested soil.

AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

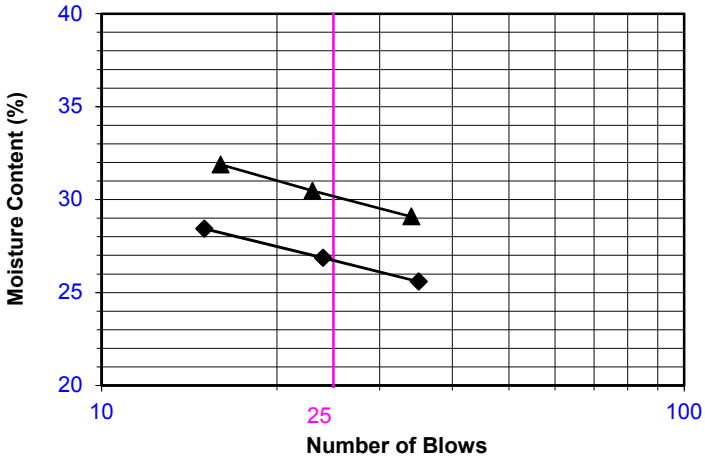
ATTERBERG LIMITS
ASTM D 4318

Project Name: Eden/Indian Hills **Tested By:** DK Date: 05/21/19
Project No.: GS 8201 **Checked By:** AP Date: 05/22/19



PROCEDURE USED

- ☐ Wet Preparation
- ☒ Dry Preparation
- ☒ Procedure A Multipoint Test
- ☐ Procedure B One-point Test



Symbol	Boring Number	Sample Type	Depth (feet)	LL	PL	PI	Plasticity Chart Symbol
♦	TP-1	Bulk	0-3	27	14	13	CL
▲	TP-4	Bulk	2-4	30	13	17	CL

AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

EXPANSION INDEX TEST RESULTS

ASTM D 4829

Client Name: Geotechnical Soilutions Inc.
Project Name: Eden/Indian Hills
Project No.: GS 8201

AP Job No.: 19-0540
Date: 05/21/19

Boring No.	Sample Type	Depth (ft)	Soil Description	Molded Dry Density (pcf)	Molded Moisture Content (%)	Init. Degree Saturation (%)	Measured Expansion Index	Corrected Expansion Index
TP-1	Bulk	0-3	Clayey Sand	114.7	8.7	50.4	40	40
TP-8	Bulk	0-5	Fat Clay	101.1	11.9	48.1	100	98

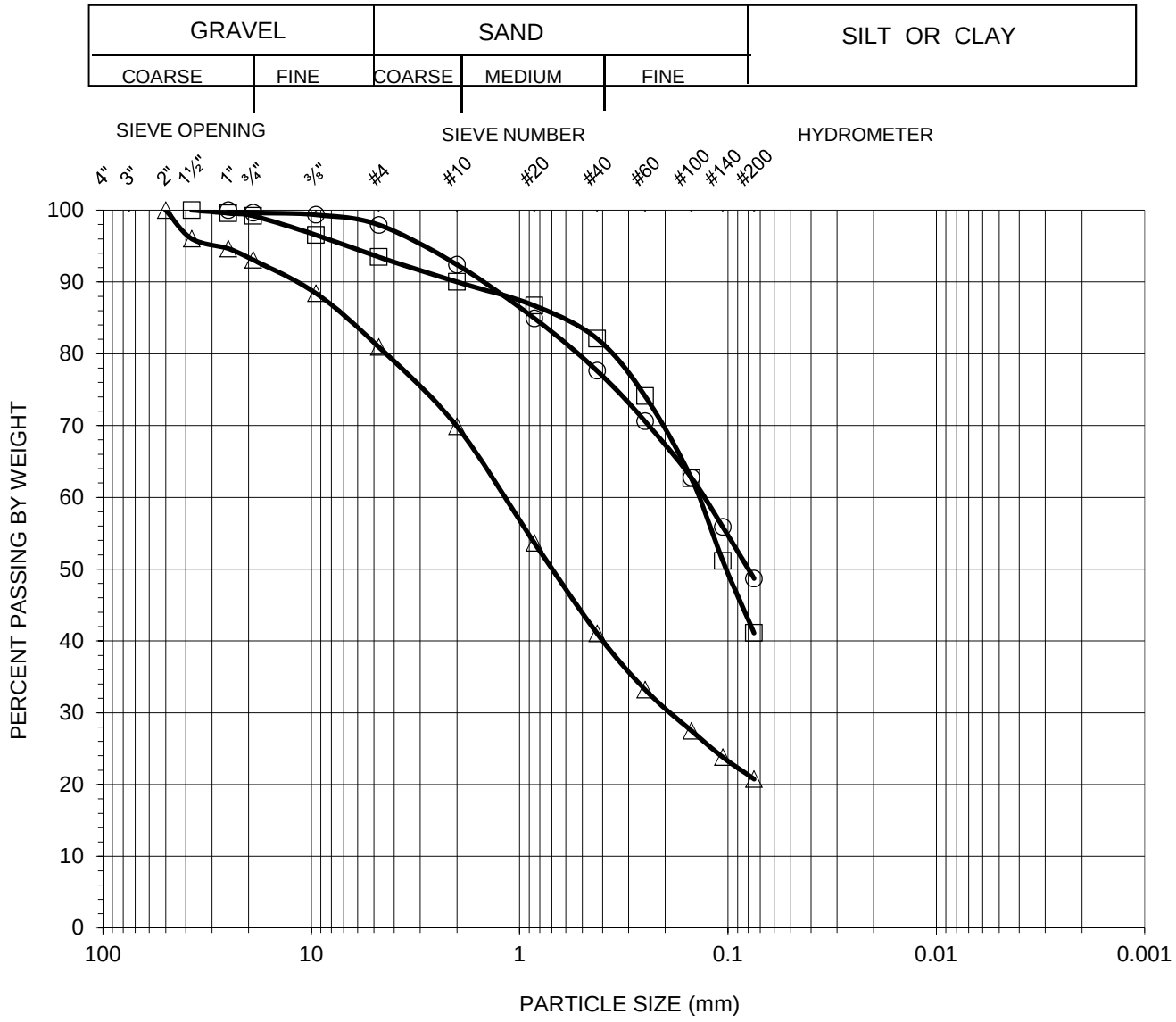
ASTM EXPANSION CLASSIFICATION

Expansion Index	Classification
0-20	V. Low
21-50	Low
51-90	Medium
91-130	High
>130	V. High

AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	Geotechnical Soilutions Inc.	Tested by:	LS	Date:	05/22/19
Project Name:	Eden/Indian Hills	Computed by:	NR	Date:	05/22/19
Project Number:	GS 8201	Checked by:	AP	Date:	05/22/19



Symbol	Boring No.	Sample Type	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	TP-1	Bulk	0-3	2	49	49	27:14:13	SC
□	TP-2	Bulk	0-3	7	52	41	N/A	SM
△	TP-4	Bulk	2-4	19	60	21	30:13:17	SC

AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

COMPACTION TEST

Client: Geotechnical Soilutions Inc. AP Number: 19-0540
Project Name: Eden/Indian Hills Tested By: NG Date: 05/21/19
Project No. : GS 8201 Calculated By: JP Date: 05/22/19
Boring No.: TP-1 Checked By: AP Date: 05/22/19
Sample Type: Bulk Depth(ft.): 0-3
Visual Sample Description: Clayey Sand

Compaction Method: [X] ASTM D1557 [ ] ASTM D698
Preparation Method: [ ] Moist [X] Dry

METHOD: A
MOLD VOLUME (CU.FT): 0.0333

Wt. Comp. Soil + Mold (gm.)	3882	3956	3935	3771		
Wt. of Mold (gm.)	1835	1835	1835	1835		
Net Wt. of Soil (gm.)	2047	2121	2100	1936		
Container No.						
Wt. of Container (gm.)	238.91	235.74	232.73	229.61		
Wet Wt. of Soil + Cont. (gm.)	721.21	668.72	667.27	631.79		
Dry Wt. of Soil + Cont. (gm.)	687.91	630.59	620.64	611.11		
Moisture Content (%)	7.42	9.66	12.02	5.42		
Wet Density (pcf)	135.38	140.28	138.89	128.04		
Dry Density (pcf)	126.04	127.92	123.98	121.46		

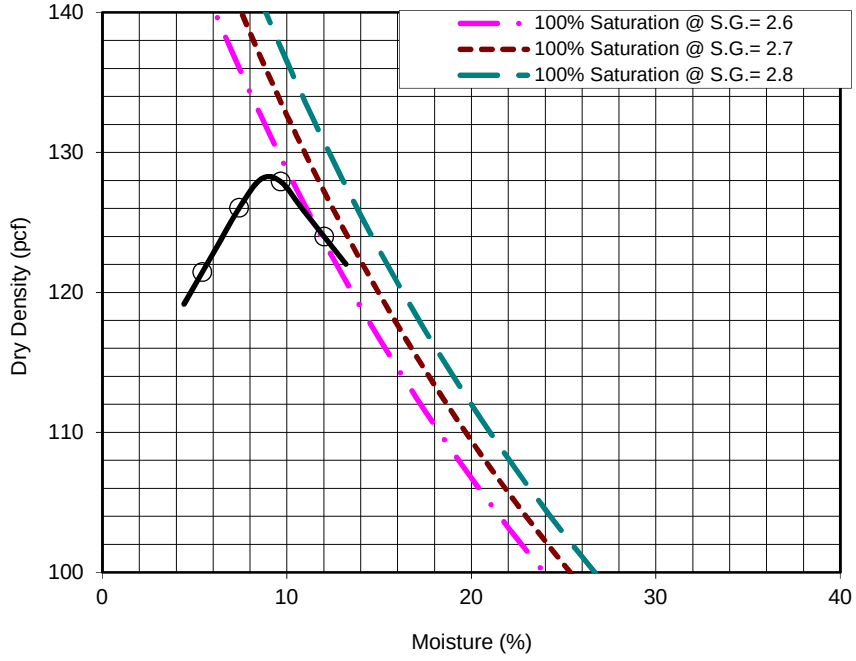
Maximum Dry Density (pcf): **128.2**
Maximum Dry Density w/ Rock Correction (pcf): **N/A**
Optimum Moisture Content (%): **8.9**
Optimum Moisture Content w/ Rock Correction (%): **N/A**

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* *2.0%*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* *N/A*
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* *N/A*
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

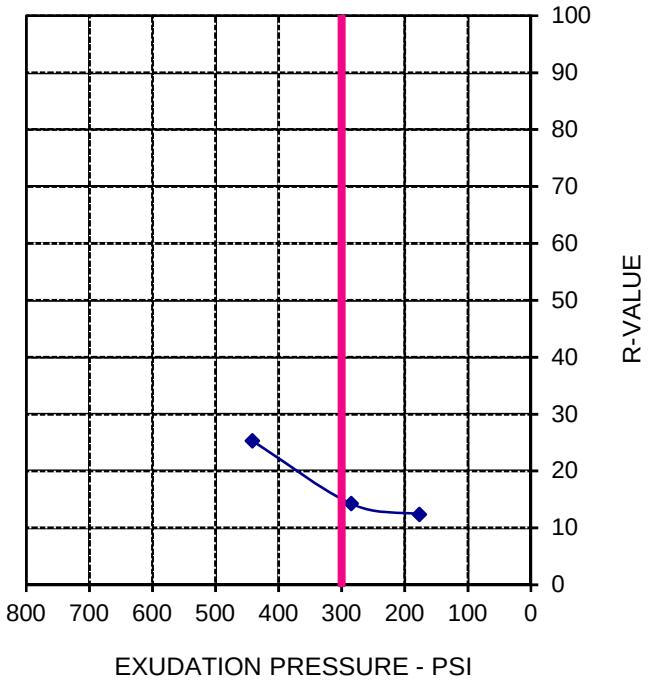
R-VALUE TEST DATA

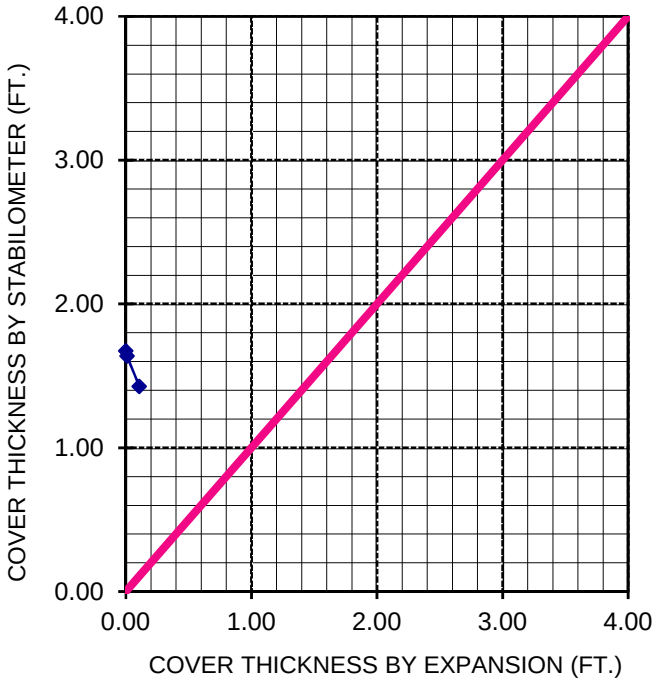
ASTM D2844

Project Name:	Eden/Indian Hills	Tested By:	ST	Date:	05/16/19
Project Number:	GS 8201	Computed By:	KM	Date:	05/20/19
Boring No.:	TP-1	Checked By:	AP	Date:	05/22/19
Sample Type:	Bulk	Depth (ft.):	0-3		
Location:	N/A				
Soil Description:	Clayey Sand				

Mold Number	C	A	B	
Water Added, g	21	32	42	
Compact Moisture(%)	11.1	12.3	13.3	
Compaction Gage Pressure, psi	250	200	100	
Exudation Pressure, psi	441	285	177	
Sample Height, Inches	2.4	2.5	2.5	
Gross Weight Mold, g	3038	3045	3053	
Tare Weight Mold, g	1968	1967	1967	
Net Sample Weight, g	1070	1078	1086	
Expansion, inchesx10^{-4}	32	3	0	
Stability 2,000 (160 psi)	42/98	56/122	60/126	
Turns Displacement	4.22	4.68	4.77	
R-Value Uncorrected	27	14	12	
R-Value Corrected	25	14	12	
Dry Density, pcf	121.6	116.4	116.2	
Traffic Index	8.0	8.0	8.0	
G.E. by Stability	1.43	1.64	1.67	
G.E. by Expansion	0.11	0.01	0.00	

R-VALUE	By Exudation:	15
	By Expansion:	*N/A
	At Equilibrium: (by Exudation)	15
Remarks	Gf = 1.34, and 0.3 % Retained on the ¾" *Not Applicable	





AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

COMPACTION TEST

Client: Geotechnical Soilutions Inc. AP Number: 19-0540
Project Name: Eden/Indian Hills Tested By: NG Date: 05/21/19
Project No. : GS 8201 Calculated By: JP Date: 05/22/19
Boring No.: TP-2 Checked By: AP Date: 05/22/19
Sample Type: Bulk Depth(ft.): 0-3
Visual Sample Description: Silty Sand

METHOD: A
MOLD VOLUME (CU.FT): 0.0333

Compaction Method: [X] ASTM D1557 [ ] ASTM D698
Preparation Method: [ ] Moist [X] Dry

Wt. Comp. Soil + Mold (gm.)	3658	3759	3830	3816		
Wt. of Mold (gm.)	1835	1835	1835	1835		
Net Wt. of Soil (gm.)	1823	1924	1995	1981		
Container No.						
Wt. of Container (gm.)	234.12	238.39	238.76	219.91		
Wet Wt. of Soil + Cont. (gm.)	739.18	741.29	712.54	594.55		
Dry Wt. of Soil + Cont. (gm.)	701.23	693.86	658.16	543.73		
Moisture Content (%)	8.12	10.41	12.97	15.69		
Wet Density (pcf)	120.57	127.25	131.94	131.02		
Dry Density (pcf)	111.51	115.25	116.80	113.25		

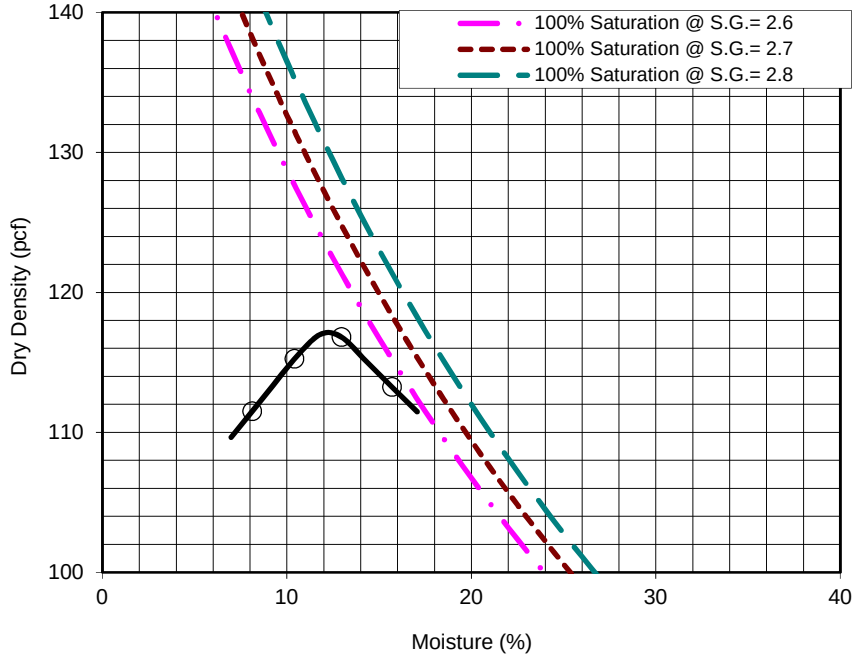
Maximum Dry Density (pcf): **117.1**
Maximum Dry Density w/ Rock Correction (pcf): **119.5**
Optimum Moisture Content (%): **12.1**
Optimum Moisture Content w/ Rock Correction (%): **11.3**

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* 6.5%
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* N/A
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* N/A
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

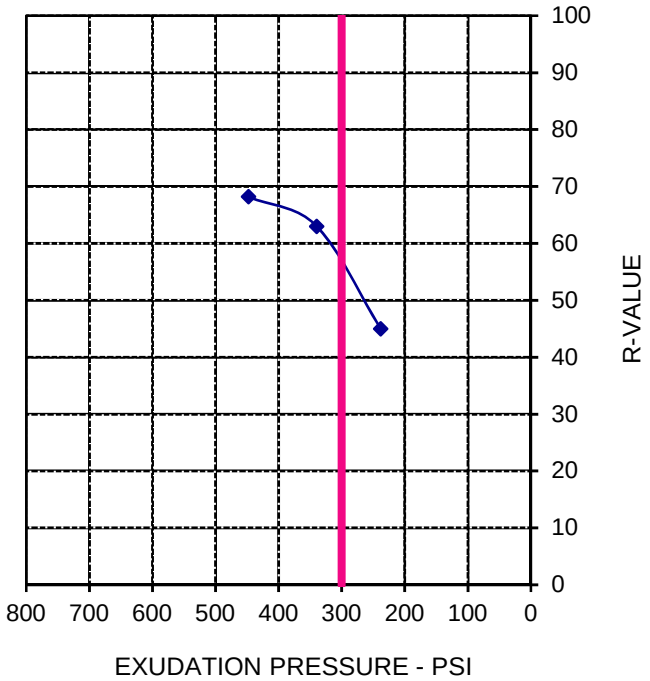
R-VALUE TEST DATA

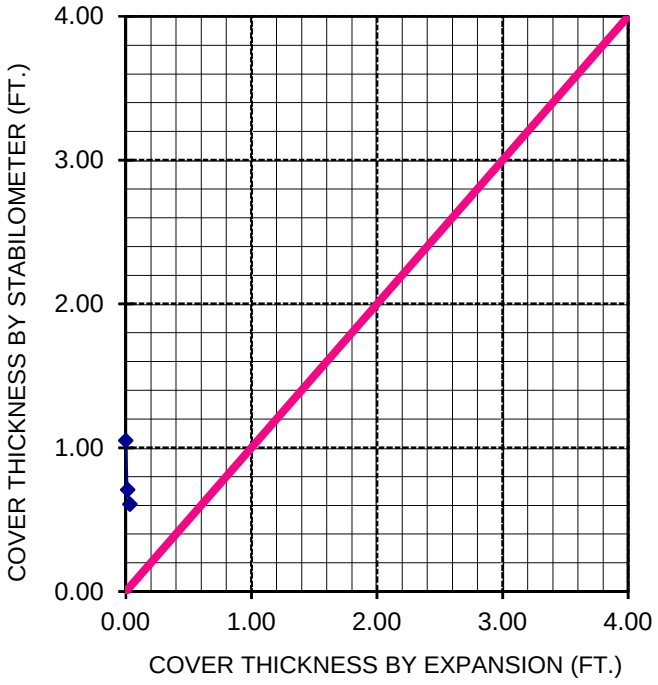
ASTM D2844

Project Name:	Eden/Indian Hills	Tested By:	ST	Date:	05/16/19
Project Number:	GS 8201	Computed By:	KM	Date:	05/20/19
Boring No.:	TP-2	Checked By:	AP	Date:	05/22/19
Sample Type:	Bulk	Depth (ft.):	0-3		
Location:	N/A				
Soil Description:	Silty Sand				

Mold Number	G	I	H	
Water Added, g	81	73	66	
Compact Moisture(%)	16.1	15.2	14.4	
Compaction Gage Pressure, psi	250	250	250	
Exudation Pressure, psi	238	339	448	
Sample Height, Inches	2.6	2.6	2.6	
Gross Weight Mold, g	2931	2911	2927	
Tare Weight Mold, g	1826	1818	1836	
Net Sample Weight, g	1104	1093	1091	
Expansion, inchesx10^{-4}	0	4	10	
Stability 2,000 (160 psi)	30/64	22/42	18/34	
Turns Displacement	5.58	5.08	4.82	
R-Value Uncorrected	40	58	66	
R-Value Corrected	45	63	68	
Dry Density, pcf	109.6	109.3	111.1	
Traffic Index	8.0	8.0	8.0	
G.E. by Stability	1.05	0.71	0.61	
G.E. by Expansion	0.00	0.01	0.03	

R-VALUE	By Exudation:	57
	By Expansion:	*N/A
	At Equilibrium: (by Exudation)	57
Remarks	Gf = 1.34, and 0.4 % Retained on the ¾" *Not Applicable	



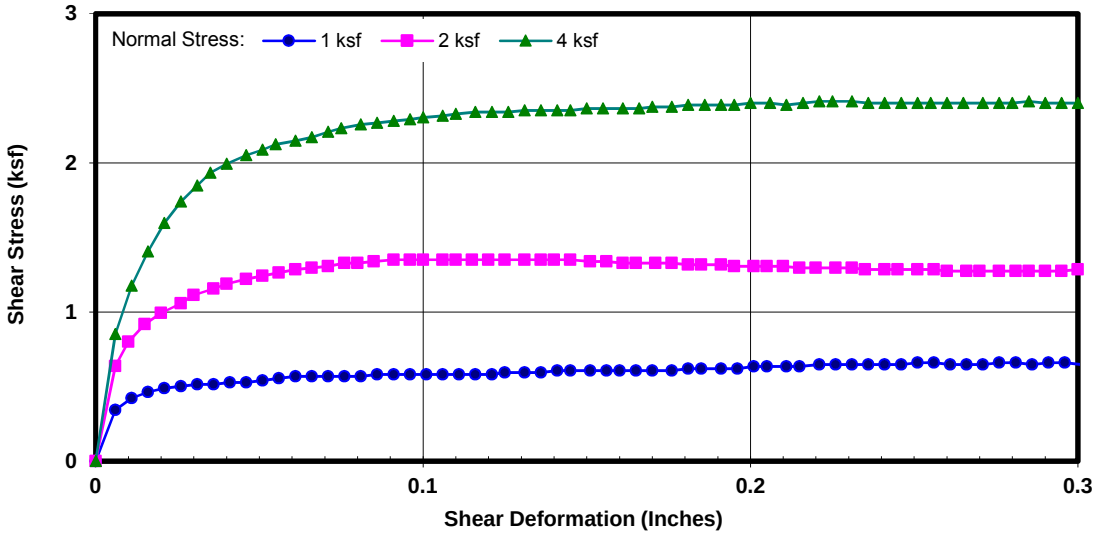


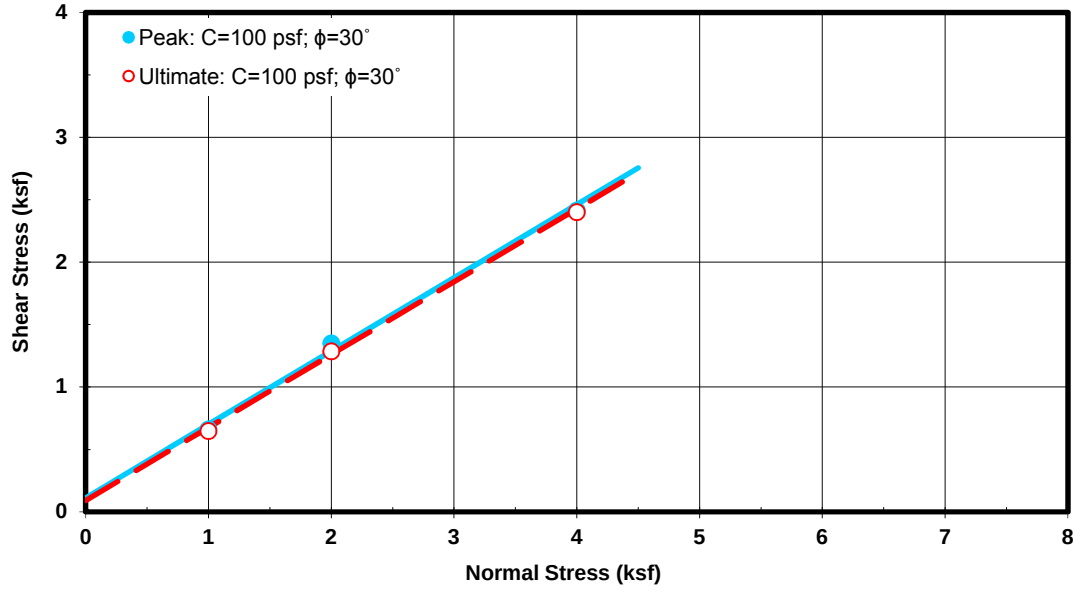
AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	Eden/Indian Hills		**Tested By:**	NG	**Date:** 05/20/19
Project No.:	GS 8201		**Computed By:**	JP	**Date:** 05/22/19
Boring No.:	TP-3		**Checked by:**	AP	**Date:** 05/22/19
Sample No.:	-	**Depth (ft):** 3			
Sample Type:	Mod. Cal.				
Soil Description:	Clayey Sand w/gravel				
Test Condition:	Inundated	**Shear Type:** Regular			

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
124.1	106.7	16.3	19.3	76	90	1	0.660	0.647
						2	1.350	1.285
						4	2.412	2.400





AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

COMPACTION TEST

Client: Geotechnical Soilutions Inc. AP Number: 19-0540
Project Name: Eden/Indian Hills Tested By: JT Date: 05/21/19
Project No. : GS 8201 Calculated By: JP Date: 05/22/19
Boring No.: TP-4 Checked By: AP Date: 05/22/19
Sample Type: Bulk Depth(ft.): 2-4
Visual Sample Description: Clayey Sand w/gravel

METHOD: C
MOLD VOLUME (CU.FT): 0.0752

Compaction Method: [X] ASTM D1557 [ ] ASTM D698
Preparation Method: [ ] Moist [X] Dry

Wt. Comp. Soil + Mold (gm.)	7207	7266	6842	7022		
Wt. of Mold (gm.)	2626	2626	2626	2626		
Net Wt. of Soil (gm.)	4581	4640	4216	4396		
Container No.						
Wt. of Container (gm.)	280.94	479.06	280.94	346.98		
Wet Wt. of Soil + Cont. (gm.)	432.40	627.82	445.02	514.37		
Dry Wt. of Soil + Cont. (gm.)	423.06	614.98	438.70	495.68		
Moisture Content (%)	6.57	9.45	4.01	12.57		
Wet Density (pcf)	134.30	136.03	123.60	128.87		
Dry Density (pcf)	126.02	124.29	118.84	114.49		

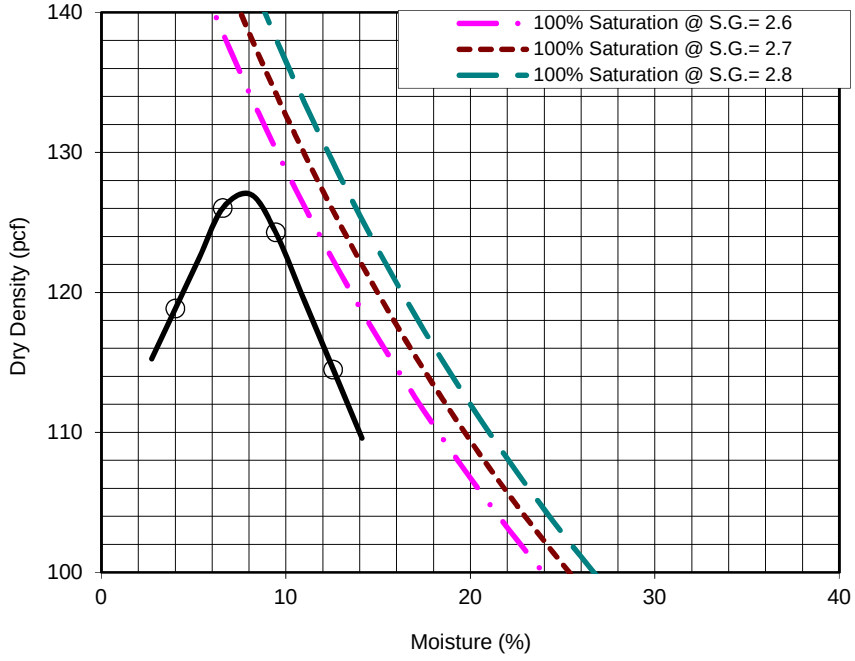
Maximum Dry Density (pcf): **127.0**
Maximum Dry Density w/ Rock Correction (pcf): **129.2**
Optimum Moisture Content (%): **7.9**
Optimum Moisture Content w/ Rock Correction (%): **7.4**

PROCEDURE USED

[ ] *METHOD A: Percent of Oversize:* *N/A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* *N/A*
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[X] *METHOD C: Percent of Oversize:* *6.9%*
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)

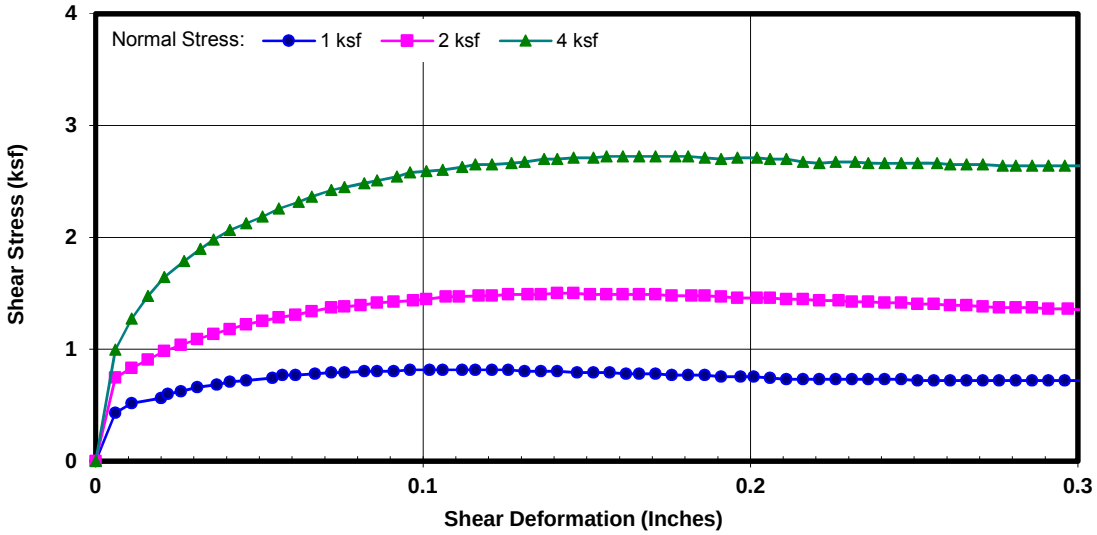


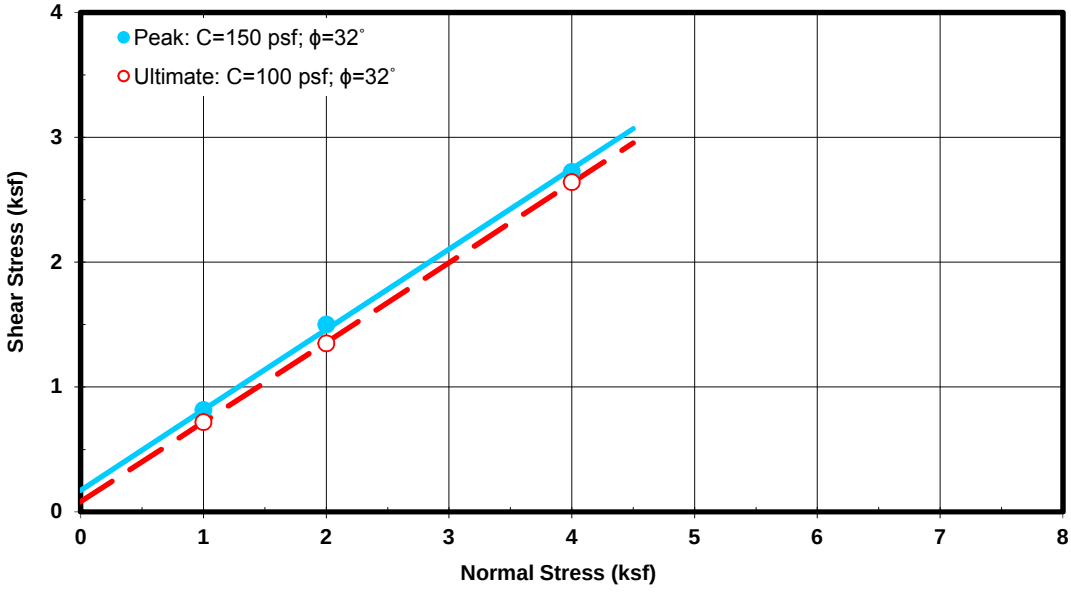
AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	Eden/Indian Hills		**Tested By:**	NG	**Date:** 05/20/19
Project No.:	GS 8201		**Computed By:**	JP	**Date:** 05/22/19
Boring No.:	TP-4		**Checked by:**	AP	**Date:** 05/22/19
Sample No.:	-	**Depth (ft):** 4			
Sample Type:	Mod. Cal.				
Soil Description:	Clayey Sand w/gravel				
Test Condition:	Inundated	**Shear Type:** Regular			

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
131.2	113.1	16.0	17.8	88	98	1	0.816	0.720
						2	1.501	1.350
						4	2.724	2.640





AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

R-VALUE TEST DATA

ASTM D2844

Project Name:	Eden/Indian Hills	Tested By:	ST	Date:	05/16/19
Project Number:	GS 8201	Computed By:	KM	Date:	05/20/19
Boring No.:	TP-4	Checked By:	AP	Date:	05/22/19
Sample Type:	Bulk	Depth (ft.):	2-4		
Location:	N/A				
Soil Description:	Clayey Sand w/gravel				

Mold Number	D	E	F	
Water Added, g	21	11	0	
Compact Moisture(%)	11.5	10.5	9.3	
Compaction Gage Pressure, psi	150	200	250	
Exudation Pressure, psi	197	312	518	
Sample Height, Inches	2.4	2.4	2.3	
Gross Weight Mold, g	3028	3012	2916	
Tare Weight Mold, g	1964	1955	1869	
Net Sample Weight, g	1063	1058	1047	
Expansion, inchesx10^{-4}	0	0	21	
Stability 2,000 (160 psi)	50/108	44/102	20/40	
Turns Displacement	4.27	4.07	4.00	
R-Value Uncorrected	22	26	65	
R-Value Corrected	21	24	70	
Dry Density, pcf	120.4	120.8	124.0	
Traffic Index	10.0	10.0	10.0	
G.E. by Stability	1.98	1.89	0.76	
G.E. by Expansion	0.00	0.00	0.07	

R-VALUE		
	By Exudation:	23
	By Expansion:	*N/A
	At Equilibrium: (by Exudation)	23

Remarks

Gf = 1.28, and 8.7 % Retained on the ¾"
*Not Applicable