APPENDIX F2

Geotechnical Addendum

GROUP DELTA

Spring Meadows Homes, LLC.
18217 Gale Avenue, Suite A
City of Industry, CA 91478

August 3, 2023
Group Delta Project No. LA1579A

Attention: Mr. Jack Su

Subject: Geotechnical Addendum – Response to Comments from City of Walnut
Proposed Residential Development
Tentative Tract No. 72798
Assessor's Parcel Numbers: 8709-093-001, 002, & 003
Northeast corner of North Lemon Avenue & La Puente Road
City of Walnut, California

Dear Mr. Su,

This letter presents our responses to the comments provided by City of Walnut regarding the Environmental Impact Document for the subject property. We previously performed a geotechnical investigation and presented the results in a report dated March 17, 2023 (Group Delta Project No. LA-1579). The comments were provided by VCS Environmental in a memorandum dated May 12, 2023. The memorandum is attached to this letter for ease of reference.

The geotechnical/geological related comments and Group Delta's responses are itemized below.

City's Comment:
The City's General Plan Figure PS-4 Seismic Hazards identifies a potential landslide area on the project site. The project geotechnical references that the site does not include slopes recognized for the potential of seismically induced landslide hazards as shown in Figure 7. The geotechnical report Figure 7 is not consistent with General Plan Figure PS-4. In the Draft EIR we will be addressing Seismic Hazards identified in the General Plan. For consistency, we would like to see the project geotechnical report address the landslide hazard identified in the General Plan and incorporate it into the geotechnical report analysis.

Group Delta's Response:

The City of Walnut General Plan Figure PS-4 is shown in Figure 1. The General Plan figure is a regional map identifying areas requiring investigation for seismically induced geologic hazards, including Fault Rupture, Landslide, and Liquefaction. The Figure PS-4 is cited as sourced from the California Department of Conservation, Seismic Hazards Zones, 1999. The state Seismic Hazard Zone map was presented in Figure 7 of the Group Delta report. These references should reflect consistent hazard zones.

The regional scale of these maps can be misleading to the actual seismic hazard zone for landslides in relation to the project site. The zone mapped in PS-4 appears to extend from the west facing slope, cross Lemon Creek Road, then cross Lemon Creek, and terminate irregularly within the lower portions of the existing eastern slope. While the state Seismic Hazard Zone map illustrates the same zone, just west of the site, within the hills extending up from Lemon Creek Road. In addition, the identified liquefaction hazard zone on Figure PS-4 is mapped outside of the creek area and within bedrock slope areas. These factors indicate that the location of the hazard areas in relation to the site, needs to be further evaluated at a site-specific scale with site geologic context.

First, to better evaluate the state mapped location of the seismic hazard potential landslide zone with respect to the slopes at the project site, an overlay comparison of the site plan with the California Department of Conservation Seismic Hazards Zones GIS mapping data was performed, Figure 2.1. Then we performed additional exploration within the areas of the landslide hazard zone which encroached the project site. The soil conditions within the area were further explored by drilling three (3) borings (B-22 to B-24) to depths of 26 to 31 feet below the existing grade using hollow stem auger drilling equipment at the locations shown on Figure 2.1 and 2.2. Details of the current explorations and the logs of the borings and test pits are presented in Appendix A.

Laboratory testing was performed on selected soil samples collected from the borings to characterize the subsurface materials and to evaluate their index and engineering properties. The laboratory testing program consisted of the following:

- Soil classification
- Pocket Penetrometer
- Direct Shear
- Moisture/Density

The summary of the current laboratory testing and results with a brief description is presented in Appendix B.

The subsurface soils consist of artificial fill (af), alluvium (Qa) and colluvial (Qc) soils underlain by Monterey (Puente) Formation (Tpsq). The alluvium and colluvium consist predominantly of medium stiff to stiff clayey soils and medium dense sand. Groundwater was encountered at about elevations 584 and 588 feet, likely perched within the alluvial deposits overlying the bedrock materials.

Slope Model

The slope conditions were evaluated through geotechnical borings, surface topography, and geologic mapping performed onsite during our prior investigation and reported geologic conditions within N. Lemon Avenue by Leighton and Associated (1991) Grading Plan for Keystone Estates. Mapped and boring data indicate that slope is comprised of thinly bedded siltstone and

sandstone bedrock of the Monterey (mapped Topanga) formation. Bedrock bedding orientations measured during the development of N. Lemon Avenue indicate 1) that the bedrock is shallow below the roadway and 2) bedding dips consistently to the northeast, obliquely to the slope, ranging from 12-62 degrees. A dip of 40 degrees was estimated through averaging the bedding data. The apparent dip was calculated for each representative cross section, as shown in Figure 3.1 and 3.2. Overlying the slope face is an unknown depth of colluvium and fill. At the toe of the slope alluvium has partially filled in drainage from Lemon Creek. Some fill is also within the tow of the slope.

Cross section 10-10' (Figure 3.1) was prepared to model the slope conditions within the landslide investigation zone overlapping into the western most portion of the site. There is no proposed grading or proposed structures in the landslide investigation zone. Cross Section 11-11' (Figure 3.2) was prepared to model the slope just outside the mapped landslide investigation zone, where there is some minor proposed grading to accommodate the proposed storm water retention basin.

Slope stability analyses were performed on cross sections 10-10' and 11-11'. Analyses on Cross Section 10-10' were to evaluate the global stability of the existing slope. Analyses on Cross Section 11-11' were to evaluate the global stability that might be impacted from the proposed Basin No.1 excavation that will be installed at the toe of the existing slope. Details of analyses procedures and results are discussed in the following sections.

Shear Strength

Shear strengths of the materials onsite were selected based on the results of both field and laboratory tests. For bedrock, cross bedding shear strengths were obtained from first pass of direct shear test results. For along bedding strength, we were to use the strength parameters from the results of reshear of samples. However, we conservatively took lowest values from the direct shear tests that were performed on bedrock materials.

The shear strength values utilized in our analysis are presented in Table 1.

Table 1: Recommended Shear Strength Parameters for Stability Analyses

Materials	Unit Weight (pcf)	Friction Angle (deg)	Cohesion (psf)
Fill	120	30	200
Alluvium (Clay)	120	30	200
Colluvium	120	29	50
Claystone Bedrock – Cross Bedding	70	40	100
Claystone Bedrock – Along Bedding	70	20	100

Global Stability Analyses

The global stability analyses were performed using Slide slope stability software. The Bishop simplified method was applied to the slope conditions modelled in Cross sections 10-10' and 11-11'. For seismic slope stability analyses, we have used horizontal seismic coefficient of 0.15g in accordance with the "Manual for Preparation of Geotechnical Reports (LACDPW, 2013).

We have used circular method to evaluate the global stability analyses. We also used anisotropic model and non-circular analyses to confirm the global stability that might be impacted by the bedrock along bedding strength. Bedrock bedding orientation dips obliquely to the slope.

The static and seismic stability analyses indicates that the factor of safety of the slope against global instability are great than 1.5 and 1.1 for static case and seismic case, respectively. The results of the slope stability analyses are summarized in Table 2.1 and 2.2 for Section 10-10', and 11-11', respectively. The results of the stability analyses are presented in Appendix C.

Table 2.1. Slope Stability Analyses Summary – Section 10-10'

Cross Section	Method	Description	Factor of Safety	
			Static	Seismic
10-10'	Circular	Existing Slope	1.66	1.22
	Non-Circular	Existing Slope	2.27	1.51

Table 2.2. Slope Stability Analyses Summary – Section 11-11'

Cross Section	Method	Description	Factor of Safety	
			Static	Seismic
11-11'	Circular	Existing Slope	1.81	1.29
	Non-Circular	Existing Slope	3.35	2.42
	Circular	Basin No. 1 Excavation at Toe of Slope	1.81	1.29
	Non-Circular	Basin No. 1 Excavation at Toe of Slope	3.32	2.11

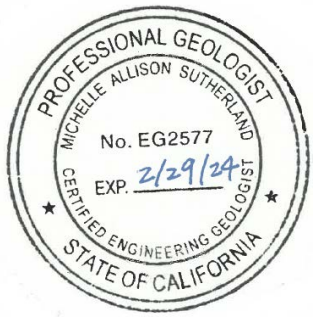
Conclusion

Based on the results of the stability analyses discussed herein, it is our opinion that global stability is not an issue. The proposed structures may be setback from adjacent slopes in accordance with Section 1808.7 of 2022 California Building Code. No other special structural setback is required.

The recommendations were developed in accordance with generally accepted geotechnical engineering principles and practice. The professional engineering work and judgments presented in this memorandum meet the standard of care of our profession at this time. No other warranty, expressed or implied, is made.

Sincerely,
Group Delta Consultants, Inc.





Ethan Tsai, G.E.
Associate Geotechnical Engineer

Michelle A. Sutherland, CEG
Associate Engineering Geologist

Attachments:

City's Comments Memorandum

Figure 1 – Seismic Hazard Map

Figures 2.1 and 2.2 – Exploration and Geology Maps

Figures 3.1 and 3.2 – Cross Section 10-10' and 11-11'

Appendix A – Field Exploration

Appendix B – Laboratory Test Results

Appendix C – Slope Stability Analyses

CITY'S COMMENTS MEMORANDUM

VCS Environmental
EXPERT SOLUTIONS | CEQA-NEPA . Biology . Regulatory

Memorandum

Date: May 12, 2023

To: Joelle Guerra, City of Walnut

From: Dan Bott, VCS Environmental

Subject: The Brookside Development Project Hydrology Report and Geotechnical Report Comments

The following are comments on the revised Hydrology Report prepared for The Brookside Development Project by Pace in April 2023. In order to respond to California Department Fish and Wildlife NOP comment letter and to provide greater clarity on potential water quality issues, we are requesting that additional information be included in the Hydrology Report. Additionally, we are requesting that additional information be included in the geotechnical report.

Hydrology Report

1. The CDFW NOP comment letter requests that the Draft EIR provide hydrological modeling of the 100, 50, 25, 5 and 2-year frequency storm events and how water and sediment is conveyed through the project site. The hydrology report which we used for our analysis in the Draft EIR provides 2, 10, 50 and 100-year storm modeling and does not include 5- and 25-year modeling. We will need to respond to the CDFW comment letter in the Draft EIR and would like the hydrology study to include the 5 year and 25-year modeling or have the hydrology report provide a clear explanation of why it is not needed for us to include in the Draft EIR to respond to CDFWS's request.
2. The CDFW NOP comment letter requests that the Draft EIR provide a discussion of how water is flowed, and how sediment is transported through site for each year of the requested modeling. It is not clear to us if the hydrology report is addressing sediment being transported through the site. To respond to CDFW's comment we would like the hydrology report to include a section that specifically addresses this issue for us to incorporate into the Draft EIR.
3. The Steam Stability section of the revised hydrology report references a Streambed Stability Analysis provided in Appendix C, which is based on the former 28-unit plan and the data and analysis provided in the prior hydrology report. The report concludes the

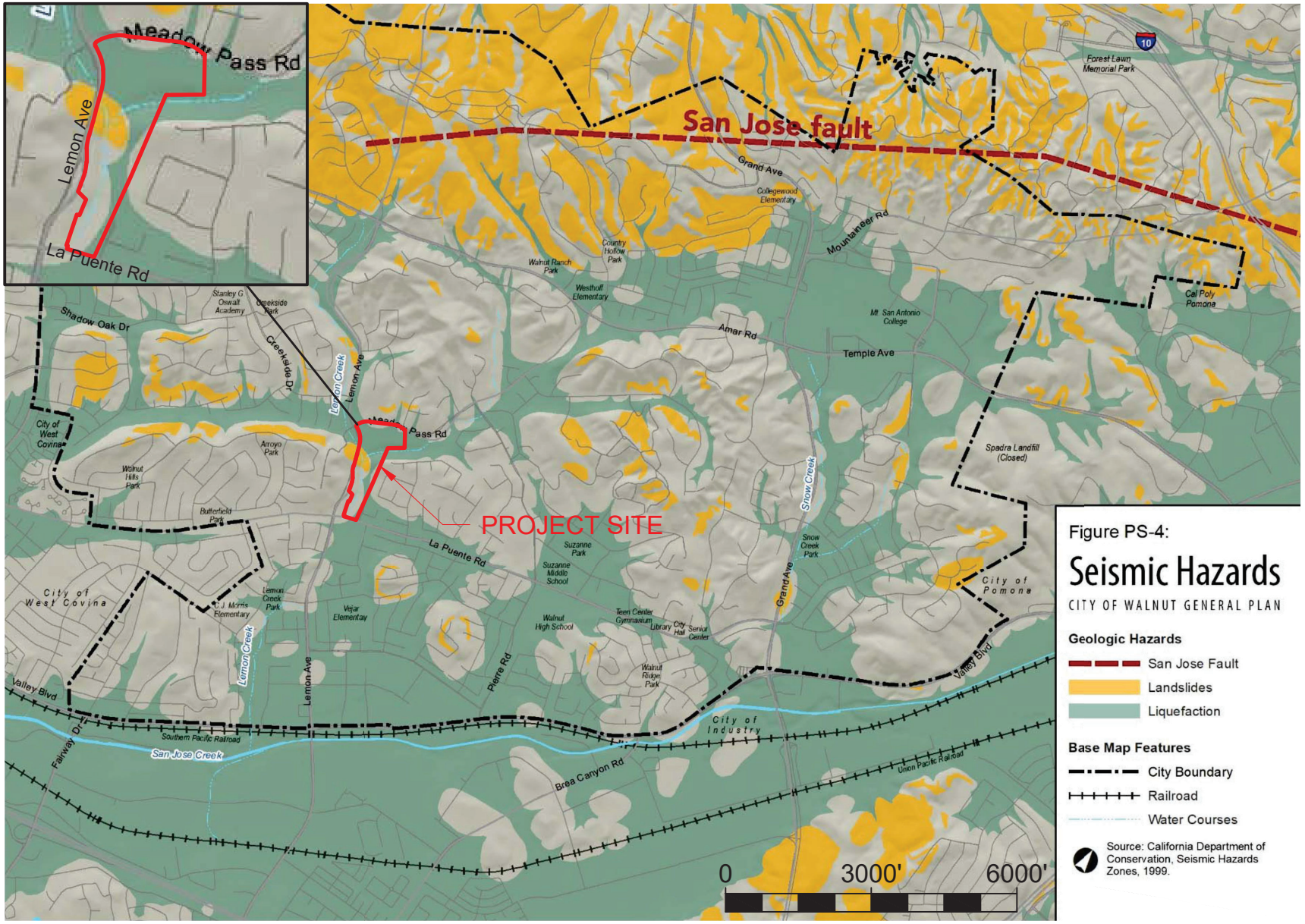
results streambed stability analysis would be the same. A fundamental rule of CEQA is to Show Your Work. We believe stream stability is a key environmental issue for CDFW and the public and that the Streambed Stability Analysis in Appendix C should be updated like all of the other reports that have been revised to evaluate the current proposed project and incorporate data and analysis from the current hydrology report.

4. The hydrology report identifies that increased stormwater runoff from the site would be mitigated by the two proposed onsite water basins before being released into Lemon Creek. The hydrology report should discuss potential pollutant and potential water quality issues to Lemon Creek associated with releasing stormwater runoff into Lemon Creek.
5. The hydrology report identifies that 100 percent 100-year storm flow would be retained onsite and because of lack of adequate infiltration, would be slowly released into Lemon Creek. The Hydrology Report should discuss potential pollutant and potential water quality issues to Lemon Creek associated with releasing 100-year stormwater runoff into Lemon Creek.

Geology

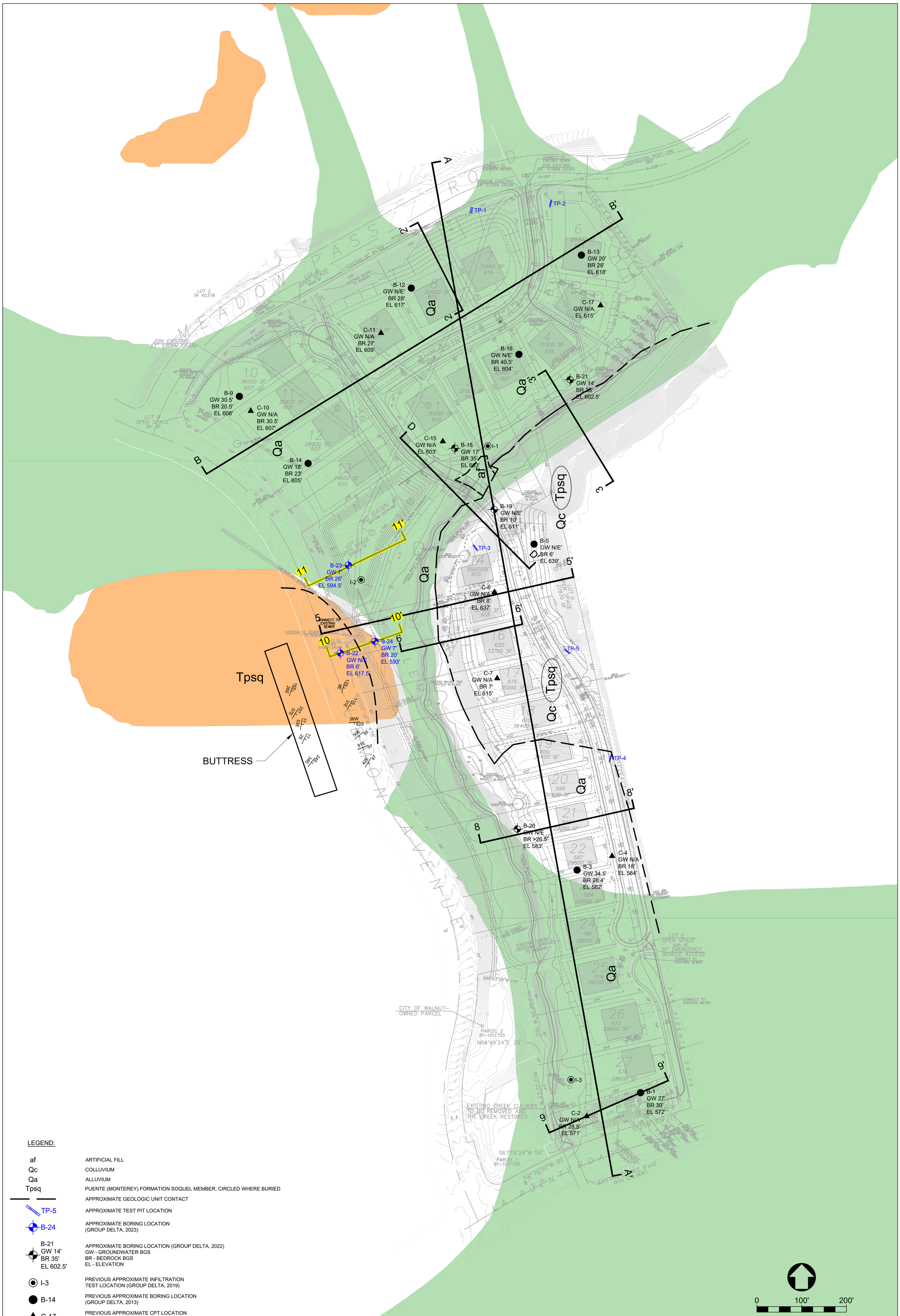
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FIGURES



DATE: 06/28/2023	DRAWN BY: JMT	GROUP DELTA	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	PROJECT NUMBER: LA1579A
REVIEWED BY: ET	APPROVED BY: -		SEISMIC HAZARD CITY OF WALNUT GENERAL PLAN PROPOSED RESIDENTIAL DEVELOPMENT SPRING MEADOWS HOMES, LLC. WALNUT, CALIFORNIA	SCALE: AS SHOWN
PREPARED BY: -				FIGURE NUMBER: 1

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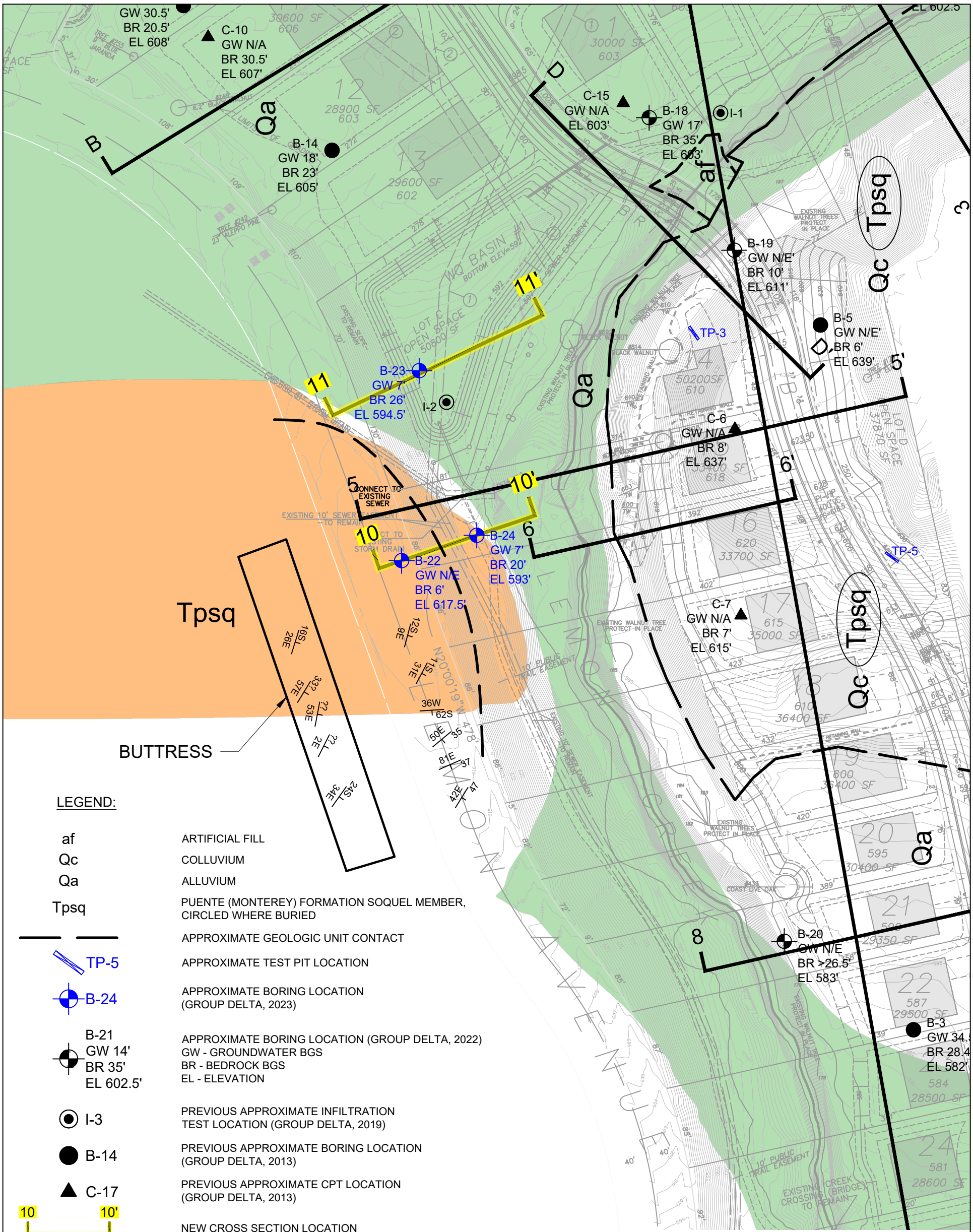
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Qa	ALLUVIUM
Tpsq	PUENTE (MONTEREY) FORMATION SOQUEL MEMBER, CIRCLED WHERE BURIED
	APPROXIMATE GEOLOGIC UNIT CONTACT
TP-5	APPROXIMATE TEST PIT LOCATION
B-24	APPROXIMATE BORING LOCATION (GROUP DELTA, 2023)
B-21 GW 14' BR 35' EL 602.5'	APPROXIMATE BORING LOCATION (GROUP DELTA, 2022) GW - GROUNDWATER BGS BR - BEDROCK BGS EL - ELEVATION
I-3	PREVIOUS APPROXIMATE INFILTRATION TEST LOCATION (GROUP DELTA, 2019)
B-14	PREVIOUS APPROXIMATE BORING LOCATION (GROUP DELTA, 2013)
C-17	PREVIOUS APPROXIMATE CPT LOCATION (GROUP DELTA, 2013)
10 10'	NEW CROSS SECTION LOCATION
A A'	PREVIOUS CROSS SECTION LOCATION (2022)
	STATE MAPPED EARTHQUAKE ZONE OF REQUIRED INVESTIGATION FOR EARTHQUAKE INDUCED LANDSLIDE
	STATE MAPPED EARTHQUAKE ZONE OF REQUIRED INVESTIGATION FOR EARTHQUAKE INDUCED LIQUEFACTION
9 600 36400 SF	PROPOSED RESIDENTIAL DEVELOPMENT, SPRING MEADOWS HOMES, LLC.

REFERENCE: LEIGHTON AND ASSOCIATES, INC. GRADING PLAN REVIEW FOR KEYSTONE RIDGE ESTATES (1991). STRIKE AND DIP OF BEDROCK BEDDING PLANE (LEIGHTON, 1991) AND CALIFORNIA DEPARTMENT OF CONSERVATION, SEISMIC HAZARDS ZONES, 1999.

DATE: 08/02/2023	DRAWN BY: JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	EXPLORATION AND GEOLOGY MAP	PROJECT NUMBER: LA1579A
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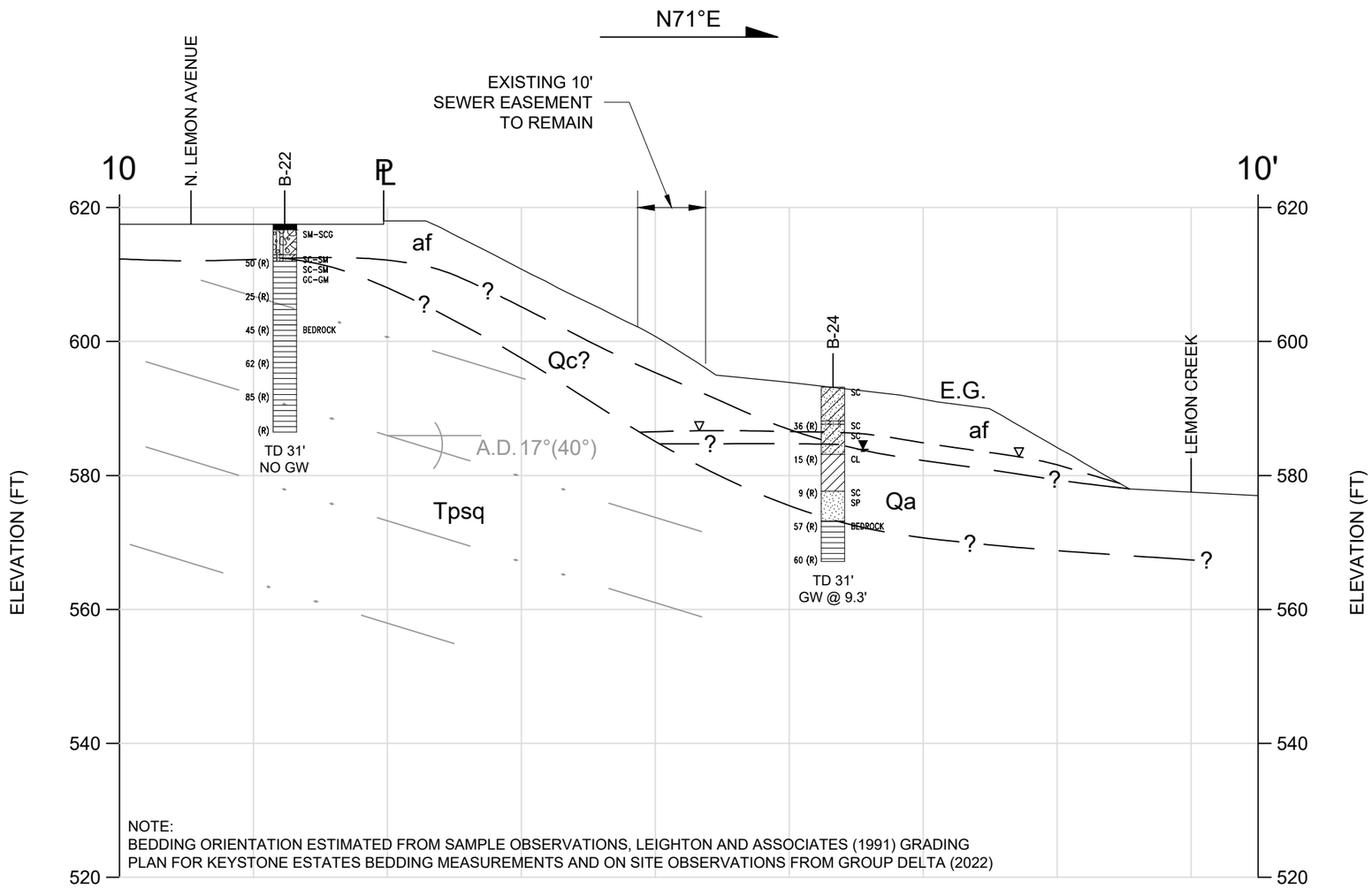
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	STATE MAPPED EARTHQUAKE ZONE OF REQUIRED INVESTIGATION FOR EARTHQUAKE INDUCED LIQUEFACTION
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REFERENCE: LEIGHTON AND ASSOCIATES, INC. GRADING PLAN REVIEW FOR KEYSTONE RIDGE ESTATES (1991). STRIKE AND DIP OF BEDROCK BEDDING PLANE (LEIGHTON, 1991) AND CALIFORNIA DEPARTMENT OF CONSERVATION, SEISMIC HAZARDS ZONES, 1999.

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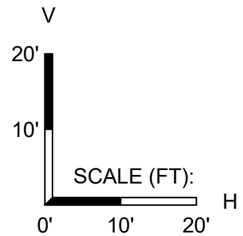
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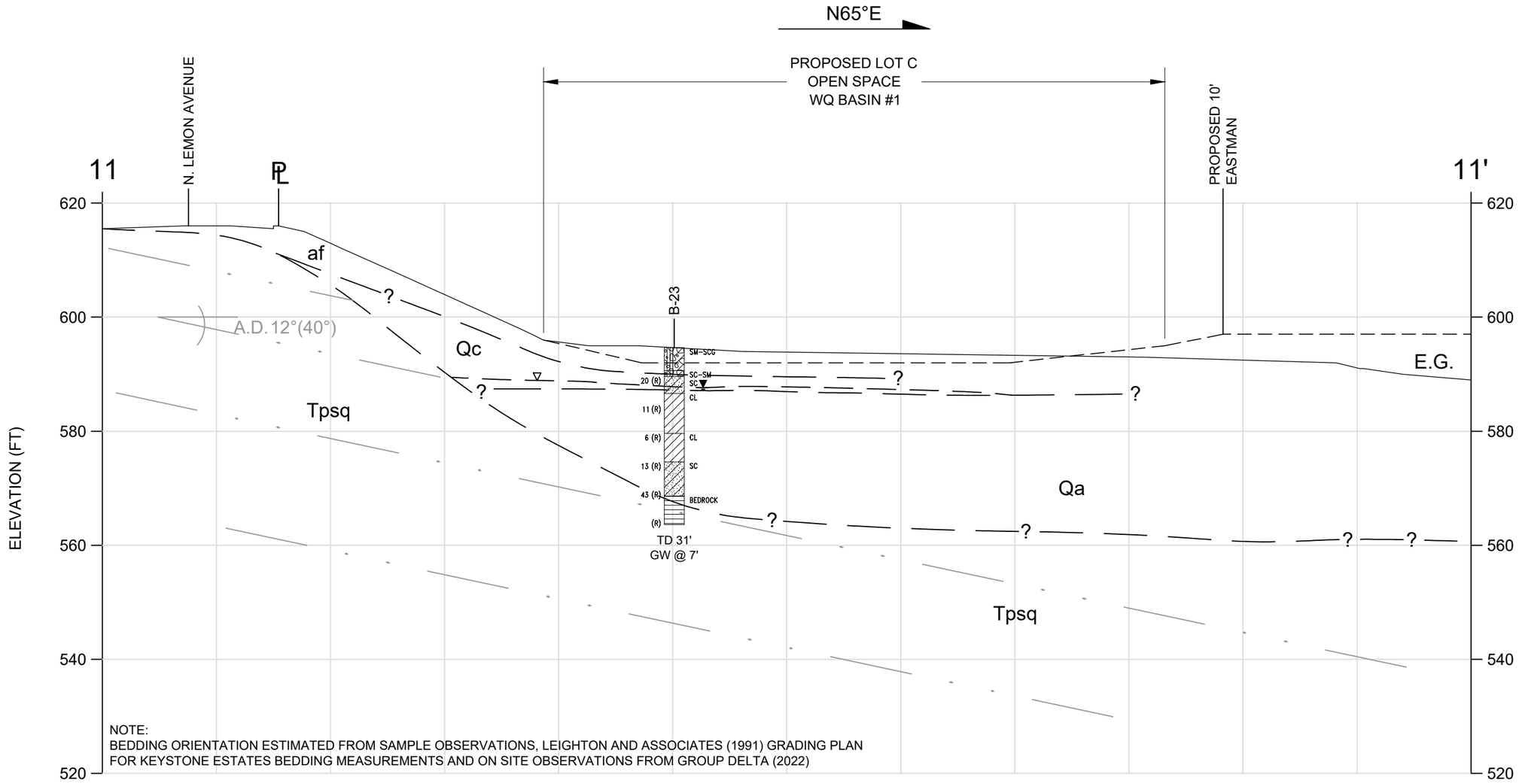
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Qc	COLLUVIUM
Qa	ALLUVIUM
Tpsq	PUENTE FORMATION SOQUEL MEMBER
— — —	PROPOSED GRADE
—— ? ——	APPROXIMATE GEOLOGIC CONTACT
—— · · ——	BEDDING OF BEDROCK APPARENT DIP (TRUE DIP)
▽	MEASURE GROUNDWATER AFTER DRILLING
▼	GROUNDWATER ENCOUNTERED DURING DRILLING
PL	PROPERTY LINE
E.G.	EXISTING GRADE



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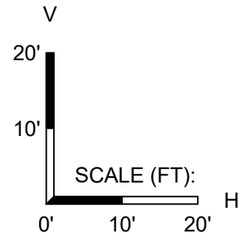
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NOTE:
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Qa	ALLUVIUM
Tpsq	PUENTE FORMATION SOQUEL MEMBER
— — —	PROPOSED GRADE
—— ? ——	APPROXIMATE GEOLOGIC CONTACT
— · · —	BEDDING OF BEDROCK APPARENT DIP (TRUE DIP)
▽	MEASURE GROUNDWATER AFTER DRILLING
▼	GROUNDWATER ENCOUNTERED DURING DRILLING
PL	PROPERTY LINE
E.G.	EXISTING GRADE



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PROJECT NUMBER: LA1579A
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APPENDIX A

FIELD INVESTIGATION

APPENDIX A
FIELD EXPLORATION

A.1 Introduction

Group Delta conducted supplemental subsurface explorations on June 23, 2023 for slope stability assessment for the Residential Development (Tentative Tract No. 72798) in Walnut, California. The explorations consisted of three (3) hollow-stem borings. The exploration locations and numbers are shown in Figure 2.1 and 2.2. A summary table of the recent field explorations conducted by Group Delta is provided in Table A-1.

Table A-1
Summary of Subsurface Explorations

Exploration No.	Date Performed	*Ground Surface Elevation (feet, MSL)	Total Depth (ft)	Groundwater Depth (ft)	Exploration Type
B-22	6/23/2023	617.5	31	Not Encountered	Hollow-Stem Auger
B-23	6/23/2023	594.5	31	7	Hollow-Stem Auger
B-24	6/23/2023	593	26	7	Hollow-Stem Auger

*Approximate ground surface elevations taken from Michael Baker International Tentative Tract Map (08/10/2022)

A.2 Borings

Hollow-stem auger borings were advanced to depths of 26 to 31 feet below the ground surface at different areas of the site. The borings were drilled on June 23, 2023, by 2R Drilling, Inc. (Group Delta's subcontractor) by way of a CME 75 drill rig. The borings were performed under the supervision of a Group Delta field engineer, who maintained detailed logs of the soils and bedrock encountered, classified the materials in accordance with the Unified Soil Classification System (USCS) and the Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010), obtained samples, and measured groundwater levels.

Driven samples and bulk samples of the encountered subsurface materials were obtained from the borings. Driven samples were collected with a Modified California Sampler lined with 1-inch-high brass sample rings. The Modified California sampler has an outside diameter of 3 inches, and a cutting shoe with an inside diameter of 2.42 inches. The driven samples were retained in brass rings, placed in sealed plastic canisters to prevent moisture loss, and transported to Group Delta's laboratory for testing and further evaluation. The Modified California samplers were driven into the soil and/or rock at the bottom of the borehole using a 140-pound hammer free-falling 30 inches. The penetration resistance (or "blow count") in blows per six inches of driving was recorded on the logs. Bulk samples were obtained at various depth ranges and placed into polyethylene bags.

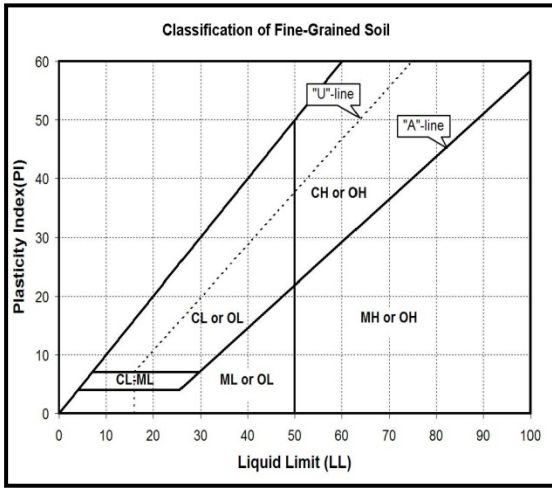
CLASSIFICATION OF INORGANIC FINE GRAINED SOILS (Soils with ≥50% finer than No. 200 Sieve)

GROUP SYMBOL				GROUP NAME
CL	<30% plus No. 200	<15% plus No. 200		Lean clay
		15-25% plus No. 200	%sand ≥%gravel	Lean clay with sand
			%sand <%gravel	Lean clay with gravel
	≥30% plus No. 200	% sand ≥ % gravel	<15% gravel	Sandy lean clay
			≥15% gravel	Sandy lean clay with gravel
		% sand < % gravel	<15% sand	Gravelly lean clay
			≥15% sand	Gravelly lean clay with sand
ML	<30% plus No. 200	<15% plus No. 200		Silt
		15-25% plus No. 200	%sand ≥%gravel	Silt with sand
			%sand <%gravel	Silt with gravel
	≥30% plus No. 200	% sand ≥ % gravel	<15% gravel	Sandy silt
			≥15% gravel	Sandy silt with gravel
		% sand < % gravel	<15% sand	Gravelly silt
			≥15% sand	Gravelly silt with sand
CH	<30% plus No. 200	<15% plus No. 200		Fat clay
		15-25% plus No. 200	%sand ≥%gravel	Fat clay with sand
			%sand <%gravel	Fat clay with gravel
	≥30% plus No. 200	% sand ≥ % gravel	<15% gravel	Sandy fat clay
			≥15% gravel	Sandy fat clay with gravel
		% sand < % gravel	<15% sand	Gravelly fat clay
			≥15% sand	Gravelly fat clay with sand
MH	<30% plus No. 200	<15% plus No. 200		Elastic silt
		15-25% plus No. 200	%sand ≥%gravel	Elastic silt with sand
			%sand <%gravel	Elastic silt with gravel
	≥30% plus No. 200	% sand ≥ % gravel	<15% gravel	Sandy elastic silt
			≥15% gravel	Sandy elastic silt with gravel
		% sand < % gravel	<15% sand	Gravelly elastic silt
			≥15% sand	Gravelly elastic silt with sand

Reference:
ASTM D 2487 and 2488

Laboratory Classification of Clay and Silt

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).



CL: LL<50; above A-Line.

CH: LL≥50; above A-Line.

ML: LL<50; below A-Line, or PI<4, or Non-Plastic

MH: LL≥50; below A-Line.

CL-ML: above A-Line and PI=4 to 7

CL/CH, ML/MH: at or near LL=50

ML/CL, MH/CH: at or near the A-Line

Field Identification of Clays and Silts

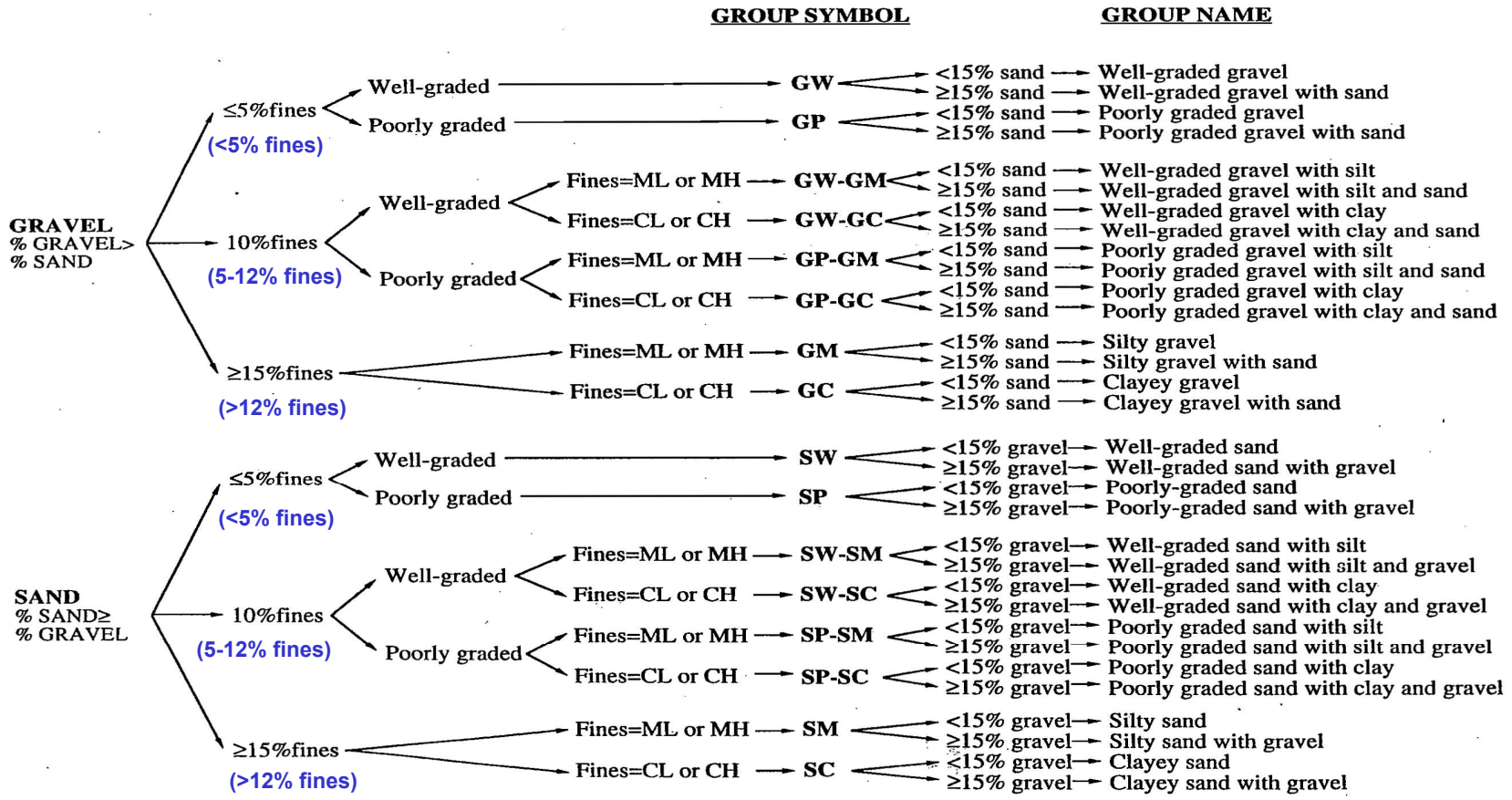
Group Symbol	Dry Strength	Dilatancy	Toughness	Plasticity
ML	None to low	Slow to rapid	Low or thread cannot be formed	Low to nonplastic
CL	Medium to high	None to slow	Medium	Medium
MH	Low to medium	None to slow	Low to medium	Low to medium
CH	High to very high	None	High	High

GROUP DELTA

Project No.: LA-1579

KEY FOR SOIL CLASSIFICATION #1
Figure A-1a

CLASSIFICATION OF COARSE-GRAINED SOILS (Soils with <50% "fines" passing No. 200 Sieve)



Reference:

ASTM D 2487 and 2488

Note: Values estimated to nearest 5% to be used for visual identification, values in parentheses to be used for classification when based on laboratory grain size data.

Granular Soil Gradation Parameters

Coefficient of Uniformity: $C_u = D_{60}/D_{10}$

Coefficient of Curvature: $Cc = D_{30}^2 / (D_{60} \times D_{10})$

D_{10} = 10% of soil is finer than this diameter

D_{30} = 30% of soil is finer than this diameter

D_{60} = 60% of soil is finer than this diameter

Group Symbol	Gradation or Plasticity Requirement
SW	$C_u > 6$ and $1 \leq C_c \leq 3$
GW	$C_u > 4$ and $1 \leq C_c \leq 3$
GP or SP	Clean gravel or sand not meeting requirement for SW or GW
SM or GM	Non-plastic fines or below A-Line or PI<4
SC or GC	Plastic fines or above A-Line and PI>7

GROUP DELTA

Project No.: LA-1579

KEY FOR SOIL CLASSIFICATION #2

Figure A-1b

SOIL IDENTIFICATION AND DESCRIPTION SEQUENCE

Sequence		Refer to Section		Required	Optional
		Field	Lab		
1	Group Name	2.5.2	3.2.2	●	
2	Group Symbol	2.5.2	3.2.2	●	
	Description Components				
3	Consistency of Cohesive Soil	2.5.3	3.2.3	●	
4	Apparent Density of Cohesionless Soil	2.5.4		●	
5	Color	2.5.5		●	
6	Moisture	2.5.6		●	
7	Percent or Proportion of Soil	2.5.7	3.2.4	●	◍
	Particle Size	2.5.8	2.5.8	●	◍
	Particle Angularity	2.5.9			○
	Particle Shape	2.5.10			○
8	Plasticity (for fine-grained soil)	2.5.11	3.2.5		○
9	Dry Strength (for fine-grained soil)	2.5.12			○
10	Dilatency (for fine-grained soil)	2.5.13			○
11	Toughness (for fine-grained soil)	2.5.14			○
12	Structure	2.5.15			○
13	Cementation	2.5.16		●	
14	Percent of Cobbles and Boulders	2.5.17		●	
	Description of Cobbles and Boulders	2.5.18		●	
15	Consistency Field Test Result	2.5.3		●	
16	Additional Comments	2.5.19			○

Describe the soil using descriptive terms in the order shown

Minimum Required Sequence:

USCS Group Name (Group Symbol); Consistency or Density; Color; Moisture; Percent or Proportion of Soil; Particle Size; Plasticity (optional).

◍ = optional for non-Caltrans projects

Where applicable:

Cementation; % cobbles & boulders;
Description of cobbles & boulders;
Consistency field test result

Ref.: Caltrans Soil and Rock Logging Classification, and Presentation Manual (2010)

HOLE IDENTIFICATION

Holes are identified using the following convention:

H-YY-NNN

Where:
H: Hole Type Code
YY: 2-digit year
NNN: 3-digit number (001-999)

Hole Type Code	Description
A	Auger boring (hollow or solid stem, bucket)
R	Rotary drilled boring (conventional)
RC	Rotary core (self-cased wire-line, continuously-sampled)
RW	Rotary core (self-cased wire-line, not continuously sampled)
P	Rotary percussion boring (Air)
HD	Hand driven (1-inch soil tube)
HA	Hand auger
D	Driven (dynamic cone penetrometer)
CPT	Cone Penetration Test
O	Other (note on LOTB)

Description Sequence Examples:

SANDY lean CLAY (CL); very stiff; yellowish brown; moist; mostly fines; some SAND, from fine to medium; few gravels; medium plasticity; PP=2.75.

Well-graded SAND with SILT and GRAVEL and COBBLES (SW-SM); dense; brown; moist; mostly SAND, from fine to coarse; some fine GRAVEL; few fines; weak cementation; 10% GRANITE COBBLES; 3 to 6 inches; hard; subrounded.

Clayey SAND (SC); medium dense, light brown; wet; mostly fine sand,; little fines; low plasticity.

GROUP DELTA

GROUP DELTA CONSULTANTS, INC.
GEOTECHNICAL ENGINEERS AND GEOLOGISTS

FIGURE NUMBER A-2a

PROJECT NAME: Residential Development - Tentative Tract No. 72798

PROJECT NUMBER LA-1579

BORING RECORD LEGEND #1

GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names
GW	Well-graded GRAVEL Well-graded GRAVEL with SAND
GP	Poorly graded GRAVEL Poorly graded GRAVEL with SAND
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND
GW-GC	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GP-GM	Poorly graded GRAVEL with SILT Poorly graded GRAVEL with SILT and SAND
GP-GC	Poorly graded GRAVEL with CLAY (or SILTY CLAY) Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GM	SILTY GRAVEL SILTY GRAVEL with SAND
GC	CLAYEY GRAVEL CLAYEY GRAVEL with SAND
GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND
SW	Well-graded SAND Well-graded SAND with GRAVEL
SP	Poorly graded SAND Poorly graded SAND with GRAVEL
SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL
SW-SC	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SP-SM	Poorly graded SAND with SILT Poorly graded SAND with SILT and GRAVEL
SP-SC	Poorly graded SAND with CLAY (or SILTY CLAY) Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SM	SILTY SAND SILTY SAND with GRAVEL
SC	CLAYEY SAND CLAYEY SAND with GRAVEL
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL
PT	PEAT
	COBBLES COBBLES and BOULDERS BOULDERS

Graphic / Symbol	Group Names
CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
CL-ML	SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
ML	SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
OL	ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
OL	ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
CH	Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
MH	Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
OH	ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
OH	ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
OL/OH	ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND

FIELD AND LABORATORY TESTS

C	Consolidation (ASTM D 2435-04)
CL	Collapse Potential (ASTM D 5333-03)
CP	Compaction Curve (CTM 216 - 06)
CR	Corrosion, Sulfates, Chlorides (CTM 643 - 99; CTM 417 - 06; CTM 422 - 06)
CU	Consolidated Undrained Triaxial (ASTM D 4767-02)
DS	Direct Shear (ASTM D 3080-04)
EI	Expansion Index (ASTM D 4829-03)
M	Moisture Content (ASTM D 2216-05)
OC	Organic Content (ASTM D 2974-07)
P	Permeability (CTM 220 - 05)
PA	Particle Size Analysis (ASTM D 422-63 [2002])
PI	Liquid Limit, Plastic Limit, Plasticity Index (AASHTO T 89-02, AASHTO T 90-00)
PL	Point Load Index (ASTM D 5731-05)
PM	Pressure Meter
PP	Pocket Penetrometer
R	R-Value (CTM 301 - 00)
SE	Sand Equivalent (CTM 217 - 99)
SG	Specific Gravity (AASHTO T 100-06)
SL	Shrinkage Limit (ASTM D 427-04)
SW	Swell Potential (ASTM D 4546-03)
TV	Pocket Torvane
UC	Unconfined Compression - Soil (ASTM D 2166-06) Unconfined Compression - Rock (ASTM D 2938-95)
UU	Unconsolidated Undrained Triaxial (ASTM D 2850-03)
UW	Unit Weight (ASTM D 4767-04)
VS	Vane Shear (AASHTO T 223-96 [2004])

SAMPLER GRAPHIC SYMBOLS

- Standard Penetration Test (SPT)
- Standard California Sampler
- Modified California Sampler
- Shelby Tube
- Piston Sampler
- NX Rock Core
- HQ Rock Core
- Bulk Sample
- Other (see remarks)

DRILLING METHOD SYMBOLS

- Auger Drilling
- Rotary Drilling
- Dynamic Cone or Hand Driven
- Diamond Core

WATER LEVEL SYMBOLS

- First Water Level Reading (during drilling)
- Static Water Level Reading (after drilling, date)

DEFINITIONS FOR CHANGE IN MATERIAL

Term	Definition	Symbol
Material Change	Change in material is observed in the sample or core, and the location of change can be accurately measured.	———
Estimated Material Change	Change in material cannot be accurately located because either the change is gradational or because of limitations in the drilling/sampling methods used.	- - - - - - - -
Soil/Rock Boundary	Material changes from soil characteristics to rock characteristics.	~~~~~

Ref.: Caltrans Soil and Rock Logging Classification, and Presentation Manual (2010)

GROUP DELTA

GROUP DELTA CONSULTANTS, INC.
GEOTECHNICAL ENGINEERS AND GEOLOGISTS

FIGURE NUMBER
A-2b

PROJECT NAME:
Residential Development - Tentative Tract No. 72798

PROJECT NUMBER
LA-1579

BORING RECORD LEGEND #2

CONSISTENCY OF COHESIVE SOILS

Descriptor	Shear Strength (tsf)	Pocket Penetrometer, PP Measurement (tsf)	Torvane, TV. Measurement (tsf)	Vane Shear, VS. Measurement (tsf)
Very Soft	< 0.12	< 0.25	< 0.12	< 0.12
Soft	0.12 - 0.25	0.25 - 0.50	0.12 - 0.25	0.12 - 0.25
Medium Stiff	0.25 - 0.50	0.50 - 1.0	0.25 - 0.50	0.25 - 0.50
Stiff	0.50 - 1.0	1.0 - 2.0	0.50 - 1.0	0.50 - 1.0
Very Stiff	1.0 - 2.0	2.0 - 4.0	1.0 - 2.0	1.0 - 2.0
Hard	> 2.0	> 4.0	> 2.0	> 2.0

APPARENT DENSITY OF COHESIONLESS SOILS

Descriptor	SPT N_{60} - Value (blows / foot)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

MOISTURE

Descriptor	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

Descriptor	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

PARTICLE SIZE

Descriptor		Size (in)
Boulder		> 12
Cobble		3 - 12
Gravel	Coarse	3/4 - 3
	Fine	1/5 - 3/4
Sand	Coarse	1/16 - 1/5
	Medium	1/64 - 1/16
	Fine	1/300 - 1/64
Silt and Clay		< 1/300

PLASTICITY OF FINE-GRAINED SOILS

Descriptor	Criteria
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

CONSISTENCY OF COHESIVE SOILS VS. N_{60}

Description	SPT N_{60} (blows / foot)
Very Soft	0 - 2
Soft	2 - 4
Medium Stiff	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	> 30

Ref: Peck, Hansen, and Thornburn, 1974, "Foundation Engineering", Second Edition

Note: Only to be used (with caution) when pocket penetrometer or other data on undrained shear strength are unavailable. Not allowed by Caltrans Soil and Rock Logging and Classificaton Manual, 2010

CEMENTATION

Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

Ref.: Caltrans Soil and Rock Logging Classification, and Presentation Manual (2010), with the exception of consistency of cohesive soils vs. N_{60}.

GROUP DELTA

GROUP DELTA CONSULTANTS, INC.
GEOTECHNICAL ENGINEERS AND GEOLOGISTS

FIGURE NUMBER A-2c

PROJECT NAME: Residential Development - Tentative Tract No. 72798

PROJECT NUMBER LA-1579

BORING RECORD LEGEND #3

BORING RECORD

PROJECT NAME	PROJECT NUMBER	HOLE ID
Spring Meadows Homes, LLC	LA1579A	B-22

SITE LOCATION	START	FINISH	SHEET NO.
Intersection of N. Lemon Ave & Meadow Pass Rd, Walnut, CA	6/23/2023	6/23/2023	1 of 2

DRILLING COMPANY	DRILL RIG	DRILLING METHOD	LOGGED BY	CHECKED BY
2R Drilling	GT-16	Hollow-Stem Auger	M. Andreasen	E. Tsai

HAMMER TYPE (WEIGHT/DROP)	HAMMER EFFICIENCY (ERi)	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GW (ft)
Automatic Trip: 140lb / 30in		8	31	617.5	▽ N/E / *na* DURING DRILLING

DRIVE SAMPLER TYPE(S) & SIZE (ID)	NOTES	
CAL-Mod (2.4" I.D.)	N_{60}* = 1.0N_{MC}	▼ N/E / *na* AFTER DRILLING

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	MOISTURE (%)	DRY DENSITY (PCF)	PASSING #200 (%)	ATTERBERG LIMITS (LL:PL:PI)	POCKET PEN (tsf)	OTHER TESTS	DRILLING METHOD	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
														3" Asphalt over 6" Base.
	615		Bulk-1											**FILL** SILTY TO CLAYEY SAND WITH GRAVEL (SM-SCG), light yellow brown, dry, gravel (1/2-2" diameter), well-graded.
5			R-2	13 23 27										-Less GRAVEL, otherwise same as above. SILTY TO CLAYEY SAND (SC-SM). Asphalt in upper 6" of CalMod sampling.
	610													**PUENTE FORMATION (Tpsq)** Bedrock: CLAYSTONE, light gray, moist, extremely weathered, tightly fractured, thinly bedded to laminated, iron oxide staining, caliche stringers.
10			R-3	6 11 14		24.5	80.5			2.5				
	605													
15			R-4	13 20 25		25.2	70.9**			4.0				-dry, moderately weathered, thinly bedded, iron oxide staining coating fracture surfaces and laminae, few sandstone layers, trace manganese spotting.
	600													
20			R-5	25 25 37		23.1	76.7							
	595													

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GROUP DELTA CONSULTANTS, INC.
370 Amapola Ave., Suite 212
Torrance, CA 90501

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE
A-1 a

BORING RECORD

PROJECT NAME	PROJECT NUMBER	HOLE ID
Spring Meadows Homes, LLC	LA1579A	B-22

SITE LOCATION	START	FINISH	SHEET NO.
Intersection of N. Lemon Ave & Meadow Pass Rd, Walnut, CA	6/23/2023	6/23/2023	2 of 2

DRILLING COMPANY	DRILL RIG	DRILLING METHOD	LOGGED BY	CHECKED BY
2R Drilling	GT-16	Hollow-Stem Auger	M. Andreasen	E. Tsai

HAMMER TYPE (WEIGHT/DROP)	HAMMER EFFICIENCY (ERi)	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GW (ft)
Automatic Trip: 140lb / 30in		8	31	617.5	▽ N/E / *na* DURING DRILLING

DRIVE SAMPLER TYPE(S) & SIZE (ID)	NOTES	
CAL-Mod (2.4" I.D.)	N_{60}* = 1.0N_{MC}	AFTER DRILLING: ▼ N/E / *na*

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	MOISTURE (%)	DRY DENSITY (PCF)	PASSING #200 (%)	ATTERBERG LIMITS (LL:PL:PI)	POCKET PEN (tsf)	OTHER TESTS	DRILLING METHOD	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			R-6	21 35 50		27.6	79.1							
	590													
30			R-7	32 50		29.8	72.9							
	585													Total Depth: 31 feet bgs. Groundwater was not encountered. Boring backfiled with tamped soil cuttings and patched with 5" of cold-patch asphalt. **Average taken from Direct Shear test.
35														
	580													
40														
	575													
45														
	570													

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FIGURE
A-1 b

BORING RECORD

PROJECT NAME	PROJECT NUMBER	HOLE ID
Spring Meadows Homes, LLC	LA1579A	B-23

SITE LOCATION	START	FINISH	SHEET NO.
Intersection of N. Lemon Ave & Meadow Pass Rd, Walnut, CA	6/23/2023	6/23/2023	1 of 2

DRILLING COMPANY	DRILL RIG	DRILLING METHOD	LOGGED BY	CHECKED BY
2R Drilling	GT-16	Hollow-Stem Auger	M. Andreasen	E. Tsai

HAMMER TYPE (WEIGHT/DROP)	HAMMER EFFICIENCY (ERi)	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GW (ft)
Automatic Trip: 140lb / 30in		8	31	594.5	▽ 7.0 / *587.5* DURING DRILLING

DRIVE SAMPLER TYPE(S) & SIZE (ID)	NOTES	
CAL-Mod (2.4" I.D.)	N_{60}* = 1.0N_{MC}	▼ 7.0 / *587.5* AFTER DRILLING

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	MOISTURE (%)	DRY DENSITY (PCF)	PASSING #200 (%)	ATTERBERG LIMITS (LL:PL:PI)	POCKET PEN (tsf)	OTHER TESTS	DRILLING METHOD	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			Bulk-1											**FILL** SILTY TO CLAYEY SAND WITH GRAVEL (SM-SCG), gray brown, dry, some fine to medium gravel, thick roots.
	590													-Color change to brown, moist.
5			R-2	1 8 12		25.5	97.6							**COLLUVIUM** SANDY CLAY (SC); dark brown, very moist, stiff, fine to medium sand, moist, trace fine gravel and coarse sand, fine roots, plastic, caliche stringers, organic rich
	585													**ALLUVIUM (Qa)** CLAY (CL), brown, wet, medium stiff, few angular rock fragments, carbonate stringers, worm holes, organic rich, partially decomposed plant fragments, plastic, some sand.
10			R-3	3 4 7		24.8	98.4**			0.5	DS			
	580													
15			R-4	3 3 3		35.8	84.4			1.0				CLAY WITH SOME SAND (CL); greyish brown, wet, mostly fines, fine sand, low to medium plasticity, small fragments of partially decomposed plants.
	575													
20			R-5	11 9 4		34.6	85.3							CLAYEY SAND (SC); greyish brown, wet, fine to coarse sand, fine to medium angular gravel, few small fragments of partially decomposed plants.
	570													

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FIGURE
A-2 a

BORING RECORD

PROJECT NAME	PROJECT NUMBER	HOLE ID
Spring Meadows Homes, LLC	LA1579A	B-23

SITE LOCATION	START	FINISH	SHEET NO.
Intersection of N. Lemon Ave & Meadow Pass Rd, Walnut, CA	6/23/2023	6/23/2023	2 of 2

DRILLING COMPANY	DRILL RIG	DRILLING METHOD	LOGGED BY	CHECKED BY
2R Drilling	GT-16	Hollow-Stem Auger	M. Andreasen	E. Tsai

HAMMER TYPE (WEIGHT/DROP)	HAMMER EFFICIENCY (ERi)	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GW (ft)
Automatic Trip: 140lb / 30in		8	31	594.5	▽ 7.0 / *587.5* DURING DRILLING

DRIVE SAMPLER TYPE(S) & SIZE (ID)	NOTES	
CAL-Mod (2.4" I.D.)	N_{60}* = 1.0N_{MC}	▼ 7.0 / *587.5* AFTER DRILLING

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	MOISTURE (%)	DRY DENSITY (PCF)	PASSING #200 (%)	ATTERBERG LIMITS (LL:PL:PI)	POCKET PEN (tsf)	OTHER TESTS	DRILLING METHOD	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			R-6	10 18 25		19.8	107.4			4.0				-Same as above, caliche stringers, very stiff to hard.
	565													**BEDROCK- PUENTE FORMATION (Tpsg)** SANDY CLAYSTONE; medium to coarse grained sand, wet, mottled with white, red, yellow, tan; extremely weathered, tightly-intensely fractured.
30			R-7	21 50		30.7	86.9			4.0				
	560													Total Depth: 31 feet bgs. Groundwater was measured to be at 7' bgs. Boring backfiled with tamped soil cuttings. **Average taken from Direct Shear test.
35														
	555													
40														
	550													
45														
	545													

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370 Amapola Ave., Suite 212
Torrance, CA 90501

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE
A-2 b

BORING RECORD

PROJECT NAME	PROJECT NUMBER	HOLE ID
Spring Meadows Homes, LLC	LA1579A	B-24

SITE LOCATION	START	FINISH	SHEET NO.
Intersection of N. Lemon Ave & Meadow Pass Rd, Walnut, CA	6/23/2023	6/23/2023	1 of 2

DRILLING COMPANY	DRILL RIG	DRILLING METHOD	LOGGED BY	CHECKED BY
2R Drilling	GT-16	Hollow-Stem Auger	M. Andreasen	E. Tsai

HAMMER TYPE (WEIGHT/DROP)	HAMMER EFFICIENCY (ERi)	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GW (ft)
Automatic Trip: 140lb / 30in		8	26	593	▽ 9.3 / *583.8* DURING DRILLING

DRIVE SAMPLER TYPE(S) & SIZE (ID)	NOTES	
CAL-Mod (2.4" I.D.)	N_{60}* = 1.0N_{MC}	▼ 7.0 / *586.0* AFTER DRILLING

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	MOISTURE (%)	DRY DENSITY (PCF)	PASSING #200 (%)	ATTERBERG LIMITS (LL:PL:PI)	POCKET PEN (tsf)	OTHER TESTS	DRILLING METHOD	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
	590		Bulk-1											**FILL** CLAYEY SAND (SC), dark greyish brown, moist, fine to medium grained sand, some fine gravel, mostly fines, moderately plastic, some decomposed organics.
5			R-2	10 15 21		24.6	90.6			2.5				-1.25" diameter asphalt in upper 6" of CalMod sampling. CLAYEY SAND (SC), dark greyish brown, moist, very stiff, fine to medium grained sand, some fine gravel, mostly fines, moderately plastic, some decomposed organics, plastic.
	585													▽
10			R-3	4 7 8		33.3	86.1							**ALLUVIUM (Qa)** CLAY (CL); brown, moist, stiff, caliche stringers, few worm holes, fine angular rock fragments, few partially decomposed plant fragments.
	580													
15			R-4	4 6 3		26.9	93.2							-Same as above, increase in gravel. SAND (SP), yellowish gray brown, wet, medium stiff, fine to coarse sand, some to trace angular bedrock fragments, few fines.
	575													
20			R-5	13 19 38		38.1	80.7							**PUENTE FORMATION (Tpsq)** CLAYSTONE; olive gray, wet, thinly bedded, moderately weathered, iron oxide staining, trace manganese spotting, tightly fractured; steeply dipping, near vertical bedding.
	570													

GDC_LOG_BORING_2011 LA1579A.GPJ GDCLOG.GDT 7/21/23

GROUP DELTA CONSULTANTS, INC.
370 Amapola Ave., Suite 212
Torrance, CA 90501

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FIGURE
A-3 a

BORING RECORD

PROJECT NAME	PROJECT NUMBER	HOLE ID
Spring Meadows Homes, LLC	LA1579A	B-24

SITE LOCATION	START	FINISH	SHEET NO.
Intersection of N. Lemon Ave & Meadow Pass Rd, Walnut, CA	6/23/2023	6/23/2023	2 of 2

DRILLING COMPANY	DRILL RIG	DRILLING METHOD	LOGGED BY	CHECKED BY
2R Drilling	GT-16	Hollow-Stem Auger	M. Andreasen	E. Tsai

HAMMER TYPE (WEIGHT/DROP)	HAMMER EFFICIENCY (ERi)	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GW (ft)
Automatic Trip: 140lb / 30in		8	26	593	▽ 9.3 / *583.8* DURING DRILLING

DRIVE SAMPLER TYPE(S) & SIZE (ID)	NOTES	
CAL-Mod (2.4" I.D.)	N_{60}* = 1.0N_{MC}	▼ 7.0 / *586.0* AFTER DRILLING

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	MOISTURE (%)	DRY DENSITY (PCF)	PASSING #200 (%)	ATTERBERG LIMITS (LL:PL:PI)	POCKET PEN (tsf)	OTHER TESTS	DRILLING METHOD	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			R-6	15 26 34		32.7	87.2							
	565													Total Depth: 26 feet bgs. Groundwater was encountered at 9'3" and measured at 7'. Boring backfiled with tamped soil cuttings. **Average taken from Direct Shear test.
30														
	560													
35														
	555													
40														
	550													
45														
	545													

GDC_LOG_BORING_2011 LA1579A.GPJ GDCLOG.GDT 7/21/23

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Torrance, CA 90501

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FIGURE
A-3 b

APPENDIX B

LABORATORY TESTING

APPENDIX B
LABORATORY TESTING

B.1 Introduction

Modified California drive samples and bulk samples were collected during the field explorations and transported to Group Delta's laboratory for further evaluation and testing. Tests were performed on selected samples in accordance with American Society for Testing and Materials (ASTM) as an aid in classifying the in-situ earth materials and to evaluate their engineering properties. Laboratory testing for this investigation included:

- Soil Classification: USCS (ASTM D2487) and Visual Manual (ASTM D2488)
- Moisture content (ASTM D2216) and Dry Unit Weight (ASTM D2937)
- Direct Shear (ASTM D3080)

A brief description of the laboratory testing program and test results are presented below.

B.2 Soil Classification

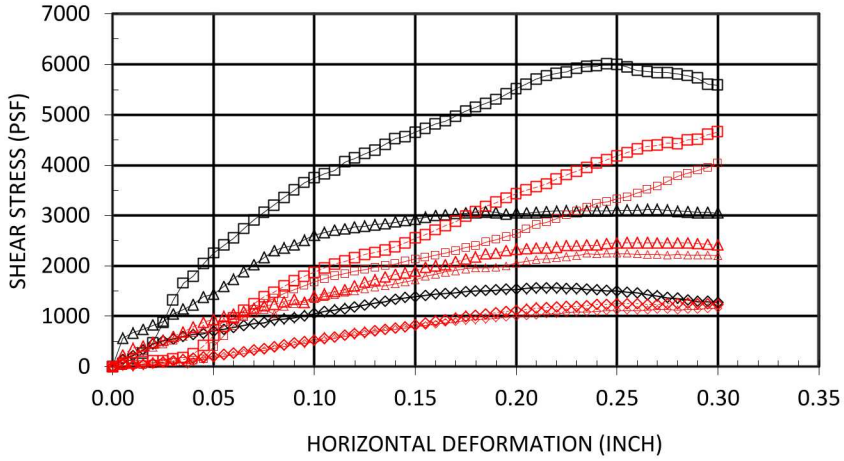
The subsurface materials were classified visually in the field using the Unified Soil Classification System (USCS), in accordance with ASTM Test Methods D2487 and D2488 and following Caltrans Soil and Logging Classification and Presentation Manual (2010). Soil classifications were modified as necessary based on further inspection and testing in the laboratory. The soil classifications are presented on the key for soil classification and on the boring logs in Appendix A.

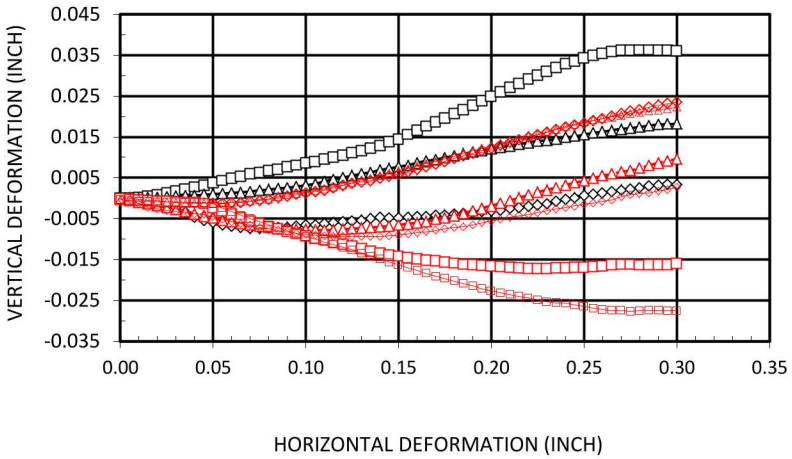
B.3 Moisture Content and Dry Unit Weight

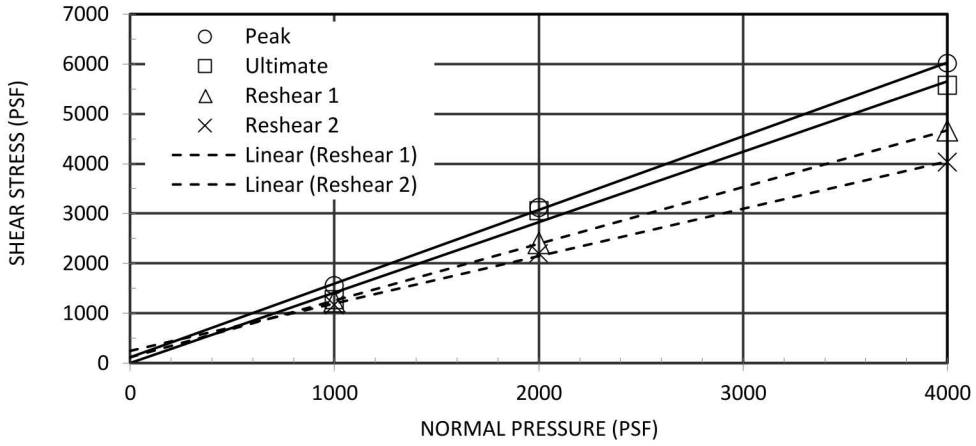
The natural moisture content and dry unit weight of selected ring samples were determined in general accordance with ASTM D2216 and ASTM D2937. Results of these tests are presented on the boring log in Appendix A.

B.4 Direct Shear

Direct shear testing was performed on undisturbed ring samples in accordance with ASTM D3080. After the initial weight and volume measurements were made, the sample was placed in a calibrated shear machine and a selected normal load was applied. Each sample was then saturated, allowed to consolidate, and then were sheared under a constant strain to failure. Shear stress and sample deformations were monitored throughout the test. The test results are presented in Figures B-1 through B-7.







Boring:	B-22	Init. Moisture	25.2%			
Depth, feet	15.0	Init. Dry Density	N/A	pcf	Reshears	
Sample No.:	R-4	Shear Results	Peak	Ultimate	R1	R2
Sample Type	Ring	Cohesion (psf)	114	6	114	248
Soil Type	Bedrock	Friction Angle	56	55	49	44

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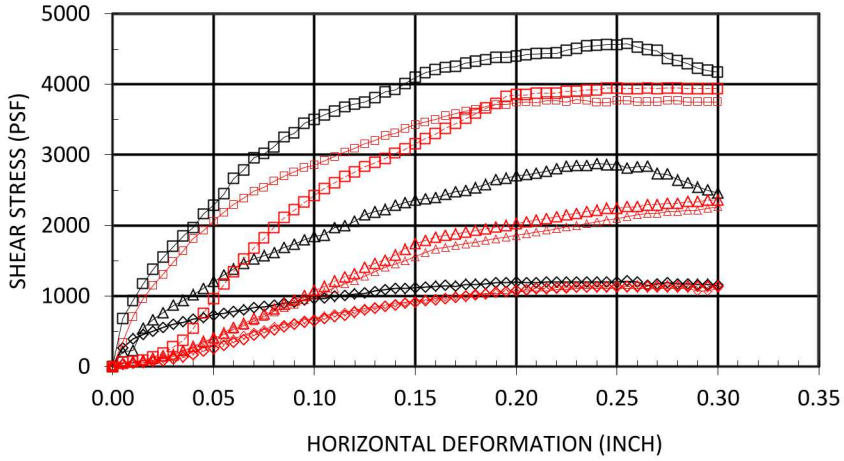
Project Name:
Spring Meadows
Client: Group Delta
Job No.: LA1579A
EGLAB Project No.: 23-053-001

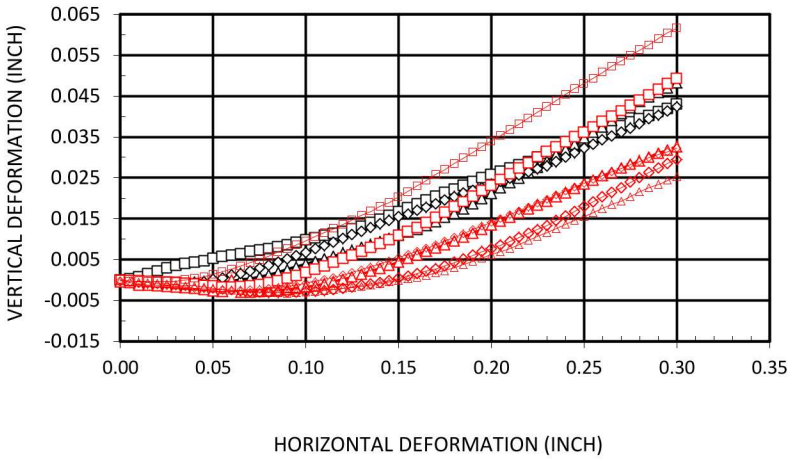
Symbol	σ	Init. Moisture	Final Moisture	$\gamma_{d\ (pcf)}$	S (%)
◇	1000	25.2%	48.1%	69.3	100.0
△	2000	25.2%	47.4%	71.0	100.0
□	4000	25.2%	39.9%	72.3	100.0

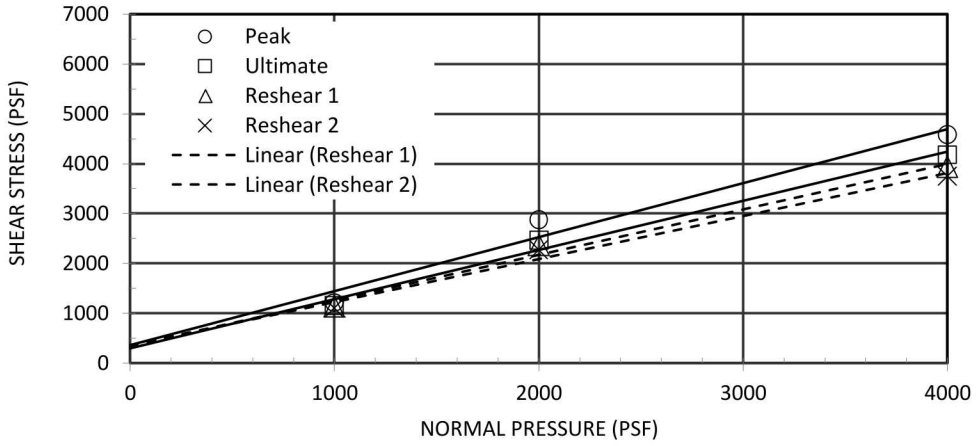
DIRECT SHEAR

07/23

Figure







Boring:	B-22	Init. Moisture	23.1%			
Depth, feet	20.0	Init. Dry Density	N/A	pcf	Reshears	
Sample No.:	R-5	Shear Results	Peak	Ultimate	R1	R2
Sample Type	Ring	Cohesion (psf)	362	296	352	360
Soil Type	Bedrock	Friction Angle	47	45	42	41

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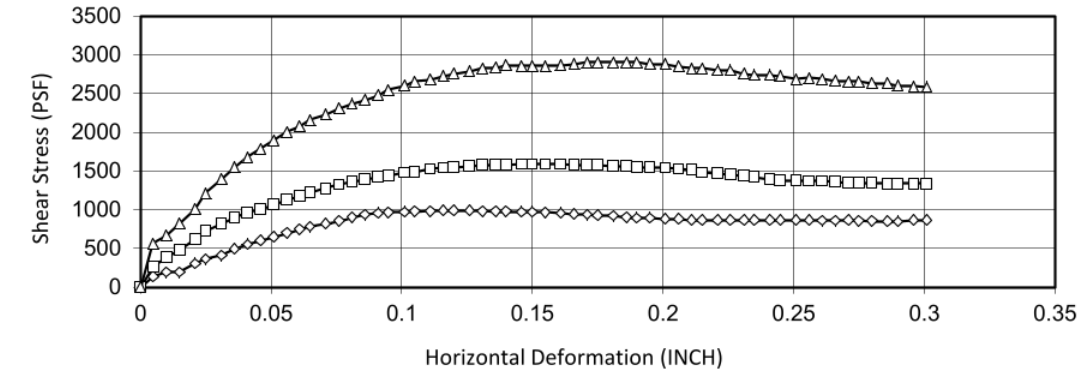
Project Name:
Spring Meadows
Client: Group Delta
Job No.: LA1579A
EGLAB Project No.: 23-053-001

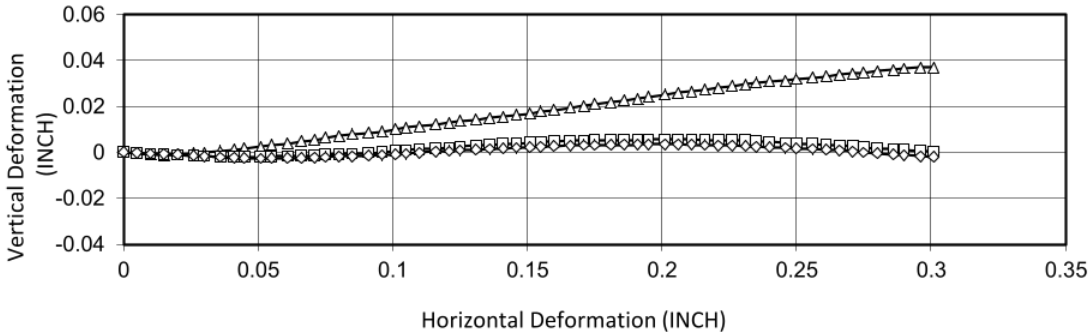
Symbol	σ	Init. Moisture	Final Moisture	$\gamma_{d\ (pcf)}$	S (%)
◇	1000	23.1%	46.9%	73.7	100.0
△	2000	23.1%	43.2%	73.9	100.0
□	4000	23.1%	42.8%	74.2	100.0

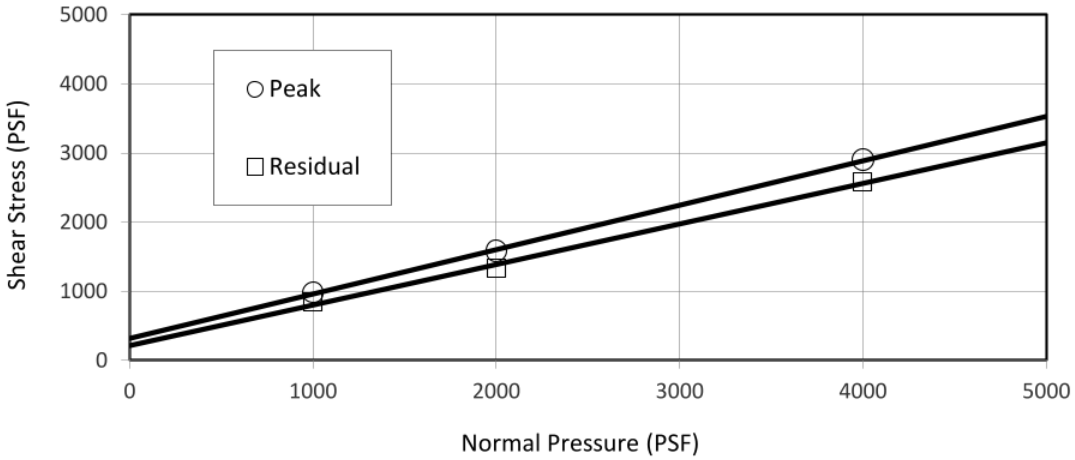
DIRECT SHEAR

07/23

Figure







Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
B-23	R-3	10.0	Ring	SC	○	328	33
					□	222	30

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)	γ_d (pcf)	S (%)
1000	24.8	27.8	96.7	100
2000	24.8	25.4	99.2	98
4000	24.8	23.7	99.4	92

EGLAB, INC.

Project Name: Spring Meadows

Client: Group Delta

Project No.: LA1579A

EGLAB Project No.: 23-053-001

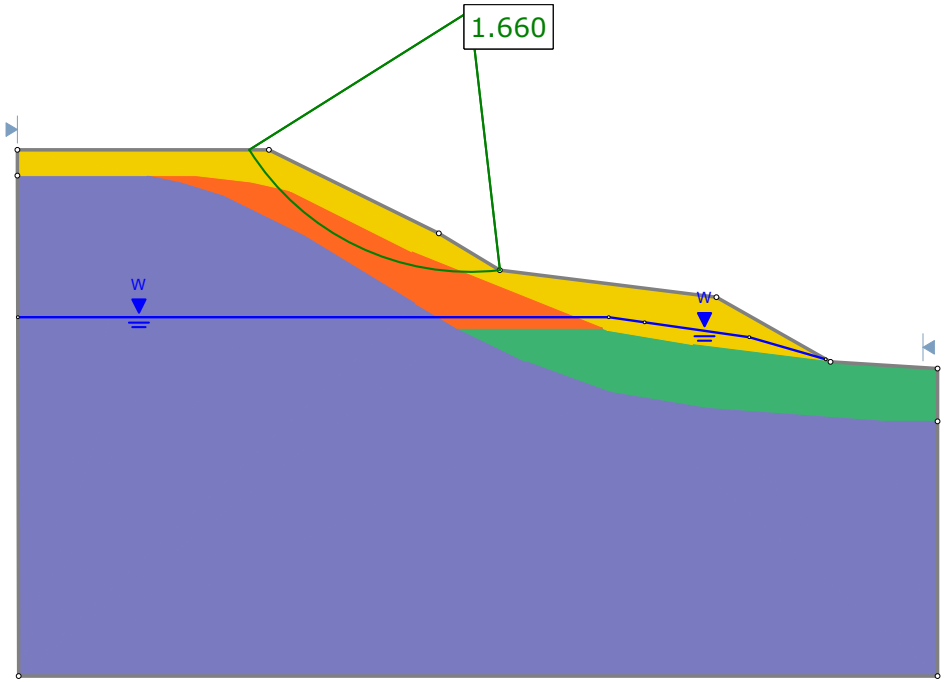
DIRECT SHEAR

07/23 (ASTM D3080) Figure

APPENDIX C

SLOPE STABILITY ANALYSES

Section 10-10'. Existing Slope
Cast: Static
Analyses Method: Circular

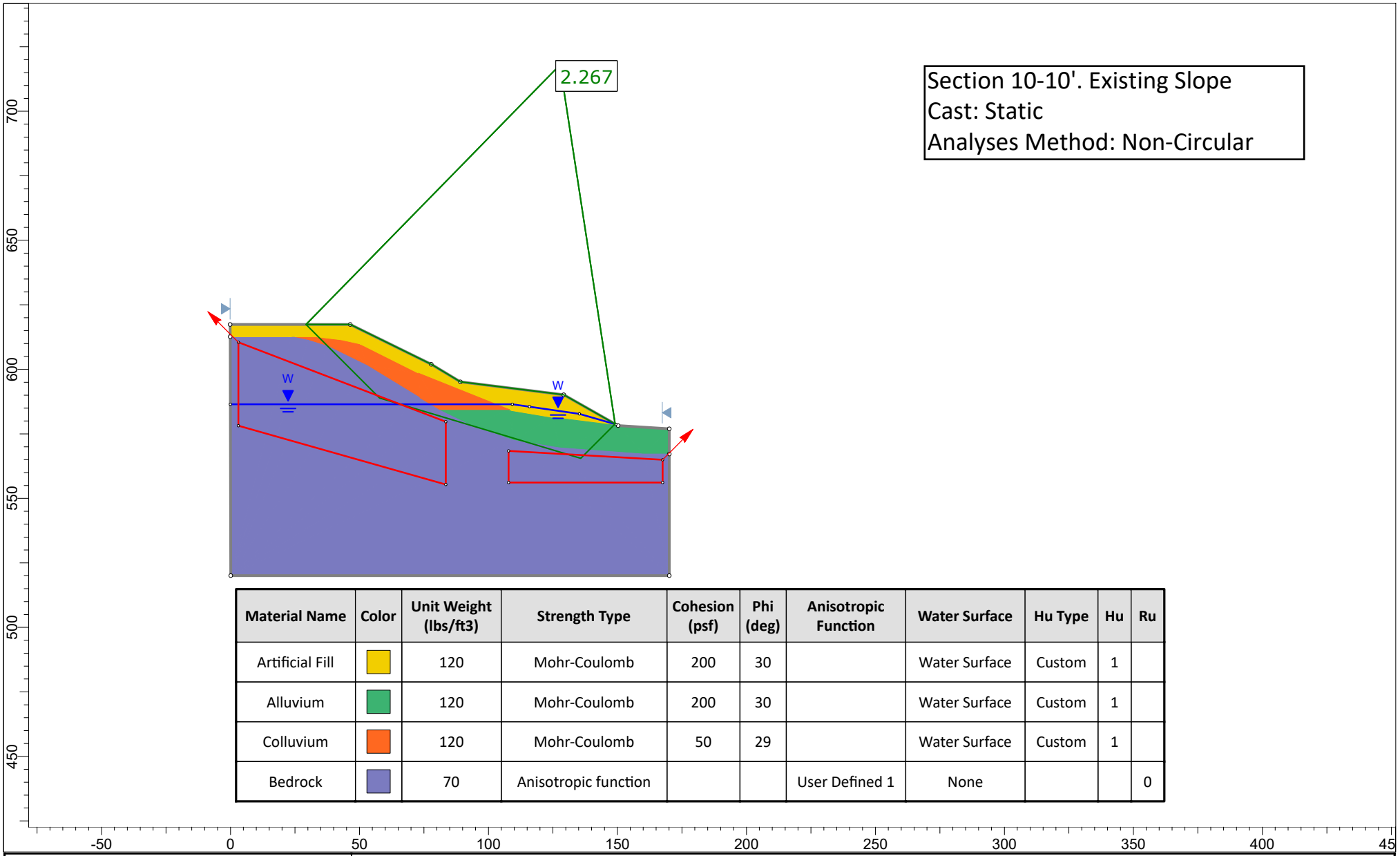


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Hu Type	Hu
Artificial Fill		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Alluvium		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Colluvium		120	Mohr-Coulomb	50	29		Water Surface	Custom	1
Bedrock		70	Anisotropic function			User Defined 1	Water Surface	Custom	1

650
600
550
500
-50
0
50
100
150
200
250
300

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Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		Scale 1:426	Company
Date	7/31/2023, 2:02:34 PM		File Name Section 10.slmd



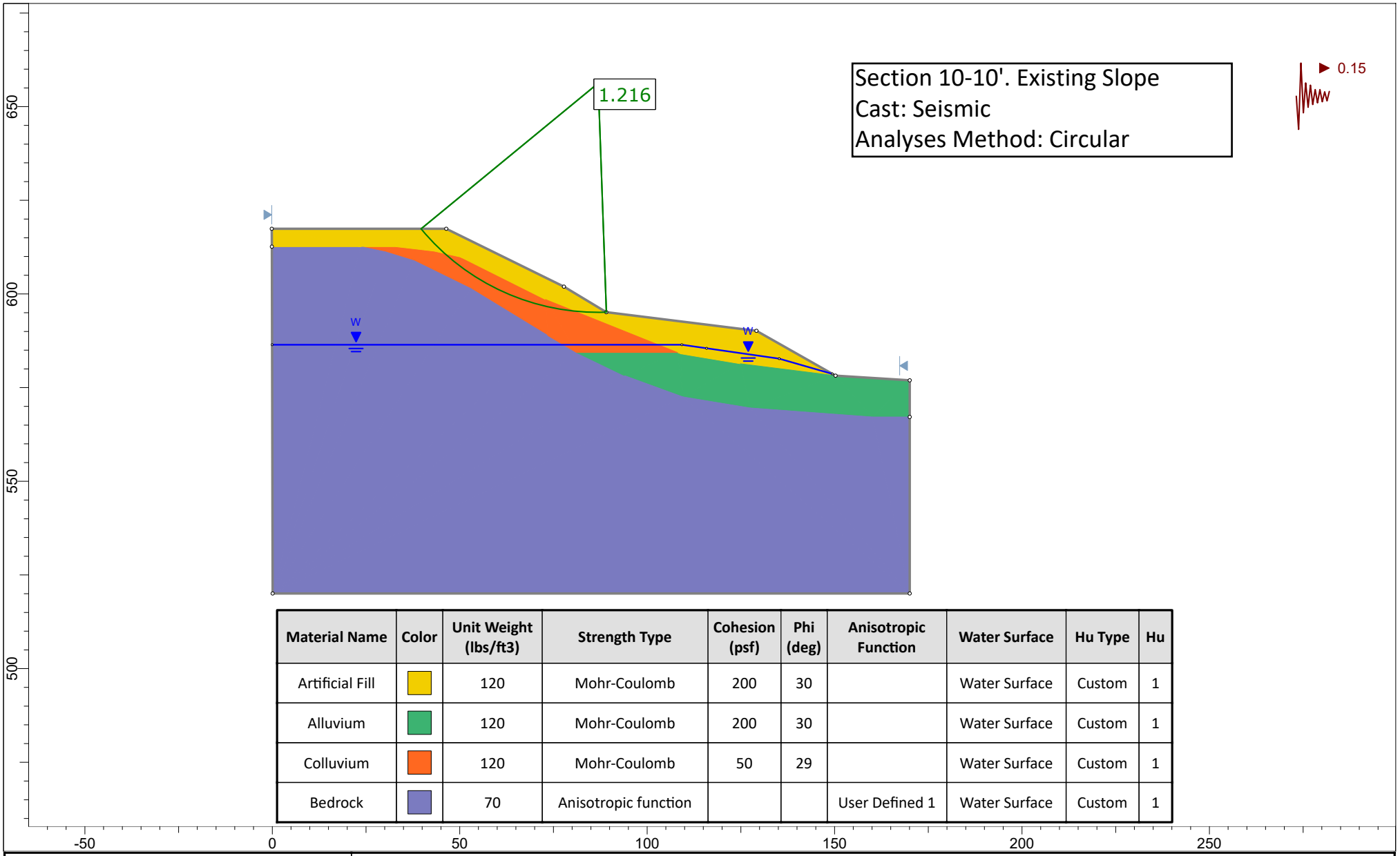
Section 10-10'. Existing Slope
Cast: Static
Analyses Method: Non-Circular

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Hu Type	Hu	Ru
Artificial Fill		120	Mohr-Coulomb	200	30		Water Surface	Custom	1	
Alluvium		120	Mohr-Coulomb	200	30		Water Surface	Custom	1	
Colluvium		120	Mohr-Coulomb	50	29		Water Surface	Custom	1	
Bedrock		70	Anisotropic function			User Defined 1	None			0

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Project			
Analysis Description			
Drawn By	Scale 1:617	Company	
Date		File Name	Section 10.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Hu Type	Hu
Artificial Fill		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Alluvium		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Colluvium		120	Mohr-Coulomb	50	29		Water Surface	Custom	1
Bedrock		70	Anisotropic function			User Defined 1	Water Surface	Custom	1

SLIDEINTERPRET 8.010

Project: SLIDE - An Interactive Slope Stability Program

Analysis Description:

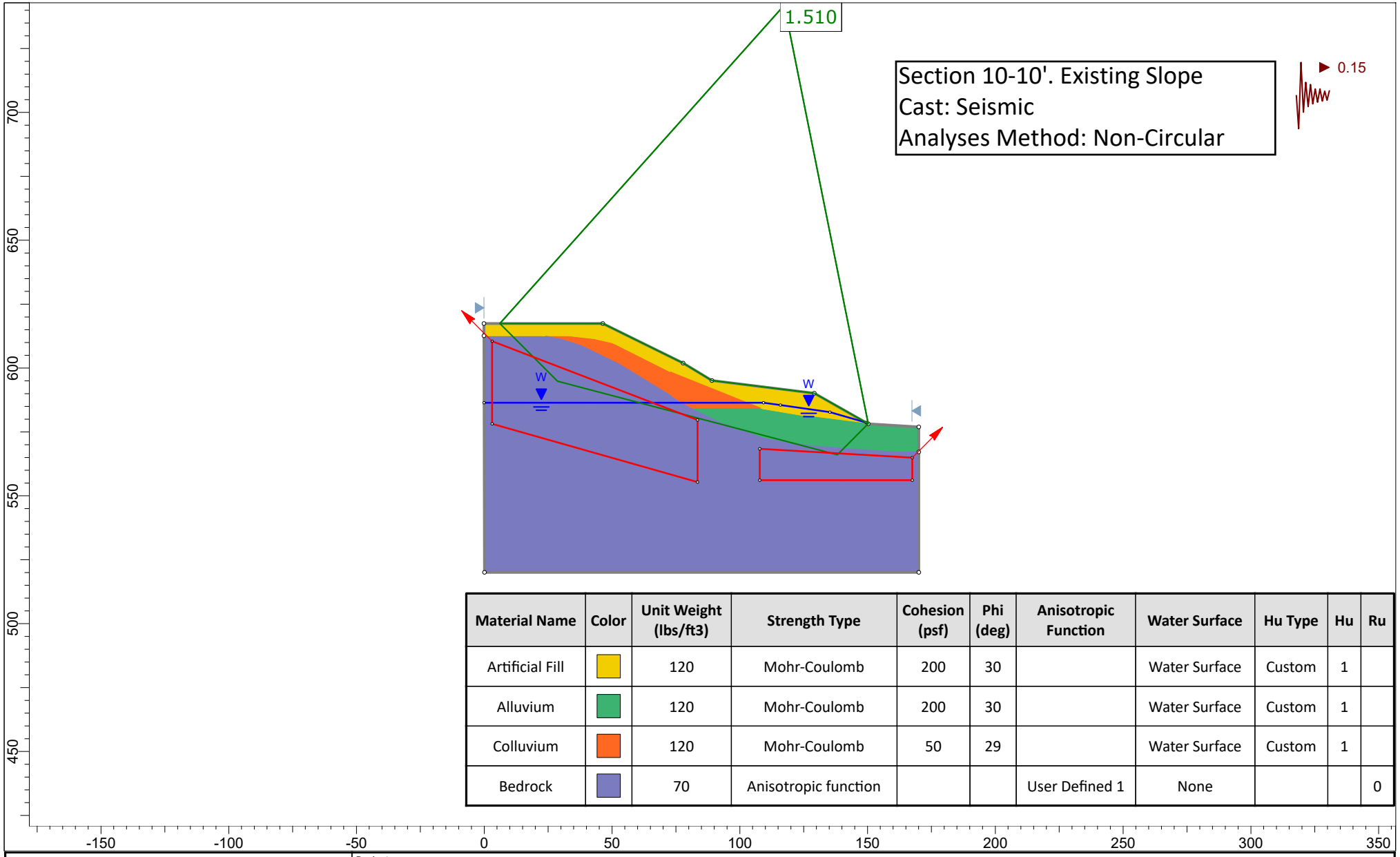
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Scale: 1:425

Company:

Date: 7/31/2023, 2:02:34 PM

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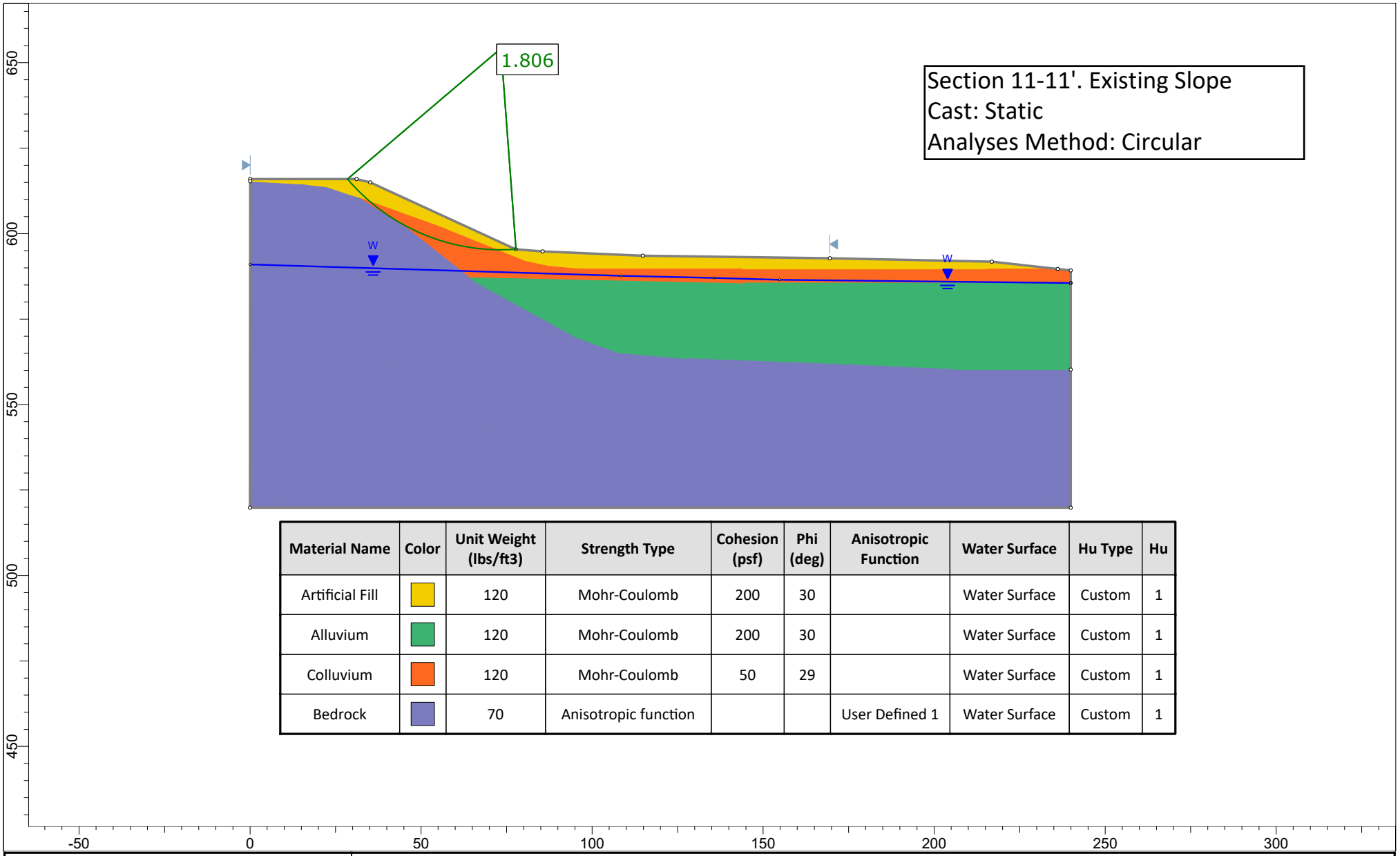


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Hu Type	Hu	Ru
Artificial Fill		120	Mohr-Coulomb	200	30		Water Surface	Custom	1	
Alluvium		120	Mohr-Coulomb	200	30		Water Surface	Custom	1	
Colluvium		120	Mohr-Coulomb	50	29		Water Surface	Custom	1	
Bedrock		70	Anisotropic function			User Defined 1	None			0

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Project			
Analysis Description			
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Date		*File Name*	Section 10.slmd

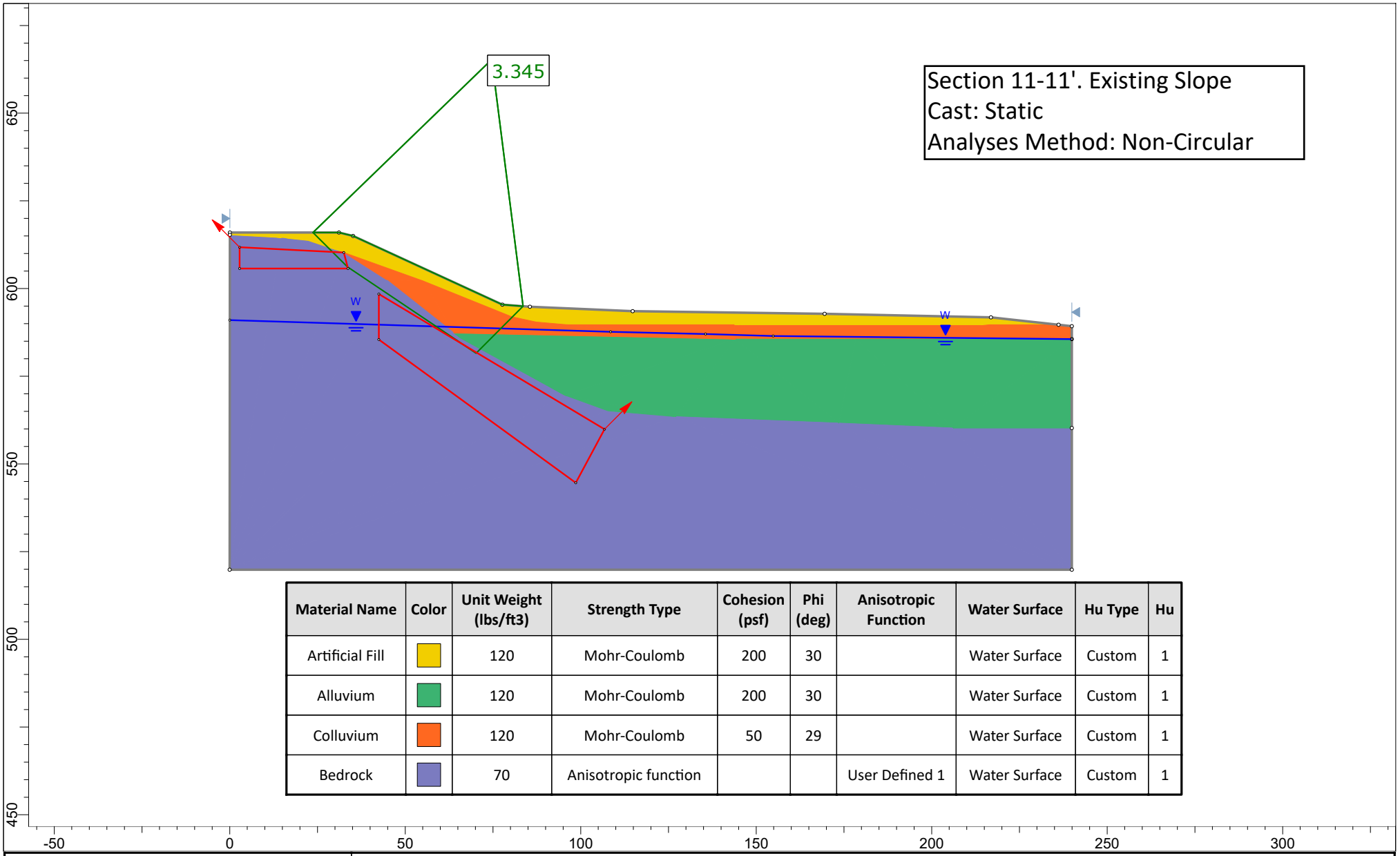


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Hu Type	Hu
Artificial Fill		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Alluvium		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Colluvium		120	Mohr-Coulomb	50	29		Water Surface	Custom	1
Bedrock		70	Anisotropic function			User Defined 1	Water Surface	Custom	1

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Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
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Date	7/31/2023, 2:02:34 PM		*File Name* Section 11.slmd

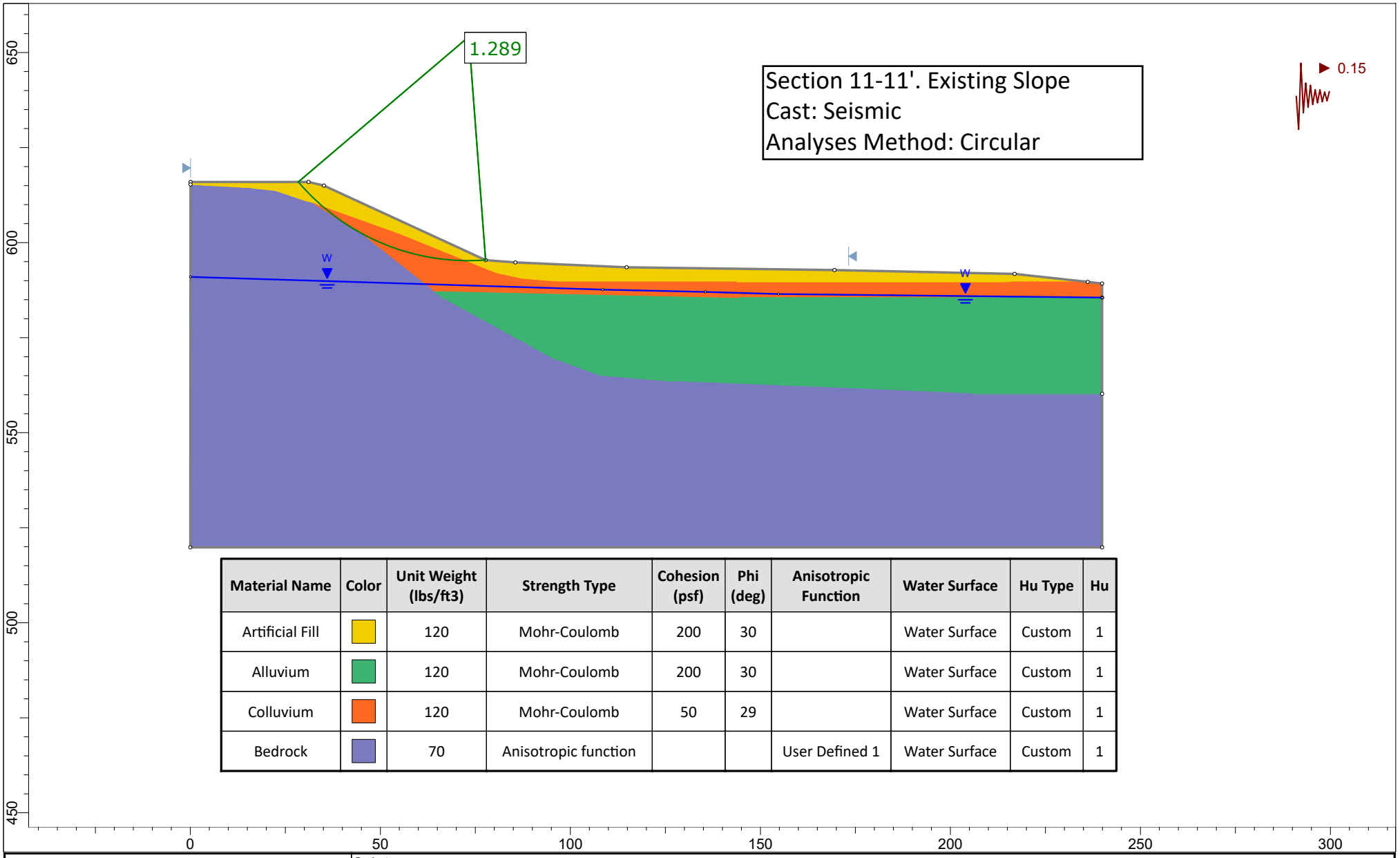


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Hu Type	Hu
Artificial Fill		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Alluvium		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Colluvium		120	Mohr-Coulomb	50	29		Water Surface	Custom	1
Bedrock		70	Anisotropic function			User Defined 1	Water Surface	Custom	1

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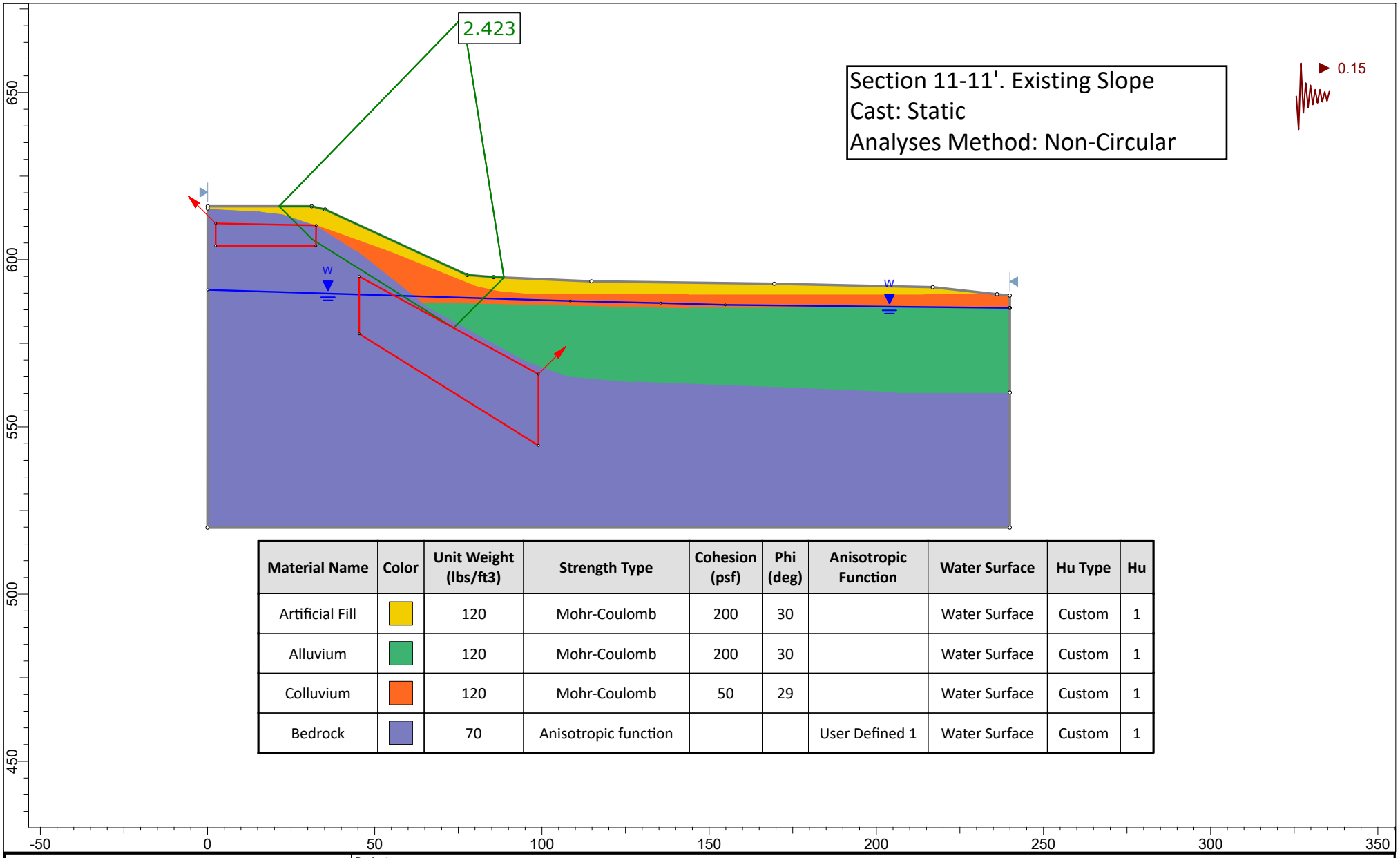
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Date	7/31/2023, 2:02:34 PM		*File Name* Section 11.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Hu Type	Hu
Artificial Fill		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Alluvium		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Colluvium		120	Mohr-Coulomb	50	29		Water Surface	Custom	1
Bedrock		70	Anisotropic function			User Defined 1	Water Surface	Custom	1

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Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
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Date	7/31/2023, 2:02:34 PM		*File Name* Section 11.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Hu Type	Hu
Artificial Fill		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Alluvium		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Colluvium		120	Mohr-Coulomb	50	29		Water Surface	Custom	1
Bedrock		70	Anisotropic function			User Defined 1	Water Surface	Custom	1

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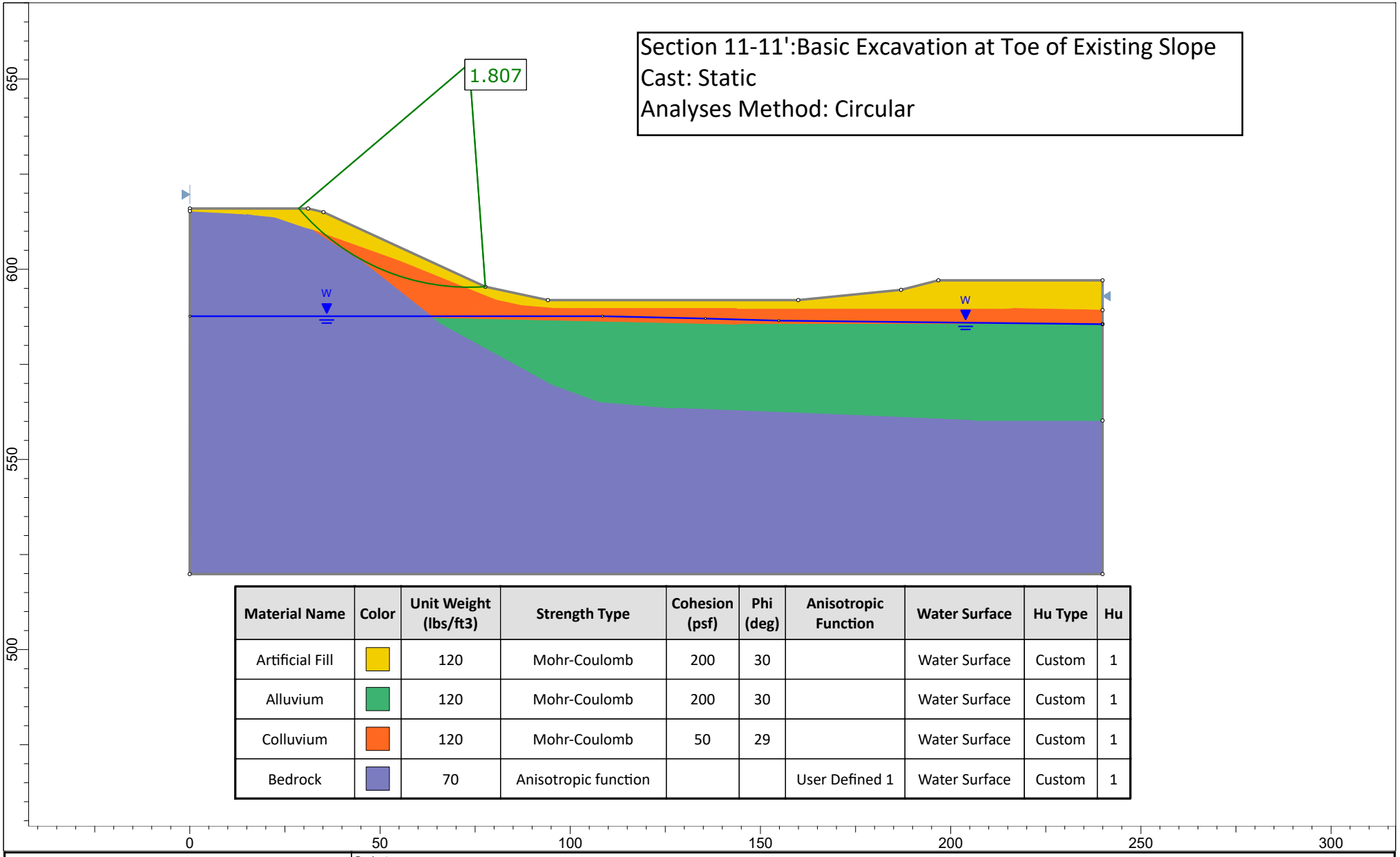
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Drawn By: | *Scale*: 1:476 | *Company*:

Date: 7/31/2023, 2:02:34 PM | *File Name*: Section 11.slmd

Section 11-11':Basic Excavation at Toe of Existing Slope
Cast: Static
Analyses Method: Circular



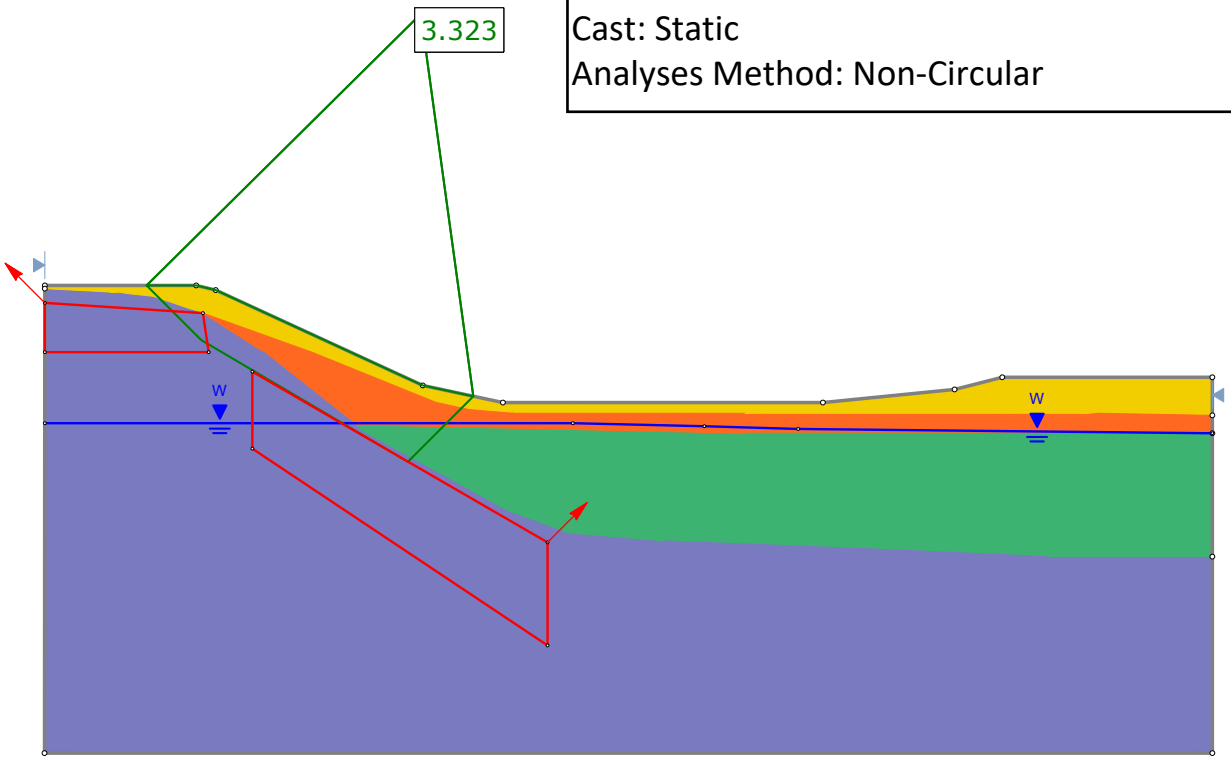
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Hu Type	Hu
Artificial Fill		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Alluvium		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Colluvium		120	Mohr-Coulomb	50	29		Water Surface	Custom	1
Bedrock		70	Anisotropic function			User Defined 1	Water Surface	Custom	1

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SLIDEINTERPRET 8.010

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		Scale 1:418	Company
Date	7/31/2023, 2:02:34 PM		File Name Section 11.slmd

Section 11-11':Basic Excavation at Toe of Existing Slope
Cast: Static
Analyses Method: Non-Circular



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Hu Type	Hu
Artificial Fill		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Alluvium		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Colluvium		120	Mohr-Coulomb	50	29		Water Surface	Custom	1
Bedrock		70	Anisotropic function			User Defined 1	Water Surface	Custom	1

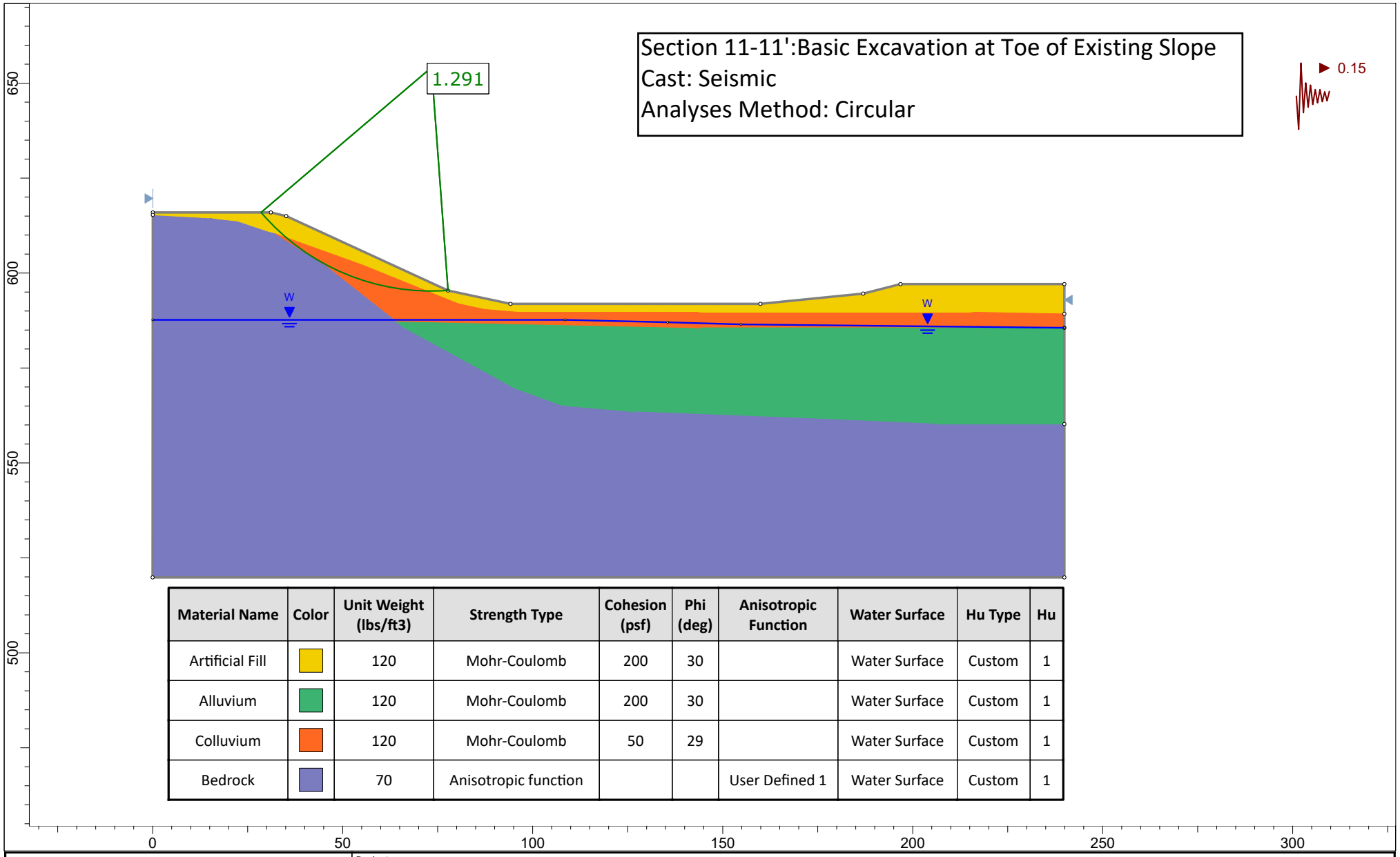
650
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300

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SLIDEINTERPRET 8.010

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
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Section 11-11':Basic Excavation at Toe of Existing Slope
Cast: Seismic
Analyses Method: Circular

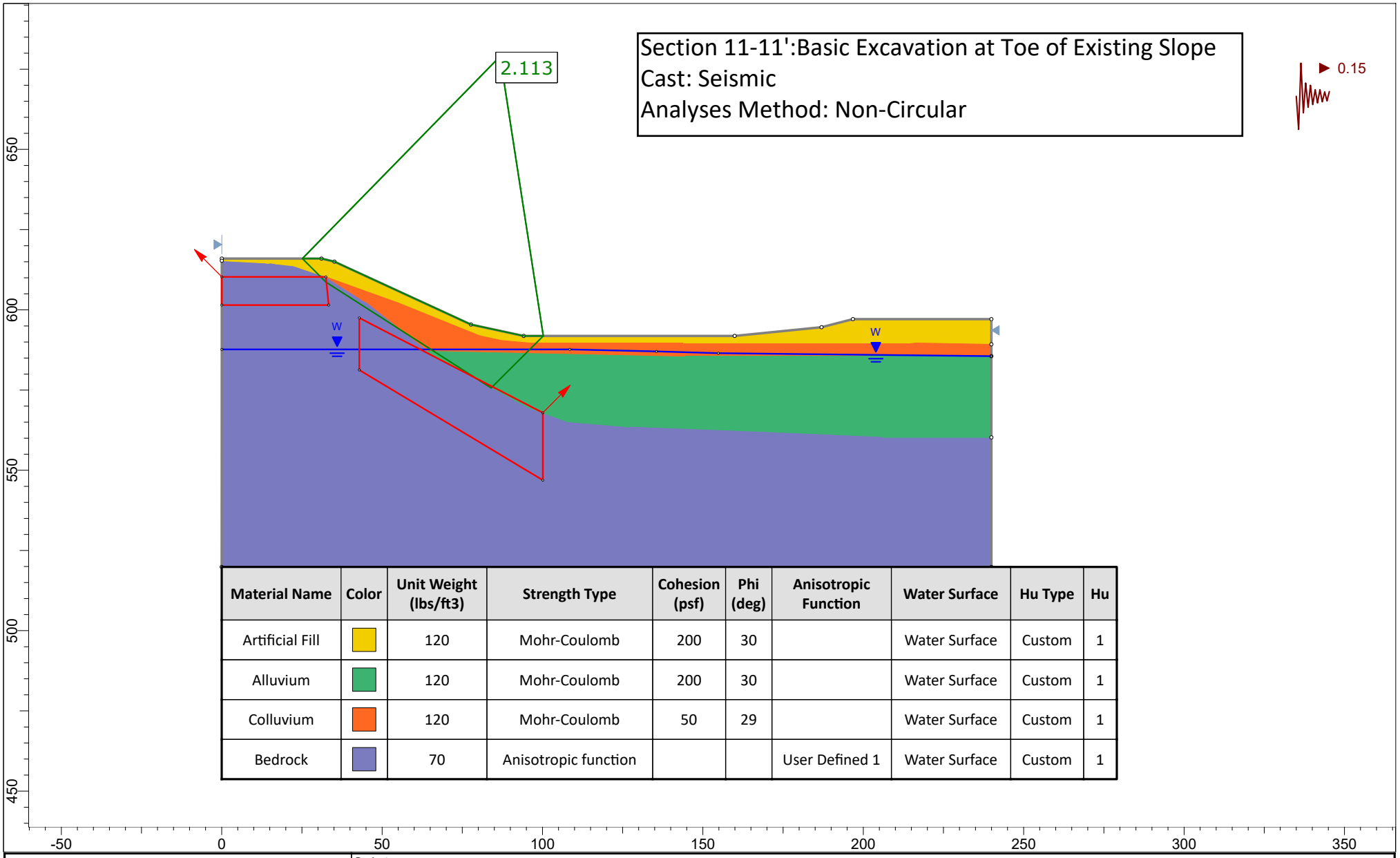


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Hu Type	Hu
Artificial Fill		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Alluvium		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Colluvium		120	Mohr-Coulomb	50	29		Water Surface	Custom	1
Bedrock		70	Anisotropic function			User Defined 1	Water Surface	Custom	1

SLIDEINTERPRET 8.010

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		Scale 1:419	Company
Date	7/31/2023, 2:02:34 PM		File Name Section 11.slmd

Section 11-11':Basic Excavation at Toe of Existing Slope
Cast: Seismic
Analyses Method: Non-Circular



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Hu Type	Hu
Artificial Fill		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Alluvium		120	Mohr-Coulomb	200	30		Water Surface	Custom	1
Colluvium		120	Mohr-Coulomb	50	29		Water Surface	Custom	1
Bedrock		70	Anisotropic function			User Defined 1	Water Surface	Custom	1

SLIDEINTERPRET 8.010

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		Scale 1:496	Company
Date	7/31/2023, 2:02:34 PM		File Name Section 11.slmd