Construction Testing & Engineering, Inc.
Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

GEOTECHNICAL SLOPE STABILITY EVALUATION
MANUFACTURED SLOPE
RESCUE RANCH
EAST OF PASEO PENASCO AND NORTH OF HIGHLAND VALLEY ROAD
COUNTY OF SAN DIEGO, CALIFORNIA
APN 276-030-48 AND APN 276-030-49

PREPARED FOR:

4030 GOLDFINCH INVESTMENTS, LLC
ATTENTION: MR. CHARLES P. PACE
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CTE JOB NO.: 10-13290G

OCTOBER 5, 2016

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1.0 INTRODUCTION AND SCOPE OF SERVICES

1.1 Introduction

Construction Testing and Engineering, Incorporated (CTE) has prepared this report of geotechnical slope stability evaluation pertaining to the west descending manufactured slope at the northwest corner of the ResQue Ranch (Ranch) building pad. The Ranch is comprised of a barn, stables, arena and enclosures for horses positioned on a level building pad. The intent of the ResQue Ranch is to rescue and arrange for the adoption of horses that have been neglected or are in need of support. Figure 1 is a map showing the general location of the site. This stability evaluation was authorized through the CTE proposal G-3867 dated August 22, 2016 by Crosbie Gliner Schiffman Southard & Swanson, LLP (CG3) as legal representatives of 4030 Goldfinch Investments, LLC (Goldfinch).

1.2 Scope of Services

The scope of services includes:

- Review of readily available geologic reports pertinent to the site and adjacent areas (Appendix A contains a list of cited references);
- Assessment of the site geologic conditions (Figure 2 depicts site surface geology and exploration locations, and Figure 2A and Figure 2B depict cross sections of site geologic conditions);
- Placement of four soil borings advanced by power equipment and one boring advanced by hand means (Boring Logs are attached as Appendix B);
- Securing a boring permit for one of the power equipment advanced soil boring as it extended below 20 feet, below the County of San Diego Department of Environmental Health requires such a permit;
- Utilization of boring information from a single hand advanced percolation test hole (P-3);
- Geologic reconnaissance observations of the subject slope;
- Laboratory testing of selected samples retrieved from soil borings (laboratory test results are in Appendix C);
- Slope stability calculations (attached in Appendix D);
- Analyses, conclusions, and recommendations; and,
- Preparation of this report.

2.0 PROJECT DESCRIPTION AND BACKGROUND

2.1 Description

The site is located east of the City of Escondido in hillside terrain of the Highland Valley area of the County of San Diego, California. It is accessed via a private road to Paseo Penasco and is to the north of Highland Valley Road. The property is comprised of APN 276-030-48 and APN 276-030-49. It is utilized as a horse ranch with a level pad supporting a barn, stables, corral, walking areas and outdoor pipe pen enclosures. The subject manufactured slope faces west, and is on the west side of the Ranch (barn and arena area) building pad. The manufactured slope face is graded to a surface ratio of 2:1 (horizontal to vertical), and has an approximate maximum height of 30 vertical feet.

2.2 Background

CTE performed soil compaction testing services between February 9 and April 7, 2015 as the site was being bulk graded to develop a level building pad for the ResQue Ranch facility. A County of San Diego approved grading plan had not been issued at the time of grading. As such, applicable permits were not available at the time of grading. Apparently, the downslope property owner has placed a legal complaint against the Ranch regarding stability of the manufactured slope.

3.0 FIELD EXPLORATION

The field exploration conducted by CTE included reconnaissance level observation and subsurface explorations. Five soil borings were advanced to evaluate subsurface conditions at the site. One of the five borings (B-5) was placed at the bottom of the manufactured slope and was advanced by CTE staff through hand methods to a depth of 3.5 feet where it encountered refusal to progress. The remaining four borings were advanced by a truck mounted power drive hollow stem auger drill rig operated by Baja Exploration, a California C-57 licensed driller. The maximum depth explored was Boring B-2 that penetrated to a depth of 26.3 feet. Boring B-2 was placed below a depth 20 feet; as such it was retroactively permitted through the County of San Diego Department of Environmental (DEH) Monitoring Well Program, as required. The remaining borings were less than a depth of 20 feet. Consequently, they did not require permitting through the Monitoring Well Program. Additionally, percolation test hole P-3 was advanced by CTE staff through hand means, and was placed to evaluate bio-retention Basin O infiltration as a part of an additional project scope exclusive of this slope stability evaluation. CTE staff logged percolation test hole P-3 to allow an evaluation of subsurface soils at Basin O as applicable to this stability evaluation of the manufactured slope. Soil samples were collected from Boring B-1 and Boring B-2 for classification and selected laboratory testing. Soils encountered by all borings and the percolation test hole P-3 were classified and logged. The field reconnaissance observations and subsurface explorations were conducted by California accredited Certified Engineering Geologists.

4.0 GEOLOGY

4.1 General Physiographic Setting

The site lies within the intermountain area of the County of San Diego. Geomorphically, this area is recognized as formed by hillside terrain and intervening depositional valleys. Bedrock underlying the area is generally very dense crystalline of Cretaceous geologic age.

4.2 Geologic Conditions

Based on CTE's site observations and logging of exploratory borings in combination CTE's grading observations, site reconnaissance observations and review of referenced documents, the site earth materials consist of compacted fill soil, residual soil, residual soil and Cretaceous Woodson Mountain granodiorite. The Quaternary Previously Placed Fill (Qppf on maps and sections) is composed of medium dense to dense, clayey to silty sand. Dense silty to clayey fine to coarse grained san Residual Soil has developed through weathering of the underlying Cretaceous Woodson Mountain granodiorite, and is considered to be a portion of this granitic formation as depicted on the attached map and sections. The Cretaceous Woodson Mountain granodiorite (Kwm on maps and sections to include Residual Soil) is a dense to very dense crystalline bedrock.

Regional mapping by Tan and Giffen (1995) did not indicate large landslides to underlie the property. Their mapping showed the site to be in an area least susceptible to naturally occurring landslides.

Groundwater was not encountered by the site boring and/or exposed as seepages or springs on the site or nearby downslope properties.

5.0 LABORATORY TESTING

Laboratory testing was performed on equipment driven and bulk samples collected from the subsurface explorations. Selected samples were tested to evaluate field moisture and density, gradation, and direct shear. The test results are shown on the Boring Logs in Appendix B and in Laboratory Test Results, Appendix C.

6.0 RECONNSAISSANCE FINDINGS

Reconnaissance level observations of the manufactured slope were performed on August 30, 2016 by Gregory Rzonca a Certified Engineering Geologist accredited through the State of California. The slope was observed to be graded at an approximate 2:1 (horizontal to vertical) surface ratio. The field observations of the manufactured slope did not indicate the presence of gross instability. The slope was essentially bare of vegetation. Plastic grid was noted on the slope surface as erosion protection. However, the near surface face of the manufactured slope was noted to be surficially eroded at several locations with scour to a maximum depth of approximately one foot.

7.0 SLOPE STABILITY ANALYSES

7.1 General

Slope stability analyses were performed using SLOPE/W GEOSTUDIO 2004, a computer program that uses two-dimensional limiting equilibrium methods to calculate factors-of-safety against failure. SLOPE/W is a graphical software product that operates under Microsoft Windows. The program allows AutoCAD/LDD developed cross sections to be directly input into the program for analyses. This results in reasonably accurate cross sections upon which geologic structural and stratigraphic modeling can be placed. Site topography from available grading plans and geology from the explorations performed were utilized for the modeling and analysis.

7.2 Computer Files

Computer files containing the slope stability calculations performed are not provided herewith. However, such files are available upon request; contact CTE's office and the requested files will be transmitted via email. A "Viewer License" of SLOPE/W is available online and, once installed, the user is allowed to open each analysis and view the input information. As part of the restriction of utilizing the "Viewer License," the limited software application will not allow the user to calculate the results of the analysis. For the GEOSTUDIO 2004 program, the reviewer is directed to the website: www.geo-slope.com/downloads for a download and free evaluation copy of the software. If additional information is necessary regarding the use of SLOPE/W, CTE encourages the user to contact the software manufacturer.

7.3 Methodology

Spencer's Method of Slope Stability Analyses was utilized. The utilized method satisfies pertinent conditions of equilibrium, and is the stated SP 117A preferred method of analyses. The analysis was conducted on the current conditions as per the available grading plan and geologic information developed by CTE for the slope stability evaluation. Sections were evaluated for slope stability utilizing the strength parameters derived from the laboratory shear testing of onsite samples.

The computer program feature termed "Auto Search" was utilized for Cross Section A-A'; this feature, as the title implies, automatically searches the section geometry for the composite failure surface with the lowest factor of safety. Upon locating the lowest factor of safety (using 1000 computer generated composite failure surfaces), the program optimizes the critical failure surface using up to an additional 2000 "optimized" surfaces. A grid and radius was utilized to constrain the hypothetical failure at the toe of the slope depicted on Section B-B'. The grid and radius locates the most critical hypothetical failure path through the section to find the critical radius within specified grid boundaries.

7.4 Material Property Assumptions

Site-specific geotechnical information and conservative ultimate material strength properties were utilized in the slope stability analyses. The laboratory tests yielded shear strength values ranging from 45.9 degrees and 360 pounds per square foot (psf) in the sample from B-1 at 10 feet, and 24.5 degrees and 1,270 psf in the sample from B-1 at 18.5 feet. CTE plotted these values and developed a shear plot to include values at the end of the shear test. CTE conservatively assigned the same derived shear strength to the Previously Placed Fill, Residual Soil, and Woodson Mountain granodiorite. Based upon interpretation of these values CTE conservatively assigned ultimate shear test values per Table 7.4 below.

TABLE 7.4 SLOPE STABILITY MATERIAL PROERTIES			
Material	**Unit Weight (pcf)**	**Cohesion (psf)**	**Friction Angle (phi)**
Previously Placed Fill and Woodson Mountain granodiorite (including residual soil)	130	700	25

7.5 Analytical Results

Analyses were performed on two lines of sections to evaluate the most likely direction of hypothetical failure as: 1) Section A-A' located on the south margin of the property through bio-retention Basin O, associated retaining walls, and near bio-retention Basin B and, 2) Section B-B' located on the north margin of the manufactured slope along the highest portion of the subject slope. The cross sections were oriented perpendicular to the major axis of slope surface topographic contours. These two lines of section were analyzed for hypothetical gross failures through the entire slope. Section B-B' was analyzed for surficial stability assuming saturated soil within three feet of the finished face. Hypothetical groundwater surfaces were conservatively modelled by assuming hypothetical saturation of soils associated with Basin B and Basin O in Section A-A' and hypothetical saturation of soils within five feet of Cretaceous Woodson Mountain granodiorite residual soil in Section B-B'. The calculated critical surface and pertinent input factors are provided on figures attached in Appendix D. A summary of the calculated safety factor for these conditions is provided on the following Table 7.5.

TABLE 7.5
CALCULATED SAFETY FACTORS

Condition Analyzed	Calculated Safety Factor
Section A, Static, Auto Search for Critical Deep Hypothetical Failure	4.642
Section B, Static, Grid and Radius Search for Critical Deep Failure	2.649
Surficial Failure, Three Feet Saturated Profile	5.00

Based on the results of the analyses presented, the slope is calculated to have adequate safety factors for deep (gross) and near surface (shallow) as they are above the County of San Diego required 1.5 safety factor for gross and surficial stability.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The engineering calculations indicate the subject manufactured slope possesses a safety factor in excess of 1.5 for gross and surficial stability as required by the County of San Diego. By this measure, the subject manufactured slope is considered to be stable. As such, remedial measures to improve site stability as calculated herein are not recommended at this time.

Geologic field observations of the manufactured slope did not indicate the presence of gross instability. The face of the manufactured slope was observed to essentially be bare of vegetation. Plastic grid was noted on the slope surface apparently as erosion protection. However, the near surface face of the manufactured slope was noted to be surficially eroded at several locations with scour to a maximum depth of approximately one foot. As such, the slope should be protected from sheet and similar erosion by planting to include hydroseed (as acceptable to the governing authority) at the earliest practical opportunity. Planting of the slope face should include sufficiently deep rooted plants requiring minimal irrigation. However, CTE is not an expert at plant reinforcement of slopes. As such, a qualified landscape architect could be contacted to develop such a planting plan, as/if necessary.

9.0 LIMITATIONS OF INVESTIGATION

The recommendations provided in this report are based on the observation of site conditions, encountered subsurface conditions, and review of pertinent documents available to CTE at this time. The slope stability investigation presented in this report has been conducted according to current geotechnical engineering practice and standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No other warranty, expressed or implied, is made regarding the conclusions, recommendations and opinions expressed in this report. Variations may exist and conditions not observed or described in this report could be present.

CTE's conclusions and recommendations are based on an analysis of the conditions reported herein. If conditions different from those described in this report are encountered, CTE should be notified and additional recommendations, if necessary, will be provided upon request.

CTE appreciates this opportunity to be of service on this project. If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,
CONSTRUCTION TESTING & ENGINEERING, INC.

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Certified Engineering Geologist

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Principal Engineer

GFR/DTM:nri

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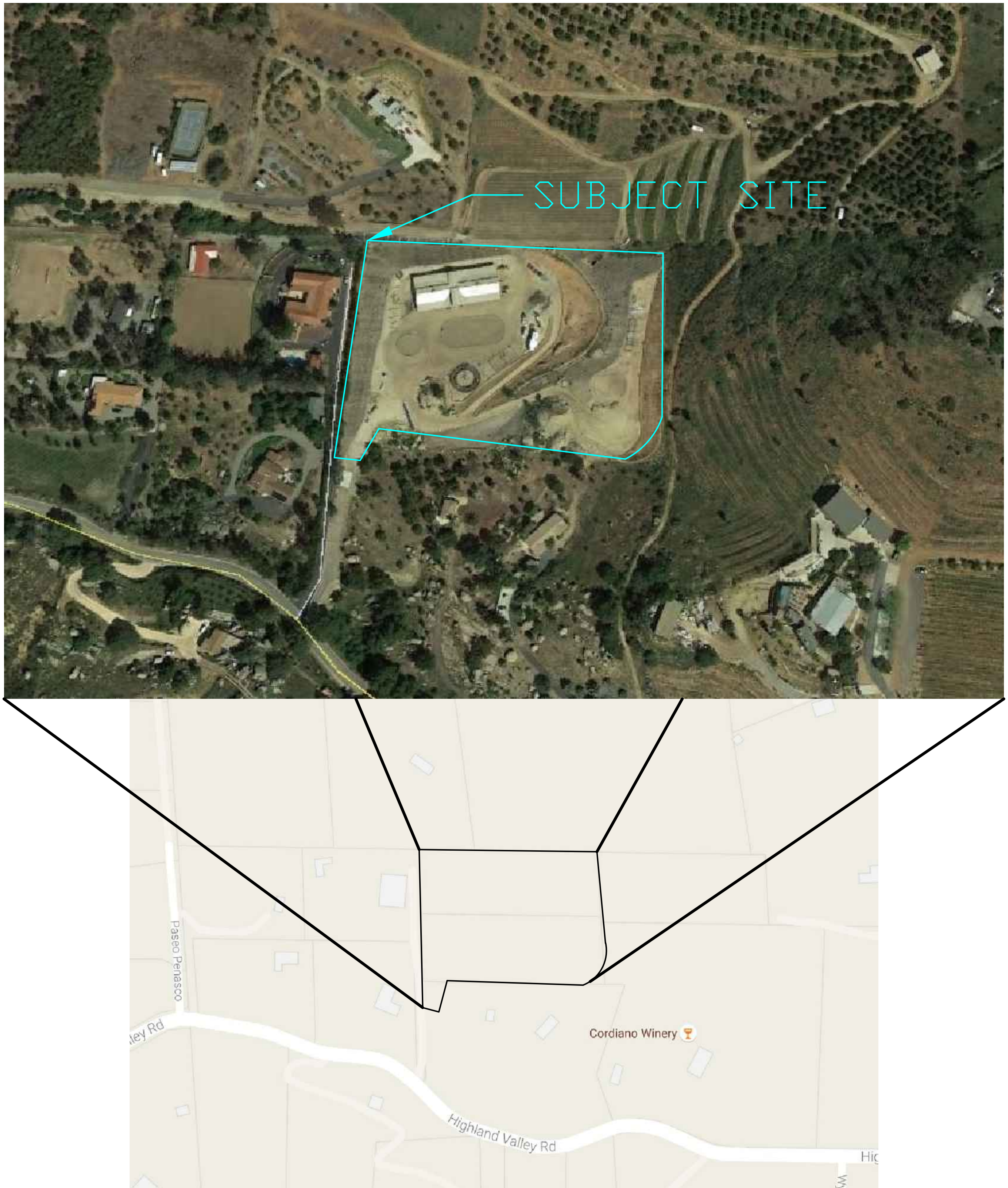

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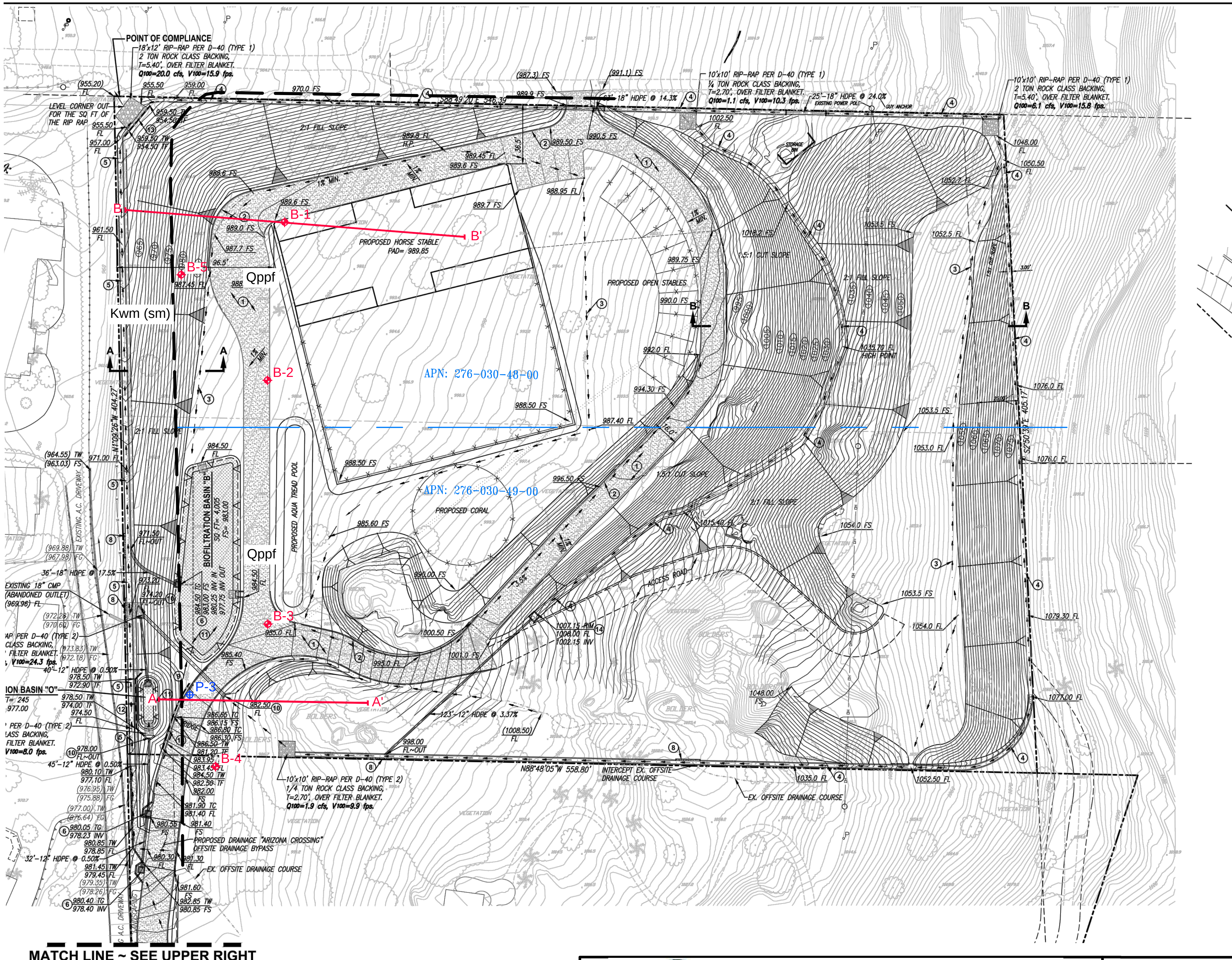
SITE INDEX MAP ResQue RANCH APN: 276-030-48-00 NORTH OF HIGHLAND VALLEY ROAD, SAN DIEGO, CALIFORNIA	SCALE: AS SHOWN CTE JOB NO.: 10-13290G	DATE: 10/16 FIGURE: 1



LEGEND

B-5	APPROXIMATE BORING LOCATION
P-3	APPROXIMATE PERCOLATION TEST LOCATION, ALL PERCOLATION TESTS NOT SHOWN)
Qppf	QUATERNARY PREVIOUSLY PLACED FILL
Kwm (sm)	CRETACEOUS WOODSON MOUNTAIN GRANODIORITE
	APPROXIMATE GEOLOGIC CONTACT
	CROSS SECTION A-A'

40' 0 20' 40'

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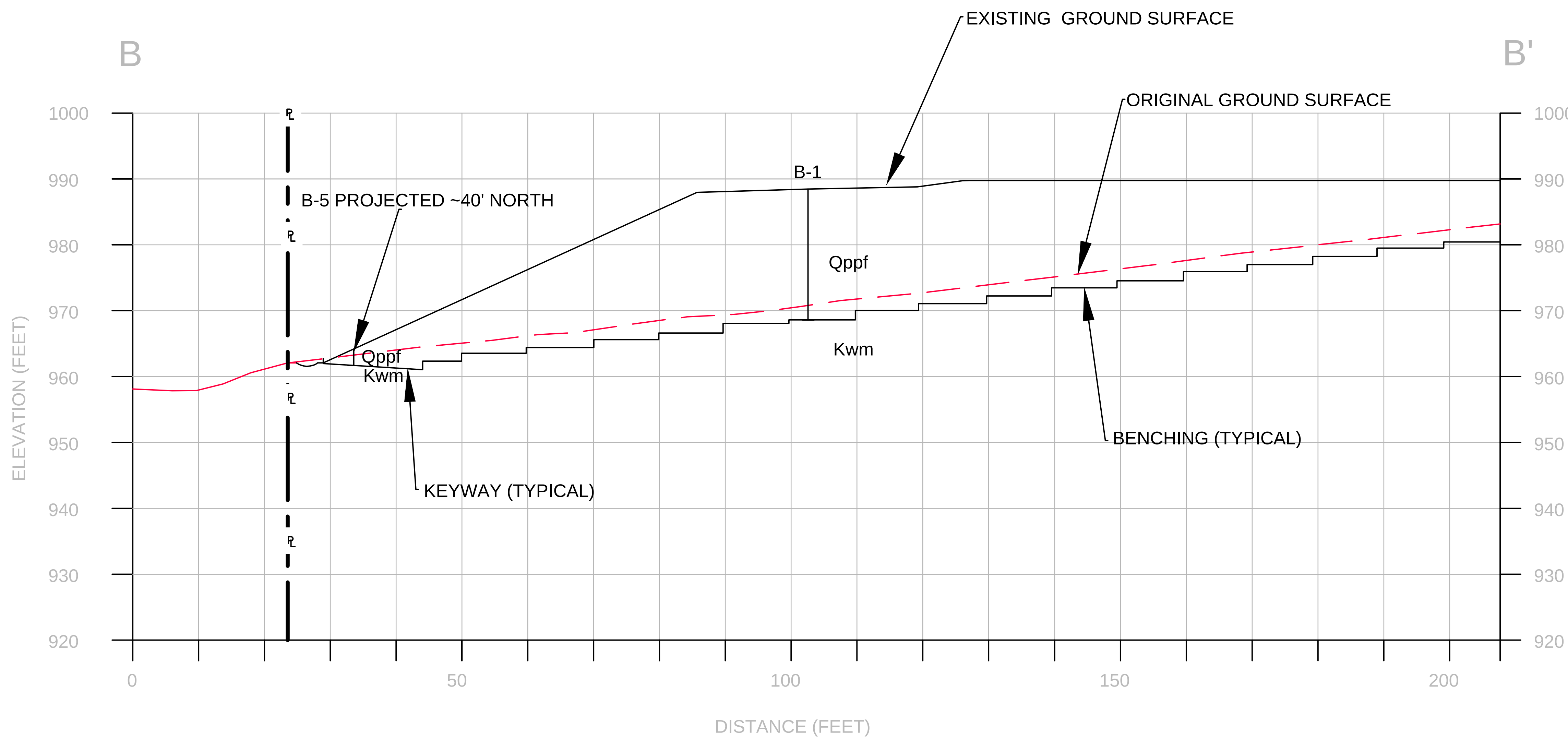
GEOTECHNICAL MAP
RESQUE RANCH
APN: 276-030-48-00
NORTH OF HIGHLAND VALLEY ROAD, SAN DIEGO, CALIFORNIA

CTE JOB NO:	10-13290G
SCALE:	1" ~ 40'
DATE: 10/16	FIGURE: 2



LEGEND

Qppf Quaternary Previoulsy Placed Fill

Kgr Cretaceous Woodson Mountain Granodiorite

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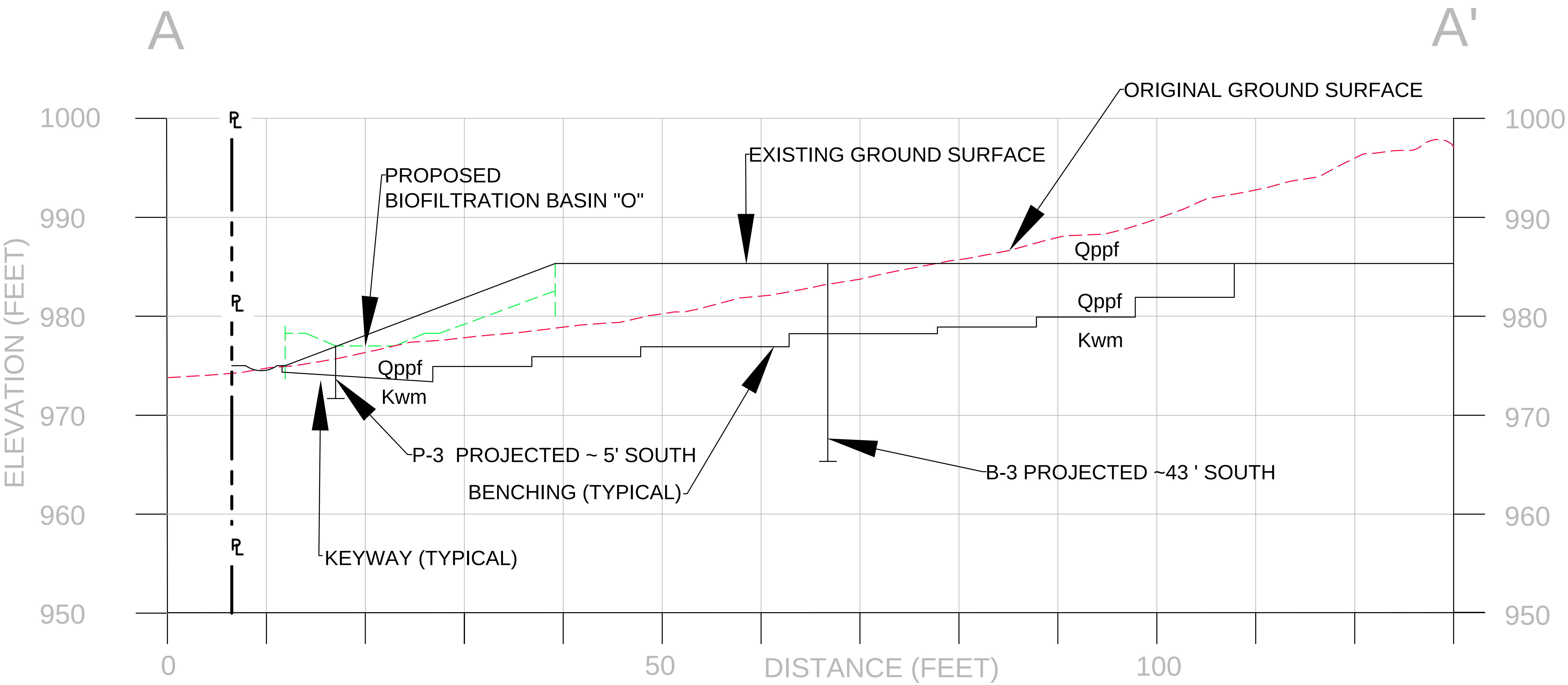
GEOLOGIC CROSS SECTION B–B'

RESQUE RANCH

APN: 276-030-48-00

NORTH OF HIGHLAND VALLEY ROAD, SAN DIEGO, CALIFORNIA

CTE JOB NO: 10-13290G	
SCALE: 1" = 20'	
DATE: 10/16	FIGURE: 2B



LEGEND

Qppf QUATERNARY PREVIOUSLY PLACED FILL

Kwm CRETACEOUS WOODSON MOUNTAIN GRANODIORITE

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GEOLOGIC CROSS SECTION A-A'
RESQUE RANCH
APN: 276-030-48-00
NORTH OF HIGHLAND VALLEY ROAD, SAN DIEGO, CALIFORNIA

CTE JOB NO:	10-13290G
SCALE:	1" = 10'
DATE: 10/16	FIGURE: 2A

APPENDIX A

REFERENCES CITED

REFERENCES CITED

1. California Geological Survey, 2008 “Guidelines for Evaluating and Mitigating Seismic Hazards in California” Special Publication 117A.

2. Harden, D.R., 1997, “California Geology.”

3. Jennings, C.W., 1997, “Geologic Map of California.”

4. Jennings, C. W., 1987, “Fault Map of California with Locations of Volcanoes, Thermal Springs and Thermal Wells.”

5. Norris, R.M. and Web, R.W., 1976. “Geology of California.”

6. Tan, S.S., Giffen, D.G., 1995, “Landslide Hazards in the Northern Part of the San Diego Metropolitan Area, San Diego County, California” Escondido Quadrangle, DMG Open File Report 95-04.

7. Tan, S.S., Kennedy, M.P., 1999, “Geologic Map of the Escondido 7.5’ Quadrangle, San Diego County, California” California Department of Conservation, Division of Mines and Geology, United States Geological Survey and United States Geological Survey.

APPENDIX B

EXPLORATION LOGS

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DEFINITION OF TERMS

PRIMARY DIVISIONS			SYMBOLS	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	**GRAVELS** MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS < 5% FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES, LITTLE OF NO FINES
		GRAVELS WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS < 5% FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	**SILTS AND CLAYS** LIQUID LIMIT IS LESS THAN 50		ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, SLIGHTLY PLASTIC CLAYEY SILTS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, SILTS OR LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTY CLAYS
HIGHLY ORGANIC SOILS			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES

BOULDERS	COBBLES	GRAVEL		SAND			SILTS AND CLAYS
		COARSE	FINE	COARSE	MEDIUM	FINE	

12" 3" 3/4" 4 10 40 200

CLEAR SQUARE SIEVE OPENING — U.S. STANDARD SIEVE SIZE

ADDITIONAL TESTS

(OTHER THAN TEST PIT AND BORING LOG COLUMN HEADINGS)

MAX- Maximum Dry Density
GS- Grain Size Distribution
SE- Sand Equivalent
EI- Expansion Index
CHM- Sulfate and Chloride Content , pH, Resistivity
COR - Corrosivity
SD- Sample Disturbed

PM- Permeability
SG- Specific Gravity
HA- Hydrometer Analysis
AL- Atterberg Limits
RV- R-Value
CN- Consolidation
CP- Collapse Potential
HC- Hydrocollapse
REM- Remolded

PP- Pocket Penetrometer
WA- Wash Analysis
DS- Direct Shear
UC- Unconfined Compression
MD- Moisture/Density
M- Moisture
SC- Swell Compression
OI- Organic Impurities

FIGURE: BL1

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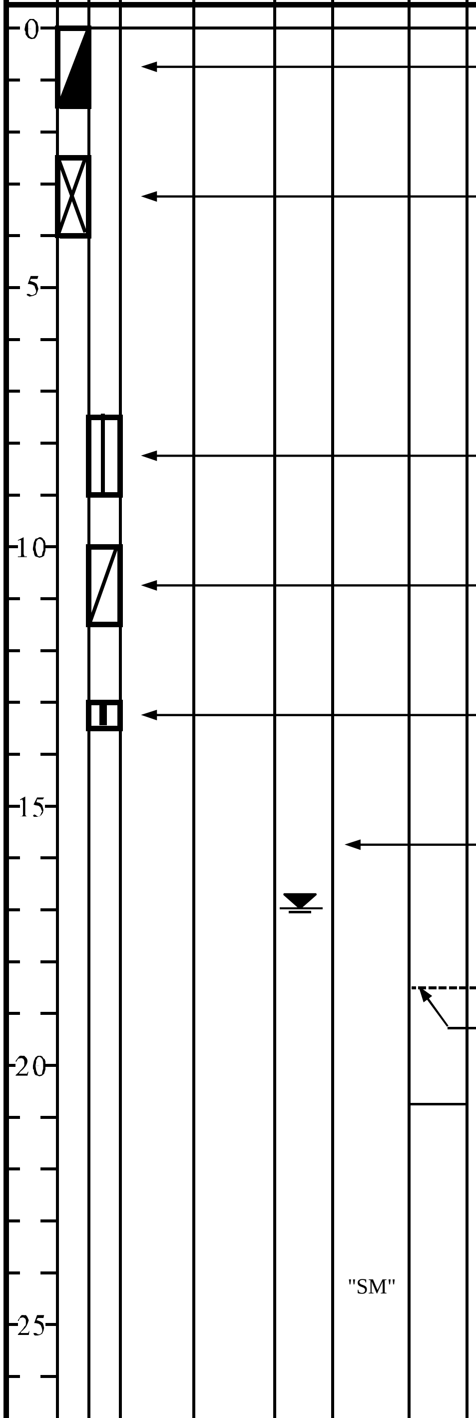
PROJECT:	DRILLER:	SHEET: of
CTE JOB NO:	DRILL METHOD:	DRILLING DATE:
LOGGED BY:	SAMPLE METHOD:	ELEVATION:

BORING LEGEND

Depth (Feet) | Bulk Sample | Driven Type | Blows/Foot | Dry Density (pcf) | Moisture (%) | U.S.C.S. Symbol | Graphic Log | DESCRIPTION | Laboratory Tests



Block or Chunk Sample

Bulk Sample

Standard Penetration Test

Modified Split-Barrel Drive Sampler (Cal Sampler)

Thin Walled Army Corp. of Engineers Sample

Groundwater Table

Soil Type or Classification Change

? ——— ? ——— ? ——— ? ——— ? ——— ? ——— ? —

Formation Change [(Approximate boundaries queried (?)]

Quotes are placed around classifications where the soils exist in situ as bedrock

FIGURE: BL2

PROJECT:	RESQUE RANCH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13290G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	8/30/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~989 Feet

BORING: B-1

Depth (Feet)	Bulk Sample	Driven Sample Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense to dense, moist, grayish brown, fine to coarse grained clayey SAND.	
5		X	13 20 34	123.0	8.4				MD, GS
10		X	13 19 27	106.2	6.3				MD, DS
								Gravel	
15		X	15 26 33	124.0	8.7				MD, GS
								Gravel	
		X	9 14 50/4"	131.6	8.4				MD, DS
20						"SC"		**CRETACEOUS WOODSON MOUNTAIN GRANODIORITE:** Very dense, slightly moist, brownish gray tonalite that excavates to clayey fine to medium grained SAND, highly weathered, oxidized.	
								Total Depth: 19.9' No Groundwater Encountered Backfilled 8/30/2016	
25									

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PROJECT:	RESQUE RANCH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13290G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	8/30/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~989 Feet

BORING: B-2

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense to dense, moist, grayish brown, fine to coarse grained silty SAND.	
5		SPT	23 30 45						
10									
15		Ring	14 14 16					Becomes dense	GS
						SM/SC		Dense, moist, grayish brown, silty to clayey fine to coarse grained SAND.	
		Ring	12 14 18						
20									
25									

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PROJECT:	RESQUE RANCH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13290G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	8/30/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~989 Feet

BORING: B-2

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25						SM/SC		Dense, moist, grayish brown, silty to clayey fine to coarse grained SAND.	
						"SC"		**<u>CRETACEOUS WOODSON MOUNTAIN GRANODIORITE</u>:** Very dense, slightly moist, brownish gray tonalite that excavates to clayey fine to medium grained SAND, highly weathered, oxidized.	
								Total Depth: 26.3' No Groundwater Encountered Backfilled with Bentonite Chips on 8/30/2016	
30									
35									
40									
45									
50									

PROJECT:	RESQUE RANCH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13290G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	8/30/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~989 Feet

BORING: B-3

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Medium dense to dense, moist, grayish brown, fine to coarse grained clayey SAND.	
5									
7						SM		**<u>RESIDUAL SOIL</u>:** Dense, moist, dark gray, silty fine grained SAND.	
10									
13						"SM"		**<u>CRETACEOUS WOODSON MOUNTAIN GRANODIORITE</u>:** Very dense, slightly moist, reddish brown tonalite that excavates to silty fine grained SAND, highly weathered, oxidized.	
15									
								Becomes moderately weathered	
20								Total Depth: 20.0' No Groundwater Encountered Backfilled 8/30/2016	
25									

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PROJECT:	RESQUE RANCH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13290G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	8/30/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~981 Feet

BORING: B-4

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense to dense, moist, grayish brown, fine to coarse grained clayey SAND.	
5									
						SM		**RESIDUAL SOIL:** Dense, moist, dark reddish brown, silty fine to coarse grained SAND.	
						"SM"		**CRETACEOUS WOODSON MOUNTAIN GRANODIORITE:** Very dense, slightly moist, reddish brown tonalite that excavates to silty fine grained SAND, moderately weathered, oxidized.	
10									
15									
								Total Depth: 16.0' (Refusal in Dense Tonalite) No Groundwater Encountered Backfilled 8/30/2016	
20									
25									

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PROJECT:	RESQUE RANCH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13290G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	8/30/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~965 Feet

BORING: B-5

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Medium dense, dry to moist, grayish brown, silty fine to coarse grained clayey SAND.	
						"SM"		**<u>CRETACEOUS WOODSON MOUNTAIN GRANODIORITE</u>:** Very dense, slightly moist, brownish gray tonalite that excavates to clayey fine to medium grained SAND, highly weathered, oxidized.	
5								Total Depth: 3.5' (Refusal in Dense Tonalite) No Groundwater Encountered Backfilled 8/30/2016	
10									
15									
20									
25									

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PROJECT:	RESQUE RANCH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13290G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	8/30/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~965 Feet

BORING: P-3

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense, dry to moist, grayish brown, silty fine to coarse grained SAND.	
						"SM"		**CRETACEOUS WOODSON MOUNTAIN GRANODIORITE:** Very dense, slightly moist, brownish gray tonalite that excavates to clayey fine to medium grained SAND, highly weathered, oxidized.	
5									
								Total Depth: 5.3' No Groundwater Encountered Backfilled 8/30/2016	
10									
15									
20									
25									

APPENDIX C

LABORATORY ANALYTICAL RESULTS

APPENDIX C
LABORATORY METHODS AND RESULTS

Laboratory tests were performed on selected soil samples to evaluate their engineering properties. Tests were performed following test methods of the American Society for Testing and Materials, or other accepted standards. The following presents a brief description of the various test methods used. Laboratory results are presented in the following section of this Appendix.

Classification
Soils were classified visually according to the Unified Soil Classification System. Visual classifications were supplemented by laboratory testing of selected samples according to ASTM D 2487.

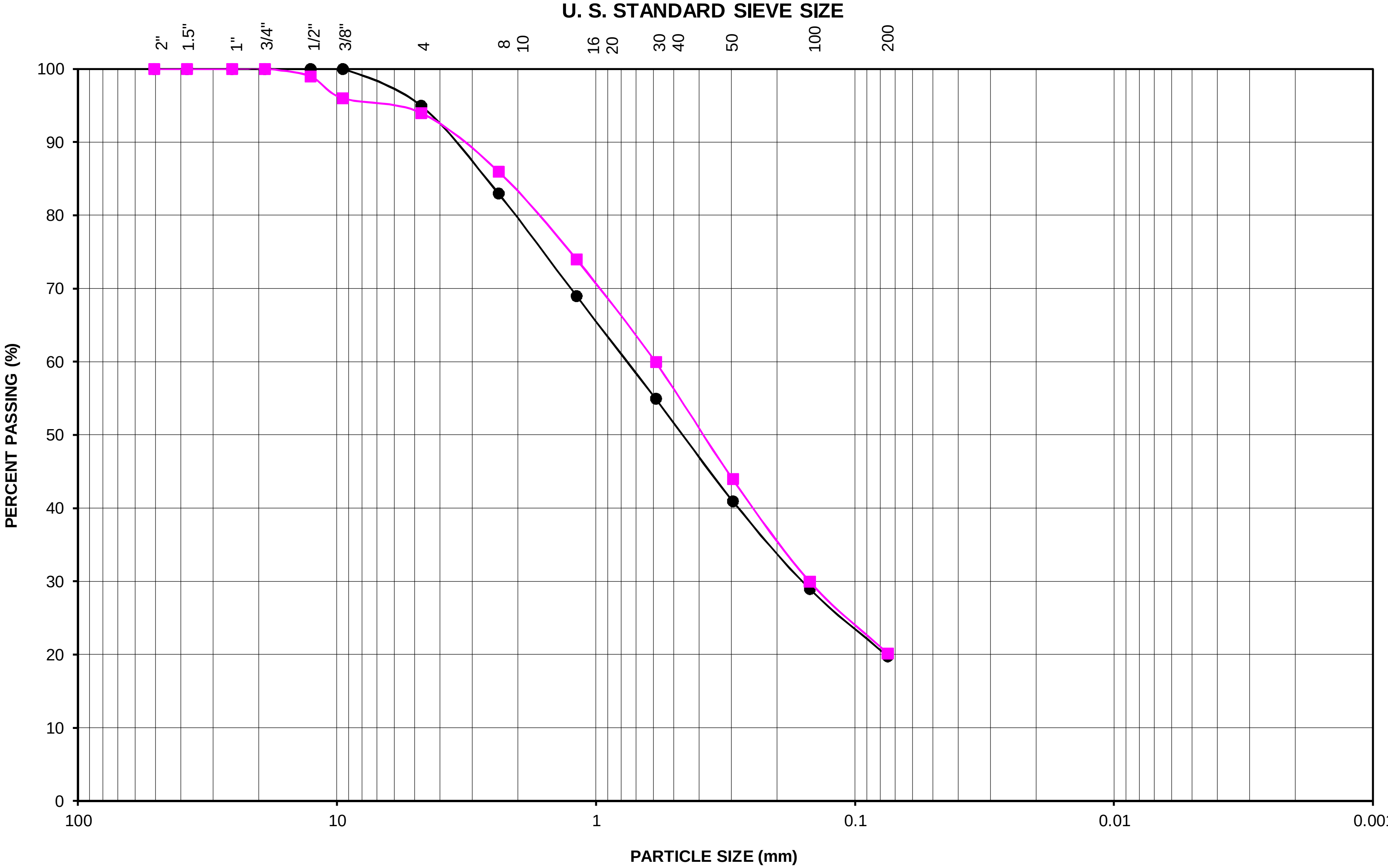
Particle-Size Analysis
Particle-size analyses were performed on selected representative samples according to ASTM D 422.

In-Place Moisture/Density
The in-place moisture content and dry unit weight of selected samples were determined using relatively undisturbed chunk soil samples.

Direct Shear
Direct shear tests were performed on selected drive samples collected from the field exploration. Direct shear testing was performed in accordance with ASTM D 3080. The samples were inundated during shearing to represent adverse field conditions.

IN-PLACE MOISTURE AND DENSITY

LOCATION	DEPTH (feet)	% MOISTURE	DRY DENSITY
B-1	5	8.4	123.0
B-1	10	6.3	106.2
B-1	15	8.7	124.0
B-2	18.5	8.4	131.6



PARTICLE SIZE ANALYSIS

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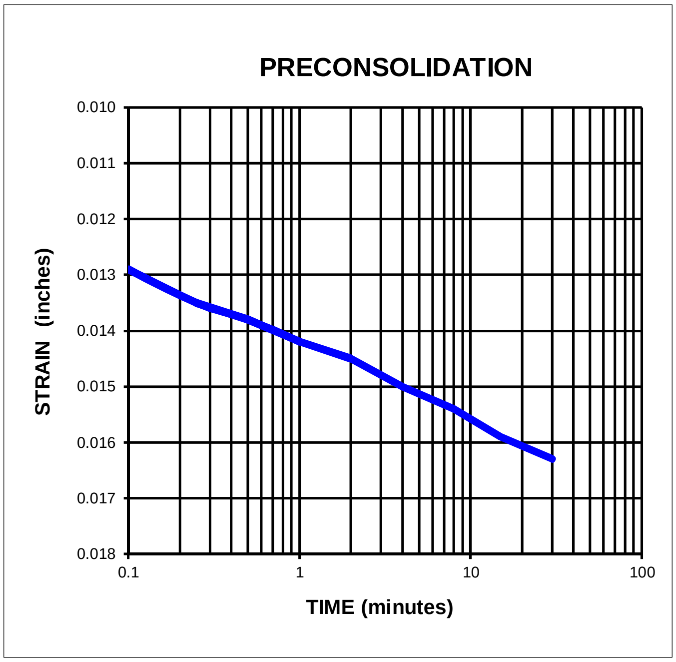
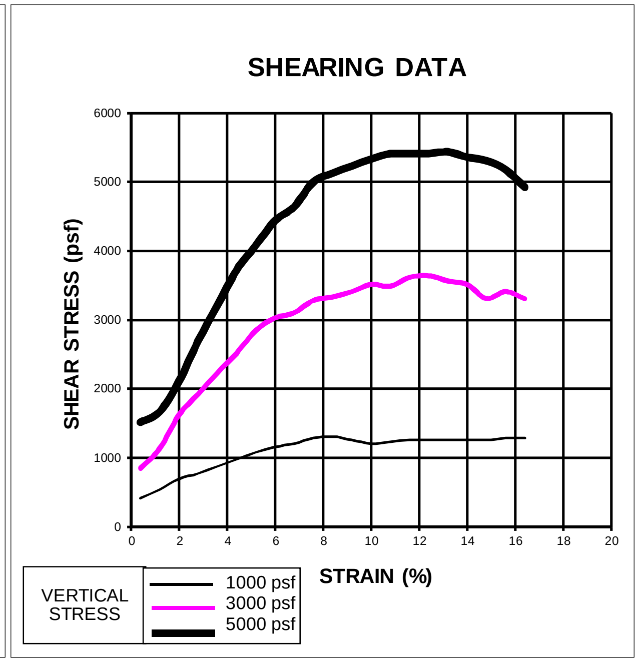
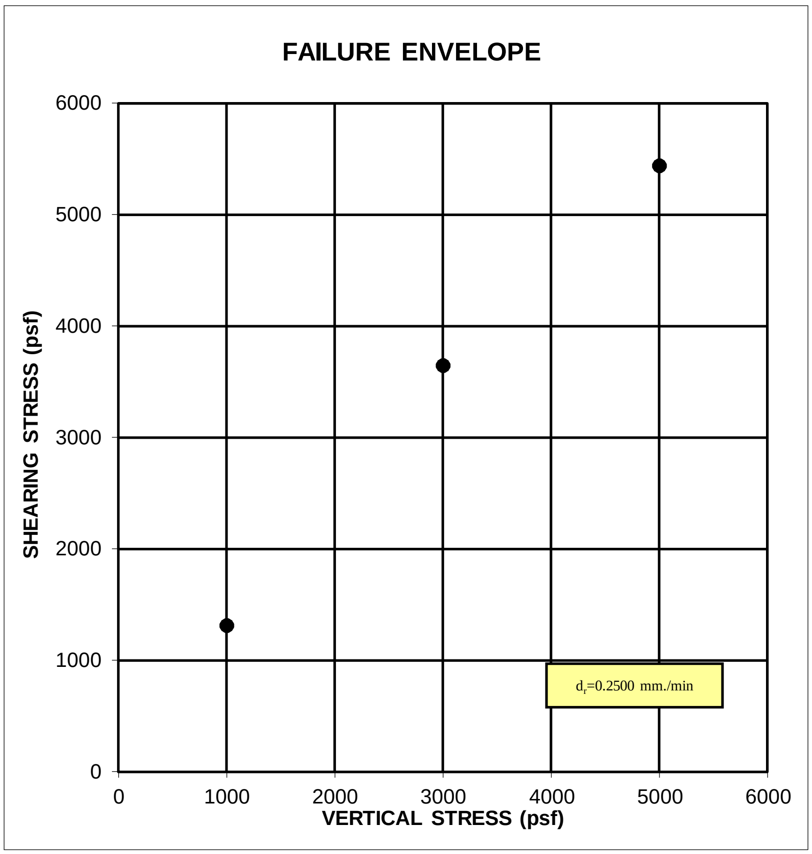
Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-1	5	●	-	-	
B-1	15	■	-	-	
CTE JOB NUMBER:		10-13290G		FIGURE:	C-1

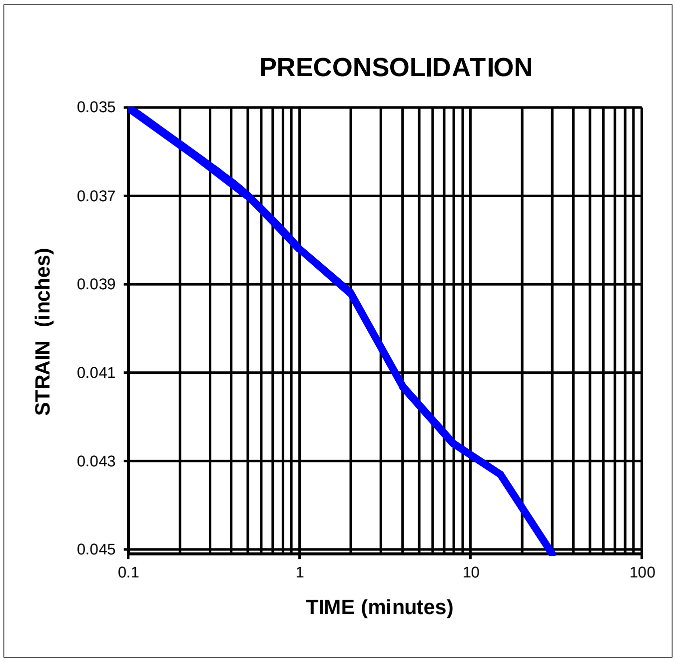


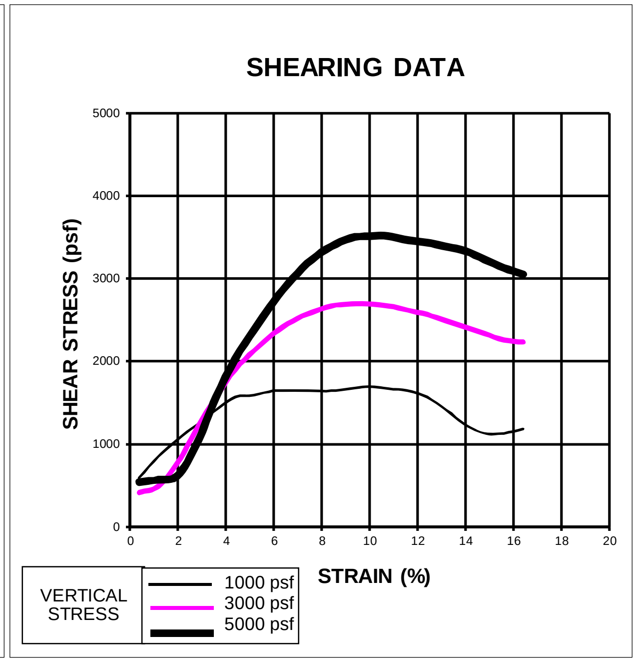


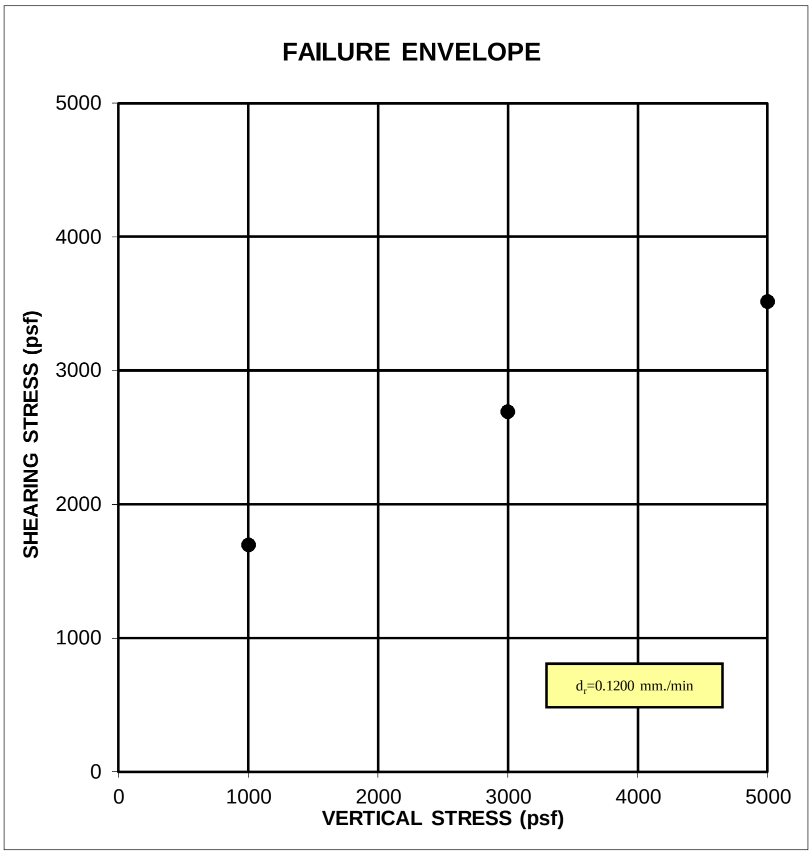


SHEAR STRENGTH TEST - ASTM D3080

Job Name:	ResQue Ranch Manufactured Slope			Initial Dry Density (pcf):	106.2
Project Number:	10-13290G	Sample Date:	8/30/2016	Initial Moisture (%):	6.3
Lab Number:	26609	Test Date:	9/8/2016	Final Moisture (%):	16.8
Sample Location:	B-1 @ 10'	Tested by:	Julian Carmona	Cohesion:	360 psf
Sample Description:	Brown SW			Angle Of Friction:	45.9







SHEAR STRENGTH TEST - ASTM D3080

Job Name:	ResQue Ranch Manufactured Slope			Initial Dry Density (pcf):	131.6
Project Number:	10-13290G	Sample Date:	8/30/2016	Initial Moisture (%):	8.4
Lab Number:	26609	Test Date:	9/12/2016	Final Moisture (%):	16.2
Sample Location:	B-1 @ 18.5'	Tested by:	Julian Carmona	Cohesion:	1270 psf
Sample Description:	Dark Brown SM			Angle Of Friction:	24.5

APPENDIX D

SLOPE STABILITY

Surficial Slope Stability:

CTE Job Number: 10.13290G | Date: 1-Oct-16

Assumptions:

1) Saturation of Slope Surface
2) Sufficient Permeability to Establish Water Flow

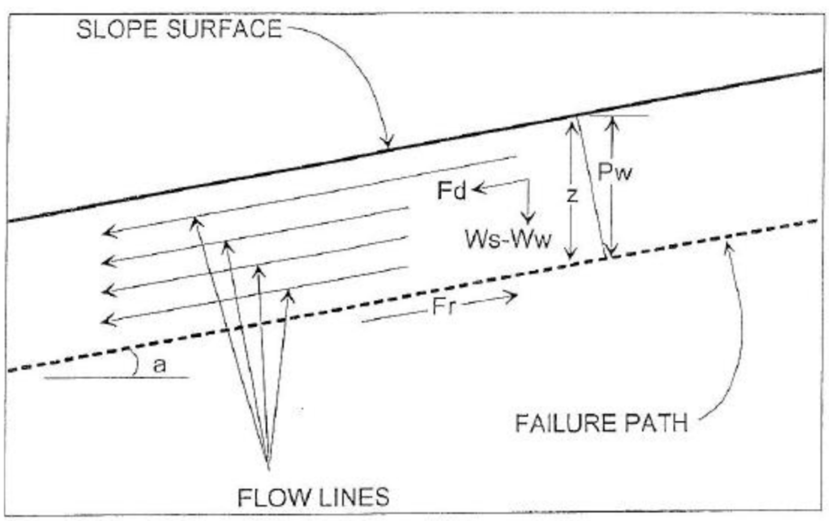
Yellow Boxes Require Input

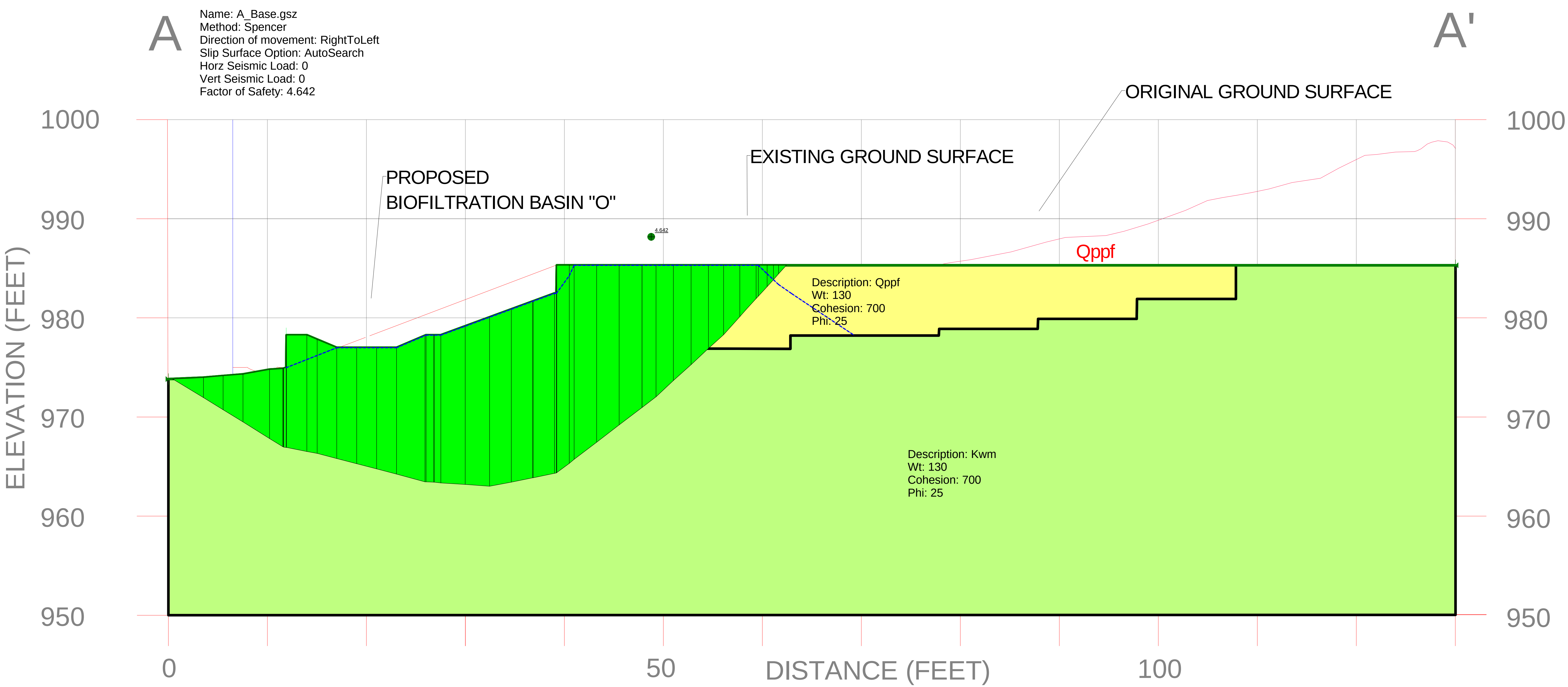
Variables:

Ws = Saturated Soil Unit Weight	=	130
Ww = Unit Weight of Water (62.4 lbs/ft^3)	=	62.4
z = Layer Thickness, (feet)	=	3
a = Angle of Slope Face, (degrees)	=	26.4
phi = Internal Friction Angle, (degrees)	=	25
c = Apparent Cohesion, (psf)	=	700

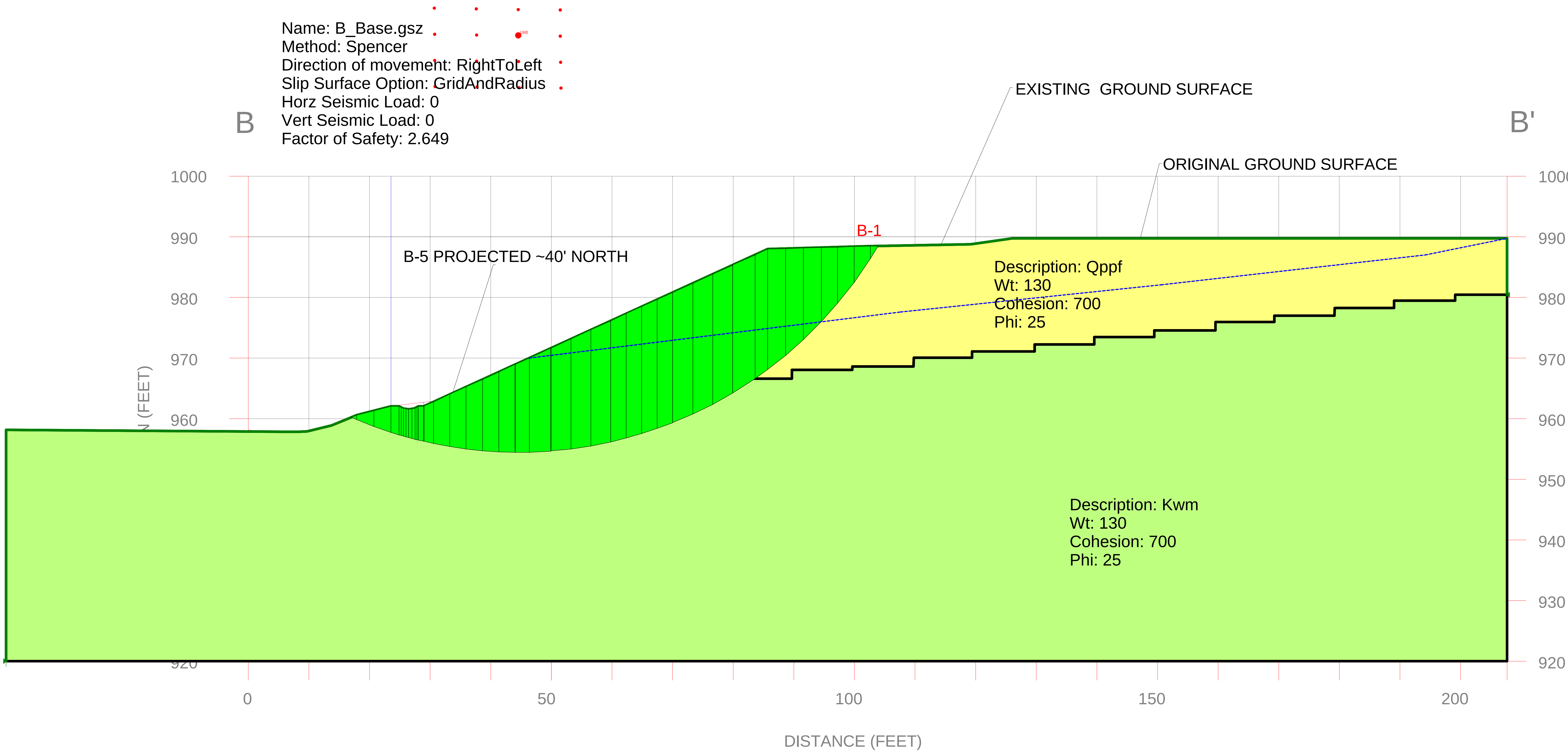
Equations:

Pw = Water Pressure Head = (z)cos^2(a))	
u = Pore Water Pressure = (Ww)(z)(cos^2(a))	
Fd = (0.5)(z)(Ws)(sin(2a))	155.3
Fr = (z)(Ws-Ww)(cos^2(a))(tan(phi))+c	775.9
Factor of Safety (FS) = Fr/Fd	5.00





A
A'
Name: A_Base.gsz
Method: Spencer
Direction of movement: RightToLeft
Slip Surface Option: AutoSearch
Horz Seismic Load: 0
Vert Seismic Load: 0
Factor of Safety: 4.642
ORIGINAL GROUND SURFACE
EXISTING GROUND SURFACE
PROPOSED
BIOFILTRATION BASIN "O"
4.642
Qppf
Description: Qppf
Wt: 130
Cohesion: 700
Phi: 25
Description: Kwm
Wt: 130
Cohesion: 700
Phi: 25
ELEVATION (FEET)
1000
990
980
970
960
950
0
50
100
DISTANCE (FEET)



Name: B_Base.gsz
Method: Spencer
Direction of movement: RightToLeft
Slip Surface Option: GridAndRadius
Horz Seismic Load: 0
Vert Seismic Load: 0
Factor of Safety: 2.649
B
B'
EXISTING GROUND SURFACE
ORIGINAL GROUND SURFACE
B-1
B-5 PROJECTED ~40' NORTH
Description: Qppf
Wt: 130
Cohesion: 700
Phi: 25
Description: Kwm
Wt: 130
Cohesion: 700
Phi: 25
1000
990
980
970
960
950
940
930
920
0
50
100
150
200
DISTANCE (FEET)