Appendix E-1 Geotechnical Review



February 22, 2024

NUWI – Lyons Canyon, LLC 2001 Wilshire Blvd., Suite 401 Santa Monica, California 90403

Attention: Mr. Benny Sam

Job No. 2020-200-001

Subject: Response to County of Los Angeles Comments Dated November 8, 2023 Proposed Lyons Canyon Development Tentative Tract Map 83301 Los Angeles County, California

Reference: <u>See References</u>

Ladies and Gentlemen:

R.T. Frankian and Associates, Inc., (RTF&A) presents this response to address review comments provided by the County of Los Angeles Department of Public Works (County), Geotechnical and Materials Engineering Division (GMED), Geologic and Soils Engineering Sections, in their November 8, 2023 review comments concerning the subject site. The review comments are in response to the R.T. Frankian & Associates (RTF&A) Geotechnical 100-Scale Plan Review, dated September 15, 2023. The GMED review sheet comments are shown below in bold type. Our response follows each comment in regular type. A copy of the GMED Review sheet is included with this response.

REPORT REVIEW COMMENTS

G1. Several landslides are mapped on the slopes below the proposed water tank. Verify that landslides illustrated on Figure 1 will be removed and/or mitigated. Show limits of removals on geotechnical map and/or other mitigation measures.

This comment was discussed with the GMED Geology reviewers during a virtual meeting where new Geologic Sections were presented and in addition to addressing the original comment, slope stability calculations were also requested.

Slopes associated with the proposed water tank pad are generally steep, often with slope ratios steeper than 1 horizontal : 1 vertical (H:V), and in many locations steeper than .5H:1V. Hard conglomeratic sandstone beds between 8 feet and 40 feet thick have facilitated the steep slopes, ledges, cliffs, and hogbacks, are not prone to be involved in landslides, but rather hold the slopes up, limiting the extent of and orientation of slope instabilities in the area. Field mapping and interpretation of aerial imagery from 1930 to the present 2017 with select images presented as Figures HA-1 through HA-4 undoubtedly indicate that there is no geomorphic expression of any deep seated slope failures or landslides on the slopes of the proposed tank pad or in the vicinity. Furthermore, it is absolutely apparent that site slopes are intact as the stratigraphy favorably crosses the area of the proposed cut.

Therefore, the features previously labeled as landslides Qls11, Qls12, Qls13, and Qls14 have been relabeled and are classified as surficial slumps labeled as SS1, SS2, SS3, and SS4 (respectively) on Figure 1(R). Geologic Cross Sections 19-19', 20-20', 21-21', and 22-22' have been constructed and are presented as Figure 2.1, along with Geologic Cross Sections 13-13' through 18-18' which have previously been submitted.

Grading of the water tank pad, as proposed, will remove roughly 40 to 60 feet of rock from the ridgeline. This proposed grading will remove the steepest parts of the slopes that include the heads of the four mapped surficial slumps. This alone will mitigate further advancement or encroachment of surficial degradation into the proposed water tank pad. Each surficial slump, SS1, SS2, SS3, SS4 is discussed individually below, and identified on Figure 1(R). Each of these slumps are not deep seated features, but rather are surficial in nature, with SS3 and SS4 being considered creep features. The proposed grading does not adversely impact the stability of the existing slopes, it improves it.

Surficial Slump SS1 is surficial sloughing involving colluvium and weathered sandy mudstone on a dip slope that is structurally controlled by hard well cemented hog back forming conglomeratic sandstone. Proposed grading will remove the top of SS1 and leave debris on the slope below the cut to function as armor. Proposed grading will reduce water on the slope. Grading of the water tank pad will improve the conditions of the slope. Surficial Slump SS1 does not pose a negative impact to the water tank pad. No slope specific mitigations are necessary or recommended.

Surficial Slump SS2 is a collection of coalescing shoots generated on the antidip slope within sandy mudstone situated below a ledge forming well cemented cobbly sandstone, not the same hard sandstone bed associated with SS1. The shoots are shallow accumulations of materials with a maximum estimated thickness of 8 feet. Proposed grading will remove the heads of the shoots and the majority of the sloughed materials. Grading as proposed will reduce the natural accumulation and focusing of water into the shoots thereby improving the slope's overall condition. Grading as proposed will mitigate SS2's potential for encroachment or impacts to the proposed water tank pad. No slope specific mitigations are necessary or recommended.



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Surficial Slump SS3 is an accumulation of colluvium and weathered rock that is creeping down slope. The top of SS3 is generally at the elevation of the water tank pad. Estimated maximum thickness of the slide debris is 8 feet. Proposed grading will improve the condition of the slope and reduce the volume of water on the slope. No specific mitigations are necessary or recommended for SS3.

Surficial Slump SS4 is a coalescing of small surficial slope failures and creep of colluvium and weathered rock. This complex is in a stratigraphically similar position as SS2. The top of SS4 is generated from very steep (.25:1 H:V) slopes at elevations generally above the proposed water tank elevation. Below an elevation of about 1520 the thickness of accumulated material on the slope is estimated to be about 8 feet while at the base of the slope the debris thickness is estimated to be up to 15 feet thick. Proposed grading for the water tank will remove the upper portions of the slope that are sloughing and creeping downward. Grading will reduce water on the slope improving the overall slope condition. No specific mitigation measures are necessary or proposed for SS4.

This comment was discussed with the GMED Geology reviewers during a virtual meeting where new Geologic Sections were presented and in addition to addressing the original comment, gross slope stability calculations were also requested on Geologic Cross Sections 19-19' and 21-21'. Slope stability calculations were performed using the program Slope/W Version 2022.1 prepared by GeoStudio. A static factor of safety of 1.5 and a seismic factor of safety of 1.1 are required for gross stability per GMED Guidelines. Presented below are the recommended shear strengths for use at the subject site that were previously approved by GMED with their previous approval of the referenced reports.

	COHESION	ANGLE OF SHEARING RESISTANCE
MATERIAL	(psf)	(degrees)
Landslide Failure Plane (MSR)	200	16
TQss Bedding Static (MSR)	250	20
TQss Bedding Seismic (SSR)	200	30
TQss Cross Bed Static (SSR)	500	34
TQss Cross Bed Seismic (SSR)	800	36
Compacted Fill 90% (SSR)	350	30
Compacted Fill 95% (SSR)	400	30
Alluvium (Qal)	250	30

The slope stability calculations are presented in the Appendix and meet Los Angeles County factor of safety requirements and are considered grossly stable. No additional mitigations are considered necessary beyond those previously presented in the reviewed report.



G2. Please show the location of the abandoned oil will on Figure 1.

Acknowledged, see Figure 1(R).

S1. Show the following on the geotechnical map:

a. Existing proposed grades.

Acknowledged, see Figure 1(R).

b. Approximate limits and depth of removal and recompaction of unsuitable soils, if applicable.

Estimated removal depths are delineated with a designation such as R=20 which designates that a 20' removal below existing grade is recommended prior to placing compacted fill. The "Removal Depth Boundary Line" as labeled, extends northeast from Qls4, with the transition from a 15' foot to a 20' recommended removal below existing grade within Qac. Where the arrows end and or intersect a contact or the "Removal Depth Boundary Line" those are areas of transitioning to another estimated removal depth.

c. Location of "Restricted Use Areas", if applicable.

Restricted Use Areas are not proposed or anticipated for the project.

S2. The geotechnical consultant(s) must sign, stamp and indicate the date of signature on all reports and addenda.

Acknowledged.

S3. Please submit documents in response to this review using the EPIC-LA system at the following URL: <u>https://epicla.lacounty.gov/Self/Service/#/home</u>. The documents must be submitted to the EPIC-LA geotechnical study plan case number ESTU2021000162. Please contact GMED staff at (626)458-4925 if documents cannot be uploaded to the plan case.

Submittal of this response to EPIC-LA is referred to United Civil Inc. so that they can coordinate submittal of this response with their plan and/or other related project submittals.



The following are attached and complete this report:

- County of Los Angeles Department of Public Works, Geotechnical and Materials Engineering Division, Geologic and Soils Engineering Review Sheet, dated November 8, 2023, 1 sheet,
- Geotechnical Map Figure 1(R).
- Geologic Sections Figure 2.1
- Historical Aerial Images Figures HA-1 through HA-4
- Appendix Slope Stability Calculations



Respectfully submitted, R. T. Frankian & Associates

lan W. Raeplicka

Alan W. Rasplicka Principal Geotechnical Engineer

Ander

Glenn A. Lauman Principal Engineering Geologist

PDF Distribution via email: New Urban West, Inc. Attn: Mr. Jason Jan, Mr. Jonathan Frankel Madison Real Estate Consulting, LLC Attn: Mr. Benny Sam United Civil Inc., Mr. Anthony Ng, Attn: Mr. Matt Sawyer



PCA LX001129/A863 EPIC LA RPPL2021003061 ESTU2021000162

Telephone: (626) 458-4925

County of Los Angeles Department of Public Works Geotechnical and Materials Engineering Division GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET 900 S. Fremont Avenue, Alhambra, CA 91803

Sheet 1 of 1

Tentative Tract / Parce	Map	83301	Tentative Map Dated	09/06/2023 (Tentative/Exhibit A)
Grading By Subdivider	? [Y] (Y or N)	2,600,000 yd3	Location	Lyons Canyon
Geologist	R.T. Fran	kian	Subdivider	NUWI-LYONS CANYON, LLC
Soils Engineer	R.T. Fran	nkian	Engineer/Arch.	Alliance Land Planning & Engineering
Review of:	d:			<u>v</u> v v

Soils Engineering Report(s) Dated:

Geotechnical Report(s) Dated: 09/15/2023, 7/27/21, 03/19/21

References:

TENTATIVE MAP FEASIBILITY IS NOT RECOMMENDED FOR APPROVAL. PRIOR TO RECOMMENDING APPROVAL OF THE TENTATIVE TRACT OR PARCEL MAP:

- G1. Several landslides are mapped on the slopes below the proposed water tank. Verify that landslides illustrated on Figure 1 will be removed and/or mitigated. Show limits of removals on geotechnical map and/or other mitigation measures.
- G2. Please show the location of the abandoned oil well on Figure 1.
- S1. Show the following on the geotechnical map:
 - a. Existing and proposed grades.
 - b. Approximate limits and depth of removal and recompaction of unsuitable soils, if applicable.
 - c. Location of "Restricted Use Areas", if applicable.
- S2. The geotechnical consultant(s) must sign, stamp, and indicate the date of signature on all reports and addenda.
- S3. Please submit documents in response to this review using the EPIC-LA system at the following URL: <u>https://epicla.lacounty.gov/SelfService/#/home</u>. The documents must be submitted to the EPIC-LA geotechnical study plan case number ESTU2021000162. Please contact GMED staff at (626) 458-4925 if documents cannot be uploaded to the plan case.
- NOTE: Provide a copy of this review sheet with your resubmittal.

NOTE(S) TO THE PLAN CHECKER/BUILDING AND SAFETY DISTRICT ENGINEER:

PER THE SOILS ENGINEER:

- A. ON-SITE SOILS ARE CORROSIVE TO FERROUS METALS.
- B. EXPANSION INDEX OF NEAR-SURFACE CERTIFIED ENGINEERED FILL ON BUILDING LOTS SHOULD BE EVALUATED AT THE COMPLETION OF GRADING.
- C. THE SOILS REPORT DATED 3/19/21 INDICATES THERE MAY BE ENVIRONMENTAL CONCERNS REGARDING THE PRESENCE OF OILS WELLS.
- D. FOR SECTION G-G' OF THE REPORT DATED 7/27/21, THE BEDDING PLANE THAT MEETS COUNTY FACTOR OF SAFETY REQUIREMENTS IS AT A DEPTH OF 15 FEET BELOW THE PROPOSED RETAINING WALL.
- E. FOR SECTION G-G' OF THE REPORT DATED 7/27/21, A PROPOSED PILE RETAINING WALL IS RECOMMENDED. PILES MUST BE SUFFICIENTLY STIFF TO PROVIDE RESISTANCE OF 10 KIPS PER FOOT OF WALL AT THE MID-HEIGHT OF THE PROPOSED RETAINING WALL.

SIONAL ENGI GE MOLIA Prepared by C 91931 George Molina Matt CIVII TE OF CALIFOR Soils Section 0919 Date 11/8/2023

Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey <u>NOTICE:</u> Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders. P:\gmepub\Development Review\\Combined Reviews\Tracts and Parcels\83301, Lyons Canyon, 2023-11-08, TM-10-NA.docx





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N27E





- Explanation Qac Alluvium, Colluvium Undifferentiated TQss Saugus Formation, Sunshine Ranch Member Qls Landslide Debris SS4 Surficial Slough Sandstone Conglomerate Hard, Well Cement Sandstone Conglomerate - Hard, Well Cemented, Ridge/Hogback Forming

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APPENDIX A

SLOPE STABILITY CALCULATIONS





GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

www.RTFrankian.com

RTFA Job

Analysis Type: Spencer PWP Conditions from: Ru Slip Surface Option: Grid and Radius Critical slip surfaces saved: 25 Optimize Critical Slip Surface Location: No Tension Crack Option: (none)

Factor of Safety: 1.64

Volume: 4,506.5313 ft³ Weight: 563,316.41 lbf Entry: (149.10496, 230.44929) ft Exit: (337.5218, 125.61122) ft Radius: 234.14477 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 03:41:04 PM Kind: SLOPE/W Tool Version: 11.4.2.250

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Lyons Can RTFA Job Analysis Type: Spencer PWP Conditions from: Ru Slip Surface Option: Grid and Radius Critical slip surfaces saved: 25 Optimize Critical Slip Surface Location: No Tension Crack Option: (none)

Factor of Safety: 1.64

Volume: 4,506.5313 ft³ Weight: 563,316.41 lbf Entry: (149.10496, 230.44929) ft Exit: (337.5218, 125.61122) ft Radius: 234.14477 ft Center: (300.19058, 191.38719) ft

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GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

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RTFA Job

Analysis Type: Spencer PWP Conditions from: Ru Slip Surface Option: Grid and Radius Critical slip surfaces saved: 25 Optimize Critical Slip Surface Location: No Tension Crack Option: (none)

Factor of Safety: 1.25

Volume: 4,870.8927 ft³ Weight: 608,861.59 lbf Entry: (143.41233, 230.44929) ft Exit: (338.57065, 125.16057) ft Radius: 248.48248 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 03:49:46 PM Kind: SLOPE/W Tool Version: 11.4.2.250

iyon		
No.: 2022-200	02/21/2024	1:650



Factor of Safety: 1.25

Volume: 4,870.8927 ft³ Weight: 608,861.59 lbf Entry: (143.41233, 230.44929) ft Exit: (338.57065, 125.16057) ft Radius: 248.48248 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 03:49:46 PM Kind: SLOPE/W Tool Version: 11.4.2.250

Lyons Canyon		
RTFA Job No.: 2022-200	02/21/2024	1:650

Section 19

Report generated using GeoStudio 2022.1. Copyright © 2022 Bentley Systems, Incorporated.

File Information

File Version: 11.04 Title: Lyons Canyon Comments: Lyons Canyon RTFA Job No.: 2022-200 Created By: AWR Revision Number: 351 Date: 02/21/2024 Time: 03:49:46 PM Tool Version: 11.4.2.250 File Name: Lyons Canyon Water Tank Site.gsz Directory: C:\Users\Alan\Documents\2020-200 Lyons Canyon\9-18-2023\

Project Settings

Unit System: U.S. Customary Units Start Date: Sunday, February 01, 2024

Analysis Settings

Section 19

Kind: SLOPE/W Analysis Type: Spencer Settings **PWP Conditions from: Ru** Unit Weight of Water: 62.430189 pcf Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Grid and Radius Critical slip surfaces saved: 25 **Optimize Critical Slip Surface Location: No** Tension Crack Option: (none) Distribution F of S Calculation Option: Constant Convergence **Geometry Settings** Minimum Slip Surface Depth: 0.1 ft Number of Slices: 30 Factor of Safety Convergence Settings Maximum Number of Iterations: 100 Tolerable difference in F of S: 0.001 **Under-Relaxation Criteria** Initial Rate: 1 Minimum Rate: 0.1 Rate Reduction Factor: 0.65 Reduction Frequency (iterations): 50 Solution Settings

Search Method: Root Finder Tolerable difference between starting and converged F of S: 3 Maximum iterations to calculate converged lambda: 20 Max Absolute Lambda: 2

Materials

TQss Cross Bedding

Slope Stability Material Model: Mohr-Coulomb Unit Weight: 125 pcf Effective Cohesion: 500 psf Effective Friction Angle: 34 ° Phi-B: 0 ° Pore Water Pressure Ru: 0.02

Slip Surface Grid

Upper Left: (297.91594, 407.2148) ft Lower Left: (284.68759, 324.06519) ft Lower Right: (417.34901, 342.96283) ft Grid Horizontal Increment: 12 Grid Vertical Increment: 12

Slip Surface Radius

Upper Left Coordinate: (188.30964, 210.30141) ft Upper Right Coordinate: (188.30964, 210.30141) ft Lower Left Coordinate: (188.30964, 172.50614) ft Lower Right Coordinate: (188.30964, 172.50614) ft Number of Increments: 12 Use Left Projection: No Left Projection Angle: 135 ° Use Right Projection: No Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (0.19941, 183.80617) ft Right Coordinate: (352.20619, 120.89809) ft

Geometry

Name: 2D Geometry

Settings

View: 2D Element Thickness: 1 ft 2/21/24, 3:53 PM

Points

	Х	Y
Point 1	0.19941 ft	183.80617 ft
Point 2	74.11957 ft	230.44929 ft
Point 3	179.62034 ft	230.44929 ft
Point 4	191.89818 ft	215.57665 ft
Point 5	227.21277 ft	186.02125 ft
Point 6	236.45279 ft	180.89493 ft
Point 7	245.7561 ft	178.67986 ft
Point 8	253.92023 ft	177.16095 ft
Point 9	265.56518 ft	172.16122 ft
Point 10	281.577 ft	159.37708 ft
Point 11	294.61429 ft	149.12445 ft
Point 12	310.87925 ft	139.37813 ft
Point 13	314.61323 ft	135.45429 ft
Point 14	339.35876 ft	124.82194 ft
Point 15	352.20619 ft	120.89809 ft
Point 16	352.20619 ft	0.14496 ft
Point 17	0.70571 ft	0.14496 ft

Regions

	Material	Points	Area
Region 1	TQss Cross Bedding	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	68,533 ft ²

Section 19



Factor of Safety: 1.51

Volume: 1,032.2147 ft³ Weight: 129,026.84 lbf Entry: (162.75123, 172.42338) ft Exit: (237.15427, 229.76598) ft Radius: 116.69975 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 04:07:12 PM Kind: SLOPE/W Tool Version: 11.4.2.250

iyon		
No.: 2022-200	02/21/2024	1:650



Factor of Safety: 1.51

Volume: 1,032.2147 ft³ Weight: 129,026.84 lbf Entry: (162.75123, 172.42338) ft Exit: (237.15427, 229.76598) ft Radius: 116.69975 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 04:07:12 PM Kind: SLOPE/W Tool Version: 11.4.2.250

iyon		
No.: 2022-200	02/21/2024	1:650



Factor of Safety: 1.22

Volume: 1,099.3591 ft³ Weight: 137,419.89 lbf Entry: (166.51771, 175.34841) ft Exit: (240.42632, 229.76598) ft Radius: 112.79415 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 04:11:30 PM Kind: SLOPE/W Tool Version: 11.4.2.250

iyon		
No.: 2022-200	02/21/2024	1:650



Factor of Safety: 1.22

Volume: 1,099.3591 ft³ Weight: 137,419.89 lbf Entry: (166.51771, 175.34841) ft Exit: (240.42632, 229.76598) ft Radius: 112.79415 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 04:11:30 PM Kind: SLOPE/W Tool Version: 11.4.2.250

iyon		
No.: 2022-200	02/21/2024	1:650
Section 21 Static

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File Information

File Version: 11.04 Title: Lyons Canyon Comments: Lyons Canyon RTFA Job No.: 2022-200 Created By: AWR Revision Number: 355 Date: 02/21/2024 Time: 04:07:12 PM Tool Version: 11.4.2.250 File Name: Lyons Canyon Water Tank Site.gsz Directory: C:\Users\Alan\Documents\2020-200 Lyons Canyon\9-18-2023\ Last Solved Date: 02/21/2024 Last Solved Time: 04:07:16 PM

Project Settings

Unit System: U.S. Customary Units Start Date: Sunday, February 01, 2024

Analysis Settings

Section 21 Static Kind: SLOPE/W Analysis Type: Spencer Settings PWP Conditions from: Ru Unit Weight of Water: 62.430189 pcf Slip Surface Direction of movement: Right to Left Use Passive Mode: No Slip Surface Option: Grid and Radius Critical slip surfaces saved: 25 **Optimize Critical Slip Surface Location: No** Tension Crack Option: (none) Distribution F of S Calculation Option: Constant Convergence **Geometry Settings** Minimum Slip Surface Depth: 0.1 ft Number of Slices: 30 Factor of Safety Convergence Settings Maximum Number of Iterations: 100 Tolerable difference in F of S: 0.001 **Under-Relaxation Criteria** Initial Rate: 1 Minimum Rate: 0.1

Rate Reduction Factor: 0.65 Reduction Frequency (iterations): 50 Solution Settings Search Method: Root Finder Tolerable difference between starting and converged F of S: 3 Maximum iterations to calculate converged lambda: 20 Max Absolute Lambda: 2

Materials

TQss Cross Bedding

Slope Stability Material Model: Mohr-Coulomb Unit Weight: 125 pcf Effective Cohesion: 500 psf Effective Friction Angle: 34 ° Phi-B: 0 ° Pore Water Pressure Ru: 0.002

Slip Surface Grid

Upper Left: (98.97672, 321.26204) ft Lower Left: (94.07846, 251.97448) ft Lower Right: (185.78491, 249.79748) ft Grid Horizontal Increment: 12 Grid Vertical Increment: 12

Slip Surface Radius

Upper Left Coordinate: (194.82932, 194.17543) ft Upper Right Coordinate: (194.82932, 194.17543) ft Lower Left Coordinate: (194.82932, 160.15968) ft Lower Right Coordinate: (194.82932, 160.15968) ft Number of Increments: 12 Use Left Projection: No Left Projection Angle: 135 ° Use Right Projection: No Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (0.81357, 180.15968) ft Right Coordinate: (474.04192, 163.15181) ft

Geometry

Name: 2D Geometry

Settings

View: 2D Element Thickness: 1 ft

Section 21 Static

Points

	Х	Y
Point 1	0.81357 ft	0.63212 ft
Point 2	0.81357 ft	180.15968 ft
Point 3	15.7742 ft	168.97858 ft
Point 4	53.09704 ft	142.67937 ft
Point 5	64.12066 ft	139.2148 ft
Point 6	92.6246 ft	124.41165 ft
Point 7	106.64035 ft	134.17543 ft
Point 8	140.65609 ft	154.17543 ft
Point 9	158.92381 ft	169.45102 ft
Point 10	173.72696 ft	180.94708 ft
Point 11	190.26239 ft	196.69511 ft
Point 12	205.22302 ft	215.43527 ft
Point 13	220.49861 ft	229.76598 ft
Point 14	352.6246 ft	229.76598 ft
Point 15	363.96318 ft	213.23055 ft
Point 16	386.16791 ft	203.93921 ft
Point 17	402.2309 ft	192.44315 ft
Point 18	420.02617 ft	182.20693 ft
Point 19	432.78208 ft	182.20693 ft
Point 20	440.97105 ft	182.20693 ft
Point 21	474.04192 ft	163.15181 ft
Point 22	474.04192 ft	-0.62772 ft

Regions

	Material	Points	Area
Region 1	TQss Cross Bedding	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22	89,154 ft²

Slip Results

Slip Surfaces Analysed: 523 of 2197 converged

Current Slip Surface

Slip Surface: 1,083 Factor of Safety: 1.51 Volume: 1,032.2147 ft³ Weight: 129,026.84 lbf Resisting Moment: -6,489,464 lbf·ft Activating Moment: -4,305,730.2 lbf·ft Resisting Force: 92,717.708 lbf Activating Force: 61,496.802 lbf Slip Rank: 3 of 2,197 slip surfaces Exit: (237.15427, 229.76598) ft Entry: (162.75123, 172.42338) ft Radius: 116.69975 ft Center: (300.19058, 191.38719) ft

Slip Slices

	x	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	235.96458 ft	227.69039 ft	0.51889807 psf	-40.468127 psf	-27.646097 psf	500 psf	0 psf	TQss Cross Bedding
Slice 2	233.5852 ft	223.71787 ft	1.5120279 psf	179.08436 psf	119.77405 psf	500 psf	0 psf	TQss Cross Bedding
Slice 3	231.20582 ft	220.07249 ft	2.4233725 psf	405.40275 psf	271.81302 psf	500 psf	0 psf	TQss Cross Bedding
Slice 4	228.82644 ft	216.702 ft	3.2659942 psf	636.10234 psf	426.8535 psf	500 psf	0 psf	TQss Cross Bedding
Slice 5	226.44706 ft	213.56764 ft	4.0495848 psf	869.70563 psf	583.89238 psf	500 psf	0 psf	TQss Cross Bedding
Slice 6	224.06768 ft	210.63968 ft	4.7815754 psf	1,105.2659 psf	742.28608 psf	500 psf	0 psf	TQss Cross Bedding
Slice 7	221.6883 ft	207.89472 ft	5.4678149 psf	1,342.1613 psf	901.61117 psf	500 psf	0 psf	TQss Cross Bedding
Slice 8	219.22564 ft	205.22909 ft	5.8356668 psf	1,507.0202 psf	1,012.5618 psf	500 psf	0 psf	TQss Cross Bedding
Slice 9	216.67971 ft	202.63717 ft	5.8865332 psf	1,590.768 psf	1,069.0161 psf	500 psf	0 psf	TQss Cross Bedding
Slice 10	214.13378 ft	200.19965 ft	5.8988004 psf	1,662.9233 psf	1,117.6771 psf	500 psf	0 psf	TQss Cross Bedding
Slice 11	211.58785 ft	197.90363 ft	5.8756914 psf	1,723.6097 psf	1,158.6262 psf	500 psf	0 psf	TQss Cross Bedding
Slice 12	209.04192 ft	195.73827 ft	5.8199205 psf	1,772.9047 psf	1,191.9137 psf	500 psf	0 psf	TQss Cross Bedding
Slice 13	206.49599 ft	193.6943 ft	5.7337981 psf	1,810.8426 psf	1,217.5613 psf	500 psf	0 psf	TQss Cross Bedding
Slice 14	203.9763 ft	191.78261 ft	5.5227444 psf	1,804.7543 psf	1,213.597 psf	500 psf	0 psf	TQss Cross Bedding
Slice 15	201.48286 ft	189.99427 ft	5.1889904 psf	1,752.0245 psf	1,178.2554 psf	500 psf	0 psf	TQss Cross Bedding
Slice 16	198.98942 ft	188.30258 ft	4.8310718 psf	1,684.5146 psf	1,132.9609 psf	500 psf	0 psf	TQss Cross Bedding
Slice 17	196.49599 ft	186.70259 ft	4.4502288 psf	1,602.0887 psf	1,077.6207 psf	500 psf	0 psf	TQss Cross

file:///C:/Users/Alan/Documents/2020-200 Lyons Canyon/9-18-2023/Lyons Canyon Water Tank Site - Section 21 Static.html

Section 21 Static

								Bedding
Slice 18	194.00255 ft	185.18992 ft	4.0475574 psf	1,504.5588 psf	1,012.1076 psf	500 psf	0 psf	TQss Cross Bedding
Slice 19	191.50911 ft	183.76067 ft	3.6240302 psf	1,391.6857 psf	936.2594 psf	500 psf	0 psf	TQss Cross Bedding
Slice 20	189.08129 ft	182.4449 ft	3.2813377 psf	1,301.3905 psf	875.58568 psf	500 psf	0 psf	TQss Cross Bedding
Slice 21	186.71908 ft	181.23572 ft	3.021204 psf	1,236.8837 psf	832.25073 psf	500 psf	0 psf	TQss Cross Bedding
Slice 22	184.35688 ft	180.0932 ft	2.7444026 psf	1,161.1247 psf	781.33735 psf	500 psf	0 psf	TQss Cross Bedding
Slice 23	181.99468 ft	179.01522 ft	2.4514691 psf	1,073.81 psf	722.64048 psf	500 psf	0 psf	TQss Cross Bedding
Slice 24	179.63247 ft	177.99982 ft	2.1428884 psf	974.59977 psf	655.93045 psf	500 psf	0 psf	TQss Cross Bedding
Slice 25	177.27027 ft	177.04526 ft	1.8190993 psf	863.1143 psf	580.95095 psf	500 psf	0 psf	TQss Cross Bedding
Slice 26	174.90806 ft	176.14994 ft	1.4804996 psf	738.93106 psf	497.41669 psf	500 psf	0 psf	TQss Cross Bedding
Slice 27	172.35499 ft	175.2497 ft	1.1579806 psf	617.34819 psf	415.62555 psf	500 psf	0 psf	TQss Cross Bedding
Slice 28	169.61106 ft	174.35285 ft	0.84946074 psf	497.04485 psf	334.68802 psf	500 psf	0 psf	TQss Cross Bedding
Slice 29	166.86713 ft	173.53028 ft	0.52237161 psf	360.46353 psf	242.78338 psf	500 psf	0 psf	TQss Cross Bedding
Slice 30	164.1232 ft	172.78037 ft	0.17711925 psf	206.72978 psf	139.32153 psf	500 psf	0 psf	TQss Cross Bedding

REVISED GEOTECHNICAL 100-SCALE PLAN REVIEW

LYONS CANYON DEVELOPMENT VESTING TENTATIVE TRACT NO. 83301 LOS ANGELES COUNTY, CALIFORNIA

FOR

NUWI – LYONS CANYON, LLC

September 15, 2023

Job No. 2020-200-001



TABLE OF CONTENTS

TABLE OF CONTENTS	1
SCOPE OF WORK	2
SITE DESCRIPTION	3
TRACT MAP REVISIONS	4
SUBSURFACE EXPLORATIONS	4
LABORATORY ANALYSES	5
GEOLOGY	5
REGIONAL GEOLOGY	5
SITE GEOLOGY	6
GROUNDWATER	8
CONCLUSIONS AND RECOMMENDATIONS	9
GENERAL	9
GEOLOGIC CONSIDERATIONS	9
STABILITY ANALYSES	11
GEOLOGIC SECTIONS AND ASSUMED CRITICAL FAILURE SURFACE	11
SHEAR STRENGTH PARAMETERS	12
LIQUEFACTION	
INFILTRATION	21
GRADING	22
DRAINAGE	
GENERAL GRADING REQUIREMENTS	
GRADING OBSERVATION	31
TEMPORARY EXCAVATIONS	31
CORROSION TESTS	32
EXPANSIVE SOILS	
FOUNDATIONS	
FLOOR SLAB SUPPORT	35
SEISMIC DESIGN PARAMETERS	
PAVEMENT DESIGN	
RETAINING WALLS	40
OBSERVATION AND TESTING	
LOS ANGELES COUNTY SECTION 111 STATEMENT	



The following are attached and complete this report.

- References
- GMED Tentative Approval
- Geotechnical Map Figure 1
- Geologic Sections Figure 2
- Geotechnical Sections Figure 3
- Stability Fill Detail for Grossly Stable Slopes Figure 4
- Appendix A RTF&A Field Explorations
- Appendix B Field Explorations by Others
- Appendix C Laboratory Testing
- Appendix D Slope Stability Analyses
- Appendix E Gregg CPT Soundings
- Appendix F Seismic Parameters
- Appendix G Liquefaction Calculations
- Appendix H Ayers Oil Well Documentation
- Appendix I United Civil Plan Set Sheets 1-5 of 5, dated September 5, 2023
- Appendix J Geotechnical 100-Scale Plan Review (dated March 19, 2021)
- Appendix K– Response to County Comments (dated July 27, 2021)
- Appendix L Aerial Imagery and LIDAR





September 15, 2023

NUWI – Lyons Canyon, LLC 2001 Wilshire Blvd., Suite 401 Santa Monica, California 90403

Job No. 2020-200-001

Attention: Mr. Jason Han

Subject:

Revised 100-Scale Geotechnical Plan Review Proposed Lyons Canyon Development The Trails at Lyons Canyon Vesting Tentative Tract No. 83301 Los Angeles County, California

References: See attached References

R. T. Frankian & Associates, Inc., (RTF&A) is pleased to present this updated and revised geotechnical grading plan review for Lyons Canyon, Tract 83301, Los Angeles County, California (Site). We recently prepared a revised geotechnical plan review (RTF&A, 2022) and it was requested by the project team that our previous approved Tentative Plan Review Report (RTF&A, 2021a) and approved response (RTF&A, 2021b) be presented in Appendix J and Appendix K of this report. Grading Plan revisions evaluated herein were made to the previous Los Angeles County approved RTF&A Geotechnical 100-Scale Plan. This report updates and supersedes our June 9, 2022 report (RTF&A, 2022).

This revised plan review is based on the attached September 5, 2023, The Trails at Lyons Canyon, Vesting Tentative Tract No. 83301 Plan prepared by United Civil, Inc. (United), included in Appendix I. Sheet 2 of 5 was used as a base for our Geotechnical Map, attached as Figure 1. The purpose of the report is to provide an updated geotechnical report to verify the applicability of the recommendations presented in our referenced reports relative to the current grading plan by United. The grading and foundation recommendations of the referenced reports remain applicable, unless specifically superseded by this report.

The findings, conclusions, and recommendations presented in this report are based on data developed by RTF&A, Pacific Soils, and Gold Coast, as well as appropriate engineering and geologic analyses. The assessment of general Site environmental conditions for the presence of contaminants in the soils and groundwater was beyond the scope of this investigation.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers and geologists practicing in this or similar localities at this time. No other warranty either express or implied is made as to the professional advice included in this report. This report has been prepared for NUWI-Lyons Canyon, LLC, and their design consultants, to be used solely for planning and design of the Vesting Tentative Tract Map No. 83301.

SCOPE OF WORK

The scope of work for the previous review is presented in the referenced reports and the updated geotechnical review of the Site plan is included as Figure 1:

- reviewed State of California Alquist-Priolo Earthquake Fault Zone Maps and Seismic Hazard Maps to evaluate potential geologic hazards;
- reviewed geologic maps published by the California Geological Survey (formerly known as the California Division of Mines and Geology) and the Dibblee Foundation to assess regional geologic conditions;
- reviewed groundwater data from the Los Angeles County Department of Public Works Water Resources Division, California Division of Mines and Geology Seismic Hazard Zones Maps Oat Mountain (1997) and Newhall Quadrangles (1997), GeoTracker and GAMA to establish high groundwater levels and trends in the area;
- review of select aerial imagery and Lidar imagery, Figures L1-L4 (Appendix L);
- reviewed the referenced reports;



-3-

- performed Site reconnaissance and geologic mapping of the Site;
- excavated and logged exploratory borings, test pits, and Site reconnaissance to observe subsurface geologic units and structure;
- conducted Cone Penetrometer Tests (CPT) to evaluate liquefaction potential of alluvial materials on-site;
- performed geologic and engineering analyses to determine slope stability, liquefaction assessment, grading recommendations including anticipated removals, and preliminary foundation recommendations;
- prepared Geologic Cross Sections depicting the grading conditions, relative to the proposed cut slopes and/or our interpretation of subsurface conditions (Figure 2);
- prepared conclusions and recommendations based on existing Site conditions and future intended use; and
- prepared a Geotechnical Map, presented as Figures 1.

SITE DESCRIPTION

The Site is situated along the northeast foothills of the Santa Susana Mountains within the Santa Clarita area of Los Angeles County, California. The location of the Site is shown on Sheet 1 of the Vesting Tentative Tract Map No. 83301 dated September 5, 2023, with Sheet 2 being used as the base map for our Geotechnical Map, Figure 1. Sheet 2 of the Vesting Tentative Tract Map No. 83301 (Plan) were prepared by United at a scale of 1 inch = 100 feet provide topography of the existing and proposed grades.

The Site is bounded by The Old Road on the east, immediately south of a residential development (Tract 3794) and undeveloped hillside terrain to the west and south. Topography at the Site is dominated by the alluviated valley floor of Lyons Canyon which drains southeast then swinging to the northeast. The surrounding hills that border the canyon are characterized by a series of steep to moderately steep bedrock ridges. Elevations across the Site range from approximately 1,600 feet above mean sea level (msl), along ridge tops to roughly 1,300 feet



-4-

along The Old Road. The natural slopes on-site exhibit gradients ranging from approximately .25:1 to 10:1 horizontal to vertical (h:v).

TRACT MAP REVISIONS

The majority of the revisions to the map presented in this report are related to the addition of a proposed water tank pad and associated graded slopes for the proposed access road in the southwest portion of the Site. In addition, perimeter roads and building pads were modified and slopes along the western portion of the Site were revised. Several of these modifications were related to a revised Oak Tree mitigation planning that modified the grading for these trees to remain in their current locations. These modifications that affected the graded pad areas were mostly along the north side of "B" Street and the eastern portion of the south side of "A" Street.

SUBSURFACE EXPLORATIONS

Subsurface data was available for the Site and adjacent areas from prior investigations conducted by Pacific Soils in 2006 and Gold Coast in 2015. This data was supplemented by the excavation of an additional 5 hollow-stem auger borings excavated on November 10, 2020 and 5 Cone Penetrometer Tests (CPT) by Gregg Drilling for RTF&A in January, 2021 as presented in our referenced report (RTF&A, 2021a). Two days of field mapping were completed in April of 2022, and April of 2023, and a total of 18 additional test pits were excavated in April of 2022 as part of the tank site investigation, for modification of proposed slopes and basins along the western property boundary, and to confirm the geotechnical conditions along the southern portion of the Site. Boring and test pit logs developed by RTF&A are presented in Appendix A and the 2021 Gregg CPT soundings are presented in Appendix E. Exploratory test pits and borings from Pacific Soils and Gold Coast are presented in Appendix B. Geologic structural data obtained from the various test pits and borings, as well as from reconnaissance geologic mapping of the Site by RTF&A, are presented on the Geotechnical Map, Figure 1 with our interpretation of subsurface conditions presented in Figure 2 "Geologic Cross-Section".



-5-

LABORATORY ANALYSES

We performed laboratory tests on selected samples obtained from the test pits to aid in the classification of the soils, and to determine the pertinent engineering properties of the foundation soils.

GEOLOGY

REGIONAL GEOLOGY

The Site is located in the eastern Ventura Basin, within the Transverse Ranges geomorphic province of California, along the northeastern flank of the Santa Susana Mountains. The Ventura Basin consists of a narrow, elongate sedimentary trough extending from the Santa Barbara Channel on the west, to the San Gabriel fault on the east. The axis of the trough trends east-west, reflecting the overall east-west trend of the Transverse Ranges, and generally coincides with the Santa Clara River Valley and the Santa Barbara Channel. The Ventura Basin has been an area of subsidence and sediment accumulation since the beginning of the Tertiary period, with the present trough-like form developing near the beginning of the Miocene epoch (Winterer and Durham, 1962).

The structure of the Basin is defined as a highly folded "synclinorium" formed by northsouth compressional forces (Kew, 1924) and containing a maximum 50,000± feet of marine and nonmarine Tertiary through Quaternary age sediments (Bailey and Jahns, 1954). Two main periods of general deformation of the Ventura Basin are indicated by the regional geologic structure: one in middle to late Miocene (represented by deposition of the Modelo Formation), and the other during the Pleistocene epoch, after deposition of the Plio-Pleistocene Saugus Formation (Kew, 1924; Winterer and Durham, 1962; Yeats et al., 1994). The flanks of the Ventura Basin synclinorium are broken by a series of large reverse/thrust faults including the Santa Susana and Oak Ridge faults on the southern flank, and the Red Mountain and San Cayetano faults on the northern flank (Bailey and Jahns, 1954; Yeats et al., 1994). The San Gabriel fault, the dominant geologic feature in the Santa Clarita Valley, forms the eastern



Ventura Basin boundary, and separates the Ventura Basin from the structurally similar Soledad Basin.

Sedimentary rock units comprising the eastern Ventura basin include approximately 2,000 feet of undifferentiated middle to late Eocene age rocks, $1,000\pm$ feet of the middle Miocene age Topanga Formation, $5,000\pm$ feet of the late Miocene age Modelo Formation, $4,000\pm$ feet of the late Miocene to early Pliocene age Towsley Formation, $5,000\pm$ feet of the Pliocene age Pico Formation, and $7,000\pm$ feet of the Plio-Pleistocene Saugus Formation (Winterer and Durham, 1962). The undifferentiated Eocene units and the Topanga, Modelo, Towsley, and Pico Formations are composed of marine sediments; the Saugus Formation is composed of interfingering shallow-water marine, brackish water, and nonmarine units (Kew, 1924; Winterer and Durham, 1962). These Tertiary period rock units rest unconformably on pre-Cretaceous age metamorphic and igneous basement rocks of the San Gabriel Mountains.

SITE GEOLOGY

General: Geologic conditions within the boundaries of Site have been previously evaluated by Pacific Soils (2006) and Gold Coast (2015). Additional geologic data was collected by RTF&A in January, 2021, April, 2022, and April 2023.

<u>Geologic Units</u>: The geologic units within the Site consist of bedrock of the Pico and Saugus formations, alluvium and colluvial (slope wash) deposits, landslide and debris flow deposits, and man-made fill. The geologic units identified within the Site are shown on the Geotechnical Map (Figures 1). A description of each unit is presented as follows:

<u>Pico Formation (Tp)</u>: Marine sedimentary rock units of the Pliocene age Pico Formation (map unit "Tp") are exposed in the southwest corner of the Site. The formation is composed primarily of fine- to medium-grained sandstones, coarse-grained pebbly sandstones, siltstones, and some silty claystone interbeds. Fine-grained sandstone is the dominant lithology of the formation and is typically very thinly or thinly bedded, soft, and moderately weathered, with alternating bands of iron oxide staining. Siltstone and silty claystone beds are moderately to well indurated and massive. Sandstone beds are typically dark yellowish orange to yellowish gray;



siltstone beds are typically yellowish gray to olive brown. The Pico Formation was not encountered during the current field investigation.

Saugus Formation, Sunshine Ranch Member (TQss): The Sunshine Ranch Member of the Saugus Formation (designated map unit "TQss") underlies the majority of the Site and within the literature it is described as interfingering shallow-water marine, brackish water, and nonmarine sedimentary units of Plio-Pleistocene age (Winterer and Durham, 1962). Within the Site, the Sunshine Ranch Member is composed of fine- to coarse-grained sandstone and conglomeratic/pebbly sandstone, with some siltstone interbeds. Medium to coarse grained, ridge forming, sandstone and conglomeratic sandstone are the dominant lithologies of the formation in the south and are typically hard to very hard, locally difficult to excavate with a backhoe, slightly moist to dry, and moderately to thickly bedded to massive. Some of the fine grained sandstone and silty sandstone beds are very thinly bedded, locally laminated, medium hard to soft, regularly moderately weathered, and have some iron oxide staining. Siltstone and sandy siltstone beds are typically found in the Site's northern areas, generally .5 to about 10 feet thick, soft to medium hard, moderately to well indurated, and thickly bedded to massive. Sandstone beds are dark yellowish brown to grayish orange, while siltstones are yellowish gray.

<u>Undifferentiated Alluvium and Colluvium (Qac)</u>: Undifferentiated Holocene age alluvium and colluvium (map unit "Qac") overlie the bedrock units on-site, with the alluvium mantling the floor of Lyons Canyons and the colluvium generally occurring in drainage swales and side canyons, and on slopes. These materials consist of loose to moderately dense mixtures of sand, silt, gravel, cobbles, and to a lesser extent, boulders.

<u>Man-made Deposits (af)</u>: Man-made deposits (map unit "af"), associated with past grading activities for development of The Old Road, are located along the east boundary of the Site. The man-made deposits are composed of sand and silt mixtures derived primarily from the local bedrock materials.

Landslide and Debris Flow Deposits: Landslide and Debris Flow deposits were identified on-site and are described in the Conclusions section that follows.



<u>Geologic Structure</u>: The Site is located along the northerly limb of the asymmetrical Pico anticline. Within the Site boundaries, the beds forming the northerly limb strike generally northwest and dip 30 to 65 degrees to the northeast creating a steep, asymmetric hogback ridgeline along the southern boundary of the project. The very steep topography and prominent ridge is the result of hard sandstone and conglomerate beds armoring slopes. Many of the north facing slopes are dip slopes.

GROUNDWATER

Groundwater within the Site occurs in the alluvial deposits within Lyons Canyon and major tributary canyons. Data from the Water Resources Division of Los Angeles County Department of Public Works (LACDPW) indicates that one water well was located adjacent to the Site boundaries. This well, designated as Well No. 5832, was located immediately north of the Site near the intersection of Sagecrest Circle and The Old Road. The water level data from this well, which was destroyed in 1965, covers the period of December, 1956 through November, 1964, with the last water level measured on November 24, 1964. The water level at that time was measured at a depth of 118.4 feet below existing ground surface.

Exploration completed within the Site by Pacific Soils (2006) indicated groundwater within the alluviated valley floor at depths ranging from 53 to 69 feet below existing ground surface. Groundwater was not encountered within our borings within the valley floor within the main easterly canyon. However, seepage was encountered in the northerly draining canyon within Hollow Stem 3 and 4 at depths of 25 and 20 feet, respectively. Pore water dissipation, performed within some of the CPT soundings as presented in Appendix E, did not provide a consistent groundwater depth. Based on review of the California Division of Mines and Geology seismic hazard report for Oat Mountain , the historic water depth just north of the Site along The Old Road is 30 feet. A historic high water of 30 feet was conservatively utilized for the liquefaction calculations presented in Appendix G.



-9-

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

Based on our review of previous geotechnical reports prepared for the project and adjacent areas, the additional subsurface exploration performed by RTF&A, and analyses completed as part of this work, it is our opinion that Vesting Tentative Tract No. 83301 may be developed as planned, provided our recommendations are incorporated in the design of the project.

GEOLOGIC CONSIDERATIONS

Faulting: No active or potentially active faults are known to exist within the subject Site and the Site is not located within an Alquist-Priolo Earthquake Fault Zone. The closest Alquist-Priolo Zone is located approximately 1.5 miles northwest of the Site and was established for surface features identified following the 1994 Northridge earthquake. In our opinion, there is little probability of surface fault rupture occurring on-site.

Landslides: Landslides were identified during this field investigation. Typically, landslides were near surface features impacting weathered and creep impacted rock on steep slopes. Failures appeared to bedding plane controlled. Large deep seated landslides were not identified on Site. Review of the California Geological Surveys "Landslide Inventory and Deep Landslide Susceptibility Map" indicated the Site is not included within a known or inferred landslide.

Debris Flows (Qdf): Remnant debris flow deposits were identified and mapped during this field investigation as depicted on Figure 1. Where observed, subtle geomorphic expression of the deposits was evident. Estimated maximum thickness of the identified deposits was on the order of 16 feet. Test pit excavations revealed that much of the surficial materials on Site slopes to a depth of about 8 feet have been or may be creep impacted, and subject to sloughing and or sliding.



The potential for debris flows exists anywhere that a moderate to thick accumulation of residual soil, slope wash, or weathered bedrock materials occur on moderate to steep slopes. The potential debris flow hazard should be addressed as part of a review of 1" = 40' rough grading plans, when building lots and drainage features have been more clearly defined.

At the rough grading plan stage, possible mitigative measures could include, but not be limited to, one or more of the following:

- removal of potential debris material;
- building setbacks from ascending slopes;
- reduction and control of drainage onto the debris material;
- construction of debris basins; and
- construction of an impact wall designed for an equivalent fluid density of at least 125 pounds per cubic foot.

In general, building lots most susceptible to potential debris flow are those lots located directly below and adjacent to natural slopes. Based on our review of the United plan, all future lots appear to have acceptable separation, either vertical or horizontal, from natural slopes and potential debris flow source areas. Therefore, potential debris flow impacts are judged to be minimal. However, these opinions should be verified at the rough grading plan review stage.

<u>**Oil Wells</u>**: Data from the California Department of Conservation's Geologic Energy Management Division (CalGEM) indicate that one oil well, designated "Ayers" 1 is located within the subject Site. Only limited data on this well exists in the CalGEM records. Based on the data, the well was drilled in February, 1961 to a depth of 9,785 feet. The well was subsequently abandoned in April, 1961. However, geophysical survey techniques did identify anomalies within the vicinity of the reported historical well location and GPS information from that search is included with the documentation related to "Ayers" 1 that was provided by Atlas in their December 28, 2020 report that is presented in Appendix H.</u>



Figure 1 presents the surveyed location of the Ayers 1 well. It is location on the plan is based on surveyed data by others. It is anticipated and recommended that CalGEM will be contacted regarding the well's current abandonment. Furthermore, and as anticipated, CalGEM will require that the well be modified relative to proposed grade and re-abandoned to current standards, by others.

<u>Rockfalls</u>: Future building pads within the Site will not be located directly downslope of any potential rockfall areas.

<u>Rippability:</u> The bedrock exposed within the Site is weakly to moderately cemented and can likely be excavated with conventional grading equipment. Heavy single shank ripping may be needed for massive ridge forming well-cemented conglomerate or well-cemented sandstone units within the Saugus Formation, primarily in the southern areas of the Site. Should a hard well-cemented layer be encountered, the use of breakers or jackhammers may be necessary.

<u>Restricted Use Areas (RUAs)</u>: There are no proposed RUAs within the Site.

STABILITY ANALYSES

Slope stability analyses were performed using the program Slope/W by GEO-SLOPE International Ltd., which utilized Bishop's Simplified Method or Spencer's Method was used.

GEOLOGIC SECTIONS AND ASSUMED CRITICAL FAILURE SURFACE

The updated analyses were based on subsurface conditions as depicted on the Geologic Sections, Figure 2. The existing ground surface, proposed grading scheme, and subsurface geologic structure are shown on the geologic sections. For analyses, where the location of weak bedding planes is unknown or uncertain, one is assumed to be located exactly at the critical location, typically near the toe of the slope. Although groundwater was not indicated on the Geologic Sections, the analyses assumed a phreatic surface above the critical failure surface for bedding plane failures. The critical failure surfaces, phreatic surfaces, factors of safety, and recommended mitigation measures (i.e., stabilization or buttress fills, if necessary) are added to the Geologic Sections for presentation as Geotechnical Sections in this report. The Geotechnical



-12-

Sections and Slope Stability Analysis are presented in Figure 3 and the computer printouts are presented in Appendix D.

SHEAR STRENGTH PARAMETERS

As part of the evaluation of shear strength parameters to be used in slope stability calculations, the referenced reports concerning the Site and adjacent sites were reviewed. The shear strength parameters used for slope stability analyses are based on review of the referenced reports (RTF&A, 2000 and 2016) from relatively nearby sites, review of recommended shear strength parameters from the Gold Coast (2015) report, with additional tests supplemented by our office for to establish the recommended shear strength parameters.

Presented below are the recommended shear strengths for use at the Site. The shear test results are considered to be effective values; that is, they require hydrostatic pressures be considered in a stability analysis. A description of the testing procedures and the direct shear test results are presented in Appendix C.

MATERIAL	COHESION (psf)	ANGLE OF SHEARING RESISTANCE (degrees)
Landslide Failure Plane (MSR)	200	16
TQss Bedding Static (MSR)	250	20
TQss Bedding Seismic (SSR)	200	30
TQss Cross Bed Static (SSR)	500	34
TQss Cross Bed Seismic (SSR)	800	36
Compacted Fill 90% (SSR)	350	30
Compacted Fill 95% (SSR)	400	30
Alluvium (Qal)	250	30

SLOPE STABILITY

The revised tract map for the Site will include grading of 12 cut slopes. Details specific to all proposed cut slopes, including anticipated geologic conditions and recommended mitigation of potential slope instability, were previously discussed in our March 19, 2021 report (RTF&A, 2021a). Cut Slopes 2, 5, 7, 10, 11, and 12 have been reconfigured as part of the



proposed revised grading. Cut Slope 10 was modified to accommodate the proposed water tank and tank access road, and as a result slopes 10A through 10D have been identified as part of the proposed tank Site grading and slope modifications. As the proposed grading for all remaining cut slopes is essentially unchanged, only cut slopes CS-2, CS-5, CS-7, CS-10, CS-10A, CS-10B, CS-10C, CS-10D, CS-11, and CS-12 are discussed in the following sections.

<u>Cut Slope CS-2</u>: Cut slope CS-2 is proposed as a 2:1 h:v curved cut, sweeping from southwest facing to east facing with a maximum height of 40 feet. An eight feet high retaining wall is planned along a portion of the base of the cut along the road. Saugus Formation will be exposed within the majority of the cut with the exception of alluvium/colluvium being exposed at the base of the cut at its' western extent. Saugus Formation bedding strikes at roughly north 55 west, dipping to the north at 31 degrees, which is generally favorable to the cut. It is recommended that the alluvium and colluvium within the cut slope be entirely removed and reconstructed as a stability fill with backdrains.

<u>Cut Slope CS-5</u>: Cut Slope CS-5 will consist of a north-facing 2:1 h:v slope that will attain a maximum height of about 60 feet. A 15-foot-high retaining wall will be constructed across the toe of the cut slope. Test Pit 2, a 35 feet long trench was excavated within the proposed slope footprint to obtain additional geologic subsurface information. Cut Slope CS-5 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 37 to 65 degrees towards the northeast. This bedding orientation exhibits an apparent bedding component dipping approximately 16 degrees to the north (see Geologic Section 9-9', Figure 2). Bedding will impose a surcharge on the proposed retaining wall of 3 kips per foot of retaining wall. Analyses of the daylighted bedding condition presented in Appendix D meets County static and seismic factor of safety requirements after construction of a retaining wall able to resist the daylighted surcharge load of 3 kips for seismic conditions. It is assumed that the proposed retaining wall will be constructed as a either soil nail or Cast-In-Drilled-Hole (CIDH) pile supported retaining wall using top-down construction sequencing. The



pile or soil nail supported retaining wall will be more expensive than a conventional retaining wall, but is considered feasible.

<u>Cut Slope CS-7</u>: Cut Slope CS-7 will consist of a north-northwest-facing 2:1 slope that will attain a maximum height of about 75 feet. A 10-foot-high retaining wall will be constructed across the toe of the cut slope. Test Pit 1, a roughly 30 feet long trench was excavated within the proposed slope footprint to obtain additional geologic subsurface information. Cut Slope CS-7 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 30 to 40 degrees towards the northeast. This bedding orientation exhibits an apparent bedding component dipping approximately 25 degrees to the north (see Geologic Section 8-8', Figure 2) and is daylighted with respect to the north-northwest-facing cut slope.

Bedding will impose a surcharge on the proposed retaining wall of 3 kips per foot of retaining wall to meet factor of safety requirements. Analyses of the daylighted bedding condition presented in Appendix D meets County static and seismic factor of safety requirements after construction of a retaining wall able to resist the daylighted surcharge load of 3 kips. It is assumed that the proposed retaining wall will be constructed as a either soil nail or Cast-In-Drilled-Hole (CIDH) pile supported retaining wall using top-down construction sequencing. The pile or soil nail supported retaining wall will be more expensive than a conventional retaining wall, but is considered feasible.

<u>Cut Slope CS-10</u>: Cut Slope CS-10 was significantly revised to provide an access road to the new proposed water tank pad. Cut Slope CS-10 will consist of cutting about 235 feet of elevation to yield a southeast-facing 2:1 slope that will attain a maximum height of about 210 feet. CS-10 ascends up slope and paralleling the strike of the hogback ridge line as presented in Figure 1. Based on apparent dips shown along the ridge line, what appears to be significant variations in bedrock orientations shown in Geologic Cross-Section 1-1' (Figure 2) are not, but are a result of small variation within the strike of the ridge forming beds. Figure 1 depicts Geologic Cross-Section line 1-1' and the strike of bedding nearly parallel, with the rock dipping away from the viewer. Cut Slope CS-10 will expose Saugus Formation units in which the



underlying bedding strikes northwest and dips roughly 41 to 71 degrees towards the northeast. As depicted on Geologic Cross-Section 1-1' (Figure 2), this bedding orientation is favorably oriented with respect to the southeast-facing cut slope and the slope is considered grossly stable from a geologic standpoint.

Alluvial and Colluvial deposits will also be exposed in the proposed debris basin slopes below Cut Slope CS-10. The alluvium and colluvial soils exposed in the proposed basin cut slopes should be removed and replaced as a fill slope. Backdrains would only be required where the back of the fill slope will be within bedrock materials.

Where the water tank access road makes a 180 degree turn at about a proposed elevation 1,445 feet there is only a narrow strip of bedrock with a gradient that dips steeply to the north. There is a thin skinned surficial slide (2 to 5 feet thick) and a potential for creep and surficial slope erosion that could eventually progress to the south where it could impact the proposed access road. Accordingly, it is recommended that up to five CIDH soldier piles be installed to depths of about 30 feet as shown on the attached Geotechnical Map, Figure 1. The diameter of the CIDH piles is expected to be about 30 inches, but should be a minimum diameter of 24 inches.

<u>Cut Slope CS-10A</u>: Located at the top of Cut Slope CS-10A is proposed as a south facing 42 feet high 1.5:1 h:v cut bedrock rock cut made to accommodate the access water tank pad. Geologic Cross Sections 10-10' and 16-16' present the subsurface geometry of the rock with respect to the proposed cut. Bedding is favorably steeply dipping (51 degrees) to the northeast and therefore CS-10A is grossly stable from a geologic perspective. It is anticipated that weathered rock and colluvium within 10 feet of the slope's face may be susceptible to surficial sloughing. Grading of the cut slope will improve the overall condition, nuisance water will be directed away from the slope surfaces, and no structures or improvements are planned at the base of the slopes.

<u>Cut Slope CS-10B</u>: A 65 feet high south facing 1.5:1 h:v bedrock cut slope is proposed to accommodate the tank access road. Bedrock is oriented striking to the northwest and dipping



to the northeast at about 65 degrees. As presented, CS-10B bedding is favorable for the cut slope and CS-10B is grossly stable from geologic perspective. It is anticipated that weathered rock and colluvium within 10 feet of the slope's face may be susceptible to surficial sloughing. Grading of the cut slope will improve the overall condition, nuisance water will be directed away from the slope surfaces, and no structures or improvements are planned at the base of the slopes.

<u>**Cut Slope CS-10C**</u>: Proposed as a less than 75 feet high, 1.5:1 h:v, north facing bedrock cut slope, CS-10C will cut through northwest trending, northeast dipping (about 55 degrees) Saugus Formation bedrock, see Figure 1. Bedrock is dipping significantly steeper than the proposed 1.5:1 h:v cut slope as shown in Cross-Section 10-10'. The slope is considered grossly stable from a geologic perspective. It is anticipated that weathered rock and colluvium within 10 feet of the south facing slope's face may be susceptible to surficial sloughing. Grading of the cut slope will improve the overall condition, nuisance water will be directed away from the slope surfaces, and no structures or improvements are planned at the base of the slopes.

<u>Cut Slope CS-10D</u>: Cut Slope CS-10 wraps to the north at its base, and changes the orientation of the 2:1 horizontal: vertical slope. Apparent bedding was evaluated with geometry being presented in Geologic Cross-Sections 6-6' and 13-13'. Bedding is striking to the northwest while dipping to the northeast at roughly 45 degrees to 60 degrees. Apparent bedding within the CS-10D is inclined at about 12 degrees, daylighting within the cut. It is recommended that the portion of the cut slope daylighting bedding be reconstructed as a stability fill slope with backdrains. The keyway for the stability fill should measure 30 feet wide and 3 feet deep, and should extend upslope to the top of the cut at an elevation of about 1,440 feet.

<u>Cut Slope CS-10E</u>: Cut slope 10E is proposed as 1.5:1 h:v, 60 feet high and south facing 1.5:1. It is a bedrock cut exposing rock dipping to the north east at about 52 degrees, and is oriented favorable to the cut. CS-10E is considered grossly stable from a geologic perspective. It is anticipated that weathered rock and colluvium within 10 feet of the south facing slope's face may be susceptible to surficial sloughing. Grading of the cut slope will improve the overall



condition, nuisance water will be directed away from the slope surfaces, and no structures or improvements are planned at the base of the slopes.

<u>Cut Slope CS-11</u>: Cut Slope CS-11 will consist of a northeast-facing 2:1 slope with terrace drains that will attain a height of approximately 80 feet. Additional subsurface exploration consisting of TP-8 through TP-11 were excavated within the proposed slope footprint to obtain additional geologic structure. The cut slope will expose sedimentary rock units of the Saugus Formation at the edges of the proposed cut slope and, in the central portion of the slope, alluvial/colluvial deposits, and landslide debris. Bedding in the Saugus Formation strikes northwest and dips 32 to 65 degrees to the northeast. Portions of two landslides were identified within the proposed limits of Cut Slope CS-11 as depicted on Figure 1. There is also expected to be colluvium and alluvium exposed in Cut Slope CS-11 in addition to a fill over cut in the upper portion of the slope. Accordingly, it is recommended that Cut Slope CS-11 be constructed as a 35-foot-wide by 3-foot-deep stability fill. The stability fill should terminate at a terrace drain near the top of the proposed cut slope. The stability fill should be constructed with backdrains in accordance with the recommendations presented in the "Conclusions and Recommendations" section of this report, and as shown on Figure 4.

<u>Cut Slope CS-12</u>: Cut Slope CS-12 will consist of an east-northeast-facing 2:1 slope that will attain a maximum height of 85 feet. Test Pit TP-5 and Test Pit TP-7 were excavated within the proposed slope footprint to obtain additional geologic structure as depicted in Geologic Cross Section 2-2'. At the northeastern toe of Cut Slope CS-12, two small landslides were identified, with the western slide crossing beyond the toe of the proposed slope. These landslides should be removed in their entirety and replaced with compacted fill or as a stability fill. Rock observed within the test pits indicated that the upper 6 feet to 8 feet was or had the potential to be creep effected. The southern and central portion of Cut Slope CS-12 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 42 to 46 degrees towards the northeast. As depicted on Geologic Section B-B' (Figure 2), this bedding orientation



exhibits an apparent bedding component dipping approximately 31 degrees to the northeast. The apparent bedding is steeper than the 2:1 (26 degrees) slope gradient and the central and southern portion of cut slope is considered grossly stable from a geologic standpoint.

Debris flow deposits were identified in the northern portion of Cut Slope 12 that is located above a proposed basin. The debris flow was investigated by TP-5. It is recommended that the debris flow be removed in its entirety and reconstructed as a stability fill slope with backdrains. The keyway for the stability fill should measure 35 feet wide and 3 feet deep. This proposed debris flow removal and replacement with a Stability Fill with backdrains, should extend to the top of the proposed slope.

LIQUEFACTION

Liquefaction may occur when saturated, loose to medium dense soils with little to no cohesion are densified by ground vibrations. The densification results in increased pore water pressures if the soils are not sufficiently permeable to dissipate these pressures during, and immediately following, an earthquake. When the pore water pressure is equal to or exceeds the overburden pressure, liquefaction of the affected soil layers occurs. For liquefaction to occur, three conditions are required:

- ground shaking of sufficient magnitude and duration;
- a groundwater level at or above the level of the susceptible soils during the ground shaking; and
- soils that are susceptible to liquefaction.

For a Site to be considered susceptible to liquefaction using the criteria and methodology initially developed by Seed and Idriss (1982), liquefaction of underlying soil layers must result in an observed surface effect such as sand boils, mud-spouts, surface water seepage, ground cracking, or quicksand-like conditions.

Lateral spreading can result in ground cracking and may occur when a Site is sloped or is near a free-face and there is a sufficiently continuous liquefiable layer on which the overlying



soils can move laterally. Due to the recommended removal depths and the lack of a free-face located below the recommended removals, the potential for lateral spread occurring at the Site is low.

Ground settlement may occur during seismic shaking of an area. The settlement can be caused by liquefaction of loose granular soils and by compaction of loose, but not necessarily liquefiable, soils.

The State of California Seismic Hazard Map for the Oat Mountain Quadrangle indicates the alluvial areas of the Site are located within a potential liquefaction area. The locations of the CPT soundings that were advanced for the subject investigation are indicated on the attached Geotechnical Map, Figure 1. As previously mentioned, the logs for the borings are presented in Appendix A, CPT soundings are presented in Appendix G, and the results of our laboratory tests are presented in Appendix C of this report. The results of our liquefaction calculations are presented in Appendix G.

Ground Shaking: Ground shaking of sufficient magnitude and duration to cause liquefaction can occur virtually anywhere within Southern California. The seismic parameters determined for the Site resulted in a PGAm of 1.17g. The deaggregation obtained from the USGS website indicates the mean contribution to acceleration is a 6.85 magnitude earthquake located 7.27 kilometers from the Site. The seismic data is presented in Appendix F and the liquefaction calculations are presented in Appendix G. There will not be any liquefaction related settlements with the existing bedrock areas mapped as TQss areas as indicated on the Geotechnical Map, Figure 1.

Liquefaction Analysis: The liquefaction evaluation was performed in accordance with the 2014 Los Angeles County Building Code and the Los Angeles County Department of Public Works Geotechnical Materials Engineering Division (GMED) document GS 045.0, dated October 1, 2014. Liquefaction calculations are presented in Appendix G.

Liquefaction evaluation and calculations were previously performed for the Site (Gold Coast, 2015) which determined that the alluvial portions of the Site were subject to up to 1.39 inches of



liquefaction settlement and 0.49 inches of dry sand settlement for a total seismic settlement of about 1.89 inches. The liquefaction evaluation performed by RTF&A on the 5 CPT soundings performed by Gregg Drilling in January, 2021 are discussed below and the liquefaction calculations are presented in Appendix G.

The existing alluvial areas (Qac) mapped at the Site are subject to liquefaction. After the recommended removals are performed, the remaining alluvium soils will be mantled by certified engineered fill. The alluvial soils are underlain by bedrock materials. Accordingly, the existing canyon areas at the Site will be underlain by a combination of bedrock materials, denser alluvial deposits, and certified engineered fill. Based on liquefaction calculations presented in Appendix G that were performed on the recent Gregg Drilling CPT soundings, it was determined that liquefaction settlement would be about 1.25 inches (Boring HS-5). The maximum dry sand settlement expected at the Site is about 0.5 inches. The total dynamic settlement after performing either the 15 or the 20 feet of removal and elevating the Site grade within the existing Qac areas is expected to be about 1.75 inches with up to about 1 inch of seismic differential settlement within a horizontal distance of about 30 feet.

Based on the results of our analyses, some alluvial soils beneath the Site and below the groundwater level may liquefy in the event of a large earthquake on a nearby fault that produces the design-level ground motions. In addition, soils above the groundwater level may also experience "dry" settlement. This will result in seismically induced ground settlement. The potential for liquefaction induced lateral spread occurring at the Site is considered Low. The recommended liquefaction mitigation at this Site consists of a combination of ground modification below the proposed building areas and structural mitigation. Each of the liquefaction mitigation methods is discussed below.

Ground Improvement: The recommended grading will involve the removal of the upper soils in the proposed building areas and their replacement with properly compacted fill. The upper soils, which are subject to dry sand settlement, would be removed to depths of either



15 or 20 feet and replaced with compacted fill soils as indicated on the attached Geotechnical Map, Figure 1. Properly compacted fill soils would not be subject to liquefaction.

<u>Structural Mitigation</u>: According to GMED GS 045.0, dated October 1, 2014, structural mitigation alone is acceptable for up to 4 inches of total seismically induced settlement, with up to 1 inch of seismically induced differential vertical displacement over a horizontal distance of 30 feet. Anything in excess of these settlements requires a combination of ground modification and structural mitigation. Accordingly, the recommended liquefaction mitigation at this Site consists of a combination of ground modification below the proposed building areas and structural mitigation.

Structural mitigation to reduce the potential for liquefaction and/or seismically induced settlement of the proposed buildings would include minimum requirements for foundation and floor slab construction as presented in the following "Recommendations" section of this report. The project Structural Engineer should also be consulted regarding the design of structural components of the buildings to reduce adverse impacts associated with liquefaction-induced settlement of the proposed structures at the Site.

INFILTRATION

The Los Angeles County Department of Public Works (LACDPW) prepared "Guidelines for Design, Investigation, and Reporting Low Impact Development Stormwater Infiltration" (Document GS200.2, dated June 30, 2017). These guidelines provide stringent requirements for minimum infiltration rates, hillside developments with steep slopes, and sites subject to liquefaction.

At the completion of the proposed grading operations, the surface of the Site is expected to consist of either relatively shallow certified compacted fill cap overlying bedrock in the existing cut areas or deeper fill soils ranging from about 20 to greater than 30 feet overlying alluvial soils. All the alluvial soils at the Site are underlain by bedrock. Compacted fill soils at the Site are not expected to meet the minimum county infiltration requirements of 0.3 inches per hour. In addition, the alluvial soils at the Site are designated by the State of California as having



the potential of being subject to liquefaction when saturated and are subject to seismic settlement as evaluated in this report. The guidelines state that infiltration shall not increase the potential for seismic settlement of structures on or adjacent to the Site. Accordingly, in compliance with the LACDPW Guidelines, it is recommended that infiltration into the subsurface compacted fill soils not occur at the Site and that stormwater mitigation requirements be achieved by methods other than on-site infiltration.

GRADING

General: The following sections present recommendations for treatment of cut and fill slopes, and grading. The applicability of the preliminary recommendations given in the following sections for foundation and retaining wall design should be confirmed at the completion of grading. Paving studies and soil corrosivity tests should be performed at the completion of rough grading to develop detailed recommendations for protection of utilities, structures, and for construction of the proposed roads.

<u>Site Preparation</u>: Prior to performing earthwork, the existing vegetation and any deleterious debris should be removed from the Site. All unsuitable soils in the areas of grading that are receiving fill should be removed to competent bedrock materials and replaced with engineered fill. The depth of removal and recompaction of unsuitable soils is noted on the Geotechnical Map. Any fill required to raise the Site grades should be properly compacted.

Removal of the exposed natural soils should extend to at least the depths indicated on the Geotechnical Map.

<u>Removal Depths</u>: The required depth of removal and recompaction of the natural soils is indicated on the Geotechnical Map. Deeper removals will be required if disturbed or unsuitable soils are encountered. After excavation of the upper natural soils on hillsides and in canyons, further excavation should be performed, if necessary, to remove slope wash or other unsuitable soils.

The Geotechnical Consultant of Record may require that additional shallow excavations be made periodically in the exposed bottom to determine that sufficient removals have been



made prior to recompacting the soil in-place. Deeper removals may be recommended by RTF&A based on observed field conditions during grading. During grading operations, the removal depths should be observed by a representative of RTF&A and surveyed by the Project Civil Engineer for conformance with the recommended removal depths shown on the grading plan.

Expansive Bedrock Requirements: It is anticipated that bedrock materials exposed at pad grade may contain expansive claystone beds that could cause differential expansion. Therefore, within building areas at locations where expansive bedrock units are exposed at pad grade, it is recommended that the bedrock be removed and recompacted to a depth at least 8 feet below the proposed final pad elevations or 5 feet below the bottom of proposed footings, whichever is greater. It is also recommended that in exposed bedrock areas receiving pavement or hardscape improvements, the bedrock be removed and recompacted to a depth at least 3 feet below proposed soil subgrade. The soils generated by these over-excavations should be mixed with non-expansive soils to yield a relatively non-expansive mixture. Should the resulting fill soil still be expansive, special construction techniques, such as pad subgrade saturation or post-tensioned slabs, may be required to reduce the potential for expansive soil–related distress.

<u>Transition Lot Requirements</u>: Proposed building pads located in a cut and fill transition zone may experience cracking and movement of the footings and slab due to differing compressibility of the fill, as compared to the bedrock material. To reduce the potential for cracking and differential settlement, the portion of the lot in cut bedrock or terrace deposits should be over-excavated to a depth at least 5 feet below the proposed finished pad elevation or 3 feet below the bottom of proposed footings, whichever is greater. The over-excavation should extend at least 5 feet laterally beyond the building limits, or 1 foot laterally for each 1 foot over-excavated below proposed finished pad elevation, whichever is greater. Where removal and recompaction for potentially expansive soils or bedrock is also required, it is recommended that the 8 foot removals be performed as described in the "Expansive Bedrock" section of this report.



<u>Material for Fill</u>: The on-site soils, less any debris or organic matter, may be used in the required fills. Any expansive clays should be mixed with non-expansive soils to result in a mixture having an expansion index less than 30 if they are to be placed within the upper eight feet of the proposed rough grades.

Rocks or hard fragments larger than eight inches may not be placed in the fill without special treatment. Rocks or hard fragments larger than four inches shall not be clustered or compose more than 25% by weight of any portion of the fill or a lift. Soils containing more than 25% rock or hard fragments larger than four inches must be removed or crushed with successive passes (e.g., with a sheepsfoot roller) until rock or hard fragments larger than four inches constitute less than 25% of the fill or lift.

Oversized Material: Rocks or material greater than eight inches in diameter, but not exceeding four feet in largest dimension, shall be considered oversized rock. The oversized rocks can be incorporated into deep fills where designated by the Geotechnical Consultant of Record. Rocks should be placed in the lower portions of the fill and should not be placed within the upper 10 feet of compacted fill, or nearer than 15 feet to the surface of any fill slope. Windrows should be excluded from areas of proposed utilities, pools, and other types of future underground improvements. Additional costs and construction difficulties should be anticipated if future improvements are located in areas where there will be conflicts with existing windrows. Rocks between eight inches and four feet in diameter shall be placed in windrows or shallow trenches located so that equipment can build up and compact fill on both sides. The width of the windrows shall not exceed four feet. The windrows should be staggered vertically so that one windrow is not placed directly above the windrow immediately below. Rock greater than one foot in diameter shall not exceed 30% of the volume of the windrows. Granular fill shall be placed on the windrow, and enough water should be applied so that soil can be flooded into the voids. Fill should be placed along the sides of the windrows and compacted as thoroughly as possible. After the fill has been brought to the top of the rock windrow, additional granular fill



should be placed and flooded into the voids. Flooding is not permitted in fill soils placed more than one foot above the top of the windrowed rocks.

Where utility lines or pipelines are to be located at depths greater than 15 feet, rock shall be excluded in that area. Excess rock that cannot be included in the fill, or that exceeds four feet in diameter, should be stockpiled for export or used for landscaping purposes.

The oversized material recommendations presented in this report provide for the geotechnical consultant to coordinate with the grading contractor to develop a procedure for construction of compacted fills that have a satisfactory fill performance for the intended use of the fill. It should be understood that it is not feasible and/or cost effective to eliminate all oversize material from constructed fills as part of a conventional grading operation. The exclusion of all oversize material is not necessary for satisfactory fill performance on the majority of projects.

Import Material: Import material should consist of relatively non-expansive soils with an expansion index less than 30. The imported materials should contain sufficient fines (binder material) so as to be relatively impermeable, and result in a stable subgrade when compacted. The import material should be free of organic materials, debris, and rocks larger than 12 inches. A bulk sample of potential import material, weighing at least 25 pounds, should be submitted to the Geotechnical Consultant of Record at least 48 hours in advance of fill operations. All proposed import materials should be approved by the Geotechnical Consultant of Record prior to being placed at the Site.

Compaction: After the Site is cleared and excavated as recommended, the exposed soils should be carefully observed for the removal of all unsuitable material. Next, the exposed subgrade soils should be scarified to a depth of at least six inches, brought to above optimum moisture content, and rolled with heavy compaction equipment. The upper six inches of exposed soils should be compacted to at least 90% of the maximum dry density obtainable by the ASTM D 1557-02 Method of Compaction.



After compacting the exposed subgrade soils, all required fills should be placed in loose lifts, not more than eight inches in thickness, and compacted to at least 90% of their maximum density. For fills placed at depths greater than 40 feet below proposed finish grade, a minimum compaction of 93% of the maximum dry density is required. The moisture content of the fill soils at the time of compaction should be above the optimum moisture content. Compacted fill should not be allowed to dry out before subsequent lifts are placed.

Rough grades should be sloped so as not to direct water flow over slope faces. Finished exterior grades should be sloped to drain away from building areas to prevent ponding of water adjacent to foundations.

Shrinkage And Bulking: Shrinkage of about 12 to 16 percent is estimated for the onsite natural alluvial soils when removed and placed as compacted fill. A bulking value of about 2 to 6 percent is estimated for materials generated from Saugus Formation bedrock cut areas for use as compacted fill. The actual shrinkage and bulking will depend upon the relative compaction obtained by the contractor during grading operations and would be expected to change on a daily basis.

Permanent Slopes: Permanent cut and fill slopes may be inclined at 2:1 or flatter. The current Site plan indicates that the steepest slope to be constructed at the Site during grading will be 2:1.

Proposed Cut Slopes: Cut slopes proposed for the rough grading of the pSite have been designated, as shown on the Geotechnical Map. Each cut slope is discussed with specific recommendations presented in the "Slope Stability Analysis" section of this report. All grading should conform to the minimum recommendations presented in this report. If these slopes are modified from those that are discussed in this report, the modifications should be reviewed by RTF&A to ascertain the applicability of our recommendations.

Fill Slopes: Where the toe of a fill slope terminates on natural, fill, or cut materials, a keyway is required at the toe of the fill slope. The fill slope keyway should be a minimum width of 12 feet, be founded within competent material, and should extend a horizontal distance



beyond the toe of the fill to the depth of the keyway. The keyway should be sloped back at a minimum gradient of two percent into the slope. The width of fill slopes shall be no less than eight feet, and under no circumstances should the fill widths be less than what the compaction equipment being used can fully compact. Benches should be cut into the existing slope to bind the fill to the slope. Benches should be step-like in profile, with each bench not less than four feet in height and established in competent material. Compressible or other unsuitable soils should be removed from the slope prior to benching. Competent material is defined as being essentially free of loose soil, heavy fracturing, or erosion-prone material and is established by the Geotechnical Consultant of Record during grading.

Where the top or toe of a fill slope terminates on a natural or cut slope and the natural or cut slope is steeper than a gradient of 3:1, a drainage terrace with a width of at least six feet is recommended along the contact. As an alternative, the natural or cut portion of the slope can be excavated and reconstructed as a stability fill slope to provide an all-fill slope condition. Where the contact between the face of the fill slope and the face of a lower natural or cut slope is inclined at 45 degrees or steeper, a drainage terrace would not be required.

When constructing fill slopes, the grading contractor shall avoid spillage of loose material down the face of the slope during the dumping and rolling operations. Preferably, the incoming load shall be dumped behind the face of the slope and bladed into place. After a maximum of four feet of compacted fill has been placed, the contractor shall backroll the outer face of the slope by backing the tamping roller over the top of the slope, thoroughly covering all of the slope surface with overlapping passes of the roller. The foregoing should be repeated after the placement of each four-foot thickness of fill. As an alternative, the fill slope can be overbuilt, and the slope cut back to expose a compacted core. If the required compaction is not obtained on the fill slope, additional rolling will be required prior to placement of additional fill, or the slope shall be overbuilt and cut back to expose the compacted core.

Stability Fills: Stability fill can be recommended to minimize the potential for erosion and to eliminate adverse fill-over-cut conditions. Stability fill slope should be constructed in



accordance with Stability Fill Details for Grossly Stable Slopes (Figure 4). Backdrains should be installed at the backcut of the stability fill as recommended below.

DRAINAGE

Subdrains: Canyon subdrains are recommended to intercept and remove groundwater within canyon fill areas. All subdrains should extend up-canyon, with the drain inlet carried to within 15 feet of final pad grade. The approximate location for recommended subdrains are shown on the Geotechnical Map, Figure 1. Specific subdrain locations should be determined in the field during grading operations.

The subdrains should be surveyed by the Project Surveyor to establish line and grade during construction, and for future location reference. Subdrain and backdrain excavations should be observed by the Geotechnical Consultant.

The subdrains should be installed in accordance with the manufacturer's specifications. A minimum 2% gradient is to be maintained in the subdrain pipes and the pipe shall have at least 8 uniformly spaced narrow slots per foot. The width of the slots should not exceed 1/16 of an inch. If PVC pipe with drilled perforations is utilized, the diameter of the holes should not exceed 3/8 of an inch, if gravel and filter fabric is used or 1/8 inch diameter if Los Angeles County Flood Control District (LACFCD) Designation F-1 Filter Material is used. There should be at least 8 uniformly spaced sets of 2 perforations per lineal foot of pipe. When constructing the subdrain, the pipe should be placed so that the drilled perforations are positioned on the bottom half of the pipe. The upstream end of subdrains should be capped. The final 20 feet of pipe at the downstream end of canyon, stabilization, buttress, and side hill fills shall not be slotted or perforated. Provisions should be made at all times during construction to prevent damage to the subdrain from construction equipment, and to prevent soils from being washed into an exposed subdrain by surface waters.

For runs up to 500 feet, subdrains for the bottom of canyon fills should consist of at least 6-inch diameter pipe. For runs of 500 to 1,500 feet, 8-inch diameter pipe shall be used. For runs over 1,500 feet, 10-inch diameter pipe shall be used.


Canyon subdrains may be installed in a rectangular trench excavated to expose competent material and shall be approved by the Geotechnical Consultant. The subdrains should be surrounded by at least 3 cubic feet per lineal foot of granular filter material and there should be at least 6 inches of compacted granular filter material or gravel on all sides of the pipe. The granular filter material for subdrains should meet the F1 material criteria, or have a gradation approved by the Geotechnical Consultant prior to placement.

As an alternative to the granular filter material, 3/4-inch diameter gravel may be placed around the pipe. The gravel should be separated from the surrounding soils by a filter fabric such as Mirafi 140N, or equivalent, wrapped around the gravel ("burrito wrapped").

Backdrains: Backdrains are required for all stability fills or buttress fills, and should consist of 4-inch diameter perforated or slotted pipe. The vertical spacing of the backdrains should be a maximum of about 15 feet, with a horizontal spacing of about 100 feet. Backdrain outlets should consist of non-perforated pipe. The gradient should be at least 2% to the discharge end. The exact location of the backdrains should be determined in the field by the Geotechnical Consultant after the backcut has been made, so that it can be best positioned to intercept potential seepage.

Surface Drainage: All surface drainage should be directed away from proposed structures through non-erosive devices. The ponding of water must not be allowed, especially adjacent to foundations. The pad gradients should not slope toward any descending slopes in order to reduce the potential for surficial erosion. Water that flows towards slopes should be conducted to appropriate discharge locations via non-erodible drainage devices. Drainage devices, including drainage terraces on graded slopes should be inspected periodically and should be kept clear of debris. Drainage and erosion control should be designed in accordance with the standards set forth in the CBC.

Any modification of the grades of building pads, parking areas, etc., could adversely affect drainage at the Site. Future landscaping, construction of walkways, planters and walls, etc. must never modify Site drainage unless additional measures to enhance drainage (e.g., area



drains, additional grading, etc.) are designed and constructed in accordance with the applicable Los Angeles County regulations.

Erosion Protection: In order to reduce the potential for erosion, all permanent cut-andfill slopes on-site should be seeded or planted with lightweight, deep-rooting, drought-resistant vegetation. A landscaping expert should be consulted for ground cover recommendations. Excessive landscape irrigation or leakage from irrigation lines can cause localized slope failures. Therefore, irrigation systems for slope vegetation should be designed and maintained to minimize leakage onto graded slopes. If automatic sprinkler systems are used, they should be adjusted for seasonal variations in rainfall. Vegetation on natural slopes should remain natural and not be landscaped or irrigated in the same manner as graded slopes.

Rodent burrows are known to provide direct conduits for water flow that can decrease slope stability. Therefore, in order to maintain the integrity of graded slopes, a rodent abatement program should be instituted.

Even with the implementation of these recommendations, it is not possible to eliminate erosion within hillside developments. Removal of debris from drainage devices, slope maintenance, and landscaping will be required, especially after periods of heavy rainfall.

GENERAL GRADING REQUIREMENTS

- 1. All fills, unless otherwise specifically designed, shall be compacted to at least 90 percent of the maximum dry unit weight as determined by ASTM D 1557-02 Method of Soil Compaction.
- 2. No fill shall be placed until the area to receive the fill has been adequately prepared, and subsequently approved by the Geotechnical Consultant of Record or his representative.
- 3. Fill soils should be kept free of debris and organic material.
- 4. Rocks or hard fragments larger than eight inches may not be placed in the fill without approval of the Geotechnical Consultant of Record or his representative, and in a manner specified for each occurrence.



- 5. Bedrock fragments larger than eight inches, or fill soils containing greater than 25 percent of bedrock fragments larger than four inches in diameter, must be removed or processed using successive passes of a sheepsfoot compactor until rock fragments constitute less than 25 percent of the fill material.
- 6. The fill material shall be placed in layers which, when compacted, shall not exceed eight inches per layer. Each layer shall be spread evenly and shall be mixed thoroughly during the spreading to ensure uniformity of material and moisture.
- 7. When moisture content of the fill material is too low to obtain adequate compaction, water shall be added and thoroughly dispersed until the soil is approximately two to four percent above optimum moisture content.
- 8. When the moisture content of the fill material is too high to obtain adequate compaction, the fill material shall be aerated by blading, or other satisfactory methods, until the soil is approximately two to four percent above optimum moisture content.
- 9. Fill and cut slopes should not be constructed at gradients steeper than 2:1 (horizontal: vertical).

GRADING OBSERVATION

Construction observation should be made by a Geotechnical Consultant of Record during any grading activities within the Site, to verify the findings within this report. Additional recommendations may be required for landfill design based on conditions uncovered during grading.

TEMPORARY EXCAVATIONS

Based on our review of the subject plans, it does not appear that significant temporary excavations will be required during the construction of the proposed development. However, the following recommendations are applicable in areas where excavations are to be made.

Temporary excavations are not expected to stand vertically in cuts that exceed four feet in height. Temporary excavations in excess of four feet may be sloped at a gradient of ³/₄:1, to a maximum height of 12 feet. Slopes higher than 12 feet should be slopes back at a 1:1 gradient. By temporary, we mean a period not exceeding 60 days. All regulations of State or Federal OSHA should be followed.



-32-

If excavations are made during the rainy season (normally from November through April), particular care should be taken to protect slopes against erosion. Measures to help mitigate erosion, such as the installation of berms, plastic sheeting, or other devices, may be warranted. Surface water should be prevented from flowing over or ponding at the top of excavations.

CORROSION TESTS

Corrosion testing was previously performed by Golden Coast (2015) and indicated that the on-site soluble sulfate concentrations are negligible. The on-site soils are also corrosive to buried metals. A soil corrosion study was not performed as part of this scope of this investigation. Samples of the near-surface soil should be obtained at the conclusion of grading and be submitted to a corrosion consultant for testing. The purpose of performing the tests would be to determine if the Site soils are corrosive to concrete or underground utilities in contact with the soil.

EXPANSIVE SOILS

Samples of the on-site soils were obtained in 2015 during the investigation of the Site for laboratory expansion index testing (Golden Coast, 2015) and indicated a "very low" expansion potential. It is anticipated that when finer grained layers of the TQss are excavated and placed as compacted fill that the future compacted fill generated from the on-site soils may have a very low to medium potential for expansion depending upon the characteristics of the excavated bedrock and the degree of mixing that is obtained when placed as compacted fill. The Site soils can be classified as having a very low to medium potential for expansion.

The expansion index of near-surface certified engineered fill on building lots should be evaluated at the completion of grading to provide appropriate foundation recommendations commensurate with the post-grading expansion index test results.



FOUNDATIONS

<u>General</u>: Buildings may be supported on continuous or individual spread footings established in properly compacted fill soils. Foundations and floor slabs should be designed by a structural engineer, in accordance with the minimum requirements of the CBC.

Design Criteria: The recommendations presented in this section are based on the assumption that the proposed structures will have column loads not exceeding approximately 100 kips and continuous foundation loads not exceeding 3 kips per lineal foot. A bearing value of 2,000 pounds per square foot (psf) may be used in the design of spread foundations. This value can be increased by one-third when considering seismic and wind forces. The bearing material should consist of compacted fill soil. Individual column pads and continuous wall footings should be designed to meet the minimum width and depth requirements, as set forth in the CBC. Foundation depths should be measured from the lowest adjacent final grade.

Building setbacks for structures located adjacent to either ascending or descending slopes should be in accordance with the standards set forth in the CBC. All foundation excavations should be observed and approved by a representative from our firm prior to placement of reinforcing steel. Foundations should be deepened, where necessary, to prevent surcharge loads from being imposed on adjacent foundations or utilities. Observation of foundation excavations may also be required by the appropriate reviewing governmental agencies. The contractor should be familiar with the requirements of the governing reviewing agencies.

Foundations should be deepened, where necessary, to prevent surcharge loads from being imposed upon adjacent foundations or utilities. Surcharge loads should be assumed to be distributed out from the bottom edges of foundations at 45-degree angles. Foundation excavations should be cleaned of all loose material and be observed and approved by a representative of the Geotechnical Engineer of Record prior to casting concrete.

The Foundation Plans should be reviewed by the Geotechnical Engineer of Record. The Geotechnical Engineer of Record should sign and stamp the plan, provided the plans have been found to conform to the geotechnical recommendations presented in this report.



-34-

<u>Mat Foundations</u>: A mat foundation system can be used as an alternative to a posttensioned slab within liquefaction areas and also for expansive soils conditions. If a mat foundation is utilized, the following geotechnical recommendations may be utilized for mat foundation construction. A base modulus of subgrade reaction of 300 pounds per cubic inch (pci) is recommended for use in the design of mat foundations for the proposed buildings at the Site. The mat could be founded directly on a 4-inch-thick layer of Crushed Aggregate Base (CAB) compacted to 95 percent relative compaction to provide a firm working surface, but it is not required from a geotechnical perspective. If utilized, the base would be placed directly on compacted fill soil that would be placed as part of the grading recommended in this report.

The base modulus should be reduced in accordance with the following equation:

$$k = k_b \left[\frac{(1+B)}{2xB} \right]^2$$

where:

k = modulus of subgrade reaction for design

 $k_b = 300 \text{ pci} = \text{base modulus of subgrade reaction in pci}$

B = least dimension of foundation in feet

It is expected that mat foundations for the proposed buildings will range from about 8 to 30 inches in thickness. The thickness of each mat foundation will be a function of the loading conditions and is referred to the Project Structural Engineer for design. It is anticipated that each mat foundation, including the weight of the supported building, will impose pressure on the underlying soil of about 1,500 psf. This value could be considered as the design bearing value for mat foundation design.

Lateral Design: Lateral restraint at the bases of footings or slabs may be assumed to be the product of the dead load and a coefficient of friction of 0.4. Passive pressure on the faces of footings may also be used to resist lateral forces. A passive pressure of zero at the surface of finished grade, increasing at the rate of 250 psf per foot of depth, to a maximum value of 2,500



psf, may be used at this Site. The passive pressure and friction may be combined without reduction when evaluating lateral resistance.

<u>Settlement</u>: Provided that the proposed buildings are supported on shallow foundations established in compacted fill soils, as recommended, column loads do not exceed 100 kips, and continuous footings do not exceed 3 kips per lineal foot, we estimate that the maximum static settlement will be about 0.75 inches with seismic settlements of about 1.75 inches for a total settlement of about 2.5 inches within the alluvial areas (Qac) at the Site. Differential static and seismic settlements with the alluvial areas at the Site are expected to be about 1.4 inches within a horizontal distance of 30 feet. Within the compacted fill areas directly underlain by bedrock (TQss mapped areas), total seismic and static settlements of about 1 inch with differential settlement of about 0.75 inches within a horizontal distance of about 30 feet are expected. Our firm should review the foundation loads after plans are developed, to verify the applicability of our recommendations to the proposed structures.

FLOOR SLAB SUPPORT

General: The floor slab design recommendations presented in this section are based upon the assumption that the soil subgrade in proposed floor slab areas will consist of compacted fill soil and that floor slabs will be subjected to normal loads with no special requirements. Any surficial soils that become dried or disturbed during the course of construction should be moisture-conditioned and compacted prior to casting the floor slab.

Conventional floor slabs may be utilized at the subject development outside of liquefaction areas, provided the subgrade soils consist of compacted fill soils with a very low (Expansion Index of 0 to 20) potential for expansion. If the subgrade soils are determined to have an expansion potential in the low or higher range (Expansion Index greater than 21), posttensioned floor slabs, as indicated below, are recommended. Post-tensioned slabs are also recommended for all building pads located within existing alluvial areas that are subject to liquefaction.



-36-

<u>Conventional Floor Slabs</u>: Conventional slabs-on-grade should be designed per the recommendations of the CBC. However, as a minimum, the building floor slabs should have a nominal thickness of at least 4 inches and should be reinforced with a No. 4 rebar spaced at 18 inches on center, in each direction, or equivalent. Thicker slabs may be required depending on the floor loads and the structural requirements; we defer to the Project Structural Engineer for design of the floor slabs.

Post-Tensioned Floor Slabs: Post-tensioned floor slabs should be designed per the recommendations of the CBC and be designed to resist the calculated static and seismic settlements in addition to the following geotechnical parameters. The design values, presented following this paragraph, assume that the proposed floor slabs will be poured monolithic with continuous perimeter edge footings. Perimeter edge footings should have a minimum depth of 18 inches. Footing depths should be measured from the lowest adjacent grade for perimeter footings or the top of slab for interior footings.

Net Bearing Value:

An allowable net bearing value of 2,000 psf for footings with a minimum width of 12 inches and a minimum depth of 18 inches below the top of slab or 18 inches below the lowest adjacent grade may be used.

Coefficient of Friction:

Passive Pressure:

Modulus of Subgrade Reaction (K): 250 pcf for level ground condition

150 pounds per cubic inch (pci) for a footing width of one foot. For larger footings or floor slabs, this value should be reduced using the following equation:

$$Kr = K \left[\frac{(B+1)}{2B} \right]^2$$

where:

0.75

Kr = Reduced Modulus Value



-37-K = Modulus of Subgrade Reaction for a One-Foot-Wide Plate $\mathbf{B} =$ Width of Large Footing or Slab 1,000 pounds per square inch (psi) Modulus of Elasticity: Edge Moisture Variation Distance Me (Center Lift): 5.25 feet Me (Edge Lift): 2.5 feet Estimated Differential Movement Medium Low My (swelling): 0.4 0.9 0.7My (shrink): 0.3

<u>Water Vapor Mitigation</u>: Water vapor transmitted through floor slabs is a common cause of floor covering problems. An impermeable membrane "vapor barrier" should be installed to reduce excess vapor drive through the floor slab. The function of the impermeable membrane is to reduce the amount of water vapor transmitted through the floor slab. Vapor-related impacts should be expected in areas where a vapor barrier is not installed.

Construction activities and exposure to the environment may cause deterioration of the prepared subgrade. Therefore, the Geotechnical Consultant of Record should observe the condition of the final subgrade soils immediately prior to slab-on-grade construction and, if necessary, perform further density and moisture content tests to determine the suitability of the final prepared subgrade. The soil subgrade should be thoroughly moistened prior to casting.

Water vapor migration through slabs and associated adverse impacts should be anticipated if a vapor barrier is not constructed. The vapor barrier system recommended in this report has a record of satisfactory performance when properly installed. There are numerous methods of reducing vapor migration through slabs that also have satisfactory performance records. Each of the potential moisture reducing mitigation methods has advantages relative to cost, performance, protection of the vapor barrier during construction, and concrete curing. If requested and authorized, we would be pleased to provide the design team with additional geotechnical input on the selection of a suitable vapor barrier system.



-38-

Floor slabs should be constructed in a manner to decrease the potential of water vapor migration through the slabs. The floor slabs should be underlain by a vapor barrier consisting of a fifteen-mil-thick impermeable membrane. Care should be taken to avoid damage to the membrane and to seal the membrane around utilities and other penetrations.

Floor slabs should be underlain by a vapor barrier surrounded by 2 inches of sand above and below the barrier. The vapor barrier should be at least 10 millimeters thick; care should be taken to preserve the continuity and integrity of the barrier beneath the floor slab. The sand should be sufficiently moist to remain in place and be stable during construction; however, if the sand above the barrier becomes saturated before placing concrete, the moisture in the sand can become a source of water vapor.

Another factor affecting vapor transmission through floor slabs is a high water-to-cement ratio in the concrete used for the floor slab. A high water-to-cement ratio increases the porosity of the concrete, thereby facilitating the transmission of water and water vapor through the slab. The Project Structural Engineer or a concrete mix specialist should provide recommendations for the design of concrete for footings and floor slabs in accordance with the CBC, with consideration of the above comments.

Alternative methods of providing floor slab water vapor mitigation have also been successfully utilized. If requested, we would be pleased to provide geotechnical comments if it is desired to utilize alternative mitigation methods. The recommendations presented herewith may be superseded by the design team based on their successful experience with alternative mitigation methods. However, RTF&A assumes no responsibility related to adverse impacts associated with superseding the recommendations of this report.

SEISMIC DESIGN PARAMETERS

As with virtually all property in southern California, the Site may be subjected to strong ground shaking during earthquakes on nearby or distant faults and the improvements should be designed to resist such shaking in accordance with current codes. The seismic data is presented in Appendix C and the liquefaction calculations are presented in Appendix D. If requested and



-39-

authorized, we would be pleased to provide additional parameters utilizing other standards. The use of an appropriate seismic design parameter is referred to the Structural Engineer.

The following coefficients and factors apply to seismic force design of structures at the Site. The parameters were determined using the Applied Technology Council (ATC) Seismic Design Maps website, based upon American Society Civil Engineers (ASCE) document ASCE 7-16. Since S1 is greater than 0.2, null was reported for Sm1 and Sd1 and it will be necessary for the Project Structural Engineer to determine Cs (Seismic Response Coefficient) with the exception for Site Class D presented in Section 11.4.8 of ASCE 7-16.

Site Class	D
Ss	2.49
S ₁	0.85
S _{MS}	2.49
S _{M1}	Null*
S _{DS}	1.66
S _{D1}	Null*
PGAM	1.17

** See Section 11.4.8 of ASCE 7-16

PAVEMENT DESIGN

Samples of the on-site soil should be obtained from near final grade elevation in proposed pavement areas, following the grading operations, to perform R-value tests. The R-value test results would be used to prepare pavement section recommendations. The <u>preliminary</u> pavement section recommendations presented below are based on the assumption that the on-site soils have an R-value of at least 20. The <u>final</u> pavement section recommendations could vary depending on the results of the actual R-value tests. We would be pleased to provide pavement section recommendations for alternative Traffic Index values upon request.

Aspirant Thickness (CAD) Dase Course Thickness
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8

Traffic Index	(Inches)	(Inches)
4	3	5
6	4	9

5

Base course material should consist of crushed aggregate base (CAB), as defined by Section 200-2.2 of the Standard Specifications for Public Works Construction ("Greenbook"), or crushed miscellaneous base (CMB), as defined by Section 200-2.4 of the Greenbook. Base course material should be compacted to at least 95% of the maximum dry density of that material.

Base course material should be purchased from a supplier who will certify that it will meet or exceed the specifications in the Greenbook, as indicated. We could, upon request, perform sieve analysis and sand equivalency tests on material delivered to the Site that appears suspect. Additional tests could be performed, upon request, to determine if the material is in compliance with the remainder of the specifications indicated in the Greenbook.

The pavement section recommendations presented above are based upon assumed Traffic Index values. RTF&A does not take responsibility for the numerical determination of the Traffic Index values nor the areas where they apply within the Site.

RETAINING WALLS

<u>General</u>: Conventional retaining walls, CIDH pile supported retaining walls, and/or soil nail walls may be utilized at the Site. Conventional retaining walls can be designed in accordance with the "Retaining Walls" section presented later in this report. The Geotechnical Engineer of Record should review and approve the final retaining wall plans and specifications prior to construction.

Groundwater is not anticipated to be encountered during the drilling of the soldier piles or anchors. Likewise, caving of materials during the drilling of the soldier piles or anchors is not anticipated to occur.



14

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

-40-

Conventional Retaining Walls: For design of cantilevered retaining walls where the retained height of soils is less than 15 feet, and the walls are structurally independent from the proposed building, it may be assumed that drained soils will exert a lateral pressure equal to that developed by a fluid with a density of 30 pounds per cubic foot (pcf) where the backfill is level, and 45 pcf where the backfill is inclined at 2:1. The proposed retaining wall at the toe of Cut Slope CS-5 should be designed to resist an additional surcharge at a height of 10 feet of 10 kips as a result of daylighted apparent bedding.

In addition to the recommended earth pressures, the retaining walls should be designed to resist any applicable surcharges due to storage or traffic loads. A drainage system should be provided behind the walls to prevent the development of hydrostatic pressure behind the walls. If a drainage system is not installed, the walls should be designed to resist an additional hydrostatic pressure equal to that developed by a fluid with a density of 55 pcf against the full height of the wall.

In addition to the recommended earth and hydrostatic pressures, the upper ten feet of walls adjacent to vehicular traffic areas should be designed to resist a uniform lateral pressure of 100 psf, acting as a result of an assumed 300 psf surcharge behind the walls due to normal traffic. If the traffic is kept back at least ten feet from the walls, the traffic surcharge may be neglected.

The back of retaining walls should be water-proofed where aesthetics are concerned. Backfill placed behind retaining walls should be compacted to a minimum of 90% of the maximum dry density as determined by ASTM D 1557-02. When backfilling behind walls, it is recommended that the walls be braced, and heavy compaction equipment not be used closer to the back of the wall than the height of the wall. Soils which have a potential for expansion in excess of five percent should not be utilized for backfill behind walls which are greater than three feet in height.

<u>**Tieback and Pile Retaining Structures**</u>: Wherever the height of proposed retaining structures shoring exceeds 12 feet, it is expected that the retaining wall shoring will be designed



and constructed using tieback anchors or raker braces. The maximum height of the south wall indicated on the attached Geotechnical Map (Figure 1) is 27 feet.

For the design of tied-back or braced lateral support, we recommend the use of a uniform distribution of earth pressure. The recommended pressure distribution for the case where the grade is inclined at a gradient of 2:1 behind the shoring is a uniform lateral rectangular-earth pressure equal to 28H in psf (exclusive of hydrostatic pressure), throughout the depth of excavation, where H is the height of the shoring in feet. The recommended lateral pressures to be used in the design of the shoring do not incorporate adjacent surcharge loads from items such as bedding surcharge, existing streets, traffic, and buildings. An additional horizontal load of 3 kips per linear foot should be applied at the mid-height of the proposed retaining walls for Cut Slope 7 and 8 as previously discussed in the slope stability section of this report. This bedding surcharge is in addition to any loads from adjacent sources such as cranes, adjacent buildings, and traffic that should be added to the recommended lateral pressure, where applicable.

Traffic loads are not expected to surcharge the proposed retaining walls at the Site. However, if applicable, the upper 10 feet of walls below grade should include a uniform conventional shoring rectangular lateral pressure of 75 psf due to adjacent traffic unless traffic is kept at least 10 feet away from the perimeter of the shoring. This additional lateral pressure would be the result of an assumed 250 psf surcharge behind the wall due to normal street loads.

Design of Piles: For the design of Cast-in-drilled-hole piles spaced at least 2½ diameters on centers, the allowable lateral bearing value (passive value) of the soils below the bottom of the excavation may be assumed to be zero at the excavated surface, increasing at the rate of 600 psf of depth, to a maximum of 4,500 psf. To develop the full lateral value, provisions should be taken to assure firm contact between the piles and the undisturbed soils. The concrete placed in the pile excavations above the excavation bottom may be a lean-mix concrete. The concrete used in that portion of the shoring pile which is below the planned excavated level should be of sufficient strength to adequately transfer the imposed loads to the surrounding soils. It should be noted that in the unlikely event that groundwater is encountered, it will be required to increase



-43-

the design strength of concrete by 1,000 pounds per square inch (psi) where it is required to utilize a rigid tremie pipe and cast concrete in standing water more than 12 inches in depth.

The piles below the excavated level may be used to resist downward loads, provided that the portion of the piles below the excavated level is backfilled with structural concrete. The frictional resistance between the concrete soldier piles and the soils below the excavated level may be taken as equal to 500 psf (this value is based on the assumption that uniform full bearing will be developed between the steel shoring beam and the lean-mix concrete and between the lean-mix concrete and the retained earth.)

Lagging: Lagging should be installed between the CIDH piles prior to wall construction. Lagging may not be required, from a geotechnical perspective, in areas that expose materials that are not prone to caving and/or sloughing. Areas where it is desired to omit lagging should be observed and approved by a representative of the Geotechnical Engineer of Record. The governing agency should be contacted regarding any restrictions related to the elimination of lagging. Lagging may <u>not</u> be eliminated in areas where the excavation will be subject to surcharge loads from existing structures or items such as cranes or other construction equipment.

The shoring piles and anchors should be designed for the full anticipated lateral pressure. The pressure on the lagging, however, will be less due to arching in the soils and/or bedrock. The lagging should be designed for the recommended earth pressure but limited to a maximum value of 400 psf.

Anchor Design: Tieback friction anchors and/or soil nails (anchors) may be used to resist lateral loads. For design purposes, it may be assumed that the active wedge adjacent to the shoring or retaining wall is defined by an imaginary plane projected at 15 degrees from the horizontal to the bottom of the excavation. The anchors should extend at least 15 feet beyond the potential active wedge formed by this plane, and to a greater length, as necessary, to develop the desired capacities.

The capacities of anchors should be determined by testing of the initial anchors as outlined in the following "Anchor Installation" subheading of this report. Only the frictional resistance



developed beyond the active wedge should be considered as effective in resisting lateral loads. If the anchors are spaced at least 6 feet on centers, no reduction in the capacity of the anchors need be considered due to group action.

Anchor Capacities: The bedrock or terrace deposits/concrete strength at the interface along the length of an anchor will determine the capacity of that anchor. The anchor strengths presented in the following paragraph are suggested as the maximum values likely to be obtained. It is expected that the Shoring Engineer would use these (or lesser) values to determine the anchor test loads as opposed to the anchor design loads.

It is anticipated that the majority of the tie-back anchors will be founded in bedrock and/or terrace deposits. It is suggested that an ultimate friction of 800 psf for initial anchors be assumed for the bond length when designing anchors in open shafts with concrete placed through a standard tremie pipe. For pressure-grouted or post-grouted anchors, a value of 2,400 psf is suggested as a friction design value for the initial testing of anchors.

The shear strength, which may be mobilized between the materials encountered and the bond length of the earth anchor, will vary as a function of construction technique; the shear strength suggested above is considered to represent the upper limit. It is possible that some reduction of the available friction strength may result in areas where difficulties occur during the drilling and/or casting procedures. It is for this reason that we strongly recommend that initial anchor tests be conducted as early as possible to determine if the stated values are, in fact, available for use in production anchors.

Anchor Installation: Selected tie-back anchors should initially be installed and tested prior to installing production anchors. Based on the results of the initial anchor tests, the lengths, design friction values, or diameter of production anchors may be adjusted. Tieback anchors may be installed at angles of 15 to 40 degrees below the horizontal. For open shafts, the anchors should be filled with concrete placed by utilizing a tremie pipe and pumping concrete to the tip of the anchor. The anchors may also be of the pressure-grouted or post-grouted type. Testing of anchors should be performed prior to backfilling the active wedge.



Anchor Testing: In general, anchors are considered adequate if 150 percent of the design load is applied for a period of at least 15 minutes and the anchor deflection is less than 0.1 inch during that time period. The Geotechnical Engineer of Record should select at least one initial anchor on each tie-back level for a 24-hour 200 percent performance test. A quick 30-minute 200 percent test should be performed on 10 percent of the anchors. It is the responsibility of the Shoring Contractor to install an anchor rod or strand of sufficient strength to withstand the 200 percent test load. The purpose of the longer 200 percent tests is to verify the friction value assumed in design. The anchors should be tested to develop 2.0 times the assumed friction value. Where satisfactory tests are not achieved on the initial anchors, the anchor diameter and/or length should be increased until satisfactory test results are obtained.

The total deflection during the 24-hour 200 percent test should not exceed 12 inches during loading; the anchor deflection should not exceed 0.75 inch during the 24-hour period, measured after the 200 percent test load is applied. If the anchor movement is less than 0.5 inch after the 200 percent load has been applied for 12 hours, and the movement over the previous 4 hours has been less than 0.1 inch, the test may be terminated.

For the quick 200 percent test, the 200 percent test load should be maintained for 30 minutes. The total deflection of the anchor during the 200 percent quick test should not exceed 12 inches; the deflection after the 200 percent test load has been applied should not exceed 0.25 inch during the 30-minute period.

A test load of at least 150 percent of the design load should be applied to all of the production anchors. The total deflection during testing should not exceed 12 inches for each anchor. The deflection under the 150 percent test load should not exceed 0.1 inch over a 15-minute period in order for the anchor to be approved for the design load.

After a satisfactory test, each production anchor should be "locked off" at the design load. The actual "lock off" load should be verified by checking the "lift-off" load of the anchor. The "lock off" load must be between 95 percent and 110 percent of the design load of the anchor.



-46-

The installation of the soldier piles, tie-back anchors, and load testing of the anchors should be observed by a representative of the Geotechnical Engineer of Record.

Wall "Free-Board": It is recommended that the wall design include wall "free-board" of at least 18 inches in areas where the top of the wall is downgradient of natural slopes.

Drainage: A drainage system should be provided behind retaining walls, or the walls should be designed to resist hydrostatic pressures. The drainage system could consist of a four-inch diameter perforated pipe placed six inches from the base of the wall, with the perforations down, and connected to an outlet device. The pipe should be sloped at least 1 inch per 50 feet and surrounded on all sides by at least six inches of clean gravel. The gravel should be "burrito-wrapped" with filter fabric, such as Mirafi 140N, or equivalent. As an alternative to the gravel and filter fabric, filter material meeting the requirements of LACFCD Designated F-1 Filter Material, and slotted pipe, may be used. The backside of the wall should be water-proofed.

A vertical six-inch-wide gravel chimney drain, or a drainage geocomposite such as Miradrain, should be placed against and behind retaining walls that are higher than three feet. The top of the back drain should be capped with 18 inches of on-site soils.

The installed drainage system should be observed by the Geotechnical Consultant of Record prior to backfilling the system. Inspection of the drainage system may also be required by the reviewing governmental agencies.

OBSERVATION AND TESTING

This report has been prepared assuming that RTF&A will perform all geotechnicallyrelated field observations and testing. If the recommendations presented in this report are utilized, and observation and testing of the geotechnical work is performed by others, the party performing the observation and testing must review this report and assume responsibility for the recommendations contained herein. That party would then assume the title "Geotechnical Consultant of Record."



-47-

A representative of the Geotechnical Consultant of Record of Record should be present to observe all grading operations, as well as all footing excavations. A report presenting the results of the observations and related testing should be issued upon completion of those operations.

LOS ANGELES COUNTY SECTION 111 STATEMENT

Based on the findings summarized in this submittal, it is our professional opinion that the proposed grading, and any proposed structures at the Site, will be safe from hazards of settlement, slippage, or landslide, provided that the recommendations of this submittal, and those of the Los Angeles County Code, are incorporated into the proposed construction. Additionally, the proposed Site grading will not adversely affect the geotechnical conditions on adjacent properties.

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-48-

The following are attached and complete this report.

- References
- GMED Tentative Approval
- Geotechnical Map Figure 1
- Geologic Sections Figure 2
- Geotechnical Sections Figure 3
- Stability Fill Detail for Grossly Stable Slopes Figure 4
- Appendix A RTF&A Field Explorations
- Appendix B Field Explorations by Others
- Appendix C Laboratory Testing
- Appendix D Slope Stability Analyses
- Appendix E Gregg CPT Soundings
- Appendix F Seismic Parameters
- Appendix G Liquefaction Calculations
- Appendix H Ayers Oil Well Documentation
- Appendix I United Civil Plan Set Sheets 1-5 of 5, dated September 5, 2023
- Appendix J Geotechnical 100-Scale Plan Review (dated March 19, 2021)
- Appendix K Response to County Comments (dated July 27, 2021)
- Appendix L Aerial Imagery and LIDAR



Respectfully submitted,

R. T. FRANKIAN & ASSOCIATES

alan W. Raeplicka

Alan W. Rasplicka Principal Geotechnical Engineer

and: (

Glenn Lauman Principal Engineering Geologist

Distribution: New Urban West, Inc. Attn: Mr. Jason Han, Mr. Jonathan Frankel United Civil Inc, Attn: Mr. Anthony Ng, Attn. Mr. Matt Sawyer Madison Real Estate Consulting, LLC Attn: Mr. Benny Sam



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PCA <u>GMTR/A864</u> EPIC LA <u>ESTU2021000162</u> Telephone: (626) 458-4925

County of Los Angeles Department of Public Works Geotechnical and Materials Engineering Division GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET 900 S. Fremont Avenue, Alhambra, CA 91803

Tentative Tract / Parcel	Мар	83301	Tentative Map Dated	07/28/2021 (Tent)	Parent Tract
Grading By Subdivider	? [Y] (Y or N)	2,600,000 yd ^a	Location	Lyons Canyo	n
Geologist	R.T. Frankian		Subdivider	NUWI-LYONS CANYON, LLC	
Soils Engineer	R.T. Fra	nkian	Engineer/Arch.	Alliance Land Plan	ning & Engineering

Review of:

Geologic Report(s) Dated: Soils Engineering Report(s) Dated: Geotechnical Report(s) Dated: <u>7/27/21, 03/19/21</u> References:

TENTATIVE MAP FEASIBILITY IS RECOMMENDED FOR APPROVAL FROM A GEOTECHNICAL STANDPOINT

PRIOR TO FILING THE FINAL LAND DIVISION MAP THE FOLLOWING CONDITIONS MUST BE FULFILLED:

- G1. The final map must be approved by the Geotechnical and Materials Engineering Division (GMED) to assure that all geotechnical requirements have been properly depicted. For Final Map clearance guidelines refer to policy memo GS051.0 in the County of Los Angeles Department of Public Works Manual for Preparation of Geotechnical Reports. The Manual is available at: http://dpw.lacounty.gov/gmed/permits/docs/manual.pdf.
- G2. A grading plan must be geotechnically approved by the GMED prior to Final Map approval. The grading depicted on the plan must agree with the grading depicted on the tentative tract or parcel map and the conditions approved by the Planning Commission. If the subdivision is to be recorded prior to the completion and acceptance of grading, corrective geologic bonds may be required.
- G3. Prior to grading plan approval, a detailed geotechnical report must be submitted that addresses the proposed grading. All recommendations of the geotechnical consultant(s) must be incorporated into the plan. The report must comply with the provisions of the County of Los Angeles Department of Public Works *Manual for Preparation of Geotechnical Reports*. The Manual is available at: <u>http://dpw.lacounty.gov/gmed/permits/docs/manual.pdf</u>.
- G4. All geologic hazards associated with this proposed development must be eliminated. Alternatively, the geologic hazards may be designated as restricted use areas (RUA), and their boundaries delineated on the Final Map. These RUAs must be approved by the GMED, and the subdivider must dedicate to the County the right to prohibit the erection of buildings or other structures within the restricted use areas. For information on the RUA policy refer to policy memo GS063.0 in the County of Los Angeles Department of Public Works Manual for Preparation of Geotechnical Reports. The Manual is available at: http://dpw.lacounty.gov/gmed/permits/docs/manual.pdf.
- S1. At the grading plan stage, submit grading plans to the GMED for verification of compliance with County Codes and policies.
- S2. At the rough grading stage, provide data from the recommended settlement monitoring program to verify that settlements will comply with County codes and policies.

NOTE(S) TO THE PLAN CHECKER/BUILDING AND SAFETY DISTRICT ENGINEER:

PER THE SOILS ENGINEER:

A. ON-SITE SOILS ARE CORROSIVE TO FERROUS METALS.

George Molina

Soils Section

- B. EXPANSION INDEX OF NEAR-SURFACE CERTIFIED ENGINEERED FILL ON BUILDING LOTS SHOULD BE EVALUATED AT THE COMPLETION OF GRADING.
- C. THE SOILS REPORT DATED 3/19/21 INDICATES THERE MAY BE ENVIRONMENTAL CONCERNS REGARDING THE PRESENCE OF OILS WELLS.
- D. FOR SECTION G-G' OF THE REPORT DATED 7/27/21, THE BEDDING PLANE THAT MEETS COUNTY FACTOR OF SAFETY REQUIREMENTS IS AT A DEPTH OF 15 FEET BELOW THE PROPOSED RETAINING WALL.
- E. FOR SECTION G-G' OF THE REPORT DATED 7/27/21, A PROPOSED PILE RETAINING WALL IS RECOMMENDED. PILES MUST BE SUFFICIENTLY STIFF TO PROVIDE RESISTANCE OF 10 KIPS PER FOOT OF WALL AT THE MID HEIGHT OF THE PROPOSED RETAINING WALLALED.

Prepared by

Geir R. Mathisen No. 2376 CERTIFIED Matthew Cur ENGINEERING GEOLOGIST Matthew Cro OI **Geelegy Section** 09/20/2021 Date

Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey

ORGE MOLIN

C 91931

CIVIL

OF CALIFO

NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders. Ptgmepublicevelopment Reviews/Tracts and Parcels/83301, Lyons Canyon, 2021-09-20, TM 4-A.docx

EXPLANATION



Area Not Mapped

S-EP-27

M PS-EP-26

PS-EP-28

GSC-B-20

















CHNICAL SECTIONS				
I, Lyons Canyon, LLC				
Lyons Canyon Development entative Tract Map No. 83301 ngeles County, California				
JH	Checked By: GAL			
Figure 3	2020-200-001			
AATES hit A 355 GEOTECHNICAL ENG				



R.T. FRANKIAN & ASSOCIATES FIEBRE34

APPENDIX A

FIELD EXPLORATIONS



Appendix A September 15, 2023 2020-200-001 Page A-1

APPENDIX A

FIELD EXPLORATION

RECONNAISSANCE GEOLOGIC MAPPING

During geologic mapping, local surficial deposits (both natural and man-made) and bedrock units were mapped on a 1 inch = 100 feet topographic base map prepared Alliance. Geologic structural features, including bedding, were observed, measured, and plotted on the base map.

LOGGING OF EXPLORATIONS

As part of this plan review work on the Site, additional backhoe test pits were performed at selected locations at the Site to supplement previous RTF&A hollow stem Borings (HS-1 through HS-5), and five CPT soundings (CPT-1 through CPT-5) were performed. The recent tests pits (TP-1 through TP-18) ranged in depth from about 5- to13 with a track mounted _Backhoe__. The recent test pit logs are also presented in this Appendix. The approximate locations of the subsurface explorations are presented on the Geotechnical Map.

The borings were excavated with an 8-inch diameter hollow stem auger was used. Undisturbed and bulk samples of the subsurface materials were collected from the borings for laboratory inspection and testing. The lined-barrel sampler used to take undisturbed samples has an external diameter of 3.25 inches and an internal diameter of 2.625 inches. The depths at which the undisturbed samples were obtained are indicated on the logs. The number of blows required to drive the sampler 12 inches with the hammer is also shown on the boring logs.

The approximate locations of the subsurface explorations are presented on the Geotechnical Map.







LOG OF TEST PIT TP-3

JOB NUMBER: 2020-200-001 CLIENT: NEW URBAN WEST, Inc. LO

LOGGED BY: GAL

LOCATION: LYONS CANYON ELEVATION:

DATE LOGGED: 4/30/22



SCALE: 1"=5'



- A SANDSTONE fine to medium grained, very hard, hammer rings when hitting rock, slightly moist, locally friable, pinkish gray (5YR 8/1), holds vertical cliffs
- B CONGLOMERATE pebbles to cobbles, rounded to subrounded, hard, slightly moist, GRAYISH ORANGE PINK (5YR 7/2)
- C SANDSTONE fine to medium, hard, slightly moist, pinkish gray (5YR 8/1), with trace silt
- D CONGLOMERATE pebbles to cobbles, hard, slightly moist, light brownish gray (5YR 6/1)
JOB NUMBER: 2020-200-001 CLIENT: NEW URBAN WEST, Inc.

LOGGED BY: GAL

LOCATION: LYONS CANYON ELEVATION:

DATE LOGGED: 4/30/22



SCALE: 1"=5'

В

С

D

Е

B: N84W 30N

B: N78W 34N

COLLUVIUM - SANDY SILT, with CLAY to SANDY CLAY, - soft, slightly moist, moderate yellowish brown (10YR 5/4)

COBBLE CONGLOMERATE, - cobbles to 10", rounded, hard, slightly moist, very pale orange (10YR 8/2)

SANDSTONE - medium to coarse grained, medium hard, slightly moist, yellowish gray (5Y 7/2)

SANDSTONE - fine, slightly moist, yellowish gray (5Y 8/1)

CONGLOMERATE PEBBLE AND COBBLE - medium hard, slightly moist, moderate yellowish brown (10YR 5/4)

F SANDSTONE - fine grained, medium hard, slightly moist, yellowish gray (5Y 8/1)

JOB NUMBER: 2020-200-001 CLIENT: NEW URBAN WEST, Inc. LOGGED BY: GAL

LOCATION: LYONS CANYON **ELEVATION:**

DATE LOGGED: 4/30/22



SCALE: 1"=5'



B: N52W 46N

A DEBRIS FLOW - CLAYEY SAND TO SANDY CLAY - with pebbles and cobbles, dense, firm, slightly moist to moist, moderate yellowish brown (10YR 5/4)

B CLAYSTONE TO SILTY CLAYSTONE TO CLAYEY SILTSTONE - soft, slightly moist to moist, dark yellowish orange (10YR 6/6), with CLAYSTONE layers approximately 1"-3" thick, dark yellowish brown (10YR 4/2), and SILTSTONE layers 1/2"-2" thick

JOB NUMBER: 2020-200-001

CLIENT: NEW URBAN WEST, Inc.

LOGGED BY: GAL

LOCATION: LYONS CANYON

ELEVATION:

DATE LOGGED: 4/30/22







B: N54W 42N

A COLLUVIUM - SANDY SILT, with clay to SILTY CLAY with fine sand, soft, loose, infilling into rock, slightly moist to powdery dry, moderate yellowish brown (10YR 5/4)

B SANDSTONE WITH INTERBEDDED PEBBLE CONGLOMERATE - medium hard, slightly moist to moist, grayish pink (5R 8/2)

JOB NUMBER: 2020-200-001 CLIENT: NEW URBAN WEST, Inc.

LOGGED BY: GAL

LOCATION: LYONS CANYON **ELEVATION:**

DATE LOGGED: 4/30/22



- 1 B: N48W 43N
- A COLLUVIUM SANDY CLAY to SANDY SILT soft, loose, creeping, parting surfaces at base, slightly moist to powdery dry, pale yellowish brown (10YR 6/2)
- B SANDSTONE medium to coarse grained, with silt and trace clay, soft, can readily be excavated with hand tools, slightly moist, dark yellowish brown (10YR 4/2)
- C SANDY SILTSTONE soft to medium hard, slightly moist, pale yellowish brown (10YR 6/2)
- D SANDSTONE fine, hard, backhoe bucket bounced, slightly moist, yellowish gray (5Y 7/2)

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc.

LOGGED BY: GAL

LOCATION: LYONS CANYON

ELEVATION:

DATE LOGGED: 4/30/22



SCALE: 1"=5'

- COLLUVIUM/LANDSLIDE CLAY TO SILTY CLAY, stiff, slightly moist to moist, dusky А brown (5YR 2/r)
- CLAY TO SILTY CLAY stiff, slightly moist to moist, pale yellowish brown (10YR 6/2), В massive
- COLLUVIUM CLAY TO SILTY CLAY, soft to loose, blocky, slightly moist С

JOB NUMBER: 2020-200-001 CLIENT: NEW URBAN WEST, Inc. LOGGED BY: GAL

LOCATION: LYONS CANYON ELEVATION:

DATE LOGGED: 4/30/22



SCALE: 1"=5'

- 1 CREEP EFFECTED LAMINATED SHEARING
- 2 S: N48W 42N
- (3) B: N72W 32N
- (4) B: N65W 41N
- 5 B: N55W 51N
- A CLAYEY SILTSTONE weathered to a soil like consistency, soft, loose to powdery dry, grayish brown (5YR 3/2)
- B SILTY SANDSTONE fine, locally with clay lenses, hard, backhoe teeth chattering, slightly moist, yellowish gray (5Y 7/2)

contact is sharp with broken and creeping rock parallel to the contact

JOB NUMBER: 2020-200-001 CLIENT: NEW URBAN WEST, Inc.

LOGGED BY: GAL

LOCATION: LYONS CANYON ELEVATION:

DATE LOGGED: 4/30/22



- 1 Slide Plane: N16E 78S, CLAY, 1/16, slicked, dark reddish brown (10R 3/4)
- A COLLUVIUM CLAYEY SILT to SANDY SILT, soft, easy to excavate with hand tools, slightly moist, moderate brown (5YR 3/4)
- B LANDSLIDE CLAYEY SAND, fine, soft, slightly moist, light brown (5YR 5/6)
- C SILTY SANDSTONE soft, friable, can be excavated with hand tools, slightly moist, light bluish gray (5B 7/1), with staining, dark yellowish orange (10YR 6/6), in round pebbles, massive

JOB NUMBER: 2020-200-001

CLIENT: NEW URBAN WEST, Inc.

LOGGED BY: GAL

LOCATION: LYONS CANYON

ELEVATION:

DATE LOGGED: 4/30/22



- 1 B: N79W 41N to N82W 50N, infilled fractures parallel to bedding
- 2 B: N79W 40N
- A COLLUVIUM CLAYEY SILT soft, loose, slightly moist, dark yellowish brown (10YR 4/2)
- B SANDSTONE Interbedded PEBBLE AND COBBLE CONGLOMERATE, hard, slightly moist, yellowish gray (5y 7/2)
- C Soil infilling SILTY CLAY to CLAY soft, slightly moist, moderate yellowish brown (10YR 5/4), cracks develop primarily along bedding planes parallel to sub parallel

JOB NUMBER: 2020-200-001 CLIENT: NEW URBAN WEST, Inc.

LOGGED BY: GAL

LOCATION: LYONS CANYON ELEVATION:

DATE LOGGED: 4/30/22



- 1 Zone of creep, well developed, planar fractures surfaces with minor amounts of downslope translation parallel to bedding
- 2 FRACTURE: N42W 48N, creep surface, well developed
- 3 FRACTURE: N80W 31N, creep surfaces
- (4) B: N84W 57N
- 5 Soil Infilling
- (A) COLLUVIUM CLAYEY SILT soft, loose, slightly moist, grayish brown (5YR 3/2)
- B INTERBEDDED SANDSTONE AND MUDSTONE soft, loose, fractured, slightly moist, blackish red (5R 2/2)
- C SANDSTONE fine, soft, locally loose, friable, slightly moist, grayish orange rust colored (10YR 7/4), staining pervasive

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc.

LOGGED BY: GAL

LOCATION: LYONS CANYON ELEVATION:

DATE LOGGED: 4/30/22



- 1 B: N75W 31N SILTSTONE 1/4" thick interbed
- 2 B: N85W 36N
- 3 FRACTURE: Surfaces creep
- A SANDSTONE fine to medium grained, hard, slightly moist, grayish brown (5y 8/4), hard to excavate fresh rock with backhoe

JOB NUMBER: 2020-200-001

CLIENT: NEW URBAN WEST, Inc.

LOGGED BY: GAL



- CLAYEY SAND fine grained, with silt, soft, moist, grayish brown (5YR 3/2)
- SILTY SAND fine grained, with clay, soft, wet, moderate yellowish brown (10YR 5/4) (B)

JOB NUMBER: 2020-200-001 CLIENT: NEW URBAN WEST, Inc.

LOGGED BY: GAL

LOCATION: LYONS CANYON ELEVATION:

DATE LOGGED: 4/30/22



SCALE: 1"=5'

1 B: N83W 53N



Infilled cracks - creep

SANDSTONE with INTERBEDDED PEBBLE CONGLOMERATE - hard when not weathered, dry, pale yellowish brown (10YR 6/2)

JOB NUMBER: 2020-200-001 CLIENT: NEW URBAN WEST, Inc.

LOGGED BY: GAL

LOCATION: LYONS CANYON ELEVAT

ELEVATION:

DATE LOGGED: 4/30/22

BEARING: S56W



- 1 J: N52E 82NW Planar, continuous for length of test pit, tight, water staining
- 2 J: N55E 86N Planar, similar to 1
- (3) Soil filled cracks with root mats
- A SANDY SILT TO CLAYEY SAND- soft, loose, creeping, slightly moist, moderate yellowish brown (10YR 5/4)
- B SANDSTONE TO SILTY SANDSTONE fine, with clay, loose and friable where slightly weathered, hard where fresh, backhoe teeth chatter, slightly moist, light olive gray (5Y 5/2), massive

JOB NUMBER: 2020-200-001 CLIENT: NEW URBAN WEST, Inc.

LOGGED BY: GAL

LOCATION: LYONS CANYON ELEVATION:

DATE LOGGED: 4/30/22



- 1 J: N52E 82NW Planar, continuous for length of test pit, tight, water staining
- 2 J: N55E 86N Planar similar to 1
- 3 Soil filled cracks with root mats
- A SANDY SILT TO CLAYEY SAND soft, loose, creeping, slightly moist, moderate yellowish brown (10YR 5/4)
- B SANDSTONE TO SILTY SANDSTONE fine, with clay, loose and friable where slightly weathered, hard where fresh, hoe teeth chatter, slightly moist, light olive gray (5Y 5/2), massive

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc.

LOGGED BY: GAL

LOCATION: LYONS CANYON ELEVATION:

DATE LOGGED: 4/30/22



- SCALE: 1"=5'
 - A ALLUVIUM SILT with clay, firm, slightly moist to very moist at 10' below ground surface, moderate brown (5YR 3/4), massive

	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	BORING HS-1 JOB NUMBER: 2020-200 DATE DRILLED: 11/10/20 EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler LOGGED BY: MKM BORING DEPTH: 0-35.5' SURFACE CONDITIONS: Open Lot
				-	-	X		ML	ALLUVIUM (Qal) SILT: trace clay, moderately dense, slightly moist, brown
indicated.	10	6.3	95	-	5				
id date i	7	9	92	-	-				
ation an mes.	9	12.2	95	-	10				moderately dense trace fine to coarse sand
ific loca	10	11.1	97	-	-			SM	SILTY SAND: fine with occasional coarse, moderately dense, moist, brown
only at the spec is at other locatio	15	13.4	91	-				CL	SILTY CLAY: fine sand, stiff, moist, brown
imate and applies osurface condition	8	14.4	98	-	20			ML	SILT: with clay, moderately stiff, moist, brown
nereon is approx presentative of sut	14	13.4	101	-	25— 				trace gravel increasing in stiffness past 25'
conditions snown arranted to be rep	22	12.6	109	-	 30 			SW	SAND: fine to coarse, with silt and gravel, dense, moist, light brown
og of subsurface It is not w	18	5.3	101		35			- SM	SILTY SAND: fine, dense, moist, brown Bottom of Boring at 35.5 feet. No water. No caving.
Note: The I									
								LOC	BOF BORING R.T. FRANKIAN & ASSOCIA

	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	BORING HS-2 JOB NUMBER: 2020-200 DATE DRILLED: 11/10/20 EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler LOGGED BY: MKM BORING DEPTH: 0-31' SURFACE CONDITIONS: Clearing in Field
				-		X		ML	ALLUVIUM (Qal) SILT: trace fine sand, moderately dense, dry, light brown
cated.		6	94		5				fine with some medium to coarse, dense, slightly moist
indic	22			-	-				fine
and date	20	4.8	97	-	-	***		SW	SAND: fine to coarse with gravel, dense, slightly moist, light brown
ation	14	9	92	-	10			ML	SILT: with fine sand, stiff, slightly moist, brown
pecific loca	18	3.7	, 101 -	-	_	15		SM	SILTY SAND: fine to medium with trace coarse, dense, slightly moist, brown
nly at the s at other loc	8	7.2	94	-	15— —			ML	SILT: with some fine sand, trace clay, moderately stiff, moist, brown
iximate and applies out the second structure of the second structure conditions of the second structure second structure second structure second structure second structure second structure second seco	26	6	113	-	20		SM	SILTY SAND: fine to meduim with trace coarse, gravel, dense, moist, brown	
In hereon is appro epresentative of s	49			-	 25 				No Recovery
itions show ted to be r	20	2.8	101	-	30-				light brown
G 2020-200.GPJ FRANKIAN GDT 2/8/21 te: The log of subsurface condi It is not warrant						Bottom of Boring at 31 feet. No water. No caving.			
		<u> </u>			40			LOC	OF BORING R.T. FRANKIAN & ASSOCIATES

LOG OF	Note: The log of subsurface con It is not warr	anted to	shown hereon is approxima be representative of subsu	te and applies rface condition 55 14.3 111 -	s only at the sp ns at other loca 11 15.8 115 - - - - - - - - - - - - - - - - - -	25 11.4 115 - SW SAN	ation a times. 15 11.4 109 - ¹⁰ CL CLAY	nd date ind	icated. 21 7.3 97 -		BLOWS PER FOOT MOISTURE CONTENT (%) DRY UNIT WEIGHT (LBS. PER CU. FT.) N-VALUE DEPTH (FEET) SAMPLE LOCATION GRAPHIC LOG SOIL TYPE
BORING	Bottom of Boring at 31 feet. Water @ 25'. No caving.	No Recovery, @ 31': SAUGUS FORMATION (TQs) - Sunshine Ranch Member (TQss) - Moderately hard	seepage @ 25', No Recovery	reduced sand	'EY SAND: with fine to coarse sand, gravel, plastic, medium dense, very moist, dark brown): fine to coarse, trace clay, dense, moist, brown	: with fine to coarse sand, trace gravel, stiff, moist, dark brown	trace fine to very coarse sand, dense, moist, brown to dark brown	dense, slightly moist	<u>JVIUM (Qal)</u> /EY SAND: fine, medium dense, dry, dark brown	DB NUMBER: 2020-200 ATE DRILLED: 11/10/20 QUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler DGGED BY: MKM ORING DEPTH: 0-31' URFACE CONDITIONS: Dirt Road

BOREHOLE LOG 2020-200.GPJ FRANKIAN.GDT 2/9/21

R.T. FRANKIAN & ASSOCIATES

	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	BORING HS-4 JOB NUMBER: 2020-200 DATE DRILLED: 11/10/20 EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler LOGGED BY: MKM BORING DEPTH: 0-30.5' SURFACE CONDITIONS: Dirt Road
					_			ML	ALLUVIUM (Qal) SILT: trace fine to coarse sand, gravel, moderately dense, dry, light brown
dicated.	17	5.6	108	-	5				with fine sand, occasional gravel, moist, brown
nd date inc	23	4.1	106	-				SM	SILTY SAND: fine to coarse, fine gravel, medium dense, moist, light brown
ation al imes.	25	7	110	-	10			SP	GRAVELLY SAND: fine to coarse, trace silt, dense, moist, brown
ific loc: ons or t	18	19.7	103	-				ML	SILT: with clay and fine sand, moderately stiff, very moist, dark brown
s only at the spec ons at other locatio	6	29.8	95	-				SC	CLAYEY SAND: fine, with silt, medium dense, very moist, dark brown
oximate and applie ubsurface conditio	50/5"	28.8		-					seepage @ 20' SAUGUS FORMATION (TQss) GRAVELLY SANDSTONE: fine to coarse, with clay and silt, moderately hard, very moist, yellowish brown
lown hereon is appre e representative of s	50/2"	12.2	107	-					
ions sh ed to b	50/6"	9.4	96	_	30—		9 9 9 9 9 9 9		
ote: The log of subsurface conditi It is not warrante									Bottom of Boring at 30.5 feet. Water @ 20'. No caving.
ž		1	1		40			LOG	OF BORING R.T. FRANKIAN & ASSOCIAT

						z			BORING HS-5
	-OWS PER FOO	OISTURE ONTENT (%)	RY UNIT WEIGH BS. PER CU. FT.	-VALUE	EPTH (FEET)	AMPLE LOCATIO	RAPHIC LOG	JIL TYPE	JOB NUMBER: 2020-200 DATE DRILLED: 11/10/20 EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler LOGGED BY: MKM BORING DEPTH: 0-28'
	BI	≥ŏ	르늰	ż		S/	0	ў МІ	ALLUVIUM (Qal)
id date indicated.	11 25	10.1	101	-	5				SILT: with fine sand, moderately dense, moist, dark brown some fine gravel
on an les.	22	6.7	102	-	10—				with coarse sand
pecific locati cations or tim	16	6.3	110	-					with clay and fine to coarse sand, fine gravel, dense, brown
pplies only at the s nditions at other loo	13	8.7	109	-	15—			SM	SILTY SAND: fine to medium, dense, moist, gray
and a ce cor	83/11"	8.7	121	-	20—				SAUGUS FORMATION (TQss)
hereon is approximate د presentative of subsurfac	50/5"	9.4	104	-					SANDY SILTSTONE: moderately hard, moist, gray, caliche mottling with clay
showr be re					1				Bottom of Boring at 28 feet. No water. No caving.
E LOG 2020-200.GPJ FRANKIAN GDT 2/8/21 Note: The log of subsurface conditions s It is not warranted to l					30 35 				
ВОКЕНО								LOC	
									K.I. FRANKIAN & ASSOCIATE

NUWI – Lyons Canyon, LLC September 15, 2023 2020-200-001

APPENDIX B

EXPLORATIONS BY OTHERS



SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

ELEVATION: SEE PLATE 1

BORING LOG NO. B-1

FILE NO.: GC14-122536

DATE: 02/09/15

METH	THOD: 6-inch Hotlow Stem Auger DRILLING CO.: HD DRILLING												
	SAM	PLE	BLOW	COUNT			SIE	EVE		DESCRIPTION AND REMARKS			
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOO				
0 -	SPT		2	2.8					۱ ۲. (۱	ALLUVIUM - Qal - (0' - 60')			
-									1 S /	2.5' - Dark brown very fine- to fine-grained silty sand with			
	SPI	v	13	5.9 10.0	94	08.0				peoples, moist, loose. 5' . Medium brown - year fine-grained silly sand slightly moist, loose			
	SPT		6	8.3	3.4	30.3				7.5' - Light to medium brown very fine-grained sity sand, damp, slightly firm.			
-													
10	SPT		12	16.6						10' - Medium brown fine- to medium-grained sand, slightly damp, slightly firm.			
-	SPT		4	5.5						12.5' - 15' - Medium to dark brown very fine-grained silty sand, slightly			
-	SPT		4	5.5						damp, slightly firm.			
-		X	13	10.0	9.7	100.6							
-	SPT		5	6.9					1:	17.5' - 20' - Dark brown very fine-grained silty sand, slightly damp, firm.			
20	SPT		15	20.7									
-	SPT		32	44.2						22.5' - 25' - Medium brown fine- to coarse grained sand containing			
-									D.	loebbles, slightly damp, firm,			
-	SPT		35	48.3					· · ·	27.5' - 30' - Medium brown fine- to coarse-grained sand, slightly damp,			
-		x	57	43.7	8.3	104.3			8.	firm.			
-	SPT		34	46.9					1. in				
30	SPT	,	32	44.2					j				
-	SPT		32	44.2					1	32.5' - Cobble/boulder			
							1						
•	SPT	1	39	53.8		1				35' - 40' - Medium brown fine- to medium-grained silty sand, dry, firm.			
-		×	59	45.2	9.2	106.7							
-	1957 I		43	59.3		ļ				ACC Madium to dark horses find actional although a statistical account although			
40	J.		40	00.2					0.1	140 - Medium to dark brown me-grained sitty sand containing graver, signify			
	SPT		35	48.3					101	42.5' - 45' - Medium brown very fine- to medium-grained clavey to silty sand			
-					1					slightly moist, firm.			
-	SPT		35	48.3					- <u> </u>				
·		X	62	47.5	7.8	110.4			1 Sugar	47.5' - Medium brown very fine- to medium-grained silty sand, humid, firm.			
-	ISPI		32	44.2									
50	12571		3/	51.1						150° - 55° - Medium brown fine- to coarse-grained gravelly sity sand,			
	SPI	r	46	63.5					ça. Ç				
~									6				
·	SPI	r	40	55.2			li			55' - 60' - Medium brown fine- to coarse-grained silty gravelly sand, humid,			
ŀ		X	64	49.1	7.6	113.3				űrm.			
-	- SPT 46 63.5												
60	(13P) mm	ij Dotë	44 11 The	60.7				to					
	nini Ch	= 1 = 1	15/8"	Diamo	ng COl	rection	ו זמט אי- ר	iors	were ul 1 ງ ເດກ	IIIzed to determine N(60) (Per SP117)			
No	teer		<u>ייט נט</u> וחדאו	DEDTU			<u>»ր է</u> Դեթո	- <u>-</u>	TEDING				
	INTER TOTAL DEPTH: 60 GROUNDWATER: NO REFUSALICAVING: NO BACKFILLED: YES												
										PLAIE 2.1			

SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

ELEVATION: SEE PLATE 1

BORING LOG NO. B-2

FILE NO.: GC14-122536 DATE: 02/09/15 DRILLING CO.: HD DRILLING

METH	THOD: 6-inch Holiow Stem Auger DRILLING CO.: HD DRILLING												
	SAM	PLE	BLOWC	OUNT			SIE	VË		DESCRIPTION AND REMARKS			
рертн (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC				
0	SPT		7	9.7						ALLUVIUM - Qal - (0' - 60') 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.			
•	SPT	~	9	12.4		00.0			× 1	5' - Medium brown very fine-grained silty sand, humid, slightly firm.			
-	SPT	^	10 6	8.3	11,4	90.2				7.5' - Medium brown very fine-to fine-grained silty sand, humid, slightly firm.			
10	SPT		6	8.3						10' - Dark brown very fine- to fine-grained silty sand, humid, slightly firm.			
-	SPT SPT		7 9.7 5 6.9 X 18 13.8 10.7 1		ļ				12.5' - 15' - Medium brown very fine- to fine-grained silty sand, humid, loose to slightly firm.				
-	SPT	х	18 11	13.8 15.2	10.7	104.7				17.5' - 27.5' - Dark brown very fine-grained silty sand, humid, slightly firm.			
- 20	SPT		18	24.8									
-	SPT		22	30.4									
-	SPT	×	28 48	38.6 36.8	10.3	107.3				27.5' Medium to dark brown fine- to very coarse-grained silty sand			
- 30	SPT SPT		28 29	38.6 40.0					1.14 C	30' - 32.5' - Dark brown to medium reddish brown fine- to coarse-grained			
-	SPT		27	37.3						sity sand containing peoples to gravel, rumid, firm.			
•	SPT	x	29 55	40.0	8.2	112.8			1. N. (37.5' - 40' - Medium reddish brown fine- to very coarse-grained pebbly			
- 40	SPT SPT		42 36	58.0 49.7					0.121	silty sand, humid, dense.			
-	SPT		38	52.4						42.5' - Medium brown very fine- to fine-grained clayey to silty sand,			
-	 SP1	r x	40 68	55.2 52.1	8.4	118.0			1. 1. 1. F. 1. 1.	45' - Medium reddish brown fine- to very coarse-grained pebbly to gravelly sand, slightly moist, dense.			
- 50	X 68 52.1 8.4 1 SPT 37 51.1 59.5 53.8									47.5' - 50' - Dark brown very fine- to fine-grained clayey to silty sand,			
-	- SPT 56 77.3								1	- slightly moist, firm. - 52.5' - 60' - Medium brown fine- to coarse-grained pebbly to gravelly sand,			
	- SPT 50 for 6" , burnid, dense.												
60	- SPT 50 for 6" End at 60'												
Со	mm	ents	: The	followi	ng cor	rectio	n fac	tors	were u	tilized to determine N(60) (Per SP117)			
<u> </u>	Cb	= 1	.15 (8"	Diame	eter Bo	preholo	e); ()s =	1.2 (SP	T Sampler without liner); Cs = 2/3 (California Sampler)			
No	Iotes: TOTAL DEPTH: 57.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES												
	PLATE 2.2												

SUB-SURFACE DATA

BORING LOG NO. B-3

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/09/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVĒ DESCRIPTION AND REMARKS GRAPHIC LOC 200 SCREEN (FT) ŝ PASSING MOISTURE N(60) FIELD DENSITY DEPTH BULK RING % 0 ALLUVIUM - Qal - (0' - 60') . SPT 4 5.5 2.5' - 5' - Medium to dark brown very fine- to fine-grained silty sandy clay ٩., ~ ~ containing pebbles, moist, slightly firm, 3 SPT 4.1 . 5' - 15' - Dark brown very fine-grained silty sand, humid, loose. ;-;; х 11 8.4 15.9 102.0 . SPI 4 5.5 ١Ż. 10 **ISPT** 4 5.5 . SPI 3 41 SPT 11 15' - Medium brown fine- to medium-grained silty sand, humid, slightly firm. _ 15.2 Å... 34 Х 26.1 5.5 105.8 17.5' - 30' - Medium brown fine- to coarse-grained silty sand, humid, dense. SPT 18 \mathcal{V} 24.8 4. \$ \mathcal{L} 20 SPT 17 23.5 ISP1 28 38.6 SPT 27 37.3 -48 -36.8 6.0 115.4 х SPT 27 37.3 Ľ 1 30 ISPT 25 34.5 30' - Medium brown very fine- to fine-grained silty sand, humid, firm. SPT 27 _ 37.3 <u>د ج</u> 32.5' - Medium to dark brown fine- to coarse-grained silty sand containing 6.8 gravel, humid, dense. يندم برقم Ŋ . SPT 55 FOR 6" 35' - Cobble/bouider 3 х 51 39.1 8.3 114.3 37.5' - 42.5' - Medium brown very fine- to fine-grained silty sand, humid, firm. SPT 32 44.2 \mathbb{R}^{d} 40 SPT 35 48.3 SPT 43 59.3 42.5' - 47.5' - Medium brown fine- to medium-grained silty sand containing ò. gravel, humid, dense. SPT . 32 44.2 Х 57 43.7 5.6 116.2 \mathcal{O} 34 . 597 46.9 SPT 50 37 51.1 ωh 50' - Medium brown fine-grained silty sand, humid, dense. 10 İSPT Ş 33 45.5 52.5' - Medium brown very fine- to fine-grained clayey to silty sand, slightly moist, firm. SPT 60 _ 82.8 55' - 60' - Medium reddish brown fine- to very coarse-grained silty sand, ••• х 82 62.9 4.3 126.2 humid, dense. ١τ SPT 67 FOR 6" SPT 64 FOR 5" 60 End at 60' Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) TOTAL DEPTH: 60 Notes: **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES



SUB-SURFACE DATA

BORING LOG NO. B-4

PLATE

2.4

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/10/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS GRAPHIC LOG 200 SCREEN DEPTH (FT) E % PASSING MOISTURE N(60) DENSITY FIELD BULK RING Ð 1 4 4 4 2 1 1 1 ALLUVIUM - Qal - (0' - 50') SPT 8 11.0 2.5' - Dark brown fine- to coarse-grained silty sand, slightly moist, firm. مهدية أر SPT 7 9.7 5' - 17.5' - Light to medium brown very fine- to fine-grained sand, dry, firm, х 26 19.9 9.4 83.9 SPT 13 17.9 SPT 10 12 16.6 Ŀ SPT 8 11.0 SPT 13 17.9 Х 20 15.3 8.6 93.0 . f SPT 8 11.0 17.5' - Dark brown very fine- to fine-grained clayey to silty sand, slightly moist, slightly firm. ľ SPT 20 16 22.1 20' - Dark brown very fine- to fine-grained silty sand, humid, loose to slightly firm. SPT 22 30.4 22.5' - 25' - Medium brown very fine- to fine-grained clayey to silty sand, Ţ humid, slightly firm. SPT 27 37.3 - . . 48 36.8 12.0 104.4 х 5 SPT 25 34.5 27.5' - 30' - Medium brown fine- to coarse-grained clayey to silty sand, İSPT 30 24 33.1 humid to slightly moist, firm. 1.5 1 2121 SPT 27 37.3 32.5' - 35' - Medium brown fine- to very coarse-grained clayey to silty sand, humid to slightly moist, firm. - \ SPT . 24 33.1 2.37.5 '- 50' - Medium brown to medium reddish brown fine- to very coarseх 46 35.3 8.3 111.0 grained silty sand, humid, dense. ` SPT 34 46.9 SPT 40 29 40.0 SPT 36 49.7 SPT 50 69.0 Х 50 for 6" 6.7 114.6 SPT 50 for 6" SPT 50 70 96.6 End at 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 50' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

SUB-SURFACE DATA

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BORING LOG NO. B-5

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/11/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS Š 200 SCREEN E % PASSING MOISTURE GRAPHIC N(60) DENSITY ELD BULK RING ALLUVIUM - Qai - (0' - 40') SPT 2 2.8 Ň 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose. SPT 4 5.5 5' - Medium to dark brown very fine- to fine-grained silty sand, humid to Х 17 13.0 9.7 105.8 slightly moist, slightly firm. **I**SP 6 8.3 7.5' - 17.5' - Medium brown to dark brown fine- to medium-grained silty sand, humid, loose to slightly firm. 7 SPT 9.7 1 SPT 8 11.0 SPT 8 11.0 Į, х 24 18.4 7.5 99.4 . . ISPT 12 16.6 17.5' - Medium brown very fine- to fine-grained silty sand, humid, firm SPT 15 20.7 20' - 25' - Light to medium brown very fine- to fine-grained silty sand, humid, firm. $\left(\right)$ SPT 16 22.1 SPT 17 23.5 / 25' - Medium brown fine- to medium-grained silty sand, humid, firm. 32 24.5 2.8 х 108.9 ISPT 23 31.7 - e # 2 \ 2 25' - 30' - Medium brown fine- to very coarse-grained silty sand, Ś SPT 20 27,6 humid, firm. ς τ. μ. εγ. . Ν SPT 24 33.1 30' - 40' - Light to medium brown fine- to very coarse-grained silty Ý \odot sand containing gravel, humid, dense very dense. SPT 36 49.7 × ဆင်္ပ Х 50 for 6" 5.1 117.6 5/0 İSPT 56 77.3 ISPT 67 92.5 40' - Refusal (Saugus Formation ?) End at 40^t Comments: The following correction factors were utilized to determine N(60) (Per SP117)

Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 40' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

PLATE 2.5

SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

BORING LOG NO. B-6

PLATE 2.6

FILE NO.: GC14-122536

DATE: 02/10/15

МЕТ	HOD:	6-inc	h Hollow	Stem A	uger			DRILLING CO.: HD DRILLING					
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS			
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOO				
0										ALLUVIUM - Qal - (0' - 60')			
-	SPT		2	2.8					N.	2.5' - Dark brown very fine- to medium-grained silty sand, slightly moist,			
•	6 07		40						1.5	loose.			
-	971	x	22	16.0	49	96.9			\cdot	5' - 10' - Light brown very fine- to fine-grained silty sand, humid, firm.			
•	SPT	~	10	13.8	1.0				1				
-													
10	SPT		9	12.4						10' - Dark brown very fine- to fine-grained silty sand, humid, firm.			
-	ерт		10	17.0									
-	SPT		10	17.9						12.5' - Dark brown very fine- to fine-grained clayey to silty sand, humid, firm.			
-	Ĭ I	х	18	13.8	7.5	99.8			`\.	humid stabily firm			
-	SPT		9	12.4					. A	17.5' - 35' - Medium brown very fine- to medium-grained silty sand, humid,			
-									<u> </u>	firm.			
20	SPT		12	16.6					~ `				
-	SPT		27	373					• -				
-			2,	51.5			ĺ						
-	SPT		25	34.5									
-		х	46	35.3	6.1	103.8							
-	SPT		38	52.4	ĺ				. 7-				
30	SPT		31	42.8									
-	SPT		33	45.5									
-				40.0									
	SPT		47	64.9					··· ··	35'- 50' - Medium brown fine- to very coarse-grained silty sand, humid,			
•		х	62	47.5	6.0	104.2			12 X	dense.			
-	SPT		36	49.7									
40	SPT		35	48.3									
-	SPT		39	53.8					1.				
-				00.0					$\mathbb{N}_{\mathcal{N}}$				
•	SPT		37	51.1					``				
-		х	66	50.6	6.4	104.8			۰.`				
-	SPT		39	53.8					1				
50	581		35	48.3						50' - 55' - Dark brown medium- to very coarse-grained clayey to silty sand,			
-	SPT		34	46.9						islightly moist, dense.			
r				(dia					<u>`</u>				
-	SPT		33	45.5					ینر کر ، سور در				
-	Х		62	47.5	23.9	106.1			1.5	57.5' - Dark brown fine- to coarse-grained clayey to silty sand, moist, dense.			
-	SPT		37	51.1		ļ			12.	60' - Dark brown fine- to coarse-grained clayey to silty sand, saturated, dense.			
Cor	ame	nte	The f	49.7 Mowin		l. Peotion	fact	010		Ind at 60'			
501	omments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117) Ch = 1.15 (8" Diameter Borehole): Cs = 1.2 (SPT Sampler without lines): Cs = 2/2 (California Sampler)												
Not	<u>Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)</u>												

SUB-SURFACE DATA

ELEVATION: SEE PLATE 1

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

BORING LOG NO. B-7

FILE NO.: GC14-122536

DATE: 02/11/15

	IETHOD: 6-inch Holiow Stem Auger DRILLING CO.: HD DRILLING												
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS			
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOO				
0	SPT		4	5.5						ALLUVIUM -Qal - (0' - 60') 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.			
-	SPT	x	1 15 7	1.4 11.5	9.4	88.9				5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm.			
10	SPT		, 10	13.8									
-	SPT SPT	x	9 6 16	12.4 8.3 12.3	82	90.6							
-	SPT		6	8.3	9.2	20.0							
20	SPT		6	8.3					1.1 1.1 1.1	20' - Medium brown fine- to coarse-grained silty sand, humid, firm,			
-	SPT		23 22	30.4						25' - Medium brown fine-grained silty sand, humid, slightly firm.			
- - 30	SPT SPT	x	52 49 54	39.9 67.6 74.5	8.1	104.4			1.1	27.5' - 35' - Medium reddish brown fine- to very coarse-grained sand containing gravel, dry, dense.			
	SPT		32	44.2					il ogi				
-	SPT SPT	x	26 30 30	35.9 23.0 41.4	11.3	103.4				35' - Medium to dark brown very fine- to fine-grained clayey to silty sand, slightly moist, slightly firm.			
40 -	SPT		35	48.3					0,1,	37.5' ~ 45' - Medium brown fine- to very coarse-grained pebbly to gravelly sand, dry, dense.			
-	SPT		30	41,4					10,00	45' - 50' - Dark brown fine- to coarse-grained clayey to silty sand containing			
- - 50	SPT SPT	x	29 31 44	22.2 42.8 60.7	9.9	116.7			11 10	bebbles, slightly moist, firm to dense. 50' - 60' - Medium reddish brown fine- to coarse-grained pebbly to gravelly			
	SPT		50 f	or 6"						silty sand, slightly moist, dense.			
-	SPT X SPT		63 50 f	86.9 or 6" or 6"	3.5	110.0			0.1	60' - Rock/boulder			
60	SPT 50 for 6" End at 60"												
Cor	mments: The following correction factors were utilized to determine N(60) (Per SP117)												
-	Cb	= 1.	15 (8" [Diamet	er Bo	rehole); Cs	3 = 1	.2 (SP1	Sampler without liner): Cs = 2/3 (California Sampler)			
Not	es:	T	OTAL C	EPTH:	60'	GRO	UND	WAT	ER: NC	REFUSAL/CAVING: NO BACKFILLED VES			
				• •	_					PLATE 27			

SUB-SURFACE DATA

BORING LOG NO. B-8

PLATE 2.8

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

FILE NO .: GC14-122536

ELE\	LEVATION: SEE PLATE 1 DATE: 02/12/15												
MET	HOD:	6-inc	h Hollow	Stem A	uger					DRILLING CO.: HD DRILLING			
	SAM	PLE	BLOW	COUNT			SIE	EVE		DESCRIPTION AND REMARKS			
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOG				
0 -	SPT		5	6.9						ALLUVIUM - Qal - (0' - 60') 2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose.			
• • •	SPT SPT	x	12 21 15	16.6 16.1 20.7	7.1	89.3				5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm.			
10 - -	SPT SPT SPT		10 13 11	13.8 17.9 15.2									
• •	SPT	×	28 16	21.5 22.1	4.8	101,2							
20 - -	SPT SPT		21 30	29.0 41.4						20' - Medium reddish brown fine- to medium-grained silty sand, humid, dense,			
- - - 30	SPT SPT SPT	×	22 42 24 28	30.4 32.2 33.1 38.6	5.1	107.8				25' - Medium reddish brown fine- to very coarse-grained pebbly sand, humid, dense. 27.5' - Medium brown fine- to medium-grained silty sand, humid, dense. 30' - 47.5' - Medium reddish brown fine- to very coarse-grained pebbly to			
- - - 40	SPT SPT SPT SPT	x	37 28 50 27 35	51.1 38.6 38.3 37.3 48.3	5.9	109.5				gravelly silty sand, humid, dense.			
	SPT SPT SPT SPT SPT X	×	36 31 50 fr 46 63 91 50 fr	49.7 42.8 or 6" 69.0 63.5 86.9 125.6 or 6"	7.1	110.0			1 0 1 0 1 0 0 0 0	47.5' - 55' - Medium reddish brown fine- to very coarse-grained silty sandy clay containing gravel, moist, dense. 55' -60' - Medium gray fine- to medium-grained sandy clay, slightly moist, dense.			
- 60										End at 60'			
Con	omments: The following correction factors were utilized to determine N(60) (Per SP117)												
	Cb :	= 1.	15 (8" I	Diamet	er Bo	rehole); C	s = 1	.2 (SPT	Sampler without liner); Cs = 2/3 (California Sampler)			
Not	es;	T	OTAL D	EPTH:	60'	GRO	UND	WAT	ER: NO	REFUSAL/CAVING: NO BACKFILLED: YES			

SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

BORING LOG NO. B-9

FILE NO.: GC14-122536

DATE: 02/11/15

METI	HOD:	6-inc	h Hollow	/ Stem A	uger					DRILLING CO.: HD DRILLING	
	SAM	PLE	BLOW				SIE	VË		DESCRIPTION AND REMARKS	
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC		
0 -	SPT		1	1.4						ALLUVIUM - Qal - (0' - 47.5') 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.	
-	SPT SPT	x	11 34 8	15.2 26.1 11.0	6.3	101.3			1	5' - 12.5' - Light to medium brown very fine- to fine-grained silty sand, dry, firm.	
10	SPT		9	12.4					· · ·		
-	SPT SPT SPT	x	11 9 26 10	15.2 12.4 19.9 13.8	7.7	104.4				12.5' - Medium to dark brown fine- to coarse-grained silty sand, dry, firm. 15' - 20' - Medium to dark brown fine-grained silty sand, humid, firm.	
- 20 -	SPT		14	19.3					1		
-	SPT SPT		22 24	30.4 33.1						22.5' - 35' - Medium reddish brown very fine- to medium-grained silty sand, humid, firm.	
- 30 -	SPT SPT	x	50 fo 21 22	or 5" 29.0 30.4	6.4	105.6					
-	SPT		25 30	34.5 41.4						35' - 46' - Dask brown very fire, to coarse, project alougy to all young	
- - 40	SPT SPT	x	54 39 38	41.4 53.8 52.4	5.7	111.3			1.1.2	slightly moist, firm.	
-	SPT		44	60.7							
- - 50	SPT SPT SPT	x	47 50 fr 50 fr 72	64.9 or 6" or 5" 99.4	5.8	112.2				45' - Medium gray very fine- to medium-grained sandy clay to clayey sand, moist, very dense. SAUGUS FORMATION - Ts - (47.5' - 57.5') - Medium gray medium- to very coarse- grained clayey sand, moist, very dense.	
-	SPT		50 f	or 4"					1.4.		
- - 60	SPT		50 f	or 5"					·	End at 57.5'	
Con	nme	nts:	The f	ollowin	g corr	ection	facto	ors w	vere uti	lized to determine N(60) (Per SP117)	
Note	- CD :	- 1. T	10 (8") 01"A1 F	Jamet	er Bol); Cs HMP	S = 1	.2 (SP]	Sampler without liner); Cs = 2/3 (California Sampler)	
1100	otes: TOTAL DEPTH: 55' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES										



SUB-SURFACE DATA

BORING LOG NO. B-10

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/12/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS **GRAPHIC LOC** Z 200 SCREEI DEPTH (FT) % PASSING MOISTURE N(60) DENSITY ELD BULK RING ii. 0 ALLUVIUM - Qai - (0' - 27.5') N. SPT 14 19.3 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, firm. ~` SPT . 31 42.8 5' - 17.5' - Medium brown fine- to coarse-grained silty sand, dry, firm. Х 37 28.4 ኑ . 1 SPT 12 16.6 10 SPT 12 16.6 ź]SPT 19.3 -14 SPT 14 19.3 х 35 26.8 4.8 97.2 -İSPT 16 . 22.1 20 SPT 13 17.9 20' - 22.5' - Medium brown fine- to coarse-grained pebbly silty sand, dry, 28 dense. 6 SPT 43 59.3 _ . SPT 44 60.7 22.5' - 27.5' - Light to medium brown very fine- to fine-grained silty sand, dry, _ x 75 57.5 4.3 115.3 slightly firm. s. ISPT 50 for 4" -SAUGUS FORMATION - Ts - (27.5' - 30') - Medium brown fine- to very coarsegrained silty sand, dry, very dense. SPT 30 50 for 2" End at 30' • . 40 . 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 30' **GROUNDWATER: NO REFUSAL/CAVING**

: NO	BAC	KFILLED	: YES	
	PL	ATE	2	10

SUB-SURFACE DATA

BORING LOG NO. B-11

PLATE

2.11

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/17/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT DESCRIPTION AND REMARKS SIEVE ľ0 2 200 SCREEN % PASSING DEPTH (FT) FIELD (N) MOISTURE GRAPHIC N(60) DENSITY BULK RING C ALLUVIUM - Qai - (0' - 10') ×.7 SPT 5 6.9 2.5' - Dark brown very fine- to fine-grained silty sand, sightly moist, loose. SPT • 12 16.6 5' - Medium gray very fine- to medium-grained clayey to silty sand, slightly Х 43 33.0 6.8 109.7 . moist, firm. SPT 22 30.4 7.5' - Medium reddish brown fine- to medium-grained silty sand, dry, dense. •, • 10 SPT 50 for 4" 泛 SAUGUS FORMATION - Ts - (10' - 17.5') ŧ 10' - Medium brown fine- to very coarse-grained silty sand, dry, dense. 9.1 SPT 50 for 6" 12.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly . : بې moist, dense. н SPT 50 for 4" 15' - 17.5' - Light to medum gray very fine-grained silty clay, moist, very stiff. 1 . 20 . 30 40 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

SUB-SURFACE DATA

BORING LOG NO. B-12

PLATE

2.12

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/18/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS % **GRAPHIC LOG** 200 SCREEN FIELD (N) % PASSING MOISTURE (FT N(60) DENSITY DEPTH BULK RING 0 ALLUVIUM - Qal - (0' - 7.5') - Medium reddish brown very fine- to fine-grained silty $\sum_{i=1}^{n}$ SPT 6 8.3 sand, slightly moist slightly firm. \mathcal{X} _ SPT 19 26.2 117.9 Х 72 55.2 6.2 1: SPT 50 for 5" * SAUGUS FORMATION - Ts - (7.5' - 10') - Medium brown fine-grained silty sand, humid, very dense. $\tilde{\sim}$ 10 SPT 50 for 3" End at 10 20 30 40 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 10' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

SUB-SURFACE DATA

BORING LOG NO. B-13

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/18/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS GRAPHIC LOD 200 SCREEN (LL Ê % PASSING MOISTURE FIELD (N(60) DENSITY DEPTH BULK RING 0 ALLUVIUM - Qal - (0' - 15') ISPT 6 8.3 2.5' - 5' - Medium reddish brown very fine- to fine-grained silly sand, humid, -~1 firm. . ISPT 9 12.4 х 33 25.3 10.9 93.8 -SPT 17 23.5 7.5' - 10' - Medium brown fine- to medium-grained silty sand to sandy silt, н 1 humid, firm. 10 SPT 11 15.2 54 12.5' - 15' - Medium brown fine- to coarse-grained silty sand, dry, firm. **İSP**T 11 15.2 -SAUGUS FORMATION - Ts - (15' - 17.5') - Medium brown fine- to medium-grained SPT 40 55.2 ... Х 50 for 6" silty sand to sandy clay, slightly moist, very dense. 8.1 SPT 50 for 3" End at 17.5' 20 30 40 . 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES



SUB-SURFACE DATA

BORING LOG NO. B-14

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1 METHOD: 6-inch Hollow Stem Auger SAMPLE BLOWCOUNT SIEVE $\widehat{(L)}$ $\widehat{(2)}$ $\widehat{(3)}$ \widehat

FILE NO.: GC14-122536 DATE: 02/17/15

DRILLING CO.: HD DRILLING DESCRIPTION AND REMARKS

0 SPT 6 8.3 SPT 9 124 8.0 97.9 SPT 33 26.5 8.0 97.9 SPT 17 23.5 8.0 97.9 SPT 11 15.2 - - SPT 50 for 6" 8.3 - - SPT 50 for 6" 50 for 6" - - SPT 50 for 6" 13.8 97.7 - SPT 50 for 6" - - - SPT 50 for 4" - - - SO - - - - -	BULK	RING	FIELD (N)	N(60)	MOISTURE 9	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LO	
SPT 9 12 4 SPT 33 25.3 SPT 17 23.5 ID SPT 11 IS.2 50 for 5' SO for 5' 50 for 5' SPT 50 for 4' SPT <td>) SPT</td> <td></td> <td>6</td> <td>8.3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>ALLUVIUM - Qal - (0' - 12.5') 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose</td>) SPT		6	8.3						ALLUVIUM - Qal - (0' - 12.5') 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose
SPT 9 12.4 SPT 17 23.5 SPT 17 23.5 SPT 11 15.2 SPT 50 for 6' 50 for 6' SPT 50 for 6' 50 for 6' SPT 50 for 6' 13.8 SPT 50 for 6'' 10.10 SPT 50 for 6'' </td <td>·</td> <td></td> <td></td> <td></td> <td></td> <td>Ì</td> <td></td> <td></td> <td>, ~· ∕.</td> <td></td>	·					Ì			, ~· ∕.	
SPT 17 23.5 SPT 50 for 6' SPT X 50 for 3' SPT 50 for 3' SPT 50 for 4'' SPT	SPT	x	9 33	12.4 25.3	8.0	97,9				5' - Light to medium brown very fine-grained silty sand, humid, slightly firm.
10 SPT 11 15.2 SPT 50 for 6" 50 for 6" SPT 50 for 6" 50 for 3" SPT 50 for 3" 50 for 4" SPT 50 for 4" 13.8 97.7 SPT 50 for 4" 11.8 97.7 SPT	- SPT		17	23.5			Į			7.5' - 12.5' - Medium brown very fine- to fine-grained silty sand to sandy silt,
SPT 50 for 6" SPT 50 for 6" SPT 50 for 6" SPT 50 for 6" SPT 50 for 6" SPT 50 for 6" SPT 50 for 6" SPT 50 for 4" SPT 50 for 4" <td< td=""><td>O ISPT</td><td></td><td>11</td><td>15.2</td><td></td><td>ļ</td><td></td><td></td><td>of</td><td>humid, dense.</td></td<>	O ISPT		11	15.2		ļ			of	humid, dense.
SPT S0 for 6" S0 for 6" S0 for 5" S0 for 6"				1.2.2						
a a a a b a b a b a b a b a b a b a b a b a b a b a b a b a b a b a b a b a a b a b a b a b a b a b a b a b a a b a b a b a	· SPT		50 f	or 6"					1, 1	SAUGUS FORMATION - Ts - (12.5' - 20') - Medium brown fine- to medium-grained
SPT 50 for 3" 50 for 4" 50 for 4" End at 20' End a		x	50 fi	or 6"	13.8	97.7			Ŷ.	clayey to slity sand, numid to slightly moist, dense.
20 SPT 50 for 4" End at 20" 30 Image: Second state stat	SPT		50 f	or 3"			ļ		1.1	
The following correction factors were utilized to determine N(so) (Per SP117)	0 SPT		50 f	or 4"					· · · · · · · · · · · · · · · · · · ·	End at 20'
The following correction factors were utilized to determine N(so) (Per SP117)										
The following correction factors were utilized to determine N(so) (Per SP117)										
Soments: The following correction factors were utilized to determine N(so) (Per SP117)										
Solution of the following correction factors were utilized to determine N(so) (Per SP117)										
The following correction factors were utilized to determine N(60) (Per SP117)	0							i		
The following correction factors were utilized to determine N(60) (Per SP117)	-									
The following correction factors were utilized to determine N(so) (Per SP117)										
The following correction factors were utilized to determine N(so) (Per SP117)	-									
A0 										
The following correction factors were utilized to determine N(so) (Per SP117)										
 The following correction factors were utilized to determine N(60) (Per SP117) 	-									
Somments: The following correction factors were utilized to determine N(60) (Per SP117)										
50 - - - - - - - - - - - - -	.						ļ			
- - - - - - - - - - - - - -	-									· ·
comments: The following correction factors were utilized to determine N(60) (Per SP117)										
omments: The following correction factors were utilized to determine N(60) (Per SP117)	0									
$C_{h} = 1.15$ (9 th Diameter Perchala): $C_{h} = 4.3$ (CDT $C_{h} = 1.5$ (1)	ommei	nts:	The f	ollowin	g corr	ection	facto	ors w	/ere uti	lized to determine N(60) (Per SP117)
lotes: TOTAL DEPTH: 20' GROUNDWATER: NO REFUSAL/CAVING: NO BACKEN ED: VES										
PI ΔTF 214										

SUB-SURFACE DATA

BORING LOG NO. B-15

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/17/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS 200 SCREEN GRAPHIC LOG DEPTH (FT) PASSING E MOISTURE N(60) FIELD (DENSITY BULK RING % Ð ALLUVIUM - Qal - (0' - 7.5') . 2.7 7 SPT 9.7 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose. **İ**SPT 7 • 9.7 5' - Light to medium brown very fine-grained silty sand, humid, slightly firm. ł Х . 50 for 5" 7.5 98.2 SPT 69 -95.2 SAUGUS FORMATION - Ts - (7,5' - 20') 5 7.5' - 17.5' - Medium brown very fine- to fine-grained silty sand to sandy silt, `./ 10 SPT 50 for 4" humid, very dense. . ، بر SPT -50 for 5" İSPT . 50 for 5" Х 50 for 4" 13.2 100,0 1 SPT • 50 for 5" : • = - -SPT 20 50 for 4" 20' - Medium brown fine- to medium-grained clayey to silty sand, humid to slightly moist, very dense. -End at 20' • 30 . 40 . 50 • . 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 20' **GROUNDWATER: NO** REFUSAL/CAVING: NO BACKFILLED: YES


SUB-SURFACE DATA

BORING LOG NO. B-16

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/17/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS 200 SCREEN GRAPHIC LOO % PASSING DEPTH (FT) ŝ MOISTURE N(60) FIELD (DENSITY BULK RING G ALLUVIUM - Qal - (0' - 15') X SPT 8 11.0 -2.5' - Medium to dark brown very fine- to fine-grained silty sand, slightly moist, loose. SPT 9 12.4 -5' - 10' - Medium brown very fine- to fine-grained silty sand, dry, firm. . 1 х 52 39.9 7.1 104.9 SPT 26 -35.9 1 ſ 10 SPT 20 27,6 4 SPT 27.6 20 . 12.5'- 15' - Light to medium brown very fine- to fine-grained silty sand to SPT 50 for 5" sandy silt, slightly moist, dense. х 50 for 5" 107.4 12.6 SAUGUS FORMATION - Ts - (15' - 22.5') - gray siltstone. SPT _ 50 for 3" 20 SPT 50 for 4" 1 _ SPT 50 for 2" 1 End at 22.5 • -. 30 _ 40 50 -. . 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 22.5' REFUSAL/CAVING: NO **GROUNDWATER: NO** BACKFILLED: YES



SUB-SURFACE DATA

BORING LOG NO. B-17

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/18/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS GRAPHIC LOO MOISTURE % 200 SCREEN DEPTH (FT) % PASSING FIELD (N) N(60) DENSITY BULK RING 0 ALLUVIUM - Qal - (0' - 5') Ţ. SPT 5 6.9 2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose. _ SPT 15.2 -11 SAUGUS FORMATION - Ts - (5' - 15') .4 Х 68 52.1 10.0 -98.1 5' - 7.5' - Medium to dark brown fine- to medium-grained silty sand, humid, slightly lfirm. *L.*.. . 7.5' - 15' - Medium brown fine- to medium-grained silly to sandy clay, humid, 10 SPT 28 38.6 very dense. _ -SPT 56 77.3 چنے یہ نسر. -SPT _ 50 for 5" End at 15' -_ 20 30 -40 -. 50 _ . . 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 15 GROUNDWATER: NO **REFUSAL/CAVING: NO** BACKFILLED: YES

SUB-SURFACE DATA

BORING LOG NO. B-18

PRO.	ROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536												
ELEV	ATIC)N:	SEE PL	ATE 1				•		DATE: 02/18/15			
метн	HOD:	6-inc	h Hollow	/ Stem A	uger					DRILLING CO.: HD DRILLING			
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS			
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC				
0 - <td< td=""><td>SPT SPT SPT SPT</td><td>Ĩ X nts:</td><td>The f</td><td>13.8 20.7 or 3" or 3" or 3"</td><td>8.2 g corr</td><td>105.0</td><td>facto</td><td></td><td></td><td>ALLUVIUM - Qai - (0' - 7.5') 2 5' - Dark brown very fine- to fine-grained silty sand, moist, slightly firm. 5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense. SAUGUS FORMATION - Ts - (7.5' - 10') - Dark brown fine- to coarse-grained silty sand, slightly moist, very dense. End at 10' 10' 10' 10' 10' 10' 10' 10'</td></td<>	SPT SPT SPT SPT	Ĩ X nts:	The f	13.8 20.7 or 3" or 3" or 3"	8.2 g corr	105.0	facto			ALLUVIUM - Qai - (0' - 7.5') 2 5' - Dark brown very fine- to fine-grained silty sand, moist, slightly firm. 5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense. SAUGUS FORMATION - Ts - (7.5' - 10') - Dark brown fine- to coarse-grained silty sand, slightly moist, very dense. End at 10' 10' 10' 10' 10' 10' 10' 10'			
Note	<u></u>	- 1. 	NTAL *	JEDTU		enole	$\frac{1}{100000}$		2 (371	Sampler without liner); Cs = 2/3 (California Sampler)			
NOR	/ð.	11	JAL L	12218.	10	GRU	UNDI	NAI	ER: NU	REFUSAL/CAVING: NO BACKFILLED: YES			
										PLATE 2.18			

SUB-SURFACE DATA

BORING LOG NO. B-19

PRO	PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536												
ELE	/ATIC)N:	SEE PL	ATE 1						DATE: 02/19/15			
MET	HOD:	6-inc	h Hollow	v Stem A	uger			_		DRILLING CO.: HD DRILLING			
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS			
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOG				
	SPT SPT SPT SPT SPT	X	LL 20 16 80 58 32 50 fr 80	27.6 22.1 61.3 80.0 44.2 or 5" 110.4	9.8	91.5	%	# 20	CITY CR	ALLUVIUM - Qal - (0' - 7.5') - Medium brown fine-grained silty sand, dry, slightly firm. PICO FORMATION - Tp - (7.5' - 15') 7.5' - 12.5' - Medium brown claystone to siltstone. 12.5' - 15' - Dark brown claystone to siltstone. End at 15'			
Con	nme	nts:	The f	ollowín	a corr	ection	l facto	ors M	l /ere uti	Ized to determine N(m) (Per SP117)			
	Cb = 1.15 (8" Diameter Borehole); $Cs = 1.2$ (SPT Sampler without liner); $Cs = 2/3$ (California Sampler)												
Not	es:	Ţ	OTAL L	DEPTH:	15'	GRO	UND	WAT	ER: NO	REFUSAL/CAVING: NO BACKFILLED: YES			
										PLATE 2.19			

SII	GOLD COAST GEOSERVICES, INC.												
	3-SUI	RFA	CE	DAT	ΓA		BORING LOG NO. B-20						
ELEVATION METHOD: 6- SAMPI	D.R. HOR : SEE PL inch Hollow E BLOW	ATE 1 v Stem A COUNT			SI SUSSE	SCREEN A	SANTA CLARITA FILE NO.: GC14-122536 DATE: 02/19/15 DRILLING CO.: HD DRILLING DESCRIPTION AND REMARKS						
INB SPT 0 - - SPT - - - - - - - - - - - -	20 20 50 f 50 f 79 50 f	12.4 27.6 or 3" or 5" 109.0 or 2"	0W	103.9		# 200	δ ALLUVIUM - Qal - (0' - 7.5') 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, sightly firm. 5' - Medium brown fine- to medium-grained silty sand, humid, firm. PICO FORMATION - Tp - (7.5' - 12.5') - Medium brown siltstone End at 12.5						
- 50 - - - - - - - - - - - - - - - - - -	is: The f 1.15 (8" I	ollowin Diamet DEPTH:	g corr er Bo 12.5'	rection rehole	facto); C:	ors v s = 1	were utilized to determine N(60) (Per SP117) 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) ATER: NO REFUSAL/CAVING: NO BACKER LED: YES						

SUB-SURFACE DATA

(F.7)

DEPTH

Û

10

20

.

30

40

50

.

SPT

SPT

SPT

Х

34

40

46.9

55.2

6.7

114.3

50 for 4"

57 for 5"

B-21 BORING LOG NO. PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/13/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS Š 200 SCREEM Ê PASSING **MOISTURE** GRAPHIC N(60) DENSITY ELD BULK RING 11 % ALLUVIUM - Qal - (0' - 47.5') SPT 3 4.1 2.5' - 5' - Medium to dark brown very fine- to medium-grained silty sand, humid, loose. SPT 3 4.1 Х 26 19.9 5.7 99.0 :, { SPT 13 17.9 7.5' - 10' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm. SPT 1 8 11.0 SPT 9 12.5' - 22.5' - Medium to dark brown very fine- to fine-grained silty sand, 12.4 SPT 6 8.3 humid, slightly firm. 15 Х 11.5 9.2 104.6 SPT 8 11.0 SPT 14 19.3 SPT 19 26.2 SPT 20 27.6 33 25.3 9.8 108.7 x SPT 0.0 31 42.8 27.5' - 30' - Medium brown fine- to coarse-grained pebbly silty sand, humid, SPT 29 40.0 dense. 14 SPT 33 45.5 35' - Medium reddish brown fine- to coarse-grained pebbly sand, humid, 0 SPT 28 38.6 dense. D Х 58 44.5 18.8 107.9 37.5' - 47.5' - Medium brown fine- to medium-grained silty sand to sandy silt, moist, SPT 32 44.2 firm. SPT 33 45.5 SPT 30 41.4

> i, t SAUGUS FORMATION - TS - (47.5' - 50') - Medium reddish brown fine- to very coarse-grained clayey to silty sand, moist to saturated, dense. End at 50'

60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 50' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES PLATE 2.21

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BORING LOG NO. **B-22**

SUB-SURFACE DATA PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/13/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS % GRAPHIC LOQ 200 SCREEN DEPTH (FT) E % PASSING MOISTURE N(60) DENSITY FIELD BULK RING 0 ALLUVIUM - Qai - (0' - 17.5') SPT 2 2.8 ļ 2.5' - 5' - Dark brown fine- to medium-grained silly sand, humid, loose. SPT -3 41 Х 24 18.4 3.8 103.7 7.5' - 15' - Dark brown fine- to very coarse-grained silty sand, humid, SPT 15 20.7 slightly firm. 10 SPT 15 20.7 SPT 19 26.2 SPT 11 15.2 8.7 х 60 46.0 119.1 Ĩ, _**∖**1 SPT 70 96.6 SAUGUS FORMATION - TS - (17.5' - 32.5') Ge. 17.5' - 27.5' - Medium yellowish brown medium- to very coarse-grained sand, SPT 20 53 73.1 humid, very dense. SPT 68 93.8 SPT 65 89.7 х 50 for 3" 12.6 110.4 27.5' - 32.5' - Medium yellowish brown medium- to very coarse-grained silty SPT 50 for 6" sand, slightly moist, very dense. SPT 30 50 for 6° */ SPT 50 for 5" End at 32.5' 40 50 -

60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 32.5' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES



SUB-SURFACE DATA

BORING LOG NO. B-23

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/16/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS **GRAPHIC LO** PASSING SCREEI Ê DEPTH (FT) VIOISTURE DENSITY N(60) ELD BULK RING 200 * 0 ALLUVIUM - Qal - (0' - 27.5') SPT 3 4.1 2.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly moist, loose. SPT 15 20.7 5' - Dark brown very fine- to medium-grained clayey to silty sand, х 57 43.7 8.0 97.0 humid, firm. * * * SPT 30 41.4 17.5' - 10' - Medium to dark brown fine- to coarse-grained clayey to silty 7 sand, humid, firm. ÷ SPT 10 14 19.3 रें इ SPT 12 16.6 12.5' - 17.5'- Medium to dark brown fine- to coarse-grained clayey to SPT 5 6.9 silty sand, slightly moist, slightly firm. $\overline{}$ 27 х 20.7 11.5 107.4 SPT 12 16.6 . 20 SPT 13 17.9 20' - 27.5' - Medium to dark brown fine- to very coarse-grained gravelly to J. pebbly clayey to silty sand, humid to slightly moist, slightly firm. 1°52 SPT 18 -24.8 • SPT 13 . 17.9 SAUGUS FORMATION - Ts - (27.5' - 30') 43 33.0 4.3 х 111.7 25' - 27.5' - Medium yellowish brown fine- to coarse-grained silty sand Ör / SPT 46 63.5 containing peobles, humid, firm to dense. 10 ÍSPT 30 50 for 5" 30' - Rock/boulder 40 -50 . . 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 30' **GROUNDWATER: NO** REFUSAL/CAVING: NO **BACKFILLED: YES**



GOLD COAST GEOSERVICES, INC. SUB-SURFACE DATA BORING LOG NO. **B-24** PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/16/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS GRAPHIC LOO 200 SCREEN (FT) Z PASSING MOISTURE N(60) DENSITY ELD (DEPTH × RING BUL * Ð ALLUVIUM - Qal - (0' - 27.5') 6 \sim SPT 2.5' - Dark brown fine- to medium-grained clayey to silly sand, slightly moist, 8.3 . slightly firm. _ SPT 24 33.1 5' - 10' - Dark brown fine- to medium-grained clayey to silty sand, humid, 1 χ 55 42.2 8.6 83.1 firm to dense. , , 4 **SPT** 20 27.6 . \mathbf{N} 10 SPT 13 17.9 SPT -17 23.5 12.5' - 27.5' - Medium brown fine- to medium-grained clayey silt to silty clay, SPT 8 11.0 r humid to slightly moist, firm to dense. N : 39 29.9 х 15.9 95.6 SPT 21 29.0 20 SPT 13 17.9 **ISPT** 57 78.7 _ ÷ SPT -24 33.1 PICO FORMATION - Tp - (27.5' - 37.5') ÷ 18.5 50 for 4" 101.1 x 27.5' - 35' - Medium to dark grayish brown fine-grained clayey silt to silty clay, <u>----</u> SPT 50 for 5" . moist, dense. 30 SPT 64 88.3 SPT 60 82.8 ~ . . SPT 42 58.0 35' - 37.5' - Dark brown claystone to siltstone, very dense. End at 37.5' х 50 for 5" 27.5 94.9 SPT 50 for 4" 40

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 60

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 Comments: The following correction factors were utilized to determine N(60) (Per SP117)

 Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

 Notes:
 TOTAL DEPTH: 37.5'

 GROUNDWATER: NO
 REFUSAL/CAVING: NO
 BACKFILLED: YES

PLATE

2.24

GOLD COAST GEOSERVICES, INC.SUB-SURFACE DATABORING LOG NO. B-25

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/16/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT DESCRIPTION AND REMARKS SIEVE 2 GRAPHIC LOG 200 SCREEN % PASSING DEPTH (FT) Ē NOISTURE N(60) DENSITY FIELD BULK RING 0 ALLUVIUM - Qal - (0' - 17.5') SPT 14 19.3 2.5' - Medium to dark brown fine- to medium-grained silty sand, humid, firm. SPT 41 56.6 5' - 12.5' - Medium brown fine- to coarse-grained clayey to silty sand, humid, به بر ÷ х 82 62.9 7.5 99.1 firm to dense. SPT 28 38.6 10 SPT 20 27.6 SPT 29 40.0 SPT ... 8 11.0 15' - 17.5' - Light yellowish brown very fine- to fine-grained silty sand to sandy silt, х 50 for 3" humid, slightly firm. SPT 70 96.6 SAUGUS FORMSTION - Ts - (17.5' - 27.5') 17.5' - Medium reddish brown fine- to medium-grained clayey to silty sand, SPT 20 31 42.8 dry, very dense. 20' - Medium reddish brown silfstone, very dense. SPT 50 for 6" 22.5' - Light grayish brown siltstone, very dense. SPT 40 55.2 25' - Medium gray siltstone, very dense · 2 х 50 for 3" End at 27.5' 30 40 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 27.5' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

PLATE

2.25

GEOTECHNICAL BORING LOG

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SHEET 1 OF 2

PROJE DATE DATE DRILLI TYPE	PROJECT NO. <u>102453-T</u> DATE STARTED <u>6/20/01</u> DATE FINISHED <u>6/20/01</u> DRILLER <u>Ledezma Drilling</u> TYPE OF DRILL RIG <u>30" Bucket Auger</u>			102453- 5/20/01 5/20/01 dezma D		PROJECT NAME Lyons Canyon Ranch GROUND ELEV. <u>1317</u> BORING DESIG. GW DEPTH (FT) <u>67</u> LOGGED BY DRIVE WT. <u>See Note</u> NOTE <u>0-24' 35</u> DROP <u>12 inches</u> 2577# 4	BORING DESIG <u>B-1</u> LOGGED BY <u>CRN</u> NOTE <u>0-24' 3548#: 24-47'</u> _2577#: 47-73' 1648#					
DEPTH (feet)	ELEV,	SAMPLE	BLOWS/FT	ГІТНОГОСҮ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS		
	1315-					ALLUVIUM (Qal): Sandy Silt to Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, firm/moderately dense.						
5-	1310-	R/B	1				7.3	102.0	31			
	1305-	R	1				7.0	96.4	25			
15	1300-	R	1			Sandy Silt to Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, firm/moderately dense, some interbedded pabble lenses.	10.2	102.4	44			
- 20-	1295-	R/B	1			Silty Sand; fine- to coarse-grained with some pebbles and few cobbles, moderate to dark yellowish brown, moist, moderately dense.	4.9	112.2	26			
- 25	1290-					n g∴n n s		· · · · · · · · · · · · · · · · · · ·				
	1285-	<u> </u>				Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, moderately dense to dense.						
35	1280-											
SAMP B	PLE TY RING SPT (BULK	'PES: (DRIV SPLIT SAMF	(E) SAM SPOOM PLE	IPLE N) SAMP	LE E SAMPLE	CONTACT WATER SEEP BEDDING JOINTING SI SHEAR	C S EER	OIL	s 5, IN Plat	I C. Έ Α-1		

SHEET 2 OF 2

GEOTECHNICAL BORING LOG

1317

67

PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT.

DROP

Lyons Canyon Ranch See Note 12 inches

BORING DESIG. B-1 LOGGED BY CRN NOTE 0-24' 3548#: 24-47' 2577#: 47-73' 1648#



PROJECT NO.

DRILLER

DATE STARTED

DATE FINISHED

TYPE OF DRILL RIG

102453-T

6/20/01

5/20/01

Ledezma Drilling



SHEET 2 OF 2

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GEOTECHNICAL BORING LOG

PROJECT NO.

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DATE STARTED DATE FINISHED

102453-T

6/20/01 6/20/01

PROJECT NAME Lyons Canyon Rench GROUND ELEV. 1325 GW DEPTH (FT) 53 DRIVE MT. San Visite DRIVE WT. See Note Ledezma Drilling

BORING DESIG. <u>B-2</u> LOGGED BY <u>CRN</u> NOTE <u>0-24' 3548#; 24-47'</u>

DRILLER Ledezma Drilling TYPE OF DRILL RIG 30" Bucket Auger					Drilling Auger	DRIVE WT. See Note NOTE 0-24' 3548#; 24-47' DROP 12 inches 2577#: 47-73' 1648#								
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	ГІТНОГОСУ	ATTITUDES	GE	OTECHNICAL DESC	CRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS	
	1285	R	8			Silty Sand; fine moderate yellov	- to very coarse-grained wish brown, slightly moi	l with pebbles st to moist, de	hnse.	6.5	122.2	51		
- 45 - -	1280	B												
- 50-	1275-	R	6			Sand; fine- to c yellowish browr	oarse-grained with pebt	bles, pale to n nse to dense.	noderate	5.5	135.5	61		
-					2	Water at 53± fe	et. <u>to 54+ feet.</u>		······································					
						Total Depth 54 Water at 53 fee Caving from 52 Hole backfilled	feet. t. to 54 feet. with native materials an	nd tamped.						
SAMF	LE TY RING	PES: (DRIVE	E) SAM	PLE		¥ GROUNDV				C S EER	DILS	3 . IN		
B	BULK	SAMP		T TUB	E SAMPLE		S SHEAR			· · ·	F		Е А-4	

PROJE	ECT NO START FINISH ER OF DR). TED IED ILL RI		102453 6/20/0 6/20/0 dezma l "Bucket	3-T 11 Drilling Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1331 BORING DESIG. GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE DROP 12 inches 2577# 4	18#; 24 7-73' 1	B-3 CRN -47' 648#		
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	ГІТНОГОВУ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY		OTHER TESTS
	1330					ALLUVIUM (Qal): Silty Sand; very fine- to fine-grained, pale yellowish brown, dry, loose. Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, dry to slightly moist, loose to moderately dense.				
10	1320-	B	1			1 to 2 <u>+</u> feet thick boulder lense with 6 to 12 <u>+</u> inch boulders. Silty Sand; fine to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, moderately dense.	2.3	106.7	11	
20-	1310-	R/B	2			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	5.7	115.3	35	
	1305-					Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, moderately dense.				
35-	1300 -	R	3			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	4.9	114.1	28	
SAMI B	PLE TY RING SPT (BULK	PES: (DRIV SPLIT SAM	ve) san I spooi Ple	IPLE N) SAMI	PLE BE SAMPLE	V GROUNDWATER LEVEL WATER SEEP CO CONTACT B BEDDING F FAULT JOINTING S SHEAR	C SO EER	JILS SILS	5 5, IN 21 AT	

GEOTECHNICAL BORING LOG

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SHEET 1 OF 2

PLATE A-5

PROJE	CT NC START	ED ED		102453 6/20/0 6/20/0	-T 1	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1331 BORING GW DEPTH (FT) LOGGEI	DESIG DBY	8-3 CRN	I	
ORILLE TYPE (er Dé dri	ll àic	<u>Le</u> 5 <u>_ 30'</u>	dezma D Bucket	hilling Auger	DRIVE WT. <u>See Note</u> NOTE DROP <u>12 inches</u>	<u>0-24' 3548#:</u> 2577#: 47-73	24-47 1648#		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE	DENSITY	SAT- URATION	OTHER TESTS
	1290-	R/B	6				10.4	115.0	63	
45-										
						SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Sandstone; very fine- to fine-grained, medium lig gray, slightly moist, moderately hard to hard.	ght			
50-	1280-	R/B	18			Siltstone; mottled olive gray and light gray, slightly mole hard. Total Depth 51 feet. No water and no caving.	st, 15.7	115.7	97	
						Hole backfilled with native materials and temped.				
										2

SAMP	LE TYF RING (SPT (S	PES: DRIVE	E) SAM SPOON	PLE I) SAMP	LE	Y GROUNDWATER LEVEL Seep © CONTACT B BEDDING E FAULT	ACIFIC S	SOIL	s S, in	1C.

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		G	EOTECHNICAL BORING LOG	SHEE	ET 1 OF 1
PROJECT NO. DATE STARTED DATE FINISHED DRILLER TYPE OF DRILL R	10245 6/20/ 6/20/ Ledezma IG <u>30'' Bucke</u>	3-T 01 Drilling t Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1342 BORING DESIG. GW DEPTH (FT) 14 LOGGED BY DRIVE WT. See Note NOTE 0-24' 35483 DROP 12 inches 2577#.47-	B-4 CRN #: 24-47' 73' 1648#	
DEPTH (feel) ELEV. SAMPLE TYPE	BLOWS/FT	ATTITUDES	GEOTECHNICAL DESCRIPTION	CCNT. (%) DRY (pcf) DENSITY SAT-	URATION (%) OTHER TESTS
	1	AT	Attuvium (Qai): Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, slightly moist to moist, moderately dense. Silty Sand to Sandy Silt; very fine-grained with few pebbles, dark yellowish brown, slightly moist to moist, moderately dense. Water seep and caving from 7 to 9± feet. Pebbly Sand; coarse-grained with abundant cobbles, dark yellowish brown, wet, moderately dense. Water at 14± feet, caving from 14 to 16± feet. Total Depth 16 feet. Water and caving at 7 to 9 feet and 14 to 16 feet. Hole backfilled with native materials and tamped.	9.8 108.3	96
SAMPLE TYPES: IRI RING (DRIN ISI SPT (SPLIT IEI BULK SAM	/E) SAMPLE SPOON) SAMI PLE (T) TUE	PLE DE SAMPLE	GROUNDWATER LEVEL WATER SEEP C CONTACT B BEDDING F FAULT JOINTING S SHEAR D	SOILS ERING,	INC.

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						1	G	EOTECHNIC	AL BORING	LOG			SHE	E	1 OF 1
	PROJE	CT NO	D.		102453	- <u>T</u>		PROJECT NAME	Lyons Canyon I	Ranch					
	DATE	START	ED		6/20/0	1		GROUND ELEV.	1388	BO	RING DESIG. GGED BY		B-5		
	DRILLE	ER		Lec	lezma D	rilling		DRIVE WT.	See Note	NO	TE 0-24' 35	48#: 24	-47:		
	TYPE (OF DR	ILL R	G <u>30"</u>	Bucket.	Auger		DROP	12 inches		2577#;	4 <u>7-73</u> 1	648#		
·	H⊋	>	ш Ш	S/FT	OGY	IDES					······	URE (%)	<u>∱</u>	NO	ER TS
	(fee (fee		SAMI	BLOW	LITHOL	ATTITL		GEO	TECHNICAL DE	SCRIPTION		MOIST	DRY (NRAT URAT	OTH TES
								ALLUVIUM (Qal): fine-grained, mode within top 3±, feet dense/firm at dept	Silty Sand to San erate yellowish bro becoming slightly h.	dy Silt; very îi wn, dry and ic moist and mo	ne- to pose/soft derately				
	10	-	R/B	Push		þ		Water seep at 10	feet.						
		- 1375 - -													
	15-	-					Y .	Water at 15± feet. Caving from 14 to	16+ feet.			4			
								Water at 10 and 1 Caving from 14 to Hole backfilled wit	5 feet. 16 feet. h native materials	tamped.	·				
	SAMP	LETY	PES:												
	8	RING		/È) SAM	PLE						PAUIE			5	
	S	SPT (S	SPLIT	SPOON	I) SAMP	LE		B BEDDING	EFAULT		ENGIN	ER	INC	i, IN	IC.
	B	BULK	SAM	PLE [TUB	E SAMPLE	Ξ	JOINTING	S SHEAR					PLAT	E A-6

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SHEET 1 OF 1

GEOTECHNICAL BORING LOG

PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP

PROJECT NO.

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DATE STARTED DATE FINISHED

102453-T

6/20/01 6/20/01

Lyons Canyon Ranch 1384 See Note 12 inchas -----

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BORING DESIG. <u>B-6</u> LOGGED BY CRN LOGGED BY <u>CRN</u> NOTE <u>0-24' 3548#; 24-47'</u> 2577#; 47-73' 1648#

DRILLE TYPE (ER DF DR	ILL R	IG <u>Le</u> 1G <u>30</u> "	dezma I Bucket	Drilling Auger	DRIVE WT. DROP	See Note 12 inches	NOTE <u>0-24' 3</u> 2577#:	548#; 24 47-73' 1	-47 [*] 648#	<u>.</u>	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	птногосу	ATTITUDES	GEC	TECHNICAL DESCRI	PTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS
	1380- - -	SAN G	Bounce	THO		ALLUVIUM (Qal) fine-grained with yellowish brown, becoming slightly at depth. Top 3 <u>+</u> Boulders; 1 <u>+</u> fool <u>Refusal</u> Total Depth 7 fee No water and no Refusal due to ro Hole backfilled w	Silty Sand to Sandy Silt some pebbles and some dry and loose/soft within the moist to moist and mode feet is porous. In diameter. No sample it. caving. cks. ith native materials and ta	; very fine- to cobbles, dark top 1 to 3 <u>+</u> feet, grately dense/firm due to rocks.		DRY		
SAMP R S B	LE TY RING SPT (SPT (SPT (SPT (SPT (SPT (SPT (SPT (PES: DRIN 5PLIT SAM	/E) SAM " SPOON PLE	PLE I) SAMF	PLE E SAMPLE	¥ GROUNDWA ► WATER SEE B BEDDING JOINTING	ATER LEVEL P C CONTACT F FAULT S SHEAR	PACIF	IC SO EER	DILS ING	5 , IN 2LAT	C. E A-9



GEOTECHNICAL BORING LOG

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PROJI DATE DATE DRILL TYPE	ECT NC START FINISH ER OF DRI), TED IED ILL R	IG	10245 6/25/ 6/25/ dezma Bucke	3-T 01 01 Drilling t Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1358 BORING DESIG. B-7 GW DEPTH (FT) LOGGED BY CRN DRIVE WT, See Nota NOTE 0-24' 3543#; 24-47' DROP 12 inches 2577#; 47-73' 1648#								
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	ПТНОТОВУ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcl) DENSITY	SAT- URATION (%)	OTHER TESTS				
	1385	R/S	4 4 for 3" Bounce		 C: N75W 44NE B: N70W 54NE B: N30W 59NE 	COLLUVIUM/ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, dry and loose top 3± feet, slightly moist and moderately dense at depth, abundant roots and rootlets throughout. 1± inch thick yellowish red lense at contact. SAUGUS FORMATION- SUNSHINE RANCH MEMBER (Tar); Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, grayish orange, slightly moist, hard, moderately to well indurated, slight to moderate bedding. 1± foot thick, scour/infill structure - infill with fine-grained Sand (attitude from top of Sand infill). 2± foot thick, scour/infill structure - infill with fine-grained Sand (attitude from top of infill). Silty Sandstone; fine-grained, light gray, slightly moist, hard, well indurated. Used ripper and core bucket from 18 to 19± feet. Refusal at 19± feet. Total Depth 19 feet. No water, no caving. Hole backfilled with native materials and tamped.	4.6	114.8	27					
	RING SPT (S BULK	(DRI) SPLI1 SAM	VE) SAM I SPOON PLE	PLE I) SAMI T) TUE	PLE IE SAMPLE	WATER SEEP CONTACT B BEDDING FAULT JOINTING S SHEAR	C S EER	UIL: INC P	5 ;, in latë	IC. E A-11				

GEOTECHNICAL BORING LOG PROJECT NO. PROJECT NAME 102453-T Lyons Canyon Ranch DATE STARTED 6/25/01 GROUND ELEV. 1353 BORING DESIG. <u>B-8</u> GW DEPTH (FT) DATE FINISHED 6/25/01 LOGGED BY CRN 19 NOTE 0-24' 3548#; 24-47' DRILLER Ledezma Drilling DRIVE WT. See Nole 30" Bucket Auger TYPE OF DRILL RIG DROP 12 inches 2577#, 47-73 1648# ATTITUDES MOISTURE CONT. (%) LITHOLOG 20 **BLOWS/FT** [] [] OTHER TESTS DEPTH (feet) ELEV. SAMPLI URATI (%) GEOTECHNICAL DESCRIPTION DEN COLLUVIUM/ALLUVIUM (Qal): Silty Sand to Sandy Silt; tine- to coarse-grained with pebbles, cobbles, some clay pods, slightly moist to moist, loose/soft to moderately dense/firm at depth. 1350 5 1345 10 increasing pebbles and cobbles. 1340 15 10.7 122.3 81 R/B 6 1335 Water at 19 feet. 20 SAUGUS FORMATION-SUNSHINE RANCH MEMBER 14.1 121.5 98 10 R (Tsr): Silty Sandstone to Sandy Siltstone; very fine- to fine-grained, light olive, moist, moderately hard, moderately В to well indurated, thinly bedded to laminated, weathered. 1330 Silty Sandstone; fine to coarse-grained, medium light gray, 25 slightly moist, hard, moderately to well indurated. 9.8 122.0 73 Total Depth 26 feet. Water at 19 feet. No caving. Hole backfilled. SAMPLE TYPES: **X GROUNDWATER LEVEL PACIFIC SOILS** R RING (DRIVE) SAMPLE ► WATER SEEP C CONTACT **ENGINEERING, INC.** S SPT (SPLIT SPOON) SAMPLE F FAULT B BEDDING B BULK SAMPLE S SHEAR

TUBE SAMPLE

JJOINTING

PLATE A-12

SHEET 1 OF 2

GEOTECHNICAL BORING LOG PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1327

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PROJI DATE DATE DRILLI TYPE	PROJECT NO. DATE STARTED DATE FINISHED RILLER YPE OF DRILL RIG		IG <u>10</u>	102453-T 6/25/01 6/25/01 Ledezma Drilling IG 30" Bucket Auger		PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1327 BORING DESIG. B-9 GW DEPTH (FT) LOGGED BY CRN DRIVE WT. See Note NOTE 0-24' 3548#, 24-47' DROP 12 inches 2577#; 47-73' 1648#
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	птногосу	ATTITUDES	GEOLECHNICAT DESCLIDION
-	1325 -		•			ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, top 6± feet dry to moist at depth, loose top 3± feet to moderately dense at depth.
5	1320-					
10- - -		R/5	Push			Sandy Silt to Silty Sand; fine-grained, moderate to dark 13.9 115.1 84 yellowish brown, moist, firm/moderately dense, porous, abundant rootlets.
15-	- - 1310 - -					
20	- - 1305	R	1			Silty Sand; fine- to medium-grained, moderate to dark 12.1 111.7 64 yellowish brown, moist, moderately dense, micaceous.
25-	- 1300 -					
30- - -	- - 1295 -	R/B	Push			Silty Sand to Sandy Silt; fine- to coarse-grained with some 18.0 112.0 100 pebbles, moderate yellowish brown, moist to very moist, moderately dense, micaceous.
35	1290 -					
_	- -	в				(Tsr): Silty Sandstone; fine to medium-grained, light olive gray, moist, moderately hard, moderately indurated, slightly
SAMF R S B	PLE TY RING SPT (8 BULK	PES: (DRIV SPLIT SAMI	'E) SAM SPOON PLE	PLE I) SAMP T] TUB	LE E SAMPLE	CONTACT B BEDDING JOINTING C CONTACT B BEDDING C CONTACT C C CONTACT C C CONTACT C C C CONTACT C C C C C C C C C C C C C C C C C C C

SHEET 2 OF 2

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	GEOTECHNIC	AL BORING LOG	•
102453-T	PROJECT NAME	Lyons Canyon Ranch	
6/25/01	GROUND ELEV.	1327	BORING DESIG.
6/25/01	GW DEPTH (FT)		LOGGED BY
1 Ph. 101	Provide the same to a same	· · · ·	ALOTTE D DAL DE LO L

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BORIN	G DESIG.	<u>B-9</u>	_
LOGGE	DBY	CRN	_
NOTE	0-24' 35	48#; 24-47'	
	25775-2	7.73' 1648#	

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PROJECT NO. DATE STARTED DATE FINISHED DRILLER TYPE OF DRILL RIG	102453-T 6/25/01 6/25/01 Ledezma Drilling 30" Bucket Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1327 BORING DESIG. B-9 GW DEPTH (FT) LOGGED BY CRN DRIVE WT. See Note NOTE 0-24' 3548#; 24-47' DROP 12 inches 2577#; 47-73' 1648#			
DEPTH (feet) ELEV. SAMPLE BLOWS/FT	LITHOLOGY	GEOTECHNICAL DESCRIPTION GEOLECHNICAL DESCRIPTION			
R 5		to moderately weathered. Total Depth 41 feet. No water, no caving: Hole backfilled with native materials and tamped. Hole backfilled with native materials and tamped. Second Second	S SPT (SPLIT SPC	DÓN) SAMPLE	B BEDDING JOINTING C CONTACT FAULT S SHEAR ENGINEERING, INC. PLATE A-14

	PROJE DATE DATE DRILLI	CT NO	D. FED HED		10245 4/25/ 4/26/ ave's D	3-T 02 02 92 91(ling	PROJECT NAME Lyons Canyon Rang GROUND ELEV. 1635 GW DEPTH (FT) DRIVE WT. See Note	h BORING DESIG. LOGGED BY NOTE <u>0-27' 45</u>	<u>))#: 27</u>	8-10 CRN '-52'		
-	YPE			G <u></u>	виске				1000#.		<u> </u>	
	DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTRUDES	GEOTECHNICAL DESCR	IPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER TESTS
		1635~ 1630-	B			B: N75W 45NE	PICO FORMATION (Tp): Sandy Siltstone Sand, pale yellowish brown, slightly mois (abundant bi-valves); interbedded with Si fine- to fine-grained, pale yellowish brown hard, scour-fill into Siltstone; both units jo infill, both units laminated to 8± inch thick	; very fine-grained t, hard, fossiliferous ity Sandstone; very , slightly moist, inted with caliche bedding,				
	- 10- -	1525-	R/B	4 for 5"		B: 800W 54NE	Interbedded Silty Sandstone; fine-grained grayish orange, slightly moist to moist, ha Siltstone; mottled grayish orange and pal moist to moist, hard; both units laminated bedding.	d, pale yellowish to ard; with Sandy e olive gray, slightly I to 2 <u>+</u> inch thick	8.8	115.4	54	
	15-	1620-				B: N05W 53NE	Some interlayered Silty Claystone; olive moderately firm to firm, laminated, 1 to 2 some caliche along bedding.	gray, moist, <u>+</u> mm thick layers,				
	20-	1615-	R/B	5 for 4"		(8: 880W 45NE)	Silty Sandstone; fine- to medium-grained brown staining, slightly moist, hard, lamir thick bedding./	, light gray with light nated to 1/4 <u>+</u> inch	5.8	108.0	29	· · · · · · · · · · · · · · · · · · ·
-	25	1610 <i>-</i>				B: N70W 51NE	Some isolated cobble lenses, quartzite a composition.	nd gneissic				
	- 30- - -	1605-	R/8	8 for 8"		8: N70W 50NE	Sandy to Clayey Siltstone; very fine-grain gray, moist, moderately hard to hard, lan thick bedding, some gypsum strands alor 1/4± inch thick. Some isolated Clay lenses and pods; dai moist, moderately firm to firm, concentral planes.	ned Sand; light olive sinated to 1/4 <u>+</u> Inch ng bedding up to rk brownish black, ted along bedding	. 11.0	115.4	69	
	35- - -	1600-				8: N65W 49NE	Claystone layer; 1/4± inch thick, olive gra abundant well formed, gypsum crystals.	ay, moist, soft,				
	SAMF	1595 LE TY RING	PES: (DRIV	/E) SAM	PLE	<u> </u>	X GROUNDWATER LEVEL		C S		5 5	<u>i</u> Ir

					G	EOTECHNICAL BORING LOG	SH	EET	2 OF 3
PROJI DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR). 'ED IED ILL R	IG <u>30</u> °	10245 4/25/ 4/26/ ave's D Bucke	3-T D2 D2 Drilling t Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1535 BORING DESIG GW DEPTH (FT) LOGGED BY DRIVE WT. <u>See Note</u> NOTE 0-27' 4500# DROP 12 inches 3500#; 52-8 80-104' 180	8-10 CRN 27-52' 0' 2500# 0#	······································	-
DEPTH (feat)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	CONT. (%) DRY (pcf) DENSITY	SAT- URATION	OTHER TESTS
	1595	R	8 for 6"		B: N\$0W 47NE	Sandy Siltstone; fine-grained Sand; olive gray, moist, hard, some laminated to 1/4± inch bedding, generally massive, with abundant cross-cutting gypsum seams. Cobbie layers; 1± foot thick, set in pebbly sand matrix, medium- to very coarse-grained, moist, moderately hard to hard, quartizite cobbles and pebbles.	121.2	2 73	
-					B: NB5W 57NE	Silty Sandstone; fine-grained, reddish brown, slightly molst to moist, hard; interlayered with Sandy Siltstone; very fine- to fine-grained Sand, moist, moderately firm to firm, some very firm layers, laminated; both units 6 to 12 inch beds.			
50 - -	1585 -	R/B	8 for 5"			Silty Sandstone; fine-grained, pale olive gray, moist, hard. 7.	.2 113.	41	
- - - - -	1580-	······································			8: N76W 48NE. 8: N75W 50NE	Pebble lense; medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary. Some isolated Clay lenses and pods along bedding, 1± inch thick to 6± inches long, medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.			
- - - - - -	1575-	R	10 for 5"		B: N50E 47NW	Silty Sandstone; layered fine- to medium-grained, pale ofive gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to $1/2\pm$ inch thick bedding. Siltstone concretion; $1\pm$ inch thick, light to olive gray, slightly moist, very hard, massive, slightly jointed with light brown staining along joints.	.3 113.	0 42	
65	1570-				B: E-W 51N	Some gypsum along bedding; up to 1/4± inch thick.			e F
- - 70- -	1565-	R/8	10 for 5'	N MANY MANY ANY ANY ANY ANY ANY ANY ANY ANY ANY	5: 660W 48NE	Clayey Sandstone; very fine- to fine-grained, layered, pale yellowish brown to olive gray, moist, hard, friable, generally massive, some gypsum strands.	2.1 109.	6 63	
75	1560 -					Clayey Siltstone to Clayey Sandstone layers; 1± foot thick, very fine-grained, medium light to medium gray, moist, hard, micaceous, massive.			
					3: N75W 46NE	Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, laminated to 1 <u>+</u> inch thick bedding.			
SAM	PLETY	PES				T GROUNDWATER LEVEL	SOII	S	
R	RING SPT (BULK	(DRI SPLI SAM	ve) sam T spoon Iple	PLE 1) SAM T TUE	PLE BE SAMPLE	WATER SEEP C CONTACT B BEDDING FAULT JOINTING S SHEAR		G, R	NC.

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PROJE DATE S DATE I DRILLE TYPE (DJECT NO. E STARTED E FINISHED LLER E OF DRILL RIG ULLER E OF DRILL RIG ULLER E OF DRILL RIG ULLER E OF DRILL RIG ULLER ULL			10245 4/26/ 4/26/ ave's D Bucke	3-T D2 D2 Irilling t Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1592 BORING DESIG. GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE 0-27' 450' DROP 12 inches 80-104'	00#; 27 2-80' 2	B-11 CRN -52' 500#				
DEPTH (feel)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	MO(STURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER TESTS		
						PICO FORMATION (Tp):	1					
	1580-				5: N50W 45SN J: N50E Vertical J: N10W 52NE	Sandy Siltstone; very fine-grained Sand, layered light to olive gray and light brown, slightly moist, moderately hard to hard, laminated to 1/2+ inch thick bedding, jointed/weathered, abundant roots.						
	- 1575 - -				F: N90W 62NE F: N50W 63SW	Fault Gouge: 1/4 to 1/2± inch thick, plastic Clay layer; olive gray, moist, soft to firm, flaky, abundant roots and rootlets.						
10-	- - 1570 -	R/B	5		J: N45W 78SW F: N55E 85NW	Fault Gouge: plastic Clay layer; olive gray, moist, soft, flaky, abundant roots.	13.0	119.4	89			
- 15-	-				8: N50E 48NW							
20-	1565 - - -	R/B	5 for 6"		B: N40E 49NW	Some medium sized bi-valves. Sandy Siltstone; very fine-grained Sand, medium dark gray,	13.2	122.3	9 9			
	1560 - - -					bivalves.						
25-	1555-				j: N50W 865W J: N40E 66NW	Clay lined joint 1-2 mm thick. Gypsum lined joint 2-3 mm thick.						
30	1550-	R/B	8 far 6"		B: N60W 755W	Sandy Siltstone; very fine-grained Sand, greenish gray, slightly molst, firm, massive, fossiliferous (small bi-valves); interlayered plastic with Silty Sandstone, medium gray, slightly moist, hard, slightly layered to massive; some Interlayered Claystone, medium dark to dark gray, moist, soft	12.2	123.5	95			
35	-					to moderately firm, laminated, flaky.						
-	1545-		<u> </u>			Some isolated concretionary pods, 2 to 6± inches in diameter, very hard.						
SAMP	LE TY	PES: (DRI)	/E) SAM	PLE								
S B	B BULK SAMPLE					B BEDDING F FAULT	EEK	INC P	i, in Late	I G. E A-18		

SHEET 1 OF 3

GEOTECHNICAL BORING LOG

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SHEET 2 OF 3

2201		3		10245	G			LOG	,		SHE	ET 2	2 OF 3
DATE	START	ED ED		4/26/	02	GROUND ELEV.	1582	BOF	RING DESIG.	·	<u>B-11</u>		
DRILL	ER		<u>D</u>	4/26/ ave's D	uz Irilling	DRIVE WT.	See Note	NOT	GED BY 'E <u>0-27' 45</u>	00#: 27	<u>'-52'</u>		
	OF DR		iG <u>30</u> "	Bucka	<u>t Auger</u>	DROP _	12 inches		<u>3500#: {</u> 80-104'	52 <u>-80' 2</u> 100 <i>0#</i>	500#;		
DEPTH (feel)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	ATTITUDES	GEOT	ECHNICAL DES	SCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER TESTS
-	1540	R	8 for 6"		B: N20£ 55NW	Clayey to Sandy Si to dark greenish gra massive.	ltstone; very fine-g ay, slightly moist, i	grained Sand, firm, laminated	greenish I to	12.3	119.7	85	
45-	1535-				B. N60W 55SW (Approx.)								
	-					Hard drilling.							
- 50 -		R/8	10 for 6"			Clayey Siltstone; m slightly laminated, g	edium dark gray, s generally massive.	slightly moist, -	firm,	11.9	122.1	89	
55-					B: N55W 75SW								
-	1525 -				B: N20W 57NE (Approx.)	Siltstone concretior massive.	n lense; 8 to 10 <u>+</u> ir	nches thick, ve	ery hard,				
60 -	- 1520 -	R	15 for 6"		D. NOTA	Clayey Siltstone; of laminated, general	ive gray, slightiy n y massive, few sn	noist, firm, slic nall bi-valve sl	ihtiy nelis.	10.5	121.0	76	
65	-		ſ		Ventical	Ripple marks, smai	amphtude.						
-	- 1515 -				B: N50W 52SW B: N50W 43SW								
70-	-					Onnale Difficience		٩٠ - ـــــ المريد	t 			,44	
- - -	- 1510- -	R	15 for 5"		B: NOCE SASE	sandy Sitistone; ve slightly moist, hard, bedding, generally Clay lense; 2 to 3 <u>+</u> soft, pliable.	ny fine-grained Sa slightly laminated massive. inches thick, med	and, medium d 3 to 1/2 <u>+</u> inch lium dark gray	lark gray, thick , moist,	10.3	105.0	47	
75-	1505 ~~				B: N50W 75SW								
SAMF R	PLE TY RING SPT (S	PES: (DRI\ SPLIT	/E) SAM SPOON	PLE I) SAME	PLE	✗ GROUNDWATI ► WATER SEEP B BEDDING	ER LEVEL		PACIFI ENGIN	C S(EER	DILS ING	S , IN	C.
B	BULK	SAM	PLE	T TUB	SE SAMPLE		SHEAR				PL	.ATE	A-19

G			EOTECHNICAL BORING LOG SHEET					ET	3 OF 3				
PROJI DATE	ECT NO). Ted		10245	3-T 02	PROJECT NAME	Lyons Canyon F 1582	Ranch BO	RING DESIG.		B-11		
DATE	FINISH	IED		4/26/	32	GW DEPTH (FT)		LO	GGED BY) 	CRN		
	er Of dr		IG <u>30</u> '	rave's C ' Bucke	rilling t Auger	DRIVE WT.	<u>See Note</u> 12 joches	NO	1E 0-27 45	00#; 27 ;2-80' 2	<u>-52'</u> 500#		
- · · · ·					·				80-104	1006#			
DEPTH (feel)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOT	ECHNICAL DES	CRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
		R	25 for				· · · · · · · · · · · · · · · · · · ·			10.8	120.8	78	
	1500-	R	25 for 3.5"			Total Depth 81 fee No water, no cavin Hole backfilled with	g. i native materials a	and tamped.		10.8	120.8	78	
SAME	ן א ד דע			<u> </u>	<u> </u>	T COOLINDIALAT					<u> </u>	l	<u> </u>
SAMF R S S	YLE TY RING SPT (1 BULK	PES: (DRIN SPLIT SAM	/E) SAM SPOON PLE [PLE 1) SAMI []] TUB	PLE IE SAMPLE	¥ GROUNDWAT ► WATER SEEP	ER LEVEL C CONTACT F FAULT S SHEAR	PS	PACIFI	C S(EER	DILS ING PI	S i , IN Late	IC. E A-20
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SHEET 1 OF 3

GEOTECHNICAL BORING LOG

PROJE DATE DATE DRILLE TYPE	ECT NO START FINISH ER OF DR). TED IED ILL RI	G <u>30"</u>	10245 4/29/ 4/29/ eve's C Bucke	3-T 02 02 07 June 1 Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1557 BORING DESIG. B-12 GW DEPTH (FT) LOGGED BY CRN DRIVE WT. See Note NOTE D-27' 4500#; 27-52' DROP 12 inches 3500#; 52-80' 2500#;	
DEPTH (feel)	ELEV.	SAMPLE	BLOWS/FT	LITHOLOGY	ATTITUDES		OTHER TESTS
5	1555 - - - 1550 -				B: NGOW 57NE	PICO FORMATION (Tp): Sandy Silistone; very fine- to fine-grained Sand; yellowish brown, slightly moist to moist, moderately hard, laminated to 1/2± inch thick bedding; interlayered with Silty Sandstone; fine-grained, mottled moderate yellowish brown and pale olive, slightly moist, moderately hard, laminated to 1/2± inch thick bedding; abundant caliche, both units highly to moderately weathered.	
- 10	- - 1549	R/B	5 for 10"		6: N80E 72NW	Abundant penecontemporaneous deformation. 12.9 117.6 64 Sandy Siltstone; very fine-grained Sand; light olive gray, slightly moist to moist, moderately hard to hard, slightly laminated generally massive; some interlayered Silty Sandstone, fine-grained, layered vellowish gray and light	
15	- 1540 ~ -				8: N50W 65NE	brown, slightly moist, moderately hard to hard, laminated to 1/4± inch thick bedding; some fine-grained gypsum along bedding bottom of "high to moderate" weathering zone.	
20	1535 -	R/B			B: N70W 73NE	Clayey Siltstone; mottled light to olive gray and moderate brown, slightly moist to moist, moderately hard to hard, massive, micaceous, some fine-rained gypsum strands. Silty Sandstone to Clayey Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some small isolated bi-valves and gastropods.	
	- 1530 - -				B. E.W.GAN		
30	1525-	R/B	10 for 10°		(Аџргох.)	Sandy Siltstone; very fine-grained, medium dark gray, slightly moist to moist, hard, slightly laminated, generally massive, slightly fossiliferous, micaceous.	,
35	1520 -						
SAMF R S B	PLE TY RING SPT (I BULK	PES: (DRIV SPLIT SAMI	/E) SAMI SPOON PLE [PLE) SAM T) TUE	PLE 3E SAMPLE	CONTACT BEDDING JOINTING CONTACT FAULT SHEAR CONTACT FAULT SHEAR PACIFIC SOILS ENGINEERING, II PLAT	NC. E A-21

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FROJE).		10245	G 3-T	PROJECT NAME Lyons Canyon Ranch	01-3
DATE	START	ED IED		4/29/	02 02	GROUND ELEV. <u>1557</u> BURING DESIG. <u>B-12</u> GW DEPTH (FT) LOGGED BY <u>CRN</u>	
DRILL	ER		D	ave's C	rilling	DRIVE WT. <u>See Note</u> NOTE <u>0-27' 4500#; 27-52'</u>	
IYPE	of Dr	ILL R	IG <u>30</u> "	Bucke	I Auger	DROP <u>12 inches</u> <u>3500#; 52-80; 2500#;</u> 80-104; 1000#	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	TESTS
	1515-				B: N70W 69NE	Sandy Siltstone to Silty Sandstone; very fine-grained Sand, medium dark gray, slightly moist to moist, hard, slightly laminated generally massive, slightly fossiliferous, micaceous; some interlayered Silty Sandstone, very fine-grained, light gray, slightly moist, hard, and Claystone, brownish to olive black, moist, moderately firm, laminated.14.2 118.614.2 95	
45	- 1510- -				8: N50W 57NE (Approx.)		
- 50-	-	R/B	8 for 8"			Silty sandstone; very fine- to fine-grained, medium dark to 13.4 (120.6 96 olive gray, slightly moist, hard, slightly laminated, generally	
_	1505- -					massive, micaceous, slightly fossiliferous.	
55	-						
60							
-	- 1495-	R/B	15 for 8"		8: N60W 53NE	Silty Sandstone; very fine- to fine-grained, medium dark gray, 13.2 120.6 94 slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous; some interbedded Claystone lenses, 1 to 2± thick, brownish to olive black, moist, moderately firm to firm, laminated.	
65-	-				B: N60W 53NE	Silty Sandstone lense; 8± inches thick, light to medium light gray, fine-grained, moist, moderately hard, fossiliferous; underlain by 1 to 2± inch_thick soft Claystone lense.	
-	1490 - -				B: N50W 52NE		
70-	- 1485 -	R	15 for 8"			Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	
75-	1480 -				B: N25W 77NE		
SAME	- ינב דע	PES					
R S B	RING SPT (I BULK	(DRIN SPLIT SAM	VE) SAM I SPOON PLE [PLE I) SAMI T] TUE	PLE 3E SAMPLE	WATER SEEP C CONTACT B BEDDING E FAULT JOINTING S SHEAR PLATE	C . A-22

					G	EOTECHNICAL BORING LOG	SH	ÈET	3 OF 3
PROJE		Э.		10245	3-T	PROJECT NAMELyons Canyon Ranch			
DATE	START	ED		4/29/	02	GROUND ELEVBORING DESIG	<u>B-12</u>		
DAIE	FINISE	IED		4/29/	U2	GW DEPTH (FT) LOGGED BY	CRN		· ·
TYPE	IN DE DR		IG <u>30</u> "	Sucke	t Auger	DROP 12 inches 3500# 52-80	2500#		
				waana			2. <u>000</u> 17,	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
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EE E	Щ	12 N	Ň	₫	Ĕ	GEOTECHNICAL DESCRIPTION	1 ZZ	XX8	E S
<u>م</u>		S_	L L L	É	Ę			Ш.	0 H
					4	20		ļ	
		R/B	20 for 6"			13.3	1108.9	68	
								1	
-	1475-	1			B: NGSVV 46NE	Silly Sandstorie lense; interbedded with Sandy Silistone, dark		1	
						massive 1/2 to 1+ inch thick beds			
85-	-	1			B: NSDW 63NE	1			
	-								
	1470 -							1	
								1	
	-								
-	-								
90 -	-	<u> </u>				4.00			
		R	25 for 5"			12.3	104.8	56	
						Total Depth 91 feet.			
						No water, no caving.	ļ	1	
						Hole backlilled with native materials and tamped.	1		
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SAMF	LE TY	PES:				GROUNDWATER LEVEL	OIL	S	
R	RING	(DRI)	VE) SAMI	PLΕ			~:L' }{}!/	₩ FB	
S	SPT (S	SPLIT	SPOON) SAMI	PLE		UNG	3, IP	wu: ∖
B	BULK	SAM	PLE [T) TUE	E SAMPLE	JJOINTING S SHEAR	р	LAT	E A-23
L						· · · · · · · · · · · · · · · · · · ·	•		

	GEOTECHNICAL BORING LOG SI								SHE	ET	1 OF 2			
	PROJE		D.		10245	<u>3-T</u>	PROJECT NAMELyons Canyon Ranch							
	DATE	START	red		5/1/0	2	GROUND ELEV.	1445	9	ORING DESIG.		<u>B-13</u>		
		riNiSr ≃A	15.0	n	<u>. 5/1/0</u> ave's i'i	i <u>z</u>		See Note	ಒ ಗ	OGGED BT IOTE 0-27' 45	00#: 27	<u>-52'</u>	<u></u>	
	TYPE	JF DR	ILL R	IG 30"	Buckel	t Auger	DROP	12 inches	''	3500#: 5	2-80' 2	500#:		
										A0-104	1000#			
	_		in l	H.	×°.	S					200	Ęγ	Z	
	Ea	2	Ц Ц Ц	S/F	ğ	<u> </u>	· · ·					造는	<u>-9</u> -	E E
	Щě	- 	ĮΣ	N N	õ	E I	GEO	TECHNICAL	DESCRIPTIO	V	S L	≿ž	88e	E S I
	Δ-	ш	ଌୖ	JLC	Ē					•	80	造ם	5	
:		-1445				A .	- <u>.</u>							
							SAUGUS FORMA	TION - SUNSE	HINE RANCH ME	EMBER				
			1				IISTI: Silly Sandsi	one; nne- to co	oarse-grained w	in pendies,				
	-	-	-				hard to hard abun	o pale yellowia idant scour-inf	ill normal gradir	10 cratery				
	-	-	-						J	· J ·	Č,	ĺ		
						B: NOCE 55NW					1	(
	5-	1440-								·	t			
	-	-	-											
												1		
		-	-											
	10-	1435-					Cillu Condatana d		materia sete ve	Haudah	+	116 1	10	
		-	R/B	5 for 5"		5. 1400E 3514FV	brown doute sligh	ne- to coarse- itiv moist mod	grained, pale ye lerately hard to t	nowish Nard	4.5	1 10.1	20	
								ing moloc, mou						
	-		1											
	-	-	4			D. MODE COMIN	Course interiors of	Clause Cibete						
	15-	1430-				B. NYOE BUNNY	- Some interrayered	nist moderate	lv hard laminate	cnes inick, -d	1			
							paie onve gray, m		y nara, ianinak					
	. 1													
			-									ł		
			-					503-03-1						
			4				-1 toot thick lense (or 6 to 8± inch	diameter coopie	es, scour/intili		ļ		
	-						Sandy Sillstone: v	erv fine- to fin	e-grained, bale (olive grav.				
	20-	1425-	R/B	5 for 6"			moist, moderately	hard to hard,	slightly laminate	d generally	11.1	120.1	78	
		•	1				massive,							
	-					[1		1	
	_	-												
												1		
		•	-								ĺ			
	25	1420	1								-		1	
	-	-	-											
			_											
			}											
	-	-	1			8: E-W 40N	Silly Sandstone; f	ine- to coarse-	grained with sor	ne pebble				
			-				lenses, gravish or	ange to light o	live gray, slightl	y maist to				
	30-	1415-	}				moist, moderately	hard to hard, i ddion	abundant scour-	-till, graded	-	105.0		
			R	8 for 6"			Deduing, Closs-De	aang.			5.1	105.6	24	
			-											
		•	-											
	_		-											
	35	1410-]								1			
			· ·			B: NBOW 43NE								
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		1.000		1										
	SAMP	1405- 12 TY	PES:				I GROUNDWA	TER LEVEL			<u> </u>		<u> </u>	
	R	RING	(DRI	VE) SAM	PLE		-WATER SEF				0 31		ې د ،	
	S	SPT (SPLE	T SPOON) SAM	PLE	BI BEDDING	E FAUL	T		EEK	INC	2, IP	4G.
	8	BULK	SAM	PLE [<u>T)</u> TUE	BE SAMPLE	JJOINTING	S SHEA	R			P	LATF	E A-24
	L								رو با با با با با با با با با با با با با 	······································				

GEOTECHNICAL BORING LOG

PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT.

102453-T

5/1/02 5/1/02

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PROJECT NO.

DATE STARTED DATE FINISHED DRILLER

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Lyons Canyon Ranch 1445 See Note 12 inches

 BORING DESIG.
 B-13

 LOGGED BY
 CRN

 NOTE
 0-27' 4500#; 27-52'

 3500#; 52-80' 2500#;

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	ER OF DR	ILL R	IG <u>30</u> "	ave's D Bucket	riflina Auger	DRIVE WT. DROP	See Note 12 inches	NOTE _0-27' _3500	4500#; #:52-8	27-52 ¹ 0' 2500	#;	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	GROUP SYMBOL	GEOTE	CHNICAL DESCRIPTION	4	MOISTURE CONT. (%)	DRY (pc) DENSITY	SAT- URATION (%)	OTHER TESTS
		R/B	8 for 6"			Silty Sandstone; ve slightly moist to moi interlayered Silty Sa pebbles, grayish or hard.	ry fine- to fine-grained, pale ist, moderately hard to hard; andstone, fine- to coarse-gra ange, slightly moist, modera	olive gray, some ained with tely hard to	3.8	112.5	21	
45-	1400-							***				
-						Silty Sandstone; fin cobbles, moderate y moderately hard to	e- to coarse-grained with pe yellowish to moderate brown hard.	bbles and n, moist,				
- 50	1395-	8	N/R			Discontinuous Pale coarse-grained darl thick.	osol; Silty Sand to Sandy Si k yeliowish brown, moist, so	lt, fine- to ft, 6 <u>+</u> inches -				
-						Silty Sandstone; fin cobbles, some boul yellowish to modera massive 50/50± cla @ 50 feet; no samp	e- to coarse-grained with pe ders up to 10 <u>+</u> inches, mod ate brown, moist, moderateh st-malrix supported. ble recovery due to cobbles.	bbles and erate y hard to hard,				
55 -	1390-							-				
60- -	1385~	R/B	10 for 5"			Silty Sandstone; fin some cobbles, mod moist, hard.	e- to coarse-grained with pe lerate yellowish to moderate	bbles and brown,	7.5	112.7	43	
-	-					FAULT ZONE: Clay moderately hard to some scour-infill wit	vey Sillstone; dusky blue gro hard, massive, some polish Ih overlying Sandstone.	een, moist, ed surfaces,				
65-	1380-											
- - -						FAULT: Claystone; slightly pliable, abur laminated to 1± incl @ 66'; Trend and p 42W. Sitty Sandstone; ye	olive gray, moist, moderate ndant polished surfaces and h thick bedding. lunge of striations on fault p	ly firm, d striations, lane: N60E				
70 - 	1375 -	R/B	10 for 10'			bedding. Silty Sandstone; fin cobbles, moderate scour-infil, general	e- to coarse-grained with pe yellowish brown, moist, moo y massive, matrix supported	ebbles and derately hard, d.	14.6	119.0	99	
- 75-	1370-							-				
-		B										
-						Total Depth 78 feet Hole backfilled with	No water, no caving, native materials and tampe					
SAMF	LE TY	PES:			-	Ground Water MAX - Max, Dens	Seepage	PACI	FIC	SOI		<u> </u>
E E E	KING (SPT (8		E) SAMP SPOON	ILE SAMP	LE	DS - Direct Shear HYDR - Hydrome ASCE - Expansio	ter Analysis n Index		NEE	RIN	G, IN	IC.
	DULK	GANA	ິພະນີ [1UB	L SAMPL	- CONS - Consolidi	alion			-	MLAT	= A-25

SHEET 1 OF 1

GEOTECHNICAL BORING LOG

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PROJECT NO. DATE STARTED DATE FINISHED DRILLER TYPE OF DRILL RIG			102453-T 5/2/02 5/2/02 Dave's Drilling 30" Bucket Auger			PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1338 BORING DES GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE 0-27 DROP 12 Inches 3590 B0-1			IIG. <u>B-14</u> CRN *4500#; 27-52' #; 52-80' 2500#; D4' 1000#			
DEPTH (faet)	ELEV.	SAMPLE	aLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	1	MOISTURE CONT. (%)	DRY (pc) DENSITY	SAT- URATION (%)	OTHER TESTS	
SAMP	11333 - - - - - - - - - - - - - - - - - -	PES: DRIVE) SAMF			Y Ground Water Seepage MAX - Max. Density/Opt. Moist. Direct Shara	e to indant fine- to yellowish and cobbles, ark yellowish e, some ierate to ierate to it. PACI		SOI			
IS B	SPT (SPLIT S SAMPI	SPOON Le [I) SAMP	ⁱ LE E SAMPLI	HYDR - Hydrometer Analysis ASCE - Expansion Index E CONS - Consolidation		NEE	RIN	G, IN Plati	IC. E A-26	
SHEET 1 OF 1

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GEOTECHNICAL BORING LOG

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PROJE DATE DATE DATE DRILLE TYPE	ECT NO START FINISH ER OF DR). ED ED ILL RIG		102453 5/2/0 5/2/0 ave's D Bucket	3-T 2 2 rilling Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1338 BORING DES GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE 0-27 DROP 12 inches 350	6IG. <u>' 4500#</u>)#: 52-8	<u>E-14</u> <u>CRI</u> : 27-52 0' 250(B v #:	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
5		B				SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, pale yellowish brown, dry, very loose, abundant rootlets and gopher holes. ALLUVIUM (Oal): Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, dry, loose to moderately dense, stratified, some boulders to 10 <u>+</u> inches. Increase moisture to: slightly moist. Boulder layer; up to 3 <u>+</u> feet in diameter, moderate caving.				
10	1328 - - - 1323 - - -	B				Boulder layer; up to 2± feet in diameter, predominantly Sandstone and Pebbly Sandstone, some granite. Clayey Siltstone layer; 1 to 2± inch thick, mottled moderate yellowish brown and pale olive, moist to wet (perched/saturated), soft. Boulder layer, need rippers/core to continue. Refusal. Total Depth 14 feet. No water. Moderate caving throughout. Refusal - Boulders. Hole backfilled.				
20-	- - - - - - - - - - - - - - -		•			e				
30- 	- 1308 - - - - 1303 -									
SAMP	PLE TY RING (SPT (S BULK	PES: DRIVE SPLIT S) SAMF SPOON LE [PLE 4) SAMF	PLE E SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	FIC	SOI	LS IG, IN	IC.

PLATE A-27

GEOTECHNICAL BORING LOG

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PROJE DATE DATE DRILLI TYPE	ATE STARTED ATE FINISHED RILLER YPE OF DRILL RIG			102453 4/4/0 4/4/0 A & W Dr Rotary M	3.T 2 2 illing Jash	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1323 BORING I GW DEPTH (FT) LOGGED DRIVE WT. See Note NOTE _1 DROP 30 inches ri)ESIG BY 40# for <u>SP</u> ng sample	<u>RW-</u> TMI T; 400#	1) for	
DEPTH (feel)	ELEV.	SAMPLE TYPE	ELOWS/FT	гітногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pc() DENSITY	SAT- URATION (%)	OTHER TESTS
 	-					ALLUVIUM (Qai):				
5	- 1318 - - -	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.				
- 10 - -	- 1313 - - -	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.				
15-	- 1308 - - -	SPT	15			Silty Sand; brown with pebbles, slightly moist, medium dense.				
20-	- 1303 - -	SPT	26		:	Silty Sand; light brown with pebbles, slightly moist, medium dense.				
25 - -	1298 - - -	SPT	60			Gravelly Sand; brown, slightly moist, very dense.				
30-	1293 -	R	25			Silty Sand; fine- to medium-grained, light brown, moist, medium dense, 2 <u>+</u> feet thick layer.	12.0	108.4	61	
35-	- 1288 -	SPT	40			Sand; fine- to medium-grained, brown with gravel, moist, dense.				
 	~					Very firm drilling.				
SAMP R S	LE TY RING (SPT (\$ BUT K	I I PES: DRIVE SPLIT I SAMP) SAM SPOOI	III PLE N) SAMP	PLE F SAMPI	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index Section Statement Stat	CIFIC GINEE	SOII RIN	_S G, IN	۱Ċ.

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PROJE DATE DATE DRILLI TYPE	ROJECT NO. ATE STARTED ATE STARTED ATE FINISHED RILLER /PE OF DRILL RIG CONTROL RIG Rotary Wash		3-T 2 2 rilling Vash	GEOTECHNICAL BORING LOG PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1323 GW DEPTH (FT) LOGGED BY DRIVE WT. See Note DROP 30 Inches	3IG. <u>+ for SP</u> sample	RW- TMI T: 4007	1 <u>1</u> <u>2</u> <u>4</u> for	2 01 2		
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногобу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
		SPT	34			Gravelly Sand; fine- to medium-grained, brown, slightly moist, dense, some silt.				
45-	1278	SPT	17 for 12"			Gravelly Sand; fine- to medium-grained, brown, moist, dense.	-			
						SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr):				
 50 	1273	SPT	75 for 6"			Harder drilling. Sandstone; medium- to coarse-grained with gravel, grayish brown.				
55-	1268	SPT	75 for 5*			Silty Sandstone; fine- to coarse-grained with gravel, grayish brown.				
- - - 60	1263	SPT	50 for 1"		•	No recovery.				
65-	1258	R	50 for 4"			- <u>Sandstone: medium- to coarse-grained, brown, hard.</u> Total Depth 65 feet. No apparent water or caving. Hole backfilled.				
SAMF		PES:				¥ Ground Water Seepage				
R	RING SPT (BULK	(DRIV SPLIT SAMI	e) Samř Spoon Ple [PLE I) SAMF	PLE E SAMPL	MAX - Max, Density/Opt, Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	inee	soii Rin	L S G, IN PLAT	NC. E A-29

SHEET 1 OF 2



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SHEET 2 OF 2

PROJE DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	D. TED IED ILL R		10245: 4/4/0 4/4/0 & W D Rotary V	3-T 2 2 Vash	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1318 BORING DE GW DEPTH (FT) 69 LOGGED BY DRIVE WT. See Note NOTE 140 DROP 30 inches Ling	SIG # for SP sample	RVV- TMI T: 4004	2 5	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	тиногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	DTHER TESTS
	-	R	32			Sand; fine to coarse-grained brown, slightly moist, dense, soil retrieved from sampler tip with large rock fragment.				
45	1273 -	R	28		- -	Sand; with gravel, medium to coarse-grained, red brown, slightly moist, slightly dense, Siltstone fragments in sampler tip.	11.0	121.7	81	
50	1268 -	SPT	57 for 6"			Silty Sand; fine to coarse-grained with gravel, light brown, slightly moist, very dense, sample may be from side of boring.	-			
55-	1263 -	SPT	22			Sandy to Silty Clay; dark brown, moist, very stiff, soil obtained by driving ring samplet 6".				
60-	1258 -	SPT	18			Sandy to Silty Clay; dark brown, moist, very stiff, soil obtained by driving ring sampler 6".				
65-	1253	SPT	15			Sandy Silty Clay; fine-grained Sand, light brown, slightly moist, stiff, soil obtained by driving ring sampler 6".				
70-	1248	SPT	32			SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): slightly Sandy Silty Clay; fine-grained Sand, grayish brown, soil obtained by driving ring sampler 6".				
75-	1243 -	SPT	22 for 12"			Silty Sandstone; gray. Total Depth 75 feet. Water at 69 feet. No apparent caving. Hole backfilled.				
SAMF R S B	PLE TY RING SPT (BULK	i Pes: Driv Split Sam	'E) SAMI ' SPOOI PLE	1 PLE N) SAMI T TUB	PLE IE SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	IFIC INEE	SOI RIN	LS G, II PLAT	VC. E A-31



SHEET 1 OF 2

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						GEOTECHNICAL B	ORING LOG			S	HEET	2 OF 2
	ECT NO). ten		10245	<u>3-T</u>		ns Canyon Ranch		10	DIA	2	
DATE	FINISH	ED		4/5/0	2	GW DEPTH (FT)		OGGED BY	(a. <u></u>	TME	<u>}</u>	
TYPE	OF DR	ILL R	IG	Rotary V	Vash	DROP 30 inc	thes		ample		- 101	
				7		<u></u>	······································		₩@	\$	z	·
HLA fa	N.	PE PE	NS/F	OLOC	00LP MBOI	GEOTECHNICA	DESCRIPTION		TUF TUF	SITC SITC	,0 [] [] []	HER STS
l He	ា	SAN	io 19	TH	SYA GR				NOC	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NR NR NR	БЩ
		SPT	30			Silty Sand: medium- to coars	e-orained, with gravel	. lioht				
-			for 11"			brown, slightly moist, very der	1se.	- -		:		
-												
45-	1285-	ļ						-				
-		SPT	19			Sandy Silt; fine-grained, light	brown, slightly moist,	very stiff.				
-	-											
					:							
-											-	
50	1280-	SPT	50 for			Slightly Silty Sand; fine-graine	d, reddish brown, mo	ist, very				
			10.5"			dense.						
-												
-					1							
55-	1275-		64			Soody Silfy Clay, fina grained	. Nahthrown maint h					
-	-	SPI	31	}		obtained from ring sampler, d	, iight browd, moist, n. riven 6".	aru, son				
-												
-	-	-										
-	4070					SAUGUS FORMATION - SUN	SHINE RANCH MEM	BER				
50-	1270-	SPT	75			(Isr): Slightly Clayey Sand; medium)- to coarse-grained, g	ray.				
-			10f 5"									
-	-											
-	-	•						•				
55-	1265 -	R	60			Sandstone; medium to coarse	-grained; gray. No sa	ample _/ -				
		~	for 6"			Total Depth 65 feet.						
						No apparent caving.						
						Hole backfilled.						
			•									
									ļ			
									8			
C A A 17						N Oracle 1			ļ			
	rle I Y RING (rea; DRIV	E) SAMÍ	≥LE		 Ground Water Seepage MAX - Max. Density/Opt. Moi DS - Direct Share 	st.	PACI	FIC S	SOIL	S	
S	SPT (SPLIT	SPOON) SAMP	LE	HYDR - Hydrometer Analysis		ENGI	NEE	RIN	G, IN	IC.
	BULK	SAM	PLE	<u>T</u> TUB	E SAMPL	CONS - Consolidation		IJ		. 1	PLATE	E A-33

GEOTECHNICAL BORING LOG SHEET 1 OF 1

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—	PROJ DATE DATE DRILL TYPE	ECT N STAR FINISF ER OF DR	D. TED HED HLL R		10245 4/5/0 4/5/0 & W D Rotary V	3-T 2 rilling Vash	PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP	Lyons Canyon R 1408 See Note 30 inches	BORIN BORIN LOGGI NOTE	IG DESIG ED BY 140# for SP ring_sample	<u>RW-</u> TMI T: 400/	4) ! for	
	DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	птногосу	GROUP SYMBOL	GEOTECI	HNICAL DESCRI	PTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
		1398 1398	SPT SPT	7 7 11 35 for 11" 75 for 11"	ГШНО	GRG	ALLUVIUM (Qal): ALLUVIUM (Qal): Sandy Silty Ciay; fine- moist, firm. Silty Sand; light brown SAUGUS FORMATIO (Tsr): Slightly Clayey Verv fine Sandy Siltst. Total Depth 20 feet. No apparent groundw Hole backfilled.	-grained Sand, light -grained Sand, light n, slightly moist, me <u>N - SUNSHINE RAI</u> Siltstone; grayish I <u>one: gray, hard.</u> ater or caving.	t brown, slightly dium dense.	ed.	119.3		410
	SAME	LE TY RING (SPT (BULK	PES: DRIV SPLIT SAMI	E) SAMP SPOON PLÉ [PLE SAMF	PLE E SAMPL	 ✓ Ground Water Se MAX - Max. Density: DS - Direct Shear HYDR - Hydrometer ASCE - Expansion Is CONS - Consolidation 	epage /Opt. Moist. Analysis ndex			SOII RIN	-S G, IN PLATE	I C. E A-34

SHEET 1 OF 2

and the statement of the

	PROJE DATE DATE DRILLI TYPE	ECT NO START FINISH ER OF DR). Ted Hed NLL R	 	10245 4/5/0 4/5/0 & & W D Rotary V	3-T 2 2 rilling Vash	PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP	Lyons Canyon R 1348 17 See Note 30 inches	BORING DI LOGGED B NOTE 14	ESIG. Y 0# for SP	<u>RW-</u> TMI T: 4004	5) for	
	DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	ГІТНОLOGY	GROUP SYMBOL	GEOTEC	CHNICAL DESCRI	PTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
		- - 1343 • - -	SPT	17			<u>ALLUVIUM (Qal);</u> Silty Sand; fine-grain dense.	ed, light brown, sligt	ntly moist, medium				
	10	1338 ~ - 	SPT	8			Silty Sand to Sandy S	Silt; dark brown, moi:	st, loose.				
			R	5			Silty Sand; fine- to m moist, slightly dense. Clavev to Sitty Sand;	edium-grained, dark brown, moist, loose	brown, slightly	17.3	112.9	<u>99</u>	
	25-	- - - 1323 - - -	SPT	10			Clayey to Sandy Silt;	gray, very moist, sti	ff.				
	30	- 1318 - - -	SPT	50 for 8"			Some gravel. Silly fine- to medium-	grained Sand; gray,	moist, very dense.	-		· · · · ·	
(35-	- 1313 - - 	SPT	57			SAUGUS FORMATIC (Tst): Silty Sandstor	<u>PN - SUNSHINE RAN</u> ne/Sandy Siltstone; I	<u>ICH MEMBER</u> brown/gray.				
	SAMP Rif S B	LE TYI RING (i SPT (S BULK	PES: DRIVE SPLIT SAMF	e) Samf Spoon Ple (2LE I) SAMP	LE E SAMPLI	Ground Water St MAX - Max. Density DS - Direct Shear HYDR - Hydrometer ASCE - Expansion I CONS - Consolidati	eepage //Opt. Moist. r Analysis Index on	PAC ENC		SOIL RIN	.S G, IN PLATE	IC. A-35

							GEOTECHNIC	AL BORING	LOG			S	HEET	2 OF 2
	PROJE). 160	 .	102453	<u>3-T</u>	PROJECT NAME	Lyons Canyon F	Ranch			BIAL	5	
	DATES	INISH	ED		4/5/0	2	GROUND ELEV. GW DEPTH (FT)	1348	LO	GGED BY		TM	<u>)</u>	
· - ·	DRILLE TYPE C	ir DF DR	ILL R	IG F	<u>& W Di</u> Rotary V	<u>illing</u> Vash	DRIVE WT. DROP	See Note 30 inches	NC	TE <u>140</u>	for SP sample	<u>r: 400</u> #	for	
:														······
	E_	~	ЩШ	NFT	о <u></u> б	뤽 익					17E (%)	<u>⊐</u> 27	NO NO	ຜູທ
	EPT	ELEY		SMC	ģ	MB MB	GEOTEC	HNICAL DESCRI	PTION		NT.	Z SNSI	LEE®	THE
		ш	ଌୄୖ	BLC	5	იზ					80 80	66	IJ	0 -
	F		R	50 for 10			Silty Sandstone; med	ium- to coarse-grai	ned, gray, ha	ard/	·····-	••••••		
							Total Depth 40 feet.							
							Groundwater at 17 fe	et.						
			1				Hole Dackfilled.							
												:		
				:										
	1													
								_			1			
								r						
					:									
												ł		
											[1		
	SAMPI	ETY	I PES:				Ground Water Se	96540ë		D A O				
	RF	RING (DRIV	E) SAMF	PLE		MAX - Max. Density DS - Direct Shear	/Opt. Moist.	Ð	FACI		SUII MIUC	_3 ^ !^	
	S	SPT (S	SPLIT	SPOON) SAMF	LE	HYDR - Hydromete ASCE - Expansion	r Analysis Index	S	CNG		RIN	G, If	4 . ,
		SULK	SAM		TIOB	e Sampl	E CONS - Consolidati	on		 			PLATI	: A-36

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						GEOTECHNICAL BORING LOG		S	1EET	1 OF 1
PROJ DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	o. Ted 1ed IILL R		10245 4/5/0 4/5/0 & & W D Rotary V	3-T 2 2 rilling Vash	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1379 BORING DESI GW DEPTH (FT) 18 LOGGED BY DRIVE WT. See Note NOTE 140# DROP 30 Inches ring s	G for SP ample_	RW- TMI T; 400#	5 } for	
DEPTH (feel)	ELEV,	SAMPLE TYPE	BLOWS/FT	гітногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
	1374	SPT SPT R R	5 14 23 11 50 for 6'			ALLUVIUM (Qal): Silty Sand; brown, slightly moist, bose. Gravelly Sand; fine- to medium-grained, brown, some silt, slightly moist, medium dense. Gravelly Sand; fine- to medium-grained, with some silt, reddish brown, very moist, medium dense. SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty medium- to coarse-grained Sand; red brown, with gravel, ring sample disturbed. Sandy Siltstone: very fine-grained Sand, bluish gray, hard. Total Depth 25 feet. No apparent caving. Water at 17.5 feet. Hole backfilled.	15.6	116.6	99	
SAMF RI SI	PLE TY RING (BULK	PES: DRIV SPLIT SAM	E) SAMI SPOOP PLE	PLE N) SAMP	PLE E SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	FIC :	SOII RIN	.S G, IN PLATI	IC. Ξ Α-37

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End And Hast Log Object GEOTECHNICAL DESCRIPTION Hast Object Hast Hast <thhast< th=""> <thhast< th=""> <thhast< th=""></thhast<></thhast<></thhast<>	PROJE DATE DATE DRILLE TYPE	PROJECT NO. DATE STARTED DATE STARTED DATE FINISHED DRILLER TYPE OF DRILL RIG			102453 7/31/0 7/31/0 iregg in See No	9-1 01 -Situ ote	GEOTECHN PROJECT NAM GROUND ELEN GW DEPTH DRIVE WT. DROP	ICAL BOR Lyons Ca 1317 140 lbs 30 inches	ING LOG	BORING DI LOGGED B NOTE <u>Co</u> _MO 	ESIG Y ombo Rig ounted. A- ash_SPT	S CPT/SI CRI - Truck 1/2" Ro & CPT	HEET PT-1 N	1 OF 3
SAMPLE TYPES Begin CPT - Stop CPT - (Unable to advance) Drill through gravely layers. Solutions (DRVE) SAMPLE Begin CPT - Stop CPT - (Unable to advance) Drill through gravely layers. Solutions (DRVE) SAMPLE Begin CPT - Stop CPT - (Unable to advance) Drill through gravely layers. Stop CPT - Stop CPT - Stop CPT - (Unable to advance) Drill through gravely layers. Begin CPT - Stop CPT - (Unable to advance) Drill through gravely layers. Stop CPT - Stop CPT - Stop CPT - (Unable to advance) Drill through gravely layers. Begin CPT - Stop CPT (6± inches of advancement). Drill Stop CPT - Stop CPT - Stop CPT (6± inches of advancement). Drill Stop CPT - Stop CPT - Stop CPT (6± inches of advancement). Drill MAX_MAX_Density(Soft Moist) PACIFIC SOILS EIERNAG (DRVE) SAMPLE Groups Water Sepage MAX_MAX_Density(Soft Moist) PACIFIC SOILS	DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногову	GROUP SYMBOL	GEOT	ECHNICAL DE	SCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
5 - 1312 Begin CPT. 10 - 1307 - 15 - 1302 - 20 - 1297 - 30 - 1297 - 30 - 1297 Begin CPT - Drill through gravelly layers. 30 - 1297 Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers. 30 - 1297 Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers. 30 - 1287 Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers. 30 - 1287 Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers. 30 - 1287 Begin CPT - Stop CPT (6± inches of advancement). Drill 55 - 1282 - 35 - 1282 - 36 - 1287 Begin CPT - Stop CPT (6± inches of advancement). Drill CPT - Stop CPT (6± inches of advancement). Drill - State Considy(Opt Mater Seepage Max - Max Densidy(Opt Mater) - GIB prively SAMPLE - CPT - Stop CPT Max - Densidy(Opt Mater) - 36 - 1282 - - 37 - 1282 - - 38 - 1282 - - 39 - 1282 - - 39 - 1282 -							ALLUVIUM (Qal): B-1 for descriptive	(Note: See adjac log of Alluvium	cent exploratory from 0 to 70 <u>+</u> fe	y boring eet).				
10-1307 - 15-1302 - 20-1297 - 25-1292 Begin CPT - Drill through gravelly layers. 30-1287 SET 50 for 5" Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers. 30-1287 SET 50 for 5" Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers. 30-1287 SET 50 for 5" Begin CPT - Stop CPT (6± inches of advancement). Drill 35-1282 - 35-1282 - 36-1287 SET 50 for 5" SAMPLE TYPES: - MAR LETYPES: - MAR LETYPES: - GINRING (DRIVE) SAMPLE - EBERING (DRIVE) SAMPLE - CED ETT OFT SED ON SAMPLE - CED ETT OFT SED ON SAMPLE - CED ETT OFT SED ON SAMPLE -	5-	1312 -					Begin CPT.							
15-1302 - 20-1257 - 20-1257 - 20-1257 - 30-1257 - 30-1257 - 30-1257 - 30-1257 - 30-1257 - 30-1257 - 30-1257 - 30-1267 </td <td>10-</td> <td>- 1307</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td>	10-	- 1307									-			
20-1297 - 25-1292 - 30-1287 - 30-1287 - 30-1287 - 30-1287 - 30-1287 - 30-1287 - 30-1287 - 30-1287 - 30-1287 - SPT 50 for 5" - Begin CPT - Stop CPT - (Unable to advance) Drill through gravely layers. Begin CPT - Stop CPT (6± inches of advancement). Drill Through gravely layers. - - <t< td=""><td>- 15 </td><td>1302 -</td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	- 15 	1302 -		-										
Stop CPT - Drill through gravelly layers. Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers. Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers. Begin CPT - Stop CPT (6± inches of advancement). Drill through gravelly layers. SAMPLE TYPES: BRING (DRIVE) SAMPLE IS SET ESPOND SAMPLE SAMPLE TYPES: BRING (DRIVE) SAMPLE SAMPLE T	20	1297	~ • • • • • • • • • • • • • • • • • • •											
25 1292 30 1287 5 1287 SPT 50 for 5" Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers. Begin CPT - Stop CPT (6± inches of advancement). Drill .35 1282 1287 SPT 50 for 5" Begin CPT - Stop CPT (6± inches of advancement). Drill through gravelly layers. SAMPLE TYPES: BRING (DRIVE) SAMPLE [S] SPT (SPI IT SPDOD) SAMPLE [S] SPT (SPI IT SPDOD) SAMPLE [S] SPT (SPI IT SPDOD) SAMPLE	⊷.]	-					Stop CP1 - Drill th	rough gravelly la	iyers.					
30-1287 SPT 50 for 5" -1287 SPT 50 for 5" -1282	25-	1292					Begin CPT - Stop gravelly layers.	CPT - (Unable 1	o advance) Dri	ll through				
35-1282 - 35-1282 - SAMPLE TYPES: Image: Construction of the second	30	- 1287 - -	SPTS	50 for 5"			Begin CPT - Stop through gravelly la	CPT (6± inches iyers.	of advancemen	nt). Drill				
SAMPLE TYPES:	.35-	- 1282 - - -	······································								-			
SAMPLE TYPES: BRING (DRIVE) SAMPLE SI SPT (SPI IT SPOON) SAMPLE SI SPT (SPI IT SPOON) SAMPLE SI SPT (SPI IT SPOON) SAMPLE SI SPT (SPI IT SPOON) SAMPLE	- 													
	SAMP RI	ILE TY RING (SPT (1	PES: DRIVE SPLIT	E) SAMF SPOON	PLE	٩LE	▲ Ground Wate MAX - Max. Der DS - Direct She HYDR - Hydrom	r Seepage Isily/Opt. Moist. ar eter Analysis	R	PAC ENC	CIFIC GINEE	SOI RIN	LS G, II	VC.



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SHEET 3 OF 3



SHEET 1 OF 2



						GEOTECHNICAL BORING LOG			S	HEET	2 OF 2
PROJE	CT NC). ED		10245 7/31/(3-T	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1363	BORING DES	iG		<u>97-2</u>	
DRILLE	ER ER DF DRI		G	iregg in See N	- <u>Situ</u> ofe	DRIVE WT. <u>140 lbs.</u> DROP <u>30 inches</u>	NOTE Comi	o Rig Iteri 4-	- Truck	stary	-
				7			M/ast	SPT WG	& CPT	7	-
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/F	гітногое	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		MOISTUR CONT. (%	DRY (pcf DENSITY	SAT- URATION (%)	OTHER TESTS
SAMP		PES: DRM	50 for 3" E) SAMF	2LE DISAMI		Silty Sandstone; fine- to coarse-grained, medium slightly moist, hard to very hard. Total Depth 41 feet. Groundwater at 15 feet. No apparent caving. Hole backfilled.	gray,	FIC	SOII	LS €.	NC-
B	BULK	SAMF	PLE (TTUB	E SAMPL	E ASCE - Expansion Index CONS - Consolidation				PLAT	E A-42



						GEOTECHNICA	L BORING	LOG			S	HEET	2 OF 2
PROJ	ECT NO). 'ED		10245	3-T		Lyons Ranc	<u>h</u> BC	RING DESI	-	. B. 10	17	
DATE	FINISH	ED		1/13/	04	GW DEPTH (FT)		LO	GGED BY			<u>v</u>	
DRILL	er of dr		30	JN Dril Bucket	ling	DRIVE WT.	See Note	NC	TE <u>0-24'</u>	3548::	#: <u>24-4</u> 3' 164	17' R#	
· · · · · · · · · · · · · · · · · · ·							<u></u>			· · · · · · · · · · · · ·	4. <u>+_1</u> 4791	ur .	-
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHN	NICAL DESCRI	IPTION		MOISTURE CONT. (%)	DRY (pc) DENSITY	SAT- URATION (%)	OTHER TESTS
						Total Depth 40 <u>+</u> feet. No water. Some raveling 34 to 36 <u>+</u> Hole backfilled.	<u>-</u> feet.			ΣO			
	RING (DRIVE) SAM	LE		MAX - Max. Density/O DS - Direct Shear	page pt. Molst.	A		SIC S	SOII RIN	LS G IN	JC
B	SPT (S BULK	SAMP	LE	IT TUB	FLE SAMPLI	ASCE - Expansion indi CONS - Consolidation	nalysis EX		۲ ب و اسم			PLATI	E A-44
						· · · · · · · · · · · · · · · · · · ·						*****	

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SHEET 1 OF 2

GEOTECHNICAL BORING LOG

PROJECT NAME GROUND ELEV. 1323 GW DEPTH (FT) DRIVE WT. DROP

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102453-T

1/13/04

JN Drilling

1/13/04

PROJECT NO.

DATE STARTED

DATE FINISHED DRILLER

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Lyons Ranch See Note 12 inches

BORING DESIG. _____B-102 LOGGED BY <u>CRN</u> NOTE <u>0-24', 3548::#: 24-47'</u> <u>2577#: 47-75', 1648#</u>

TYPE OF DRILL RIG 30" Bucket Auger			' Bucket	Auger	DROP <u>12 inches</u>	_2577#	47-7	5', 164	3#	-	
DEPTH (feet)	ELEV	SAMPLE TYPE	BLOWS/FT	ГІТНОГОВҮ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
						SOL: Sandy Silt; very fine- to fine- with some medium-grained Sand, dark yellowish brown, moist, very loose, abundant roots and rootlets. ALLUVIUM (Qal): Sand Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist to moist, loose.	/				
-		R/B	٦			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, loose, porous, some rootlets.		4.8	100.7	19	
10	1313 -	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, voose, porous, some rootlets.	very	9.4	105.1	42	
15-	1308 -	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, moderate yellowish brown, slightly moist to moist, very loose.		9.8	106.8	45	
20-	1303 -	R/B	1			Sandy Sill to Silly Sand; fine- to medium- with some coarse-grained Sand and pebbles, colour change to moderate yellowish brown, moisture increase to slightly moist to moist, dry to slightly moist, loose.		8.1	107.0	38	
25-	1298 -	R/B	2			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose to medit dense.	ım	3.0	115.6	16	
30	1293 -					Increase abundance of pebbles and cobbles.					
- - - 35-	- - 1258 -	RB	З			Pebbly to Cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist to moist, medit dense; Interlayered with Silty Sand; fine- to coarse-grai with pebbles, pale to moderate yellowish brown, slightly moist, medium dense.	ım ned	3.8	118.3	24	
-						Change to cork-screw auger due to abundant cobbles a boulders (up to 12 <u>+</u> inches). 34 to 38 <u>+</u> faet, moderate to severe raveling of <u>coarse-grained materials</u> . SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr)(?): Clayey to Sandy Silt; fine-grained Sand; moderate yellowish brown, moist, so	na ft.				
SAM	PLE TY RING (PES: DRIV	E) SAMI	⊃LE		Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear			SOI	_S	
ISI B	SPT (S BULK	SPLIT SAMI	' SPOON Ple	I) SAMF []] TUB	PLE E SAMPL	HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	IIUVI.	NEE	IN	DLAT	ч с. Е А-45
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PROJECT NO. 102453-T DATE STARTED 1/13/04 DATE FINISHED 1/13/04 DRILLER JN Drilling TYPE OF DRILL RIG 30" Bucket Auger		PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP	Lyons Ranc 1323 See Note 12 Inches	b BC LC NC	ORING DES OGGED BY OTE <u>0-24'</u> 2577	IG , <u>3548;</u> #: 47-7	B-10 CR≀ #: 24-4 5', 164	2 \ 17'. 3#	-				
DEPTH (feel)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTEC	HNICAL DESCRI	PTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
SAMP	LETY	PES:	E) SAMF			Y Ground Water Se MAX - Max. Density DS - Direct Shear	ard Drilling" at aug aveling 34 to 38± fe	er tip/refusal bet.	PACI		SOIL	-S	
B	SPT (S BULK	IPLIT SAMF	SPOON PLE	I) SAMF	'LE E SAMPLI	ASCE - Hydromelar ASCE - Expansion I CONS - Consolidation	Analysis ndex on	S		* i [_	a N HIM	D, IN Plate	E A-46

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SHEET 1 OF 2

GEOTECHNICAL BORING LOG

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PROJECT NO.

DRILLER

DATE STARTED DATE FINISHED 102453-T 1/13/04 1/13/04

JN Drilling

<u>.....</u>..

 PROJECT NAME
 Lyons Ranch

 GROUND ELEV.
 1324
 BORING DESIG.
 B-103

 GW DEPTH (FT)
 LOGGED BY
 CRN

 DRIVE WT.
 See Note
 NOTE
 0-24', 3548;;#; 24-47',

 DROP
 12 inches
 2577#; 47-75', 1648#

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TYPE	OF DR	ILL R	IG <u>30</u>	' Bucket	Auger	DROP	12 inches	_2577	#: 47-7	5'. 1648	谜	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	GROUP SYMBOL	GEO	TECHNICAL DESCRIPT	ION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
-	-					ALLUVIUM (Qal Sand, dark to m abundant roots a	I): Sandy Silt; very fine- to fi oderate yellowish brown, mo and rootlets.	ne-grained bist, very loose,				
	1319 - -	R	Push			Silty Sand; fine- brown, slighty m Increase abunda	to medium-grained, modera loist, very loose. ance of pebbles.	ite yellowish	4.0	103.1	17	
	- 1314 -	R	Push			Silty Sand; fine- yellowish brown	to coarse-grained with pebi , slighty moist, loose to med	oles, moderate dium dense.	8.6	104.8	38	
-	-					Some cobbles a	and boulders (up to 12± inch	es).				
15~ - -	1309 -	R	Push			Silty Sand; fine- moderate yellow dense.	to medium-grained with sor vish brown, slightly moist, loo	ne pebbles, ose to medium	8.9	107.4	42	
	1304 -	R	1			Silty Sand; fine- moderate yellow	to medium-grained with sor vish brown, slightly moist, loo	ne pebbles, ose.	11.1	104,8	49	
25-	1299 -	R	1			Silty Sand; tine- moderate yellow	to coarse-grained with pebf vish brown, slightly moist, lo	bles, pale to	4.8	114.9	28	
- 30 - -	 1294 - - -	R	З			Silty Sand; fine- pale to moderati dense,	to coarse-grained with pebl e yellowish brown, slightly π	ples and cobbles, [–] hoist, medium	6.3	111.5	33	
	- 1289 - - -					Pebbly to cobbly yellowish brown	y Sand; fine- to coarse-grain , slightly moist, medium den	ed, moderate se to dense.				
SAMF	LE TY	PES:			<u> </u>	Y Ground Wi MAX - Max D	ater Seepage	PACI	FIC	SOII	<u>.</u> S	
S R	KING (SPT (BULK	SPLIT SAM	E) SAMI SPÓÓN PLE	-LE N) SAMP	HE F SAMPI	DS - Direct Si HYDR - Hydro ASCE - Expan	hear ometer Analysis nsion Index		NEE	RIN	G, IN	
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PROJECT NAME	
GROUND ELEV.	
GW DEPTH (FT)	
DRIVE WT	St
DROP	12

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102453-T

1/13/04 1/13/04

JN Drilling

PROJECT NO.

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DATE STARTED DATE FINISHED DRILLER

Lyons Ranch 1324 ___ ee Note Linches

 BORING DESIG.
 B-103

 LOGGED BY
 CRN

 NOTE
 0-24', 3548; #; 24-47',

 2577#; 47-75', 1648#

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TYPE	OF DR	LL RIC	3 <u>30</u> '	'Bucket	Auger	DROP <u>12 inches</u> 257	7 <u>#: 47-7</u>	<u>#: 24-1</u> 5', 164	8#	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	REPLACE	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pc) DENSITY	SAT- URATION (%)	OTHER TESTS
		B				Pebbly to cobbly Sand; fine- to coarse-grained with some boulders up to 12± inches, moderate yellowish brown, slightly moist, dense.				
45	1279 -					Increase abundant of cobbles and boulders.				
	-					SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and Cobble Conglomerate; fine to very coarse-grained Sand matrix, pale vellowish gray, dry to slighty moist, hard. Total Depth 49 feet. No water. No caving. Hole backfilled.				
SAMP R	nie (Y RING (SPT (S BULK	PES: DRIVE IPLIT 5 SAMPI) SAMF SPOON LE [PLE I) SAMP T TUB	PLE E SAMPLI	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion index CONS - Consolidation	FIC	SOII RIN	LS G, IN Plati	NC. E A-48

SHEET 1 OF 2

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GEOTECHNICAL BORING LOG PROJECT NAME _____Lyons Ranch

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PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP

PROJECT NO.

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DATE STARTED DATE FINISHED DRILLER 102453-T

1/13/04

1/13/04

JN Drilling

TYPE OF DRILL RIG 30" Bucket Auger

ME <u>Lyon</u> V. <u>1315</u> T) <u>See Note</u> 12 inches

BORING DESIG. <u>B-104</u> LOGGED BY <u>CRN</u> NOTE <u>0-24', 3548; #, 24-47'</u> 2577#; 47-75', 1648#

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DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
				5		ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, loose to medium dense. Sandy Silt; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.				
5	1310- - -	R	1			Silty Sand; very fine- to fine-grained Sand, moderate yellowish brown, moist, toose.	6.8	103.8	29	
10 -	1305 - -	R/B	2			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, medium dense.	6.4	100.4	25	
	1300-	R	3			Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, slightly moist, medium dense.	2.4	120.7	16	
20	- 1295 - - -	R	1			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.3	103.4	27	
25	- 1290 - -	в				Pebbly to Cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist to moist, medium dense. Some boulders up to $12 \pm inches$.				
- - 30	- 1285 -	R	2			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.9	108.2	33	
35	- - 1280 -	R	3			Interlayered 1± foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense. Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slightly moist, medium dense.	3.5	107.7	17	
		R	2			Interlayered 1+ foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense.	4.0	111.1	21	
SAMP R S B	PLE TY RING (SPT (S BULK	PES: DRIV SPLIT SAMI	E) SAMP SPOON PLE [PLE I) SAMF T TUB	PLE E SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation GONS - Consolidation	FIC NEE	soii Rin	LS G, IP Plati	1C. E A-49

GEOTECHNICAL BORING LOG SHEET 2 OF 2 PROJECT NO. 102453-T PROJECT NAME Lyons Ranch DATE STARTED 1/13/04 GROUND ELEV. BORING DESIG. _____ B-104 1315 DATE FINISHED 1/13/04 GW DEPTH (FT) LOGGED BY CRN NOTE 0-24', 3548; #: 24-47 JN Drilling DRILLER DRIVE WT. See Note TYPE OF DRILL RIG 30" Bucket Auger DROP 2577#: 47-75, 1648# ____12 inches URATION MOISTURE CONT (%) LITHOLOGY BLOWS/FT щ **GROUP** SYMBOL DRY (pc) OTHER TESTS DEPTH (feet) SAMPL TYPE ELEV. **GEOTECHNICAL DESCRIPTION** 45-1270 4.3 108.3 21 Silly Sand; fine- to coarse-grained with pebbles, moderate R/B 3 yellowish brown, slightly moist, medium dense. Interlayered 1± foot: Pebbly to Cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense. 50--1265 8.4 104.0 37 Silly Sand; very fine- to medium-grained with some pebbles, R 4 moderate yellowish brown, slightly moist, medium dense. Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist, medium dense. 55-1260 Silty Sand; fine- to very coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, medium dense. 60 1255 65-1250 ₿ Silty Sand; fine- to very coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, medium dense. Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist, medium dense. SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and cobble Conglomerate; medium to coarse-grained Sand matrix, pale 70-1245 vellowish gray, dry to slighty moist, hard. Total Depth 70 feet. No water. No caving. Hole backfilled. SAMPLE TYPES: Ground Water Seepage PACIFIC SOILS MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation **R**RING (DRIVE) SAMPLE ENGINEERING, INC. S SPT (SPLIT SPOON) SAMPLE B BULK SAMPLE T TUBE SAMPLE

PLATE A-50

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TABLE II

Exploratory Pits	Depth (feet)	Logged by: CRN Description Date Logged: 07/05/01
EP-1	0 to 6	<u>COLLUVIUM (Ocol)</u> : Silty Sand to Sandy Silt; fine- to medium- grained, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense/soft to firm, abundant roots and rootlets.
	6 to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, olive gray, slightly moist, moderately hard to hard, abundant white carbonate stringers, moderately weathered top $1\pm$ foot.
		Total Depth 8 feet. No water, no caving.
EP-2	0 to 15	<u>ALLUVIUM (Qal)</u> : Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant roots and rootlets.
		Total Depth 15 feet No water, no caving.
EP-3	0 to 2½	SOIL: Silty Sand to Sandy Silt; fine- to medium-grained, moderate yellowish brown, dry, loose/soft, abundant roots and rootlets.
	2½ to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light olive, slightly moist, top $2\pm$ feet highly weathered and loose with abundant roots and rootlets, moderately hard at depth, massive.
		Total Depth 8 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Logged by: CRNDescriptionDate Logged: 07/05/01
EP-4	0 to 5	<u>COLLUVIUM (Qcol)</u> : Silty Sand; fine- to medium-grained with pebbles and some cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense, abundant roots and rootlets.
	5 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to coarse-grained with pebbles and cobbles, light yellowish gray, slightly moist, moderately hard, some interbedded pebbles lenses, generally massive.
		Bedding Attitude: @ 7 feet, N40W, 42NE
		Total Depth 9 feet. No water, no caving.
EP-5	0 to 8	<u>ALLUVIUM (Qal)</u> : Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant root, and rootlets.
	8 to 10	Cobbly Sand; medium- to coarse-grained with pebbles, slightly moist, loose to moderately dense, roots to depth.
	10 to 13	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light olive gray, slightly moist, moderately hard, slight to moderate weathering, massive.
		Total Depth 13 feet.

No water, no caving.

TABLE II

Exploratory Pits	Depth (feet)	Logged by: CRNDescriptionDate Logged: 07/0	<u>)5/01</u>
EP-6	0 to 2	SOIL: Siliy Sand; fine- to coarse-grained with pebbles and cobb moderate yellowish brown, dry, loose, abundant roots and rootle	oles, :ts.
	2 to 4	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (T Cobble Conglomerate; coarse-grained Sand matrix, slightly moin moderately hard.	<u>sr}:</u> st,
	4 to 7	Siltstone; light bluish gray, slightly moist, moderately hard, lami	inated.
		Bedding Attitude: @ 5 feet, N50W, 37 NE	
		Total Depth 7 feet.	
EP-7	0 to ½	<u>SOIL</u> : Silty Sand; fine- to coarse-grained with pebbles and cobb moderate yellowish brown, dry, loose, abundant roots and rootle	oles, ets.
	½ to 2	<u>SAUGUS FORMATION – SUNSHINE RANCH MEMBER (T</u> Pebble Conglomerate; medium- to coarse-grained Sand matrix, s moist, loose, abundant roots.	<u>sr):</u> slightly
	2 to 5	Silty Sandstone; fine- to medium-grained, light yellowish gray, s moist, moderately hard, abundant roots.	slightly
		Bedding Attitude: @ 3 feet, N60W, 35 NE	
		Total Depth 5 feet.	

TABLE II

Exploratory <u>Pits</u>	Depth (feet)	Logged by Description Date Logged	: CRN ed: 07/05/01
EP-8	0 to 1	<u>SOIL</u> : Sandy Silt; light to moderate yellowish brown, drabundant roots and rootlets.	ry, soft,
	1 to 3	SAUGUS FORMATION – SUNSHINE RANCH MEM Sandy Siltstone; light olive gray, slightly moist, moderat abundant white carbonate, highly jointed, slightly lamins massive.	<u>BER (Tsr):</u> tely hard, ated, generally
	3 to 5	Claystone; reddish brown, moist, moderately hard, highl abundant white carbonate along joints.	y jointed,
		Bedding Attitude: @ 4 feet, N70W, 45NE	
		Total Depth 5 feet. No water, no caving.	
EP-9	0 to 6	<u>COLLUVIUM (Qcol):</u> Silty Sand; fine- to coarse-grain and cobbles, dark yellowish brown, dry to slightly moist to moderately dense at depth, abundant root and rootlets	ed with pebbles at depth, loose
	6 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEM Pebble and Cobble Conglomerate; medium to coarse-gra matrix, slightly moist, moderately hard, poorly indurated	BER (Tsr); nined Sand I.
	9 to 12	Silty Sandstone; fine-grained, light olive gray, slightly n moderately hard, moderately indurated, moderately bedd	ioist, ied.
		Bedding Attitude: @ 10 feet, N60W, 45NE	
		Total Depth 12 feet. No water, no caving.	

TABLE II

Exploratory <u>Pits</u>	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-10	0 to 2	SOIL: Sandy Silt; yellowish brown, mois rootlets.	st, firm, abundant roots and
	2 to 5	SAUGUS FORMATION SUNSHINE I Clayey Siltstone; light olive gray, moist, n slightly fractured; overlies Silty Sandston yellowish gray, slightly moist, moderately generally massive.	RANCH MEMBER (Tsr): moderately hard, massive, e; fine-grained, light y hard, slightly bedded,
		Bedding Attitude: @ 3 feet, N45W, 47N	E
		Total Depth 5 feet. No water, no caving.	
EP-11	0 to 3	<u>ALLUVIUM (Qal):</u> Silty Sand; fine- to r yellowish brown, top $2\pm$ feet dry and loos moderately dense at depth, abundant root	nedium-grained, moderate se, slightly moist to and rootlets, porous.
	3 to 20	Pebbly Sand; fine- to coarse-grained with yellowish brown, slightly moist to moist,	cobbles, light to moderate moderately dense.
		Total Depth 20 feet. No water, no caving.	

TABLE II

Exploratory Pits	Depth (feet)	Logged by: CRN Description Date Logged: 07/05/01
EP-12	0 to 3	<u>SOIL:</u> Sandy Silt to Silty Sand; fine to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist, soft/loose, abundant roots and rootlets.
	3 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; fine- to coarse-grained Sand matrix, slightly moist, moderately hard, poorly to moderately indurated, moderately bedded.
		Bedding Attitudes: @ 5 feet, N50W, 44NE @ 8 feet, N45W, 42NE
		Total Depth 10 feet. No water, no caving.
EP-13	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate to dark yellowish brown, dry to slightly moist, loose to moderately dense, porous, abundant roots and rootlets.
	6 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, moderately hard, moderately indurated, moderately bedded.
		Bedding Attitude: @ 8 feet, N50W, 46NE
		Total Depth 9 feet. No water, no caving.

TABLE II

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-14	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silty Sand; fine- to medium-grained, dark yellowish brown, dry to slightly moist, loose to moderately dense, porous, abundant roots and rootlets.	
	6 10 8	SAUGUS FORMATION – SUNSHINE F Clayey Siltstone; olive to light olive gray, hard, massive, abundant white carbonate.	ANCH MEMBER (Tsr): moist, soft to moderately
		Total Depth 8 feet. No water, no caving.	
EP-15	0 to 2½	<u>SOIL</u> : Silty Sand; fine- to medium-graine to slightly moist, loose, porous, abundant holes.	ed, dark yellowish brown, dry roots and rootlets, gopher
	2½ to 7	SAUGUS FORMATION – SUNSHINE F Sandstone; fine- to medium-grained with slightly moist, moderately hard, slightly b lenses of pebbles and cobbles with scour-	ANCH MEMBER (Tsr): pebbles, yellowish orange, edded; some interbedded fill basal contacts.
		Approximate Bedding Attitude: @ 5 feet	, N50W, 38NE
		Total Depth 7 feet.	
		no water, no caving.	

TABLE II

Exploratory <u>Pits</u>	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-16	0 to 3	<u>SOIL</u> : Silty Sand to Sandy Silt; fine to yellowish brown, dry to slightly moist rootlets.	o medium-grained, moderate , loose/soft, abundant roots and
	3 to 5	SAUGUS FORMATION – SUNSHIN Pebble Conglomerate; medium- to coa moist, loose, highly weathered, abunda	<u>IE RANCH MEMBER (Tsr):</u> arse-grained Sand matrix, slightly ant roots.
		@ 5 feet, Claystone; 1 to $4\pm$ inch thick yellowish brown and olive gray, moist surfaces, discontinuous layer.	k layer, mottled moderate t, soft, flaky, some polished
	5 to 9	Sandstone; fine-grained, light olive gra hard, highly weathered, abundant joint	ay, slightly moist, moderately ts, abundant roots along joints.
		Bedding Attitude: @ 5 feet, N60W, 3	2NE
		Total Depth 9 feet. No water, no caving.	
EP-17	0 to ½	<u>SOIL:</u> Sandy Silt; dark yellowish brov rootlets.	vn, dry, soft, abundant roots and
	½ to 8	SAUGUS FORMATION – SUNSHIN Sandstone; fine- to medium-grained, li moist, moderately hard to hard, top 1 <u>+</u> slight to moderate bedding with some	VE RANCH MEMBER (Tsr): ight yellowish gray, slightly foot moderately weathered, rootlets along bedding planes.
		Bedding Attitudes: @ 3 feet, N65W, @ 6 feet, E-W, 49	43NE 9N
		Total Depth 8 feet. No water, no caving.	

TABLE II

Exploratory <u>Pits</u>	Depth (feet)	Description	Logged by: CRN Date Logged; 07/05/01
EP-18 0 to 2 <u>SOIL</u> : Silty Sand; finc- to coarse-grained with pebb cobbles, light to moderate yellowish brown, dry, loo and rootlets.		d with pebbles and some wn, dry, loose, abundant roots	
	2 to 7	SAUGUS FORMATION – SUNSHINE Silty Sandstone; fine-grained, mottled re moist, hard, top 2+ feet slightly jointed, r	RANCH MEMBER (Tsr): ddish orange and olive gray, moderately bedded.
		Bedding Attitude: @ 5 feet, N60W, 40S	SW
		Total Depth 7 feet. No water, no caving.	
EP-19	0 to ½	SOIL: Silty Sand; fine-grained, light to dry, loose, abundant roots and rootlets.	moderate yellowish brown,
	½ to 6	SAUGUS FORMATION – SUNSHINE Sandstone; fine-grained, light olive gray hard to hard, moderately bedded.	RANCH MEMBER (Tsr): , slightly moist, moderately
		Bedding Attitude: @ 4½ feet, N65W, 40	ONE
		Total Depth 6 feet. No water, no caving.	
EP-20	0 to 9	<u>ALLUVIUM (Qal)</u> : Cobbly Sand; fine-tabundant pebbles, light yellowish brown slightly moist to moist and moderately d to 12± inches diameter, abundant roots a caving throughout. Total Depth 9 feet	to coarse-grained with a, top $2\pm$ feet dry and loose, ense to depth, some cobbles up and rootlets to depth. Severe
		No water, caving from 0 to 9 feet.	

TABLE II

Exploratory	Depth (feet)	Description Detail or 2005/01
<u>PIIS</u>	(1eet)	Description Date Loggeu: 07/05/01
EP-21	0 to 13	<u>ALLUVIUM (Qal)</u> : Silty Sand to Sandy Silt; fine- to medium-grained with some pebbles and cobbles; moderate yellowish brown, top $2\pm$ feet dry and loose, slightly moist to moist and moderately dense to depth, poorly consolidated, some roots to depth.
	13 to 14	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium to coarse-grained Sand matrix, moist, moderately hard to hard, weathered.
		Total Depth 14 fect No water, no caving.
EP-22	0 to 7	<u>ALLUVIUM (Qal)</u> : Silty Sand; fine- to medium-grained with some pebbles, dark yellowish brown, top $2\pm$ feet loose and dry, slightly moist to moist and moderately dense to depth, basal cobbles, abundant roots and rootlets.
	7 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Siltstone: moderate yellowish brown, moist, moderately hard, laminated, moderately fractured, some tectonic shears along bedding, some roots and rootlets.
	10 to 12	Silty Sandstone; very fine- to fine-grained, olive gray, slightly moist to moist, moderately hard, slightly fractured.
		Bedding Attitude: @ 10 feet, N60W, 40NE
		Total Depth 12 feet.
		No water, no caving.

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TABLE II

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-23	0 to 1	SOIL: Silty Sand; fine- to coarse-grained w brown, dry, loose, abundant roots and rootle	vith pebbles, dark yellowish ets.
	1 to 5	SAUGUS FORMATION – SUNSHINE RA Sandstone; fine- to medium-grained, pale ye moist, moderately hard to hard, some rootle depth.	ANCH MEMBER (Tsr): ellowish gray, slightly its from 1 to 3 <u>+</u> feet in
		Bedding Attitude: @4 feet, N60W, 45NE	
		Total Depth 5 feet. No water, no caving.	
EP-24	0 to 1	SOIL: Silty Sand; fine- to coarse-grained w dark yellowish brown, dry, loose, abundant	with pebbles and cobbles, roots and rootlets.
	1 to 4	SAUGUS FORMATION – SUNSHINE RA Pebble and Cobble Conglomerate; medium- matrix, slightly moist, moderately hard to h	ANCH MEMBER (Tsr): - to coarse-grained Sand ard, few roots to depth.
	4 to 5	Sandstone; fine- to medium-grained, light y moist, moderately hard, moderately bedded	ellowish gray, slightly
		Bedding Attitude: @ 4½ feet, N60W, 40N	E
		Total Depth 5 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Logged by: CRNDescriptionDate Logged: 07/05/01
EP-25	0 to 2½	<u>COLLUVIUM (Ocol)</u> : Silty Sand to Sandy Silt; very fine- to fine- grained with some isolated pebbles, moderate to dark yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets, porous.
	2½ to 5	Clayey Silt; moderate to dark yellowish brown, slightly moist, soft to firm, porous, abundant caliche.
	5 to 9	<u>PICO FORMATION (Tp)</u> : Clayey Siltstone; mottled pale olive gray and light brown, slightly moist, moderately firm, laminated to $\frac{1}{2}$ -inch thick bedding, weathered to a depth of 7± feet.
		Bedding Attitudes: @ 6 feet, N50E, 32SE @ 8 feet, N80E, 35SE
		Total Depth 9 feet. No water, no caving.
EP-26	0 to 1½	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry to slightly moist, loose, abundant roots and rootlets, porous.
	1½ to 6	<u>PICO FORMATION (Tp):</u> Clayey Siltstone; pale olive, slightly moist, moderately firm, laminated to massive $2\pm$ -inch thick bedding, weathered with roots and caliche to a depth of $3\frac{1}{2}$ feet.
		Bedding Attitudes: @ 4 feet, N30W, 40NE @ 4½ feet, N10W, 30NE @ 5 feet, N30E, 29SE
		The start in the start start

Total Depth 6 feet. No water, no caving.
LOG OF EXPLORATORY PITS

Exploratory	Depth	Logged by: CRN
Pits	(feet)	Description Date Logged: 07/05/01
EP-27	0 to 1	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets.
	1 to 5	<u>PICO FORMATION (Tp)</u> : Sandy Siltstone; fine-grained, pale olive gray, slightly moist, moderately hard, 1 to $6\pm$ inch thick laminated beds; jointed/fractured, interbedded with Clayey Siltstone; pale olive to olive gray, moderately firm, laminated to $3\pm$ -inch thick massive beds; top $1\frac{1}{2}\pm$ feet highly weathered.
		Bedding Attitudes: @ 4 feet, N50W, 39NE
		Total Depth 5 feet. No water, no caving.
EP-28	0 to 1	SOIL: Sandy Silt; very fine- to fine-grained, pale to moderate yellowish brown, dry, loose, abundant roots and rootlets.
	1 to 7	<u>PICO FORMATION (Tp)</u> : Interbedded Silty Sandstone; very fine- to fine-grained, pale olive, slightly moist, moderately hard, 2 to $6\pm$ -inch laminated bedding; with Clayey Siltstone, pale to dark olive, slightly moist to moist, moderately firm, laminated to $2\pm$ -inch thick bedding; top $3\pm$ feet highly weathered and abundant roots.
		Bedding Attitudes: @ 5 feet, EW, 49N @ 6 feet, N70E, 73NW
		Total Depth 7 feet

Total Depth 7 feet. No water, no caving.

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-29	0 to 11	ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine- grained, moderate yellowish brown, dry to slightly moist at $6\pm$ feet to depth, loose/soft to moderately dense/firm with depth.	
	11 to 12	<u>PICO FORMATION (Tp):</u> Silty Claystone; dark olive green, moist, moderately firm to firm, laminated to ½±-inch thick bedding.	
		Total Depth 12 feet. No water; no caving.	
EP-30	0 to 14	<u>COLLUVIUM (Ocol)</u> : Clayey to Sandy Sil pale to moderate yellowish brown, dry to sli abundant rootlets and roots.	t; very fine-grained Sand, ghtly moist, soft, porous,
		Total Depth 14 feet. No water, no caving.	
EP-31	0 to 1	SOIL: Clayey To Sandy Silt; very fine- to f brown, slightly moist to moist, soft, porous, rootlets.	inc-grained, dark yellowish abundant roots and
	1 to 2	<u>PICO FORMATION (Tp):</u> Claystone; mott brown, slightly moist to moist, moderately f abundant roots.	led olive gray and light irm, highly weathered,
	2 to 3	Silty Sandstone; light gray lenses 3 to $4\pm$ ind with light brown core, slightly moist, moder fill bottom, flat top.	ches thick at top and bottom ately hard, massive, scour-
	3 to 4	Silty Sandstone to Sandy Siltstone; pale oliv highly weathered, blocky, abundant caliche.	e gray, slightly moist, firm,
	4 to 5	Sandy to Clay Siltstone; pale to dark olive g moderately hard, laminated to $\frac{1}{2}$ -inch bedd	ray, slightly moist to moist, ling.
		Bedding Attitudes: @ 3 feet, N80W, 59SW @ 4 feet, N65W, 35SW	' (overturned) ' (overturned)
		Total Depth 5 feet. No water, no caving.	

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-32	0 to 5	<u>COLLUVIUM (Qcol):</u> Sandy Silt; ve moderate yellowish brown, dry to slig rootlets.	ry fine-grained Sand, pale to htly moist, soft, abundant
	5 to 8	PICO FORMATION (Tp): Silty Sand pale to olive gray, slightly moist to mo to 3 <u>+</u> -inch beds.	Istone; very fine- to fine-grained, pist, moderately hard, laminated
		Bedding Attitude: @ 6 feet, N70E, 54	INW
		Total Depth 8 feet. No water, no caving.	
EP-33	0 to 12	<u>COLLUVIUM (Qcol)</u> : Sandy Silt; ve yellowish brown, dry to slightly moist foot diameter boulder at $2\pm$ feet.	ry fine- to fine-grained Sand, pale , loose/soft, abundant rootlets, 2 <u>+</u>
~~~~~		No water, no caving.	
EP-34	0 to ½	SOIL: Clayey Silt; moderate yellowis roots and rootlets.	h brown, dry, loose, abundant
	½ to 4	PICO FORMATION (Tp): Silty Sand pale to olive gray, slightly moist, mod abundant roots and rootlets.	lstone; very fine- to fine-grained, erately firm, highly weathered,
	4 to 6	Silty Sandstone; fine-grained, pale olimoderately hard, massive.	ve gray, slightly moist,
		Bedding Attitudes: @ 3 feet, N45E, 6 @ 5 feet, N70E, 5	55SE (overturned) 59SE (overturned)
		Total Depth 6 feet. No water, no caving.	

April 11, 2006 Work Order 102453-RT

# TABLE II

# LOG OF EXPLORATORY PITS

Exploratory <u>Pits</u>	Depth (feet)	Description		Logged by: CRN Date Logged: 07/05/01
EP-35	0 to 14	ALLUVIUM (Qal): some medium-grain loose/soft, slightly n slightly porous, pocl	Silty Sand to Sandy Silt ed, moderate yellowish c noist to moist and moder ket of pebbles and cobble	t; very fine- to fine- with brange, top $2\pm$ feet dry and ately dense/firm at depth, es @ $12\pm$ feet.
		Total Depth 14 feet. No water, no caving		
EP-36	0 to ½	<u>SOIL:</u> Sandy Silt; v dry, soft, abundant r	ery fine-grained Sand, n oots and rootlets.	noderate yellowish brown,
	½ to 6	<u>PICO FORMATION</u> pale olive gray, sligl bedding, upper 3 <u>+</u> fe	<u>N (Tp):</u> Silty Sandstone; htly moist, moderately has eet slightly creep affected	very fine- to fine-grained, ard, laminated to 3±-inch 3.
	6 to 8	Silty Sandstone, fine moderately hard, ma	e-grained, pale olive gray ssive.	y, slightly moist,
		Bedding Attitudes:	<ul> <li>@ 2 feet, N10E, 50NW</li> <li>@ 4 feet, N30W, 30SW</li> </ul>	
		Total Depth 8 feet.		

No water, no caving.

# LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Logged by: CRNDescriptionDate Logged: 07/05/01
EP-37	0 to ½	SOIL: Sandy Silt; very fine-grained, moderate yellowish brown, dry, loose, abundant roots and rootlets.
	½ to 5	<u>PICO FORMATION (Tp):</u> Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard, laminated to $1 \pm$ inch bedding, possibly creep affected.
	5 to 7	Silty Sandstone; fine-grained, pale olive, slightly moist, moderately hard to hard, massive.
		Bedding Attitudes: @ 2 feet, N10E, 36NW @ 5 feet, N50E, 42 NW
		Total Depth 7 feet. No water, no caving.
EP-38	0 to ½	SOIL: Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, dry, loose, porous, abundant roots and rootlets.
	½ to 2	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; medium- to very coarse-grained with pebbles and cobbles of quartzite and granitics (Mt. Lowe), pale yellowish orange, slightly moist, moderately hard, poorly cemented, slightly layered generally massive.
	2 to 6	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; very fine-grained, moderate yellowish brown, slightly moist, moderately hard/firm, slightly laminated, generally massive.
		Contact Attitude: @ 2 feet, N65W, 67NE Bedding Attitude: @ 4 feet, N55W, 54NE
		Total Depth 6 feet.

No water, no caving.

Exploratory <u>Pits</u>	Depth (feet)	Description I	Logged by: CRN Date Logged: 07/05/01
EP-39	0 to 17	<u>COLLUVIUM (Qcol):</u> Sandy Silt; very fine- yellowish brown, dry to slightly moist at dept wet at bottom.	grained Sand, moderate h, soft to firm at depth,
		Total Depth 17 feet. No water, no caving.	
EP-40	0 to 9	<u>ALLUVIUM (Qal):</u> Silty Sand to Sandy Silt; yellowish brown, dry to slightly moist at dept moderately dense/firm at depth, roots to 5 <u>+</u> fe	; fine-grained, moderate th, loose/soft to eet in depth.
	9 to 10	SAUGUS FORMATION – SUNSHINE RAN Silty Sandstone; fine- to medium-grained, yel massive.	<u>NCH MEMBER (Tsr);</u> llowish gray, moist, hard,
		Total Depth 10 fect. No water, no caving.	
EP-41	0 to 1	SOIL: Silty Sand; fine- to coarse-grained, da loose, abundant roots and rootlets.	rk yellowish brown, dry,
	1 to 3	SAUGUS FORMATION – SUNSHINE RAN Pebbly Sandstone; medium- to very coarse-gr slightly moist, moderately hard, abundant roo	NCH MEMBER (Tsr): rained, yellowish gray, ots, normal grading.
	3 to 5	Silty Sandstone; fine- to medium-grained, yel moist, moderately hard, massive.	llowish gray, slightly
		Bedding Attitude: @ 3 feet, N70W, 32NE	
		Total Depth at 5 feet. No water, no caving.	

April 11, 2006 Work Order 102453-RT

# TABLE II

Exploratory Pits	Depth (feet)	I Description D	Logged by: CRN Date Logged: 07/05/01
EP-42	0 to 1½	SOIL: Silty Sand; fine- to coarse-grained with dark yellowish brown, dry, loose, abundant ro	h pebbles and cobbles, ots and rootlets.
	1½ to 6	SAUGUS FORMATION – SUNSHINE RAN Silty Sandstone; fine- to medium-grained, mo light brown, slightly moist, hard, ¼ to 3±-inch	CH MEMBER (Tsr): ttled yellowish gray and h beds.
		@ 4 feet; $6\pm$ inch thick carbonaceous layer, bi sulfur deposits.	rownish black, abundant
		Bedding Attitude: @ 4 feet, N65W, 28NE	
		Total Depth 6 feet. No water, no caving.	
EP-43	0 to 1½	SOIL: Sandy Silt; very fine-grained, dark yel slightly moist, soft, abundant rootlets.	lowish brown, dry to
	1½ to 6	SAUGUS FORMATION – SUNSHINE RAN Silty Sandstone; very fine- to fine-grained, pa moist, moderately hard to hard, slightly bedde	ICH MEMBER (Tsr): le olive gray, slightly ed generally massive.
		Bedding Attitude: @ 4 feet, N70W, 45NE	
		Total Depth 6 feet. No water, no caving.	

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-44	0 to 1	<u>SOIL</u> : Sandy Silt to Silty Sand; ver dark yellowish brown, slightly mois rootlets.	ry fine- to fine-grained, moderate to st, soft/loose, abundant roots and
	1 to 5	SAUGUS FORMATION – SUNSH Silty Sandstone; fine- to medium-g layers with pebbles, pale yellowish hard, bedded.	HNE RANCH MEMBER (Tsr): rained with some coarse-grained gray, slightly moist, moderately
		Bedding Attitude: @ 4 feet, N60W	7,43NE
		Total Depth 5 feet. No water, no caving.	
EP-45	0 to 7	<u>ALLUVIUM (Qal):</u> Silty Sand; ver moderate yellowish brown, dry to s moderately dense at depth.	ry fine- to medium-grained, pale to lightly moist at depth, loose to
	7 to 14	Pebbly Sand; medium- to coarse-gr yellowish brown, moist, moderately	ained with cobbles, moderate y dense.
		Total Depth 14 feet. No water, no caving.	

April 11, 2006 Work Order 102453-RT

# TABLE II

Exploratory	Depth	Logged by: CRN
Pits	(feet)	Description Date Logged: 07/05/01
EP-46	0 to 2½	SOIL: Silty Sand; fine- to coarse-grained, dark yellowish brown, dry, loose, abundant roots and rootlets.
	2½ to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone, medium- to coarse-grained with cobbles, yellowish orange, slightly moist, moderately hard to hard, bedded.
		Bedding Attitudes: @ 5 feet, N55W, 36NE @ 8 feet, N40W, 32NE
		Total Depth 9 feet. No water, no caving.
EP-47	0 to 5	<u>COLLUVIUM (Ocol)</u> : Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, dry, loose to moderately dense, abundant roots and rootlets.
	5 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; medium- to coarse-grained with pebbles and cobbles, yellowish gray, slightly moist, moderately hard to hard, slightly layered, generally massive, some scour in fill structures.
		Bedding Attitude – Approximate: @ 8 feet, N50W, 30NE
		Total Depth 9 feet. No water, no caving.

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-101	0 to 2	<u>SOIL</u> : Sandy Silt; fine-, dark yellowish brown, sl: abundant roots, and rootlets.	ightly moist, loose, soft,
	2 to 7	<u>PICO FORMATION (Tp):</u> Clayey Siltstone; pale moist, moderately hard, massive to slightly beddee	yellowish green, slightly d.
		Attitude: Bedding @ 4 feet, N30E 50 SE	
		Total Depth 7 feet.	
EP-102	0 to 7	<u>COLLUVIUM (Qcol)</u> : Sandy Silt to Silty Sand; fi light yellowish brown to yellowish green at depth, abundant roots and rootlets.	ne-grained, moderate to slightly moist, loose,
	7 to 9	<u>PICO FORMATION (Tp):</u> Clayey Siltstone; pale moist, moderately hard, massive to slightly beddee	yellowish green, slightly d, moderately weathered.
		Attitude: Bedding @ 8 feet, N70E 41 SE	
<u></u>		Total Depth 9 feet.	
EP-103	0 to 2	SOIL: Sandy Silt; fine-grained, moderate yellowis loose, abundant roots and rootlets.	sh brown, slightly moist,
	2 to 6	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; fine-g green, dry to slightly moist, moderate hard, massiv highly weathered with abundant roots and rootlets	grained, pale yellowish ve, upper 3 to 4 <u>+</u> feet
		Total Depth 6 feet.	

Log	Depth		Logged: 1-26-04
No.	(ft.)	Description	By: CRN
EP-104	0 to 2	SOIL/COLLUVIUM (Qcol): Clayey Silt; moderat slightly moist, soft, abundant roots and rootlets.	e yellowish brown,
	2 to 7	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; fine-gr green, dry to slightly moist, moderate hard, massive some shell fragments, some roots to depth.	ained, pale yellowish e, weathered $2\pm$ feet,
		Total Depth 7 feet.	
EP-105	0 to 5	<u>COLLUVIUM (Qcol)</u> : Sandy to Claycy Silt; mode pale yellowish green, slightly moist, loose, abundar	rate yellowish brown to at roots and rootlets.
	5 to 8	PICO FORMATION (Tp): Sandy Siltstone; fine-gr green, dry to slightly moist, moderate hard, massiv some shell fragments, some roots to depth.	ained, pale yellowish e, weathered 2 <u>+</u> feet,
		Total Depth 8 feet.	
EP-106	0 to 10	COLLUVIUM (Qcol): Sandy to Clayey Silt; mode pale yellowish green, slightly moist, loose, abundar	rate yellowish brown to at roots and rootlets.
	10 to 12	<u>PICO FORMATION (Tp):</u> Clayey Siltstone; pale moist, moderately hard, massive, moderately weath carbonate.	yellowish green, slightly hered, some white
		Total Depth 12 feet.	

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-107	0 to 1	<u>SOIL:</u> Sandy to Claycy Silt; fine-grained, moderate slightly moist, loose, abundant roots and rootlets.	e yellowish brown,
	1 to 7	<u>PICO FORMATION (Tp)</u> : Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to $\frac{1}{2+}$ inch bedding, top $2+$ feet highly weathered with abundant roots and rootlets, some white carbonate.	
		Attitude: Bedding @ 6 feet, N50E 53NW	
		Total Depth 7 feet.	
EP-108	0 to 1	SOIL: Sandy to Clayey Silt; fine-grained, moderate slightly moist, loose, abundant roots and rootlets.	e ycllowish brown,
	1 to 6	<u>PICO FORMATION (Tp):</u> Silty Sandstone; fine-gr green, slightly moist, moderately hard to hard at de generally massive, upper 2 <u>+</u> feet highly weathered	rained, pale yellowish pth, slightly bedded, with abundant roots.
		Attitude: Bedding @ 5 feet, N10E 56NW	
<u></u>	· · · · ·	Total Depth 6 feet.	
EP-109	0 to 2	<u>SOIL</u> : Sandy to Clayey Silt; fine-grained, moderate slightly moist, loose, abundant roots and rootlets.	e yellowish brown,
	2 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-gr green, slightly moist, moderately hard, laminated to 2± feet highly weathered.	rained, pale yellowish b $\frac{1}{2}$ inch bedding, top
		Attitude: Bedding @ 6 feet, N80E 36NW	
		Total Depth 7 feet.	

April 11, 2006 Work Order 102453-RT

# TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-110	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, in slightly moist, loose, abundant roots and rootle	noderate yellowish brown, ts.
	2 to 8	<u>PICO FORMATION (Tp):</u> Silty to Clayey Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to $\frac{1}{2+}$ inch bedding, top 2+ feet highly weathered.	
		Attitude: Bedding @ 6 feet, E-W 57N	
		Total Depth 8 feet.	
EP-111	0 to 7	<u>COLLUVIUM (Ocol):</u> Silty to Clayey Sand; fi yellowish brown, slightly moist, loose, abunda	ne-grained, dark to moderate nt roots and rootlets.
	7 to 9	<u>PICO FORMATION (Tp):</u> Silty Sandstone; fin grained, pale yellowish green, slightly moist, n bedded, generally massive.	e- with some medium- noderately hard, slightly
		Attitude: Bedding @ 8 feet, N50W 47NE	
		Total Depth 9 feet.	
EP-112	0 to 1	SOIL: Silty Sand to Sandy Silt; fine-grained, mainted states and rootle slightly moist, loose, abundant roots and rootle	noderate yellowish brown, ts.
	1 to 6	PICO FORMATION (Tp): Silty Sandstone; fin green, slightly moist, moderately hard, top 2 to	ne-grained, pale yellowish $3\pm$ feet highly weathered.
		Attitude: Bedding @ 5 feet, N60E 52NE	
		Total Depth 6 feet.	

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# TABLE II

# EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-113	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Silty Sandstone; fine green, slightly moist, moderately hard, slightly b	-grained, pale yellowish edded, generally massive.
		Total Depth 7 feet.	
EP-114	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silty to Clayey Sand; find brown to moderate yellowish brown at depth, sli abundant roots and rootlets.	e-grained, dark yellowish ghtly moist, loose,
	6 to 8	PICO FORMATION (Tp): Silty Claystone; mot reddish brown, moist, firm, generally massive, a	tled olive and moderate bundant white carbonate.
		Attitude: Bedding @ 7 feet, N70W 46NE	
		Total Depth 8 feet.	
EP-115	0 to 3	SOIL: Sandy to Clayey Silt; fine-grained, moder moist, loose, abundant roots and rootlets.	rate yellowish brown,
	3 to 7	<u>PICO FORMATION (Tp):</u> Clayey Sandstone; fi slightly moist to moist, moderately hard, laminat highly weathered with abundant white carbonate	ne-grained, pale olive, ted to massive, top 2 <u>+</u> feet e.
		Attitude: Bedding @ 5 feet, EW33N	
		Total Depth 7 feet.	
EP-116	0 to 2	<u>SOIL</u> : Silty Sand; very fine- to fine-grained, mo moist, loose, abundant roots and rootlets.	derate yellowish brown,
	2 to 9	<u>PICO FORMATION (Tp):</u> Silty Sandstone; very some interbeded, medium- to coarse-grained San yellowish gray, dry to slightly moist, medium ha	y fine- to fine-grained, nd with pebbles, pale ard, generally massive.
		Attitude: Bedding @ 7 feet, E-W 37N	

Total Depth 9 feet.

# TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-117	0 to ½	<u>SOIL</u> : Silty Sand to Sandy Silt; fine-grained, moderate yellowish bro slightly moist, loose, abundant roots and rootlets.	
	½ to 6	<u>PICO FORMATION (Tp)</u> : Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, massive, some shell fragments,	
-		Total Depth 6 feet.	
EP-118	0 to 4	SOIL/COLLUVIUM (Qcol): Silty Sand to Sand moderate yellowish brown, slightly moist, loose rootlets.	ly Silt; fine-grained, e, abundant roots and
	4 to 6	<u>PICO FORMATION (Tp):</u> Clayey Sandstone; f yellowish green, slightly moist, moderate hard, s massive.	inc-grained, moderate slightly bedded, generally
		Attitude: Approximate Bedding @ 5 feet; E-W 2	27N
	<u>.</u>	Total Depth 6 feet.	
EP-119	0 to 2	<u>SOIL</u> : Silty Sand to Sandy Silt; fine-grained, mostightly moist, loose, abundant roots and rootlet	oderate yellowish brown, s.
	2 to 8	<u>PICO FORMATION (Tp)</u> : Clayey Sandstone; fine-grained, moderate yellowish brown, slightly moist, loose, laminated to ¹ / ₂ + inch bedding.	
		Attitude: Bedding @ 6 feet, N70W 55NE	
·····		Total Depth 8 feet.	
EP-120	0 to 5	<u>COLLUVIUM (Qcol)</u> : Silty to Clayey Sand; fir yellowish brown, slightly moist to moist, loose, rootlets.	ne-grained, moderate abundant roots and
	5 to 7	<u>PICO FORMATION (Tp)</u> : Clayey Siltstone; pa moderately hard, massive, top $1\pm$ foot highly we white carbonate.	le olive, slightly moist, eathered with abundant
		Total Depth 7 feet.	

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# TABLE II

Log	Depth		Logged: 1-26-04
<u>No.</u>	(ft.)	Description	By: CRN
EP-121	0 to 1	SOIL: Silty Sand; fine-grained, moderate yellowish loose, abundant roots and rootlets.	1 brown, slightly moist,
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; fine-g slightly moist, moderately hard to hard at depth, ½	gained, pale yellowish, + inch bedding.
		Attitude: Bedding @ 4 feet, E-W 40N	
		Total Depth 6 feet.	
EP-122	0 to 1	SOIL: Silty Sand; fine-grained, moderate yellowish loose, abundant roots and rootlets.	n brown, slightly moist,
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; fine-, moist, moderately hard to hard at depth, laminated	pale yellowish, slightly to $\frac{1}{2}$ inch bedding.
		Attitude: Bedding @ 5 feet, N80E 46NW	
		Total Depth 6 feet.	
EP-123	0 to 1	SOIL: Sandy Silt to Silty Sand; fine-grained, mode slightly moist, loose, abundant roots and rootlets.	erate yellowish brown,
	1 to 7	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; fine-g slightly moist, moderately hard, laminated to $\frac{1}{2+}$ in highly weathered.	rained, pale olive, nch bedding, top 2± feet
		Attitude: Bedding @ 5 feet, N70E 48NW	
		Total Depth 7 feet.	

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN	
EP-124	0 to ½	<u>SOIL:</u> Sandy Silt to Silty Sand; fine-grained, me slightly moist, loose, abundant roots and rootlet	oderate yellowish brown, s.	
	⅔ to 6	<u>PICO FORMATION (Tp)</u> : Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to $\frac{1}{2+}$ inch bedding, top 2+ feet highly weathered.		
		Attitude: Bedding @ 4 feet, N70E 52NE Joint @ 4 feet, N25E Vertical		
<u></u>		Total Depth 6 feet.		
EP-125	0 to 1	SOIL: Sandy Silt to Silty Sand; fine- to coarse-grained with some pebble and cobbles, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.		
	1 to 5	<u>PICO FORMATION (Tp)</u> : Silty Sandstone; fine-grained, pale yellowish grey, dry to slightly moist, moderately hard to hard at depth, some thinly interlayered medium- to coarse-grained Sand lenses, generally massive.		
		Attitude: Bedding @ 4 feet, N80W 52NE		
		Total Depth at 5 feet.		
EP-126	1 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand to Sand moderate yellow brown, slightly moist, loose, a	l, Silt; fine-grained, bundant roots and rootlets.	
	3 to 7	<u>PICO FORMATION (Tp)</u> : Sandy Siltstone; find yellowish green, dry to slightly moist, moderate top $2\pm$ feet highly weathered with abundant whi	e-grained Sand, pale ly hard, ½± inch bedding, ite carbonate.	
		Attitude: Bedding @ 6 feet, N80E 36NW		
		Total Depth 7 feet.		

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-127	0 to 9	<u>COLLUVIUM (Qcol)</u> : Silty Sand to Sand, Silt yellow brown, slightly moist, loose, abundant r	; fine-grained, moderate roots and rootlets.
	9 to 10	<u>PICO FORMATION (Tp):</u> Silty Claystone; olive, moist, moderately firm to firm, some white carbonate.	
		Total Depth 10 feet.	
EP-128	0 to 4	<u>COLLUVIUM/ALLUVIUM (Qcol/Qal)</u> : Silty Sand to Sandy Silt; fine grained, moderate yellow brown, moist, loose to medium dense with depth, some roots and rootlets.	
	4 to 6	<u>PICO FORMATION (Tp):</u> Claystone; olive, m laminated to $1\pm$ inch bedding, slightly plastic, s	ioist, moderately firm, some white carbonate.
		Attitude: Bedding @ 5 feet, N60W 52NE	
<b>~</b>		Total Depth 6 feet.	
EP-129	0 to 5	<u>COLLUVIUM/ALLUVIUM (Qcol/Qal)</u> : Silty grained with some basal cobbles, moderate yel medium dense with depth, some roots and root	Sand to Sandy Silt; fine- low brown, moist, loose to lets.
	5 to 7	<u>PICO FORMATION (Tp):</u> Claystone; olive, m laminated to $1\pm$ inch bedding, slightly plastic, s	noist, moderately firm, some white carbonate.
		Attitude: Bedding @ 6 feet, N60W 42NE	
		Total Depth 7 feet.	

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### TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-130	0 to 1	SOIL: Silty Sand to Sandy, Silt; fine-grained, mod slightly moist, loose, abundant roots and rootlets.	lerate yellow brown,
	1 to 7	<u>PICO FORMATION (Tp)</u> : Sandy Siltstone to Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to $\frac{1}{2}$ inch bedding, top 2 to 3 $\pm$ feet highly weathered with some roots and rootlets.	
		Attitude: Bedding @ 6 feet, N30E 33NW	
		Total Depth 7 Feet.	
EP-131	0 to 1½	<u>SOIL</u> : Silty Sand to Sandy, Silt; fine-grained, mod slightly moist, loose, abundant roots and rootlets.	lerate yellow brown,
	1½ to 6	<u>PICO FORMATION (Tp) (south side of pit)</u> : Silty olive and moderate yellowish brown, slightly mois laminated to $1\pm$ inch bedding, highly jointed/fracta rootlets to depths.	<ul> <li>Claystone; mottled</li> <li>st, moderately hard,</li> <li>ured, some roots and</li> </ul>
		Attitude: Bedding @ 5 feet, N40E 48NW	
		FAULT (2 to 3+ inches thick zone): Silty Sand; fine-grained, pale grey, dry, loose, some roots.	
		Attitude: Fault @ 5 feet, N60W Vertical	
	1½ to 6	<u>PICO FORMATION (Tp) (north side of pit)</u> : Silty grained, layered pale grey and pale olive, slightly 1 to $6\pm$ inch bedding, top $2\pm$ feet moderately weat	<ul> <li>Sandstone; fine- moist, moderately hard, hered.</li> </ul>
		Attitude: Bedding @ 5 feet, N60W Vertical	
		Total Depth 6 feet.	

# **EXPLORATORY PITS**

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-132	0 to 1	SOIL: Clayey Silt; moderate yellow brown, slight roots, rootlets and white carbonate.	ly moist, loose, abundant
	1 to 7	<u>PICO FORMATION (Tp)</u> : Interbedded Silty Claystone; mottled olive and moderate yellowish brown, slightly moist, moderately hard, laminated to $1\pm$ inch bedding; with Silty Sandstone, fine-grained, pale olive, slightly moist, moderately hard, 2 to $3\pm$ inch bedding, top $3\pm$ inch bedding, top $3\pm$ feet highly weathered.	
		Attitudes: Bedding @ 5 feet, N60W Vertical Bedding @ 6 feet, N30W Vertical	
		Total Depth 7 feet.	
EP-133	0 to ½	SOIL: Clayey Silt; moderate yellow brown, slight roots, rootlets and white carbonate.	ly moist, loose, abundant
	½ to 6	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; very pale yellowish green, slightly moist, moderately h inch bedding, top $2\pm$ feet highly weathered with a some white carbonate.	fine- to fine-grained, ard, laminated to $1\pm$ bundant rootlets and
		Attitude: Bedding @ 5 feet, N60E 69NW	
		Total Depth 6 feet.	
EP-134	0 to 3	SOIL: Clayey Silt with Sand; fine-grained, moder slightly moist, loose, abundant roots, rootlets and	ate yellow brown, white carbonate.
	3 to 5	PICO FORMATION (Tp): Silty Sandstone; fine- grey, dry, moderately hard, massive, abundant she	to coarse-grained, pale Hs.
	5 to 8	Silty Claystone; mottled olive and moderate yellow moderately hard, slightly bedded generally massiv	w brown, slightly moist, e.
		Attitude: Bedding @ 7 feet, N50W 58NE	
		Total Depth 8 feet.	

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Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-135	0 to 2½	<u>SOIL</u> : Sandy Silt; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	2½ to 7	<u>PICO FORMATION (Tp):</u> Silty Sandstone; moderate yellow brown, slightly moist, loose, top 2± feet highly weathered with roots and rootle	
		Attitude: Bedding @ 6 feet, N60W 49NE	
		Total Depth 7 feet.	
EP-136	0 to 1	SOIL: Sandy Silt; fine-grained, moderate yellow b moist, loose, abundant roots and rootlets.	rown, dry to slightly
	1 to 8	<u>PICO FORMATION (Tp):</u> Silty Claystone; moder slightly moist, loose, top $3\pm$ feet highly weathered, some interbedded Silty Sandstone, fine-grained, pa yellowish grey, dry, moderately hard, 1 to $2\pm$ inch	ate yellow brown, with roots and rootlets; le to moderate bedding.
		Attitude: Bedding @ 7 feet, N40W 72SW	
		Total Depth 8 feet.	
EP-137	0 to 5	SOIL/COLLUVIUM (Qcol): Sandy Silt to Silty Samoderate yellow brown, dry to slightly moist, loos rootlets.	and; fine-grained, e, abundant roots and
	5 to 12	<u>PICO FORMATION (Tp)</u> : Silty Claystone; moder slightly moist, loose, top $3\pm$ feet highly weathered, some interbedded Silty Sandstone, fine-grained, pa yellowish grey, dry, moderately hard, 1 to $2\pm$ inch	ate yellow brown, , with roots and rootlets; ile to moderate bedding.
		Attitude: Bedding @ 11 feet, N50W 52NE	
		Total Depth 12 feet.	

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-138	0 to 7	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure.	
		Attitude: Bedding @ 6 feet, N40W 37NE	
		Note: Soil removed by dozer during recent fire fig	hting operations.
		Total Depth 7 feet.	
EP-139	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with peb moderate yellowish brown, slightly moist, loose, s	bles and cobbles, come roots and rootlets.
	½ to 5	SAUGUS FORMATION-SUNSHINE RANCH M Sandstone; fine- to coarse-grained with pebbles an yellowish brown to pale grey, slightly moist, mode bedded generally massive with some scour fill stru	<u>fEMBER (Tsr):</u> Silty ed cobbles, pale crately hard, slightly ecture.
		Attitude: Approximate Bedding @ 4 feet E-W 30N	
/ <u></u>	·····	Total Depth 5 feet.	
EP-140	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pel moderate yellowish brown, slightly moist, loose, s	obles and cobbles, some roots and rootlets.
	½ to 6	SAUGUS FORMATION-SUNSHINE RANCH M Sandstone; fine- to coarse-grained with pebbles ar yellowish brown to pale grey, slightly moist, mode bedded generally massive with some scour fill stru	<u>fEMBER (Tsr):</u> Silty nd cobbles, pale erately hard, slightly neture.
		Attitude: Bedding @ 5 feet, N80E 28NW	
		Total Depth 6 feet.	

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### TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-141	0 to 3	SOIL: Silty to Clayey Sand; very fine- to medium pebbles, dark yellowish brown, moist, soft, some	n-grained with some roots and rootlets.
	3 to 8	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Gravelly Sandstone; fine- to coarse-grained with pebbles and cobbles, some boulders up to $18\pm$ inches, pale yellowish brown, slightly moist, moderately hard, massive, matrix supported, top $2\pm$ feet highly weathcred	
		Total Depth 8 feet.	
EP-142	0 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand; fine- to pebbles and cobbles, moderate to dark yellow bro roots and rootlets.	coarse-grained with own, moist, loose some
	3 to 9	SAUGUS FORMATION-SUNSHINE RANCH Gravelly Sandstone; fine- to coarse-grained with yellowish grey to pale grey, slightly moist, mode interlayered pebbles and cobbles lenses.	MEMBER (Tsr): pebbles and cobbles, pale rately hard, massive with
		Attitude: Bedding @ 8 feet, E-W 33N	
		Total Depth 9 feet.	
EP-143	0 to ½	SOIL: Silty Sand; fine- to medium-grained, mod- slightly moist, loose, some roots and rootlets. Note: Some soil removed during recent fire fight	erate yellowish brown, ing operations.
	½ to 6	SAUGUS FORMATION-SUNSHINE RANCH Sandstone; fine- to medium-grained, pale grey, s hard, slightly bedded generally massive.	MEMBER (Tsr): Silty lightly moist, moderately
		Attitude: Bedding @ 4 feet, N60W 32NE	
		Total Depth 6 feet.	

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# TABLE II

# **EXPLORATORY PITS**

_	Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
	EP-144	0 to 5	5 <u>SOIL/COLLUVIUM (Qcol)</u> : Silty Sand; fine- to medium-grained, moderate yellow brown, slightly moist to moist, loose, abundant roo rootlets.	
		5 to 9	SAUGUS FORMATION-SUNSHINE RANCH Sandstone; fine- to coarse-grained, pale grey, sh hard, massive with some interlayered pebble and Attitude: Bedding @ 7 feet, N70W 32NE	<u>MEMBER (Tsr):</u> Pebbly ightly moist, moderately d cobbles lenses.

Total Depth 9 feet.

### TABLE I

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# EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-201	0 to 2	SOIL: Sandy Clay; dark yellowish brown, slightly m common, clusters of small bi-valve shells.	oist, finn, rootlets
	2 to 9	SAUGUS FORMATION - SUNSHINE RANCH ME Siltstone; light olive gray with reddish brown stain, d fractured, weathered.	<u>MBER (Tsr):</u> Sandy ry, soft, highly
	@ 9	Fine- to medium-grained Sandstone, pinkish gray, sol some pebbles, probable cross-bed.	ft, poorly cemented,
		Bedding Attitude: N65E, 28NW	
		Total Depth 9 feet.	
EP-202	0 to 2	SAUGUS FORMATION - SUNSHINE RANCH ME to medium-grained Sandstone, pinkish gray, dry, soft small cobbles.	<u>MBER (Tsr):</u> Fine- , many pebbles and
	2 to 5	Sandy Siltstone, pale yellowish brown, slightly moist fractured, rootlet to depth.	, soft, moderately
	5 to 6	Sandstone, pinkish gray, dry, soft.	
		Bedding Attitude: N55W, 35NE	
		Total Depth 6 feet.	
EP-203	0 to 2	SOIL: Sandy Silt; dark yellowish brown, slightly mo pebbles.	bist, stifī, mæny
	2 to 4 ¹ / ₂	SAUGUS FORMATION - SUNSHINE RANCH ME to medium-grained Sandstone, pinkish gray, slightly cemented.	<u>EMBER (Tsr)</u> : Fine- moist, soft, poorly
	4½ to 7	Siltstone, light olive gray, slightly moist, soft to mode	erately hard.
		Bedding Attitude: N80E, 45NW	
		Total Depth 7 feet.	

# EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-204	0 to 6½	SAUGUS FORMATION - SUNSHINE RANCH MEM coarse-grained Sandstone, soft to moderately hard, dry, pebble and small cobble beds and lenses.	<u>IBER (Tsr):</u> Fine- to poorly cemented,
		Bedding Attitude: EW, 40N	
		Total Depth 6½ feet.	
EP-205	0 to 2	SOIL: Silty Clay; dark yellowish brown, moist, stiff, p	orous.
	2 to 10	SAUGUS FORMATION - SUNSHINE RANCH MEM Siltstone, light olive gray, slightly moist, soft to moder	<u> </u>
	@6&8	white carbonate pods common.	
	-	Silty Sandstone; very light olive gray, slightly moist, m 12 inch thick interbeds.	oderately hard, 6 to
		Bedding Attitude: N85W, 30NE	
		Ring and Bulk samples at 6 and 10 feet.	
		Total Depth 8 feet.	
EP-206	0 to ¼	SOIL: Sandy Silt; moderate yellowish brown, dry, firm	n, porous.
	¼ to 5	SAUGUS FORMATION - SUNSHINE RANCH MEN medium-grained Sandstone, pinkish gray, dry, soft to n poorly cemented, roots to depth.	<u>ABER (Tsr):</u> Fine- to noderately hard,
	@ 3	8 to 10-inch thick Silty Sandstone-pebble conglomerate dry, soft, one small cobble.	e, grayish orange,
		Bedding Attitude: N70W, 45NE	
		Total Depth 5 feet.	

### TABLE I

# EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-207	0 to ½	SOIL: Sandy Silt; dark yellowish brown, moist, firm	, abundant rootlets.
	½ to 3½	PICO FORMATION (Tp): Silty Sandstone; very pal yellowish gray, slightly moist, soft, red brown stain c	e orange to ommon.
		Bedding Attitude: N55W, 40NE	

Total Depth 3½ feet.

# SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

ELEVATION: SEE PLATE 1

# BORING LOG NO. B-1

FILE NO .: GC14-122536

DATE: 02/09/15

METH	HOD:	6-inc	h Hollow	Stem A	uger					DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW	COUNT			SIE	EVE		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOG	
0	SPT		2	2.8					N.j	ALLUVIUM - Qal - (0' - 60')
	SPT		5	6.9					× 1	pebbles, moist, loose.
-		х	13	10.0	9.4	98.9				5' - Medium brown very fine-grained silty sand, slightly moist, loose.
•	SPT		6	8.3					.ŝj	7.5' - Light to medium brown very fine-grained silty sand, damp, slightly firm.
10	SPT		12	16.6					1	10' - Medium brown fine- to medium-grained sand, slightly damp, slightly firm.
-	SPT		4	5.5					· ./	12.5' - 15' - Medium to dark brown very fine-grained silty sand, slightly
-	SPT		4	5.5					. Ti	damp, slightly firm.
-		х	13	10.0	9.7	100.6			· ·	
-	SPT		5	6.9					.1:	17.5' - 20' - Dark brown very fine-grained silty sand, slightly damp, firm.
20	SPT		15	20.7						
-	SPT		32	44.2					fire.	22.5' - 25' - Medium brown fine- to coarse grained sand containing
-	edt		35	19.3						pebbles, slightly damp, firm.
	J	l v	57	40.5	83	104 3			l. • •	firm
-	SPT	L^	34	46.9	0.0	104.0				
30	SPT		32	44.2					j.,	
-	SPT		32	44.2					30	32.5' - Cobble/boulder
	SPT		39	53.8			1		5.	35' - 40' - Medium brown fine- to medium-grained silty sand dry firm
		x	59	45.2	9.2	106.7			1.1	oo - 40 - Mediani brown inte- to mediani-grained sitty saild, dry, intri.
-	SPT		43	59.3					1	
40	SPT		40	55.2					1 · = ·	40' - Medium to dark brown fine-grained silty sand containing gravel, slightly
	-			100			1		0.0	moist, dense
	SPT	1	35	48.3					ω.	42.5' - 45' - Medium brown very fine- to medium-grained clayey to silty sand
3									1.~~	slightly moist, firm.
5	SPT		35	48.3	70	110.			5	47.51 Madium braun can Gan to and the sector in the
	SPT	^	32	41.5	1.8	110.4			. Inca	aler. 5 - Medium brown very tine- to medium-grained silty sand, humid, firm.
50	SPT		37	51.1					1	50' - 55' - Medium brown fine- to coarse-grained gravely sitty sand
100	SPT		46	63.5					0.4	humid, firm.
-									00	
•	SPT	1	40	55.2						55' - 60' - Medium brown fine- to coarse-grained silty gravelly sand, humid,
•		X	64	49.1	7.6	113.3			io :0	firm.
-	SPT		46	63.5					-0-0	
60	<b>SPT</b>		44	60.7		1			1.1	End at 60'
Col	mme	ents	: Ine	Discoulowin	ng cor	rection	n tac	tors	were ut	This is a second s
	CD	= 1	. 15 (8"	Diame	eter Bo	prenole	e); C	/S =	1.2 (SP	Sampler without liner); Cs = 2/3 (California Sampler)
NO	tes:	1	OTAL	DEPTH	: 60'	GRO	JUN	DWA	TER: N	D REFUSAL/CAVING: NO BACKFILLED: YES
										PLATE 2.1

# SUB-SURFACE DATA

ELEVATION: SEE PLATE 1

METHOD: 6-inch Hollow Stem Auger

SAMPLE BLOWCOUNT

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

SIEVE

# BORING LOG NO. B-2

FILE NO .: GC14-122536 DATE: 02/09/15 DRILLING CO .: HD DRILLING DESCRIPTION AND REMARKS

TH (FT)	~	(1)	(N)	l(60)	sture %	SITY	ASSING	SCREEN	оніс гоо				
EP.	SULF	NNN NNN	Ē	2	NOI	DEN	% P/	200	RAF				
		<u> </u>						#		ALLUVIUM - Qal - (0' - 60')			
-	SPT		7	9.7					34	2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.			
-		1							N.,				
-	SPT		9	12.4					~ 1	5' - Medium brown very fine-grained silty sand, humid, slightly firm.			
-		x	18	13.8	11.4	98.2			•				
-	SPT		6	8.3					÷	7.5' - Medium brown very fine-to fine-grained silty sand, humid, slightly firm.			
10	SDT	l	6	83					Ľ	10' - Dark brown very fine- to fine-grained silty sand humid slightly firm			
-	SFI		0	0.5					6.	To a Dark brown very line to line-granico sity sand, namid, signey linn.			
-	SPT		7	9.7					11	12.5' - 15' - Medium brown very fine- to fine-grained silty sand, humid,			
-	SPT		5	6.9			l		1 CV -	loose to slightly firm.			
-		х	18	13.8	10.7	104.7			7				
-	SPT		11	15.2			l		1	17.5' - 27.5' - Dark brown very fine-grained silty sand, humid, slightly firm.			
-									_[-1				
20	SPT		18	24.8		ļ	II.		e				
-				20.4					1				
-	SPI		22	30.4			1		7.5				
-	SPT		28	38.6					1				
-		x	48	36.8	10.3	107.3	1			27.5' Medium to dark brown fine- to very coarse-grained silty sand			
-	SPT		28	38.6					1.1.				
30	SPT		29	40.0			N.		Nº Si	30' - 32.5' - Dark brown to medium reddish brown fine- to coarse-grained			
-									0:	silty sand containing pebbles to gravel, humid, firm.			
-	SPT		27	37.3			-		0.2				
-										35' - Medium brown fine- to medium-grained silty sand, slightly moist, firm.			
-	SPT		29	40.0			-		15.				
-		X	55	42.2	8.2	112.8			1.15	37.5' - 40' - Medium reddish brown fine- to very coarse-grained pebbly			
-	SPT		42	58.0	ll –				0, 0',	silty sand, humid, dense.			
40	SPT		36	49.7					1.0.3				
-	I CDT		20	52.4	ll l					12 El Madium brown your final to final grained aloyay to silty cond			
	JSP1		30	52.4					Eir	42.5 - Medium blown very line- to line-grained clayey to sitty sand,			
	SPT		40	55.2	8				5.5	45' - Medium reddish brown fine- to very coarse-grained pebbly to gravelly			
-		x	68	52.1	8.4	118.0			0.0	sand, slightly moist, dense,			
-	SPT		37	51.1					. 0 .				
50	SPT		39	53.8						47.5' - 50' - Dark brown very fine- to fine-grained clayey to silty sand,			
-	1				1				5-1-1	-slightly moist, firm.			
-	SPT	1	56	77.3						52.5' - 60' - Medium brown fine- to coarse-grained pebbly to gravelly sand,			
× 1					ï –	1	1		.0.	humid, dense.			
-	SPI		50	for 6"					0.2				
-	lepi	-	50	for 6"	1	1	1		1:5				
60	SPI		0	101 0					0	End at 60'			
Co	comments: The following correction factors were utilized to determine N(60) (Per SP117)												
	Cb = 1.15 (8" Diameter Borehole); $Cs = 1.2$ (SPT Sampler without liner); $Cs = 2/3$ (California Sampler)												
Not	lotes: TOTAL DEPTH: 57.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES												
										PLATE 2.2			

# SUB-SURFACE DATA

# BORING LOG NO. B-3

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/09/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING DESCRIPTION AND REMARKS SAMPLE BLOWCOUNT SIEVE 200 SCREEN **GRAPHIC LO** (FT) PASSING Z MOISTURE N(60) IELD ( DENSITY DEPTH BULK RING % 0 ALLUVIUM - Qal - (0' - 60') . SPT 4 2.5' - 5' - Medium to dark brown very fine- to fine-grained silty sandy clay 5.5 1. Y containing pebbles, moist, slightly firm. SPT 3 1.1 5' - 15' - Dark brown very fine-grained silty sand, humid, loose. -4.1 х 11 102.0 -8.4 15.9 SP' 4 5.5 10 SPT 4 5.5 2 SPT 3 4.1 --SPT 11 15.2 15' - Medium brown fine- to medium-grained silty sand, humid, slightly firm. .l... 105.8 34 26.1 х 5.5 17.5' - 30' - Medium brown fine- to coarse-grained silty sand, humid, dense. .Y. -SPT 18 24.8 1. 1 .F SPT 20 17 23.5 SPT 28 38.6 -SPT 27 37.3 -. х 48 36.8 6.0 115.4 SPT 27 37.3 -; . 30 SPT 25 34.5 30' - Medium brown very fine- to fine-grained silty sand, humid, firm. (~··· SPT 27 37.3 _ 32.5' - Medium to dark brown fine- to coarse-grained silty sand containing 0:0 gravel, humid, dense. SPT 55 FOR 6" 35' - Cobble/boulder -15 х -51 39.1 8.3 114.3 37.5' - 42.5' - Medium brown very fine- to fine-grained silty sand, humid, firm. SPT 32 44.2 . 21 40 SPT 35 48.3 1 -1 -SPT 43 59.3 42.5' - 47.5' - Medium brown fine- to medium-grained silty sand containing • • 0 gravel, humid, dense. .... SPT 32 44.2 . O. х 57 43.7 5.6 116.2 O SPT 34 46.9 1. SPT 50 37 r.k 51.1 50' - Medium brown fine-grained silty sand, humid, dense. 1. 5 SPT 33 45.5 52.5' - Medium brown very fine- to fine-grained clayey to silty sand, slightly moist, firm. SPT 60 82.8 55' - 60' - Medium reddish brown fine- to very coarse-grained silty sand, -.. х 82 62.9 4.3 126.2 humid, dense. 15 SPT 67 FOR 6" -11 60 SPT 64 FOR 5" End at 60' Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) TOTAL DEPTH: 60' Notes: **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES



# SUB-SURFACE DATA

BORING LOG NO. B-4

FILE NO .: GC14-122536

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

DATE: 02/10/15

METI	HOD: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING													
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS				
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOO					
0 -	SPT		8	11.0					- 1 . 4  	ALLUVIUM - Qal - (0' - 50') 2.5' - Dark brown fine- to coarse-grained silty sand, slightly moist, firm.				
- - -	SPT SPT	x	7 26 13	9.7 19.9 17.9	9.4	83.9				5' - 17.5' - Light to medium brown very fine- to fine-grained sand, dry, firm.				
- 10	SPT		12	16.6					: ./.					
	SPT SPT SPT	x	8 13 20 8	11.0 , 17.9 15.3 11.0	8.6	93.0				17.5' - Dark brown very fine- to fine-grained clayey to silty sand, slightly				
20	SPT SPT		16 22	22.1 30.4					131 1.	moist, slightly firm. 20' - Dark brown very fine- to fine-grained silty sand, humid, loose to slightly firm. 22.5' - 25' - Medium brown very fine- to fine-grained clayey to silty sand,				
30	SPT SPT SPT	x	27 48 25 24	37.3 36.8 34.5 33.1	12.0	104.4			13.1.1.1.1	27.5' - 30' - Medium brown fine- to coarse-grained clayey to silty sand, humid to slightly moist, firm.				
- - - - 40	SPT SPT SPT SPT	x	27 24 46 34 29	37.3 33.1 35.3 46.9 40.0	8.3	111.0			Fritte Street	32.5' - 35' - Medium brown fine- to very coarse-grained clayey to silty sand, humid to slightly moist, firm. 37.5 ' - 50' - Medium brown to medium reddish brown fine- to very coarse- grained silty sand, humid, dense.				
- - - 50 -	SPT SPT SPT SPT	x	36 50 50 fr 50 fr 70	49.7 69.0 or 6" or 6" 96.6	6.7	114.6			1.1.1	End at 50'				
60			Th											
Jon	Ch ·	וונ <b>S:</b> = 1 י	15 (8" r	Jiamet	er Por	reholo	ract	ors $v$	vere uti	Ized to determine N(60) (Per SP117)				
Not	tes: TOTAL DEPTH: 50' GROUNDWATER: NO REFUSAL (CAVING: NO RACKET LED VED													
						5110	2110			DIATE 04				
										PLATE 2.4				

# SUB-SURFACE DATA

N(60)

2.8

5.5

13.0

8.3

9.7

11.0

11.0

18.4

16.6

20.7

22.1

23.5

24.5

31.7

27.6

33.1

49.7

77.3

92.5

ELEVATION: SEE PLATE 1

(FT)

DEPTH BULK RING

0

-

-

-

10 SPT

-

-SPT

. 20 SPT

-

-

-

-SPT

-

-SPT

30 SPT

-

-

-

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40

_

--_ 50 SPT

SPT -

SPT .

SPT

SPT -

SPT

SPT

SPT -

SPT

SPT

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х

х

х

METHOD: 6-inch Hollow Stem Auger

SAMPLE BLOWCOUNT

(z)

FIELD

2

4

17

6

7

8

8

24

12

15

16

17

32

23

20

24

36

56

67

50 for 6"

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

MOISTURE

9.7

7.5

2.8

5.1

SIEVE

% PASSING

DENSITY

105.8

99.4

108.9

117.6

200 SCREEN

LOO

GRAPHIC

11

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213

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humid, firm.

1

#### BORING LOG NO. **B-5**

FILE NO .: GC14-122536 DATE: 02/11/15 DRILLING CO .: HD DRILLING DESCRIPTION AND REMARKS ALLUVIUM - Qal - (0' - 40') 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose. 5' - Medium to dark brown very fine- to fine-grained silty sand, humid to slightly moist, slightly firm. 7.5' - 17.5' - Medium brown to dark brown fine- to medium-grained silty sand, humid, loose to slightly firm.

17.5' - Medium brown very fine- to fine-grained silty sand, humid, firm

20' - 25' - Light to medium brown very fine- to fine-grained silty sand, humid, firm.

25' - Medium brown fine- to medium-grained silty sand, humid, firm.

30' - 40' - Light to medium brown fine- to very coarse-grained silty sand containing gravel, humid, dense very dense.

25' - 30' - Medium brown fine- to very coarse-grained silty sand,

.10 in' 40' - Refusal (Saugus Formation ?) End at 40'

-												
60												
Con	nme	nts:	The f	ollowin	g corr	rection	factors w	vere uti	lized to determine N(60) (Per	SP117)		_
	Cb :	= 1.1	5 (8" I	Diamet	er Bo	rehole	); Cs = 1	.2 (SPT	Γ Sampler without liner); Cs :	= 2/3 (California	Sampler)	
Note	es:	TC	DTAL D	DEPTH:	40'	GRO	UNDWAT	ER: NO	REFUSAL/CAVING: NO	BACKFILLED:	YES	_
										PLATE	2.5	

# SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

### ELEVATION: SEE PLATE 1

# BORING LOG NO. B-6

FILE NO.: GC14-122536 DATE: 02/10/15

DATE. 02/10/15

SAMPLE         BLOWCOUNT         SIEVE         DESCRIPTION AND REMARKS           Image: Construction of the system of the	
Li       X       Image	
0       -       SPT       2       2.8         -       SPT       10       13.8       4.9       96.9         -       SPT       10       13.8       -       5' - 10' - Light brown very fine- to fine-grained silty sand, humid, firm.         -       SPT       10       13.8       -       -       5' - 10' - Light brown very fine- to fine-grained silty sand, humid, firm.         -       SPT       13       17.9       -       -       -         -       SPT       6       8.3       -       -       -         -       SPT       6       8.3       -       -       -         -       SPT       9       12.4       -       -       -         -       SPT       6       8.3       -       -       -         -       SPT       9       12.4       -       -       -         -       SPT       12       16.6       -       -       -         -       SPT       27       37.3       -       -       -       -         -       SPT       25       34.5       -       -       -       -         -       -       -<	
<ul> <li>SPT</li> <li>SPT</li> <li>10</li> <li>13.8</li> <li>SPT</li> <li>10</li> <li>13.8</li> <li>SPT</li> <li>9</li> <li>12.4</li> <li>SPT</li> <li>9</li> <li>12.4</li> <li>SPT</li> <li>6</li> <li>8.3</li> <li>7.5</li> <li>99.8</li> <li>10' - Dark brown very fine- to fine-grained silty sand, humid, firm.</li> <li>10' - Dark brown very fine- to fine-grained silty sand, humid, firm.</li> <li>10' - Dark brown very fine- to fine-grained silty sand, humid, firm.</li> <li>10' - Dark brown very fine- to fine-grained silty sand, humid, firm.</li> <li>12.5' - Dark brown very fine- to fine-grained clayey to silty sand, humid, 15' - Medium to dark brown fine- to medium-grained silty sand, humid, 15' - Medium to dark brown very fine- to medium-grained silty sand, humid, 15' - Medium brown very fine- to medium-grained silty sand, humid, 17.5' - 35' - Medium brown very fine- to medium-grained silty sand, humid, firm.</li> <li>SPT</li> <li>SPT</li> <li>12</li> <li>16.6</li> <li>SPT</li> <li>20</li> <li>SPT</li> <li>22</li> <li>SPT</li> <li>23</li> <li>34.5</li> </ul>	
SPT       10       13.8       4.9       96.9         SPT       10       13.8       4.9       96.9         SPT       9       12.4       10       13.8         SPT       9       12.4       10' - Dark brown very fine- to fine-grained silty sand, humid, firm.         SPT       13       17.9       10' - Dark brown very fine- to fine-grained clayey to silty sand, humid, firm.         SPT       6       8.3       7.5       99.8         SPT       9       12.4       10' - Dark brown very fine- to fine-grained clayey to silty sand, humid, firm.         SPT       6       8.3       7.5       99.8         SPT       9       12.4       10' - Dark brown very fine- to fine-grained clayey to silty sand, humid, firm.         SPT       9       12.4       10' - Medium to dark brown fine- to medium-grained silty sand, humid, firm.         SPT       9       12.4       12       16.6         SPT       27       37.3       34.5       10' - SPT         SPT       25       34.5       10' - SPT       10' - SPT	,
-       SPT       X       22       16.9       4.9       96.9         -       SPT       9       12.4       10       13.8       10' - Dark brown very fine- to fine-grained silty sand, humid, firm.         -       SPT       13       17.9       13       17.9         -       SPT       6       8.3       7.5       99.8         -       SPT       9       12.4       10' - Dark brown very fine- to fine-grained clayey to silty sand, humid, 15' - Medium to dark brown fine- to medium-grained silty sand, humid, 15' - Medium to dark brown very fine- to medium-grained silty sand, humid, slightly firm.         -       SPT       12       16.6         -       SPT       27       37.3         -       SPT       25       34.5	
-       SPT       10       13.8       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - </td <td></td>	
-       9       12.4         -       SPT       13       17.9         -       SPT       6       8.3         -       SPT       6       8.3         -       SPT       18       13.8       7.5         9       12.4       99.8       12.5' - Dark brown very fine- to fine-grained clayey to silty sand, humid, 15' - Medium to dark brown fine- to medium-grained silty sand, humid, slightly firm.         -       SPT       9       12.4         -       9       12.4       99.8         -       SPT       12       16.6         -       -       -       -         -       SPT       27       37.3         -       SPT       25       34.5	
10       SPT       9       12.4         -       SPT       13       17.9         -       SPT       6       8.3         -       SPT       6       8.3         -       X       18       13.8       7.5       99.8         -       SPT       9       12.4       12.5' - Dark brown very fine- to fine-grained clayey to silty sand, humid, firm.         -       SPT       9       12.4       13.8       7.5       99.8         -       SPT       9       12.4       16.6       17.5' - 35' - Medium brown very fine- to medium-grained silty sand, humid, firm.         -       SPT       12       16.6       -       -       -         -       SPT       27       '37.3       -       -       -         -       SPT       25       34.5       -       -       -	
-       SPT       13       17.9         -       SPT       6       8.3         -       SPT       18       13.8       7.5         -       SPT       9       12.4       15' - Medium to dark brown fine- to medium-grained silty sand, humid, slightly firm.         -       SPT       12       16.6       -         -       SPT       27       37.3       -         -       SPT       25       34.5       -	
-       SPT       6       8.3         -       X       18       13.8       7.5       99.8         -       SPT       9       12.4       15' - Medium to dark brown fine- to medium-grained silty sand, humid, slightly firm.         20       SPT       12       16.6       17.5' - 35' - Medium brown very fine- to medium-grained silty sand, humid, slightly firm.         -       SPT       27       37.3       -         -       SPT       25       34.5       -	firm
-       X       18       13.8       7.5       99.8       humid, slightly firm.         -       SPT       9       12.4       12.4       17.5' - 35' - Medium brown very fine- to medium-grained silty sand, humid, slightly firm.         20       SPT       12       16.6       17.5' - 35' - Medium brown very fine- to medium-grained silty sand, humid, slightly firm.         -       SPT       27       '37.3       14         -       SPT       25       34.5       14	
-       SPT       9       12.4         -       SPT       12       16.6         -       SPT       27       '37.3         -       SPT       25       34.5	
-     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     -     - <td>nid,</td>	nid,
- SPT 27 37.3 - SPT 25 34.5	
- SPT 27 '37.3 - SPT 25 34.5	
- SPT 25 34.5	
- SPT 25 34.5	
- X 46 35.3 6.1 103.8	
- SPT 38 52.4	
30 SF1 31 42.8	
- SPT 33 45.5	
·	
- SPT 47 64.9	
- X 62 47.5 6.0 104.2	
- SPT 36 49.7	
40 SP1 35 48.3	,
- SPT 39 53.8	
- SPT 37 51.1	
- X 66 50.6 6.4 104.8	
- SPT 39 53.8	
- Slightly moist dense	ind,
- SPT 34 46.9	
- SPT 33 45.5	
- X 62 47.5 23.9 106.1 57.5' - Dark brown fine- to coarse-grained clayey to silty sand, moist, d	ense.
- SPT 37 51.1	dense.
Comments: The following correction factors were utilized to determine N(m) (Por SP117)	
Cb = 1.15 (8" Diameter Borehole); $Cs = 1.2$ (SPT Sampler without liner); $Cs = 2/3$ (California Sampler)	A
Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	
PLATE 26	

# **GOLD COAST GEOSERVICES, INC.** SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

ELEVATION: SEE PLATE 1

# BORING LOG NO. B-7

FILE NO.: GC14-122536 DATE: 02/11/15

MET	HOD:	6-inc	h Hollov	/ Stem A	Auger					DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC	
0	SPT		4	5.5					Xi	ALLUVIUM -Qal - (0' - 60') 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-	SDT		1	1.4					2	
	SFI	x	15	1.4	9.4	88.9			TY	5° - 20° - Medium brown very fine- to fine-grained silty sand, humid, slightly firm
-	SPT		7	9.7					÷	
- 10	SPT		10	13.8					-1	
-	<b>ODT</b>			12.4					· /.	
	SPT		9	83					~	
		х	16	12.3	8.2	90.6			1.	
-	SPT		6	8.3						
20	SPT		6	8.3						20' - Medium brown fine- to coarse-grained silty sand, humid, firm.
-	SPT		23	31.7					1.1	·
-	ODT			20.4					1.	
	591	~	52	30.4	9.1	104.4			- 2'm	25' - Medium brown fine-grained silty sand, humid, slightly firm.
	SPT	^	49	67.6	0.1	104.4			· · · · · ·	27.5' 35' Medium reddich brown fing, to yong generat grained aged
30	SPT		54	74.5					13	containing gravel dry dense
-									:1:	
•	SPT		32	44.2					10.1.	
-	SPT		26	35.9						35' - Medium to dark brown very fine- to fine-grained clavey to silty sand
-		х	30	23.0	11.3	103.4			1.1	slightly moist, slightly firm.
-	SPT		30	41.4					121-	
40	SPT		35	48.3						37.5' - 45' - Medium brown fine- to very coarse-grained pebbly to gravelly
1	SPT		39	53.8					10.10	sand, dry, dense.
	12		1						St.	the second as a second second second second
-	SPT	2.1	30	41.4		1.1			1.5.5	45' - 50' - Dark brown fine- to coarse-grained clayey to silty sand containing
•		X	29	22.2	9.9	116.7			10	pebbles, slightly moist, firm to dense.
-	SPI	11	31	42.8			6		10.0	
-	SPI	110	44	60.7					See total	50' - 60' - Medium reddish brown fine- to coarse-grained pebbly to gravelly
-	SPT		50 f	or 6"	ll –				0 T	Sity sund, signify molet, dense.
-									1.0	
-	SPT		63	86.9					1'0	
-	X		50 f	or 6"	3.5	110.0				
-	SPT		50 f	or 6"					- 82	60' - Rock/boulder
Cor	1961	nto	50 f	ollowin		in chieve	fact			End at 60'
COL	Ch	= 1	15 (8")	Diamet	ig cori	rebala			vere uti	lized to determine $N(60)$ (Per SP117)
Not	00	- 1. T		JEDTU.		GRO	), C		-2 (SP	
1101		1			. 00	GRU		WAI	ER: NC	REFUSAL/CAVING: NU BACKFILLED: YES
										PLATE 2.7

# SUB-SURFACE DATA

METHOD: 6-inch Hollow Stem Auger

SAMPLE BLOWCOUNT

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

SIEVE

#### BORING LOG NO. **B-8**

FILE NO .: GC14-122536 DATE: 02/12/15 DRILLING CO .: HD DRILLING

### DESCRIPTION AND REMARKS

<b>DEPTH (FT)</b>	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC	
0 -	SPT		5	6.9						ALLUVIUM - Qal - (0' - 60') 2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose.
-									24	
-	SPT	x	12	16.6	71	00.2		1		5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly
	SPT	^	15	20.7	1.1	09.3			- 7	nun,
-									5 %	×
10	SPT		10	13.8					1.	
-	ODT		10						- '	
-	SPT		13	17.9					- F.	
		x	28	21.5	4.8	101 2			2.	
	SPT		16	22.1	4.0	101.2			· ·	
			10	22.1					12	
20	SPT		21	29.0						20' - Medium reddish brown fine- to medium-grained silty sand, humid
-									1:1:	dense.
-	SPT		30	41.4					X	
-									6	,
-	SPT		22	30.4					incine.	25' - Medium reddish brown fine- to very coarse-grained pebbly sand,
-		x	42	32.2	5.1	107.8			0,0	humid, dense.
-	SPT		24	33.1						27.5' - Medium brown fine- to medium-grained silty sand, humid, dense.
30	SPT		-28	38.6					20	30' - 47.5' - Medium reddish brown fine- to very coarse-grained pebbly to
-									1	gravelly silty sand, humid, dense.
	SPT		37	51.1					10.1	
-				1				- 1	1.6	
-	SPT		28	38.6						
-		x	50	38.3	5.9	109.5			101	
	SPT		27	37.3					:7	
40	SPT	11	35	48.3						
-							l		01	
-	SPT		36	49.7					~	
-									1.	
-	SPT		31	42.8					• Al	
-		X	50 f	or 6"	7.1	110.0	1		. 1	
-	SPT		50	69.0						47.5' - 55' - Medium reddish brown fine- to very coarse-grained silty sandy
50	SPT		46	63.5					0.	clay containing gravel, moist, dense.
-	SDT		62	000					20	
-	571		03	80.9			-		-	
	SPT		01	125 6						EEL COL Madium area fina to madium and a land to the line of the
	x		50 f	or 6"	······				51	55 -00 - wedium gray fine- to medium-grained sandy clay, slightly moist, dense.
									1.5	
60									1	End at 60'
Con	nme	nts:	The f	ollowin	g corr	ection	fact	ors w	/ere uti	ized to determine N(60) (Per SP117)
	Cb	= 1.1	15 (8" [	Diamet	er Bo	rehole	); Cs	5 = 1	.2 (SP1	Sampler without liner): $Cs = 2/3$ (California Sampler)
Not	es:	Т	DTAL D	EPTH	60'	GRO	UND	WAT		
						0.00	2110	Al		
										PLATE 2.8

# SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

# BORING LOG NO. B-9

FILE NO .: GC14-122536

METHOD:         Server biolow         DRILLING           SAMPLE         BLOWCOUNT         Structure         Structure         DESCRIPTION AND REMARKS           SAMPLE         Subconcount         Structure         Structure         DESCRIPTION AND REMARKS           Sample         Structure         Structure         Structure         DESCRIPTION AND REMARKS           Server         Structure         Structure         Structure         DESCRIPTION AND REMARKS           Sample         1         1.4         Structure         Structure         DESCRIPTION AND REMARKS           Server         Structure         Structure         Structure         Structure         DESCRIPTION AND REMARKS           Server         1         1.52         Structure         Structure         Structure         Structure           Server         9         12.4         Structure         Structure         Structure         Structure           Server         9         12.4         Structure         Structure         Structure         Structure         Structure           Server         10         13.8         101.3         Structure         Structure         Structure         Structure           Server         11         15.2         Struc	ELE\	ATIC	N:	SEE PL	ATE 1						DATE: 02/11/15
SAMPLE         BLOWCOUNT         SIEVE         DESCRIPTION AND REMARKS           LE         X $\frac{2}{\sqrt{3}}$ $\frac{1}{\sqrt{3}}$	MET	HOD:	6-inc	h Hollow	v Stem A	uger					DRILLING CO.: HD DRILLING
Lipson         SPT         Image: SPT		SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS
0       SPT       1       1       1.4       1.4       1.5       1.1       1.5.2       2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.         10       SPT       9       12.4       1.1       1.5.2       3.1       1.1.3       1.5.2       1.1.4       1.5.2       1.1.5.2       3.1       1.1.3       1.5.2       1.1.4       1.5.2       1.1.5.2       3.1       1.1.5.2       3.1       1.1.5.2       1.1.5.2       1.1.5.2       1.1.5.2       1.1.5.2       1.1.5.2       1.1.5.2       1.2.5' - Medium to dark brown fine- to coarse-grained silty sand, dry, firm.       1.5.2' - 20' - Medium to dark brown fine- to coarse-grained silty sand, humid, firm.       1.5' - 20' - Medium to dark brown fine- to coarse-grained silty sand, humid, firm.       1.5' - 20' - Medium to dark brown very fine- to medium-grained silty sand, humid, firm.         -       SPT       2.2       3.0.4       1.4       1.9.3       1.1.5'       1.5' - 4.5'       1.5' - 4.5'       1.5' - 4.5'       1.5' - 20' - Medium to dark brown very fine- to medium-grained silty sand, humid, firm.       1.5' - 20' - Medium reddish brown very fine- to medium-grained silty sand, humid, firm.       1.5' - 4.5' - 3.5' - 4.5' - 3.5' - 4.5' - 3.5' - 4.5' - 3.5' - 4.5' - 3.5' - 4.5' - 3.5' - 4.5' - 3.5' - 4.5' - 3.5' - 4.5' - 3.5' - 4.5' - 3.5' - 4.5' - 3.5' - 4.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5.5' - 5	DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC	
SPT       11       15.2         SPT       11       15.2         SPT       9       12.4         SPT       11       15.2         SPT       9       12.4         SPT       9       12.4         SPT       11       15.2         SPT       9       12.4         SPT       11       15.2         SPT       9       12.4         SPT       14       19.3         SPT       22       30.4         SPT       22       30.4         SPT       22       30.4         SPT       30       41.4       5.7         SPT       30       41.4       5.7         SPT       30       41.4       5.7         SPT       30       54.4       5.7         SPT       35       58.5         SPT       44       60.7         SPT       44       60.7	0	SPT		1	1.4					1.	ALLUVIUM - Qal - (0' - 47.5') 2 5' - Dark brown very fine- to fine-grained silty sand, slightly moist, losse
1       1       1       15.2         3       34       26.1       6.3       101.3         3       37       9       12.4         3       9       12.4       11       15.2         3       9       12.4       11       15.2         3       9       12.4       11       15.2         3       9       12.4       11       15.2         3       9       12.4       12.5' - Medium to dark brown fine- to coarse-grained silty sand, dry, firm.         15       20       SPT       14       19.3         3       SPT       22       30.4       4.1         SPT       21       29.0       4.4       105.6         30       SPT       22       30.4       4.4       5.7       111.3         SPT       35       53.6       52.4       105.6       105.6       105.6         SPT       35       53.6       52.4       105.6       105.6       105.6       111.3         SPT       35       53.6       52.4       111.3       5.7       111.3       111.4       5.7       111.3         SPT       58       58       52.4 </td <td>-</td> <td></td> <td></td> <td></td> <td>1.4</td> <td></td> <td></td> <td></td> <td></td> <td>21</td> <td>2.3 - Dark blown very line- to line-grained sity sand, signity moist, loose.</td>	-				1.4					21	2.3 - Dark blown very line- to line-grained sity sand, signity moist, loose.
SPT       X       34       26.1       6.3       101.3         SPT       9       12.4       11       15.2         SPT       26       19.9       7.7       104.4         SPT       11       13.8       7.7       104.4         SPT       22       30.4       105.6       105.6         SPT       25       34.5       111.3       111.3         SPT       30       61.4       105.6       111.3         SPT       30       51.6       7       111.3         SPT       30       51.8       7       111.3         SPT       30       52.8       7       112.2         SPT       50 for 6" </td <td>-</td> <td>SPT</td> <td></td> <td>11</td> <td>15.2</td> <td></td> <td></td> <td></td> <td></td> <td>$\sim$</td> <td>5' - 12.5' - Light to medium brown very fine- to fine-grained silty sand, dry, firm.</td>	-	SPT		11	15.2					$\sim$	5' - 12.5' - Light to medium brown very fine- to fine-grained silty sand, dry, firm.
10       SPT       9       12.4         110       SPT       9       12.4         12.5' - Medium to dark brown fine- to coarse-grained silty sand, dry, firm.         15       SPT       X       26         10       13.8       7.7       104.4         110       13.8       7.7       104.4         110       13.8       7.7       104.4         12.5' - Medium to dark brown fine-grained silty sand, humid, firm.       15' - 20' - Medium to dark brown time-grained silty sand, humid, firm.         12.5' - Medium reddish brown very fine- to medium-grained silty sand, humid, firm.       12.5' - 35' - Medium reddish brown very fine- to medium-grained silty sand, humid, firm.         12.5' - 35' - Medium reddish brown very fine- to medium-grained silty sand, humid, firm.       12.5' - 35' - Medium reddish brown very fine- to medium-grained silty sand, humid, firm.         12.5' - 35' - Medium reddish brown very fine- to coarse-grained clayey to silty sand, humid, firm.       35' - 45' - Dark brown very fine- to coarse-grained clayey to silty sand, alighty moist, firm.         135' - 45' - Dark brown very fine- to medium-grained sandy clay to clayey sand, moist, very dense.       36' - Medium gray very fine- to medium-grained sandy clay to clayey sand, moist, very dense.         14'       50 for 6''       5.8       112.2       112.2         15' - 50 for 6''       5.8       112.2       112.2 <td>-</td> <td>SPT</td> <td>×</td> <td>34</td> <td>26.1</td> <td>6.3</td> <td>101.3</td> <td></td> <td></td> <td>1.</td> <td></td>	-	SPT	×	34	26.1	6.3	101.3			1.	
10       SPT       9       12.4         SPT       10       13.8         SPT       10       13.8         SPT       10       13.8         SPT       14       19.3         SPT       22       30.4         SPT       25       34.5         SPT       30       41.4         SPT       30       41.4         SPT       30       41.4         SPT       30       41.4         SPT       30       50.675         SPT       38       52.4         SPT       44       60.7         SPT       50.675       5.8         SPT       50.675       5.8         SPT       50.675       5.8         SPT	-										
SPT SPT SPT SPT SPT       11 2 9       152 124 26       7.7       104.4         SPT SPT SPT SPT       14 19:3       19.9 10       7.7       104.4         SPT SPT SPT SPT SPT SPT SPT SPT SPT SPT	10	SPT		9	12.4					T,	
SPT       1       10.2         SPT       2       19       12.4         SPT       10       13.8       7.7       104.4         20       SPT       14       19.3       22.5' - 35' - Medium to dark brown fine-grained silty sand, humid, firm.         20       SPT       22       30.4       4.1       105.6         SPT       21       29.0       4.1       105.6         SPT       25       34.5       4.1       105.6         SPT       25       34.5       4.1       11.3         SPT       25       34.5       4.1       5.7         SPT       30       41.4       5.7       111.3         SPT       30       41.4       5.7       111.3         SPT       35       45' - Dark brown very fine- to coarse-grained clayey to silty sand, slightly moist, firm.       35' - 45' - Dark brown very fine- to coarse-grained clayey to silty sand, slightly moist, firm.         SPT       36       5.8       112.2       5.8         SPT       44       60.7       5.8       112.2         SPT       50 for 5"       5.8       112.2       5.1         SPT       50 for 5"       5.8       112.2       5.1	-	SPT		11	15.2					1	12.5' - Madium to dark brown find, to control argined allhy agend, day firm
-       SPT       X       28       19.9       7.7       104.4         20       SPT       14       19.3       -       -       -         20       SPT       14       19.3       -       -       -         20       SPT       22       30.4       -       -       -         30       SPT       21       29.0       -       -       -         30       SPT       22       30.4       -       -       -         30       SPT       25       34.5       -       -       -         30       SPT       25       34.5       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -<	-	SPT		9	12.4					<b>```</b>	15' - 20' - Medium to dark brown fine-grained silty sand, humid, firm.
-       SPT       10       13.8         20       SPT       14       19.3         -       SPT       22       30.4         -       SPT       24       33.1         -       50 for 5"       6.4       105.6         -       SPT       22       30.4         -       SPT       22       30.4         -       SPT       25       34.5         -       SPT       25       34.5         -       SPT       25       34.5         -       SPT       25       34.5         -       SPT       30       41.4         -       SPT       30       41.4         -       SPT       30       41.4         -       SPT       30       41.4         -       SPT       30       57       111.3         -       SPT       44       60.7       -       -         -       SPT       44       60.7       -       -         -       SPT       -       47       64.9       -         -       SPT       -       50 for 6"       5.8       112.2	-		x	26	19.9	7.7	104.4			1	
20       SPT       14       19.3         SPT       22       30.4         SPT       24       33.1         50       50       50"         SPT       25       34.5         21       29.0         22       30.4         SPT       22       30.4         SPT       25       34.5         SPT       25       34.5         SPT       25       34.5         SPT       25       34.5         SPT       38       52.4         SPT       38       52.4         SPT       44       60.7         SPT       50 for 6"       5.8         SPT       50 for 6"       5.8         SPT       72       9.4         SPT       50 for 5"       5.8         SP	-	SPT		10	13.8					51.	
SPT       22       30.4         SPT       24       33.1         50 for 5"       6.4       105.6         SPT       21       29.0         30       SPT       22         30       SPT       22         30       SPT       22         30       41.4         SPT       25         30       41.4         SPT       30         SPT       35'-45' - Dark brown very fine- to coarse-grained clayey to silty sand, silghtly moist, firm.         35'-45' - Dark brown very fine- to coarse-grained clayey to silty sand, silghtly moist, firm.         40       SPT         SPT       44         SO for 6"       5.8         SPT       50 for 6"         SPT       50 for 5"         SO for 5"       5.8         SPT       50 for 5"         SPT       50 for 5"         SO for 5"       5.8         SPT       50 for 5"         SPT       50 for 5"	- 20	SPT		14	19.3					T	
-       SPT       22       30.4         -       SPT       24       33.1         -       SPT       24       33.1         -       SPT       21       29.0         30       SPT       22       30.4         -       SPT       22       30.4         -       SPT       22       30.4         -       SPT       22       34.5         -       SPT       30       41.4         -       SPT       30       41.4         -       SPT       30       41.4         -       SPT       38       52.4         -       SPT       38       52.4         -       SPT       38       52.4         -       SPT       44       60.7         -       SPT       444       60.7         -       SPT       50 for 6"       5.8         SPT       -       47       64.9         -       SPT       -       47         -       SPT       50 for 5"       5.8         SPT       -       -       -         SPT       -       -       -	-				10.0					· ]	
-       SPT       24       33.1       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - </td <td>-</td> <td>SPT</td> <td></td> <td>22</td> <td>30.4</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>22.5' - 35' - Medium reddish brown very fine- to medium-grained silty sand,</td>	-	SPT		22	30.4						22.5' - 35' - Medium reddish brown very fine- to medium-grained silty sand,
x       50 for 5"       6.4       105.6         sPT       21       29.0         30       SPT       22       30.4         -       SPT       25       34.5         -       SPT       25       34.5         -       SPT       30       41.4         -       SPT       30       41.4         -       SPT       33       52.4         -       SPT       38       52.4         -       SPT       44       60.7         -       SPT       44       60.7         -       SPT       44       60.7         -       SPT       50 for 6"       5.8       112.2         -       SPT       72       99.4       -         -       SPT       50 for 5"       -       -	-	SPT		24	33.1						humid, firm.
sprt       21       29.0         30       Sprt       22       30.4         sprt       25       34.5         sprt       30       41.4         sprt       39       53.8         40       Sprt       38       52.4         sprt       38       52.4         sprt       44       60.7         sprt       44       60.7         sprt       50 for 6"       5.8       112.2         sprt       50 for 5"       5.8       112.2         sprt       50 for 5"       5.8       112.2         sprt       50 for 5"       5.8       112.2         sprt       50 for 4"       50 for 5"       50 for 5"         sprt       50 for 5"       50 for 5"       50 for 5"         sprt       50 for 5"       50 for 5"       50 for 5"		Ŭ	x	50 f	or 5"	6.4	105.6			-1	
30       SPT       22       30.4         -       SPT       25       34.5         -       SPT       30       41.4         -       SPT       30       41.4         -       SPT       30       41.4         -       SPT       39       53.8         30       SPT       38       52.4         -       SPT       44       60.7         -       SPT       44       60.7         -       SPT       50 for 6"       5.8       112.2         -       SPT       72       99.4       5.8       112.2         -       SPT       50 for 5"       5.8       112.2         -       -       -       -       -       -         -       SPT       50 for 5"       -       -       -         -       SPT       50 for 5"       -	-	SPT		21	29.0		100.0			5	
-       SPT       25       34.5         -       SPT       30       41.4       5.7         -       SPT       30       41.4       5.7         -       SPT       39       53.8       35' - 45' - Dark brown very fine- to coarse-grained clayey to silty sand,         -       SPT       38       52.4       -         -       SPT       38       52.4       -         -       SPT       38       52.4       -         -       SPT       44       60.7       -         -       SPT       50 for 6"       5.8       112.2         -       SPT       50 for 5"       5.8       112.2         -       -       -       -       -       SAUGUS FORMATION - Ts - (47.5' - 57.5') - Medium gray medium- to very coarse grained clayey sand, moist, very dense.         -       -       -       -       -       -         -       -       -       -       -       - <t< td=""><td>30</td><td>SPT</td><td></td><td>22</td><td>30.4</td><td></td><td></td><td></td><td></td><td>· ·</td><td></td></t<>	30	SPT		22	30.4					· ·	
-       SPT       25       34.5         -       SPT       30       41.4       5.7         -       SPT       39       53.8       35' - 45' - Dark brown very fine- to coarse-grained clayey to silty sand,         -       SPT       38       52.4       35' - 45' - Dark brown very fine- to coarse-grained clayey to silty sand,         -       SPT       38       52.4       35' - 45' - Dark brown very fine- to coarse-grained clayey to silty sand,         -       SPT       38       52.4       44         -       SPT       44       60.7       50 for 6"         -       SPT       50 for 6"       5.8       112.2         -       SPT       50 for 5"       5.8       112.2         -       SPT       50 for 4"       -       -         -       SPT       50 for 5"       5.8       112.2         -       -       -       -       -       -         -       SPT       50 for 5"       -       -       -         -       -       -       -       -       -       -         -       -       -       -       -       -       -         -       - <td< td=""><td></td><td></td><td>10</td><td>1</td><td>1.1.1</td><td></td><td></td><td></td><td></td><td>1.</td><td></td></td<>			10	1	1.1.1					1.	
SPT       X       30       41.4       5.7       111.3         SPT       39       53.8       38       52.4         SPT       38       52.4       50       52.4         SPT       44       60.7       5.8       112.2         SPT       50 for 6"       5.8       112.2         SPT       50 for 5"       50 for 5"       50 for 5"         SPT       50 for 5"       50 for 5"       50 for 5"         SPT       50 for 5"       50 for 5"       50 for 5"         SPT       50 for 5"       50 for 5"       50 for 5"         SPT       50 for 5"       50 for 5"       50 for 5"         SPT       50 for 5"       50 for 5"       50 for 5"         SPT       50 for 5"       50 for 5"       50 for 5"         SPT       50 for 5"       50 for 5"       50 for 5"         SPT       50 for 5"       50 for 5"       50 for 5"         SPT       50 for 5"       50 for 5"       50 for 5"         SPT       50 for 5"       50 for 5"       50 for 5"         SPT       50 for 5"       50 for 5"       50 for 5"         SPT       50 for 5"       50 for 5"       50 for 5"<	•	SPT		25	34.5					. (	
30       41.4       5.7       111.3         SPT       39       53.8         40       SPT       38       52.4         SPT       44       60.7         SPT       44       60.7         SPT       44       60.7         SPT       5.8       112.2         SPT       5.8       112.2         SPT       50 for 6"       5.8         SPT       50 for 5"         SPT       50		SPT		30	41.4					1	251 ASI Dark house in a fact to a second state in the second state in the
-       SPT       39       53.8       -       -       signifully moles, intrin.         -       SPT       38       52.4       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - <td></td> <td>SFI</td> <td>x</td> <td>54</td> <td>41.4</td> <td>57</td> <td>111 3</td> <td></td> <td></td> <td>101</td> <td>35 - 45 - Dark brown very fine- to coarse-grained clayey to silty sand,</td>		SFI	x	54	41.4	57	111 3			101	35 - 45 - Dark brown very fine- to coarse-grained clayey to silty sand,
40       SPT       38       52.4         -       SPT       44       60.7         -       SPT       47       64.9         -       SPT       50 for 6"       5.8         -       SPT       50 for 6"       5.8         -       SPT       72       99.4         -       SPT       50 for 4"       -         -       SPT       50 for 5"       -         -       -       -       -         -       -       -       -         -       -       -       -         -       -       -       -         -       -       -       -         -       -       - <td>2</td> <td>SPT</td> <td>~</td> <td>39</td> <td>53.8</td> <td>0.7</td> <td>111.5</td> <td></td> <td></td> <td>1.</td> <td>signuy moist, inm.</td>	2	SPT	~	39	53.8	0.7	111.5			1.	signuy moist, inm.
-       SPT       44       60.7         -       SPT       47       64.9         -       SPT       50 for 6"       5.8         -       SPT       50 for 6"       5.8         -       SPT       50 for 5"         50       SPT       72       99.4         -       SPT       50 for 4"         -       SPT       50 for 5"         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       - </td <td>40</td> <td>SPT</td> <td></td> <td>38</td> <td>52.4</td> <td></td> <td>1</td> <td></td> <td></td> <td>1</td> <td></td>	40	SPT		38	52.4		1			1	
-       SPT       44       60.7         -       SPT       47       64.9         -       SPT       50 for 6"       5.8         -       SPT       50 for 5"         50       SPT       72       99.4         -       SPT       50 for 5"         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -										1	
-       SPT       X       47       64.9         -       SPT       50 for 6"       5.8       112.2         -       SPT       50 for 5"       50 for 5"         50       SPT       72       99.4         -       SPT       50 for 4"       -         -       SPT       50 for 5"       -         -       -       -       -         -       -       -       -         -       -       -       -         -       -       -       -         -       -       -       -         -       -       -       -         -       -       -       -         -       -       -       -         -	۰.	SPT		44	60.7					2.	
-     X     50 for 6"     5.8     112.2       -     SPT     50 for 5"     5.8     112.2       50     SPT     72     99.4     99.4       -     SPT     50 for 4"     -       -     SPT     50 for 5"     -       -     SPT     50 for 5"     -       -     SPT     50 for 5"     -       -     SPT     50 for 5"     -       -     SPT     50 for 5"     -       -     SPT     50 for 5"     -		SPT		47	64.9					1 1	45' - Medium dray year fine- to medium-prained eardy alou to alougy acad
-       SPT       50 for 5"         50       SPT       72       99.4         -       SPT       50 for 4"         -       SPT       50 for 5"         -       -       -         -       SPT       50 for 5"         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       -       -         -       - <td>-</td> <td></td> <td>x</td> <td>50 f</td> <td>or 6"</td> <td>5.8</td> <td>112.2</td> <td></td> <td></td> <td>~'-</td> <td>moist, very dense</td>	-		x	50 f	or 6"	5.8	112.2			~'-	moist, very dense
50         SPT         72         99.4           -         SPT         50 for 4"         -           -         SPT         50 for 5"         -           -         SPT         50 for 5"         -           -         -         -         -		SPT	2	50 f	or 5"						SAUGUS FORMATION - Ts - (47.5' - 57.5') - Medium gray medium- to very coarse.
- SPT 50 for 4" - SPT 50 for 5" - SPT 50 for 5" 	50	SPT		72	99.4	1				:2:	grained clayey sand, moist, very dense.
- SPT 50 for 5" End at 57.5'		SDT		50.6	or 4"		0 000			1	and the second second second second second second second second second second second second second second second
- SPT 50 for 5" End at 57.5'				501						· . "	
	-	SPT		50 f	or 5"						End at 57.5'
	-										
	- 60										
Comments: The following correction factors were utilized to determine N(60) (Per SP117)	Con	nme	nts:	The f	ollowin	g corr	rection	facto	ors v	vere uti	lized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)		Cb :	= 1.1	15 (8" [	Diamet	er Bo	rehole	); Cs	s = 1	.2 (SP	Sampler without liner); Cs = 2/3 (California Sampler)
Notes: TOTAL DEPTH: 55' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	Not	es:	T	OTAL D	DEPTH:	55'	GRO	UND	WAT	ER: NO	REFUSAL/CAVING: NO BACKFILLED: YES


### SUB-SURFACE DATA

### BORING LOG NO. B-10

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

FILE NO .: GC14-122536 DATE: 02/12/15

MET	HOD:	6-inc	h Hollow	v Stem A	uger					DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW	COUNT			SIE	EVE		DESCRIPTION AND REMARKS
<b>DEPTH (FT)</b>	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOG	
0	SPT		14	19.3					1.1	ALLUVIUM - QaI - (0' - 27.5') 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, firm.
	SPT		31	42.8						5' - 17.5' - Medium brown fine- to coarse-grained silty sand dry firm
-		x	37	28.4					P	
-	SPT		12	16.6					1	
10	SPT		12	16.6					51	
-	SPT		14	19.3			1		:	
	SPT		14	19.3						
-		x	35	26.8	4.8	97.2			. 1.4	
-	SPT		16	22.1					17	
-									3.	

-	SPI		14	19.3			
-		X	35	26.8	4.8	97.2	- 1 1
-	SPT		16	22.1			57
-							
20	SPT		13	17.9			20' - 22.5' - Medium brown fine- to coarse-grained pebbly silty sand, dry,
-							dense.
-	SPT		43	59.3			
-			ļ				
-	SPT		44	60.7			22.5' - 27.5' - Light to medium brown very fine- to fine-grained silty sand, dry
-		x	75	57.5	4.3	115.3	slightly firm.
-	SPT		50 f	or 4"			SAUGUS FORMATION - Ts - (27.5' - 30') - Medium brown fine- to very coarse-
30	SPT	-	50 f	or 2"			Y unrained silty sand dry very dense
				1			End at 30'
							End at 50
			1		1		
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50							
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-							
60			L	L			
Cor	nme	nts:	Thef	ollowin	g corr	ection	factors were utilized to determine N(60) (Per SP117)
	Cb :	= 1.	15 (8"	Diamet	er Bo	rehole	); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)
Not	es:	T	OTAL I	DEPTH:	30'	GRO	UNDWATER: NO REFUSAL/CAVING: NO BACKELLED: YES

		1.1.20	
PL	ATE	2.	10

### SUB-SURFACE DATA

### BORING LOG NO. B-11

FILE NO .: GC14-122536

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FLEVATION SEE DLATE 1

ELEVAT	TION:	SEE PL	ATE 1						DATE: 02/17/15			
METHO	D: 6-inc	h Hollow	v Stem A	uger					DRILLING CO.: HD DRILLING			
SA	MPLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS			
DEPTH (FT) BUI K	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC				
0 - SF - SF - SF - SF - SF - SF - SF - 300        -	PT X PT X PT PT	5 12 43 22 50 fr 50 fr 50 fr	6.9 16.6 33.0 30.4 or 4" or 6" or 4"	6.8	109.7	fact			ALLUVIUM - Qai - (0' - 10') 2.5' - Dark brown very fine- to fine-grained silty sand, sightly moist, loose. 5' - Medium gray very fine- to medium-grained clayey to silty sand, slightly moist, firm. 7.5' - Medium reddish brown fine- to medium-grained silty sand, dry, dense. SAUGUS FORMATION - Ts - (10' - 17.5') 10' - Medium brown fine- to very coarse-grained silty sand, dry, dense. 12.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly moist, dense. 15' - 17.5' - Light to medium gray very fine-grained silty clay, moist, very stiff.			
C	b = 1.	15 (8" I	Diamet	er Boi	rehole	); Cs	s = 1	.2 (SPT	lized to determine N(60) (Per SP117) Sampler without liner): Cs = 2/3 (California Sampler)			
Notes	: T	OTAL	DEPTH	17.5'	GR		DWA	TER: N	IO REFUSAL/CAVING: NO BACKFILLED: YES			
									PLATE 2.11			

### SUB-SURFACE DATA

### BORING LOG NO. B-12 PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/18/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING

	SAM	PLE			SIE	VE		DESCRIPTION AND REMARKS		
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOO	
0 	SPT SPT SPT	x nts:	6 19 72 50 fd 50 ft	8.3 26.2 55.2 or 5" or 3"	6.2	117.9 ection	fact	Ors w	vere uti	ALLUVIUM - QaI - (0' - 7.5') - Medium reddish brown very fine- to fine-grained silty sand, slightly moist slightly firm. SAUGUS FORMATION - Ts - (7.5' - 10') - Medium brown fine-grained silty sand, humid, very dense. End at 10'
	Cb	= 1.1	15 (8" [	Diamet	er Bo	rehole	); Cs	s = 1	.2 (SP1	Sampler without liner); Cs = 2/3 (California Sampler)
Not	es:	Т	OTAL D	DEPTH:	10'	GRO	UND	WAT	ER: NO	REFUSAL/CAVING: NO BACKFILLED: YES

P	LATE	2.1	2

### SUB-SURFACE DATA

### BORING LOG NO. B-13

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/18/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS **GRAPHIC LOD** 200 SCREEN Z PASSING (FT) MOISTURE N(60) DENSITY FIELD DEPTH BULK RING % 0 ALLUVIUM - Qal - (0' - 15') SPT 6 8.3 2.5' - 5' - Medium reddish brown very fine- to fine-grained silty sand, humid, -firm. . SPT 9 12.4 Х 33 25.3 10.9 93.8 -SPT 17 -23.5 7.5' - 10' - Medium brown fine- to medium-grained silty sand to sandy silt, 1 humid, firm. 10 SPT 11 15.2 54 12.5' - 15' - Medium brown fine- to coarse-grained silty sand, dry, firm. SPT 15.2 -11 . SPT 40 55.2 SAUGUS FORMATION - Ts - (15' - 17.5') - Medium brown fine- to medium-grained Х 50 for 6" _ 8.1 silty sand to sandy clay, slightly moist, very dense. SPT 50 for 3" -End at 17.5' -20 --30 -40 -50 -60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES



### SUB-SURFACE DATA

#### BORING LOG NO. **B-14**

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

DATE: 02/17/15

FILE NO .: GC14-122536

	INC	00	

METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT DESCRIPTION AND REMARKS SIEVE **GRAPHIC LOG** IELD (N) 200 SCREEN % PASSING DEPTH (FT) MOISTURE N(60) DENSITY BULK RING II. 0 ALLUVIUM - Qal - (0' - 12.5') 1 SPT 6 8.3 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose. ~ SPT 9 -12.4 5' - Light to medium brown very fine-grained silty sand, humid, slightly firm. 33 . х 25.3 8.0 97.9 21 SPT 17 23.5 7.5' - 12.5' - Medium brown very fine- to fine-grained silty sand to sandy silt, . < humid, dense. 11 SPT 10 11 15.2 -: SPT 50 for 6" SAUGUS FORMATION - Ts - (12.5' - 20') - Medium brown fine- to medium-grained . SPT 50 for 5" clayey to silty sand, humid to slightly moist, dense. х 50 for 6" 13.8 97.7 • -SPT 50 for 3" ·'`~ 20 SPT 50 for 4" End at 20' 30 40 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 20' GROUNDWATER: NO **REFUSAL/CAVING: NO** BACKFILLED: YES



### SUB-SURFACE DATA

#### BORING LOG NO. B-15

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/17/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS MOISTURE % 200 SCREEN GRAPHIC LOO DEPTH (FT) PASSING FIELD (N) N(60) DENSITY BULK RING % 0 ALLUVIUM - Qal - (0' - 7.5') ~ 7 1.6 SPT 9.7 -2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose. SPT 7 9.7 -5' - Light to medium brown very fine-grained silty sand, humid, slightly firm. 11. 0 Х 50 for 5" 7.5 98.2 SPT 69 -95.2 SAUGUS FORMATION - Ts - (7.5' - 20') 17 -7.5' - 17.5' - Medium brown very fine- to fine-grained silty sand to sandy silt, 1 10 SPT 50 for 4" humid, very dense. 7: SPT -50 for 5" SPT -50 for 5" х 50 for 4" 13.2 100.0 1 SPT -50 for 5" : .- -20 SPT 50 for 4" 20' - Medium brown fine- to medium-grained clayey to silty sand, humid to slightly moist, very dense. -End at 20' -_ -30 ----40 ---50 ----. 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) TOTAL DEPTH: 20' Notes: **GROUNDWATER: NO** REFUSAL/CAVING: NO BACKFILLED: YES



### SUB-SURFACE DATA

#### BORING LOG NO. B-16

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/17/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS 200 SCREEN **GRAPHIC LOD** PASSING DEPTH (FT) ŝ MOISTURE N(60) DENSITY FIELD ( BULK RING % 0 ALLUVIUM - Qal - (0' - 15') 2 SPT 8 11.0 2.5' - Medium to dark brown very fine- to fine-grained silty sand, slightly moist, loose. SPT 9 12.4 5' - 10' - Medium brown very fine- to fine-grained silty sand, dry, firm. la 52 39.9 X 7.1 104.9 26 . SP 35.9 10 SPT 20 27.6 6 20 SPT 27.6 -12.5'- 15' - Light to medium brown very fine- to fine-grained silty sand to SPT 50 for 5" sandy silt, slightly moist, dense. х 50 for 5" 107.4 12.6 SAUGUS FORMATION - Ts - (15' - 22.5') - gray siltstone. SPT -50 for 3" 20 SPT 50 for 4" SPT 50 for 2" End at 22.5' ---30 -40 . 50 . . 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) TOTAL DEPTH: 22.5' Notes: GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.16

### SUB-SURFACE DATA

#### BORING LOG NO. B-17

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/18/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS **GRAPHIC LOO** 200 SCREEN DEPTH (FT) % PASSING FIELD (N) MOISTURE N(60) DENSITY BULK RING 0 ALLUVIUM - Qal - (0' - 5') SPT 5 6.9 2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose. . SPT 15.2 -11 SAUGUS FORMATION - Ts - (5' - 15') х 68 10.0 14 ÷ 52.1 98.1 5' - 7.5' - Medium to dark brown fine- to medium-grained silty sand, humid, slightly firm. 1. ... . 7.5' - 15' - Medium brown fine- to medium-grained silty to sandy clay, humid, - ----10 SPT 28 38.6 very dense. 77 . 1.1 -SPT 56 77.3 7.2 SPT -50 for 5" End at 15' -. 20 ----. 30 ---40 -. -50 . . . -• 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 15 GROUNDWATER: NO **REFUSAL/CAVING: NO** BACKFILLED: YES

2.17 PLATE

### SUB-SURFACE DATA

### BORING LOG NO. B-18

PROJEC	OJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536											
ELEVAT	ION	1:	SEE PL	ATE 1						DATE: 02/18/15		
METHO	D: 6	-incl	h Hollow	Stem A	uger							
SA	MP	LE	BLOW	COUNT			SIE	VE	1	DESCRIPTION AND REMARKS		
<u> </u>	Τ		<u> </u>		%		()	Ϋ́.	8			
DEPTH (FT BULK		RING	FIELD (N	N(60)	MOISTURE	DENSITY	% PASSING	# 200 SCRE	GRAPHIC L			
0         0           0         SF           -         SF	nen	∞x	LL 10 15 50 fc 50 fc 50 fc 50 fc	13.8 20.7 or 6" or 3" or 3"	8.2	a 105.0	facto	prs w = 1		ALLUVIUM - Qal - (0' - 7.5') 2.5' - Dark brown very fine- to fine-grained silty sand, moist, slightly firm. 5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense. SAUGUS FORMATION - Ts - (7.5' - 10') - Dark brown fine- to coarse-grained silty sand, slightly moist, very dense. End at 10' fized to determine N(so) (Per SP117) Sempler without liner): Ce = 2/3 (California Sempler)		
Notes		<u>т</u>		FPTU	10'	GPO		- 1. NAT	ER. NO			
		-			10	ONO				DI ATE 040		
										PLAIE 2.18		

### SUB-SURFACE DATA

#### BORING LOG NO. B-19

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/19/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT DESCRIPTION AND REMARKS SIEVE 200 SCREEN **GRAPHIC LOC** (Z PASSING MOISTURE DEPTH (FT) N(60) FIELD ( DENSITY BULK RING % 0 ALLUVIUM - Qal - (0' - 7.5') - Medium brown fine-grained silty sand, dry, slightly 1 :1 SPT 20 27.6 firm. . 1. SPT 16 22.1 2 х 80 61.3 9.8 91.5 SPT 58 80.0 PICO FORMATION - Tp - (7.5' - 15') 7.5' - 12.5' - Medium brown claystone to siltstone. 10 SPT 32 44.2 SPT 50 for 5" ~ 12.5' - 15' - Dark brown claystone to siltstone. SPT 80 110.4 End at 15' 20 30 40 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 15' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

**PLATE 2.19** 

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	sι	JB	SUF	RFA	CE	DAT	٢A			BORING LOG NO. B-20	
PRO ELE\ MET	JECT /ATIC HOD:	: D. DN: 6-inc	R. HORT SEE PL	TON - LY ATE 1 v Stem A	ONS C	CANYO	NRAN	NCH, S	SANTA (	CLARITA FILE NO.: GC14-122536 DATE: 02/19/15 DRILLING CO.: HD DRILLING	
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS	
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC		
0 - - - - - - - - - - - - - - - - - - -	SPT SPT SPT	x	9 50 fr 50 fr 79 50 fr	12.4 27.6 or 3" 109.0 or 2"	8.1	103.9		**		ALLUVIUM - Qai - (0' - 7.5') 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, sightly firm. 5' - Medium brown fine- to medium-grained silty sand, humid, firm. PICO FORMATION - Tp - (7.5' - 12.5') - Medium brown siltstone End at 12.5 End at 12.5	
60 Con	omments: The following correction factors were utilized to determine N(60) (Per SP117)										
Net	Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)										
NOT	es:	Ť		JEPTH:	12.5'	GR	OUN	IDWA	ATER: N	O REFUSAL/CAVING: NO BACKFILLED: YES	
										PLATE 2.20	

### SUB-SURFACE DATA

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BORING LOG NO. **B-21** PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/13/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS Š 200 SCREEN DEPTH (FT) Z PASSING MOISTURE GRAPHIC N(60) DENSITY FIELD BULK RING ALLUVIUM - Qal - (0' - 47.5') SPT 3 2.5' - 5' - Medium to dark brown very fine- to medium-grained silty sand, 4.1 humid, loose. SPT 3 4.1 х 26 19.9 5.7 99.0 SPT 13 17.9 7.5' - 10' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm. 10 SPT 8 11.0 7 SPT 9 12.5' - 22.5' - Medium to dark brown very fine- to fine-grained silty sand, 12.4 SPT 6 8.3 humid, slightly firm. Х 15 11.5 9.2 104.6 1. SPT 8 11.0 20 SPT 14 19.3 SPT 19 26.2 SPT 20 27.6 33 25.3 108.7 х 9.8 0.0 SPT 31 42.8 27.5' - 30' - Medium brown fine- to coarse-grained pebbly silty sand, humid, 30 SPT 29 40.0 dense. 1.1 SPT 33 45.5 35' - Medium reddish brown fine- to coarse-grained pebbly sand, humid, 0 28 SPT 38.6 dense. 0 х 58 44.5 18.8 107.9 37.5' - 47.5' - Medium brown fine- to medium-grained silty sand to sandy silt, moist, SPT 32 44.2 firm. 40 SPT 33 45.5 SPT 30 41.4 il SPT 34 46.9 х 50 for 4" 6.7 114.3 SPT 40 55.2 i.t SAUGUS FORMATION - TS - (47.5' - 50') - Medium reddish brown fine- to very SPT 57 for 5" 50 coarse-grained clayey to silty sand, moist to saturated, dense. End at 50'

60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 50' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES 2.21

PLATE

### SUB-SURFACE DATA

BORING LOG NO. B-22

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

#### DATE: 02/13/15

FILE NO .: GC14-122536

MET	HOD:	6-ind	h Hollow	Stem A	uger					DRILLING CO.: HD DRILLING
	SAMPLE BLOWCOUNT							EVE		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOG	
0 -	SPT		2	2.8				**	1	ALLUVIUM - Qal - (0' - 17.5') 2.5' - 5' - Dark brown fine- to medium-grained silty sand, humid, loose.
-	SPT	Y	3	4.1	30	102.7			1-1	7 51 451 Deduktorum fina ta una anticiata di utari
-	SPT	^	15	20.7	5.0	103.7				slightly firm.
10 -	SPT		15	20.7					1	
•	SPT SPT		19 11	26.2 15.2						
-	SPT	х	60 70	46.0 96.6	8.7	119.1			1. "	SAUGUS FORMATION - Ts - (17.5' - 32.5')
20	SPT		53	73.1					1.	17.5' - 27.5' - Medium yellowish brown medium- to very coarse-grained sand, humid, very dense.
• •	SPT		68	93.8					1.	
•	SPT	x	65 50 f	89.7 or 3"	12.6	110.4			15	27.5' - 32.5' - Medium yellowish brown medium- to very coarse-grained silty
30	SPT SPT	11	50 f	or 6" or 6"					1.	sand, slightly moist, very dense.
-	SPT		50 f	or 5"					<u>·›\</u>	End at 32.5'
•										
- 40 -										
-										
-										
- 50										
-										
-										
60	60									
Cor	Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole): Cs = 1.2 (SPT Sampler without liner): Cs = 2/3 (California Sampler)									
Not	lotes: TOTAL DEPTH: 32.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES									
										PLATE

### SUB-SURFACE DATA

#### BORING LOG NO. B-23

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

FILE NO .: GC14-122536 DATE: 02/16/15

DRII	I	ING	CO	

MET	HOD:	6-inc	h Hollov	v Stem A	Auger					DRILLING CO.: HD DRILLING	
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS	
<b>DEPTH (FT)</b>	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOG		
0	SPT SPT SPT SPT SPT SPT SPT SPT SPT SPT	x x x	3 15 57 30 14 12 5 27 12 13 18 13 43 46 50 f	4.1 20.7 43.7 41.4 19.3 16.6 6.9 20.7 16.6 17.9 24.8 17.9 33.0 63.5 or 5"	8.0 11.5 4.3	97.0	6		0 11-11-11-11-1-1-1-1-1-1-1-1-1-1-1-1-1-	<ul> <li>ALLUVIUM - Qal - (0' - 27.5')</li> <li>2.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly moist, loose.</li> <li>5' - Dark brown very fine- to medium-grained clayey to silty sand, humid, firm.</li> <li>7.5' - 10' - Medium to dark brown fine- to coarse-grained clayey to silty sand, humid, firm.</li> <li>12.5' - 17.5'- Medium to dark brown fine- to coarse-grained clayey to silty sand, slightly moist, slightly firm.</li> <li>20' - 27.5' - Medium to dark brown fine- to very coarse-grained clayey to silty sand, slightly moist, slightly firm.</li> <li>20' - 27.5' - Medium to dark brown fine- to very coarse-grained gravelly to pebbly clayey to silty sand, humid to slightly moist, slightly firm.</li> <li>SAUGUS FORMATION - Ts - (27.5' - 30')</li> <li>25' - 27.5' - Medium yellowish brown fine- to coarse-grained silty sand containing pebbles, humid, firm to dense.</li> <li>30' - Rock/boulder</li> </ul>	
Con	comments: The following correction factors were utilized to determine N(co) (Per SP117)										
501	Cb = 1.15 (8" Diameter Borehole): Cs = 1.2 (SPT Sempler without liner): Cs = 2/2 (Co-lifernia Complete)										
Not	00			DEDTU	201	CDC		- 1 \\\\	2 (07		
INOL	es:	1		JEP IH:	: 30'	GRC	UND	WAT	ER: NC	REFUSAL/CAVING: NO BACKFILLED: YES	

#### GOLD COAST GEOSERVICES, INC. SUB-SURFACE DATA BORING LOG NO. **B-24** PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/16/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS GRAPHIC LOO 200 SCREEN 2 PASSING (FT) MOISTURE N(60) DENSITY ELD DEPTH BULK RING ī. % 0 ALLUVIUM - Qal - (0' - 27.5') -SPT 6 8.3 -2.5' - Dark brown fine- to medium-grained clayey to silty sand, slightly moist, · . slightly firm. -SPT 33.1 5' - 10' - Dark brown fine- to medium-grained clayey to silty sand, humid, 24 ţ. 1 Х 42.2 55 8.6 83.1 firm to dense. 5: SPT 20 27.6 -1. 10 SPT 13 17.9 SPT -17 23.5 12.5' - 27.5' - Medium brown fine- to medium-grained clayey silt to silty clay, SPT 8 11.0 -~ humid to slightly moist, firm to dense. 1: 39 29.9 х 15.9 95.6 SPT 21 29.0 1-20 SPT 13 17.9 SPT 57 78.7 -~ SPT -24 33.1 PICO FORMATION - Tp - (27.5' - 37.5') - 10 50 for 4" 18.5 101.1 х 27.5' - 35' - Medium to dark grayish brown fine-grained clayey silt to silty clay, 12 50 for 5" SPT ~ moist, dense. 30 SPT 64 88.3 SPT 60 82.8 ~ . _ SPT 42 58.0 35' - 37.5' - Dark brown claystone to siltstone, very dense. End at 37.5' х 50 for 5" 27.5 94.9 SPT 50 for 4" 40 .

-												
-												
- 60												
Con	nme	nts	The f	ollowin	a corr	oction	factors u			d to determine N( ) (D		·
	Cb :	= 1.1	15 (8" [	Diamet	er Bor	ection	; <u>Cs = 1</u> .	2 (SPT	Sa Sa	a to determine N(60) (Per S ampler without liner); Cs =	SP117) 2/3 (California S	Sampler)
Not	es:	Т	OTAL D	DEPTH:	37.5'	GR	OUNDWA	TER: N	0	REFUSAL/CAVING: NO	BACKFILLED:	YES
											PLATE	2.24

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# GOLD COAST GEOSERVICES, INC.SUB-SURFACE DATABORING LOG NO. B-25

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/16/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS **GRAPHIC LOG** 200 SCREEN % PASSING DEPTH (FT) Z NOISTURE N(60) DENSITY FIELD BULK RING 0 ALLUVIUM - Qal - (0' - 17.5') . -SPT 14 19.3 2.5' - Medium to dark brown fine- to medium-grained silty sand, humid, firm. ./ SPT -41 56.6 5' - 12.5' - Medium brown fine- to coarse-grained clayey to silty sand, humid, 17:4 х 82 62.9 7.5 99.1 firm to dense. SPT 38.6 28 17 10 SPT 20 27.6 SPT 29 40.0 SPT 8 11.0 15' - 17.5' - Light yellowish brown very fine- to fine-grained silty sand to sandy silt, х 50 for 3" humid, slightly firm. SPT 70 96.6 SAUGUS FORMSTION - Ts - (17.5' - 27.5') 17.5' - Medium reddish brown fine- to medium-grained clayey to silty sand, SPT 20 31 42.8 dry, very dense. 20' - Medium reddish brown siltstone, very dense. SPT 50 for 6" 22.5' - Light grayish brown siltstone, very dense. SPT 40 55.2 25' - Medium gray siltstone, very dense. 50 for 3" x End at 27.5' 30 40 --50 -60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: **GROUNDWATER: NO** TOTAL DEPTH: 27.5' **REFUSAL/CAVING: NO** BACKFILLED: YES

2.25

PLATE

#### GEOTECHNICAL BORING LOG

SHEET 1 OF 2





SHEET 2 OF 2



PROJE DATE DATE DRILLI TYPE	ECT NO START FINISH ER OF DR	D. TED IED ILL RI4	G_30	102453 6/20/0 6/20/0 edezma D )" Bucket	-T 1 1 Drilling Auger	Beotechnical Boring Log         PROJECT NAME         GROUND ELEV.         GW DEPTH (FT)         DR/VE WT.         DROP         12 inches    Boring Designed Boring	48#; 24	B-2 CRN 1-47' 1648#		2 OF 2
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pd) DENSITY	URATION	OTHER TESTS
- - - 45- -	1285	R	8			Silty Sand; fine- to very coarse-grained with pebbles, moderate yellowish brown, slightly moist to moist, dense.	6.8	122.2	51	
50-	1275-	R	6			Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, moist, moderately dense to dense. Water at 53± feet. Caving from 52 to 54+ feet. Total Depth 54 feet. Water at 53 feet. Caving from 52 to 54 feet. Hole backfilled with native materials and tamped.	5.5	135.5	61	
SAMF R S B	PLE TY RING SPT ( BULK	PES: (DRIV SPLIT SAMP	e) san Spoo Ple	MPLE N) SAMP	LE E SAMPLE	K GROUNDWATER LEVEL     WATER SEEP	C S EER		S I, IN PLAT	I IC. TE A-4

SHEET 1 OF 2

#### GEOTECHNICAL BORING LOG

PROJE DATE DATE DRILLI	ECT NO START FINISH ER OF DR	D. TED HED	G	102453 6/20/0 6/20/0 edezma D " Bucket	T 1 nilling Auger	PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1331     BORING DESIG.       GW DEPTH (FT)     LOGGED BY       DRIVE WT.     See Note     NOTE     0-24'35       DROP     12 inches     2577#.4	48#; 24 17-73' 1	B-3 CRN 1-47' 1648#		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ЛЭОТОНЦІ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER TESTS
	1330					ALLUVIUM (Qal): Silty Sand; very fine- to fine-grained, pale yellowish brown, dry, loose.				
5-	1325-					Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, dry to slightly moist, loose to moderately dense.				
10-	1320-	B				1 to $2\pm$ feet thick boulder lense with 6 to $12\pm$ inch boulders.	Ī			
- 15-	1315-	R	1			Silty Sand; fine to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, moderately dense.	2.3	106.7	11	
20-	1310-	R/B	2			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	5.7	115.3	35	
- 25-	1305-					Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, moderately dense.	-			
30-	1300	R	3			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	4.9	114.1	28	
35-	1295-									
SAMF R S B	PLE TY RING SPT ( BULK	(DRIV SPLIT	e) San Spoo Ple	MPLE N) SAMP	LE E SAMPLE	Y GROUNDWATER LEVEL WATER SEEP BEDDING JOINTING BEDDING S SHEAR BEDDING	C S EEF		1 5 6, 11 Plat	IC.

PROJI DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	D. TED IED ILL RI	G_30	102453 6/20/0 6/20/0 dezma D Bucket	-T 1 1 Drilling Auger	BEOTECHNICAL BORING LOG         PROJECT NAME       Lyons Canyon Ranch         GROUND ELEV.       1331       BORING DESIG         GW DEPTH (FT)       LOGGED BY       LOGGED BY         DRIVE WT.       See Note       NOTE       0-24'3         DROP       12 inches       2577#	548#; 24 47-73' 1	B-3 CRN -47' 648#		2 OF 3
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	Ланогосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS
45-	1290-	R/B	6	7		SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Sandstone; very fine- to fine-grained, medium light gray, slightly moist, moderately hard to hard. Siltstone; mottled olive gray and light gray, slightly moist, hard. Total Depth 51 feet. No water and no caving. Hole backfilled with native materials and tamped.	10.4	115.7	97	
SAMI	PLE TY RING SPT (	PES: (DRIV SPLIT SAME	E) SAN SPOOL	IPLE N) SAMP	PLE	¥ GROUNDWATER LEVEL ► WATER SEEP B BEDDING B BEDDING F FAULT J JOINTING S SHEAR E SSHEAR	IC S	OILS	S S, IN	IC.

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PR DA DA DR	OJEC TE ST TE FI	T NC	). ED ED	Lee	102453- 6/20/01 6/20/01 dezma D	rilling	PROJECT NAME     Lyons Canyon Ranch     BORING DESIG.     B-4       GROUND ELEV.     1342     BORING DESIG.     B-4       GW DEPTH (FT)     14     LOGGED BY     CRN       DRIVE WT.     See Note     NOTE 10-24' 3548#; 24-47'
DEPTH	(feet) H	ELEV.	SAMPLE	BLOWS/FT	Bucket /	Auger	GEOTECHNICAL DESCRIPTION
	-1: 5-1: 10-1: 15-		R/B	1			Account of the second state of the second stat
S/	AMPLI R R S S	E TYP ING ( PT (S	PES: DRIVI	E) SAM	PLE	E	¥ GROUNDWATER LEVEL         ➤ WATER SEEP         IC CONTACT         B BEDDING         F FAULT    PACIFIC SOILS ENGINEERING, INC.

DATE	START FINISH ER OF DR	ILL RI	G	6/20/0 6/20/0 dezma D Bucket	rilling Auger	GROUND ELEV.     1388     BORING DESIG       GW DEPTH (FT)     15     LOGGED BY       DRIVE WT.     See Note     NOTE     0-24' 3       DROP     12 inches     2577#.	548#; 24 47-73' 1	B-5 CRN 1-47; 1648#		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ИНОГОСА	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION	OTHER
	1385-					ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry and loose/soft within top 3±, feet becoming slightly moist and moderately dense/firm at depth.	-			
10	1375-	R/B	Push		•	Water seep at 10 <u>+</u> feet.				
- 15- -						Water at 15 <u>+</u> feet. <u>Caving from 14 to 16+ feet.</u> Total Depth 16 feet. Water at 10 and 15 feet. Caving from 14 to 16 feet. Hole backfilled with native materials tamped.				
SAMF	PLE TY RING SPT (	PES: (DRIV SPLIT	E) SAM	PLE I) SAMP	LE	Y GROUNDWATER LEVEL     MATER SEEP     O CONTACT     B BEDDING     F FAULT     PACIF     ENGIN			S S, IN	

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### GEOTECHNICAL BORING LOG

DATE DATE DRILLE TYPE	START FINISH ER OF DR	ED IED	IG	6/20/0 6/20/0 lezma D Bucket	n Drilling Auger	GROUND ELEV.     1384     BORING DESIG       GW DEPTH (FT)     LOGGED BY       DRIVE WT.     See Note     NOTE       DROP     12 inches     2577#:	548#; 24 47-73' 1	B-6 CRN -47' 648#	_	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION	OTHER
5	1380-	R/B	Bounce			ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine-grained with some pebbles and some cobbles, dark yellowish brown, dry and loose/soft within top 1 to 3± feet, becoming slightly moist to moist and moderately dense/firm at depth. Top 3± feet is porous. Boulders; 1± foot in diameter. No sample due to rocks. <u>Refusal</u> Total Depth 7 feet. No water and no caving. Refusal due to rocks. Hole backfilled with native materials and tamped.				
SAMP R S	RING	PES: (DRIN SPLIT	/E) SAMF SPOON	PLE ) SAMP		GROUNDWATER LEVEL     SWATER SEEP     C CONTACT     B BEDDING     F FAULT     UIUNTING     SUSHFAR	IC SO	DIL	S S, IN	IC.

PROJE DATE I DATE I DRILLE YPE (	ECT NO START FINISH FR DF DR	D. TED HED ILL R	Lec IG <u>30"</u>	102453 6/25/0 6/25/0 lezma D Bucket	-T 1 hrilling Auger	PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP	48#; 24	B-6B CRN 1-47' 1648#		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	гітногоду	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER
5	1385	R	2			ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine- to coarse-grained with pebbles, moderate to dark yellowish brown, top 1± foot dry and loose/soft, becoming moist and moderately dense/firm at depth. 2 to 3± foot thick, boulder lenses; 2-1/2 foot diameter boulder at 6± feet in depth.	9.1	116.9	58	
10-	1375-	R/B B	6 for 6"			SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Weathered Silty Sandstone; very fine- to fine-grained, mottled moderate brown and medium light gray, moist, moderately hard, poorly indurated. Silty Sandstone; very fine- to fine-grained, medium light gray,	13,4	123.0	98	
		R	11 for 6"			Total Depth 16 feet. No water, no caving. Hole backfilled with native materials and tamped.	13.4	120.0	91	
SAMP R S	LE TY RING SPT (	PES: (DRIN SPLIT	/E) SAMI	PLE ) SAMP	LE	GROUNDWATER LEVEL     WATER SEEP     C CONTACT     B BEDDING     FAULT     FAULT     PACIFI	C SO	OILS	5 , IN	IC.

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#### **GEOTECHNICAL BORING LOG**

PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP

102453-T 6/25/01

6/25/01

PROJECT NO.

DATE STARTED DATE FINISHED

Lyons Canyon Ranch 1388 See Note 12 inches

BORING DESIG. B-7 LOGGED BY CRN NOTE 0-24' 3548#; 24-47' 2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ГІТНОГОСҮ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS
5-	1385 - 1380 -	R/B	4 4 for 3"		C: N75W 44NE B: NBOW 41NE	COLLUVIUM/ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, dry and loose top 3± feet, slightly moist and moderately dense at depth, abundant roots and rootlets throughout. 1± inch thick yellowish red lense at contact. SAUGUS FORMATION- SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, grayish orange, slightly moist, hard, moderately to well indurated, slight to moderate bedding. 1± foot thick, scour/infill structure - infill with fine-grained Sand (attitude from top of Sand infill).	4.6	114.8	27	
15-	1375-				8: N70W 54NE B: N80W 50NE	2± foot thick, scour/infill structure - infill with fine-grained Sand (attitude from top of infill). Silty Sandstone; fine-grained, light gray, slightly moist, hard, well indurated. Used ripper and core bucket from 18 to 19± feet. <u>Refusal at 19+ feet.</u> Total Depth 19 feet. No water, no caving. Hole backfilled with native materials and tamped.				
AMF R S	PLE TY RING SPT (S BULK	PES: (DRI' SPLIT	/E) SAMF SPOON PLE	PLE ) SAM T) TUI	PLE BE SAMPLE	GROUNDWATER LEVEL     WATER SEEP	C S		3 i, IN	IC.

PROJE DATE : DATE : DRILLE TYPE (	ECT NO START FINISH ER OF DR	). Ted Ied Ill Rig	G	102453 6/25/0 6/25/0 edezma D "Bucket	-T 1 rilling Auger	PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1353     BORING DESI       GW DEPTH (FT)     19     LOGGED BY       DRIVE WT.     See Note     NOTE     0-24''       DROP     12 inches     2577#	3. 3548#: 24 ; 47-73'	B-8 CRN 4-47' 1648#		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	КООТОНЦІ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS
	1350-					<u>COLLUVIUM/ALLUVIUM (Qal)</u> : Silty Sand to Sandy Silt; fine- to coarse-grained with pebbles, cobbles, some clay pods, slightly moist to moist, loose/soft to moderately dense/firm at depth.				
	1345-					Increasing pebbles and cobbles.	-	unit and		
15-	1335-	R/B	6				10.7	122.3	81	
-	1000					V Water at 19 feet.				
20-	1330-	RB	10			SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone to Sandy Siltstone; very fine- to fine-grained, light olive, moist, moderately hard, moderately to well indurated, thinly bedded to laminated, weathered.	14.1	121.5	98	
25-						Silty Sandstone; fine to coarse-grained, medium light gray, slightly moist, hard, moderately to well indurated.	198	122.0	73	
						Total Depth 26 feet. Water at 19 feet. No caving. Hole backfilled.				
SAMP R S	PLE TY RING SPT (	PES: (DRIV SPLIT	E) SAN	IPLE N) SAMP	LE	V GROUNDWATER LEVEL WATER SEEP B BEDDING F FAULT	IC S	OILS	5 , IN	IC.

SHEET	1 OF	2
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#### **GEOTECHNICAL BORING LOG**

PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT.

PROJECT NO.

DATE STARTED DATE FINISHED

102453-T

6/25/01

6/25/01

Lyons Canyon Ranch 1327 See Note

BORING DESIG. B-9 LOGGED BY CRN NOTE 0-24' 3548#; 24-47' 2577#: 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ГІТНОГОВУ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS
1.1.1.1	1325 -					ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, top 6± feet dry to moist at depth, loose top 3± feet to moderately dense at depth.				
5-	1320-									
10-	1315-	R/B	Push			Sandy Silt to Silty Sand; fine-grained, moderate to dark yellowish brown, moist, firm/moderately dense, porous, abundant rootlets.	13.9	115.1	84	
15-	1310-						1			
- 20 -	1305 -	R	1			Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, moist, moderately dense, micaceous.	12.1	111.7	64	
25-	1300-						-			
- 30-	1295	R/B	Push			Silty Sand to Sandy Silt; fine- to coarse-grained with some pebbles, moderate yellowish brown, moist to very moist, moderately dense, micaceous.	18.0	112.0	100	
	1290-									
4		В				SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine to medium-grained, light olive gray, moist, moderately hard, moderately indurated, slightly				
R	RING SPT (	PES: (DRIN SPLIT	E) SAM SPOON	PLE I) SAMP		Y GROUNDWATER LEVEL     ► WATER SEEP     C CONTACT     B BEDDING     F FAULT     J JOINTING     S SHEAR     S SHEAR	IC SI		S i, IN	IC.

PROJI DATE DATE DRILLI TYPE	ECT N STAR FINISH ER OF DR	D. FED HED	G _ 30'	102453 6/25/0 6/25/0 dezma D 'Bucket	-T 1 Drilling Auger	GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP DROP GEOTECHNICAL BORING Lyons Canyon R 1327 See Note 12 inches	BORING DESING DESING DESING DESING LOGGED BY	3 3548#; 24 ; 47-73' `	B-9 CRN 1-47' 1648#	ET .	ZOF
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	гітногоду	ATTITUDES	GEOTECHNICAL DES	CRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION	OTHER TESTS
	1285-	R	5			to moderately weathered. Total Depth 41 feet. No water, no caving. Hole backfilled with native materials a	ind tamped.	10.0	117.9	63	
SAMF R S B	PLE TY RING SPT ( BULK	PES: (DRIV SPLIT SAMF	E) SAM SPOON PLE	PLE N) SAMP	LE E SAMPLE	¥ GROUNDWATER LEVEL ► WATER SEEP CONTACT B BEDDING F FAULT JOINTING S SHEAR	PACIF ENGIN	FIC S	OILS	S S, IN	IC.

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ROJE DATE DATE DRILLI YPE	ECT NO START FINISH ER OF DR	), Ted Ied Ill Ri	G _30"	10245 4/25/ 4/26/ ave's D Bucke	3-T 02 02 villing t Auger	PROJECT NAME         Lyons Canyon Ranch           GROUND ELEV.         1635         BORING DESIG.           GW DEPTH (FT)         LOGGED BY         LOGGED BY           DRVE WT.         See Note         NOTE         0-27' 45           DROP         12 inches         80.104'	00#; 27	B-10 CRN 7-52' 2500#:	_	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	КОТОНТИ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER
5-	-1635 - 1630 -	B			B: N75W 46NE	PICO FORMATION (Tp): Sandy Siltstone; very fine-grained Sand, pale yellowish brown, slightly moist, hard, fossiliferous (abundant bi-valves); interbedded with Silty Sandstone; very fine- to fine-grained, pale yellowish brown, slightly moist, hard, scour-fill into Siltstone; both units jointed with caliche infill, both units laminated to 8+ inch thick bedding.				
10-	1625 -	R/B	4 for 5"		B: 860W 54NE B: N65W 53NE	Interbedded Silty Sandstone; fine-grained, pale yellowish to grayish orange, slightly moist to moist, hard; with Sandy Siltstone; mottled grayish orange and pale olive gray, slightly moist to moist, hard; both units laminated to 2± inch thick bedding. Some interlayered Silty Claystone; olive gray, moist, moderately firm to firm, laminated, 1 to 2±mm thick layers, some caliche along bedding.	8.8	115.4	54	
20-	1615-	R/B	5 for 4"		B: BBOW 45NE	Silty Sandstone; fine- to medium-grained, light gray with light brown staining, slightly moist, hard, laminated to 1/4 <u>+</u> inch thick bedding./	5.8	108.0	29	
25-	1610-				B: N70W 51NE	Some isolated cobble lenses, quartzite and gneissic composition.				
30-	- 1605-	R/B	8 for 8"		B: N7DW 50NE	Sandy to Clayey Siltstone; very fine-grained Sand; light olive gray, moist, moderately hard to hard, laminated to 1/4+ inch thick bedding, some gypsum strands along bedding up to 1/4+ inch thick. Some isolated Clay lenses and pods; dark brownish black, moist, moderately firm to firm, concentrated along bedding planes.	11.0	116.4	69	
35-	1600-				8: N65W 49NE	Claystone layer; 1/4+ inch thick, olive gray, moist, soft, abundant well formed, gypsum crystals.				
AMF R S	ISPLE TY RING SPT ( BULK	PES: (DRIN SPLIT SAMI	/E) SAMI SPOON PLE [	PLE ) SAM	PLE BE SAMPLE	GROUNDWATER LEVEL     WATER SEEP     C CONTACT     B BEDDING     FAULT     JOINTING     S SHEAR     S SHEAR	C S EER		S S, IN	IC.

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SEQUILITE B: NBOM 42NE	GEOTECHNICAL DESCRIPTION Sandy Siltstone; fine-grained Sand; olive gray, moist, hard, some laminated to 1/4± inch bedding, generally massive, with abundant cross-cutting gypsum seams. Cobble layers; 1± foot thick, set in pebbly sand matrix, medium- to very coarse-grained, moist, moderately hard to	0 MOISTURE	DENSITY	URATION
B: NBOW 47NE	Sandy Siltstone; fine-grained Sand; olive gray, moist, hard, some laminated to 1/4+ inch bedding, generally massive, with abundant cross-cutting gypsum seams. Cobble layers; 1+ foot thick, set in pebbly sand matrix, medium- to very coarse-grained, moist, moderately hard to	10.0	121 2	
	nard, quanzite coobles and peobles.			73
B: N85W 57NE	Silty Sandstone; fine-grained, reddish brown, slightly moist to moist, hard; interlayered with Sandy Siltstone; very fine- to fine-grained Sand, moist, moderately firm to firm, some very firm layers, laminated; both units 6 to 12 inch beds.			
	Silty Sandstone; fine-grained, pale olive gray, moist, hard.	7.2	113.1	41
B: N70W 49NE	Pebble lense; medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.			
B: N75W SONE.	Some isolated Clay lenses and pods along bedding, 1± inch thick to 6± inches long, medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.	-		
B: N60E 47NW	Silty Sandstone; layered fine- to medium-grained, pale olive gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to $1/2\pm$ inch thick bedding. Siltstone concretion; $1\pm$ inch thick, light to olive gray, slightly moist, very hard, massive, slightly jointed with light brown staining along joints.	7.3	113.0	42
B: E-W 51N	Some gypsum along bedding; up to 1/4+ inch thick.			
	Clayey Sandstone; very fine- to fine-grained, layered, pale yellowish brown to olive gray, moist, hard, friable, generally massive, some gypsum strands.	12.1	109.6	6
8: 880W 48NE				
	Clayey Siltstone to Clayey Sandstone layers; 1± foot thick, very fine-grained, medium light to medium gray, moist, hard, micaceous, massive.			
8: N75W 48NE	Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, laminated to 1+ inch thick bedding.			
E	<ol> <li>N70W 49NE</li> <li>N75W 50NE</li> <li>N80E 47NW</li> <li>E E-W 51N</li> <li>B 80W 48NE</li> <li>N75W 48NE</li> </ol>	<ul> <li>Silty Sandstone; fine-grained, pale olive gray, moist, hard.</li> <li>Silty Sandstone; fine-grained, pale olive gray, moist, hard.</li> <li>N70W 49NE</li> <li>Pebble lense; medium- to very coarse-grained Sand matrix, quartite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary. Some isolated Clay lenses and pods along bedding, 1± inch thick to 6± inches tong, medium- to very coarse-grained Sand matrix, quartite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.</li> <li>Silty Sandstone; layered fine- to medium-grained, pale olive gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to 1/2± inch thick bedding.</li> <li>NBDE 47NW</li> <li>Silty Sandstone; layered fine- to medium-grained, pale olive gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to 1/2± inch thick bedding.</li> <li>Siltstone concretion; 1± inch thick, light to olive gray, slightly moist, very hard, massive, slightly jointed with light brown staining along joints.</li> <li>E E-W 51N</li> <li>Some gypsum along bedding; up to 1/4± inch thick.</li> <li>Clayey Sandstone; very fine- to fine-grained, layered, pale yellowish brown to olive gray, moist, hard, friable, generally massive, some gypsum strands.</li> <li>BBOW 48NE</li> <li>Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, massive.</li> <li>N75W 48NE</li> <li>Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, massive.</li> <li>N75W 48NE</li> <li>Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, laminated to 1± inch thick bedding.</li> <li>GROUNDWATER LEVEL</li> <li>WATER SEEP</li> </ul>	IIIIM layers, laminated, both units o to 12 men bets.       7.2         Silty Sandstone; fine-grained, pale olive gray, moist, hard.       7.2         IN70W 49NE       Pebble lense; medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.       7.2         IN75W 50NE       Some isolated Clay lenses and pods along bedding, 1± inch thick to 6± inches long, medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, moist, hard, friable; interbedded with Sandy to Clayey concretionary.       7.3         INBOE 47NW       Silty Sandstone; layered fine- to medium-grained, pale olive gray, moist, hard, friable; interbedded with Sandy to Clayey gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to 1/2± inch thick bedding.       7.3         IIII Tay Yor Hard, massive, slightly jointed with light brown staining along joints.       8       8         IIII EW S1N       Some gypsum along bedding; up to 1/4± inch thick.       12.1         IIIII EW S2N 48NE       Clayey Siltstone to Clayey Sandstone layers; 1± foot thick, very fine-grained, medium gray, moist, hard, micaceous, laminated to 1± inch thick bedding.       12.1         S: BBOW 48NE       Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, massive.       12.1         S: BBOW 48NE       Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, laminated to	INTR layers, laminated, both units o to 12 incribeds.         Silty Sandstone; fine-grained, pale olive gray, moist, hard.         INTOW 49NE         Pebble lense; medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.         INTSW 50NE         Silty Sandstone; layered fine- to medium-grained, pale olive gray, moist, hard, friable; interbedded with Sandy to Clayey gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to 1/2± inch thick bedding.         IN NBOE 47NW         Silty Sandstone; layered fine- to medium-grained, pale olive gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to 1/2± inch thick bedding.         It not, very hard, massive, slightly pointed with light brown staining along joints.         B: E-W 5TN         Some gypsum along bedding; up to 1/4± inch thick.         Clayey Sandstone; very fine- to fine-grained, layered, pale yellowish brown to olive gray, moist, hard, friable, generally massive, some gypsum strands.         B: N75W 48NE         Silly Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, massive.         B: N75W 48NE         Silly Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, massive.         B: N75W 48NE         Silly Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, lami



ROJE ATE S ATE S RILLE YPE (	ECT NO START FINISH ER DF DR	). ED ED	G <u>D</u>	10245 4/26/ 4/26/ ave's I Bucke	3-T 02 02 Drilling th Auger	PROJECT NAME         Lyons Canyon Ranch           GROUND ELEV.         1582         BORING DESIG.           GW DEPTH (FT)         LOGGED BY         LOGGED BY           DRIVE WT.         See Note         NOTE         0-27' 45           DROP         12 inches         3500#         80-104'	00#; 27 52-80' 2 1000#	B-11 CRN '-52' 2500#:		
(feet)	ELEV.	SAMPLE	BLOWS/FT	ГІТНОГОСҮ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER
				******		PICO FORMATION (Tp):	1			
1 1 1	1580 -				8: N50W 45SN J: N60E Vertical J: N10W 62NE	Sandy Siltstone; very fine-grained Sand, layered light to olive gray and light brown, slightly moist, moderately hard to hard, laminated to 1/2+ inch thick bedding, jointed/weathered, abundant roots.				
5-	- 1575 -				F: NBOW 62NE F: N50W 63SW	Fault Gouge: 1/4 to 1/2+ inch thick, plastic Clay layer; olive gray, moist, soft to firm, flaky, abundant roots and rootlets.	t			
-										
	1570-	R/B	5		J: N45W 78SW F: N55E 65NW	Fault Gouge: plastic Clay layer; olive gray, moist, soft, flaky, abundant roots.	13.0	119.4	89	
5-					B: N50E 48NW		-			
0 1 1 1 1 1	- 1565 - - - - 1560 -	R/B	5 for 6"		B: N40E 49NW	Some medium sized bi-valves. Sandy Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some isolated small to medium bi-valves.	13.2	122.3	99	
5 1 1	1555-				J: N50W 86SW J: N40E 66NW	Clay lined joint 1-2 mm thick. Gypsum lined joint 2-3 mm thick.	-			
1 1 1 1	1550-	R/B	8 for 6"		B: N60W 75SW	Sandy Siltstone; very fine-grained Sand, greenish gray, slightly moist, firm, massive, fossiliferous (small bi-valves); interlayered plastic with Silty Sandstone, medium gray, slightly moist, hard, slightly layered to massive; some Interlayered Claystone, medium dark to dark gray, moist, soft to moderately firm, laminated, flaky.	12.2	123.5	95	
5-						and the second se	+			
1 1 1	1545-					Some isolated concretionary pods, 2 to 6+ inches in diameter, very hard.				
AMF	RING	PES: (DRIN SPLIT	/E) SAM	PLE		Y GROUNDWATER LEVEL WATER SEEP C CONTACT B BEDDING F FAULT FUILING SHEAP	IC S EER		S 5, IN	IC.

PROJI DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	D. TED IED ILL R	IG <u>30</u> "	10245 4/26/ 4/26/ ave's [ Bucke	53-T 702 702 Drilling at Auger	PROJECT NAME         Lyons Canyon Ranch           GROUND ELEV.         1582         BORING DESIG.           GW DEPTH (FT)         LOGGED BY         LOGGED BY           DROP         12 inches         3500#:	00#: 21 52-80' 1	B-11 CRN 7-52' 2500#:		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ГІТНОГОСҮ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION	OTHER TESTS
	1540-	R	8 for 6"		B: N20E 55NW	Clayey to Sandy Siltstone; very fine-grained Sand, greenish to dark greenish gray, slightly moist, firm, laminated to massive.	12.3	119.7	85	
45-	1535-				В: N60W 55SW (Арргох.)		_			
						Hard drilling.		-		
50 - -	1530-	R/B	10 for 6"			Clayey Siltstone; medium dark gray, slightly moist, firm, slightly laminated, generally massive.	11.9	122.1	89	
					B: N55W 75SW					
55-	-						1			
	1525-	-			B; N20W 67NE (Approx.)	Siltstone concretion lense; 8 to $10\pm$ inches thick, very hard, massive.				
60 -		R	15 for 6"			Clayey Siltstone; olive gray, slightly moist, firm, slightly laminated, generally massive, few small bi-valve shells.	10.5	121.0	76	
-	1520 -				B: N60W Vertical	Ripple marks, small amplitude.				
65-					B; N50W 52SW		+			
	1515 -	-			B: N50W 43SW					
70-		R	15 for 5"			Sandy Siltstone: very fine-grained Sand, medium dark grav.	10.3	105.0	47	
1	1510-				B: N80E 59SE	slightly moist, hard, slightly laminated to 1/2 <u>+</u> inch thick bedding, generally massive. Clay lense; 2 to 3 <u>+</u> inches thick, medium dark gray, moist, soft, pliable.				
75-					B: N60W 75SW		+			
-	1505-									
SAMP	PLE TY	PES:			L	S GROUNDWATER LEVEL	C S	OILS	S	
S	SPT (S BULK	SPLIT	SPOON		PLE BE SAMPLE	B BEDDING E FAULT JOINTING S SHEAR ENGIN	EER	ING	, IN	IC.

GEOTECHNICAL BORING LOG

PROJECT NO. 102453- DATE STARTED 4/26/02 DATE FINISHED 4/26/02 DRILLER Dave's Drill TYPE OF DRILL RIG 30" Bucket A	PROJECT NAME         Lyons Canyon Ranch           GROUND ELEV.         1582         BORING DESIG           GW DEPTH (FT)         LOGGED BY         LOGGED BY           DRIVE WT.         See Note         NOTE         0-27' 4           er         DROP         12 inches         3500#	500#; 2 52-80'	B-11 CRN 7-52' 2500#;							
DEPTH (feet) ELEV. SAMPLE BLOWS/FT BLOWS/FT	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY SAT- URATION	OTHER TESTS						
R 25 for 3.5" 1500-	Total Depth 81 feet. No water, no caving. Hole backfilled with native materials and tamped.	10.8	120.8 78							
SAMPLE TYPES: R RING (DRIVE) SAMPLE S SPT (SPLIT SPOON) SAMPL DUING (DRIVE) SAMPLE	V GROUNDWATER LEVEL ► WATER SEEP E BEDDING E BEDDING E SAULT SAULT SAULT E SAULT E SAULT S	IC S	OILS RING, II	NC.						
DATE DRILLI TYPE	FINISH ER OF DR		G <u>30</u> "	4/29/0 ave's D Bucket	rilling Auger	GW DEPTH (FT)         LOGGED BY           DRIVE WT.         See Note         NOTE         0-27' 45i           DROP         12 inches         3500#; 5         80-104'	00#; 27 2-80' 2 1000#	CRN -52' 500#:		1
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DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	LITHOLOG	ATTITUDE	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%	DRY (pcf) DENSITY	URATION (%)	OTHER
	1555 -				B: N60W 57NE	PICO FORMATION (Tp): Sandy Silistone; very fine- to fine-grained Sand; yellowish brown, slightly moist to moist, moderately hard, laminated to 1/2± inch thick bedding; Interlayered with Silty Sandstone; fine-grained, mottled moderate yellowish brown and pale olive, slightly moist, moderately hard, laminated to 1/2± inch thick bedding; abundant caliche, both units highly to moderately weathered.				
London -					B: NBOE 72NW	Abundant penecontemporaneous deformation.				
10-	1545 -	R/B	5 for 10"			Sandy Siltstone; very fine-grained Sand; light olive gray, slightly moist to moist, moderately hard to hard, slightly laminated generally massive; some interlayered Silty Sandstone, fine-grained, layered yellowish gray and light brown, slightly moist, moderately hard to hard, laminated to 1/4 inch thick bedding; some fine-grained gypsum along	12.9	117.6	84	
15-	1540-				8: N50W 65NE	bedding bottom of "high to moderate" weathering zone.	Ī			
20-	1535 -	R/B			B: N70W 73NE	Clayey Siltstone; mottled light to olive gray and moderate brown, slightly moist to moist, moderately hard to hard, massive, micaceous, some fine-rained gypsum strands.	14.6	115.8	90	
25-	1530-					Silty Sandstone to Clayey Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some small isolated bi-valves and gastropods.	-			
30-	1525-	R/B1	0 for 10°		B: E-W 64N (Approx.)	Sandy Siltstone; very fine-grained, medium dark gray, slightly moist to moist, hard, slightly laminated, generally massive, slightly fossiliferous, micaceous.	12.6	123.0	97	
	1520-									
SAMF	LE TY RING	PES: (DRIV	E) SAME	PLE		GROUNDWATER LEVEL	C S	OILS	5	1

TART INISH R F DRI	ED ED LL R	IG <u>30"</u>	4/29/ 4/29/ 4/29/ ave's [ Bucke	02 02 Drilling et Auger	PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1557     BORING DESIG.       GW DEPTH (FT)     LOGGED BY       DRIVE WT.     See Note     NOTE       DROP     12 inches     3500#; t	00#: 27 52-80' 2	B-12 CRN 7-52' 2500#:												
ELEV.	SAMPLE	BLOWS/FT	ΓΙΤΗΟΓΟGΥ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTUTO										
515				B: N70W 69NE B: N50W 57NE (Approx.)	Sandy Siltstone to Silty Sandstone; very fine-grained Sand, medium dark gray, slightly moist to moist, hard, slightly laminated generally massive, slightly fossiliferous, micaceous; some interlayered Silty Sandstone, very fine-grained, light gray, slightly moist, hard, and Claystone, brownish to olive black, moist, moderately firm, laminated.	14.2	118.6	95											
	R/B	8 for 8"			Silty sandstone; very fine- to fine-grained, medium dark to olive gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous,	13.4	120.8	96											
500-																			
495 -	R/B	15 for 8"		B: N60W 53NE B: N60W 53NE	Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous; some interbedded Claystone lenses, 1 to $2\pm$ thick, brownish to olive black, moist, moderately firm to firm, laminated. Silty Sandstone lense; $8\pm$ inches thick, light to medium light gray, fine-grained, moist, moderately hard, fossiliferous; underlain by 1 to $2\pm$ inch thick soft Claystone lense.	13.2	120.6	94											
490 -				B: N50W 52NE															
485-	R	15 for 8"			Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	13.0	122.1	97											
480				B: N25W 77NE					- mont										
	NISH * F DRI 515	NISHED F DRILL R F DRILL R 515 515 505 500 - R/B 495 - 485 - 485 - 480 -	NISHED T DRILL RIG 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 30" N 3 40 N 3 40 N 3 40 N 495 N 3 400 N 485 N 485 N 485 N 485 N 485 N 485 N 485 N 485 N 485 N 485 N 485 N 485 N 485 N 485 N 485 N 485 N 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for 8"         500       8 for 8"         600       8 for 8"         500       8 for 8"         8 for 8"       8 for 8"         500       8 for 8"         8 for 8"       8 for 8"         490       8 for 8"         8 for 8"       8 for 8"         480       8 for 8"         8 for 8"       8 for 8" <td>NISHED       Jugge 2002 Davis Dolling       GWDEPTH (FT) DROP       See Note 12 Inches       LOGGED BY NOTE 0-22* 45 3500#1         20       Jugge 2001       DROP       See Note 12 Inches       NOTE 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       NOTE 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       NOTE 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       Note 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       Note 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       Note 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       Note 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       See Note 12 Inches       Note 0-22* 45 3500#1         21       DROP       DROP       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       <td< td=""><td>NISHED     LCOGED BY       PRILL RIG     30° Bucket Auger       DROP     12 inches       NOTE Course Solition     DROP       Status     3000 Excel Auger       DROP     12 inches       NOTE Course Solition     DROP       Status     Solition       Solition     Solition       Solition     Solition</td><td>NISHED       1000000000000000000000000000000000000</td><td>NISHED       Jack 2000       OW DEPTH (FT)       Size Note       NOTE       C27 Stock 27.52         PRILL NG       302 Bucket Auger       DROP       12 Inches       NOTE       120 Stock 2007         Image: Solution       3000 E32 Stock 2007       3000 E32 Stock 2007       10.104       10.104         Image: Solution       Image: Solution       Image: Solution       Image: Solution       10.104       10.104         Image: Solution       td<></td>	NISHED       Jugge 2002 Davis Dolling       GWDEPTH (FT) DROP       See Note 12 Inches       LOGGED BY NOTE 0-22* 45 3500#1         20       Jugge 2001       DROP       See Note 12 Inches       NOTE 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       NOTE 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       NOTE 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       Note 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       Note 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       Note 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       Note 0-22* 45 3500#1         21       Jugge 2001       DROP       See Note 12 Inches       See Note 12 Inches       Note 0-22* 45 3500#1         21       DROP       DROP       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches       See Note 12 Inches <td< td=""><td>NISHED     LCOGED BY       PRILL RIG     30° Bucket Auger       DROP     12 inches       NOTE Course Solition     DROP       Status     3000 Excel Auger       DROP     12 inches       NOTE Course Solition     DROP       Status     Solition       Solition     Solition       Solition     Solition</td><td>NISHED       1000000000000000000000000000000000000</td><td>NISHED       Jack 2000       OW DEPTH (FT)       Size Note       NOTE       C27 Stock 27.52         PRILL NG       302 Bucket Auger       DROP       12 Inches       NOTE       120 Stock 2007         Image: Solution       3000 E32 Stock 2007       3000 E32 Stock 2007       10.104       10.104         Image: Solution       Image: Solution       Image: Solution       Image: Solution       10.104       10.104         Image: Solution       td<>	NISHED     LCOGED BY       PRILL RIG     30° Bucket Auger       DROP     12 inches       NOTE Course Solition     DROP       Status     3000 Excel Auger       DROP     12 inches       NOTE Course Solition     DROP       Status     Solition       Solition     Solition       Solition     Solition	NISHED       1000000000000000000000000000000000000	NISHED       Jack 2000       OW DEPTH (FT)       Size Note       NOTE       C27 Stock 27.52         PRILL NG       302 Bucket Auger       DROP       12 Inches       NOTE       120 Stock 2007         Image: Solution       3000 E32 Stock 2007       3000 E32 Stock 2007       10.104       10.104         Image: Solution       Image: Solution       Image: Solution       Image: Solution       10.104       10.104         Image: Solution					G	EOTECHNICAL BORING LOG		SHE	ET	3 OF 3
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PROJI DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	). FED HED ILL R	Di 11G	10245 4/29/ 4/29/ ave's I Bucke	53-T 702 202 Drilling et Auger	PROJECT NAME         Lyons Canyon Ranch           GROUND ELEV.         1557         BORING DESIG.           GW DEPTH (FT)         LOGGED BY         LOGGED BY           DRIVE WT.         See Note         NOTE         0-27' 45           DROP         12 inches         80-104'.         80-104'.	00#; 2 52-80'	B-12 CRN 7-52' 2500#:											
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS									
85-	1475-	R/B	20 for 6"		B: N65W 46NE B: N50W 63NE	Silty Sandstone lense; interbedded with Sandy Siltstone, dark gray, slightly moist, hard, slightly lamainted, generally massive, $1/2$ to $1\pm$ inch thick beds.	13.3	108.9	68										
90-		R	25 for 5"			Total Depth 91 feet. No water, no caving. Hole backfilled with native materials and tamped.	12.3	104.8	56										
SAMF	PLE TY RING	PES: (DRIV	VE) SAMF	PLE		GROUNDWATER LEVEL	CS	OILS	5										
SAMP (R) (S) (B)	PLE TY RING SPT (1 BULK	PES: (DRIV SPLIT SAM	VE) SAMF I SPOON PLE	PLE ) SAM	PLE BE SAMPLE	¥ GROUNDWATER LEVEL ► WATER SEEP B BEDDING B BEDDING F FAULT J JOINTING S SHEAR F SHEAR	C S EEF	OILS	S i, IN LATE										

TYPE	OF DR		IG <u>30"</u> E	Bucket	Auger	DROP <u>12 inches</u> <u>3500#</u> .5 B0-104	1000#	2500#:	-
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/F	LITHOLOG	ATTITUDE	GEOTECHNICAL DESCRIPTION	MOISTUR CONT. (%	DRY (pcf DENSITY	URATION
	1445				B: N80E 55NW	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles, very pale orange to pale yellowish brown, dry, moderately hard to hard, abundant scour-infill, normal grading.			
5-	1440-						Ī		
		R/B	5 for 5"		B: NBOE 35NVV	Silty Sandstone; tine- to coarse-grained, pale yellowish brown, dry to slightly moist, moderately hard to hard.	4.5	116.1	28
15-	1430-				B: N70E 50NW	Some interlayered Clayey Siltstone layers; 6± inches thick, pale olive gray, moist, moderately hard, laminated.			
20-	1425-	R/B	5 for 6"			1 foot thick lense of 6 to 8± inch diameter cobbles, scour/infill with lower contact into underlying Siltstone. Sandy Siltstone; very fine- to fine-grained, pale olive gray, moist, moderately hard to hard, slightly laminated generally massive.	11.1	120.1	78
25-	1420 -	-					-		
30-	1415-	R	B for 6"		B: E-W 40N	Silty Sandstone; fine- to coarse-grained with some pebble lenses, grayish orange to light olive gray, slightly moist to moist, moderately hard to hard, abundant scour-fill, graded bedding, cross-bedding.	5.1	105.6	24
35-	1410-				B: N80W 43NE				
SAM	1405	DES							

PROJE	CT NO START FINISH R DF DR	). ED IED	G _30"	10245 5/1/0 5/1/0 ave's D Bucket	3-T 2 2 rilling t Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1445 BORING DES GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE 0-27 DROP 12 inches BORING DES BORING DES LOGGED BY DROP 12 inches BORING DES BORING DES BORING DES BORING DES LOGGED BY NOTE 0-27 BROP 12 inches BORING DES	GIG 4500# #: 52-8 04' 100	B-1: CRM : 27-52' 0' 2500 0#	3 4 #:	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	<b>ГІТНОГОGY</b>	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER TESTS
45	1400	R/B	8 for 6"			Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist to moist, moderately hard to hard; some interlayered Silty Sandstone, fine- to coarse-grained with pebbles, grayish orange, slightly moist, moderately hard to hard.	3.8	112.5	21	
12						Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, moderate yellowish to moderate brown, moist, moderately hard to hard.				
50-	1395 -	В	N/R			Discontinuous Paleosol; Silty Sand to Sandy Silt, fine- to coarse-grained dark yellowish brown, moist, soft, 6± inches thick. Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, some boulders up to 10± inches, moderate yellowish to moderate brown, moist, moderately hard to hard, massive 50/50± clast-matrix supported				
- 55 - -	1390-					@ 50 feet; no sample recovery due to cobbles.				
60	- - 1385 - - - - -	R/B	10 for 5"			Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish to moderate brown, moist, hard. <u>FAULT ZONE:</u> Clayey Siltstone; dusky blue green, moist, moderately hard to hard, massive, some polished surfaces, some scour-infill with overlying Sandstone.	7.5	112.7	43	
65	1380 - - - 1375 - - -	R/B1	0 for 10"			<ul> <li><u>FAULT</u>: Claystone; olive gray, moist, moderately firm, slightly pliable, abundant polished surfaces and striations, laminated to 1± inch thick bedding.</li> <li>@ 66'; Trend and plunge of striations on fault plane: N60E 42W.</li> <li>Silty Sandstone; very fine- to fine-grained, light olive gray, moist, moderately hard, laminated to 2± inch, massive bedding.</li> <li>Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, moist, moderately hard, scour-infili, generally massive, matrix supported.</li> </ul>	14.6	119.0	99	
75-	- 1370 - - -	в								
-						Hole backfilled with native materials and tamped.				
SAMP RI	LE TY RING ( SPT (S BULK	PES: DRIV SPLIT SAMI	E) SAMP SPOON PLE	LE ) SAMI TI TUE	PLE	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	FIC	SOI	LS G, IN	IC.

GEOTECHNICAL BURING LOG	
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PROJE DATE DATE DRILLI TYPE	ECT NO STAR FINISH ER OF DR	d. Ted Ied Ill Ri	G _ 30	10245 5/2/0 5/2/0 ave's D Bucket	3-T )2 )2 )rilling t Auger	PROJECT NAME GROUND ELEV.     Lyons Canyon Ranch       GROUND ELEV.     1338     BORING DES LOGGED BY       GW DEPTH (FT)     LOGGED BY       DRIVE WT.     See Note     NOTE     0-27'       DROP     12 inches     3500       80-11	IG 4500# #: 52-8	B-1 CRI 27-52 0' 2500	4 N D#;	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	КООТОНТІ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
5	1333	B				SOIL: Sandy Silt; very fine- to fine-grained, pale to moderate yellowish brown, dry, very loose, abundant roatlets. ALLUVIUM (Gall): Sandy Silt to Silty Sand; very fine- to medium-grained with pebbles and cobbles, pale yellowish brown, dry, loose. Silty Sand; fine- to coarse-grained with pebbles and cobbles, some boulders up to 10± inches, moderate to dark yellowish brown, slightly moist, loose to moderately dense, stratified cobbles consist of gneiss, granite and sandstone, some quartzite. Boulder lense: 2-1/2 to 3± feet in diameter, moderate to major caving. Total Depth 8 feet. No water. Moderate to major caving 5 to 8± feet. Hole backfilled.				
R	RING SPT ( BULK	DRIVE SPLIT SAMP	E) SAMI SPOOM LE	PLE N) SAMF T TUB	PLE SE SAMPL	MAX - Max. Densily/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	NEE	RIN	IG, IN	NC. E A-26

PROJE DATE DATE DRILLI TYPE	ECT N STAR FINISH ER OF DR	D. TED HED NLL RIG	0 30	102453 5/2/0 5/2/0 ave's D "Bucket	3-T 2 2 rilling Auger	PROJECT NAME       Lyons Canyon Ranch         GROUND ELEV.       1338       BORING DES         GW DEPTH (FT)       LOGGED BY         DRIVE WT.       See Note       NOTE       0-27         DROP       12 inches       350	GIG	B-14 CRI 27-52 0' 2500	IB N )#:	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногову	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
	1333	B				SOLL: Silty Sand to Sandy Silt; very fine- to fine-grained, pale yellowish brown, dry, very loose, abundant rootlets and gopher holes. ALLUVIUM (Qal): Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, dry, loose to moderately dense, stratified, some boulders to 10 <u>+</u> inches. Increase moisture to: slightly moist. Boulder layer; up to 3 <u>+</u> feet in diameter, moderate caving.	-			
- 10- -	1328					Increase moisture to: slightly moist to moist. Boulder layer; up to 2± feet in diameter, predominantly Sandstone and Pebbly Sandstone, some granite.				
	1323	B				Clayey Siltstone layer; 1 to 2± inch thick, mottled moderate yellowish brown and pale olive, moist to wet (perched/saturated), soft. <u>Boulder layer, need rippers/core to continue.</u> Refusal. Total Depth 14 feet. No water. Moderate caving throughout. Refusal - Boulders. Hole backfilled.				
20-	1318		•							
25-	1313									
30-	1308									
35-	1303									
SAMP R S B	PLE TY RING SPT ( BULK	PES: (DRIVE) SPLIT S SAMPL	SAMI POOM	PLE N) SAMF	PLE E SAMPL	E Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	FIC	SOI	LS IG, IN PLATI	<b>IC.</b> E A-27

PROJE	STAR FINISH ER OF DR	o. Ted Hed HLL RIG	3	102453 4/4/0 4/4/0 & & W Di Rotary V	3-T 2 2 rilling Vash	PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1323     BORING DE       GW DEPTH (FT)     LOGGED B'       DRIVE WT.     See Note     NOTE       DROP     30 inches     Ling	SIG # for SP sample	RW- TME T; 400#	i ) for	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	ГІТНОГОСУ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER
						ALLUVIUM (Qai):				
5-	1318	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.	-			
10-	1313	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.	-			
15-	1308	SPT	16			Silty Sand; brown with pebbles, slightly moist, medium dense.	-			
20-	1303	SPT	26			Silty Sand; light brown with pebbles, slightly moist, medium dense.	-			
25-	1298	SPT	60			Gravelly Sand; brown, slightly moist, very dense.	-			
30-	1293	R	25			Silty Sand; fine- to medium-grained, light brown, moist, medium dense, 2 <u>+</u> feet thick layer.	- 12.0	108.4	61	
35-	1288	SPT	40			Sand; fine- to medium-grained, brown with gravel, moist, dense.	-			
4.1						Very firm drilling.				
AMP	LE TY RING SPT (	PES: (DRIVE) SPLIT	E) SAMI SPOON	PLE N) SAMF	PLE	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index	IFIC	SOI	_S G, II	VC.

SHEET 2 OF 2

DATE DATE DRILLI TYPE	STAR FINISH ER OF DF	ied Ied	G F	4/4/0 4/4/0 & W D Rotary V	2 2 rilling Vash	GROUND ELEV. <u>1323</u> BORING GW DEPTH (FT) LOGGEU DRIVE WT. <u>See Note</u> NOTE DROP <u>30 inches</u>	DESIG DBY 140# fo ring sa	or SP mple	RW- TMI T; 4007	1 0 # for	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER
1 1 1		SPT	34	-		Gravelly Sand; fine- to medium-grained, brown, slightly moist, dense, some silt.					
45-	1278	SPT	17 for 12"			Gravelly Sand; fine- to medium-grained, brown, moist, dense.	-				
10.0		-				SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr):					
50-	1273	SPT	75 for 6"			Harder drilling. Sandstone; medium- to coarse-grained with gravel, grayis brown.	h				
55-	1268	SPT	75 for 5"			Silty Sandstone; fine- to coarse-grained with gravel, gravis brown. 6 to 8 inch cobble layer.	sh –				
60-	1263	SPT	50 for 1*			No recovery.	-				
65-	1258	R	50 for 4"			Sandstone; medium- to coarse-grained, brown, hard. Total Depth 65 feet. No apparent water or caving. Hole backfilled.	_				
SAMP	PLE TY RING SPT (	PES: (DRIVI SPLIT	E) SAMP	PLE I) SAMF	ν.e	<ul> <li>Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis</li> <li>DF - Hydrometer Analysis</li> </ul>		IC :	SOI	LS G, IN	IC.



SHEET 2 OF 2





## GEOTECHNICAL BORING LOG SHEET 2 OF 2

(feet)	ELEV.	SAMPLE	BLOWS/FT	ПТНОГОСУ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
		SPT	30 for 11"			Silty Sand; medium- to coarse-grained, with gravel, light brown, slightly moist, very dense.				
45-	1285-	SPT	19			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
50	1280-	SPT	50 for 10.5"			Slightly Silty Sand; fine-grained, reddish brown, moist, very dense.				
55-	1275-	SPT	31			Sandy Silty Clay; fine-grained, light brown, moist, hard, soil obtained from ring sampler, driven 6".				
60-	1270 -	SPT	75 for 5"			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Slightly Clayey Sand; medium- to coarse-grained, gray.				
65-	1265-	R	60 for 6"			Sandstone; medium to coarse-grained; gray. No sample <u>retrieved.</u> Total Depth 65 feet. Groundwater at 54 feet. No apparent caving. Hole backfilled.				

PROJE DATE DATE DRILLE TYPE (	ECT N STAR FINISH ER OF DR	o. Ted Hed KILL R		10245 4/5/0 4/5/0 & W D Rotary V	3-T 2 2 rilling Vash	GEOTECHNICAL BORING LOG         PROJECT NAME         GROUND ELEV.         GW DEPTH (FT)         DRIVE WT.         DROP	SIG. Y # for SP sample	S RW- TMI 2T; 400#	HEET 4 2 4 for	1 OF
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ИНОГОСУ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
5	1403 -	-				ALLUVIUM (Qal):				
10-	1398 -	SPT	7			Sandy Silty Clay; fine-grained Sand, light brown, slightly moist, firm.				
15-	1393 -	SPT	35 for			SAUGUS FORMATION - SUNSHINE RANCH MEMBER				
20-	1388 -	R	75			(Tsr): Slightly Clayey Siltstone; grayish brown, weathered.	14.5	119.3	100	
			for 11"			No apparent groundwater or caving. Hole backfilled.				
AMPI RF SI	LE TY RING ( SPT (S BULK	PES: DRIVI SPLIT SAMF	E) SAMP SPOON PLE	LE ) SAMP	LE E SAMPL	AX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	IFIC	SOIL	LS G, IN	IC.

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SHEET 1 OF 2

3

ATE FINISHED RILLER YPE OF DRILL RIG	4/5/0 4/5/0 A & W D Rotary V	02 02 02 02 02 02 02 02 02 02 02 02 02 0	PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1348     BORING       GW DEPTH (FT)     17     LOGGED       DRIVE WT.     See Note     NOTE       DROP     30 inches     NOTE	DESI DBY 140# ting s	G. for SP	RW- TMI T; 400#	5 D f for	ſ
(feet) (feet) ELEV. SAMPLE TYPE	BLOWS/FT	GROUP	GEOTECHNICAL DESCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER
			<u>ALLUVIUM (Qal):</u>					
5 1343 SPT	17		Silty Sand; fine-grained, light brown, slightly moist, mediun dense.	n				
10-1338 SPT	8		Silty Sand to Sandy Silt; dark brown, moist, loose.					
15-1333 R	5	2	Silty Sand; fine- to medium-grained, dark brown, slightly moist, slightly dense.		17.3	112.9	99	
20-1328 	6		Clayey to Silty Sand; brown, moist, loose.	-				
25-1323 SPT	10		Clayey to Sandy Silt; gray, very moist, stiff.	-				
30 - 1318	for 8"		Some graver. Silty fine- to medium-grained Sand; gray, moist, very densi	e. –				
35-1313 SPT	57		SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone/Sandy Siltstone; brown/gray.					

~	PROJE DATE S DATE I DRILLE TYPE (	CT NO START INISH R DF DR	D. TED TED TED	A A IGR	102453 4/5/0 4/5/0 & W Di totary V	3-T 2 2 rilling Vash	GEOTECHNICAL BORING LOG         PROJECT NAME       Lyons Canyon Ranch         GROUND ELEV.       1348       BORING DES         GW DEPTH (FT)       17       LOGGED BY         DRIVE WT.       See Note       NOTE 140#         DROP       30 inches       ring	IG for SP	S RW- TMI T; 400	HEET	2 OF 2
	DEPTH (feet)	ELEV.	SAMPLE	alows/FT	тногоду	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
			R	50 for 10'			Silty Sandstone; medium- to coarse-grained, gray, hard. Total Depth 40 feet. No apparent caving. Groundwater at 17 feet. Hole backfilled.				
1)	SAMP R S B	LE TY RING ( SPT (S BULK	PES: DRIV SPLIT SAM	E) SAMF SPOON PLE	PLE ) SAMF	PLE E SAMPL	E Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	FIC	SOI	LS IG, IN PLATI	<b>VC.</b> E A-36

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ATE ATE RILLE YPE	DJECT NO. TE STARTED TE FINISHED LLER PE OF DRILL RIG DE OF DR					PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1379     BO       GW DEPTH (FT)     18     LOO       DRIVE WT.     See Note     NO       DROP     30 inches     NO	RING DESIG GGED BY TE <u>140# fo</u> _ring_sar	ING DESIG GED BY  			~
(feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	ГІТНОГОВҮ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER
5		SPT	6			ALLUVIUM (Qal): Silty Sand; brown, slightly moist, loose.					
10-	- 1369 - -	SPT	14			Gravelly Sand; fine- to medium-grained, brown, some slightly moist, medium dense.	e silt,				
15-	1364 -	SPT	23		3	Gravelly Sand; fine- to medium-grained, with some si reddish brown, very moist, medium dense.	it,				
20-	1359 -	R	11			SAUGUS FORMATION - SUNSHINE RANCH MEMBE (Tsr): Silty medium- to coarse-grained Sand; red bro with gravel, ring sample disturbed.	<u>ER</u> wn,				
25-	1354 -	R 50	0 for 6'			<u>Sandy Siltstone: very fine-grained Sand, bluish gray,</u> Total Depth 25 feet. No apparent caving. Water at 17.5 feet. Hole backfilled.	hard 1	5.6	116.6	99	
AMP	LE TY	PES:				Ground Water Seepage	PACIFI	C	SOIL	S	

ATE S ATE S RILLE YPE (	START FINISH ER DF DRI	ED ED EL RIG		7/31/0 7/31/0 7/31/0 regg In See No	-Situ	PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1317     BORING       GW DEPTH (FT)     LOGGED       DRIVE WT.     140 lbs.     NOTE (       DROP     30 inches     J	DESIG BY Combo Mounte	Rig -	CRI CRI Truck	PT-1 N	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ГІТНОГОСҮ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER
1 1 1 1						ALLUVIUM (Qal): (Note: See adjacent exploratory boring B-1 for descriptive log of Alluvium from 0 to 70 <u>+</u> feet).					
5-	1312 - - - -					Begin CPT.					
10	1307 - - -						1				
15-	- 1302 - - -						1				
20-	- 1297 - -					Stop CPT - Drill through gravely layers	-				
						sop of the Drin through gravely layers.			ñ.		
25-	1292 -					Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers.					
30-	1287 -	SPT	50 for 5"			Begin CPT - Stop CPT (6± inches of advancement). Drill through gravelly layers.	-				
35-	1282 -			-							
AMP	LETY	PES:				Y Ground Water Seepage	CIF	IC	soil	LS	

SHEET 2 OF 3

PROJE DATE DATE DRILLI TYPE	ECT NO START FINISH ER OF DR	). Ted Ied Ill Ri	G	102453 7/31/0 7/31/0 Gregg In See No	3-T 01 01 -Situ ote	PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1317     BORING DE       GW DEPTH (FT)     LOGGED B       DRIVE WT,     140 lbs.     NOTE Co       DROP     30 inches     Mo	SIG Y mbo Rig ounted, 4	CPT/S CR - Truck -1/2" Ro & CPT	PT-1 N ptary	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pc) DENSITY	SAT- URATION (%)	OTHER TESTS
	1272 - - 1267 - - 1262 - - - - - - - - - - - - - - - - - - -					Begin CPT. Stop CPT. Drill through gravelly layers. Pebbles in auger tip. Gravel lense. Begin CPT. Stop CPT. Drill through gravelly layers. Begin CPT. Stop CPT. Drill through gravelly layers.				
70	1247	SPTI	02 for 4			Gravelly Sand; medium to coarse-grained with pebbles, moderate yellowish brown, moist to wet, dense, interlayered pebble lenses.	-			
SAMP	RING SPT ( BULK	PES: DRIVI SPLIT SAMF	E) SAMI SPOON PLE	PLE I) SAME	PLE BE SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index E CONS - Consolidation	GINE	SOI	LS IG, IN	IC.

# GEOTECHNICAL BORING LOG SHEET 3 OF 3

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pc) DENSITY	SAT- URATION (%)	OTHER
		SPT	70			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine to coarse-grained with some pebbles, yellowish gray, moist to wet, moderately hard.				
- 85 - -	1232 -									
90-	1227 -	SPT	50 for 2"			Gravelly Sandstone to Pebbly Conglomerate; medium to very coarse-grained, light to medium gray, moist, moderately hard.	-			
- 95- -	1222 -									
- 100	1217 -	SPT	50 for 3"			Claystone; 1 to 2 <u>+</u> foo thick layer/lense, olive gray, moist to wet, soft to firm. @ 100 feet; No recovery of SPT sample.				
-						Hole backfilled with on-site cuttings.				
SAMF	LE TY	PES:				Ground Water Seepage	FIC	0		



PROJE DATE I DATE I DRILLE TYPE (	ECT NO. STARTED FINISHED ER OF DRILL	RIG	10245 7/31/ 7/31/ Grego In See N	3-T 01 01 n-Situ ote	GEOTECHNICAL BORING LOG PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP DROP GEOTECHNICAL BORING LOG Lyons Canyon Ranch 1363 15 140 lbs. 30 inches	BORING DES OGGED BY NOTE <u>Com</u> Wast	IG.	CPT/S CR - Truck 1/2" R & CPT	HEET	2 OF 2
DEPTH (feet)	ELEV.	BLOWS/FT	ттногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
	SF	- OB T 50 for 3"	TUH		Silty Sandstone; fine- to coarse-grained, medium g slightly moist, hard to very hard. Total Depth 41 feet. Groundwater at 15 feet. No apparent caving. Hole backfilled.	ray,	WOI	BG	UR UR	6 F
SAMP RI S B	PLE TYPES RING (DR SPT (SPL BULK SA	S: IVE) SAMF IT SPOON MPLE {	PLE I) SAMP	PLE BE SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index E CONS - Consolidation	PACI	FIC	SOI	LS IG, II	<b>VC.</b>



PLATE A-43

PROJE DATE S DATE F DRILLE TYPE (	ECT N STAR FINISI ER DF DF	D. TED HED HLL RIG	G _ 30'	102453 1/13/0 1/13/0 JN Drill Bucket	3-T 04 04 04 ling Auger	GEOTECHNICAL BORING LOG PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP 12 inches	BORING DES LOGGED BY NOTE 0-24 _257	SIG 1', 3548; 7#, 47-7	B-10 CRI #: 24-4 5', 164	HEET 01 N 47', 8#	2 OF 2
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ПТНОГОВУ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
						Total Depth 40 <u>+</u> feet. No water. Some raveling 34 to 36 <u>+</u> feet. Hole backfilled.					
SAMP RF S	LE TY RING SPT ( BULK	PES: DRIVE SPLIT : SAMP	SAMP SPOON	PLE I) SAMF	PLE E SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	PAC	IFIC	SOII	LS G, IN PLATI	<b>IC.</b> E A-44

SHEET 1 OF 2

### GEOTECHNICAL BORING LOG

PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP

4

TYPE OF DRILL RIG 30" Bucket Auger

102453-T

1/13/04

1/13/04

JN Drilling

PROJECT NO.

DRILLER

DATE STARTED

DATE FINISHED

12 inches

~

Lyons Ranch 1323 See Note

BORING DESIG. B-102 LOGGED BY CRN NOTE 0-24', 3548;;#; 24-47' 2577#: 47-75', 1648#

+

DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ГІТНОГОВУ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
						SOIL: Sandy Silt; very fine- to fine- with some medium-grained Sand, dark yellowish brown, moist, very loose, abundant roots and rootlets. ALLUVIUM (Qal): Sand Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist to moist, loose.	-			
5-	1318	R/B	1			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, loose, porous, some rootlets.	4.8	100.7	19	
- 10- -	1313	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, very loose, porous, some rootlets.	9.4	105.1	42	
15-	1308	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, moderate yellowish brown, slightly moist to moist, very loose.	9.8	106.8	46	
20-	1303 -	R/B	1			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, colour change to moderate yellowish brown, moisture increase to slightly moist to moist, dry to slightly moist, loose.	8.1	107.0	38	
25-	1298	R/B	2			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose to medium dense.	3.0	115.6	18	
- 30-	1293 -					Increase abundance of pebbles and cobbles.				
35-	1288 -	RB	3			Pebbly to Cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist to moist, medium dense; Interlayered with Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, medium dense. Change to cork-screw auger due to abundant cobbles and boulders (up to 12+ inches). 34 to 38+ feet, moderate to severe raveling of coarse-grained materials. SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr)(?): Clayey to Sandy Silt; fine-grained Sand; moderate yellowish brown, moist, soft.	3.8	118.3	24	
SAMP RI S B	PLE TY RING ( SPT ( BULK	PES: DRIV SPLIT SAMI	E) SAMF SPOON PLE [	PLE I) SAMF T TUB	PLE E SAMPL	E Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	IFIC	SOI	LS G, IN PLATE	IC. E A-45

PROJE DATE DATE DRILLE TYPE (	ECT N STAR FINISI ER OF DF	o. Ted Hed Rill Ri	G _ 30	10245 1/13/ 1/13/ JN Dril "Bucke	3-T 04 04 ling t Auger	GEOTECHNICAL BORING LOG PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP 12 Inches	BORING DES LOGGED BY NOTE 0-24 _257	SIG 1', <u>3548;</u> 7#: 47-7	B-1( CRI #: 24- 5', 164	HEET	2 OF 2
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
						\ <u>(weathered Tsr?). "Hard Drilling" at auger tip/refu</u> Total Depth 38 feet. No water. Moderate to severe raveling 34 to 38 <u>+</u> feet. Hole backfilled.	<u>sal.</u> /				
							*				
SAMP B S B	LE TY RING ( SPT ( BULK	PES: DRIVE SPLIT : SAMP	) SAMI SPOON LE	PLE I) SAMF	PLE E SAMPL		PACI	FIC : NEE	SOIL	_S G, IN PLATE	IC. A-46

SHEET	1	OF	2
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5.

PROJE DATE DATE DRILL TYPE	ECT NO. STARTED FINISHED ER OF DRILL RIG JN Drilling JN				PROJECT NAME     Lyons Ranch       GROUND ELEV.     1324     BORING DES       GW DEPTH (FT)     LOGGED BY       DRIVE WT.     See Note     NOTE       DROP     12 inches     2577	6IG 1. 3548; 2#: 47-7	B-10 CRN #: 24-4 5', 1648	3 1 7',		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER
						ALLUVIUM (Qal): Sandy Silt; very fine- to fine-grained Sand, dark to moderate yellowish brown, moist, very loose, abundant roots and rootlets.				
5-	1319	R	Push			Silty Sand; fine- to medium-grained, moderate yellowish brown, slighty moist, very loose. Increase abundance of pebbles.	4.0	103.1	17	
10-	1314 -	R	Push			Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slighty moist, loose to medium dense.	8.6	104.8	38	
						Some cobbles and boulders (up to 12± inches).				
15-	1309	R	Push			Silty Sand; fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, loose to medium dense.	8.9	107.4	42	
20-	1304	R	1			Silfy Sand; fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, loose.	11.1	104.8	49	
25-	1299 -	R	1			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose.	4.8	114.9	28	
30-	1294	R	3			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, medium dense.	6.3	111.6	33	
35-	1289					Pebbly to cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist, medium dense to dense.				
SAMP	PLE TY	PES:				Ground Water Seepage	FIC	SOII	S	
B	SPT ( BULK	(DRIV SPLIT SAMI	E) SAMF SPOON PLE	PLE I) SAMI T TUB	PLE SAMPL	DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index	NEE	RIN	G, I	NC.

PROJ DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	D. TED IED ILL RIG	30"	102453 1/13/0 1/13/0 JN Drill Bucket	3-T )4 )4 )4 Auger	PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP	Lyons Ranch 1324 See Note 12 inches	BOR LOG NOT	ING DESIG. GED BY E <u>0-24', 35</u> _2577#; 4	548;;#; 17-75',	B-103 CRN 24-47 1648	#	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ттногосу	GROUP SYMBOL	GEOTEC	HNICAL DESCRI	PTION	MOISTURE	CONT. (%)	DENSITY	URATION (%)	OTHER
45-	1279 -	B				Pebbly to cobbly Sar boulders up to 12± ir slightly moist, dense. Increase abundant o SAUGUS FORMATIO FORMATION MEMB Conglomerate; fine to vellowish gray, dry to	d; fine- to coarse-gr inches, moderate yell f cobbles and boulde <u>DN-SUNSHINE RAN</u> <u>ER (Tsr):</u> Pebble and p very coarse-graine e slighty moist, hard.	ained with sor owish brown, ers. <u>CH</u> id Cobble d Sand matrix	ne				
						Total Depth 49 feet. No water. No caving Hole backfilled.							
SAME R	PLE TY RING ( SPT (S BULK	DRIVE) SPLIT S	SAMP POON	PLE ) SAMP	PLE E SAMPLI	Ground Water S MAX - Max. Density DS - Direct Shear HYDR - Hydromete ASCE - Expansion E CONS - Consolidat	eepage y/Opt. Moist. r Analysis Index ion	6	PACIFI	C SO		S G, IN	IC.

SHEET	1	OF	2
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PROJECT NO. DATE STARTED DATE FINISHED DRILLER TYPE OF DRILL RIC		102453-T 1/13/04 1/13/04 JN Drilling 3 30" Bucket Auger		3-T 04 04 ling t Auger	BORING DESIG.     BORING DESIG.       BROJECT NAME     Lyons Ranch       GROUND ELEV.     1315       GW DEPTH (FT)     LOGGED BY       DRIVE WT.     See Note       DROP     12 inches					
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ПТНОГОСҮ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, loose to medium dense. Sandy Silt; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.				
5-	1310-	R	t			Silty Sand; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.	6.8	103.8	29	
10-	1305 -	R/B	2			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, medium dense.	6.4	100.4	25	
15-	1300-	R	3			Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, slightly moist, medium dense.	2.4	120.7	16	
20-	1295-	R	t			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.3	103.4	27	
25-	1290-	в				Pebbly to Cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist to moist, medium dense. Some boulders up to 12 <u>+</u> inches.				
	1285-	R	2			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.9	108.2	33	
35-	1280 -	R	3			Interlayered 1+ foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense. Silty Sand; fine- to coarse-grained with pebbles, moderate vellowish brown, slightly moist, medium dense.	3.5	107.7	17	
		R	2			Interlayered 1+ foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense.	4.0	111.1	21	

SAMPLE TYPES: RING (DRIVE) SAMPLE S SPT (SPLIT SPOON) SAMPLE B BULK SAMPLE T TUBE SAMPLE

-1

✓ Ground Water Seepage MAX - Max, Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-49



SHEET 2 OF 2

#### TABLE II

#### LOG OF EXPLORATORY PITS

E:	xploratory Pits	Depth (feet)	Logged by: CRN           Description         Date Logged: 07/05/01				
	EP-1	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silty Sand grained, moderate yellowish brow to moderately dense/soft to firm, a	d to Sandy Silt; fine- to medium- n, dry to slightly moist at depth, loose abundant roots and rootlets.			
		6 to 8	SAUGUS FORMATION – SUNS Sandstone; fine- to medium-grain moderately hard to hard, abundan moderately weathered top $1\pm$ foot	SHINE RANCH MEMBER (Tsr): ed, olive gray, slightly moist, t white carbonate stringers,			
			Total Depth 8 feet.				
			No water, no caving.				
	EP-2	0 to 15	<u>ALLUVIUM (Qal)</u> : Silty Sand; f and cobbles, moderate yellowish l loose to moderately dense at dept	ine- to coarse-grained with pebbles brown, dry to slightly moist at depth, h, abundant roots and rootlets.			
			Total Depth 15 feet				
			No water, no caving.				
	EP-3	0 to 2½	SOIL: Silty Sand to Sandy Silt; f yellowish brown, dry, loose/soft,	ine- to medium-grained, moderate abundant roots and rootlets.			
		2½ to 8	SAUGUS FORMATION – SUNS Sandstone; fine- to medium-grain feet highly weathered and loose w moderately hard at depth, massive	SHINE RANCH MEMBER (Tsr): ed, light olive, slightly moist, top 2 <u>+</u> vith abundant roots and rootlets, e.			
			Total Depth 8 feet				
			No water, no caving.				

### TABLE II

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-4	0 to 5	COLLUVIUM (Qcol): Silt pebbles and some cobbles, i moist at depth, loose to mod	y Sand; fine- to medium-grained with noderate yellowish brown, dry to slightly lerately dense, abundant roots and rootlets.
	5 to 9	SAUGUS FORMATION – Sandstone; fine- to coarse-g yellowish gray, slightly more pebbles lenses, generally ma	SUNSHINE RANCH MEMBER (Tsr): rained with pebbles and cobbles, light st, moderately hard, some interbedded assive.
		Bedding Attitude: @ 7 feet	, N40W, 42NE
		Total Depth 9 feet. No water, no caving.	
EP-5	0 to 8	<u>ALLUVIUM (Qal):</u> Silty S and cobbles, moderate yello loose to moderately dense a	and; fine- to coarse-grained with pebbles wish brown, dry to slightly moist at depth, t depth, abundant root, and rootlets.
	8 to 10	Cobbly Sand; medium- to c loose to moderately dense, a	oarse-grained with pebbles, slightly moist, roots to depth.
	10 to 13	SAUGUS FORMATION – Sandstone; fine- to medium moderately hard, slight to m	SUNSHINE RANCH MEMBER (Tsr): -grained, light olive gray, slightly moist, noderate weathering, massive.
		Total Depth 13 feet. No water, no caving.	

#### TABLE II

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01				
EP-6	0 to 2	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry, loose, abundant roots and rootlets.					
	2 to 4	<u>SAUGUS FORMATION – S</u> Cobble Conglomerate; coars moderately hard.	SUNSHINE RANCH MEMBER (Tsr): se-grained Sand matrix, slightly moist,				
	4 to 7	Siltstone; light bluish gray, s	lightly moist, moderately hard, laminated.				
		Bedding Attitude: @ 5 feet,	N50W, 37 NE				
		Total Depth 7 feet.					
EP-7	0 to ½	SOIL: Silty Sand; fine- to comoderate yellowish brown, o	oarse-grained with pebbles and cobbles, dry, loose, abundant roots and rootlets.				
	½ to 2	<u>SAUGUS FORMATION – S</u> Pebble Conglomerate; medin moist, loose, abundant roots	SUNSHINE RANCH MEMBER (Tsr): um- to coarse-grained Sand matrix, slightly				
	2 to 5	Silty Sandstone; fine- to mee moist, moderately hard, abu	dium-grained, light yellowish gray, slightly ndant roots.				
		Bedding Attitude: @ 3 feet,	N60W, 35 NE				
		Total Depth 5 feet					

#### TABLE II

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-8	0 to 1	SOIL: Sandy Silt; light to moder abundant roots and rootlets.	rate yellowish brown, dry, soft,
	1 to 3	SAUGUS FORMATION – SUN Sandy Siltstone; light olive gray, abundant white carbonate, highly massive.	SHINE RANCH MEMBER (Tsr): slightly moist, moderately hard, jointed, slightly laminated, generally
	3 to 5	Claystone; reddish brown, moist, abundant white carbonate along j	, moderately hard, highly jointed, joints.
		Bedding Attitude: @ 4 feet, N70	)W, 45NE
		Total Depth 5 feet. No water, no caving.	
EP-9	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silty San and cobbles, dark yellowish brow to moderately dense at depth, abu	d; fine- to coarse-grained with pebbles on, dry to slightly moist at depth, loose undant root and rootlets.
	6 to 9	<u>SAUGUS FORMATION – SUN</u> Pebble and Cobble Conglomerate matrix, slightly moist, moderately	SHINE RANCH MEMBER (Tsr): e; medium to coarse-grained Sand y hard, poorly indurated.
	9 to 12	Silty Sandstone; fine-grained, lig moderately hard, moderately indu	ht olive gray, slightly moist, urated, moderately bedded.
		Bedding Attitude: @ 10 feet, N6	60W, 45NE
		Total Depth 12 feet. No water, no caving.	

### Page 5

## TABLE II

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-10	0 to 2	SOIL: Sandy Silt; yellowish rootlets.	n brown, moist, firm, abundant roots and
	2 to 5	SAUGUS FORMATION	SUNSHINE RANCH MEMBER (Tsr): gray, moist, moderately hard, massive, ilty Sandstone; fine-grained, light st, moderately hard, slightly bedded,
		Bedding Attitude: @ 3 feet,	N45W, 47NE
		Total Depth 5 feet.	
		No water, no caving.	
EP-11	0 to 3	<u>ALLUVIUM (Qal):</u> Silty Sa yellowish brown, top 2 <u>+</u> fee moderately dense at depth, a	and; fine- to medium-grained, moderate t dry and loose, slightly moist to abundant root and rootlets, porous.
	3 to 20	Pebbly Sand; fine- to coarse yellowish brown, slightly m	-grained with cobbles, light to moderate oist to moist, moderately dense.
		Total Depth 20 feet. No water, no caving.	

#### TABLE II

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-12	0 to 3	SOIL: Sandy Silt to Silty Sand; cobbles, moderate yellowish bro abundant roots and rootlets.	; fine to coarse-grained with pebbles and own, dry to slightly moist, soft/loose,
	3 to 10	SAUGUS FORMATION – SUP Pebble and Cobble Conglomera slightly moist, moderately hard, moderately bedded.	NSHINE RANCH MEMBER (Tsr): nte; fine- to coarse-grained Sand matrix, , poorly to moderately indurated,
		Bedding Attitudes: @ 5 feet, N50W, 44NE @ 8 feet, N45W, 42NE	
		Total Depth 10 feet. No water, no caving.	
EP-13	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silty Sa and some cobbles, moderate to moist, loose to moderately dens	and; fine- to coarse-grained with pebbles dark yellowish brown, dry to slightly se, porous, abundant roots and rootlets.
	6 to 9	SAUGUS FORMATION – SU Pebble and Cobble Conglomera matrix, slightly moist, moderate moderately bedded.	NSHINE RANCH MEMBER (Tsr): ate; medium- to coarse-grained Sand ely hard, moderately indurated,
		Bedding Attitude: @ 8 feet, N5	50W, 46NE
		Total Depth 9 feet. No water, no caving.	

WDJ-cp-2453RT03-pits
# TABLE II

### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01			
EP-14	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silty Sand; fine- to medium-grained, dark yellowish brown, dry to slightly moist, loose to moderately dense, porous, abundant roots and rootlets.				
	6 to 8	<u>SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr):</u> Clayey Siltstone; olive to light olive gray, moist, soft to moderately hard, massive, abundant white carbonate.				
		Total Depth 8 feet.				
		No water, no caving.				
EP-15	0 to 21/2	SOIL: Silty Sand; fine- to medium-grained, dark yellowish brown, or to slightly moist, loose, porous, abundant roots and rootlets, gopher holes.				
	2½ to 7	SAUGUS FORMATION – Sandstone; fine- to medium- slightly moist, moderately has lenses of pebbles and cobble	SUNSHINE RANCH MEMBER (Tsr): grained with pebbles, yellowish orange, ard, slightly bedded; some interbedded s with scour-fill basal contacts.			
		Approximate Bedding Attitu	de: @ 5 feet, N50W, 38NE			
		Total Depth 7 feet.				
		No water, no caving.				

### TABLE II

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01			
EP-16	0 to 3	<u>SOIL</u> : Silty Sand to Sandy Silt; fine to medium-grained, moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets.				
	3 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble Conglomerate; medium- to coarse-grained Sand matrix, sligh moist, loose, highly weathered, abundant roots.				
		@ 5 feet, Claystone; yellowish brown and surfaces, discontinuo	1 to 4± inch thick layer, mottled moderate olive gray, moist, soft, flaky, some polished us layer.			
	5 to 9	Sandstone; fine-grain hard, highly weather	ed, light olive gray, slightly moist, moderately ed, abundant joints, abundant roots along joints.			
		Bedding Attitude: @	) 5 feet, N60W, 32NE			
		Total Depth 9 feet. No water, no caving.				
EP-17	0 to ½	SOIL: Sandy Silt; dark yellowish brown, dry, soft, abundant roots and rootlets.				
	½ to 8	SAUGUS FORMAT Sandstone; fine- to m moist, moderately ha slight to moderate be	ION – SUNSHINE RANCH MEMBER (Tsr): redium-grained, light yellowish gray, slightly rd to hard, top 1± foot moderately weathered, dding with some rootlets along bedding planes.			
		Bedding Attitudes: (	@ 3 feet, N65W, 43NE @ 6 feet, E-W, 49N			
		Total Depth 8 feet. No water, no caving.				

#### TABLE II

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01			
EP-18	0 to 2	SOIL: Silty Sand; fine- to coarse-grained with pebbles and some cobbles, light to moderate yellowish brown, dry, loose, abundant and rootlets.				
	2 to 7	<u>SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr)</u> ; Silty Sandstone; fine-grained, mottled reddish orange and olive gray, moist, hard, top $2\pm$ feet slightly jointed, moderately bedded.				
		Bedding Attitude: @ 5 feet, N60W,	40SW			
		Total Depth 7 feet. No water, no caving.				
EP-19	0 to ½	SOIL: Silty Sand; fine-grained, light dry, loose, abundant roots and rootlet	to moderate yellowish brown, s.			
	½ to 6	SAUGUS FORMATION – SUNSHI Sandstone; fine-grained, light olive g hard to hard, moderately bedded.	NE RANCH MEMBER (Tsr): ray, slightly moist, moderately			
		Bedding Attitude: @ 41/2 feet, N65W	7,40NE			
		Total Depth 6 feet. No water, no caving.				
EP-20	0 to 9	<u>ALLUVIUM (Qal)</u> : Cobbly Sand; fin abundant pebbles, light yellowish bro slightly moist to moist and moderated to 12 <u>+</u> inches diameter, abundant roo caving throughout.	he- to coarse-grained with own, top $2\pm$ feet dry and loose, ly dense to depth, some cobbles up its and rootlets to depth. Severe			
		Total Depth 9 feet No water, caving from 0 to 9 feet.				

WDJ-cp-2453RT03-pits

#### TABLE II

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01	
EP-21	0 to 13	<u>ALLUVIUM (Qal)</u> : Silty Sand to Sandy Silt; fine- to medium-grained with some pebbles and cobbles; moderate yellowish brown, top $2\pm$ feet dry and loose, slightly moist to moist and moderately dense to depth, poorly consolidated, some roots to depth.		
	13 to 14	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium to coarse-grained Sand matrix, moist, moderately hard to hard, weathered.		
		Total Depth 14 feet		
		No water, no caving.		
EP-22	0 to 7	<u>ALLUVIUM (Qal)</u> : Silty Sand; fine- to medium-grained with some pebbles, dark yellowish brown, top $2\pm$ feet loose and dry, slightly mois to moist and moderately dense to depth, basal cobbles, abundant roots and rootlets.		
	7 to 10	SAUGUS FORMATION - Siltstone; moderate yellow laminated, moderately frac some roots and rootlets.	- SUNSHINE RANCH MEMBER (Tsr): ish brown, moist, moderately hard, tured, some tectonic shears along bedding,	
	10 to 12	Silty Sandstone; very fine- moist, moderately hard, sli	to fine-grained, olive gray, slightly moist to ghtly fractured.	
		Bedding Attitude: @ 10 fe	eet, N60W, 40NE	
		Total Depth 12 feet.		
		No water, no caving.		

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# TABLE II

# LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01			
EP-23	0 to 1	SOIL: Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, dry, loose, abundant roots and rootlets.				
	1 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, pale yellowish gray, slightly moist, moderately hard to hard, some rootlets from 1 to 3± feet in depth.				
		Bedding Attitude: @ 4 feet, 1	N60W, 45NE			
		Total Depth 5 feet. No water, no caving.				
EP-24	0 to 1	SOIL: Silty Sand; fine- to coad dark yellowish brown, dry, lo	arse-grained with pebbles and cobbles, ose, abundant roots and rootlets.			
	1 to 4	SAUGUS FORMATION – S Pebble and Cobble Conglome matrix, slightly moist, modera	UNSHINE RANCH MEMBER (Tsr): erate; medium- to coarse-grained Sand ately hard to hard, few roots to depth.			
	4 to 5	Sandstone; fine- to medium-g moist, moderately hard, mode	rained, light yellowish gray, slightly rately bedded.			
		Bedding Attitude: @ 4½ feet	, N60W, 40NE			
		Total Depth 5 feet.				
		No water, no caving.				

# TABLE II

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-25	0 to 2½	<u>COLLUVIUM (Qcol)</u> : Silty Sand to Sandy Silt; very fine- to fine- grained with some isolated pebbles, moderate to dark yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets, porous.			
	2½ to 5	Clayey Silt; moderate to dark yellowish brown, slightly moist, soft to firm, porous, abundant caliche.			
	5 to 9	<u>PICO FORMATION (Tp)</u> : Clayey Siltstone; mottled pale olive gray and light brown, slightly moist, moderately firm, laminated to $\frac{1}{2}$ -inch thick bedding, weathered to a depth of 7± feet.			
		Bedding Attitudes:	<ul> <li>@ 6 feet, N50E, 32SE</li> <li>@ 8 feet, N80E, 35SE</li> </ul>		
		Total Depth 9 feet. No water, no caving	3-		
EP-26	0 to 1½	<u>SOIL</u> : Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry to slightly moist, loose, abundant roots and rootlets, porous.			
	1½ to 6	<u>PICO FORMATION (Tp):</u> Clayey Siltstone; pale olive, slight moderately firm, laminated to massive 2±-inch thick bedding, weathered with roots and caliche to a depth of 3½ feet.			
		Bedding Attitudes:	<ul> <li>@ 4 feet, N30W, 40NE</li> <li>@ 4½ feet, N10W, 30NE</li> <li>@ 5 feet, N30E, 29SE</li> </ul>		
		Total Depth 6 feet. No water, no caving.			

#### TABLE II

### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-27	0 to 1	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets.			
	1 to 5	<u>PICO FORMATION (Tp)</u> : Sandy Siltstone; fine-grained, pale olive gray, slightly moist, moderately hard, 1 to $6\pm$ inch thick laminated beds; jointed/fractured, interbedded with Clayey Siltstone; pale olive olive gray, moderately firm, laminated to $3\pm$ -inch thick massive bed top $1\frac{1}{2}\pm$ feet highly weathered.			
		Bedding Attitudes:	@ 4 feet, N50W, 39NE		
		Total Depth 5 feet. No water, no caving	5.		
EP-28	0 to 1	SOIL: Sandy Silt; yellowish brown, dr	very fine- to fine-grained, pale to moderate ry, loose, abundant roots and rootlets.		
	1 to 7	PICO FORMATIO fine-grained, pale o laminated bedding; moist to moist, moo top 3± feet highly v	<u>N (Tp)</u> : Interbedded Silty Sandstone; very fine- to live, slightly moist, moderately hard, 2 to $6\pm$ -inch with Clayey Siltstone, pale to dark olive, slightly lerately firm, laminated to $2\pm$ -inch thick bedding; veathered and abundant roots.		
		Bedding Attitudes:	<ul> <li>@ 5 feet, EW, 49N</li> <li>@ 6 feet, N70E, 73NW</li> </ul>		
		Total Depth 7 feet.			
		No water, no caving	5.		

# TABLE II

## LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description		Logged by: CRN Date Logged: 07/05/01	
EP-29	0 to 11	<u>ALLUVIUM (Qal)</u> : Silty Sand to Sandy Silt; very fine- to fine- grained, moderate yellowish brown, dry to slightly moist at $6\pm$ feet to depth, loose/soft to moderately dense/firm with depth.			
	11 to 12	<u>PICO FORMATION (Tp):</u> Silty Claystone; dark olive green, moist, moderately firm to firm, laminated to ½±-inch thick bedding.			
		Total Depth 12 feet. No water; no caving.			
EP-30	0 to 14	<u>COLLUVIUM (Qe</u> pale to moderate ye abundant rootlets a	<u>col):</u> Clayey to Sandy S ellowish brown, dry to s nd roots.	ilt; very fine-grained Sand, lightly moist, soft, porous,	
		Total Depth 14 feet. No water, no caving.			
EP-31	0 to 1	<u>SOIL</u> : Clayey To Sandy Silt; very fine- to fine-grained, dark yellowish brown, slightly moist to moist, soft, porous, abundant roots and rootlets.			
	1 to 2	<u>PICO FORMATION (Tp):</u> Claystone; mottled olive gray and light brown, slightly moist to moist, moderately firm, highly weathered, abundant roots.			
	2 to 3	Silty Sandstone; light gray lenses 3 to $4\pm$ inches thick at top and botton with light brown core, slightly moist, moderately hard, massive, scourfill bottom, flat top.			
	3 to 4	Silty Sandstone to Sandy Siltstone; pale olive gray, slightly moist, firm highly weathered, blocky, abundant caliche.			
	4 to 5	Sandy to Clay Silts moderately hard, la	tone; pale to dark olive minated to ½+-inch bec	gray, slightly moist to moist, lding.	
		Bedding Attitudes:	@ 3 feet, N80W, 59S @ 4 feet, N65W, 35S	W (overturned) W (overturned)	
		Total Depth 5 feet. No water, no cavin	g.		
WDJ-cp-2453R	T03-pits				

# TABLE II

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description		Logged by: CRN Date Logged: 07/05/01	
EP-32	0 to 5	<u>COLLUVIUM (Qcol)</u> : Sandy Silt; very fine-grained Sand, pale to moderate yellowish brown, dry to slightly moist, soft, abundant rootlets.			
	5 to 8	<u>PICO FORMATION (Tp):</u> Silty Sandstone; very fine- to fine-grained, pale to olive gray, slightly moist to moist, moderately hard, laminated to $3\pm$ -inch beds.			
		Bedding Attitude:	@ 6 feet, N70E, 54NW		
		Total Depth 8 feet. No water, no cavin	g.		
EP-33	0 to 12	<u>COLLUVIUM (Qcol)</u> : Sandy Silt; very fine- to fine-grained Sand, pale yellowish brown, dry to slightly moist, loose/soft, abundant rootlets, $2\pm$ foot diameter boulder at $2\pm$ feet.			
		No water, no caving.			
EP-34	0 to ½	SOIL: Clayey Silt; moderate yellowish brown, dry, loose, abundant roots and rootlets.			
	½ to 4	<u>PICO FORMATIO</u> pale to olive gray, s abundant roots and	<u>N (Tp):</u> Silty Sandstone slightly moist, moderatel rootlets.	e; very fine- to fine-grained, y firm, highly weathered,	
	4 to 6	Silty Sandstone; fine-grained, pale olive gray, slightly moist, moderately hard, massive.			
		Bedding Attitudes:	@ 3 feet, N45E, 65SE @ 5 feet, N70E, 59SE	(overturned) (overturned)	
		Total Depth 6 feet. No water, no caving.			

WDJ-cp-2453RT03-pits

# TABLE II

# LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-35	0 to 14	<u>ALLUVIUM (Qal)</u> : Silty Sand to Sandy Silt; very fine- to fine- some medium-grained, moderate yellowish orange, top $2\pm$ feet of loose/soft, slightly moist to moist and moderately dense/firm at slightly porous, pocket of pebbles and cobbles @ $12\pm$ feet.			
		Total Depth 14 feet No water, no caving	3.		
EP-36	0 to ½	SOIL: Sandy Silt; very fine-grained Sand, moderate yellowish brown, dry, soft, abundant roots and rootlets.			
	½ to 6	PICO FORMATIO pale olive gray, slig bedding, upper 3 <u>+</u> f	<u>N (Tp):</u> Silty Sandstone; very fine- to fine-grained, htly moist, moderately hard, laminated to 3±-inch eet slightly creep affected.		
	6 to 8	Silty Sandstone, fin moderately hard, ma	e-grained, pale olive gray, slightly moist, assive.		
		Bedding Attitudes:	@ 2 feet, N10E, 50NW @ 4 feet, N30W, 30SW		
		Total Depth 8 feet. No water, no caving	<u>z.</u>		

WDJ-cp-2453RT03-pits

#### TABLE II

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-37	0 to 1/2	<u>SOIL</u> : Sandy Silt; very fine-grained, moderate yellowish brown, dry, loose, abundant roots and rootlets.			
	½ to 5	<u>PICO FORMATION (Tp):</u> Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard, laminated to 1+ inch bedding, possibly creep affected.			
	5 to 7	Silty Sandstone; fine-grained, pale olive, slightly moist, moderately hard to hard, massive.			
		Bedding Attitudes: @ 2 feet, N10E, 36NW @ 5 feet, N50E, 42 NW			
		Total Depth 7 feet. No water, no caving.			
EP-38	0 to ½	SOIL: Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, dry, loose, porous, abundant roots and rootlets			
	½ to 2	SAUGUS FORMATION – SU Silty Sandstone; medium- to ve cobbles of quartzite and graniti slightly moist, moderately hard generally massive.	INSHINE RANCH MEMBER (Tsr): ery coarse-grained with pebbles and ics (Mt. Lowe), pale yellowish orange, l, poorly cemented, slightly layered		
	2 to 6	PICO FORMATION (Tp): Sat moderate yellowish brown, slig slightly laminated, generally m	ndy Siltstone; very fine-grained, ghtly moist, moderately hard/firm, assive.		
		Contact Attitude: @ 2 feet, N Bedding Attitude: @ 4 feet, N	165W, 67NE 155W, 54NE		
		Total Depth 6 feet. No water, no caving.			

WDJ-cp-2453RT03-pits

# TABLE II

# LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-39	0 to 17	<u>COLLUVIUM (Qcol)</u> : Sandy Silt; very fine-grained Sand, mode yellowish brown, dry to slightly moist at depth, soft to firm at dep wet at bottom.			
		Total Depth 17 feet.			
		No water, no caving.			
EP-40	0 to 9	<u>ALLUVIUM (Qal)</u> : Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, dry to slightly moist at depth, loose/soft to moderately dense/firm at depth, roots to $5\pm$ feet in depth.			
	9 to 10	<u>SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr):</u> Silty Sandstone; fine- to medium-grained, yellowish gray, moist, hard, massive.			
		Total Depth 10 fect. No water, no caving.			
EP-41	0 to 1	SOIL: Silty Sand; fine- to a loose, abundant roots and ro	coarse-grained, dark yellowish brown, dry, botlets.		
	1 to 3	<u>SAUGUS FORMATION –</u> Pebbly Sandstone; medium slightly moist, moderately h	SUNSHINE RANCH MEMBER (Tsr): - to very coarse-grained, yellowish gray, aard, abundant roots, normal grading.		
	3 to 5	Silty Sandstone; fine- to me moist, moderately hard, ma	dium-grained, yellowish gray, slightly ssive.		
		Bedding Attitude: @ 3 feet	, N70W, 32NE		
		Total Depth at 5 feet. No water, no caving.			

WDJ-cp-2453RT03-pits

# TABLE II

### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-42	0 to 11/2	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry, loose, abundant roots and rootlets.			
	1½ to 6	6 <u>SAUGUS FORMATION – SUNSHINE RANCH MEM</u> Silty Sandstone; fine- to medium-grained, mottled yello light brown, slightly moist, hard, ¼ to 3±-inch beds.			
		@ 4 feet; $6\pm$ inch thick carbon sulfur deposits.	aceous layer, brownish black, abundan		
		Bedding Attitude: @ 4 feet, N	165W, 28NE		
		Total Depth 6 feet. No water, no caving.	Depth 6 feet. ter, no caving.		
EP-43	0 to 1½	<u>SOIL</u> : Sandy Silt; very fine-g slightly moist, soft, abundant r	rained, dark yellowish brown, dry to ootlets.		
	1½ to 6	SAUGUS FORMATION – SU Silty Sandstone; very fine- to t moist, moderately hard to hard	JNSHINE RANCH MEMBER (Tsr): fine-grained, pale olive gray, slightly l, slightly bedded generally massive.		
		Bedding Attitude: @ 4 feet, N	70W, 45NE		
		Total Depth 6 feet.			

No water, no caving.

# TABLE II

# LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-44	0 to 1	SOIL: Sandy Silt to Silty Sand; very fine- to fine-grained, moderate to dark yellowish brown, slightly moist, soft/loose, abundant roots and rootlets.			
	1 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained with some coarse-grained layers with pebbles, pale yellowish gray, slightly moist, moderately hard, bedded.			
		Bedding Attitude: @ 4 feet, 1	N60W, 43NE		
		Total Depth 5 feet.			
		No water, no caving.			
EP-45	0 to 7	<u>ALLUVIUM (Qal):</u> Silty Sar moderate yellowish brown, de moderately dense at depth.	nd; very fine- to medium-grained, pale to ry to slightly moist at depth, loose to		
	7 to 14	Pebbly Sand; medium- to coa yellowish brown, moist, mod	rse-grained with cobbles, moderate erately dense.		
		Total Depth 14 feet. No water, no caving.			

WDJ-cp-2453RT03-pits

# TABLE II

# LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-46	0 to 2½	SOIL: Silty Sand; fine- to coarse-grained, dark yellowish brown, dry, loose, abundant roots and rootlets.			
	2½ to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone, medium- to coarse-grained with cobbles, yellow orange, slightly moist, moderately hard to hard, bedded.			
		Bedding Attitudes: @ 5 fe @ 8 fe	et, N55W, 36NE et, N40W, 32NE		
		Total Depth 9 feet. No water, no caving.			
EP-47	0 to 5	<u>COLLUVIUM (Qcol):</u> Silt pebbles, dark yellowish bro abundant roots and rootlets	y Sand; fine- to coarse-grained with wn, dry, loose to moderately dense,		
	5 to 9	SAUGUS FORMATION – Pebbly Sandstone; medium cobbles, yellowish gray, sli slightly layered, generally r	SUNSHINE RANCH MEMBER (Tsr): - to coarse-grained with pebbles and ghtly moist, moderately hard to hard, nassive, some scour in fill structures.		
		Bedding Attitude - Approx	imate: @ 8 feet, N50W, 30NE		
		Total Depth 9 feet.			
		No water, no caving.			

#### TABLE II

#### Depth Logged: 1-26-04 Log No. (ft.) Description By: CRN EP-101 0 to 2 SOIL: Sandy Silt; fine-, dark yellowish brown, slightly moist, loose, soft, abundant roots, and rootlets. 2 to 7 PICO FORMATION (Tp): Clayey Siltstone: pale yellowish green, slightly moist, moderately hard, massive to slightly bedded. Attitude: Bedding @ 4 feet, N30E 50 SE Total Depth 7 feet. COLLUVIUM (Qcol): Sandy Silt to Silty Sand; fine-grained, moderate to EP-102 0 to 7 light yellowish brown to yellowish green at depth, slightly moist, loose, abundant roots and rootlets. 7 to 9 PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive to slightly bedded, moderately weathered. Attitude: Bedding @ 8 feet, N70E 41 SE Total Depth 9 feet. EP-103 0 to 2 SOIL: Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets. 2 to 6 PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, upper 3 to 4+ feet highly weathered with abundant roots and rootlets. Total Depth 6 feet.

#### EXPLORATORY PITS

WDJ-cp-2453RT03-EP101-144

# TABLE II

## EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-104 0 to 2 2 to 7		SOIL/COLLUVIUM (Qcol): Clayey Silt; slightly moist, soft, abundant roots and roo	moderate yellowish brown, otlets.
		PICO FORMATION (Tp): Sandy Siltstone green, dry to slightly moist, moderate hard some shell fragments, some roots to depth.	CO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish een, dry to slightly moist, moderate hard, massive, weathered 2± feet, ome shell fragments, some roots to depth.
	_	Total Depth 7 feet.	
EP-105	0 to 5	<u>COLLUVIUM (Qcol)</u> : Sandy to Clayey Si pale yellowish green, slightly moist, loose,	ilt; moderate yellowish brown to , abundant roots and rootlets.
	5 to 8	PICO FORMATION (Tp): Sandy Siltstone green, dry to slightly moist, moderate hard some shell fragments, some roots to depth.	e; fine-grained, pale yellowish l, massive, weathered 2 <u>+</u> feet,
	-	Total Depth 8 feet.	
EP-106	0 to 10	<u>COLLUVIUM (Qcol):</u> Sandy to Clayey Si pale yellowish green, slightly moist, loose,	ilt; moderate yellowish brown to , abundant roots and rootlets.
	10 to 12	<u>PICO FORMATION (Tp):</u> Clayey Siltston moist, moderately hard, massive, moderate carbonate.	ne; pale yellowish green, slightly ely weathered, some white
		Total Depth 12 feet.	

WDJ-cp-2453RT03-EP101-144

# TABLE II

### EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-107	0 to 1	SOIL: Sandy to Clayey Silt; fine-grained slightly moist, loose, abundant roots and	1, moderate yellowish brown, rootlets.
	1 to 7	<u>PICO FORMATION (Tp)</u> : Silty Sandstor green, slightly moist, moderately hard, la 2± feet highly weathered with abundant carbonate.	one; fine-grained, pale yellowish aminated to $\frac{1}{2}$ inch bedding, top roots and rootlets, some white
		Attitude: Bedding @ 6 feet, N50E 53NV	v
		Total Depth 7 feet.	
EP-108 0 to	0 to 1	SOIL: Sandy to Clayey Silt; fine-grained slightly moist, loose, abundant roots and	l, moderate yellowish brown, rootlets.
1 to 6		<u>PICO FORMATION (Tp):</u> Silty Sandstor green, slightly moist, moderately hard to generally massive, upper 2 <u>+</u> feet highly	one; fine-grained, pale yellowish hard at depth, slightly bedded, weathered with abundant roots.
		Attitude: Bedding @ 5 feet, N10E 56NV	W
		Total Depth 6 feet.	
EP-109	0 to 2	SOIL: Sandy to Clayey Silt; fine-grained slightly moist, loose, abundant roots and	l, moderate yellowish brown, rootlets.
	2 to 7	PICO FORMATION (Tp): Silty Sandsto green, slightly moist, moderately hard, la 2± feet highly weathered.	one; fine-grained, pale yellowish aminated to $\frac{1}{2+}$ inch bedding, top
		Attitude: Bedding @ 6 feet, N80E 36NV	Ŵ
		Total Depth 7 feet.	

WDJ-cp-2453RT03-EP101-144

#### TABLE II

#### EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-110	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-graine slightly moist, loose, abundant roots and re	ed, moderate yellowish brown, ootlets.
	2 to 8	<u>PICO FORMATION (Tp)</u> : Silty to Clayey yellowish green, slightly moist, moderately bedding, top 2 <u>+</u> feet highly weathered.	V Sandstone; fine-grained, pale y hard, laminated to ½± inch
		Attitude: Bedding @ 6 feet, E-W 57N	
		Total Depth 8 feet.	
EP-111 0 to 7		<u>COLLUVIUM (Qcol)</u> : Silty to Clayey Sar yellowish brown, slightly moist, loose, abu	nd; fine-grained, dark to moderate
7 to 9	<u>PICO FORMATION (Tp):</u> Silty Sandston- grained, pale yellowish green, slightly mot bedded, generally massive.	e; fine- with some medium- ist, moderately hard, slightly	
		Attitude: Bedding @ 8 feet, N50W 47NE	
		Total Depth 9 feet.	
EP-112	0 to 1	SOIL: Silty Sand to Sandy Silt; fine-graine slightly moist, loose, abundant roots and ro	ed, moderate yellowish brown, ootlets.
	1 to 6	PICO FORMATION (Tp): Silty Sandston green, slightly moist, moderately hard, top	e; fine-grained, pale yellowish 2 to $3\pm$ feet highly weathered.
		Attitude: Bedding @ 5 feet, N60E 52NE	
		Total Depth 6 feet.	

## TABLE II

# EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN	
EP-113	-113 0 to 2 <u>SOIL</u> : Silty Sand to Sandy Silt; fine-grained, moderate yello slightly moist, loose, abundant roots and rootlets.		ed, moderate yellowish brown, ootlets.	
	2 to 7	PICO FORMATION (Tp): Silty Sandston green, slightly moist, moderately hard, sli	e; fine-grained, pale yellowish ghtly bedded, generally massive	
		Total Depth 7 feet.		
EP-114	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silty to Clayey Sat brown to moderate yellowish brown at de abundant roots and rootlets.	<u>COLLUVIUM (Qcol)</u> : Silty to Clayey Sand; fine-grained, dark yellowish brown to moderate yellowish brown at depth, slightly moist, loose, abundant roots and rootlets.	
	6 to 8	PICO FORMATION (Tp): Silty Clayston reddish brown, moist, firm, generally mas	e; mottled olive and moderate sive, abundant white carbonate.	
		Attitude: Bedding @ 7 feet, N70W 46NE		
		Total Depth 8 feet.		
EP-115	0 to 3	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, moist, loose, abundant roots and rootlets.		
	3 to 7	<u>PICO FORMATION (Tp):</u> Clayey Sandst slightly moist to moist, moderately hard, 1 highly weathered with abundant white car	one; fine-grained, pale olive, aminated to massive, top 2 <u>+</u> fee bonate.	
		Attitude: Bedding @ 5 feet, EW33N		
_		Total Depth 7 feet.		
EP-116	0 to 2	SOIL: Silty Sand; very fine- to fine-grain moist, loose, abundant roots and rootlets.	ed, moderate yellowish brown,	
	2 to 9	<u>PICO FORMATION (Tp):</u> Silty Sandston some interbeded, medium- to coarse-grain yellowish gray, dry to slightly moist, med	e; very fine- to fine-grained, ned Sand with pebbles, pale ium hard, generally massive.	
		Attitude: Bedding @ 7 feet, E-W 37N		
		Total Depth 9 feet.		

### TABLE II

### EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN	
EP-117 0 to ½		SOIL: Silty Sand to Sandy Silt; fine-graine slightly moist, loose, abundant roots and ro	d, moderate yellowish brown, ootlets.	
	½ to 6	<u>PICO FORMATION (Tp):</u> Silty Sandstone pale yellowish green, slightly moist, moder massive, some shell fragments.	; very fine- to fine-grained, rately hard, slightly bedded,	
		Total Depth 6 feet.		
EP-118	0 to 4	SOIL/COLLUVIUM (Qcol): Silty Sand to moderate yellowish brown, slightly moist, rootlets.	SOIL/COLLUVIUM (Qcol): Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
4 to 6		<u>PICO FORMATION (Tp):</u> Clayey Sandsto yellowish green, slightly moist, moderate h massive.	one; fine-grained, moderate aard, slightly bedded, generally	
		Attitude: Approximate Bedding @ 5 feet; E-W 27N		
na,		Total Depth 6 feet.		
EP-119	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.		
	2 to 8	<u>PICO FORMATION (Tp):</u> Clayey Sandsto yellowish brown, slightly moist, loose, lam	one; fine-grained, moderate inated to $\frac{1}{2}$ inch bedding.	
		Attitude: Bedding @ 6 feet, N70W 55NE		
_		Total Depth 8 feet.		
EP-120	0 to 5	<u>COLLUVIUM (Qcol)</u> : Silty to Clayey San yellowish brown, slightly moist to moist, lo rootlets.	d; fine-grained, moderate bose, abundant roots and	
	5 to 7	<u>PICO FORMATION (Tp)</u> : Clayey Siltston moderately hard, massive, top $1\pm$ foot high white carbonate.	e; pale olive, slightly moist, ly weathered with abundant	
		Total Depth 7 feet.		

# TABLE II

#### EXPLORATORY PITS

Log No,	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-121	0 to 1	SOIL: Silty Sand; fine-grained, moderate yel loose, abundant roots and rootlets.	lowish brown, slightly moist,
1 to 6		<u>PICO FORMATION (Tp):</u> Clayey Siltstone; slightly moist, moderately hard to hard at dep	fine-grained, pale yellowish, oth, $\frac{1}{2}$ inch bedding.
		Attitude: Bedding @ 4 feet, E-W 40N	
		Total Depth 6 feet.	
EP-122 0 to 1 1 to 6	0 to 1	SOIL: Silty Sand; fine-grained, moderate yel loose, abundant roots and rootlets.	lowish brown, slightly moist,
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; moist, moderately hard to hard at depth, lami	fine-, pale yellowish, slightly nated to $\frac{1}{2}$ inch bedding.
		Attitude: Bedding @ 5 feet, N80E 46NW	
		Total Depth 6 feet.	
EP-123	0 to 1	SOIL: Sandy Silt to Silty Sand; fine-grained, slightly moist, loose, abundant roots and root	moderate yellowish brown, tlets.
	1 to 7	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; slightly moist, moderately hard, laminated to highly weathered.	fine-grained, pale olive, ½± inch bedding, top 2± fee
		Attitude: Bedding @ 5 feet, N70E 48NW	
		Total Depth 7 feet.	

WDJ-cp-2453RT03-EP101-144

# TABLE II

### EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-124 0 to ½		SOIL: Sandy Silt to Silty Sand; fine-grained slightly moist, loose, abundant roots and root	l, moderate yellowish brown, otlets.
	½ to 6	<u>PICO FORMATION (Tp)</u> : Silty Sandstone; pale yellowish green, slightly moist, modera inch bedding, top 2 <u>+</u> feet highly weathered.	; very fine- to fine-grained, ately hard, laminated to $\frac{1}{2+}$
		Attitude: Bedding @ 4 feet, N70E 52NE Joint @ 4 feet, N25E Vertical	
		Total Depth 6 feet.	
EP-125	0 to 1	SOIL: Sandy Silt to Silty Sand; fine- to coar and cobbles, moderate yellowish brown, slip roots and rootlets.	rse-grained with some pebbles ghtly moist, loose, abundant
	1 to 5	<u>PICO FORMATION (Tp):</u> Silty Sandstone; grey, dry to slightly moist, moderately hard interlayered medium- to coarse-grained San	; fine-grained, pale yellowish to hard at depth, some thinly d lenses, generally massive.
		Attitude: Bedding @ 4 feet, N80W 52NE	
		Total Depth at 5 feet.	
EP-126	1 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand to S moderate yellow brown, slightly moist, loos	Sand, Silt; fine-grained, se, abundant roots and rootlets
	3 to 7	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; yellowish green, dry to slightly moist, mode top $2\pm$ feet highly weathered with abundant	; fine-grained Sand, pale erately hard, ½± inch bedding, white carbonate.
		Attitude: Bedding @ 6 feet, N80E 36NW	
		Total Depth 7 feet.	

# TABLE II

### EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-127 0 to 9		<u>COLLUVIUM (Qcol)</u> : Silty Sand to Sand, S yellow brown, slightly moist, loose, abundar	Silt; fine-grained, moderate nt roots and rootlets.
	9 to 10	<u>PICO FORMATION (Tp):</u> Silty Claystone; to firm, some white carbonate.	olive, moist, moderately firm
		Total Depth 10 feet.	
EP-128	0 to 4	<u>COLLUVIUM/ALLUVIUM (Qcol/Qal)</u> : Silty Sand to Sandy Silt; fine- grained, moderate yellow brown, moist, loose to medium dense with depth, some roots and rootlets.	
	4 to 6	<u>PICO FORMATION (Tp)</u> ; Claystone; olive laminated to $1\pm$ inch bedding, slightly plasti	, moist, moderately firm, ic, some white carbonate.
		Attitude: Bedding @ 5 feet, N60W 52NE	
		Total Depth 6 feet.	
EP-129	0 to 5	<u>COLLUVIUM/ALLUVIUM (Qcol/Qal)</u> : Si grained with some basal cobbles, moderate medium dense with depth, some roots and re	lty Sand to Sandy Silt; fine- yellow brown, moist, loose to ootlets.
	5 to 7	<u>PICO FORMATION (Tp)</u> : Claystone; olive laminated to $1\pm$ inch bedding, slightly plasti	, moist, moderately firm, ic, some white carbonate.
		Attitude: Bedding @ 6 feet, N60W 42NE	
		Total Depth 7 feet.	

### TABLE II

### EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-130	EP-130 0 to 1 <u>SOIL</u> : Silty Sand to Sandy, Silt; fine-grained, moderate yello slightly moist, loose, abundant roots and rootlets.		ed, moderate yellow brown, potlets.
	1 to 7	<u>PICO FORMATION (Tp)</u> : Sandy Siltstone to Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to $\frac{1}{2}$ inch bedding, top 2 to 3 $\pm$ feet highly weathered with some roots and rootlets.	
		Attitude: Bedding @ 6 feet, N30E 33NW	
		Total Depth 7 Feet.	
EP-131 0 to 1 ¹ / ₂ <u>SOIL</u> : Silty Sand to Sandy, Silt; fine-grained, moderate yellow slightly moist, loose, abundant roots and rootlets.			ed, moderate yellow brown, potlets.
	1½ to 6	<u>PICO FORMATION (Tp) (south side of provide and moderate yellowish brown, sligh laminated to $1\pm$ inch bedding, highly jointer rootlets to depths.</u>	it): Silty Claystone; mottled tly moist, moderately hard, ed/fractured, some roots and
		Attitude: Bedding @ 5 feet, N40E 48NW	
		FAULT (2 to 3+ inches thick zone): Silty S dry, loose, some roots.	Sand; fine-grained, pale grey,
		Attitude: Fault @ 5 feet, N60W Vertical	
	1½ to 6	<u>PICO FORMATION (Tp) (north side of pi</u> grained, layered pale grey and pale olive, s 1 to $6\pm$ inch bedding, top $2\pm$ feet moderate	it): Silty Sandstone; fine- slightly moist, moderately hard, ely weathered.
		Attitude: Bedding @ 5 feet, N60W Vertica	al
		Total Depth 6 feet.	

WDJ-cp-2453RT03-EP101-144

### TABLE II

### EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-132	0 to 1	SOIL: Clayey Silt; moderate yellow brown, roots, rootlets and white carbonate.	slightly moist, loose, abundan
	1 to 7	<u>PICO FORMATION (Tp)</u> : Interbedded Silt moderate yellowish brown, slightly moist, n $1\pm$ inch bedding; with Silty Sandstone, fine- moist, moderately hard, 2 to $3\pm$ inch beddin feet highly weathered.	y Claystone; mottled olive and noderately hard, laminated to -grained, pale olive, slightly $rg$ , top $3\pm$ inch bedding, top $3\pm$
		Attitudes: Bedding @ 5 feet, N60W Vertica Bedding @ 6 feet, N30W Vertica	al al
		Total Depth 7 feet.	
EP-133	0 to ½	SOIL: Clayey Silt; moderate yellow brown, slightly moist, loose, abundan roots, rootlets and white carbonate.	
	½ to 6	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to $1\pm$ inch bedding, top $2\pm$ feet highly weathered with abundant rootlets and some white carbonate.	
		Attitude: Bedding @ 5 feet, N60E 69NW	
		Total Depth 6 feet.	
EP-134	0 to 3	SOIL: Clayey Silt with Sand; fine-grained, slightly moist, loose, abundant roots, rootlet	moderate yellow brown, ts and white carbonate.
	3 to 5	PICO FORMATION (Tp): Silty Sandstone; grey, dry, moderately hard, massive, abunda	; fine- to coarse-grained, pale ant shells.
	5 to 8	Silty Claystone; mottled olive and moderate moderately hard, slightly bedded generally	e yellow brown, slightly moist, massive.
		Attitude: Bedding @ 7 feet, N50W 58NE	
		Total Depth 8 feet.	

WDJ-cp-2453RT03-EP101-144

# TABLE II

### EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN		
EP-135	0 to 21/2	SOIL: Sandy Silt; fine-grained, moderate ye moist, loose, abundant roots and rootlets.	ellow brown, dry to slightly		
2½ to 7		<u>PICO FORMATION (Tp):</u> Silty Sandstone; slightly moist, loose, top 2 <u>+</u> feet highly wea	moderate yellow brown, thered with roots and rootlets.		
		Attitude: Bedding @ 6 feet, N60W 49NE			
		Total Depth 7 feet.			
EP-136	0 to 1	SOIL: Sandy Silt; fine-grained, moderate ye moist, loose, abundant roots and rootlets.	ellow brown, dry to slightly		
	1 to 8	<u>PICO FORMATION (Tp)</u> : Silty Claystone; moderate yellow brown, slightly moist, loose, top $3\pm$ feet highly weathered, with roots and rootlets; some interbedded Silty Sandstone, fine-grained, pale to moderate yellowish grey, dry, moderately hard, 1 to $2\pm$ inch bedding.			
		Attitude: Bedding @ 7 feet, N40W 72SW			
		Total Depth 8 feet.			
EP-137	0 to 5	SOIL/COLLUVIUM (Qcol): Sandy Silt to S moderate yellow brown, dry to slightly mois rootlets.	Silty Sand; fine-grained, st, loose, abundant roots and		
	5 to 12	<u>PICO FORMATION (Tp)</u> : Silty Claystone; slightly moist, loose, top 3± feet highly wea some interbedded Silty Sandstone, fine-grai yellowish grey, dry, moderately hard, 1 to 2	moderate yellow brown, thered, with roots and rootlets; ned, pale to moderate $\pm$ inch bedding.		
		Attitude: Bedding @ 11 feet, N50W 52NE			
		Total Depth 12 feet.			

WDJ-cp-2453RT03-EP101-144

# TABLE II

### EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN	
EP-138 0 to 7		SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure.		
		Attitude: Bedding @ 6 feet, N40W 37	NE	
	Note: Soil removed by dozer during recent fire fighting oper-		ecent fire fighting operations.	
		Total Depth 7 feet.		
EP-139	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, loose, some roots and rootlets.		
	½ to 5	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure.		
		Attitude: Approximate Bedding @ 4 f	eet E-W 30N	
		Total Depth 5 feet.		
EP-140	0 to ½	SOIL: Silty Sand; fine- to coarse-grain moderate yellowish brown, slightly m	ned with pebbles and cobbles, oist, loose, some roots and rootlets.	
	½ to 6	SAUGUS FORMATION-SUNSHINE Sandstone; fine- to coarse-grained wit yellowish brown to pale grey, slightly bedded generally massive with some s	E RANCH MEMBER (Tsr): Silty h pebbles and cobbles, pale moist, moderately hard, slightly scour fill structure.	
		Attitude: Bedding @ 5 feet, N80E 281	NW	

#### TABLE II

### EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN		
EP-141	0 to 3	SOIL: Silty to Clayey Sand; very fine- to medium-grained with some pebbles, dark yellowish brown, moist, soft, some roots and rootlets.			
	3 to 8	SAUGUS FORMATION-SUNSHINE RAI Gravelly Sandstone; fine- to coarse-grained some boulders up to 18± inches, pale yellow moderately hard, massive, matrix supported	NCH MEMBER (Tsr): I with pebbles and cobbles, wish brown, slightly moist, I, top 2 <u>+</u> feet highly weathered.		
		Total Depth 8 feet.			
EP-142	0 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate to dark yellow brown, moist, loose some roots and rootlets.			
	3 to 9	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Gravelly Sandstone; fine- to coarse-grained with pebbles and cobbles, p yellowish grey to pale grey, slightly moist, moderately hard, massive wi interlayered pebbles and cobbles lenses.			
		Attitude: Bedding @ 8 feet, E-W 33N			
	1.0	Total Depth 9 feet.			
EP-143	0 to ½	<u>SOIL</u> : Silty Sand; fine- to medium-grained slightly moist, loose, some roots and rootle Note: Some soil removed during recent fire	, moderate yellowish brown, ts. fighting operations.		
	½ to 6	SAUGUS FORMATION-SUNSHINE RAI Sandstone; fine- to medium-grained, pale g hard, slightly bedded generally massive.	NCH MEMBER (Tsr): Silty rey, slightly moist, moderately		
		Attitude: Bedding @ 4 feet, N60W 32NE			
		Total Depth 6 feet.			

WDJ-cp-2453RT03-EP101-144

## TABLE II

### EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-144	0 to 5	SOIL/COLLUVIUM (Qcol): Silty Sand; moderate yellow brown, slightly moist to rootlets.	fine- to medium-grained, o moist, loose, abundant roots and
	5 to 9	SAUGUS FORMATION-SUNSHINE R Sandstone; fine- to coarse-grained, pale g hard, massive with some interlayered pel Attitude: Bedding @ 7 feet, N70W 32NH	ANCH MEMBER (Tsr): Pebbly grey, slightly moist, moderately bble and cobbles lenses.
		122	

Total Depth 9 feet.

#### TABLE I

#### EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-201	0 to 2	SOIL: Sandy Clay; dark yellowish brown, slig common, clusters of small bi-valve shells.	htly moist, firm, rootlets
	2 to 9	SAUGUS FORMATION - SUNSHINE RANCE Siltstone; light olive gray with reddish brown su fractured, weathered.	<u>CH MEMBER (Tsr):</u> Sandy tain, dry, soft, highly
	@9	Fine- to medium-grained Sandstone, pinkish gr some pebbles, probable cross-bed.	ay, soft, poorly cemented,
		Bedding Attitude: N65E, 28NW	1
		Total Depth 9 feet.	
EP-202	0 to 2	SAUGUS FORMATION - SUNSHINE RANC to medium-grained Sandstone, pinkish gray, dr small cobbles.	<u>CH MEMBER (Tsr):</u> Fine- y, soft, many pebbles and
	2 to 5	Sandy Siltstone, pale yellowish brown, slightly fractured, rootlet to depth.	moist, soft, moderately
	5 to 6	Sandstone, pinkish gray, dry, soft.	
		Bedding Attitude: N55W, 35NE	
		Total Depth 6 feet.	
EP-203	0 to 2	SOIL: Sandy Silt; dark yellowish brown, sligh pebbles.	tly moist, stiff, many
	2 to 4 ¹ / ₂	SAUGUS FORMATION - SUNSHINE RANG to medium-grained Sandstone, pinkish gray, sli cemented.	<u>CH MEMBER (Tsr):</u> Fine- ightly moist, soft, poorly
	4½ to 7	Siltstone, light olive gray, slightly moist, soft to	o moderately hard.
		Bedding Attitude: N80E, 45NW	
		Total Depth 7 feet.	

#### TABLE I

### EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS		
EP-204 0 to 6 ¹ / ₂		SAUGUS FORMATION - SUNSHINE RAN coarse-grained Sandstone, soft to moderately pebble and small cobble beds and lenses.	CH MEMBER (Tsr): Fine- to hard, dry, poorly cemented,		
		Bedding Attitude: EW, 40N			
		Total Depth 6½ feet.			
EP-205	0 to 2	SOIL: Silty Clay; dark yellowish brown, moist, stiff, porous.			
	2 to 10	SAUGUS FORMATION - SUNSHINE RAN Siltstone, light olive gray, slightly moist, soft white carbonate pods common.	CH MEMBER (Tsr): Sandy to moderately hard at depth,		
	@6&8	Silty Sandstone; very light olive gray, slightly 12 inch thick interbeds.	v moist, moderately hard, 6 to		
		Bedding Attitude: N85W, 30NE			
		Ring and Bulk samples at 6 and 10 feet.			
		Total Depth 8 feet.			
EP-206	0 to 1/4	SOIL: Sandy Silt; moderate yellowish brown	ı, dry, firm, porous.		
	¼ to 5	SAUGUS FORMATION - SUNSHINE RAN medium-grained Sandstone, pinkish gray, dry poorly cemented, roots to depth.	ICH MEMBER (Tsr): Fine- to v, soft to moderately hard,		
	@ 3	8 to 10-inch thick Silty Sandstone-pebble con dry, soft, one small cobble.	glomerate, grayish orange,		
		Bedding Attitude: N70W, 45NE			
		Total Depth 5 feet.			

### TABLE I

# EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-207	0 to ½	SOIL: Sandy Silt; dark yellowish brown, moist, firm, abundant rootlets.	
	1/2 to 31/2	PICO FORMATION (Tp): Silty Sandstone; very yellowish gray, slightly moist, soft, red brown sta	pale orange to in common.
		Bedding Attitude: N55W, 40NE	
		Total Depth 3½ feet.	

NUWI – Lyons Canyon, LLC September 15, 2023 2020-200-001

### **APPENDIX C**

# LABORATORY TESTING



NUWI – Lyons Canyon LLC September 15, 2023 2020-200-001

#### **APPENDIX C**

#### LABORATORY TESTING

Laboratory tests were performed on selected samples obtained from the referenced field explorations (TRF&A, 2021a) and recent test pits to aid in the classification of the soils and to determine their engineering properties.

Direct shear tests were performed on selected undisturbed samples to determine the strength of the soils. The tests were performed after soaking the samples to near-saturated moisture content and at various surcharge pressures. The strength values determined from the direct shear tests are presented on the Shear Test Data page.

Confined consolidation tests were performed on remolded samples. Water was added during the tests to each of the samples to illustrate the effect of moisture on the compressibility. The results of the tests are presented on the Consolidation Test Data pages.

Atterberg limits (liquid and plastic limit) tests were conducted on selected samples to aid in classifying the soils and determining index properties. Test results are presented on the attached graphic, "Atterberg Limit's Test Data."

A sieve analysis was used to determine the distribution of grain sizes in selected soil samples. The results of the sieve analysis tests are presented as an attachment to this report.

<u>Maximum Density Tests</u>: The maximum dry densities and optimum moisture contents of bulk soil samples obtained from the test borings were determined in our laboratory in accordance with the current ASTM Soil Compaction Method D1557. The optimum moisture contents are in percent of dry weight and the maximum dry densities are in pounds per cubic foot (pcf). The double-letter soil classification that follows each soil description is in accordance with the Uniform Soil Classification System (ASTM D2487). The results of the maximum dry density tests are as follows:

Sample	Soil Description and Classification	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
TP-1 @ 10'	SANDY CLAY (CL) very fine to medium with occasional coarse, medium brown	123.0	12.0
TP-8 @ 10'	SANDY CLAY (CL) fine to medium, dark brown	121.0	13.5
TP-17 @ 6'	SILTY SAND (SM) very fine to fine, light brown	115.0	13.0



GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY
























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NUWI – Lyons Canyon, LLC September 15, 2023 2020-200-001

## **APPENDIX D**

# **SLOPE STABILITY ANALYSES**

























NUWI – Lyons Canyon, LLC September 15, 2023 2020-200-001

# **APPENDIX E**

# **GREGG CPT SOUNDINGS**





January 14, 2021

RT Frankian Attn: Matt Marin

Subject: CPT Site Investigation Lyons Canyon Stevenson Ranch, California GREGG Project Number: D1215005

Dear Mr. Marin:

The following report presents the results of GREGG Drilling Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	$\square$
2	Pore Pressure Dissipation Tests	(PPD)	$\square$
3	Seismic Cone Penetration Tests	(SCPTU)	$\square$
4	UVOST Laser Induced Fluorescence	(UVOST)	
5	Groundwater Sampling	(GWS)	
6	Soil Sampling	(SS)	
7	Vapor Sampling	(VS)	
8	Pressuremeter Testing	(PMT)	
9	Vane Shear Testing	(VST)	
10	Dilatometer Testing	(DMT)	

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact me at 949-903-6873.

Sincerely, Gregg Drilling, LLC.

CPT Reports Team Gregg Drilling, LLC.



### Cone Penetration Test Sounding Summary

-Table 1-

CPT Sounding	Date	Termination	Depth of Groundwater	Depth of Soil	Depth of Pore Pressure
Identification		Depth (feet)	Samples (feet)	Samples (feet)	Dissipation Tests (feet)
CPT-03	1/13/2021	34.45	-	-	34.4
CPT-04	1/13/2021	39.7	-	-	39.7
CPT-05	1/13/2021	50.36	-	-	-
SCPT-01	1/13/2021	36.42	-	-	-
SCPT-02	1/13/2021	30.02	-	-	30.0



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Mayne, P.W., "NHI (2002) Manual on Subsurface Investigations: Geotechnical Site Characterization", available through <a href="http://www.ce.gatech.edu/~qeosys/Faculty/Mayne/papers/index.html">www.ce.gatech.edu/~qeosys/Faculty/Mayne/papers/index.html</a>, Section 5.3, pp. 107-112.

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Woeller, D.J., P.K. Robertson, T.J. Boyd and Dave Thomas, "Detection of Polyaromatic Hydrocarbon Contaminants Using the UVIF-CPT", 53rd Canadian Geotechnical Conference Montreal, QC October pp. 733-739, 2000.

Zemo, D.A., T.A. Delfino, J.D. Gallinatti, V.A. Baker and L.R. Hilpert, "Field Comparison of Analytical Results from Discrete-Depth Groundwater Samplers" BAT EnviroProbe and QED HydroPunch, Sixth national Outdoor Action Conference, Las Vegas, Nevada Proceedings, 1992, pp 299-312.

Copies of ASTM Standards are available through www.astm.org

# Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*.

The cone takes measurements of tip resistance  $(q_c)$ , sleeve resistance  $(f_s)$ , and penetration pore water pressure  $(u_2)$ . Measurements are taken at either 2.5 or 5 cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating onsite decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the  $u_2$  location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (*PPDT*). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.







# Gregg 15cm² Standard Cone Specifications

Dimensions	i
Cone base area	15 cm ²
Sleeve surface area	225 cm ²
Cone net area ratio	0.80
	•
Specification	IS
Cone load cell	
Full scale range	180 kN (20 tons)
Overload capacity	150%
Full scale tip stress	120 MPa (1,200 tsf)
Repeatability	120 kPa (1.2 tsf)
Sleeve load cell	
Full scale range	31 kN (3.5 tons)
Overload capacity	150%
Full scale sleeve stress	1,400 kPa (15 tsf)
Repeatability	1.4 kPa (0.015 tsf)
Pore pressure transducer	
Full scale range	7,000 kPa (1,000 psi)
Overload capacity	150%
Repeatability	7 kPa (1 psi)

Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.



# Cone Penetration Test Data & Interpretation

(1986). interpretation methods require input of the groundwater level to calculate vertical effective stress. software and does not assume any liability for use of the results in any design or review. The user various geotechnical parameters using current published correlations based on the comprehensive spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and results, but should be verified by the user. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT should be fully aware of the techniques and limitations of any method used in the software. Some the correctness or the applicability of any of the geotechnical parameters interpreted by the geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. does not warranty (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson Robertson (1990) which can be displayed as SBTn, upon request. Robertson (1990). report. The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the For CPT soundings deeper than 30m, we recommend the use of the normalized charts of The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Typical plots display SBT based on the non-normalized charts of Robertson et al The report also includes

referenced in the data are with respect to the existing ground surface. A summary of locations and depths is available in Table 1. Note that all penetration depths

situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type. Note that it is not always possible to clearly identify a soil type based solely on  $q_t$ ,  $f_s$ , and  $u_2$ . In these



Cone Bearing (bar), Qt

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Figure SBT (After Robertson et al., 1986) – Note: Colors may vary slightly compared to plots


# Cone Penetration Test (CPT) Interpretation

Gregg uses a proprietary CPT interpretation and plotting software. The software takes the CPT data and performs basic interpretation in terms of soil behavior type (SBT) and various geotechnical parameters using current published empirical correlations based on the comprehensive review by Lunne, Robertson and Powell (1997). The interpretation is presented in tabular format using MS Excel. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

The following provides a summary of the methods used for the interpretation. Many of the empirical correlations to estimate geotechnical parameters have constants that have a range of values depending on soil type, geologic origin and other factors. The software uses 'default' values that have been selected to provide, in general, conservatively low estimates of the various geotechnical parameters.

### Input:

- 1 Units for display (Imperial or metric) (atm. pressure, p_a = 0.96 tsf or 0.1 MPa)
- 2 Depth interval to average results (ft or m). Data are collected at either 0.02 or 0.05m and can be averaged every 1, 3 or 5 intervals.
- 3 Elevation of ground surface (ft or m)
- 4 Depth to water table,  $z_w$  (ft or m) input required
- 5 Net area ratio for cone, a (default to 0.80)
- 6 Relative Density constant, C_{Dr} (default to 350)
- 7 Young's modulus number for sands,  $\alpha$  (default to 5)
- 8 Small strain shear modulus number
  - a. for sands,  $S_G$  (default to 180 for  $SBT_n$  5, 6, 7)
  - b. for clays,  $C_G$  (default to 50 for SBT_n 1, 2, 3 & 4)
- 9 Undrained shear strength cone factor for clays, N_{kt} (default to 15)
- 10 Over Consolidation ratio number, k_{ocr} (default to 0.3)
- 11 Unit weight of water, (default to  $\gamma_w = 62.4 \text{ lb/ft}^3 \text{ or } 9.81 \text{ kN/m}^3$ )

### Column

- 1 Depth, z, (m) CPT data is collected in meters
- 2 Depth (ft)
- 3 Cone resistance, q_c (tsf or MPa)
- 4 Sleeve resistance, f_s (tsf or MPa)
- 5 Penetration pore pressure, u (psi or MPa), measured behind the cone (i.e. u₂)
- 6 Other any additional data
- 7 Total cone resistance,  $q_t$  (tsf or MPa)  $q_t = q_c + u (1-a)$



8	Friction Ratio, R _f (%)	$R_{f} = (f_{s}/q_{t}) \times 100\%$
9	Soil Behavior Type (non-normalized), SBT	see note
10	Unit weight, γ (pcf or kN/m³)	based on SBT, see note
11	Total overburden stress, σ _v (tsf)	$\sigma_{vo} = \sigma z$
12	In-situ pore pressure, u _o (tsf)	$u_o = \gamma_w (z - z_w)$
13	Effective overburden stress, $\sigma'_{vo}$ (tsf )	$\sigma'_{vo} = \sigma_{vo} - u_o$
14	Normalized cone resistance, Q _{t1}	$Q_{t1}=(q_t - \sigma_{vo}) / \sigma'_{vo}$
15	Normalized friction ratio, F _r (%)	$F_r = f_s / (q_t - \sigma_{vo}) \times 100\%$
16	Normalized Pore Pressure ratio, Bq	$B_q = u - u_o / (q_t - \sigma_{vo})$
17	Soil Behavior Type (normalized), SBT _n	see note
18	SBT _n Index, I _c	see note
19	Normalized Cone resistance, $Q_{tn}$ (n varies with $I_c$ )	see note
20	Estimated permeability, k _{SBT} (cm/sec or ft/sec)	see note
21	Equivalent SPT N ₆₀ , blows/ft	see note
22	Equivalent SPT (N ₁ ) ₆₀ blows/ft	see note
23	Estimated Relative Density, Dr, (%)	see note
24	Estimated Friction Angle, φ', (degrees)	see note
25	Estimated Young's modulus, E _s (tsf)	see note
26	Estimated small strain Shear modulus, Go (tsf)	see note
27	Estimated Undrained shear strength, s _u (tsf)	see note
28	Estimated Undrained strength ratio	s _u /σ _v ′
29	Estimated Over Consolidation ratio. OCR	see note

#### Notes:

- 2 Unit weight, γ either constant at 119 pcf or based on Non-normalized SBT (Lunne et al., 1997 and table below)
- 3 Soil Behavior Type (Normalized), SBT_n Lunne et al. (1997)
- 4 SBT_n Index, I_c  $I_c = ((3.47 \log Q_{t1})^2 + (\log F_r + 1.22)^2)^{0.5}$
- 5 Normalized Cone resistance, Q_{tn} (n varies with Ic)

 $Q_{tn} = ((q_t - \sigma_{vo})/pa) (pa/(\sigma'_{vo})^n and recalculate I_c, then iterate:$ 

 $\begin{array}{ll} \mbox{When } I_c < 1.64, & n = 0.5 \mbox{ (clean sand)} \\ \mbox{When } I_c > 3.30, & n = 1.0 \mbox{ (clays)} \\ \mbox{When } 1.64 < I_c < 3.30, & n = (I_c - 1.64) 0.3 + 0.5 \\ \mbox{Iterate until the change in } n, \ensuremath{\Delta n} < 0.01 \\ \end{array}$ 



7	Equivalent SPT $N_{60}$ , blows/ft	Lunne et al. (1997)
	$\frac{(q_t)}{N}$	$\left(\frac{p_{a}}{V_{60}}\right) = 8.5 \left(1 - \frac{I_{c}}{4.6}\right)$
8	Equivalent SPT (N ₁ ) ₆₀ blows/ft where $C_N$ = (pa/ $\sigma'_{vo}$ ) ^{0.5}	$(N_1)_{60} = N_{60} C_{N_r}$
9	Relative Density, Dr, (%) Only SBTn 5, 6, 7 & 8	D _r ² = Q _{tn} / C _{Dr} Show 'N/A' in zones 1, 2, 3, 4 & 9
10	Friction Angle, φ', (degrees)	$\tan \phi' = \frac{1}{2.68} \left[ \log \left( \frac{q_c}{\sigma'_{vo}} \right) + 0.29 \right]$
	Only SBT _n 5, 6, 7 & 8	Show'N/A' in zones 1, 2, 3, 4 & 9
11	Young's modulus, E _s Only SBT _n 5, 6, 7 & 8	E _s = α q _t Show 'N/A' in zones 1, 2, 3, 4 & 9
12	Small strain shear modulus, Go a. $G_o = S_G (q_t \sigma'_{vo} pa)^{1/3}$ b. $G_o = C_G q_t$	For SBT _n 5, 6, 7 For SBT _n 1, 2, 3& 4 Show 'N/A' in zones 8 & 9
13	Undrained shear strength, s _u Only SBT _n 1, 2, 3, 4 & 9	s _u = (q _t - σ _{vo} ) / N _{kt} Show 'N/A' in zones 5, 6, 7 & 8
14	Over Consolidation ratio, OCR Only SBT _n 1, 2, 3, 4 & 9	OCR = k _{ocr} Q _{t1} Show 'N/A' in zones 5, 6, 7 & 8

The following updated and simplified SBT descriptions have been used in the software:

SBT Zones		<b>SBT</b> _n	SBT _n Zones	
1	sensitive fine grained	1	sensitive fine grained	
2	organic soil	2	organic soil	
3	clay	3	clay	
4	clay & silty clay	4	clay & silty clay	
5	clay & silty clay			

Revised 02/05/2015

6

sandy silt & clayey silt

6



7	silty sand & sandy silt	5	silty sand & sandy silt
8	sand & silty sand	6	sand & silty sand
9	sand		
10	sand	7	sand
11	very dense/stiff soil*	8	very dense/stiff soil*
12	very dense/stiff soil*	9	very dense/stiff soil*
*heavil	y overconsolidated and/or ceme	ented	

Track when soils fall with zones of same description and print that description (i.e. if soils fall only within SBT zones 4 & 5, print 'clays & silty clays')



### Estimated Permeability (see Lunne et al., 1997)

SBTn	Permeability (ft/sec)	(m/sec)
1	3x 10 ⁻⁸	1x 10 ⁻⁸
2	3x 10 ⁻⁷	1x 10 ⁻⁷
3	1x 10 ⁻⁹	3x 10 ⁻¹⁰
4	3x 10 ⁻⁸	1x 10 ⁻⁸
5	3x 10 ⁻⁶	1x 10 ⁻⁶
6	3x 10 ⁻⁴	1x 10 ⁻⁴
7	3x 10 ⁻²	1x 10 ⁻²
8	3x 10 ⁻⁶	1x 10 ⁻⁶
9	1x 10 ⁻⁸	3x 10 ⁻⁹

### Estimated Unit Weight (see Lunne et al., 1997)

Approximate Unit Weight (lb/ft ³ )	(kN/m³)
111.4	17.5
79.6	12.5
111.4	17.5
114.6	18.0
114.6	18.0
114.6	18.0
117.8	18.5
120.9	19.0
124.1	19.5
127.3	20.0
130.5	20.5
120.9	19.0
	Approximate Unit Weight (lb/ft ³ ) 111.4 79.6 111.4 114.6 114.6 114.6 117.8 120.9 124.1 127.3 130.5 120.9



# Pore Pressure Dissipation Tests (PPDT)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals can be used to measure equilibrium water pressure (at the time of the CPT). If conditions are hydrostatic, the equilibrium water pressure can be used to determine the approximate depth of the ground water table. A PPDT is conducted when penetration is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure (u) with time is measured behind the tip of the cone and recorded.

Pore pressure dissipation data can be interpreted to provide estimates of:

- Equilibrium piezometric pressure
- Phreatic Surface
- In situ horizontal coefficient of consolidation (*c*_h)
- In situ horizontal coefficient of permeability (k_h)

In order to correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until it reaches equilibrium, *Figure PPDT*. This time is commonly referred to as  $t_{100}$ , the point at which 100% of the excess pore pressure has dissipated.

A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1992 and Lunne et al. 1997.

A summary of the pore pressure dissipation tests are summarized in Table 1.



Figure PPDT



# Seismic Cone Penetration Testing (SCPT)

Seismic Cone Penetration Testing (SCPT) can be conducted at various intervals during the Cone Penetration Test. Shear wave velocity (Vs) can then be calculated over a specified interval with depth. A small interval for seismic testing, such as 1-1.5m (3-5ft) allows for a detailed look at the shear wave profile with depth. Conversely, a larger interval such as 3-6m (10-20ft) allows for a more average shear wave velocity to be calculated. Gregg's cones have a horizontally active geophone located 0.2m (0.66ft) behind the tip.

To conduct the seismic shear wave test, the penetration of the cone is stopped and the rods are decoupled from the rig. An automatic hammer is triggered to send a shear wave into the soil. The distance from the source to the cone is calculated knowing the total depth of the cone and the horizontal offset distance between the source and the cone. To calculate an interval velocity, a minimum of two tests must be

performed at two different depths. The arrival times between the two wave traces are compared to obtain the difference in time ( $\Delta$ t). The difference in depth is calculated ( $\Delta$ d) and velocity can be determined using the simple equation: v =  $\Delta$ d/ $\Delta$ t

Multiple wave traces can be recorded at the same depth to improve quality of the data.

A complete reference on seismic cone penetration tests is presented by Robertson et al. 1986 and Lunne et al. 1997.

A summary the shear wave velocities, arrival times and wave traces are provided with the report.



Figure SCPT



# **Groundwater Sampling**

Gregg Drilling & Testing, Inc. conducts groundwater sampling using a sampler as shown in *Figure GWS*. The groundwater sampler has a retrievable stainless steel or disposable PVC screen with steel drop off tip. This allows for samples to be taken at multiple depth intervals within the same sounding location. In areas of slower water recharge, provisions may be made to set temporary PVC well screens during sampling to allow the pushing equipment to advance to the next sample location while the groundwater is allowed to infiltrate.

The groundwater sampler operates by advancing 44.5mm (1³/₄ inch) hollow push rods with the filter tip in a closed configuration to the base of the desired sampling interval. Once at the desired sample depth, the push rods are retracted; exposing the encased filter screen and allowing groundwater to infiltrate hydrostatically from the formation into the inlet screen. A small diameter bailer (approximately ½ or ¾ inch) is lowered through the push rods into the screen section for sample collection. The number of downhole trips with the bailer and time necessary to complete the sample collection at each depth interval is a function of sampling protocols, volume requirements, and the yield characteristics and storage capacity of the formation. Upon completion of sample collection, the push rods and sampler, with the exception of the PVC screen and steel drop off tip are retrieved to the ground surface, decontaminated and prepared for the next sampling event.

For a detailed reference on direct push groundwater sampling, refer to Zemo et. al., 1992.



Figure GWS



# Soil Sampling

Gregg Drilling & Testing, Inc. uses a piston-type push-in sampler to obtain small soil samples without generating any soil cuttings, Figure SS. Two different types of samplers (12 and 18 inch) are used depending on the soil type and density. The soil sampler is initially pushed in a "closed" position to the desired sampling interval using the CPT pushing equipment. Keeping the sampler closed minimizes the potential of cross contamination. The inner tip of the sampler is then retracted leaving a hollow soil sampler with inner 1¼" diameter sample tubes. The hollow sampler is then pushed in a locked "open" position to collect a soil sample. The filled sampler and push rods are then retrieved to the ground surface. Because the soil enters the sampler at a constant rate, the opportunity for 100% recovery is increased. For environmental analysis, the soil sample tube ends are sealed with Teflon and plastic caps. Often, a longer "split tube" can be used for geotechnical sampling.

For a detailed reference on direct push soil sampling, refer to Robertson et al, 1998.



Figure SS





FIELD REP: MATT M

Total depth: 34.45 ft, Date: 1/13/2021

#### **CLIENT: RT FRANKIAN**

### SITE: LYONS CANYON, STEVENSON RANCH, CA



# CPeT-IT v.19.0.1.24 - CPTU data presentation & interpretation software - Report created on: 1/14/2021, 10:21:32 AM Project file: C:\CPT-2021\5005SH\REPORT\215005SH.cpt



FIELD REP: MATT M

Total depth: 34.45 ft, Date: 1/13/2021

#### CLIENT: RT FRANKIAN



CPeT-IT v.19.0.1.24 - CPTU data presentation & interpretation software - Report created on: 1/14/2021, 10:21:32 AM Project file: C:\CPT-2021\5005SH\REPORT\215005SH.cpt



FIELD REP: MATT M

Total depth: 39.70 ft, Date: 1/13/2021

#### **CLIENT: RT FRANKIAN**





FIELD REP: MATT M

Total depth: 39.70 ft, Date: 1/13/2021

#### **CLIENT: RT FRANKIAN**





FIELD REP: MATT M

Total depth: 50.36 ft, Date: 1/13/2021

#### CLIENT: RT FRANKIAN





FIELD REP: MATT M

Total depth: 50.36 ft, Date: 1/13/2021

#### **CLIENT: RT FRANKIAN**



CPeT-IT v.19.0.1.24 - CPTU data presentation & interpretation software - Report created on: 1/14/2021, 10:21:32 AM Project file: C:\CPT-2021\5005SH\REPORT\215005SH.cpt



FIELD REP: MATT M

Total depth: 36.42 ft, Date: 1/13/2021

#### CLIENT: RT FRANKIAN





FIELD REP: MATT M

Total depth: 36.42 ft, Date: 1/13/2021

#### CLIENT: RT FRANKIAN





FIELD REP: MATT M

Total depth: 30.02 ft, Date: 1/13/2021

#### CLIENT: RT FRANKIAN





FIELD REP: MATT M

Total depth: 30.02 ft, Date: 1/13/2021

#### CLIENT: RT FRANKIAN



CPeT-IT v.19.0.1.24 - CPTU data presentation & interpretation software - Report created on: 1/14/2021, 10:21:33 AM Project file: C:\CPT-2021\5005SH\REPORT\215005SH.cpt



FIELD REP: MATT M

Total depth: 36.42 ft, Date: 1/13/2021

#### CLIENT: RT FRANKIAN





FIELD REP: MATT M

Total depth: 30.02 ft, Date: 1/13/2021

#### **CLIENT: RT FRANKIAN**







### **Shear Wave Velocity Calculations**

LYONS CANYON

- SCPT-01 SCPT-05

Geophone	e Offset:	0.66 Feet
Source	e Offset:	1.67 Feet

Waveform Incremental Characteristic Incremental Interval Interval Test Depth Geophone Ray Path Distance Arrival Time Time Interval Velocity Depth (Feet) Depth (Feet) (Feet) (Feet) (Ft/Sec) (ms) (ms) (Feet) 5.58 4.92 30.0000 5.19 5.19 10.50 9.84 9.98 4.79 36.6500 6.6500 719.7 7.38 15.58 14.92 15.02 5.04 43.8500 7.2000 699.7 12.38 20.67 20.01 20.08 5.06 49.1000 5.2500 17.47 964.1 24.50 4.42 25.10 24.44 55.5000 6.4000 690.1 22.22 29.85 29.90 30.51 5.40 57.1500 1.6500 3274.6 27.15 35.10 34.44 34.49 4.59 61.9000 4.7500 965.7 32.15 35.76 35.80 36.42 1.31 63.8000 1.9000 689.9 35.10

01/13/21





# Shear Wave Velocity Calculations

SCPT-02

Geophone Offset:	0.66 Feet
Source Offset:	1.67 Feet

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
5.74	5.08	5.35	5.35	14.4500			
10.33	9.67	9.82	4.47	18.7000	4.2500	1051.5	7.38
15.42	14.76	14.85	5.04	23.9500	5.2500	959.3	12.22
20.34	19.68	19.75	4.90	28.9000	4.9500	989.5	17.22
25.26	24.60	24.66	4.91	33.5500	4.6500	1055.3	22.14

01/13/21







## **GREGG DRILLING & TESTING**

**Pore Pressure Dissipation Test** 

Sounding: SCPT-02 Depth (ft): 30.02 Site: LYONS CANYON Engineer: MATT M



Time (seconds)

NUWI – Lyons Canyon, LLC September 15, 2023 2020-200-001

### **APPENDIX F**

### **SEISMIC PARAMETERS**





### **Search Information**

34.369896, -118.562368
1321 ft
2021-02-03T00:42:28.306Z
Seismic
ASCE7-16
II
D



### **Basic Parameters**

Name	Value	Description
SS	2.494	MCE _R ground motion (period=0.2s)
S ₁	0.849	MCE _R ground motion (period=1.0s)
S _{MS}	2.494	Site-modified spectral acceleration value
S _{M1}	* null	Site-modified spectral acceleration value
S _{DS}	1.663	Numeric seismic design value at 0.2s SA
S _{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

### Additional Information

Name	Value	Description
SDC	* null	Seismic design category
Fa	1	Site amplification factor at 0.2s
Fv	* null	Site amplification factor at 1.0s
CR _S	0.908	Coefficient of risk (0.2s)
CR ₁	0.893	Coefficient of risk (1.0s)
PGA	1.062	MCE _G peak ground acceleration
F _{PGA}	1.1	Site amplification factor at PGA
PGA _M	1.168	Site modified peak ground acceleration
TL	8	Long-period transition period (s)

https://hazards.atcouncil.org/#/seismic?lat=34.369896&Ing=-118.562368&address=

2/2/2021			ATC Hazards by Location				
	SsRT	2.494	Probabilistic risk-targeted ground motion (0.2s)				
	SsUH	2.747	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)				
	SsD	2.713	Factored deterministic acceleration value (0.2s)				
	S1RT	0.892	Probabilistic risk-targeted ground motion (1.0s)				
	S1UH	1	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)				
	S1D	0.849	Factored deterministic acceleration value (1.0s)				
	PGAd	1.092	Factored deterministic acceleration value (PGA)				

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

### **Disclaimer**

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the report.

U.S. Geological Survey - Earthquake Hazards Program

# Uni. ed Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the <u>U.S. Seismic Design Maps web tools</u> (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

<ul> <li>Input</li> </ul>							
Edition	Spectral Period						
Dynamic: Conterminous U.S. 2014 (u	Peak Ground Acceleration						
Latitude	Time Horizon						
Decimal degrees	Return period in years						
34.369896	2475						
Longitude							
Decimal degrees, negative values for western longitudes							
-118.562368							
Site Class							
259 m/s (Site class D)							
<u>,</u>							



2/5



## Summary statistics for, Deaggregation: Total

Deaggregation targets	Recovered targets					
Return period: 2475 yrs	Return period: 3149.6892 yrs					
<b>Exceedance rate:</b> 0.0004040404 yr ⁻¹ <b>PGA ground motion:</b> 1.0417615 g	<b>Exceedance rate:</b> 0.00031749164 yr ⁻¹					
Totals	Mean (over all sources)					
Binned: 100 %	<b>m:</b> 6.85					
Residual: 0 %	<b>r:</b> 7.27 km					
<b>Trace:</b> 0.04 %	ε.: 1.6 σ					
Mode (largest m-r bin)	Mode (largest m-r-ɛº bin)					
<b>m:</b> 7.52	<b>m:</b> 7.51					
<b>r:</b> 5.72 km	<b>r:</b> 5.72 km					
<b>ε</b> ₀ : 1.21 σ	ε.: 1.18 σ					
Contribution: 15.27 %	<b>Contribution:</b> 10.16 %					
Discretization	Epsilon keys					
<b>r:</b> min = 0.0, max = 1000.0, Δ = 20.0 km	<b>ε0:</b> [-∞2.5)					
<b>m:</b> min = 4.4, max = 9.4, $\Delta$ = 0.2	<b>ε1:</b> [-2.52.0)					
ε: min = -3.0, max = 3.0, $\Delta$ = 0.5 σ	<b>ε2:</b> [-2.01.5)					
	<b>ε3:</b> [-1.51.0)					
	<b>ε4:</b> [-1.00.5)					
	<b>ε5:</b> [-0.50.0)					
	<b>ε6:</b> [0.00.5)					
	<b>ε7:</b> [0.51.0)					
	<b>ε8:</b> [1.01.5)					
	<b>ε9:</b> [1.5 2.0]					
	<b>ε10:</b> [2.02.5]					

### **Deaggregation Contributors**

Source Set Ly Source	Туре	r	m	٤0	lon	lat	az	%
UC33brAvg_FM32	System							38.97
Santa Susana alt 2 [3]	-	5.78	7.15	1.32	118.574°W	34.313°N	189.35	22.61
Northridge Hills [1]		5.64	7.65	1.06	118.608°W	34.305°N	210.41	4.59
Santa Susana alt 2 [2]		6.28	6.47	1.68	118.528°W	34.317°N	152.08	2.52
Northridge [2]		8.54	7.50	1.41	118.576°W	34.358°N	222.71	2.19
Holser alt 2 [1]		6.07	7.49	1.25	118.570°W	34.423°N	353.48	1.09
Santa Susana East (connector) [0]		8.60	6.39	2.27	118.499°W	34.314°N	136.86	1.03
UC33brAvg_FM31	System							35.56
Santa Susana alt 1 [0]		4.83	7.31	1.27	118.576°W	34.329°N	195.65	13.60
Mission Hills 2011 [1]		8.81	6.50	1.61	118.556°W	34.283°N	176.54	5.39
Northridge Hills [1]		5.64	7.65	1.04	118.608°W	34.305°N	210.41	4.73
Northridge [2]		8.54	7.30	1.45	118.576°W	34.358°N	222.71	4.20
Holser alt 1 [2]		4.63	7.06	1.32	118.544°W	34.405°N	22.92	2.94
Santa Susana alt 1 [1]		4.83	7.36	1.20	118.576°W	34.329°N	195.65	1.13
UC33brAvg_FM31 (opt)	Grid							13.35
PointSourceFinite: -118.562, 34.410		6.70	5.73	2.02	118.562°W	34.410°N	0.00	3.32
PointSourceFinite: -118.562, 34.410		6.70	5.73	2.02	118.562°W	34.410°N	0.00	3.32
PointSourceFinite: -118.562, 34.428		7.78	5.84	2.15	118.562°W	34.428°N	0.00	1.41
PointSourceFinite: -118.562, 34.428		7.78	5.84	2.15	118.562°W	34.428°N	0.00	1.41
UC33brAvg_FM32 (opt)	Grid							12.12
PointSourceFinite: -118.562, 34.410		6.69	5.72	2.03	118.562°W	34.410°N	0.00	3.01
PointSourceFinite: -118.562, 34.410		6.69	5.72	2.03	118.562°W	34.410°N	0.00	3.01
PointSourceFinite: -118.562, 34.428		7.80	5.82	2.17	118.562°W	34.428°N	0.00	1.20
PointSourceFinite: -118.562, 34.428		7.80	5.82	2.17	118.562°W	34.428°N	0.00	1.20
NUWI – Lyons Canyon, LLC September 15, 2023 2020-200-001

# **APPENDIX G**

# LIQUEFACTION CALCULATIONS



SUMMARY SHEET

### CPTLIQ 2004AWRsettlementMSF 92020-200 Lyons CPT-1 through CPT-5 January 2021

### WORKBOOK TO CALCULATE LIQUEFACTION POTENTIAL AND SEISMIC SETTLEMENT

REFERENCE: Youd, T. L., Idriss, I. M., plus 19 others, 2001, "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT: NUWI	I - Lyons Canyon, LLO	С	Z	Ic Soil		rd# Refer	ence	h:: (1092)											
PROJ. : Lyons	Canyon		4 <	2.95 Clay to Silty Clay 2.95 Clayey Silt to Silty	Clay	2 Seed	& Idriss mea	an (1983) and	Youd (1997)										
BY: AWR DATE: 02/08/2	2021		5 <	<2.6 Silty Sand to Sandy <2.05 Clean Sand to Silty	/ Silt Sand	3 Seed 4 Idriss	& Idriss low & Golesork	er limit (1971 hi (1997)	)										
FS - Thrashold Fac	tor of Safaty -	1 30	7 <	<1.31 Gravelly Sand to Sa	and	5 Site-S	pecific												
NL = Not liquefiab	ble	1.50				Mag = 6.8	MSF	1.28											
Liquefiable Ic (betw Seismic Settlement	veen 1.5 and 2.6) = Soil (Type) =	<b>2.60</b> (usu. 2.05 to 2.6) <b>3</b>			Fil	Pa = 1.04427 tsf l Density = 125 pcf	MSP cale	1.2846274											
Depth	h Elevation> 133	CPT-1 1-13-21 3 Sht 1	CPT-2	2 1-13-21 Sht 2	CI	PT-3 1-13-21 Sht 3	1317	CPT-4	1-13-21 Sht 4	CI	PT-5 1-	-13-21	CP	T-*** 0-0-00 Sht 6	CPT-***	0-0-00 Sht 7	CP1	-*** (	0-0-00 Sht 8
M	Meas. Water> A Water	<b>55.0</b> 55.0	A Water	<b>55.0</b> 55.0	A Water	55.0 55.0	A Water	55.0	55.0	A Water	55.0	55.0	A Water	<b>0.0</b> 0.0	A Water	<b>0.0</b> 0.0	A Water	***	***
	Soil Density> D Water	30.0 30.0 feet 120 120.0 pcf	D Water Gamma	30.0 30.0 feet 120 120.0 pcf	D Water Gamma	30.0 30.0 feet 120 120.0 pcf	D Water Gamma	30.0 120	30.0 feet 120.0 pcf	D Water Gamma	30.0 120	30.0 feet 120.0 pcf	D Water Gamma	0.0 0.0 feet 120 120.0 pcf	D Water Gamma	0.0 0.0 feet 120 120.0 pcf	D Water Gamma	120	*** feet 120.0 pcf
	Site rd> rd	2 2.0	rd D d.D.	2 2.0	rd D d D	2 2.0	rd	2 20.0	2.0	rd D i D	2	2.0 faat	rd David D	2 2.0	rd D i D	2 2.0	rd D d.D.	2	2.0
	Added Fill> Fill	20.0 feet	Fill	20.0 feet	Fill	35.0 feet	Fill	3.0	feet	Fill	15.0	feet	Fill	0.0 feet	Fill	0.0 feet	Fill	***	feet
	Ratio>	18.88	-	9999	-	9999	-		4.01	-		2.69	-	#NUM!	-	#NUM!	-	#	VALUE!
	Liq Settlement Liq. Total After R&R Total	0.16 0.16 inches 0.16 inches	Liq. ( Total	0.00 0.00 inches 0.00 inches	Liq. Total	0.00 0.00 inches 0.00 inches	s Liq. s Total	0.37	0.37 inches inches	Liq. Total	1.22	1.22 inches inches	Liq. Total	#NUM! #NUM! inches #NUM! inches	Liq. #NU Total #NU	M! #NUM! inches M! inches	Liq. Total	########	inches
mete	ers feet Soil	I CPT-1 Ishihara F.S.	Soil C	CPT-2 Ishihara F.S.	Soil	CPT-3 Ishihara F.S	Soil	CPT-4	Ishihara F.S.	Soil	CPT-5	Ishihara F.S.	Soil	CPT-*** Ishihara F.S.	Soil CPT-	*** Ishihara F.S.	Soil 18"IAE10	CPT-***	Ishihara F.S.
1 0.0	05 0.16 7.8	NL	78	NL	78	NI	. 68		NL	78	•	NL	#NUM!	#NUM! #NUM! #NUM!	#NUM! #NU	M! #NUM! #NUM!	#VALUE!	#VALUE!	#VALUE! #VALUE!
3 0.1	15 0.49 7 S	NL	75	NL	75	NI	65		NL	75		NL	#NUM!	#NUM! #NUM! #NUM!	#NUM! #NU	M! #NUM! #NUM!	#NUM!	#NUM!	#VALUE! #NUM!
5 0.2	20 0.66 7.8 25 0.82 7.8	NL NL	78	NL NL	65	NI	68		NL	78		NL NL	#NUM! #NUM!	#NUM! #NUM! #NUM! #NUM! #NUM! #NUM!	#NUM! #NU #NUM! #NU	M! #NUM! #NUM! M! #NUM! #NUM!	#NUM! 0 C	#NUM!	#VALUE! #NUM! #VALUE!
6 0.30 7 0.3	0 0.98 7 S 5 1.15 7 S	NL NL	7 S 7 S	NL NL	6 S 6 S	NI NI	68		NL NL	7 S 7 S		NL NL	0 C 0 C	#NUM! #NUM!	#NUM! #NU #NUM! #NU	M! #NUM! #NUM! M! #NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
8 0.40	10 1.31 7.8 15 1.48 7.8	NL NL	78	NL NL	65	NI NI	. 65		NL NL	7 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	#NUM! #NU #NUM! #NU	M! #NUM! #NUM! M! #NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
10 0.5	50 1.64 7.S	NL	78	NL	65	NI	68		NL	65		NL	00	#NUM! #NUM!	0 C	#NUM! #NUM!	00		#VALUE! #VALUE!
12 0.60	50 1.97 7 S	NL	78	NL	68	NI	68		NL	68		NL	00	#NUM!	00	#NUM!	00		#VALUE!
14 0.7	70 2.30 7 S	NL	65	NL	65	NI	65		NL	65		NL	0 C	#NUM!	00	#NUM!	00		#VALUE!
16 0.8	30 2.62 6 S	NL	65	NL	65	NI	68		NL	65		NL	00	#NUM!	00	#NUM!	00		#VALUE! #VALUE!
17 0.8	2.79 6 S	NL NL	6 S 6 S	NL NL	68	NI	68		NL NL	65		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	000		#VALUE! #VALUE!
20 1.0	05 3.12 6 S 00 3.28 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NI NI	. 5 M . 5 M		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
21 1.05	05 3.44 6 S 10 3.61 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NI NI	. 5 M 5 M		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
23 1.15	15 3.77 6S	NL	65	NL	65	NI	5 M		NL	65		NL	00	#NUM! #NUM!	0 C	#NUM! #NUM!	00		#VALUE! #VALUE!
25 1.2	25 4.10 6S	NL	68	NL	68	NI	5 M		NL	65		NL	00	#NUM!	00	#NUM!	00		#VALUE!
20 1.30	4.27 65 5 4.43 68	NL	68	NL	65	NI	5 M		NL	65		NL	00	#NUM!	00	#NUM!	00		#VALUE!
28 1.40 29 1.4	40 4.59 68 45 4.76 68	NL NL	68	NL NL	65	NI	. 5M		NL	65		NL NL	000	#NUM! #NUM!	000	#NUM! #NUM!	00		#VALUE! #VALUE!
30 1.50 31 1.5	50 4.92 6 S 55 5.09 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NI NI	. 5 M . 5 M		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
32 1.60 33 1.6	50 5.25 6 S 55 5.41 6 S	NL NL	6 S 6 S	NL NL	65	NI NI	. 5 M 5 M		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
34 1.70	70 5.58 6 S 75 5.74 6 S	NL NL	68	NL NL	65	NI NI	. 68		NL NL	68		NL NL	000	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	00		#VALUE! #VALUE!
36 1.80	80 5.91 6S	NL	65	NL	65	NI	68		NL	68		NL	0 C	#NUM!	00	#NUM! #NUM!	00		#VALUE!
38 1.9	0 6.23 6 S	NL	65	NL	65	NI	65		NL	68		NL	00	#NUM!	00	#NUM!	00		#VALUE!
40 2.0	0 6.56 6S	NL	68	NL	65	NI	65		NL	65		NL	00	#NUM! #NUM!	00	#NUM!	00		#VALUE! #VALUE!
41 2.03	05 6.73 6 S 10 6.89 6 S	NL NL	6 S 6 S	NL NL	65	NI	68		NL NL	65		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	000		#VALUE! #VALUE!
43 2.15	15 7.05 6 S 20 7.22 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NI NI	68		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
45 2.25	25 7.38 6 S 30 7.55 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NI NI	68		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
47 2.3	5 7.71 6S	NL	65	NL	65	NI	68		NL	65		NL	00	#NUM! #NUM!	0 C	#NUM! #NUM!	00		#VALUE! #VALUE!
49 2.4	15 8.04 6 S	NL	68	NL	68	NI	68		NL	68		NL	00	#NUM!	00	#NUM!	00		#VALUE!
51 2.5	5 8.37 6 S	NL	65	NL	65	NI	65		NL	65		NL	0C	#NUM!	00	#NUM!	00		#VALUE!
52 2.6	5 8.69 6 S	NL NL	68	NL NL	65	NI	68		NL	65		NL NL	000	#NUM! #NUM!	000	#NUM! #NUM!	00		#VALUE! #VALUE!
54 2.70	70 8.86 6 S 75 9.02 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NI NI	. 68 . 5M		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
56 2.80 57 2.8	80 9.19 6 S 85 9.35 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NI NI	5 M		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
58 2.90 59 2.9	0 9.51 6 S 95 9.68 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NI NI	. 5 M		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
60 3.00	0 9.84 6 S	NL	65	NL	65	NI	5 M		NL	6 S 5 M		NL	00	#NUM! #NTM!	0 C 0 C	#NUM! #NUM!	00		#VALUE! #VALUE!
62 3.1	10 10.17 6S	NL	65	NL	65	NI	5 M		NL	5 M		NL	00	#NUM!	00	#NUM!	00		#VALUE!
64 3.2°	10.33 6 S 20 10.50 6 S	NL NL	65	NL NL	65	NI NI	5 M 5 M		NL	5 M 5 M		NL NL	00	#NUM! #NUM!	00	#NUM! #NUM!	00		#VALUE! #VALUE!
65 3.2	25 10.66 6 S 50 10.83 6 S	NL NL	65	NL NL	68	NI NI	5 M		NL NL	6 S		NL NL	0 C	#NUM! #NUM!	00	#NUM! #NUM!	000		#VALUE! #VALUE!
67 3.3 68 3.4	35         10.99         6 S           40         11.15         6 S	NL NL	6 S 6 S	NL NL	68	NI NI	68		NL NL	6 S 5 M		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!

### SUMMARY SHEET

### CPTLIQ 2004AWRsettlementMSF 92020-200 Lyons CPT-1 through CPT-5 January 2021

of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT: RTF JOB: PROJ. : BY: DATE:	NUWI - I 2020-200 Lyons Ca AWR 02/08/202	Lyons Canyo anyon 21	on, LLC			Z 3 4 5 6	Ic         Soil           >2.95         Clay to           <2.95         Clayey           <2.6         Silty Si           <2.05         Clean Si	Silty Clay Silt to Silty and to Sandy and to Silty	Clay Silt Sand	rd# 1 2 3 4	Reference Tokimats Seed & I Seed & I Idriss &	e su & Yoshimi (198 driss mean (1971) driss lower limit ( Golesorkhi (1997)	3) and Youd (199 1971)	97)									
FS = Thres	hold Factor	of Safety =		1.30			<1.31 Gravel	y Sand to Sa	nd amax = Mag =	1.17	g	MSF 12	8										
Liquefiable Seismic Se	e Ic (betweer ttlement Soi	n 1.5 and 2.6 il (Type) =	)=	2.60 (usu. 2.0	5 to 2.6)				Pa = Fill Density =	1.04427 125	tsf pcf	MSP calc 1.2846	274										
	Depth		CPT-1	1-13-21	NT	СРТ	r <b>-2</b> 1-13-21	NI	CPT-3	1-13-21		CPT-4	1-13-21		CPT-5	1-13-21	NT	CPT-***	0-0-00	CPT-***	0-0-00	CPT-***	0-0-00
69 70	3.45	11.32	65		NL NL	65		NL NL	65		NL	5 M 5 M		NL NL	65		NL NL	000	#NUM! #NUM!	000	#NUM! #NUM!	000	#VALUE! #VALUE!
71	3.55	11.65	68		NL	68		NL NI	68		NL	65		NL	65		NL NI	0 C	#NUM! #NUM!	0 C	#NUM! #NUM!	00	#VALUE!
73	3.65	11.98	65		NL	65		NL	65		NL	65		NL	65		NL	00	#NUM!	00	#NUM!	00	#VALUE!
74	3.70	12.14	68		NL	68		NL	68		NL	68		NL	65		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
76	3.75	12.30	65		NL	65		NL	65		NL	5 M		NL	65		NL	00	#NUM!	00	#NUM! #NUM!	00	#VALUE!
77	3.85	12.63	68		NL	68		NL	68		NL	5 M		NL	65		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
78	3.90	12.80	5 M		NL	5 M		NL	65		NL	68		NL	65		NL	00	#NUM!	00	#NUM! #NUM!	00	#VALUE!
80	4.00	13.12	5 M		NL	5 M		NL	68		NL	5 M		NL	65		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
81	4.05	13.45	65		NL	5 M		NL	65		NL	5 M		NL	5 M		NL	00	#NUM!	00	#NUM! #NUM!	00	#VALUE!
83	4.15	13.62	68		NL	68		NL	68		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
85	4.20	13.78	65		NL	5 M		NL	65		NL	5 M		NL	5 M		NL	00	#NUM!	00	#NUM!	00	#VALUE!
86	4.30	14.11	68		NL	68		NL	68		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
87	4.35	14.27	65		NL NL	65		NL NL	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL		#NUM! #NUM!	00	#NUM! #NUM!	000	#VALUE! #VALUE!
89	4.45	14.60	6 S		NL	6 S		NL	6 8		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
90	4.50	14.76 14.93	65		NL NL	5 M 5 M		NL NL	65		NL NL	5 M 5 M		NL NL	5 M 6 S		NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
92	4.60	15.09	6 S		NL	5 M		NL	6 8		NL	5 M		NL	6 S		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
93 94	4.65	15.26	65		NL NL	6 S 5 M		NL NL	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
95	4.75	15.58	68		NL	5 M		NL	68		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
96	4.80	15.75	65		NL NL	5 M 5 M		NL NL	65		NL	5 M		NL NL	5 M 5 M		NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
98	4.90	16.08	6 S		NL	5 M		NL	6 8		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
99	4.95	16.24 16.40	65		NL NL	5 M 4 C		NL NL	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
101	5.05	16.57	6 S		NL	4 C		NL	6 8		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
102	5.10	16.73 16.90	65		NL NL	4 C 4 C		NL NL	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
104	5.20	17.06	6 S		NL	4 C		NL	6 8		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
105	5.25	17.22	65		NL NL	4 C 4 C		NL NL	65		NL NL	5 M 4 C		NL NL	5 M 5 M		NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
107	5.35	17.55	6 5		NL	5 M		NL	5 M		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
108	5.40	17.72	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL		#NUM! #NUM!	00	#NUM! #NUM!	00	#VALUE! #VALUE!
110	5.50	18.04	6 S		NL	5 M		NL	5 M		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
111	5.55	18.21 18.37	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
113	5.65	18.54	6 S		NL	5 M		NL	68		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
114	5.70	18.70 18.86	65		NL NL	4 C 5 M		NL NL	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
116	5.80	19.03	6 S		NL	5 M		NL	68		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
117	5.85	19.19 19.36	65		NL NL	4 C 4 C		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
119	5.95	19.52	6 5		NL	4 C		NL	5 M		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
120	6.00	19.69	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL		#NUM! #NUM!	00	#NUM! #NUM!	00	#VALUE! #VALUE!
122	6.10	20.01	68		NL	5 M		NL	5 M		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
123	6.15	20.18	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	5 M 6 S		NL NL		#NUM! #NUM!	00	#NUM! #NUM!	00	#VALUE! #VALUE!
125	6.25	20.51	68		NL	5 M		NL	5 M		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
120	6.30	20.67	65		NL	5 M		NL	5 M 5 M		NL	5 M		NL	5 M 5 M		NL	00	#NUM!	00	#NUM! #NUM!	00	#VALUE!
128	6.40	21.00	5 M		NL	5 M		NL	5 M		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
129	6.45	21.16 21.33	5 M 5 M		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL		#NUM! #NUM!	00	#NUM! #NUM!	00	#VALUE! #VALUE!
131	6.55	21.49	68		NL	5 M		NL	5 M		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
132	6.60	21.65	6 S		NL NL	5 M 5 M		NL NL	68		NL	5 M 5 M		NL NL	5 M 5 M		NL NL	000	#NUM! #NUM!	000	#NUM! #NUM!	000	#VALUE! #VALUE!
134	6.70	21.98	68		NL	5 M		NL	68		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
135	6.80	22.15	65		NL	4 C		NL	65		NL	5 M		NL	5 M 5 M		NL	00	#NUM!	00	#NUM! #NUM!	00	#VALUE!
137	6.85	22.47	68		NL	4 C		NL	68		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
138	6.90	22.64	65		NL	5 M		NL	65		NL	5 M		NL	5 M 5 M		NL	00	#NUM!	00	#NUM! #NUM!	00	#VALUE!
140	7.00	22.97	5 M		NL	4C		NL	68		NL	5 M		NL	5 M		NL	00	#NUM!	0 C	#NUM!	00	#VALUE!
141 142	7.10	23.13	5 M		NL	5 M		NL	65		NL	5 M		NL	5 M		NL	00	#NUM!	00	#NUM!	00	#VALUE! #VALUE!
143	7.15	23.46	5 M		NL	5 M		NL	68		NL	5 M		NL	5 M		NL	00	#NUM!	0 C	#NUM!	00	#VALUE!
144 145	7.20	23.62	5 M		NL	5 M		NL	65		NL	5 M		NL	5 M		NL	00	#NUM!	00	#NUM!	00	#VALUE! #VALUE!
146	7.30	23.95	5 M		NL	5 M		NL	68		NL	5 M		NL	5 M		NL	0 C	#NUM! #NUM!	0 C	#NUM! #NUM!	00	#VALUE!
147	7.40	24.11	5 M		NL	5 M		NL	68		NL	5 M		NL	5 M		NL	00	#NUM!	00	#NUM!	00	#VALUE!
149	7.45	24.44	68		NL	5 M		NL	65		NL NI	5 M		NL NI	5 M 5 M		NL NI	0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	00	#VALUE!
150	7.55	24.01	65		NL	5 M		NL	68		NL	5 M		NL	5 M		NL	00	#NUM!	00	#NUM!	00	#VALUE!
152	7.60	24.93	68		NL	5 M		NL	65		NL NI	5 M 5 M		NL NI	5 M 5 M		NL NI	0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	00	#VALUE!
155	7.70	25.26	68		NL	5 M		NL	68		NL	5 M		NL	5 M		NL	00	#NUM!	00	#NUM!	00	#VALUE!

Page 2

### SUMMARY SHEET

### CPTLIQ 2004AWRsettlementMSF 92020-200 Lyons CPT-1 through CPT-5 January 2021

of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT RTF JOE PROJ. : BY: DATE:	202 202 Lyc AW 02/0	WI - Ly 20-200 ons Cany VR (08/2021	ons Canyo yon	n, LLC				Z 3 4 5 6 7	Ic Soil >2.95 Clay <2.95 Clay <2.6 Silty <2.05 Cley <1.31 Gra	to Silty Cl ey Silt to S Sand to Sa n Sand to S elly Sand t	iy Ity Cla ndy Sil ilty Sar	y t nd	rd# 1 2 3 4 5	Referen Tokimat Seed & Seed & Idriss &	e su & Yosh driss mear driss lowe Golesorkh cific	imi (1983 1 (1971) a r limit (19 i (1997)	) nd Youd (1 71)	997)										
FS = Thr NL = Nc	eshold l ot lique	Factor of fiable	f Safety =		1.30				- Inst John	eny build t	Jund	amax = Mag =	1.1	g	MSF	1.28	1											
Liquefial Seismic	ble Ic (b Settlem	ent Soil	1.5 and 2.6 (Type) =	) =	2.60 3	(usu. 2.05	to 2.6)	CP	<b>1</b>	21		Pa = Fill Density =	1.04423 125	tsf pcf	MSP calc	1.28462	1 12 21			YT 5	1 12 21		CBT ***	0.0.00	CBT ***	0.0.00	CBT ***	0.0.00
155 156		7.75 7.80	25.43 25.59	5 M 5 M			NL NL	5 M 5 M		- N - N	: 1	65 65		NL NL	5 M 5 M			NL NL	5 M 5 M	1-5		NL NL		#NUM! #NUM!	0C 0C	#NUM! #NUM!		#VALUE! #VALUE!
157 158		7.85 7.90	25.75 25.92	5 M 6 S			NL NL	5 M 5 M		N		6 S 6 S		NL NL	5 M 5 M			NL NL	5 M 5 M			NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
159		7.95	26.08 26.25	6 S 6 S			NL NL	5 M 5 M		- N		6 S 6 S		NL NL	5 M 5 M			NL NL	5 M 5 M			NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
161		8.05 8.10	26.41 26.57	6 S 6 S			NL NL	5 M 5 M		N N		6 S 6 S		NL NL	5 M 5 M			NL NL	5 M 5 M			NL NL	0 C 0 C	#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
164		8.15 8.20	26.74 26.90	65			NL NL	5 M 5 M		- N		65		NL NL	4 C			NL NL	5 M 5 M			NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
165		8.25 8.30	27.07	65			NL NL	5 M 5 M		- N		65		NL NL	40			NL NL	5 M 5 M			NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
168		8.40 8.45	27.56	65			NL NL	5 M 5 M		- N		65		NL NL	4C 4C			NL NL	5 M 5 M			NL NL		#NUM! #NUM!		#NUM! #NUM! #NUM!		#VALUE! #VALUE!
170		8.50	27.89	6 S 6 S			NL NL	5 M 5 M		- N		5 M 5 M		NL NL	5 M			NL NL	5 M 5 M			NL NL	0 C 0 C	#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
172 173		8.60 8.65	28.22 28.38	6 S 6 S			NL NL	5 M 5 M		N		5 M 5 M		NL NL	4 C 5 M			NL NL	5 M 5 M			NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
174 175		8.70 8.75	28.54 28.71	6 S 6 S			NL NL	5 M 5 M		N		4 C 5 M		NL NL	5 M 5 M			NL NL	5 M 5 M			NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
176 177		8.80 8.85	28.87 29.04	6 S 6 S			NL NL	5 M 5 M		- N		5 M 5 M		NL NL	5 M 5 M			NL NL	5 M 5 M			NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
178 179		8.90 8.95	29.20 29.36	7 S 6 S			NL NL	5 M 5 M		N	:	5 M 5 M		NL NL	5 M 5 M			NL NL	5 M 5 M			NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
180		9.00 9.05	29.53 29.69	6 S 6 S			NL NL	78		- N - N	:	5 M 5 M		NL NL	5 M 5 M			NL NL	5 M 5 M			NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
182		9.10	29.86 30.02	5 M	<1>	310.02	0.38 0.40	75		- 38.	4	5 M 5 M		3.83 2.00	5 M 5 M	<1>	200.29	0.22	5 M 5 M	<1>	273.44	0.36		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
185		9.25	30.35	65	<1>	103.34	0.22			-		5 M 5 M	-	3.26	5 M 5 M	<1>	66.76	0.39	65	<1>	91.15	0.89		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
187		9.35	30.68	5 M 5 M	<1> <1>	62.00	0.22	0 C		-		5 M 6 S		4.51	5 M	<1> <1>	40.06	0.43	65	<1> <1>	54.69 45.57	0.48	0 C 0 C	#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
189		9.45 9.50	31.00 31.17	5 M 6 S	<1> <1>	44.29 38.75	0.28	0 C 0 C		-		6 S 6 S		5.42 8.11	5 M 5 M	<1> <1>	28.61 25.04	0.38	6 S 5 M	<1> <1>	39.06 34.18	0.29	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
191 192		9.55 9.60	31.33 31.50	6 S 6 S	<1>	34.45 34.56	0.65 2.40	0 C 0 C		-		6 S 6 S		9.52 7.33	5 M 5 M	<1> <1>	22.25 20.03	0.31 0.32	6 S 6 S	<1> <1>	30.38 27.34	0.26 0.30	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
193 194		9.65 9.70	31.66 31.82	6 S 6 S		34.67 34.78	6.37 7.96	0 C 0 C		-		6 S 6 S		5.29 5.85	5 M 5 M	<1> <1>	18.21 16.69	0.30 0.25	6 S 6 S	<1> <1>	24.86 22.79	0.31 0.25	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
195 196		9.75 9.80	31.99 32.15	6 S 6 S		34.89 35.00	6.16 7.76	0 C 0 C		-		6 S 6 S		3.56 2.91	5 M 5 M	<1> <1>	15.41 14.31	0.46 0.55	5 M 5 M	<1> <1>	21.03 19.53	0.22 0.22	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
197 198		9.85 9.90	32.32 32.48	7 S 6 S		35.11 35.22	11.11 19.33	0 C 0 C		-		5 M 5 M		1.87 1.93	5 M 6 S	<1> <1>	13.35 12.52	0.39 0.49	5 M 5 M	<1> <1>	18.23 17.09	0.23 0.25	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
199 200		9.95 10.00	32.64 32.81	6 S 6 S		35.34 35.45	11.26 8.92	0 C 0 C				5 M 5 M		2.35 2.88	5 M 6 S	<1> <1>	11.78 11.13	0.51 0.39	5 M 5 M	<1> <1>	16.08 15.19	0.19 0.21	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
201 202		10.05	32.97 33.14	6 S 6 S		35.56	5.06 1.81	0 C 0 C		-		5 M 5 M		2.86	6 S 6 S	<1> <1>	10.54	0.51	5 M 5 M	<1> <1>	14.39 13.67	0.24	000	#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
203 204 205		10.15	33.30	65	<1> <1>	32.10 29.18 26.75	0.92	0C 0C				68 68		2.15	6 S 6 S	<1> <1>	9.54 9.10	0.43	68	<1> <1>	13.02	0.40		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
205 206 207		10.25	33.79	6 S 5 M	<1>	24.69	0.53			-		5 M 5 M 6 S		2.26	5 M 5 M	<1>	8.35	0.58	65	<1>	11.39	0.45		#NUM! #NUM! #NUM!		#NUM! #NUM! #NUM!		#VALUE! #VALUE!
208		10.40	34.12	5 M 5 M	<1> <1>	21.40	0.39	0 C		-		5 M 5 M		2.38	5 M	<1> <1>	7.70	0.32	65	<1> <1>	10.52	0.37	0 C 0 C	#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
210 211		10.50 10.55	34.45 34.61	5 M 4 C	<1>	18.88 18.94	0.51 NL	0 C 0 C				5 M 0 C		2.48	5 M 5 M	<1> <1>	7.15	0.35 0.34	6 S 6 S	<1> <1>	9.77 9.43	0.34 0.42	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
212 213		10.60 10.65	34.78 34.94	5 M 6 S		19.00 19.06	1.40 1.96	0 C 0 C		-		0 C 0 C			6 S 4 C	<1>	6.68 6.71	0.96 NL	6 S 6 S	<1> <1>	9.11 8.82	0.42 0.42	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
214 215		10.70 10.75	35.10 35.27	6 S 6 S		19.12 19.18	5.79 3.14	0 C 0 C				0 C 0 C			5 M 5 M	<1> <1>	6.49 6.29	1.13 0.30	6 S 6 S	<1> <1>	8.55 8.29	0.42 0.38	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
216 217		10.80 10.85	35.43 35.60	6 S 6 S		19.24 19.30	3.32 4.52	0 C 0 C		-		0 C 0 C			5 M 4 C	<1>	6.10 6.13	0.39 NL	6 S 5 M	<1> <1>	8.04 7.81	0.33 0.28	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
218 219		10.90 10.95	35.76 35.93	6 S 6 S		19.35 19.41	6.23 8.73	0 C 0 C		-		0 C 0 C			4 C 5 M	<1>	6.16 5.98	NL 0.42	5 M 5 M	<1> <1>	7.60 7.39	0.26 0.26	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
220		11.00 11.05	36.09 36.25	6 S 6 S		19.47 19.53	10.55	0 C 0 C		-		0 C 0 C			5 M 5 M	<1> <1>	5.81 5.65	0.31	5 M 5 M	<1> <1>	7.20	0.25	000	#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
222 223		11.10	36.42	6 S 0 C		19.59	19.02	0C 0C		-		0C 0C			5 M 5 M	<1> <1>	5.49	0.26	5 M 5 M	<1> <1>	6.84 6.67	0.22	000	#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
224 225 226		11.20	36.75	00		19.71				-		0 C 0 C			5 M 5 M	<1>	5.08	0.49	5 M 5 M	<1>	6.36	0.21	00	#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
227		11.35	37.24	00		19.88						0 C 0 C			5 M 4 C	<1>	4.90	0.76	5 M 5 M	<1> <1> <1>	6.08	0.26		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
229		11.45	37.57	0 C		20.00		00				0 C 0 C			5 M	<1> <1>	4.75	0.62	5 M 5 M	<1> <1>	5.82	0.24		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
231 232		11.55 11.60	37.89 38.06	0 C 0 C		20.12 20.18		0 C 0 C				0 C 0 C			5 M 5 M	<1> <1>	4.54	0.40	5 M 5 M	<1> <1>	5.58 5.47	0.24	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
233 234		11.65 11.70	38.22 38.39	0 C 0 C		20.24 20.30		0 C 0 C				0 C 0 C			5 M 5 M	<1> <1>	4.35 4.26	0.52 0.50	5 M 5 M	<1> <1>	5.36 5.26	0.24 0.28	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
235 236		11.75 11.80	38.55 38.71	0 C 0 C		20.35 20.41		0 C 0 C				0 C 0 C			6 S 6 S	<1> <1>	4.17 4.09	0.66 0.64	5 M 5 M	<1> <1>	5.16 5.06	0.27 0.35	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
237 238		11.85 11.90	38.88 39.04	0 C 0 C		20.47 20.53		0 C 0 C				0 C 0 C			5 M 5 M	<1>	4.01 4.03	1.29 1.73	6 S 6 S	<1> <1>	4.97 4.88	0.46 0.52	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
239 240	1	11.95 12.00	39.21 39.37	0 C 0 C		20.59 20.65		0 C 0 C				0 C 0 C			5 M 6 S		4.04 4.06	3.13 3.21	6 S 6 S	<1> <1>	4.80 4.71	0.75 1.04	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!

### CPTLIQ 2004AWRsettlementMSF 92020-200 Lyons CPT-1 through CPT-5 January 2021

### SUMMARY SHEET

### of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLI	ENT:	NUWI - La	vons Canvo	n. LLC		ZI	Ic Soil		rd#	Reference	2					1							
RTI	JOB:	2020-200				3	>2.95 Clay to Silty Clay		1	Tokimats	u & Yoshimi (198	(3)				1							
PRO	)J. :	Lyons Can	iyon			4	<2.95 Clayey Silt to Silty	Clay	2	Seed & Id	triss mean (1971)	and Youd (19	97)			1.							
BY	TE.	AWR 02/08/2021				5	<2.6 Silty Sand to Sandy	Silt	3	Seed & Id	friss lower limit (	19/1)				6							
DA	IL.	02/08/2021				7	<1.31 Gravelly Sand to Sany	nd	5	Site-Spec	ific					8							
FS =	= Thresh	old Factor o	of Safety =		1.30			amax =	1.17	/ g						1							
NL	= Not li	quefiable						Mag =	6.8	3	MSF 1.2	8											
Liq	iefiable	Ic (between	1.5 and 2.6	)=	2.60 (usu. 2.05 to 2.6)			Pa =	1.04427	/ tsf	MSP calc 1.2846	274											
Seis	anic Seu	Depth	(Type) -	CPT-1	1-13-21	CP	<b>F-2</b> 1-13-21	CPT-3	1-13-21	per	CPT-4	1-13-21		СР	T-5	1-13-21		CPT-***	0-0-00	CPT-***	0-0-00	CPT-***	0-0-00
	241	12.05	39.53	00	20.71	00		00			68	4.08	3.52	65	<1>	4.63	1.06	00	#NUM!	00	#NUM!	00	#VALUE!
	242	12.10	39.70	00	20.77	0 C		00			65	4.10	3.85	68	<1>	4.56	0.52	00	#NUM!	0 C	#NUM!	00	#VALUE!
	243	12.15	39.86 40.03		20.82							4.12		65	<1> <1>	4.48	0.79		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
	245	12.25	40.19	0 C	20.94	0 C		00			0 C	4.16		6 8	<1>	4.34	1.17	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	246	12.30	40.35	0 C	21.00	0 C		0 C			0 C	4.18		6 S		4.36	1.65	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	247	12.35	40.52		21.06							4.20		65		4.37	1.87		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
	249	12.45	40.85	00	21.18	00		00			00	4.24		65	<1>	4.32	1.22	00	#NUM!	00	#NUM!	00	#VALUE!
	250	12.50	41.01	0 C	21.24	0 C		0 C			0 C	4.26		6 S	<1>	4.25	0.98	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	251	12.55	41.17		21.30							4.28		65	<1>	4.19	0.92		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
	253	12.65	41.50	00	21.41	00		00			00	4.32		65	<1>	4.07	0.90	00	#NUM!	00	#NUM!	00	#VALUE!
	254	12.70	41.67	0 C	21.47	0 C		0 C			0 C	4.34		6 8	<1>	4.01	0.77	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	255	12.75	41.83		21.53							4.36		65	<1>	3.95	0.50		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
	257	12.85	42.16	00	21.65	00		00			00	4.40		5 M	<1>	3.84	0.28	00	#NUM!	00	#NUM!	00	#VALUE!
	258	12.90	42.32	0 C	21.71	0 C	-	0 C			0 C	4.42		5 M	<1>	3.79	0.24	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	259	12.95	42.49		21.77							4.44		5 M	<1>	3.74	0.24		#NUM! #NUM		#NUM! #NUM!		#VALUE!
	261	13.05	42.81	00	21.82	00		00			00	4.48		5 M	<1>	3.64	0.24	00	#NUM!	00	#NUM!	00	#VALUE!
	262	13.10	42.98	0 C	21.94	0 C		0 C			0 C	4.50		5 M	<1>	3.59	0.25	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	263	13.15	43.14		22.00							4.52		5 M	<1>	3.54	0.25		#NUM! #NUM		#NUM! #NUM!		#VALUE!
	265	13.25	43.47	00	22.00	00		00			00	4.55		5 M	<1>	3.46	0.25	00	#NUM!	00	#NUM!	00	#VALUE!
	266	13.30	43.64	0 C	22.18	0 C		00			0 C	4.57		5 M	<1>	3.41	0.28	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	267	13.35	43.80		22.24							4.59		5 M	<1>	3.37	0.28		#NUM! #NUM		#NUM! #NUM!		#VALUE!
	269	13.45	44.13	00	22.30	00		00			00	4.63		5 M	<1>	3.29	0.23	00	#NUM!	00	#NUM!	00	#VALUE!
	270	13.50	44.29	0 C	22.41	0 C		0 C			0 C	4.65		5 M	<1>	3.25	0.29	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	271	13.55	44.46		22.47	0 C						4.67		5 M	<1>	3.21	0.34		#NUM! #NUM		#NUM! #NUM!		#VALUE!
	272	13.65	44.02	00	22.59	00		00			00	4.09		5 M	<1>	3.16	0.58	00	#NUM!	00	#NUM!	00	#VALUE!
	274	13.70	44.95	0 C	22.65	0 C		00			0 C	4.73		6 8	<1>	3.11	0.64	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	275	13.75	45.11	0 C	22.71	0 C					0 C	4.75		68	<1>	3.07	0.77	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	270	13.80	45.44	00	22.82	00		00			00	4.77		65		3.08	2.24	00	#NUM!	00	#NUM!	00	#VALUE!
	278	13.90	45.60	0 C	22.88	0 C		00			0 C	4.81		6 8		3.10	2.78	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	279	13.95	45.77		22.94	0 C						4.83		65		3.12	3.09	0 C	#NUM! #NUM!		#NUM! #NUM!		#VALUE!
	281	14.05	46.10	00	23.00	00		00			00	4.87		65		3.14	1.97	00	#NUM!	00	#NUM!	00	#VALUE!
	282	14.10	46.26	0 C	23.12	0 C		0 C			0 C	4.89		6 8		3.15	2.48	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	283	14.15	46.42		23.18							4.91		65		3.16	1.88		#NUM! #NUM		#NUM! #NUM!		#VALUE!
	285	14.20	46.75	00	23.30	00		00			00	4.95		65		3.18	1.33	00	#NUM!	00	#NUM!	00	#VALUE!
	286	14.30	46.92	0 C	23.35	0 C	-	0 C			0 C	4.97		6 S	<1>	3.15	1.08	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	287	14.35	47.08		23.41							4.99		5 M	<1>	3.11	1.10		#NUM! #NUM		#NUM! #NUM!		#VALUE!
	289	14.45	47.41	00	23.53	00		00			00	5.03		5 M	<1>	3.05	1.00	00	#NUM!	00	#NUM!	00	#VALUE!
	290	14.50	47.57	0 C	23.59	0 C		0 C			0 C	5.04		5 M	<1>	3.02	0.88	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	291	14.55	47.74 47.90		23.65	0 C						5.06 5.08		5 M	<1>	2.98	0.76		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
	293	14.65	48.06	00	23.77	00		00			00	5.10		5 M	<1>	2.92	0.59	00	#NUM!	00	#NUM!	00	#VALUE!
	294	14.70	48.23	0 C	23.82	0 C		0 C			0 C	5.12		5 M	<1>	2.89	0.38	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	295 296	14.75	48.39 48.56		23.88 23.94	00						5.14		5 M 5 M	<1> <1>	2.86	0.31	00	#NUM! #NUM!		#NUM! #NUM!	00	#VALUE! #VALUE!
	297	14.85	48.72	00	24.00	00		00			00	5.18		4 C	-12	2.85	NL	00	#NUM!	00	#NUM!	00	#VALUE!
	298	14.90	48.88	0 C	24.06	0 C	-	0 C			0 C	5.20		3 C		2.86	NL	0 C	#NUM!	00	#NUM!	0 C	#VALUE!
	299	14.95	49.05		24.12							5.22		40		2.87	NL NL	00	#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
	301	15.05	49.38	00	24.24	00		00			00	5.24		5 M	1	2.85	0.32	00	#NUM!	00	#NUM!	00	#VALUE!
	302	15.10	49.54	0 C	24.30	0 C		00			0 C	5.28		6 8	1	2.82	0.38	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	303	15.15	49.70		24.35	0 C						5.30		6 S	1	2.79	0.37		#NUM! #NUM!	00	#NUM! #NUM!	00	#VALUE!
	305	15.20	50.03	00	24.47	00		00			00	5.34		5 M	i	2.74	0.32	00	#NUM!	00	#NUM!	00	#VALUE!
	306	15.30	50.20	0 C	24.53	0 C		0 C			0 C	5.36		5 M	1	2.71	0.29	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	307 308	15.35	50.36 50.52		24.59							5.38 5.40		5 M	1	2.69	0.29		#NUM! #NUM!	00	#NUM! #NUM!		#VALUE! #VALUE!
	309	15.45	50.69	00	24.03	00		00			00	5.42		00		2.70		00	#NUM!	00	#NUM!	00	#VALUE!
4	310	15.50	50.85	0 C	24.77	0 C		0C			0C	5.44		0 C		2.72		0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!

Page 4



# **GREGG DRILLING & TESTING, INC.**

SCPT-1 Average Unit Weight (psf) 120.00 Depth to Water (ft) 51.00

Interval Depth (ft)	Interval Velocity (ft/sec)	Vs (m/s)	Total Stress (psf)	Effective Stress (psf)	Effective Stress (kpa)	(Pa/∂')	(Pa/∂')0.25	Vsi (m/s)
4.9	9.8	719.7	588.0	588.0	28.1	3.6	1.4	988.1
9.8	14.9	699.7	1176.0	1176.0	56.3	1.8	1.2	807.8
14.9	20	964.1	1788.0	1788.0	85.6	1.2	1.0	1002.3
20	24.4	690.1	2400.0	2400.0	114.9	0.9	1.0	666.6
24.4	29.9	3274.6	2928.0	2928.0	140.2	0.7	0.9	3009.5
29.9	34.4	965.7	3588.0	3588.0	171.8	0.6	0.9	843.6
34.4	35.8	689.9	4128.0	4128.0	197.6	0.5	0.8	581.9



# **GREGG DRILLING & TESTING, INC.**

SCPT-2 Average Unit Weight (psf) 120.00 Depth to Water (ft) 55.00

Interval Denth	Interval Velocity	Vs	Total Stress	Effective Stress	Effective Stress			
(ft)	(ft/sec)	(m/s)	(psf)	(psf)	(kpa)	(Pa/∂')	(Pa/∂')0.25	Vsi (m/s)
5.1	9.7	1051.5	612.0	612.0	29.3	3.4	1.4	1429.2
9.7	14.8	959.3	1164.0	1164.0	55.7	1.8	1.2	1110.3
14.8	19.7	989.5	1776.0	1776.0	85.0	1.2	1.0	1030.5
19.7	24.6	1055.3	2364.0	2364.0	113.2	0.9	1.0	1023.2

Open-File Report 97-12



Plate 1.2 Historically Highest Ground Water Contours and Borehole Log Data Locations, Oat Mountain 7.5-minute Quadrangle, California.

Borehole Site _____ 30 ___ Depth to ground water in feet







#### general/wells/ Unified Hazard Tool 🚱 Deltek 💕 City of Santa Clarita... 🚱 SupplyPro: Suppl Search Buffer: None V Active Wells Vinactive Wells Happy Feet Child Care Jennifet Pl Jenni Hamkborn Ave. Jennifer PI U Wintergreen Ct The Old Rd 5 U Sit 'n Sleep 🙄 Wabuska St Wintergreen Ct Hawkborn Ave. Wabuska St gasso Ct × Well Number: 5832 Well Status: Inactive Sagecres Well Measurement Data **Historical Well Measurement Data** Last Measure Date 09/27/1965 × Last Measurement State Well ID EXPORT Mulberry Mobile (Locations are approximate.) Home Park Well ID: 5832 State #: RP Elev: John E. High Measure: 135.80 ON 11/26/1963 Low Measure: 102.20 ON 10/27/1958 Foxtall Ct Sagecrest Cir RP to WS Water Surface Measure Questionable No Measure Hawkbryn Elevation Measure Date (Depth) Well has been 09/27/1965 destroyed 5 11/24/1964 119.40 Sagecrest Cir PNS e de la com 11/24/1964 119.40 11/24/1964 119.40 W & J Bathroom The old Rd 11/26/1963 136.80 Remodeling Hawkbryn Ave 11/26/1963 136.80 11/30/1962 115.40 11/30/1962 115.40 12/11/1961 125.90 5 12/11/1961 125.90 12/05/1960 112.50 12/05/1960 112.50 11/30/1959 116.80 11/30/1959 116.80 10/27/1958 103.20 10/27/1958 103 20 yons Ranch The Old Rd Ē

NUWI – Lyons Canyon, LLC September 15, 2023 2020-200-001

# **APPENDIX H**

# AYERS OIL WELL DOCUMENTATION



# **GEOPHYSICAL EVALUATION** LYONS CANYON RANCH WELL

Santa Clarita, California

### **PREPARED FOR:**

Qtative Development Solutions 100 Spectrum Center Drive, Suite 1400 Irvine, CA 92618

PREPARED BY:

Atlas Technical Consultants, LLC 6280 Riverdale Street San Diego, CA 92120

December 28, 2020



6280 Riverdale Street San Diego, CA 92120 877.215.4321 | oneatlas.com

December 28, 2020

Atlas No. 120513SWG Report No. 1

MR. DEREK BARBOUR QTATIVE DEVELOPMENT SOLUTIONS 100 SPECTRUM DRIVE, SUITE 1400 IRVINE, CALIFORNIA 92618

Subject: Geophysical Evaluation Lyons Canyon Ranch Well Santa Clarita, California

Dear Mr. Barbour:

In accordance with your authorization, Atlas has performed a geophysical evaluation pertaining to the Lyons Canyon Ranch Well project located in Santa Clarita, California. Specifically, our services included the performance of a magnetic (MAG) evaluation for portions of the property. The primary purpose of the study was to assess the presence and location of a former oil well within a study area designated by you and your office. Our services were conducted on December 9, 2020. This report presents the methodology, equipment used, analysis, and findings.

If you have any questions, please call us at 619.280.4321.

Respectfully submitted, Atlas Technical Consultants LLC

Evan C. Anderson Senior Staff Geophysicist

ECA:PFL:pfl:ds Distribution: dbarbour@qtative.com

No. 1043 Exp. 1/31/2022 OFCALIF

Patrick F. Lehrmann, P.G., P.Gp. Principal Geologist/Geophysicist



# TABLE OF CONTENTS

1
1
1
1
2
2
2
3

## **FIGURES**

Figure 1	Site Location Map
Figure 2	Site Data Map

- Figure 3 Site Photographs
- Figure 4 Oil Well Depth Estimate



## 1. INTRODUCTION

In accordance with your authorization, Atlas has performed a geophysical evaluation pertaining to the Lyons Canyon Ranch Well project located in Santa Clarita, California (Figure 1). Specifically, our services included the performance of a magnetic (MAG) evaluation for portions of the property. The primary purpose of the study was to assess the presence and location of former oil wells within three study areas designated by you and your office. Our services were conducted on December 9, 2020. This report presents the methodology, equipment used, analysis, and findings.

## 2. SCOPE OF SERVICES

Our scope of services included:

- Performance of magnetic evaluations across the study areas using a Geometrics G858 cesium vapor magnetometer, Schonstedt GA-52 magnetic gradiometer and a Trimble Pro XRS global positioning system (GPS) for spatial control.
- Compilation and analysis of the data collected.
- Site reconnaissance and mapping.
- Preparation of this report presenting our findings, conclusions, and recommendations.

## 3. SITE AND PROJECT DESCRIPTION

The project site is located at Lyons Canyon Ranch in Santa Clarita, California (Figure 1). The study site is currently a vacant and undeveloped lot. Based on historical images, former buildings and/or structures occupied areas adjacent to the study area. However, no structures are currently in the area. The site contains active trails, dirt roads, tall trees, grass and brush. Figure 3 depicts the general site conditions in the study areas.

Based on our discussions with you, it is our understanding that an oil well formerly occupied a portion of the property with GPS coordinates provided by DOGGR.

## 4. GEOPHYSICAL INSTRUMENTATION AND APPLICATIONS

Our evaluation included the use of a Geometrics G858 cesium vapor magnetometer and Schonstedt GA-52 magnetic gradiometer. These instruments provide real-time results and facilitates the delineation of subsurface ferrous metallic features.

## 4.1 GEOMETRICS G-858 MAGNETOMETER

The Geometrics G-858 cesium vapor magnetometer measures the strength of the earth's magnetic field and the superposed magnetic field of ferromagnetic materials in its vicinity. The precision of the instrument is approximately 1/10th gamma. The earth's field strength is roughly 46,676 gammas at this latitude. The earth's magnetic field is inclined in the direction of the north



magnetic pole. Because of this inclination, a buried ferromagnetic object generally is expressed as a paired anomaly with a positive (above background) slightly to the south and a negative slightly in the direction of magnetic north, whereas a long vertical ferromagnetic object (i.e., well) would generally be expressed as a positive (monopole). However, it should be noted that surface and subsurface metal objects (i.e., fence poles, fences, and metal debris) can influence the location and size of the magnetic response. In addition, the depth of burial can substantially change the amplitude and areal extent of the magnetic response. Typically, the pipe produces an alignment of high and low responses along the length of the feature. Detection depths of more than 20 feet are possible over large ferrous pipes.

### 4.2 SCHONSTEDT GA-52C MAGNETIC GRADIOMETER

The magnetic gradiometer has two fluxgate magnetic fixed sensors that are passed closely to and over the ground. When not near a magnetic object, that is, only in the earth's field, the instrument emits an audible sound signal at a low frequency. When the instrument passes over buried iron or steel objects, so that the field is significantly different at the two sensors, the frequency of the emitted sound increases. Frequency is a function of the gradient between the two sensors. The gradiometer is less sensitive to surface features than the single sensor magnetometers. Limitations may include obstructions from surface objects and interference from nearby ferrous magnetic objects.

## 5. SURVEY METHODOLOGY

Our evaluation of the site primarily included the collection of magnetic (MAG) data using a cesium vapor magnetometer. The MAG data were collected in conjunction with a Trimble Pro XRS Global Positioning System (GPS) with sub-meter accuracy for spatial control. Measurements were collected at 0.2-second intervals along generally north-south and/or east-west traverses spaced approximately 10 feet apart across the study areas. Collected MAG data were downloaded to a portable computer in the field for preliminary analysis. The gradiometer was used to delineate the surface expression of anomalies detected during the MAG study. Detected anomalies were delineated on the surface with pin feathers and/or flags.

## 6. FINDINGS AND CONCLUSIONS

The primary purpose of our study was to evaluate the presence and location of an abandoned oil well within the designated study area through the collection of magnetic data. The results of the MAG study are presented in Figure 2 with areas of high and low magnetic responses illustrated in the figures by hot (pink/red) and cool (blue/purple) colors, respectively. Our evaluation revealed a significant candidate oil well anomaly in the study area.

The candidate oil well anomaly is located towards the western portion of the study area. The anomaly was found roughly 30 feet northwest of a former excavation and survey stake, and approximately 30 feet southwest of the DOGGR coordinates for the abandoned well. The anomaly produced a relatively high amplitude monopole magnetic response in the shape of a bull's eye



(Figure 2). This feature is similar in magnetic response and shape to former magnetic studies which revealed buried oil wells. Using the Peter's half-slope method and straight slope method, the top and/or cap of the oil well was estimated between 7  $\frac{1}{2}$  feet to 11 feet below the ground surface. Figure 4 details the approach to this estimate.

Our survey utilized industry standard equipment (i.e. magnetic instruments) and was conducted in general accordance with current practice. It should be noted, however, that the presence of existing structures and surface objects (i.e., buildings, metal fences, manholes, etc.) potentially limited the survey. Where obstructions were present subsurface data could not be collected. Moreover, magnetic responses produced by metal surface objects and underground lines can potentially obscure subsurface features.

## 7. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding the conclusions and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist, and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface surveying will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Atlas should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole responsibility.









OIL WELL DEPTH ESTIMATE	Santa Clar	ita, California	
	Project No.: 120513SWG	Date: 12/20	_



NUWI – Lyons Canyon, LLC September 15, 2023 2020-200-001

# **APPENDIX I**

## UNITED CIVIL PLAN SET TRACT 83301

## SHEETS 1-5 OF 5

## **DATED SEPTEMBER 5, 2023**





LOT 21 32










NUWI – Lyons Canyon, LLC September 15, 2023 2020-200-001

### **APPENDIX J**

### **GEOTECHNICAL 100-SCALE PLAN REVIEW**

(RTF&A, 2021a)



#### **GEOTECHNICAL 100-SCALE PLAN REVIEW**

# LYONS CANYON DEVELOPMENT VESTING TENTATIVE TRACT MAP NO. 83301 LOS ANGELES COUNTY, CALIFORNIA

FOR

NUWI – LYONS CANYON, LLC

March 19, 2021

Job No. 2020-200-001



# Table of Contents

SCOPE OF WORK	2
SITE DESCRIPTION	3
SUBSURFACE EXPLORATIONS	4
LABORATORY ANALYSES	4
GEOLOGY	4
REGIONAL GEOLOGY	4
SITE GEOLOGY	6
GROUNDWATER	7
SLOPE STABILITY	8
STABILITY ANALYSES	9
CONCLUSIONS AND RECOMMENDATIONS	15
GENERAL	15
GEOLOGIC CONSIDERATIONS	15
LIQUEFACTION	17
GENERAL	17
INFILTRATION	
GRADING	21
DRAINAGE	27
GENERAL GRADING REQUIREMENTS	
GRADING OBSERVATION	
TEMPORARY EXCAVATIONS	
CORROSION TESTS	
EXPANSIVE SOILS	
FOUNDATIONS	
FLOOR SLAB SUPPORT	
SEISMIC DESIGN PARAMETERS	
PAVEMENT DESIGN	40
RETAINING WALLS	41
OBSERVATION AND TESTING	
LOS ANGELES COUNTY SECTION 111 STATEMENT	





March 19, 2021

NUWI – Lyons Canyon, LLC 2001 Wilshire Blvd., Suite 401 Santa Monica, California 90403

Job No. 2020-200-001(R2)

Attention: Jason Han

Subject:

100-Scale Geotechnical Plan Review Proposed Lyons Canyon Development Vesting Tentative Tract Map No. 083301 Los Angeles County, California

References: <u>See attached References</u>

R.T. Frankian and Associates (RTF&A) are pleased to present this 100-scale geotechnical plan review of the proposed Lyons Canyon Development, Vesting Tentative Tract Map No. 083301 (herein referred to as "the site"), Los Angeles County, California. The plan is based on the *Vesting Tentative Tract Map No. 083301* prepared by Alliance Land Planning & Engineering, Inc. (Alliance) and dated March 11, 2021. Sheet 2 of 2 was used as a base for our Geotechnical Map, attached as Figure 1. The purpose of this report is to evaluate the proposed development of the site and provide geotechnical recommendations as required. Previous geotechnical studies conducted on the site were performed by Pacific Soils Engineering, Inc. (Pacific Soils) in 2006 and Gold Coast Geoservices, Inc. (Gold Coast) in 2015. Data from the Gold Coast report was reviewed and evaluated in preparation of this report.

The findings, conclusions, and recommendations presented in this report are based on data developed by RTF&A, Pacific Soils, and Gold Coast, as well as appropriate engineering and

geologic analyses. The assessment of general site environmental conditions for the presence of contaminants in the soils and groundwater was beyond the scope of this investigation.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for NUWI-Lyons Canyon, LLC and their design consultants, to be used solely for planning and design of the Vesting Tentative Tract Map No. 83301.

### **SCOPE OF WORK**

The scope of work for the geotechnical review of the site plan included:

- reviewed State of California Alquist-Priolo Earthquake Fault Zone Maps and Seismic Hazard Maps to evaluate potential geologic hazards;
- reviewed geologic maps published by the California Geological Survey (formerly known as the California Division of Mines and Geology) and the Dibblee Foundation to assess regional geologic conditions;
- reviewed groundwater data from the Los Angeles County Department of Public Works Water Resources Division to establish high groundwater levels and trends in the area;
- reviewed the referenced reports;
- performed site reconnaissance and geologic mapping of the site;
- excavated and logged exploratory borings and site reconasiance to observe subsurface geologic units and structure;
- conducted Cone Penetrometer Tests (CPT) to evaluate liquefaction potential of alluvial materials onsite;



- performed geologic and engineering analyses to determine slope stability, liquefaction assessment, grading recommendations including anticipated removals, and preliminary foundation recommendations;
- prepared Geologic Sections depicting the grading conditions, relative to the proposed cut slopes and/or landslides (Figure 2);
- prepared conclusions and recommendations based on existing site conditions and future intended use; and
- prepared a Geotechnical Map, presented as Figures 1.

### SITE DESCRIPTION

The site is situated along the northeast foothills of the Santa Susan Mountains within the Santa Clarita area of Los Angeles County, California. The location of the site is shown on Sheet 2 of the Vesting Tentative Tract Map No. 083301 dated March 11, 2021 that is used as the base map for our Geotechnical Map, Figure 1. This Grading/Drainage Plan was prepared by Alliance Land Planning and Engineering, Inc (Alliance) and was prepared at a scale of 1 inch = 100 feet that provides topography of existing and proposed grades.

The site is bounded by The Old Road on the east, immediately south of a residential development (Tract 3794) and undeveloped hillside terrain to the west and south. Topography at the site is dominated by the alluviated valley floor of Lyons Canyon which drains north to easterly through the site. The surrounding hills that border the canyon are characterized by a series of steep to moderately steep bedrock ridges. Elevations across the site range from approximately 1,600 feet above mean sea level, in the southwestern portion of the site, to 1,300 feet along The Old Road. The natural slopes on-site exhibit gradients ranging from approximately ³/₄:1 to 3:1 (horizontal: vertical).



-3-

-4-

### SUBSURFACE EXPLORATIONS

Subsurface data was available for the site and adjacent areas from prior investigations conducted by Pacific Soils in 2006 and Gold Coast (2015). We do not have the Pacific Soils investigation report. However, the Pacific Soils explorations were presented in the Gold Coast Investigation Report (Gold Coast, 2015). This data was supplemented by the excavation of an additional 5 hollow-stem auger borings excavated on November 10, 2020 and 5 Cone Penetrometer Tests (CPT) by Gregg Drilling for RTF&A in January, 2021. The logs of the RTF&A borings are presented in Appendix A and the recent Gregg CPT soundings are presented in Appendix E. Pertinent exploratory test pits and borings from Pacific Soils and Gold Coast are presented in Appendix B. Geologic structural data obtained from the various test pits and borings, as well as from reconnaissance geologic mapping of the site by RTF&A, are presented on the Geotechnical Map, Figure 1.

#### LABORATORY ANALYSES

We performed laboratory tests on selected samples obtained from the test pits to aid in the classification of the soils, and to determine the pertinent engineering properties of the foundation soils. The results of the tests as described and presented in Appendix C.

#### GEOLOGY

### **REGIONAL GEOLOGY**

The site is located in the eastern Ventura basin, within the Transverse Ranges geomorphic province of California, along the northerly flank of the Santa Susana Mountains. The Ventura basin consists of a narrow, elongate sedimentary trough extending from the Santa Barbara Channel on the west, to the San Gabriel fault on the east. The axis of the trough trends east-west, reflecting the overall east-west trend of the Transverse Ranges, and generally



coincides with the Santa Clara River Valley and the Santa Barbara Channel. The Ventura basin has been an area of subsidence and sediment accumulation since the beginning of the Tertiary period, with the present trough-like form developing near the beginning of the Miocene epoch (Winterer and Durham, 1962).

The structure of the basin is defined as a highly folded "synclinorium" formed by northsouth compressional forces (Kew, 1924) and containing a maximum 50,000± feet of marine and nonmarine Tertiary through Quaternary age sediments (Bailey and Jahns, 1954). Two main periods of general deformation of the Ventura basin are indicated by the regional geologic structure: one in middle to late Miocene (represented by deposition of the Modelo Formation), and the other during the Pleistocene epoch, after deposition of the Plio-Pleistocene Saugus Formation (Kew, 1924; Winterer and Durham, 1962; Yeats et al., 1994). The flanks of the Ventura basin synclinorium are broken by a series of large reverse/thrust faults including the Santa Susana and Oak Ridge faults on the southern flank, and the Red Mountain and San Cayetano faults on the northern flank (Bailey and Jahns, 1954; Yeats et al., 1994). The San Gabriel fault, the dominant geologic feature in the Santa Clarita Valley, forms the eastern Ventura basin boundary, and separates the Ventura basin from the structurally similar Soledad basin.

Sedimentary rock units comprising the eastern Ventura basin include approximately 2,000 feet of undifferentiated middle to late Eocene age rocks,  $1,000\pm$  feet of the middle Miocene age Topanga Formation,  $5,000\pm$  feet of the late Miocene age Modelo Formation,  $4,000\pm$  feet of the late Miocene to early Pliocene age Towsley Formation,  $5,000\pm$  feet of the Pliocene age Pico Formation, and  $7,000\pm$  feet of the Plio-Pleistocene Saugus Formation (Winterer and Durham, 1962). The undifferentiated Eocene units and the Topanga, Modelo, Towsley, and Pico Formations are composed of marine sediments; the Saugus Formation is composed of interfingering shallow-water marine, brackish water, and nonmarine units (Kew,



1924; Winterer and Durham, 1962). These Tertiary period rock units rest unconformably on pre-Cretaceous age metamorphic and igneous basement rocks of the San Gabriel Mountains.

### SITE GEOLOGY

<u>General:</u> Geologic conditions within the boundaries of site have been previously evaluated by Pacific Soils (2006) and Gold Coast (2015). Additional geologic data was collected by RTF&A in January, 2021.

<u>Geologic Units</u>: The geologic units within the site consist of bedrock of the Pico and Saugus formations, alluvium and colluvial (slope wash) deposits, and man-made fill. The geologic units identified within the site are shown on the Geotechnical Map (Figure 1). A description of each unit is presented as follows:

<u>Pico Formation (Tp)</u>: Marine sedimentary rock units of the Pliocene age Pico Formation (map unit "Tp") are exposed in the southwest corner of the site. The formation is composed primarily of fine- to medium-grained sandstones, coarse-grained pebbly sandstones, siltstones, and some silty claystone interbeds. Fine-grained sandstone is the dominant lithology of the formation and is typically very thinly or thinly bedded, soft, and moderately weathered, with alternating bands of iron oxide staining. Siltstone and silty claystone beds are moderately to well indurated and massive. Sandstone beds are typically dark yellowish orange to yellowish gray; siltstone beds are typically yellowish gray to olive brown.

Saugus Formation, Sunshine Ranch Member (TQss): The Sunshine Ranch Member of the Saugus Formation (designated map unit "TQss") underlies the majority of the site and consists of interfingering shallow-water marine, brackish water, and nonmarine sedimentary units of Plio-Pleistocene age (Winterer and Durham, 1962). Within the site, the Sunshine Ranch Member is composed of fine- to coarse-grained sandstone and conglomeratic/pebbly sandstone, with some siltstone interbeds. Medium to coarse sandstone and conglomeratic sandstone are the



dominant lithologies of the formation and are typically soft, dry, and thickly bedded to massive. Some of the finer grained sandstone beds are very thinly bedded, moderately weathered, and have some iron oxide staining. Siltstone beds within the formation are typically 2 feet thick or less, moderately to well indurated, and thickly bedded to massive. Sandstone beds are dark yellowish orange to grayish orange, while siltstones are yellowish gray.

<u>Undifferentiated Alluvium and Colluvium (Qac)</u>: Undifferentiated Holocene age alluvium and colluvium (map unit "Qac") overlie the bedrock units onsite, with the alluvium mantling the floor of Lyons Canyons and the colluvium generally occurring in drainage swales and side canyons, and along the lower elevations of the natural slopes. These materials consist of loose to moderately dense mixtures of sand, silt, gravel, cobbles, and to a lesser extent, boulders.

<u>Man-made Deposits (af)</u>: Man-made deposits (map unit "af"), associated with past grading activities for development of The Old Road, are located along the east boundary of the site. The man-made deposits are composed of sand and silt mixtures derived primarily from the local bedrock materials.

<u>Geologic Structure</u>: The site is located along the northerly limb of the asymmetrical Pico anticline. Within the site boundaries, the beds forming the northerly limb strike generally northwest and dip 30 to 65 degrees to the northeast.

### GROUNDWATER

Groundwater within site occurs in the alluvial deposits within Lyons Canyon and major tributary canyons. Data from the Water Resources Division of Los Angeles County Department of Public Works (LACDPW) indicates that one water well was located adjacent to the site boundaries. This well, designated as Well No. 5832, was located immediately north of the site near the intersection of Sagecrest Circle and The Old Road. The water level data from this well,



which was destroyed in 1965, covers the period of December, 1956 through November, 1964, with the last water level measured on November 24, 1964. The water level at that time was measured at a depth of 118.4 feet below existing ground surface.

Exploration completed within the site by Pacific Soils (2006) indicated groundwater within the alluviated valley floor at depths ranging from 53 to 69 feet below existing ground surface. Groundwater was not encountered within our borings within the valley floor within the main easterly canyon. However, seepage was encountered in the northerly draining canyon within Hollow Stem 3 and 4 at depths of 25 and 20 feet, respectively. Pore water dissipation was performed within some of the CPT soundings as presented in Appendix E did not provide a consistent groundwater depth. Based on review of the California Division of Mines and Geology seismic hazard report for Oat Mountain (1998), the historic water depth just north of the site along The Old Road is 30 feet. A historic high water of 30 feet was conservatively utilized for the liquefaction calculations presented in Appendix G.

### **SLOPE STABILITY**

**General**: The grading plan for Vesting Tentative Tract Map No. 83301 will include grading of 12 cut slopes. For the purposes of this report, a cut slope is defined as a slope 10 feet or more in height. The cut slopes are designated CS-1 through CS-12 with locations shown on Figure 1. Proposed cut slope gradients will be 2:1 (horizontal: vertical). The maximum cut slope height is approximately 155 feet (Cut Slope CS-10). Data specific to all of the cut slopes, including slope height, gradient, and underlying geologic conditions, are summarized on Table 1 and discussed below.

Natural slopes within the grading limits are underlain by bedrock of the Plio-Pleistocene Saugus Formation, composed of bedded sedimentary rock units. Bedding planes within the Saugus Formation are poorly to moderately well developed. The bedding can constitute planes of weakness. Where bedding is adversely oriented, or "daylighted," with respect to natural or cut



-9-

slopes, potential for "block-glide" failure exists.

### **STABILITY ANALYSES**

Slope stability analyses were performed using the program Slope/W by GEO-SLOPE International Ltd., which utilized Bishop's Simplified Method or Spencer's Method was used.

#### GEOLOGIC SECTIONS AND ASSUMED CRITICAL FAILURE SURFACE

The analyses were based on subsurface conditions as depicted on the Geologic Sections, Figure 2. The existing ground surface, proposed grading scheme, and subsurface geologic structure are shown on the geologic sections. For analyses, where the location of weak bedding planes is unknown or uncertain, one is assumed to be located exactly at the critical location, typically near the toe of the slope. Although groundwater was not indicated on the Geologic Sections, the analyses assumed a phreatic surface above the critical failure surface for bedding plane failures. The critical failure surfaces, phreatic surfaces, factors of safety, and recommended mitigation measures (i.e. stabilization or buttress fills, if necessary) are added to the Geologic Sections for presentation as Geotechnical Sections in this report. The Geotechnical Sections and Slope Stability Analysis are presented in Figures 3 and the computer printouts are presented in Appendix D.

#### SHEAR STRENGTH PARAMETERS

As part of the evaluation of shear strength parameters to be used in slope stability calculations, the referenced reports concerning the subject site and adjacent sites were reviewed. The shear strength parameters used for slope stability analyses are based on review of the referenced reports (RTF&A, 2000 and 2016) from relatively nearby sites, review of



recommended shear strength parameters from the Gold Coast (2015) report, with additional tests supplemented by our office for to establish the recommended shear strength parameters.

Presented below are the recommended shear strengths for use at the subject site. The shear test results are considered to be effective values; that is, they require hydrostatic pressures be considered in a stability analysis. A description of the testing procedures is included in Appendix B and the direct shear test results are presented in Appendix C.

	COHESION	ANGLE OF SHEARING RESISTANCE
MATERIAL	(psf)	(degrees)
Landslide Failure Plane (MSR)	200	16
TQss Bedding Static (MSR)	250	20
TQss Bedding Seismic (SSR)	200	30
TQss Cross Bed Static (SSR)	500	34
TQss Cross Bed Seismic (SSR)	800	36
Compacted Fill 90% (SSR)	350	30
Compacted Fill 95% (SSR)	400	30
Alluvium (Qal)	250	30

<u>Cut Slope CS-1</u>: Cut Slope CS-1 will consist of a southeast-facing 2:1 slope that will attain a height of approximately 115 feet. The cut slope will expose sedimentary rock units of the Saugus Formation and alluvial/colluvial deposits. Bedding in the Saugus Formation strikes northwest and dips 45 to 65 degrees to the northeast. As indicated on Geologic Section A-A' (Figure 2), the northeast-dipping bedding structure is favorably oriented with respect to the southeast-facing cut slope. Therefore, the portion of the cut slope exposing bedrock materials is considered grossly stable from a geologic standpoint.

Alluvial and colluvial materials will likely be exposed in the western portion of Cut Slope CS-1. These materials are weakly cemented and subject to erosion and surficial failures. Accordingly, it is recommended that the eastern portion of the cut slope exposing the alluvium/colluvium be reconstructed as a stability fill slope with backdrains. The keyway for the



stability fill should measure 30 feet wide and 3 feet deep and should extend to the proposed third terrace drain at an elevation of about 1,405 msl. The stability fill should be constructed with backdrains in accordance with the recommendations presented in the "Conclusions and Recommendations" section of this report, and as shown on the "Stability Fill Details for Grossly Stable Slopes" (Figure 4).

<u>Cut Slope CS-2</u>: Cut Slope CS-2 will be graded as A 30 feet high, 2:1 south-southeastfacing cut slope. The cut slope will expose of Saugus Formation units in which the underlying bedding strikes northwest and dips 31 to 35 degrees to the northeast. This bedding is favorably oriented with respect to the southeast-facing cut slope, and the slope is considered grossly stable from a geologic standpoint.

<u>Cut Slope CS-3</u>: Development of Cut Slope CS-3 will consist of trimming an existing 2:1 cut slope and lowering the overall slope height from the current 115 feet to a height of approximately 45 feet. The resultant 2:1 cut slope will face northeast. Cut Slope CS-3 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips 33 to 45 degrees towards the northeast. As depicted on Geologic Section H-H' (Figure 2), an apparent bedding component dipping 29 degrees to the northeast will be encountered in the cut slope. The apparent bedding is steeper than the 2:1 (26 degrees) slope gradient and the cut slope is considered grossly stable from a geologic standpoint.

<u>Cut Slope CS-4</u>: Cut Slope CS-4 will consist of a 40-foot high, south-southeast-facing 2:1 slope underlain by Saugus Formation units and alluvial/colluvial deposits. Bedding beneath the proposed cut slope strikes northwest and dips 30 to 45 degrees to the northeast. This bedding orientation is favorable relative to the proposed cut slope and the cut slope is considered grossly stable, from a geologic standpoint.

Alluvial and colluvial materials will likely be exposed in the lower portions of Cut Slope CS-4. These materials are weakly cemented and subject to erosion and surficial failures.



Accordingly, it is recommended that the entire cut slope be reconstructed as a stability fill slope with backdrains. The keyway for the stability fill should measure 25 feet wide and 3 feet deep.

<u>Cut Slope CS-5</u>: Cut Slope CS-5 will consist of a north-facing 2:1 slope that will attain a maximum height of 30 feet. A 10-foot-high retaining wall will be constructed across the toe of the cut slope. Cut Slope CS-5 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 37 to 65 degrees towards the northeast. This bedding orientation exhibits an apparent bedding component dipping approximately 29 degrees to the north (see Geologic Section G-G', Figure 2). Although the bedding dips steeper than the 2:1 (26 degree) cut slope and is grossly stable, the northerly-dipping bedding will impose a surcharge on the proposed retaining wall of 10 kips per foot of retaining wall. Analyses of the daylighted bedding condition presented in Appendix D meets County static and seismic factor of safety requirements after construction of a retaining wall able to resist the daylighted surcharge load of 10 kips. It is assumed that the proposed retaining wall will be constructed as a pile supported retaining wall using top-down construction sequencing. The pile supported retaining wall will be more expensive that a conventional retaining wall, but is considered feasible.

<u>Cut Slope CS-6</u>: Cut Slope CS-6 will consist of a 15-foot high, north-facing 2:1 cut slope that will expose alluvial and colluvial deposits. It is recommended that the alluvium and colluvium in the area of the cut slope be entirely removed as part of the adjacent canyon cleanout and the entire slope reconstructed as a 2:1 fill slope.

<u>Cut Slope CS-7</u>: Cut Slope CS-7 will consist of a north-northwest-facing 2:1 slope that will attain a maximum height of 40 feet. A 10-foot-high retaining wall will be constructed across the toe of the cut slope. Cut Slope CS-7 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 30 to 40 degrees towards the northeast. This bedding orientation exhibits an apparent bedding component dipping approximately 23 degrees to the north (see Geologic Section F-F', Figure 2) and is daylighted with respect to the north-northwest-facing cut slope. Analyses of the daylighted bedding



condition presented in Appendix D meets County static and seismic factor of safety requirements.

As currently proposed, the retaining wall does not need to be designed to support an additional load on the wall due to daylighted conditions. However, the need to include a load due to daylighted conditions on the proposed retaining wall below Cut Slope CS-7 should be further evaluated once the specific design details are determined. It is assumed that the proposed retaining wall will be constructed as a pile supported retaining wall using top-down construction sequencing similar to the retaining wall construction below Cut Slope CS-5.

<u>Cut Slope CS-8</u>: Cut Slope CS-8 will consist of a north-northeast-facing 2:1 slope that will attain a maximum height of 20 feet. Cut Slope CS-8 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 36 to 42 degrees towards the northeast. As depicted on Geologic Section E-E', this bedding orientation exhibits an apparent bedding component dipping approximately 33 degrees to the northeast (see Geologic Section G-G', Figure 2). The apparent bedding is steeper than the 2:1 (26 degrees) slope gradient and the cut slope is considered grossly stable from a geologic standpoint.

<u>Cut Slope CS-9</u>: Cut Slope CS-9 will consist of a  $25\pm$  feet high, south-southwest-facing 2:1 slope. The cut slope is underlain by Saugus Formation units. Bedding beneath the proposed cut slope strikes northwest and dips 36 to 42 degrees to the northeast. This bedding orientation is favorable with respect to Cut Slope CS-9 (see Geologic Section E-E'), and the cut slope is considered grossly stable from a geologic standpoint.

<u>Cut Slope CS-10</u>: Cut Slope CS-10 will consist of a southeast-facing 2:1 slope that will attain a maximum height of 155 feet. Cut Slope CS-10 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 55 to 65 degrees towards the northeast. As depicted on Geologic Section D-D' (Figure 2), this bedding orientation is favorably oriented with respect to the southeast-facing cut slope and the slope is considered grossly stable from a geologic standpoint.



Alluvial and colluvial deposits will be exposed in the central portion of the cut slope. These materials are weakly cemented and subject to erosion and surficial failures. Accordingly, it is recommended that the portion of the cut slope exposing the alluvium/colluvium be reconstructed as a stability fill slope with backdrains. The keyway for the stability fill should measure 30 feet wide and 3 feet deep, and should extend upslope to the mid-slope drainage terrace (approximate elevation 1,440 feet).

Alluvial and Colluvial deposits will also be exposed in the proposed debris basin slopes below Cut Slope CS-10. The alluvium and colluvial soils exposed in the proposed basin cut slopes should be removed and replaced as a fill slope. Backdrains would only be required where the back of the fill slope will be within bedrock materials.

<u>Cut Slope CS-11</u>: Cut Slope CS-1 will consist of a northeast-facing 2:1 slope that will attain a height of approximately 70 feet. The cut slope will expose sedimentary rock units of the Saugus Formation and, in the central portion of the slope, alluvial/colluvial deposits. Bedding in the Saugus Formation strikes northwest and dips 38 to 65 degrees to the northeast. As indicated on Geologic Section C-C' (Figure 2), an apparent bedding component of 24 degrees is daylighted with respect to the cut slope. Stability analyses performed for potential failure along the daylighted bedding depicted on Geologic Section C-C' indicate that proposed Cut Slope CS-11 meets the requirements for grossly stable slopes.

There is a potential for seepage of water along daylighted bedding planes. Therefore, it is recommended that Cut Slope CS-11 be constructed as a 20-foot-wide by 3-foot-deep stability fill. The stability fill should extend upslope to the first drainage terrace, and extend across the area of alluvium/colluvium in the central portion of the cut slope. The stability fill should be constructed with backdrains in accordance with the recommendations presented in the "Conclusions and Recommendations" section of this report, and as shown on Figure 4.

<u>Cut Slope CS-12</u>: Cut Slope CS-12 will consist of an east-northeast-facing 2:1 slope that will attain a maximum height of 75 feet. Cut Slope CS-12 will expose Saugus Formation units in



which the underlying bedding strikes northwest and dips greater than 42 to 46 degrees towards the northeast. As depicted on Geologic Section B-B' (Figure 2), this bedding orientation exhibits an apparent bedding component dipping approximately 32 degrees to the northeast. The apparent bedding is steeper than the 2:1 (26 degrees) slope gradient and the cut slope is considered grossly stable from a geologic standpoint.

### **CONCLUSIONS AND RECOMMENDATIONS**

### **GENERAL**

Based on our review of previous geotechnical reports prepared for the project and adjacent areas, the additional subsurface exploration performed by RTF&A, and analyses completed as part of this work, it is our opinion that Vesting Tentative Tract Map No. 83301 may be developed as planned, provided our recommendations are incorporated in the design of the project.

### **GEOLOGIC CONSIDERATIONS**

**Faulting:** No active or potentially active faults are known to exist within the subject site and the site is not located within an Alquist-Priolo Earthquake Fault Zone. The closest Alguist-Priolo Zone is located approximately 1.5 miles northwest of the site and was established for surface features identified following the 1994 Northridge earthquake. In our opinion, there is little probability of surface fault rupture occurring onsite.

Landslides: There are no known landslide with the subject site.

**Debris Flows:** The potential for debris flows exist anywhere that a moderate to thick accumulation of residual soil, slope wash, or weathered bedrock materials occur on moderate to steep slopes. The potential debris flow hazard should be addressed as part of a review of 1" = 40' rough grading plans, when building lots and drainage features have been more clearly defined.



-16-

At the rough grading plan stage, possible mitigative measures could include, but not be limited to, one or more of the following:

- removal of potential debris material;
- building setbacks from ascending slopes;
- reduction and control of drainage onto the debris material;
- construction of debris basins; and
- construction of an impact wall designed for an equivalent fluid density of at least 125 pounds per cubic foot.

In general, building lots most susceptible to potential debris flow are those lots located directly below and adjacent to natural slopes. Based on our review of the Alliance plan, all future lots appear to have acceptable separation, either vertical or horizontal, from natural slopes and potential debris flow source areas. Therefore, potential debris flow impacts are judged to be minimal. However, these opinions should be verified at the rough grading plan review stage.

<u>Oil Wells</u>: Data from the California Division of Oil, Gas and Geothermal Resources (DOGGR) indicate that one oil well, designated "Ayers" 1 is located within the subject site. Only limited data on this well exists in the DOGGR records. Based on the data, the well was drilled in February, 1961 to a depth of 9,785 feet. The well was subsequently abandoned in April, 1961. Recent attempts to locate this well by others were unsuccessful. However, physical survey techniques did identify anomalies within the vicinity of the reported historical well location and GPS information from that search is included with the documentation related to "Ayers" 1 that was provided by Atlas in their December 28, 2020 report that is presented in Appendix H.

It is recommended that prior to development the DOGGR mapped oil well location be surveyed and staked in the field. The surveyed location should be plotted on the current grading



plan to determine the location relative to the grading footprint. Furthermore, DOGGR should be afforded the opportunity to review the site development plans to provide the necessary recommendations with respect to well abandonment. It is likely that reabandonment of the oil well to current DOGGR standards will be required if the well is found to lie within the grading footprint.

**Rockfalls**: Future building pads within the subject site will not be located directly downslope of any potential rockfall areas.

**Rippability:** The bedrock exposed within the subject site is weakly to moderately cemented and can likely be excavated with conventional grading equipment. Heavy single shank ripping may be needed for massive conglomerate or well-cemented sandstone units within the Saugus Formation. Should a hard well-cemented layer be encountered, the use of breakers or jackhammers may be necessary.

**Restricted Use Areas (RUAs)**: There are no proposed RUAs within the subject site.

# **LIQUEFACTION**

### **GENERAL**

Liquefaction may occur when saturated, loose to medium dense soils with little to no cohesion are densified by ground vibrations. The densification results in increased pore water pressures if the soils are not sufficiently permeable to dissipate these pressures during, and immediately following, an earthquake. When the pore water pressure is equal to or exceeds the overburden pressure, liquefaction of the affected soil layers occurs. For liquefaction to occur, three conditions are required:

- ground shaking of sufficient magnitude and duration;
- a groundwater level at or above the level of the susceptible soils during the • ground shaking; and



#### -18-

• soils that are susceptible to liquefaction.

For a site to be considered susceptible to liquefaction using the criteria and methodology initially developed by Seed and Idriss (1982), liquefaction of underlying soil layers must result in an observed surface effect such as sand boils, mud-spouts, surface water seepage, ground cracking, or quicksand-like conditions.

Lateral spreading can result in ground cracking and may occur when a site is sloped or is near a free-face and there is a sufficiently continuous liquefiable layer on which the overlying soils can move laterally.

Ground settlement may occur during seismic shaking of an area. The settlement can be caused by liquefaction of loose granular soils and by compaction of loose, but not necessarily liquefiable, soils.

The State of California Seismic Hazard Map for the Oat Mountain Quadrangle indicates the alluvial areas of the subject site are located within a potential liquefaction area. The locations of the CPT soundings that were advanced for the subject investigation are indicated on the attached Geotechnical Map, Figure 1. As previously mentioned, the logs for the borings are presented in Appendix A, CPT soundings are presented in Appendix G, and the results of our laboratory tests are presented in Appendix C of this report. The results of our liquefaction calculations are presented in Appendix G.

**Ground Shaking**: Ground shaking of sufficient magnitude and duration to cause liquefaction can occur virtually anywhere within Southern California. The seismic parameters determined for the subject site resulted in a PGAm of 1.17g. The deaggregation obtained from the USGS website indicates the mean contribution to acceleration is a 6.85 magnitude earthquake located 7.27 kilometers from the site. The seismic data is presented in Appendix F and the liquefaction calculations are presented in Appendix G. There will not be any liquefaction related settlements with the existing bedrock areas mapped as TQss areas as indicated on the Geotechnical Map, Figure 1.



Liquefaction Analysis: The liquefaction evaluation was performed in accordance with the 2014 Los Angeles County Building Code and the Los Angeles County Department of Public Works Geotechnical Materials Engineering Division (GMED) document GS 045.0, dated October 1, 2014. Liquefaction calculations are presented in Appendix G.

Liquefaction evaluation and calculations were previously performed for the site (Gold Coast, 2015) which determined that the alluvial portions of the site were subject to up to 1.39 inches of liquefaction settlement and 0.49 inches none of dry sand settlement for a total seismic settlement of about 1.89 inches. The liquefaction evaluation performed by RTF&A on the 5 CPT soundings performed by Gregg Drilling in January, 2021 are discussed below and the liquefaction calculations are presented in Appendix G.

The existing alluvial areas (Qac) mapped at the site are subject to liquefaction. After the recommended removals are performed, the remaining alluvium soils will be mantled by certified engineered fill. The alluvial soils are underlain by bedrock materials. Accordingly, the existing canyon areas at the stie will be underlain by a combination of bedrock materials, denser alluvial deposits, and certified engineered fill. Bases on liquefaction calculations presented in Appendix G that were performed on the recent Gregg Drilling CPT soundings, it was determined that liquefaction settlement would be about 1.25 inches (Boring HS-5). The maximum dry sand settlement expected at the site is about 0.5 inches. The total dynamic settlement after performing either the 15 or the 20 feet of removal and elevating the site grade within the existing Qac areas is expected to be about 1.75 inches with up to about 1 inch of seismic differential settlement within a horizontal distance of about 30 feet.

Based on the results of our analyses, some alluvial soils beneath the site and below the groundwater level may liquefy in the event of a large earthquake on a nearby fault that produces the design-level ground motions. In addition, soils above the groundwater level may also experience "dry" settlement. This will result in seismically induced ground settlement. The recommended liquefaction mitigation at this site consists of a combination of ground



modification below the proposed building areas and structural mitigation. Each of the liquefaction mitigation methods is discussed below.

**Ground Improvement**: The recommended grading will involve the removal of the upper soils in the proposed building areas and their replacement with properly compacted fill. The upper soils, which are subject to dry sand settlement, would be removed to depths of either 15 or 20 feet and replaced with compacted fill soils as indicated on the attached Geotechnical Map, Figure 1. Properly compacted fill soils would not be subject to liquefaction.

<u>Structural Mitigation</u>: According to GMED GS 045.0, dated October 1, 2014, structural mitigation alone is acceptable for up to 4 inches of total seismically induced settlement, with up to 1 inch of seismically induced differential vertical displacement over a horizontal distance of 30 feet. Anything in excess of these settlements requires a combination of ground modification and structural mitigation. Accordingly, the recommended liquefaction mitigation at this site consists of a combination of ground modification below the proposed building areas and structural mitigation.

Structural mitigation to reduce the potential for liquefaction and/or seismically induced settlement of the proposed buildings would include minimum requirements for foundation and floor slab construction as presented in the following "Recommendations" section of this report. The project Structural Engineer should also be consulted regarding the design of structural components of the buildings to reduce adverse impacts associated with liquefaction-induced settlement of the proposed structures at the site.

### **INFILTRATION**

The Los Angeles County Department of Public Works (LACDPW) prepared "Guidelines for Design, Investigation, and Reporting Low Impact Development Stormwater Infiltration" (Document GS200.2, dated June 30, 2017). These guidelines provide stringent requirements for minimum infiltration rates, hillside developments with steep slopes, and sites subject to



liquefaction.

At the completion of the proposed grading operations, the surface of the subject site is expected to consist of either relatively shallow certified compacted fill cap overlying bedrock in the existing cut areas or deeper fill soils ranging from about 20 to greater than 30 feet overlying alluvial soils. All the alluvial soils at the site are underlain by bedrock. Compacted fill soils at the subject site are not expected to meet the minimum county infiltration requirements of 0.3 inches per hour. In addition, the alluvial soils at the site are designated by the State of California as having the potential of being subject to liquefaction when saturated and are subject to seismic settlement as evaluated in this report. The guidelines state that infiltration shall not increase the potential for seismic settlement of structures on or adjacent to the site. Accordingly, in compliance with the LACDPW Guidelines, it is recommended that infiltration into the subsurface compacted fill soils not occur at the subject site and that stormwater mitigation requirements be achieved by methods other than on-site infiltration.

### GRADING

**General:** The following sections present recommendations for treatment of cut and fill slopes, and grading. The applicability of the preliminary recommendations given in the following sections for foundation and retaining wall design should be confirmed at the completion of grading. Paving studies and soil corrosivity tests should be performed at the completion of rough grading to develop detailed recommendations for protection of utilities, structures, and for construction of the proposed roads.

Site Preparation: Prior to performing earthwork, the existing vegetation and any deleterious debris should be removed from the site. All unsuitable soils in the areas of grading that are receiving fill should be removed to competent bedrock materials and replaced with engineered fill. The depth of removal and recompaction of unsuitable soils is noted on the Geotechnical Map. Any fill required to raise the site grades should be properly compacted.



Removal of the exposed natural soils should extend to at least the depths indicated on the Geotechnical Map.

**<u>Removal Depths</u>**: The required depth of removal and recompaction of the natural soils is indicated on the Geotechnical Map. Deeper removals will be required if disturbed or unsuitable soils are encountered. After excavation of the upper natural soils on hillsides and in canyons, further excavation should be performed, if necessary, to remove slope wash or other unsuitable soils.

The Geotechnical Consultant of Record may require that additional shallow excavations be made periodically in the exposed bottom to determine that sufficient removals have been made prior to recompacting the soil in-place. Deeper removals may be recommended by RTF&A based on observed field conditions during grading. During grading operations, the removal depths should be observed by a representative of RTF&A and surveyed by the Project Civil Engineer for conformance with the recommended removal depths shown on the grading plan.

**Expansive Bedrock Requirements**: It is anticipated that bedrock materials exposed at pad grade may contain expansive claystone beds that could cause differential expansion. Therefore, within building areas at locations where expansive bedrock units are exposed at pad grade, it is recommended that the bedrock be removed and recompacted to a depth at least 8 feet below the proposed final pad elevations or 5 feet below the bottom of proposed footings, whichever is greater. It is also recommended that in exposed bedrock areas receiving pavement or hardscape improvements, the bedrock be removed and recompacted to a depth at least 3 feet below proposed soil subgrade. The soils generated by these over-excavations should be mixed with non-expansive soils to yield a relatively non-expansive mixture. Should the resulting fill soil still be expansive, special construction techniques, such as pad subgrade saturation or post-tensioned slabs, may be required to reduce the potential for expansive soil–related distress.



<u>Transition Lot Requirements</u>: Proposed building pads located in a cut and fill transition zone may experience cracking and movement of the footings and slab due to differing compressibility of the fill, as compared to the bedrock material. To reduce the potential for cracking and differential settlement, the portion of the lot in cut bedrock or terrace deposits should be over-excavated to a depth at least 5 feet below the proposed finished pad elevation or 3 feet below the bottom of proposed footings, whichever is greater. The over-excavation should extend at least 5 feet laterally beyond the building limits, or 1 foot laterally for each 1 foot over-excavated below proposed finished pad elevation, whichever is greater. Where removal and recompaction for potentially expansive soils or bedrock is also required, it is recommended that the 8 foot removals be performed as described in the "Expansive Bedrock" section of this report.

<u>Material for Fill</u>: The on-site soils, less any debris or organic matter, may be used in the required fills. Any expansive clays should be mixed with non-expansive soils to result in a mixture having an expansion index less than 30 if they are to be placed within the upper eight feet of the proposed rough grades.

Rocks or hard fragments larger than eight inches may not be placed in the fill without special treatment. Rocks or hard fragments larger than four inches shall not be clustered or compose more than 25% by weight of any portion of the fill or a lift. Soils containing more than 25% rock or hard fragments larger than four inches must be removed or crushed with successive passes (e.g., with a sheepsfoot roller) until rock or hard fragments larger than four inches constitute less than 25% of the fill or lift.

**Oversized Material:** Rocks or material greater than eight inches in diameter, but not exceeding four feet in largest dimension, shall be considered oversized rock. The oversized rocks can be incorporated into deep fills where designated by the Geotechnical Consultant of Record. Rocks should be placed in the lower portions of the fill and should not be placed within the upper 10 feet of compacted fill, or nearer than 15 feet to the surface of any fill slope. Windrows should be excluded from areas of proposed utilities, pools, and other types of future



underground improvements. Additional costs and construction difficulties should be anticipated if future improvements are located in areas where there will be conflicts with existing windrows. Rocks between eight inches and four feet in diameter shall be placed in windrows or shallow trenches located so that equipment can build up and compact fill on both sides. The width of the windrows shall not exceed four feet. The windrows should be staggered vertically so that one windrow is not placed directly above the windrow immediately below. Rock greater than one foot in diameter shall not exceed 30% of the volume of the windrows. Granular fill shall be placed on the windrow, and enough water should be applied so that soil can be flooded into the voids. Fill should be placed along the sides of the windrows and compacted as thoroughly as possible. After the fill has been brought to the top of the rock windrow, additional granular fill should be placed and flooded into the voids. Flooding is not permitted in fill soils placed more than one foot above the top of the windrowed rocks.

Where utility lines or pipelines are to be located at depths greater than 15 feet, rock shall be excluded in that area. Excess rock that cannot be included in the fill, or that exceeds four feet in diameter, should be stockpiled for export or used for landscaping purposes.

The oversized material recommendations presented in this report provide for the geotechnical consultant to coordinate with the grading contractor to develop a procedure for construction of compacted fills that have a satisfactory fill performance for the intended use of the fill. It should be understood that it is not feasible and/or cost effective to eliminate all oversize material from constructed fills as part of a conventional grading operation. The exclusion of all oversize material is not necessary for satisfactory fill performance on the majority of projects.

**Import Material:** Import material should consist of relatively non-expansive soils with an expansion index less than 30. The imported materials should contain sufficient fines (binder material) so as to be relatively impermeable, and result in a stable subgrade when compacted. The import material should be free of organic materials, debris, and rocks larger than 12 inches.



A bulk sample of potential import material, weighing at least 25 pounds, should be submitted to the Geotechnical Consultant of Record at least 48 hours in advance of fill operations. All proposed import materials should be approved by the Geotechnical Consultant of Record prior to being placed at the site.

<u>Compaction</u>: After the site is cleared and excavated as recommended, the exposed soils should be carefully observed for the removal of all unsuitable material. Next, the exposed subgrade soils should be scarified to a depth of at least six inches, brought to above optimum moisture content, and rolled with heavy compaction equipment. The upper six inches of exposed soils should be compacted to at least 90% of the maximum dry density obtainable by the ASTM D 1557-02 Method of Compaction.

After compacting the exposed subgrade soils, all required fills should be placed in loose lifts, not more than eight inches in thickness, and compacted to at least 90% of their maximum density. For fills placed at depths greater than 40 feet below proposed finish grade, a minimum compaction of 93% of the maximum dry density is required. The moisture content of the fill soils at the time of compaction should be above the optimum moisture content. Compacted fill should not be allowed to dry out before subsequent lifts are placed.

Rough grades should be sloped so as not to direct water flow over slope faces. Finished exterior grades should be sloped to drain away from building areas to prevent ponding of water adjacent to foundations.

Shrinkage And Bulking: Shrinkage of about 12 to 16 percent is estimated for the onsite natural alluvial soils when removed and placed as compacted fill. A bulking value of about 2 to 6 percent is estimated for materials generated from Saugus Formation bedrock cut areas for use as compacted fill. The actual shrinkage and bulking will depend upon the relative compaction obtained by the contractor during grading operations and would be expected to change on a daily basis.



**Permanent Slopes:** Permanent cut and fill slopes may be inclined at 2:1 or flatter. The current site plan indicates that the steepest slope to be constructed at the site during grading will be 2:1.

**Proposed Cut Slopes:** Cut slopes proposed for the rough grading of the project site have been designated, as shown on the Geotechnical Map. Each cut slope is discussed with specific recommendations presented in the "Slope Stability Analysis" section of this report. All grading should conform to the minimum recommendations presented in this report. If these slopes are modified from those that are discussed in this report, the modifications should be reviewed by RTF&A to ascertain the applicability of our recommendations.

**Fill Slopes:** Where the toe of a fill slope terminates on natural, fill, or cut materials, a keyway is required at the toe of the fill slope. The fill slope keyway should be a minimum width of 12 feet, be founded within competent material, and should extend a horizontal distance beyond the toe of the fill to the depth of the keyway. The keyway should be sloped back at a minimum gradient of two percent into the slope. The width of fill slopes shall be no less than eight feet, and under no circumstances should the fill widths be less than what the compaction equipment being used can fully compact. Benches should be cut into the existing slope to bind the fill to the slope. Benches should be step-like in profile, with each bench not less than four feet in height and established in competent material. Compressible or other unsuitable soils should be removed from the slope prior to benching. Competent material is defined as being essentially free of loose soil, heavy fracturing, or erosion-prone material and is established by the Geotechnical Consultant of Record during grading.

Where the top or toe of a fill slope terminates on a natural or cut slope and the natural or cut slope is steeper than a gradient of 3:1, a drainage terrace with a width of at least six feet is recommended along the contact. As an alternative, the natural or cut portion of the slope can be excavated and reconstructed as a stability fill slope to provide an all-fill slope condition. Where



the contact between the face of the fill slope and the face of a lower natural or cut slope is inclined at 45 degrees or steeper, a drainage terrace would not be required.

When constructing fill slopes, the grading contractor shall avoid spillage of loose material down the face of the slope during the dumping and rolling operations. Preferably, the incoming load shall be dumped behind the face of the slope and bladed into place. After a maximum of four feet of compacted fill has been placed, the contractor shall backroll the outer face of the slope by backing the tamping roller over the top of the slope, thoroughly covering all of the slope surface with overlapping passes of the roller. The foregoing should be repeated after the placement of each four-foot thickness of fill. As an alternative, the fill slope can be overbuilt and the slope cut back to expose a compacted core. If the required compaction is not obtained on the fill slope, additional rolling will be required prior to placement of additional fill, or the slope shall be overbuilt and cut back to expose the compacted core.

<u>Stability Fills</u>: Stability fill can be recommended to minimize the potential for erosion and to eliminate adverse fill-over-cut conditions. Stability fill slope should be constructed in accordance with Stability Fill Details for Grossly Stable Slopes (Figure 4). Backdrains should be installed at the backcut of the stability fill as recommended below.

### DRAINAGE

<u>Subdrains</u>: Canyon subdrains are recommended to intercept and remove groundwater within canyon fill areas. All subdrains should extend up-canyon, with the drain inlet carried to within 15 feet of final pad grade. The approximate location for recommended subdrains are shown on the Geotechnical Map, Figure 1. Specific subdrain locations should be determined in the field during grading operations.

The subdrains should be surveyed by the Project Surveyor to establish line and grade during construction, and for future location reference. Subdrain and backdrain excavations should be observed by the Geotechnical Consultant.



The subdrains should be installed in accordance with the manufacturer's specifications. A minimum 2% gradient is to be maintained in the subdrain pipes and the pipe shall have at least 8 uniformly spaced narrow slots per foot. The width of the slots should not exceed 1/16 of an inch. If PVC pipe with drilled perforations is utilized, the diameter of the holes should not exceed 3/8 of an inch, if gravel and filter fabric is used or 1/8 inch diameter if Los Angeles County Flood Control District (LACFCD) Designation F-1 Filter Material is used. There should be at least 8 uniformly spaced sets of 2 perforations per lineal foot of pipe. When constructing the subdrain, the pipe should be placed so that the drilled perforations are positioned on the bottom half of the pipe. The upstream end of subdrains should be capped. The final 20 feet of pipe at the downstream end of canyon, stabilization, buttress, and side hill fills shall not be slotted or perforated. Provisions should be made at all times during construction to prevent damage to the subdrain from construction equipment, and to prevent soils from being washed into an exposed subdrain by surface waters.

For runs up to 500 feet, subdrains for the bottom of canyon fills should consist of at least 6-inch diameter pipe. For runs of 500 to 1,500 feet, 8-inch diameter pipe shall be used. For runs over 1,500 feet, 10-inch diameter pipe shall be used.

Canyon subdrains may be installed in a rectangular trench excavated to expose competent material and shall be approved by the Geotechnical Consultant. The subdrains should be surrounded by at least 3 cubic feet per lineal foot of granular filter material and there should be at least 6 inches of compacted granular filter material or gravel on all sides of the pipe. The granular filter material for subdrains should meet the F1 material criteria, or have a gradation approved by the Geotechnical Consultant prior to placement.

As an alternative to the granular filter material, 3/4-inch diameter gravel may be placed around the pipe. The gravel should be separated from the surrounding soils by a filter fabric such as Mirafi 140N, or equivalent, wrapped around the gravel ("burrito wrapped").



**Backdrains**: Backdrains are required for all stability fills or buttress fills, and should consist of 4-inch diameter perforated or slotted pipe. The vertical spacing of the backdrains should be a maximum of about 15 feet, with a horizontal spacing of about 100 feet. Backdrain outlets should consist of non-perforated pipe. The gradient should be at least 2% to the discharge end. The exact location of the backdrains should be determined in the field by the Geotechnical Consultant after the backcut has been made, so that it can be best positioned to intercept potential seepage.

**Surface Drainage:** All surface drainage should be directed away from proposed structures through non-erosive devices. The ponding of water must not be allowed, especially adjacent to foundations. The pad gradients should not slope toward any descending slopes in order to reduce the potential for surficial erosion. Water that flows towards slopes should be conducted to appropriate discharge locations via non-erodible drainage devices. Drainage devices, including drainage terraces on graded slopes should be inspected periodically and should be kept clear of debris. Drainage and erosion control should be designed in accordance with the standards set forth in the CBC.

Any modification of the grades of building pads, parking areas, etc., could adversely affect drainage at the site. Future landscaping, construction of walkways, planters and walls, etc. must never modify site drainage unless additional measures to enhance drainage (e.g. area drains, additional grading, etc.) are designed and constructed in accordance with the applicable Los Angeles County regulations.

**Erosion Protection**: In order to reduce the potential for erosion, all permanent cut-andfill slopes on-site should be seeded or planted with lightweight, deep-rooting, drought-resistant vegetation. A landscaping expert should be consulted for ground cover recommendations. Excessive landscape irrigation or leakage from irrigation lines can cause localized slope failures. Therefore, irrigation systems for slope vegetation should be designed and maintained to minimize leakage onto graded slopes. If automatic sprinkler systems are used, they should be



adjusted for seasonal variations in rainfall. Vegetation on natural slopes should remain natural and not be landscaped or irrigated in the same manner as graded slopes.

Rodent burrows are known to provide direct conduits for water flow that can decrease slope stability. Therefore, in order to maintain the integrity of graded slopes, a rodent abatement program should be instituted.

Even with the implementation of these recommendations, it is not possible to eliminate erosion within hillside developments. Removal of debris from drainage devices, slope maintenance, and landscaping will be required, especially after periods of heavy rainfall.

# **GENERAL GRADING REQUIREMENTS**

- 1. All fills, unless otherwise specifically designed, shall be compacted to at least 90 percent of the maximum dry unit weight as determined by ASTM D 1557-02 Method of Soil Compaction.
  - 2. No fill shall be placed until the area to receive the fill has been adequately prepared, and subsequently approved by the Geotechnical Consultant of Record or his representative.
  - 3. Fill soils should be kept free of debris and organic material.
  - 4. Rocks or hard fragments larger than eight inches may not be placed in the fill without approval of the Geotechnical Consultant of Record or his representative, and in a manner specified for each occurrence.

Bedrock fragments larger than eight inches, or fill soils containing greater than 25 percent of bedrock fragments larger than four inches in diameter, must be removed or processed using successive passes of a sheepsfoot compactor until rock fragments constitute less than 25 percent of the fill material.

5. The fill material shall be placed in layers which, when compacted, shall not exceed eight inches per layer. Each layer shall be spread evenly and shall be mixed thoroughly during the spreading to ensure uniformity of material and moisture.



- 6. When moisture content of the fill material is too low to obtain adequate compaction, water shall be added and thoroughly dispersed until the soil is approximately two to four percent above optimum moisture content.
- 7. When the moisture content of the fill material is too high to obtain adequate compaction, the fill material shall be aerated by blading, or other satisfactory methods, until the soil is approximately two to four percent above optimum moisture content.
- 8. Fill and cut slopes should not be constructed at gradients steeper than 2:1 (horizontal:vertical).

## **GRADING OBSERVATION**

Construction observation should be made by a Geotechnical Consultant of Record during any grading activities within the project site, to verify the findings within this report. Additional recommendations may be required for landfill design based on conditions uncovered during grading.

### **TEMPORARY EXCAVATIONS**

Based on our review of the subject plans, it does not appear that significant temporary excavations will be required during the construction of the proposed development. However, the following recommendations are applicable in areas where excavations are to be made.

Temporary excavations are not expected to stand vertically in cuts that exceed four feet in height. Temporary excavations in excess of four feet may be sloped at a gradient of ³/₄:1, to a maximum height of 12 feet. Slopes higher than 12 feet should be slopes back at a 1:1 gradient. By temporary, we mean a period not exceeding 60 days. All regulations of State or Federal OSHA should be followed.


If excavations are made during the rainy season (normally from November through April), particular care should be taken to protect slopes against erosion. Measures to help mitigate erosion, such as the installation of berms, plastic sheeting, or other devices, may be warranted. Surface water should be prevented from flowing over or ponding at the top of excavations.

#### **CORROSION TESTS**

Corrosion testing was previously performed by Golden Coast (2015) and indicated that the on-site soluble sulfate concentrations are negligible. The on-site soils are also corrosive to buried metals. A soil corrosion study was not performed as part of this scope of this investigation. Samples of the near-surface soil should be obtained at the conclusion of grading and be submitted to a corrosion consultant for testing. The purpose of performing the tests would be to determine if the site soils are corrosive to concrete or underground utilities in contact with the soil.

#### **EXPANSIVE SOILS**

Samples of the on-site soils were obtained in 2015 during the investigation of the site for laboratory expansion index testing (Golden Coast, 2015) and indicated a "very low" expansion potential. It is anticipated that when finer grained layers of the TQss are excavated and placed as compacted fill that the future compacted fill generated from the on-site soils may have a very low to medium potential for expansion depending upon the characteristics of the excavated bedrock and the degree of mixing that is obtained when placed as compacted fill. The site soils can be classified as having a very low to medium potential for expansion.

The expansion index of near-surface certified engineered fill on building lots should be evaluated at the completion of grading to provide appropriate foundation recommendations commensurate with the post-grading expansion index test results.



-33-

#### FOUNDATIONS

<u>General</u>: Buildings may be supported on continuous or individual spread footings established in properly compacted fill soils. Foundations and floor slabs should be designed by a structural engineer, in accordance with the minimum requirements of the CBC.

**Design Criteria:** The recommendations presented in this section are based on the assumption that the proposed structures will have column loads not exceeding approximately 100 kips and continuous foundation loads not exceeding 3 kips per lineal foot. A bearing value of 2,000 pounds per square foot (psf) may be used in the design of spread foundations. This value can be increased by one-third when considering seismic and wind forces. The bearing material should consist of compacted fill soil. Individual column pads and continuous wall footings should be designed to meet the minimum width and depth requirements, as set forth in the CBC. Foundation depths should be measured from the lowest adjacent final grade.

Building setbacks for structures located adjacent to either ascending or descending slopes should be in accordance with the standards set forth in the CBC. All foundation excavations should be observed and approved by a representative from our firm prior to placement of reinforcing steel. Foundations should be deepened, where necessary, to prevent surcharge loads from being imposed on adjacent foundations or utilities. Observation of foundation excavations may also be required by the appropriate reviewing governmental agencies. The contractor should be familiar with the requirements of the governing reviewing agencies.

Foundations should be deepened, where necessary, to prevent surcharge loads from being imposed upon adjacent foundations or utilities. Surcharge loads should be assumed to be distributed out from the bottom edges of foundations at 45-degree angles. Foundation excavations should be cleaned of all loose material and be observed and approved by a representative of the Geotechnical Engineer of Record prior to casting concrete.



The Foundation Plans should be reviewed by the Geotechnical Engineer of Record. The Geotechnical Engineer of Record should sign and stamp the plan, provided the plans have been found to conform to the geotechnical recommendations presented in this report.

<u>Mat Foundations</u>: A mat foundation system can be used as an alternative to a posttensioned slab within liquefaction areas and also for expansive soils conditions. If a mat foundation is utilized, the following geotechnical recommendations may be utilized for mat foundation construction. A base modulus of subgrade reaction of 300 pounds per cubic inch (pci) is recommended for use in the design of mat foundations for the proposed buildings at the subject site. The mat could be founded directly on a 4-inch-thick layer of Crushed Aggregate Base (CAB) compacted to 95 percent relative compaction to provide a firm working surface, but it is not required from a geotechnical perspective. If utilized, the base would be placed directly on compacted fill soil that would be placed as part of the grading recommended in this report.

The base modulus should be reduced in accordance with the following equation:

$$k = k_b \left[ \frac{(1+B)}{2 x B} \right]^2$$

where:

k = modulus of subgrade reaction for design

 $k_b = 300 \text{ pci} = \text{base modulus of subgrade reaction in pci}$ 

B = least dimension of foundation in feet

It is expected that mat foundations for the proposed buildings will range from about 8 to 30 inches in thickness. The thickness of each mat foundation will be a function of the loading conditions and is referred to the Project Structural Engineer for design. It is anticipated that each mat foundation, including the weight of the supported building, will impose pressure on the underlying soil of about 1,500 psf. This value could be considered as the design bearing value for mat foundation design.



<u>**Pile Footings**</u>: Foundations for structures can be designed as either conventional spread footings or as pile foundations. If it is determined that pile foundations will be utilized, it is recommended that those pile foundations be designed as skin friction piles as opposed to end bearing piles. The following recommendations apply to skin friction piles.

Skin friction piles may be founded in compacted fill soils, native soils, or a combination of fill and native soil may be used to provide frictional support for the foundation piles. Friction piles should be at least 18 inches in diameter and be designed using a skin friction value of 300 psf for the supporting soils. A passive pressure of a depth of three feet, increasing at the rate of 350 psf per foot of depth, to a maximum of 3,000 psf, may be used for pile foundations. Lateral resistance and skin friction should be assumed to apply at a depth of 3 feet below the lowest adjacent grade. The foundation excavations should be cleaned of loose materials and be observed and approved by the Geotechnical Consultant of Record and the City of Santa Clarita prior to casting piles.

Lateral Design: Lateral restraint at the bases of footings or slabs may be assumed to be the product of the dead load and a coefficient of friction of 0.4. Passive pressure on the faces of footings may also be used to resist lateral forces. A passive pressure of zero at the surface of finished grade, increasing at the rate of 250 psf per foot of depth, to a maximum value of 2,500 psf, may be used at this site. The passive pressure and friction may be combined without reduction when evaluating lateral resistance.

**Settlement**: Provided that the proposed buildings are supported on shallow foundations established in compacted fill soils, as recommended, column loads do not exceed 100 kips, and continuous footings do not exceed 3 kips per lineal foot, we estimate that the maximum static settlement will be about 0.75 inches with seismic settlements of about 1.75 inches for a total settlement of about 2.5 inches within the alluvial areas (Qac) at the site. Differential static and seismic settlements with the alluvial areas at the site are expected to be about 1.4 inches within a horizontal distance of 30 feet. Within the compacted fill areas directly underlain by bedrock



(TQss mapped areas), total seismic and static settlements of about 1 inch with differential settlement of about 0.75 inches within a horizontal distance of about 30 feet are expected. Our firm should review the foundation loads after plans are developed, to verify the applicability of our recommendations to the proposed structures.

#### FLOOR SLAB SUPPORT

<u>General</u>: The floor slab design recommendations presented in this section are based upon the assumption that the soil subgrade in proposed floor slab areas will consist of compacted fill soil and that floor slabs will be subjected to normal loads with no special requirements. Any surficial soils that become dried or disturbed during the course of construction should be moisture-conditioned and compacted prior to casting the floor slab.

Conventional floor slabs may be utilized at the subject development outside of liquefaction areas, provided the subgrade soils consist of compacted fill soils with a very low (Expansion Index of 0 to 20) potential for expansion. If the subgrade soils are determined to have an expansion potential in the low or higher range (Expansion Index greater than 21), posttensioned floor slabs, as indicated below, are recommended. Post-tensioned slabs are also recommended for all building pads located within existing alluvial areas that are subject to liquefaction.

**Conventional Floor Slabs**: Conventional slabs-on-grade should be designed per the recommendations of the CBC. However, as a minimum, the building floor slabs should have a nominal thickness of at least 4 inches and should be reinforced with a No. 4 rebar spaced at 18 inches on center, in each direction, or equivalent. Thicker slabs may be required depending on the floor loads and the structural requirements; we defer to the Project Structural Engineer for design of the floor slabs.

**Post-Tensioned Floor Slabs**: Post-tensioned floor slabs should be designed per the recommendations of the CBC and be designed to resist the calculated static and seismic



#### -37-

settlements in addition to the following geotechnical parameters. The design values, presented following this paragraph, assume that the proposed floor slabs will be poured monolithic with continuous perimeter edge footings. Perimeter edge footings should have a minimum depth of 18 inches. Footing depths should be measured from the lowest adjacent grade for perimeter footings or the top of slab for interior footings.

Net Bearing Value:

Coefficient of Friction:

Passive Pressure:

Modulus of Subgrade Reaction (K):

An allowable net bearing value of 2,000 psf for footings with a minimum width of 12 inches and a minimum depth of 18 inches below the top of slab or 18 inches below the lowest adjacent grade may be used.

0.75

250 pcf for level ground condition

1,000 pounds per square inch (psi)

150 pounds per cubic inch (pci) for a footing width of one foot. For larger footings or floor slabs, this value should be reduced using the following equation:

$$Kr = K \left[ \frac{(B+1)}{2B} \right]^2$$

where:

Kr =Reduced Modulus Value Modulus of Subgrade Reaction for K = a One-Foot-Wide Plate B =Width of Large Footing or Slab

Modulus of Elasticity:

Edge Moisture Variation Distance Me (Center Lift):

5.25 feet



#### -38-

Me (Edge Lift):	2.5 feet	
Estimated Differential Movement My (swelling):	Low 0.4	Medium 0.9
My (shrink):	0.3	0.7

<u>Water Vapor Mitigation</u>: Water vapor transmitted through floor slabs is a common cause of floor covering problems. An impermeable membrane "vapor barrier" should be installed to reduce excess vapor drive through the floor slab. The function of the impermeable membrane is to reduce the amount of water vapor transmitted through the floor slab. Vapor-related impacts should be expected in areas where a vapor barrier is not installed.

Construction activities and exposure to the environment may cause deterioration of the prepared subgrade. Therefore, the Geotechnical Consultant of Record should observe the condition of the final subgrade soils immediately prior to slab-on-grade construction and, if necessary, perform further density and moisture content tests to determine the suitability of the final prepared subgrade. The soil subgrade should be thoroughly moistened prior to casting.

Water vapor migration through slabs and associated adverse impacts should be anticipated if a vapor barrier is not constructed. The vapor barrier system recommended in this report has a record of satisfactory performance when properly installed. There are numerous methods of reducing vapor migration through slabs that also have satisfactory performance records. Each of the potential moisture reducing mitigation methods has advantages relative to cost, performance, protection of the vapor barrier during construction, and concrete curing. If requested and authorized, we would be pleased to provide the design team with additional geotechnical input on the selection of a suitable vapor barrier system.

Floor slabs should be constructed in a manner to decrease the potential of water vapor migration through the slabs. The floor slabs should be underlain by a vapor barrier consisting of a fifteen-mil-thick impermeable membrane. Care should be taken to avoid damage to the membrane and to seal the membrane around utilities and other penetrations.



Floor slabs should be underlain by a vapor barrier surrounded by 2 inches of sand above and below the barrier. The vapor barrier should be at least 10 millimeters thick; care should be taken to preserve the continuity and integrity of the barrier beneath the floor slab. The sand should be sufficiently moist to remain in place and be stable during construction; however, if the sand above the barrier becomes saturated before placing concrete, the moisture in the sand can become a source of water vapor.

Another factor affecting vapor transmission through floor slabs is a high water-to-cement ratio in the concrete used for the floor slab. A high water-to-cement ratio increases the porosity of the concrete, thereby facilitating the transmission of water and water vapor through the slab. The Project Structural Engineer or a concrete mix specialist should provide recommendations for the design of concrete for footings and floor slabs in accordance with the CBC, with consideration of the above comments.

Alternative methods of providing floor slab water vapor mitigation have also been successfully utilized. If requested, we would be pleased to provide geotechnical comments if it is desired to utilize alternative mitigation methods. The recommendations presented herewith may be superseded by the design team based on their successful experience with alternative mitigation methods. However, RTF&A assumes no responsibility related to adverse impacts associated with superseding the recommendations of this report.

#### SEISMIC DESIGN PARAMETERS

As with virtually all property in southern California, the site may be subjected to strong ground shaking during earthquakes on nearby or distant faults and the improvements should be designed to resist such shaking in accordance with current codes. The seismic data is presented in Appendix C and the liquefaction calculations are presented in Appendix D. If requested and



-40-

authorized, we would be pleased to provide additional parameters utilizing other standards. The use of an appropriate seismic design parameter is referred to the Structural Engineer.

The following coefficients and factors apply to seismic force design of structures at the site. The parameters were determined using the Applied Technology Council (ATC) Seismic Design Maps website, based upon American Society Civil Engineers (ASCE) document ASCE 7-16. Since S1 is greater than 0.2, null was reported for Sm1 and Sd1 and it will be necessary for the Project Structural Engineer to determine Cs (Seismic Response Coefficient) with the exception for Site Class D presented in Section 11.4.8 of ASCE 7-16.

Site Class	D
Ss	2.49
<b>S</b> ₁	0.85
S _{MS}	2.49
S _{M1}	Null*
S _{DS}	1.66
S _{D1}	Null*
PGA _M	1.17

^{**} See Section 11.4.8 of ASCE 7-16

#### **PAVEMENT DESIGN**

Samples of the on-site soil should be obtained from near final grade elevation in proposed pavement areas, following the grading operations, to perform R-value tests. The R-value test results would be used to prepare pavement section recommendations. The <u>preliminary</u> pavement section recommendations presented below are based on the assumption that the on-site soils have an R-value of at least 20. The <u>final</u> pavement section recommendations could vary depending on the results of the actual R-value tests. We would be pleased to provide pavement section recommendations for alternative Traffic Index values upon request.



	Asphalt Thickness	(CAB) Base Course Thickness					
Traffic Index	(Inches)	(Inches)					
4	3	5					
6	4	9					
8	5	14					

Base course material should consist of crushed aggregate base (CAB), as defined by Section 200-2.2 of the Standard Specifications for Public Works Construction ("Greenbook"), or crushed miscellaneous base (CMB), as defined by Section 200-2.4 of the Greenbook. Base course material should be compacted to at least 95% of the maximum dry density of that material.

Base course material should be purchased from a supplier who will certify that it will meet or exceed the specifications in the Greenbook, as indicated. We could, upon request, perform sieve analysis and sand equivalency tests on material delivered to the site that appears suspect. Additional tests could be performed, upon request, to determine if the material is in compliance with the remainder of the specifications indicated in the Greenbook.

The pavement section recommendations presented above are based upon assumed Traffic Index values. RTF&A does not take responsibility for the numerical determination of the Traffic Index values nor the areas where they apply within the site.

#### **RETAINING WALLS**

For design of cantilevered retaining walls where the retained height of soils is less than 15 feet, and the walls are structurally independent from the proposed building, it may be assumed that drained soils will exert a lateral pressure equal to that developed by a fluid with a density of 30 pounds per cubic foot (pcf) where the backfill is level, and 45 pcf where the



backfill is inclined at 2:1. The proposed retaining wall at the toe of Cut Slope CS-5 should be designed to resist an additional surcharge at a height of 10 feet of 10 kips as a result of daylighted apparent bedding.

In addition to the recommended earth pressures, the retaining walls should be designed to resist any applicable surcharges due to storage or traffic loads. A drainage system should be provided behind the walls to prevent the development of hydrostatic pressure behind the walls. If a drainage system is not installed, the walls should be designed to resist an additional hydrostatic pressure equal to that developed by a fluid with a density of 55 pcf against the full height of the wall.

In addition to the recommended earth and hydrostatic pressures, the upper ten feet of walls adjacent to vehicular traffic areas should be designed to resist a uniform lateral pressure of 100 psf, acting as a result of an assumed 300 psf surcharge behind the walls due to normal traffic. If the traffic is kept back at least ten feet from the walls, the traffic surcharge may be neglected.

The back of retaining walls should be water-proofed where aesthetics are concerned. Backfill placed behind retaining walls should be compacted to a minimum of 90% of the maximum dry density as determined by ASTM D 1557-02. When backfilling behind walls, it is recommended that the walls be braced, and heavy compaction equipment not be used closer to the back of the wall than the height of the wall. Soils which have a potential for expansion in excess of five percent should not be utilized for backfill behind walls which are greater than three feet in height.

**Drainage**: A drainage system should be provided behind retaining walls, or the walls should be designed to resist hydrostatic pressures. The drainage system could consist of a four-inch diameter perforated pipe placed six inches from the base of the wall, with the perforations down, and connected to an outlet device. The pipe should be sloped at least 1 inch per 50 feet and surrounded on all sides by at least six inches of clean gravel. The gravel should be "burrito-



-43-

wrapped" with filter fabric, such as Mirafi 140N, or equivalent. As an alternative to the gravel and filter fabric, filter material meeting the requirements of LACFCD Designated F-1 Filter Material, and slotted pipe, may be used. The backside of the wall should be water-proofed.

A vertical six-inch-wide gravel chimney drain, or a drainage geocomposite such as Miradrain, should be placed against and behind retaining walls that are higher than three feet. The top of the back drain should be capped with 18 inches of on-site soils.

The installed drainage system should be observed by the Geotechnical Consultant of Record prior to backfilling the system. Inspection of the drainage system may also be required by the reviewing governmental agencies.

#### **OBSERVATION AND TESTING**

This report has been prepared assuming that RTF&A will perform all geotechnicallyrelated field observations and testing. If the recommendations presented in this report are utilized, and observation and testing of the geotechnical work is performed by others, the party performing the observation and testing must review this report and assume responsibility for the recommendations contained herein. That party would then assume the title "Geotechnical Consultant of Record."

A representative of the Geotechnical Consultant of Record of Record should be present to observe all grading operations, as well as all footing excavations. A report presenting the results of the observations and related testing should be issued upon completion of those operations.

#### LOS ANGELES COUNTY SECTION 111 STATEMENT

Based on the findings summarized in this submittal, it is our professional opinion that the proposed grading, and any proposed structures at the site, will be safe from hazards of settlement, slippage, or landslide, provided that the recommendations of this submittal, and those of the Los Angeles County Code, are incorporated into the proposed construction. Additionally,



-44-

the proposed site grading will not adversely affect the geotechnical conditions on adjacent properties.

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The following are attached and complete this report.

- References
- Summary of Cut Slopes Table 1
- Geotechnical Map Figure 1
- Geologic Sections Figure 2
- Geotechnical Sections Figure 3
- Stability Fill Detail for Grossly Stable Slopes Figure 4

by:

- Appendix A RTF&A Field Explorations
- Appendix B Field Explorations by Others
- Appendix C Laboratory Testing
- Appendix D Slope Stability Analyses
- Appendix E Gregg CPT Soundings
- Appendix F Seismic Parameters
- Appendix G Liquefaction Calculations
- Appendix H Ayers Oil Well Documentation

Respectfully submitted,

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★ CERTIFIED ENGINEERING GEOLOGIST #1140 ★ CERTIFIED ENGINEERING GEOLOGIST OF CALIFOR ★ OF CALIFOR New Urban West, Inc. March 19, 2021 2020-200-001

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# TABLE 1 CUT SLOPE SUMMARY Lyons Canyon Development Vestifiguitatives/Erflextel/Wipaf586583301

CUT SLOPE	SLOPE GRADIENT	SLOPE HEIGHT (feet)	SLOPE FACE DIRECTION	GEOLOGIC MATERIALS	CROSS SECTION	GEOLOGIC STABILITY	MITIGATION
CS-1	2:1	115	SE	TQss & Qac	A-A'	Favorable bedding; grossly stable	Stabilize erosion-susceptible alluvial & colluvial deposits with a 30 feet wide, 3 deep stability fill slope backdrains
CS-2	2:1	30	SSE	TQss		Favorable bedding; grossly stable	None
CS-3	2:1	40	NE	TQss	H-H'	Favorable bedding; grossly stable	None
CS-4	2:1	36	SSE	TQss & Qac		Favorable bedding; grossly stable	Stabilize erosion-susceptible alluvial & colluvial deposits with a 25 feet wide, 3 deep stability fill slope with backdrains
CS-5	2:1	35	N	TQss & Qac	G-G'	Favorable bedding; grossly stable	Retaining Wall Designed to Support 10 Kip Daylighted Bedding Surcharge
CS-6	2:1	15	N	Qac		Grossly Stable	The alluvium and colluvium exposed in the cut slope should be entirely removed and the slope reconstructed as a fill slope
CS-7	2:1	40	NNW	TQss	F-F'	Daylighted bedding; stable by analyses	None
CS-8	2:1	20	NNE	TQss & Qac	E-E'	Favorable bedding; grossly stable	None
CS-9	2:1	25	SSW	TQss	E-E'	Favorable bedding; grossly stable	None
CS-10	2:1	155	SE	TQss & Qac	D-D'	Favorable bedding; grossly stable	Stabilize erosion-susceptible alluvial & colluvial deposits with a 30 feet wide, 3 deep stability fill slope with backdrains. Stability fill should extend up to mid-slope drainage terrace
CS-11	2:1	70	NE	TQss & Qac	C-C'	Favorable bedding; grossly stable	Construct 20-foot wide 3-foot deep stability fill to first drainage terrace and across area of alluvium/colluvium
CS-12	2:1	75	ENE	TQss	B-B'	Favorable bedding; grossly stable	None







Elevation in Feet (mean sea level)



Elevation in Feet (mean sea level)











True Dip = 37*- 65*

Elevation in Feet (mean sea level)



Elevation in Feet (mean sea level)









#### **APPENDIX A**

#### FIELD EXPLORATIONS



Appendix A March 19, 2021 2020-200-001 Page A-1

#### **APPENDIX A**

#### FIELD EXPLORATION

#### **RECONNAISSANCE GEOLOGIC MAPPING**

During geologic mapping, local surficial deposits (both natural and man-made) and bedrock units were mapped on a 1 inch = 100 feet topographic base map prepared Alliance. Geologic structural features, including bedding, were observed, measured, and plotted on the base map.

#### LOGGING OF EXPLORATIONS

As part of this plan review work on the site, additional explorations were performed at selected locations at the subject site. Logging was performed on these explorations, which included 5 hollow stem borings (HS-1 through HS-5), and five CPT soundings (CPT-1 through CPT-5) were performed. The approximate locations are presented on the Geotechnical Map.

The borings were excavated with an 8-inch diameter hollow stem auger was used. Undisturbed and bulk samples of the subsurface materials were collected from the borings for laboratory inspection and testing. The lined-barrel sampler used to take undisturbed samples has an external diameter of 3.25 inches and an internal diameter of 2.625 inches. The depths at which the undisturbed samples were obtained are indicated on the logs. The number of blows required to drive the sampler 12 inches with the hammer is also shown on the boring logs.



	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	BORING HS-1 JOB NUMBER: 2020-200 DATE DRILLED: 11/10/20 EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler LOGGED BY: MKM BORING DEPTH: 0-35.5' SURFACE CONDITIONS: Open Lot
				-	-	X		ML	ALLUVIUM (Qal) SILT: trace clay, moderately dense, slightly moist, brown
indicated.	10	6.3	95	-	5				
id date i	7	9	92	-	-				
ation an mes.	9	12.2	95	-	10				moderately dense trace fine to coarse sand
ons or ti	10	11.1	97	-	-			SM	SILTY SAND: fine with occasional coarse, moderately dense, moist, brown
only at the spec s at other locatio	15	13.4	91	-				CL	SILTY CLAY: fine sand, stiff, moist, brown
Imate and applies bsurface condition	8	14.4	98	-	20			ML	SILT: with clay, moderately stiff, moist, brown
nereon is approx resentative of sul	14	13.4	101	-	25— 				trace gravel increasing in stiffness past 25'
conditions snown arranted to be rep	22	12.6	109	-	 30 			SW	SAND: fine to coarse, with silt and gravel, dense, moist, light brown
og of subsurface It is not w	18	_5.3	101		35			SM	SILTY SAND: fine, dense, moist, brown Bottom of Boring at 35.5 feet. No water, No caving
Note: The IC					40-				NO WALCE. NO CAVING.
								LOC	<b>GOF BORING</b> R.T. FRANKIAN & ASSOCIA

	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	<b>DEPTH (FEET)</b>	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	BORING HS-2 JOB NUMBER: 2020-200 DATE DRILLED: 11/10/20 EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler LOGGED BY: MKM BORING DEPTH: 0-31' SURFACE CONDITIONS: Clearing in Field
		-						ML	ALLUVIUM (Qal) SILT: trace fine sand, moderately dense, dry, light brown
cated.		6	94		5				fine with some medium to coarse, dense, slightly moist
indic	22			-	-				fine
and date	20	4.8	97	-	-	••••		SW	SAND: fine to coarse with gravel, dense, slightly moist, light brown
ation		9	92	-	10			ML	SILT: with fine sand, stiff, slightly moist, brown
pecific loca		3.7	101	-	_			SM	SILTY SAND: fine to medium with trace coarse, dense, slightly moist, brown
nly at the s		7.2	94	-	15—			ML	SILT: with some fine sand, trace clay, moderately stiff, moist, brown
iximate and applies of		6	113	-	20			SM	SILTY SAND: fine to meduim with trace coarse, gravel, dense, moist, brown
un hereon is appro	2 chickentative of 2			-	 25 				No Recovery
itions show		2.8	101	-	30—				light brown
DG 2020-200.GPJ FRANKIAN.GDT 2/8/21 te: The log of subsurface condii					35-				Bottom of Boring at 31 feet. No water. No caving.
		I	1		40			LOC	<b>G OF BORING</b> R.T. FRANKIAN & ASSOCIATES

LOG OF	lote: The log of subsurface co It is not warr		shown hereon is approxima o be representative of subsu	ate and applies inface condition 55 14 3 11 1 1 1 20 1 20	s only at the sp ns at other loca 11 15.8 115 - - - - - - - - - - - - - - - - - -	25 11.4 115 - SW SANE	ation a times. 15 11.4 109 - ¹⁰ CL CLAY	nd date ind	icated. 21 7.3 97 -		BLOWS PER FOOT MOISTURE CONTENT (%) DRY UNIT WEIGHT (LBS. PER CU. FT.) N-VALUE DEPTH (FEET) SAMPLE LOCATION GRAPHIC LOG SOIL TYPE
BORING	Bottom of Boring at 31 feet. Water @ 25'. No caving.	No Recovery, @ 31': SAUGUS FORMATION (TQs) - Sunshine Ranch Member (TQss) - Moderately hard	seepage @ 25', No Recovery	reduced sand	'EY SAND: with fine to coarse sand, gravel, plastic, medium dense, very moist, dark brown	): fine to coarse, trace clay, dense, moist, brown	: with fine to coarse sand, trace gravel, stiff, moist, dark brown	trace fine to very coarse sand, dense, moist, brown to dark brown	dense, slightly moist	IVIUM (Qal) 'EY SAND: fine, medium dense, dry, dark brown	DB NUMBER: 2020-200 ATE DRILLED: 11/10/20 QUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler DGGED BY: MKM ORING DEPTH: 0-31' ORING DEPTH: 0-31' URFACE CONDITIONS: Dirt Road

#### BOREHOLE LOG 2020-200.GPJ FRANKIAN.GDT 2/9/21

**R.T. FRANKIAN & ASSOCIATES** 

	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	<b>DEPTH (FEET)</b>	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	BORING HS-4 JOB NUMBER: 2020-200 DATE DRILLED: 11/10/20 EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler LOGGED BY: MKM BORING DEPTH: 0-30.5' SURFACE CONDITIONS: Dirt Road
					_			ML	ALLUVIUM (Qal) SILT: trace fine to coarse sand, gravel, moderately dense, dry, light brown
dicated.	17	5.6	108	-	- 5-				with fine sand, occasional gravel, moist, brown
nd date inc	23	4.1	106	-	_			SM	SILTY SAND: fine to coarse, fine gravel, medium dense, moist, light brown
ation al imes.	25	7	110	-	10—			SP	GRAVELLY SAND: fine to coarse, trace silt, dense, moist, brown
ific loc: ons or t	18	19.7	103	-				ML	SILT: with clay and fine sand, moderately stiff, very moist, dark brown
s only at the spec ons at other locatio	6	29.8	95	-	 15 			SC	CLAYEY SAND: fine, with silt, medium dense, very moist, dark brown
oximate and applie ubsurface conditio	50/5"	28.8		-					seepage @ 20' SAUGUS FORMATION (TQss) GRAVELLY SANDSTONE: fine to coarse, with clay and silt, moderately hard, very moist, yellowish brown
lown hereon is appre e representative of s	50/2"	12.2	107	-	 25 				
ions sh ed to b	50/6"	9.4	96	_	30—		0 0 0 0 0		
ote: The log of subsurface conditi It is not warrante									Bottom of Boring at 30.5 feet. Water @ 20'. No caving.
ž		1	1		40			LOG	<b>OF BORING</b> R.T. FRANKIAN & ASSOCIAT

							7			BORING HS-5
		WS PER FOOT	STURE JTENT (%)	V UNIT WEIGHT S. PER CU. FT.)	ALUE	TH (FEET)	<b>IPLE LOCATION</b>	APHIC LOG	L TYPE	JOB NUMBER: 2020-200 DATE DRILLED: 11/10/20 EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler LOGGED BY: MKM BORING DEPTH: 0-28'
		BLC	N C O N	DR) (LB(	N-Z	DEF	SAN	GR/	SOI	
									ML	ALLUVIUM (Qal) SILT: with fine sand, moderately dense, moist, dark brown
	indicated.	11	10.1	101	-	5				some fine gravel
	date	25	6.9	108	-					some me graver
	and.					10-				with coarse sand
	ation times	22	6.7	102	-	-				with clay and fine to coarse sand fine gravel dense brown
	specific loc cations or	16	6.3	110	-					with only and nine to coarse saile, nine graver, dense, brown
	nly at the s at other lo	13	8.7	109	-	15—			SM	SILTY SAND: fine to medium, dense, moist, gray
	and applies o e conditions	83/11"	8.7	121	_	 20				SAUGUS FORMATION (TQss)
	proximate a of subsurfac									SANDY SILTSTONE: moderately hard, moist, gray, caliche mottling
	hereon is ap esentative c	50/5"	9.4	104	-	25				with clay
	own b repr						<u></u>	<u></u>		Bottom of Boring at 28 feet.
	to be					30-				No water. No caving.
	ditior anted					_				
2/8/21	e con warra					-				
N.GDT	i not									
RANKIA	subsu It is					35—				
SPJ FF	g of s									
0-200.0	he lo									
JG 202	te: TI					-				
OLE LC	No					40—				
BOREH										
-										K.I. FKANKIAN & ASSOCIATE

#### **APPENDIX B**

#### **EXPLORATIONS BY OTHERS**



## GOLD COAST GEOSERVICES, INC.

## SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

ELEVATION: SEE PLATE 1

## BORING LOG NO. B-1

FILE NO.: GC14-122536

DATE: 02/09/15

METH	HOD:	6-inc	h Hollow	/ Stem A	uger					DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW	COUNT			SIE	EVE		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOO	
0 -	SPT		2	2.8					۱ ۲. (۱	ALLUVIUM - Qal - (0' - 60')
-									1 S /	2.5' - Dark brown very fine- to fine-grained silty sand with
	SPI	v	13	5.9 10.0	94	08.0				peoples, moist, loose. 5' . Medium brown - year fine-grained silly sand slightly moist, loose
	SPT		6	8.3	3.4	30.3				7.5' - Light to medium brown very fine-grained sity sand, damp, slightly firm.
-										
10	SPT		12	16.6						10' - Medium brown fine- to medium-grained sand, slightly damp, slightly firm.
-	SPT		4	5.5			1			12.5' - 15' - Medium to dark brown very fine-grained silty sand, slightly
-	SPT		4	5.5						damp, slightly firm.
-		х	13	10.0	9.7	100.6				
-	SPT		5	6.9					1:	17.5' - 20' - Dark brown very fine-grained silty sand, slightly damp, firm.
20	SPT		15	20.7						
-	SPT		37	44.2						22.5' - 25' - Medium brown fine- to coarse grained sand containing
-									D.	loebbles, slightly damp, firm,
-	SPT		35	48.3					· · ·	27.5' - 30' - Medium brown fine- to coarse-grained sand, slightly damp,
-		x	57	43.7	8.3	104.3			8.	fiem.
-	SPT		34	46.9					1. in	
30	SPT		32	44.2					j	
-	SPT		32	44.2					1	32.5° - Cobble/boulder
							1			
•	SPT	1	39	53.8		1				35' - 40' - Medium brown fine- to medium-grained silty sand, dry, firm.
-		X	59	45.2	9.2	106.7				
- 40	ISP1		43	59.3		ļ				10. Modium to dark brown find project althe good containing groups alightly
-	J.		40	00.2					0.1	140 - Medium to dark brown me-grained sitty sand containing graver, signify
	SPT		35	48.3			1		10,	42.5' - 45' - Medium brown verv fine- to medium-grained clavev to silty sand
-					1					slightly moist, firm.
-	SPT	-	35	48.3						
-		X	62	47.5	7.8	110.4			Trayle	47.5' - Medium brown very fine- to medium-grained silty sand, humid, firm.
-	SPI		32	44.2						
50	1251		37	51.1					1	150' - 55' - Medium brown fine- to coarse-grained gravelly silty sand,
	SPI	-	46	63.5					S. 6	
~	ŀ								c .	
<b>.</b>	SPT	r I	40	55.2					1	55' - 60' - Medium brown fine- to coarse-grained silty gravelly sand, humid,
•		X	64	49.1	7.6	113.3	3			firm.
-	SPI		46	63.5	1				1.00	
60	SP1		44	60.7	]]	<u></u>	1	4.	1	End at 60'
CO	mme مرح	ents – 1	15 /0"	TOHOWI	ng cor	rection	n tac	tors	were ut	allized to determine N(60) (Per SP117)
							e); (	/S =	1.2 (SP	I Sampler without liner); Cs = 2/3 (California Sampler)
NO	les.		IUIAL	UCYIH	1: 60,	GR	JUN	UWA	IER: NO	D REFUSAL/CAVING: NO BACKFILLED: YES
										PLATE

## GOLD COAST GEOSERVICES, INC.

## SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

#### ELEVATION: SEE PLATE 1

### BORING LOG NO. B-2

FILE NO.: GC14-122536 DATE: 02/09/15 DRILLING CO.: HD DRILLING

METH	IOD:	6-inc	h Hollow	Stem A	uger					DRILLING CO.: HD DRILLING		
	SAM	PLE	BLOWC	OUNT			SIE	EVË		DESCRIPTION AND REMARKS		
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC			
0	SPT		7	9.7						ALLUVIUM - Qal - (0' - 60') 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.		
-						l						
-	SPT	x	9 18	12.4 13.8	11.4	98.2				5' - Medium brown very fine-grained silty sand, humid, slightly firm.		
•	SPT		6	8.3						7.5' - Medium brown very fine-to fine-grained silty sand, humid, slightly firm.		
10	SPT		6	8.3					14	10' - Dark brown very fine- to fine-grained silty sand, humid, slightly firm.		
-	SPT		7	9.7						12.5' - 15' - Medium brown very fine- to fine-grained silty sand, humid,		
-	SPT		5	6.9						loose to slightly firm.		
		х	18	13.8	10.7	104.7						
•	SPT		11	15.2						17.5' - 27.5' - Dark brown very fine-grained silty sand, humid, slightly firm.		
20	SPT		18	24.8					- * * *			
-	SPT		22	30.4								
-							1					
- 1	SPT		28	38.6						27 Cite June to Jaw have find to use another project of the good		
-	ent	×	48	30.8	10.3	107.3				127.5 Wedrum to dark brown line- to very coarse-grained sity sand		
30	SPT	ļ	20	40.0			l			1 30' - 32 5' - Dark brown to medium reddish brown fine- to coarse-grained		
	<b>.</b>								0.	silty sand containing pebbles to gravel, humid, firm.		
-	SPT		27	37.3								
-										35' - Medium brown fine- to medium-grained silty sand, slightly moist, firm.		
•	ISPT		29	40.0		140.0	1			27.51 (0). Marium reddict brown fine to user search project potably		
*	GDT		42	42.2 58 A	0.2	112.8	l		1	s7.5 - 40 - Medium reddish brown ine- to very coarse-gramed peoply		
40	SPT		36	49.7		1			0.5	any sano, normo, dense.		
				10.1								
-	SPT	-	38	52.4			Ĩ			42.5' - Medium brown very fine- to fine-grained clayey to silty sand,		
	SPT	·	40	55.2	}	1			5.2	45' - Medium reddish brown fine- to very coarse-grained pebbly to gravely		
		x	68	52.1	8.4	118.0			0.	sand, slightly moist, dense.		
-	SPI		37	51.1					<b>.</b>			
50	SPI		39	53.8					1-1-1-1	47.5' - 50' - Dark brown very fine- to fine-grained clayey to silty sand,		
<b>I</b> -				1	1	ĺ				-Islightly moist, firm.		
	Sbj 1		1 56	[ 11.3					1.5	-jp2.5' - 60' - Medium brown tine- to coarse-grained pebbly to gravelly sand,		
	SPI	Г	50	≇ for 6"					, e			
•		l							1 C. X			
	SPI		50	for 6"	]				· · ·			
60	((SP)	ij antë	II The	follow		(		itora		JEnd at our		
	<b>Commens:</b> The following correction factors were utilized to determine $N(60)$ (Per SP317) Ch = 1.15 (8" Diameter Borehole): Ch = 1.2 (SPT Sampler without liner): Ch = 2/2 (California Sampler)											
No	tes:		IATO	DEPTH	1: 57 5	<u>וסווסו</u> ק	ROU	NDW		NO REFUSAL/CAVING: NO BACKFILLED: YES		
Linn										PLATE 22		

## GOLD COAST GEOSERVICES, INC.

### SUB-SURFACE DATA

### BORING LOG NO. B-3

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/09/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVĒ DESCRIPTION AND REMARKS GRAPHIC LOC 200 SCREEN (FT) ŝ PASSING MOISTURE N(60) FIELD DENSITY DEPTH BULK RING % 0 ALLUVIUM - Qal - (0' - 60') . SPT 4 5.5 2.5' - 5' - Medium to dark brown very fine- to fine-grained silty sandy clay ٩., ~ ~ containing pebbles, moist, slightly firm, 3 SPT 4.1 . 5' - 15' - Dark brown very fine-grained silty sand, humid, loose. ;-;; х 11 8.4 15.9 102.0 . SPI 4 5.5 ١Ż. 10 **ISPT** 4 5.5 . SPI 3 41 SPT 11 15' - Medium brown fine- to medium-grained silty sand, humid, slightly firm. _ 15.2 Å... 34 х 26.1 5.5 105.8 17.5' - 30' - Medium brown fine- to coarse-grained silty sand, humid, dense. SPT 18  $\mathcal{V}$ 24.8 4. \$  $\mathcal{L}$ 20 SPT 17 23.5 ISP1 28 38.6 SPT 27 37.3 -48 -36.8 6.0 115.4 х SPT 27 37.3 Ľ 1 30 ISPT 25 34.5 30' - Medium brown very fine- to fine-grained silty sand, humid, firm. SPT 27 _ 37.3 <u>د ج</u> 32.5' - Medium to dark brown fine- to coarse-grained silty sand containing 6.8 gravel, humid, dense. يندم برقم Ŋ . SPT 55 FOR 6" 35' - Cobble/bouider 3 х 51 39.1 8.3 114.3 37.5' - 42.5' - Medium brown very fine- to fine-grained silty sand, humid, firm. SPT 32 44.2  $\mathbb{R}^{d}$ 40 SPT 35 48.3 SPT 43 59.3 42.5' - 47.5' - Medium brown fine- to medium-grained silty sand containing ò. gravel, humid, dense. SPT . 32 44.2 Х 57 43.7 5.6 116.2  $\mathcal{O}$ 34 . 597 46.9 SPT 50 37 51.1 ωh 50' - Medium brown fine-grained silty sand, humid, dense. 10 İSPT Ş 33 45.5 52.5' - Medium brown very fine- to fine-grained clayey to silty sand, slightly moist, firm. SPT 60 _ 82.8 55' - 60' - Medium reddish brown fine- to very coarse-grained silty sand, ••• х 82 62.9 4.3 126.2 humid, dense. ١τ SPT 67 FOR 6" SPT 64 FOR 5" 60 End at 60' Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) TOTAL DEPTH: 60 Notes: **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES


#### SUB-SURFACE DATA

#### BORING LOG NO. B-4

PLATE

2.4

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/10/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS GRAPHIC LOG 200 SCREEN DEPTH (FT) E % PASSING MOISTURE N(60) DENSITY FIELD BULK RING Ð 1 4 4 4 ALLUVIUM - Qal - (0' - 50') SPT 8 11.0 2.5' - Dark brown fine- to coarse-grained silty sand, slightly moist, firm. مهدية أر SPT 7 9.7 5' - 17.5' - Light to medium brown very fine- to fine-grained sand, dry, firm, х 26 19.9 9.4 83.9 SPT 13 17.9 SPT 10 12 16.6 Ŀ SPT 8 11.0 SPT 13 17.9 Х 20 15.3 8.6 93.0 . f SPT 8 11.0 17.5' - Dark brown very fine- to fine-grained clayey to silty sand, slightly moist, slightly firm. ľ SPT 20 16 22.1 20' - Dark brown very fine- to fine-grained silty sand, humid, loose to slightly firm. SPT 22 30.4 22.5' - 25' - Medium brown very fine- to fine-grained clayey to silty sand, Ţ humid, slightly firm. SPT 27 37.3 - . . 48 36.8 12.0 104.4 х 5 SPT 25 34.5 27.5' - 30' - Medium brown fine- to coarse-grained clayey to silty sand, İSPT 30 24 33.1 humid to slightly moist, firm. 1.5 1 2121 SPT 27 37.3 32.5' - 35' - Medium brown fine- to very coarse-grained clayey to silty sand, humid to slightly moist, firm. - \ SPT . 24 33.1 2.37.5 '- 50' - Medium brown to medium reddish brown fine- to very coarseх 46 35.3 8.3 111.0 grained silty sand, humid, dense. ` SPT 34 46.9 SPT 40 29 40.0 SPT 36 49.7 SPT 50 69.0 Х 50 for 6" 6.7 114.6 SPT 50 for 6" SPT 50 70 96.6 End at 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 50' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

#### SUB-SURFACE DATA

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60

#### **BORING LOG NO. B-5**

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/11/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS Š 200 SCREEN E % PASSING MOISTURE GRAPHIC N(60) DENSITY ELD BULK RING ALLUVIUM - Qai - (0' - 40') SPT 2 2.8 Ň 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose. SPT 4 5.5 5' - Medium to dark brown very fine- to fine-grained silty sand, humid to Х 17 13.0 9.7 105.8 slightly moist, slightly firm. **I**SP 6 8.3 7.5' - 17.5' - Medium brown to dark brown fine- to medium-grained silty sand, humid, loose to slightly firm. 7 SPT 9.7 1 SPT 8 11.0 SPT 8 11.0 Į, х 24 18.4 7.5 99.4 . . ISPT 12 16.6 17.5' - Medium brown very fine- to fine-grained silty sand, humid, firm SPT 15 20.7 20' - 25' - Light to medium brown very fine- to fine-grained silty sand, humid, firm.  $\left( \right)$ SPT 16 22.1 SPT 17 23.5 / 25' - Medium brown fine- to medium-grained silty sand, humid, firm. 32 24.5 2.8 х 108.9 ISPT 23 31.7 - e # 2 \ 2 25' - 30' - Medium brown fine- to very coarse-grained silty sand, Ś SPT 20 27,6 humid, firm. ς τ. μ. εγ. . Ν SPT 24 33.1 30' - 40' - Light to medium brown fine- to very coarse-grained silty Ý  $\odot$ sand containing gravel, humid, dense very dense. SPT 36 49.7 × ဆင်္ပ Х 50 for 6" 5.1 117.6 5/0 İSPT 56 77.3 ISPT 67 92.5 40' - Refusal (Saugus Formation ?) End at 40^t Comments: The following correction factors were utilized to determine N(60) (Per SP117)

Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 40' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

PLATE 2.5

#### SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

#### BORING LOG NO. B-6

PLATE 2.6

FILE NO.: GC14-122536

DATE: 02/10/15

МЕТ	HOD:	6-inc	h Hollow	Stem A	uger					DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOO	
0										ALLUVIUM - Qal - (0' - 60')
-	SPT		2	2.8					N.	2.5' - Dark brown very fine- to medium-grained silty sand, slightly moist,
•	<b>6</b> 07		40						1.5	loose.
-	971	x	22	16.0	49	96.9			$\cdot$	5' - 10' - Light brown very fine- to fine-grained silty sand, humid, firm.
•	SPT	~	10	13.8	1.0				1	
-										
10	SPT		9	12.4						10' - Dark brown very fine- to fine-grained silty sand, humid, firm.
-	ерт		10	17.0						
-	SPT		10	17.9						12.5' - Dark brown very fine- to fine-grained clayey to silty sand, humid, firm.
-	Ĭ	х	18	13.8	7.5	99.8			`\.	humid stabily firm
-	SPT		9	12.4					. A	17.5' - 35' - Medium brown very fine- to medium-grained silty sand, humid,
-									<u> </u>	firm.
20	SPT		12	16.6					~ `	
-	SPT		27	373					• -	
-			2,	51.5			ĺ			
-	SPT		25	34.5						
-		х	46	35.3	6.1	103.8				
-	SPT		38	52.4	ĺ				. 7-	
30	SPT		31	42.8						
-	SPT		33	45.5						
-				40.0						
	SPT		47	64.9					··· ··	35'- 50' - Medium brown fine- to very coarse-grained silty sand, humid,
•		х	62	47.5	6.0	104.2			12 X	dense.
-	SPT		36	49.7						
40	SPT		35	48.3						
-	SPT		39	53.8					1.	
-				00.0					$\mathbb{N}_{\mathcal{N}}$	
•	SPT		37	51.1					``	
-		х	66	50.6	6.4	104.8			۰.`	
-	SPT		39	53.8					1	
50	581		35	48.3						50' - 55' - Dark brown medium- to very coarse-grained clayey to silty sand,
-	SPT		34	46.9						islightly moist, dense.
r				( dia					<u>`</u>	
-	SPT		33	45.5					ینر کر ، سور در	
-	Х		62	47.5	23.9	106.1			1.5	57.5' - Dark brown fine- to coarse-grained clayey to silty sand, moist, dense.
-	SPT		37	51.1		ļ			- 2.5	60' - Dark brown fine- to coarse-grained clayey to silty sand, saturated, dense.
Cor	ame	nte	The f	49.7 Mowin		l. Peotion	fact	010		Ind at 60'
501	Ch	= 1.1	15 /8" f	Diamet	er Bo	rehole	iacti ): Cr	∪is V s = 1		NZEU to determine $N(60)$ (PER SP117) Sampler without liner): $C = 2/3$ (California Sampler)
Not	<u>.</u> es:			EPTH	60'	GRO		WAT		

## SUB-SURFACE DATA

ELEVATION: SEE PLATE 1

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

## BORING LOG NO. B-7

FILE NO.: GC14-122536

DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger       SAMPLE BLOWCOUNT       SIEVE       ©       ©       ©       ©										DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOO	
0	SPT		4	5.5						ALLUVIUM -Qal - (0' - 60') 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-	SPT	x	1 15 7	1.4 11.5	9.4	88.9				5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm.
10	SPT		, 10	13.8						
-	SPT SPT	x	9 6 16	12.4 8.3 12.3	82	90.6				
-	SPT		6	8.3	9.2	20.0				
20	SPT		6	8.3					1.1 1.1 1.1	20' - Medium brown fine- to coarse-grained silty sand, humid, firm,
-	SPT		23 22	30.4						25' - Medium brown fine-grained silty sand, humid, slightly firm.
- - 30	SPT SPT	x	52 49 54	39.9 67.6 74.5	8.1	104.4			1.1	27.5' - 35' - Medium reddish brown fine- to very coarse-grained sand containing gravel, dry, dense.
	SPT		32	44.2					il ogi	
-	SPT SPT	x	26 30 30	35.9 23.0 41.4	11.3	103.4				35' - Medium to dark brown very fine- to fine-grained clayey to silty sand, slightly moist, slightly firm.
40 -	SPT		35	48.3					0,1,	37.5' ~ 45' - Medium brown fine- to very coarse-grained pebbly to gravelly sand, dry, dense.
-	SPT		30	41,4					10,00	45' - 50' - Dark brown fine- to coarse-grained clayey to silty sand containing
- - 50	SPT SPT	x	29 31 44	22.2 42.8 60.7	9.9	116.7			11 10	bebbles, slightly moist, firm to dense. 50' - 60' - Medium reddish brown fine- to coarse-grained pebbly to gravelly
	SPT		50 f	or 6"						silty sand, slightly moist, dense.
-	SPT X SPT		63 50 f	86.9 or 6" or 6"	3.5	110.0			0.1	60' - Rock/boulder
60	SPT		50 f	or 6"			[[			End at 60'
Cor	nme	nts:	The f	ollowin	a corr	ection	fact	ors v	vere uti	lized to determine N(m) (Per SP117)
-	Cb	= 1.	15 (8" [	Diamet	er Bo	rehole	); Cs	3 = 1	.2 (SP1	Sampler without liner): Cs = 2/3 (California Sampler)
Not	otes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES									
				• •	_					PLATE 27

## SUB-SURFACE DATA

#### BORING LOG NO. B-8

PLATE 2.8

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

FILE NO .: GC14-122536

ELE\	/ATIC	)N;	SEE PL	ATE 1						DATE: 02/12/15
MET	HOD:	6-inc	h Hollow	Stem A	uger					DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW	COUNT			SIE	EVE		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOG	
0 -	SPT		5	6.9						ALLUVIUM - Qal - (0' - 60') 2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose.
• • •	SPT SPT	x	12 21 15	16.6 16.1 20.7	7.1	89.3				5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm.
10 - -	SPT SPT SPT		10 13 11	13.8 17.9 15.2						
• •	SPT	×	28 16	21.5 22.1	4.8	101,2				
20 - -	SPT SPT		21 30	29.0 41.4						20' - Medium reddish brown fine- to medium-grained silty sand, humid, dense,
- - - 30	SPT SPT SPT	×	22 42 24 28	30.4 32.2 33.1 38.6	5.1	107.8				25' - Medium reddish brown fine- to very coarse-grained pebbly sand, humid, dense. 27.5' - Medium brown fine- to medium-grained silty sand, humid, dense. 30' - 47.5' - Medium reddish brown fine- to very coarse-grained pebbly to
- - - 40	SPT SPT SPT SPT	x	37 28 50 27 35	51.1 38.6 38.3 37.3 48.3	5.9	109.5				gravelly silty sand, humid, dense.
	SPT SPT SPT SPT SPT X	×	36 31 50 f 46 63 91 50 f	49.7 42.8 or 6" 69.0 63.5 86.9 125.6 or 6"	7.1	110.0			1 0 1 0 1 0 0 0 0	47.5' - 55' - Medium reddish brown fine- to very coarse-grained silty sandy clay containing gravel, moist, dense. 55' -60' - Medium gray fine- to medium-grained sandy clay, slightly moist, dense.
- 60										End at 60'
Con	nme	nts:	The f	ollowin	g cori	rection	fact	ors v	vere util	lized to determine N(60) (Per SP117)
	Cb :	= 1.	15 (8" I	Diamet	er Bo	rehole	); C	s = 1	.2 (SPT	Sampler without liner); Cs = 2/3 (California Sampler)
Not	es;	T	OTAL D	EPTH:	60'	GRO	UND	WAT	ER: NO	REFUSAL/CAVING: NO BACKFILLED: YES

### SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

## BORING LOG NO. B-9

FILE NO.: GC14-122536

DATE: 02/11/15

METI	HOD:	6-inc	h Hollow	/ Stem A	uger					DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW				SIE	VË		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC	
0 -	SPT		1	1.4						ALLUVIUM - Qal - (0' - 47.5') 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-	SPT SPT	x	11 34 8	15.2 26.1 11.0	6.3	101.3			1	5' - 12.5' - Light to medium brown very fine- to fine-grained silty sand, dry, firm.
10	SPT		9	12.4					· · ·	
-	SPT SPT SPT	x	11 9 26 10	15.2 12.4 19.9 13.8	7.7	104.4				12.5' - Medium to dark brown fine- to coarse-grained silty sand, dry, firm. 15' - 20' - Medium to dark brown fine-grained silty sand, humid, firm.
- 20 -	SPT		14	19.3					1	
-	SPT SPT		22 24	30.4 33.1						22.5' - 35' - Medium reddish brown very fine- to medium-grained silty sand, humid, firm.
- 30 -	SPT SPT	x	50 fo 21 22	or 5" 29.0 30.4	6.4	105.6				
-	SPT		25 30	34.5 41.4						35' - 46' - Dask brown very fire, to coarse, project stower to silly cond
- - 40	SPT SPT	x	54 39 38	41.4 53.8 52.4	5.7	111.3			1. 1.2	slightly moist, firm.
-	SPT		44	60.7						
- - 50	SPT SPT SPT	x	47 50 fr 50 fr 72	64.9 or 6" or 5" 99.4	5.8	112.2				45' - Medium gray very fine- to medium-grained sandy clay to clayey sand, moist, very dense. SAUGUS FORMATION - Ts - (47.5' - 57.5') - Medium gray medium- to very coarse- grained clayey sand, moist, very dense.
-	SPT		50 f	or 4"					1.4.	
- - 60	SPT		50 f	or 5"					·	End at 57.5'
Con	nme	nts:	The f	ollowin	g corr	ection	facto	ors w	vere uti	lized to determine N(60) (Per SP117)
Note	- CD : 	- 1. T	10 (8" ) 01"A1 F	Jamet	67 BOI		); Cs HMP	S = 1	.2 (SP]	Sampler without liner); Cs = 2/3 (California Sampler)
1101				·LF (11);	40	GRU	UND	VVA {	EK: NC	REFUSAL/GAVING: NU BACKFILLED: YES



#### SUB-SURFACE DATA

#### BORING LOG NO. B-10

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/12/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS **GRAPHIC LOC** Z 200 SCREEI DEPTH (FT) % PASSING MOISTURE N(60) DENSITY ELD BULK RING ii. 0 ALLUVIUM - Qai - (0' - 27.5') N. SPT 14 19.3 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, firm. ~` SPT . 31 42.8 5' - 17.5' - Medium brown fine- to coarse-grained silty sand, dry, firm. Х 37 28.4 ኑ . 1 SPT 12 16.6 10 SPT 12 16.6 ź ]SPT 19.3 -14 SPT 14 19.3 х 35 26.8 4.8 97.2 -İSPT 16 . 22.1 20 SPT 13 17.9 20' - 22.5' - Medium brown fine- to coarse-grained pebbly silty sand, dry, 28 dense. 6 SPT 43 59.3 _ . SPT 44 60.7 22.5' - 27.5' - Light to medium brown very fine- to fine-grained silty sand, dry, _ x 75 57.5 4.3 115.3 slightly firm. s. ISPT 50 for 4" -SAUGUS FORMATION - Ts - (27.5' - 30') - Medium brown fine- to very coarsegrained silty sand, dry, very dense. SPT 30 50 for 2" End at 30' • . 40 . 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 30' **GROUNDWATER: NO REFUSAL/CAVING** 

: NO	BAC	KFILLED	: YES	
	PL	ATE	2	10

#### SUB-SURFACE DATA

#### BORING LOG NO. B-11

PLATE

2.11

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/17/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT DESCRIPTION AND REMARKS SIEVE ľ0 2 200 SCREEN % PASSING DEPTH (FT) FIELD (N) MOISTURE GRAPHIC N(60) DENSITY BULK RING C ALLUVIUM - Qai - (0' - 10') ×.7 SPT 5 6.9 2.5' - Dark brown very fine- to fine-grained silty sand, sightly moist, loose. SPT • 12 16.6 5' - Medium gray very fine- to medium-grained clayey to silty sand, slightly Х 43 33.0 6.8 109.7 . moist, firm. SPT 22 30.4 7.5' - Medium reddish brown fine- to medium-grained silty sand, dry, dense. •, • 10 SPT 50 for 4" 泛 SAUGUS FORMATION - Ts - (10' - 17.5') ŧ 10' - Medium brown fine- to very coarse-grained silty sand, dry, dense. 9.1 SPT 50 for 6" 12.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly . : بې moist, dense. н SPT 50 for 4" 15' - 17.5' - Light to medum gray very fine-grained silty clay, moist, very stiff. 1 . 20 . 30 40 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

#### SUB-SURFACE DATA

#### BORING LOG NO. B-12

PLATE

2.12

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/18/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS 20 **GRAPHIC LOG** 200 SCREEN FIELD (N) % PASSING MOISTURE (FT N(60) DENSITY DEPTH BULK RING 0 ALLUVIUM - Qal - (0' - 7.5') - Medium reddish brown very fine- to fine-grained silty  $\sum_{i=1}^{n}$ SPT 6 8.3 sand, slightly moist slightly firm.  $\mathcal{X}$ _ SPT 19 26.2 117.9 Х 72 55.2 6.2 1: SPT 50 for 5" * SAUGUS FORMATION - Ts - (7.5' - 10') - Medium brown fine-grained silty sand, humid, very dense.  $\tilde{\sim}$ 10 SPT 50 for 3" End at 10 20 30 40 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 10' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

#### SUB-SURFACE DATA

#### BORING LOG NO. B-13

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/18/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS GRAPHIC LOD 200 SCREEN (LL Ê % PASSING MOISTURE FIELD ( N(60) DENSITY DEPTH BULK RING 0 ALLUVIUM - Qal - (0' - 15') ISPT 6 8.3 2.5' - 5' - Medium reddish brown very fine- to fine-grained silly sand, humid, -~1 firm. . ISPT 9 12.4 х 33 25.3 10.9 93.8 -SPT 17 23.5 7.5' - 10' - Medium brown fine- to medium-grained silty sand to sandy silt, н 1 humid, firm. 10 SPT 11 15.2 54 12.5' - 15' - Medium brown fine- to coarse-grained silty sand, dry, firm. **İSP**T 11 15.2 -SAUGUS FORMATION - Ts - (15' - 17.5') - Medium brown fine- to medium-grained SPT 40 55.2 ... Х 50 for 6" silty sand to sandy clay, slightly moist, very dense. 8.1 SPT 50 for 3" End at 17.5' 20 30 40 . 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES



#### SUB-SURFACE DATA

#### BORING LOG NO. B-14

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1 METHOD: 6-inch Hollow Stem Auger SAMPLE BLOWCOUNT SIEVE  $\widehat{(L)}$   $\widehat{(2)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat{(3)}$   $\widehat$ 

FILE NO.: GC14-122536 DATE: 02/17/15

#### DRILLING CO.: HD DRILLING DESCRIPTION AND REMARKS

DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE :	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LO	
0	SPT		6	8.3						ALLUVIUM - Qal - (0' - 12.5') 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose
•						Ì			,~∕.	
-	SPT	x	9 33	12.4 25.3	8.0	97,9				5' - Light to medium brown very fine-grained silty sand, humid, slightly firm.
-	SPT		17	23.5						7.5' - 12.5' - Medium brown very fine- to fine-grained silty sand to sandy silt,
- 10	SPT		11	15.2		ļ			ef	humid, dense.
-				1.0.2					~ <u>*</u>	
-	SPT		50 fe	or 6"						SAUGUS FORMATION - Ts - (12.5' - 20') - Medium brown fine- to medium-grained
-		x	50 f	oro i or6"	13.8	97.7				clayey to silly sand, humid to slightly moist, dense.
-	SPT		50 f	or 3"						
- 20	SPT		50 f	or 4"					····	Find at 20'
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60										
on	nme	nts:	The f	ollowin	g corr	ection	facto	ors w	ere util	lized to determine N(60) (Per SP117)
lot		- [.] T(		Jiamet	20'	enole)	UNITY	s = 1	2 (SPT	Sampler without liner); Cs = 2/3 (California Sampler)
		<u> </u>					U.11			DIATE 244

#### SUB-SURFACE DATA

#### BORING LOG NO. B-15

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/17/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS 200 SCREEN GRAPHIC LOG DEPTH (FT) PASSING E MOISTURE N(60) FIELD ( DENSITY BULK RING % Ð ALLUVIUM - Qal - (0' - 7.5') . 2.7 7 SPT 9.7 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose. **İ**SPT 7 • 9.7 5' - Light to medium brown very fine-grained silty sand, humid, slightly firm. ł Х . 50 for 5" 7.5 98.2 SPT 69 -95.2 SAUGUS FORMATION - Ts - (7,5' - 20') 5 7.5' - 17.5' - Medium brown very fine- to fine-grained silty sand to sandy silt, `./ 10 SPT 50 for 4" humid, very dense. . ، بر SPT -50 for 5" İSPT . 50 for 5" Х 50 for 4" 13.2 100,0 1 SPT • 50 for 5" : • = - -SPT 20 50 for 4" 20' - Medium brown fine- to medium-grained clayey to silty sand, humid to slightly moist, very dense. -End at 20' • 30 . 40 . 50 • . 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 20' **GROUNDWATER: NO** REFUSAL/CAVING: NO BACKFILLED: YES



#### SUB-SURFACE DATA

#### BORING LOG NO. B-16

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/17/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS 200 SCREEN GRAPHIC LOO % PASSING DEPTH (FT) ŝ MOISTURE N(60) FIELD ( DENSITY BULK RING G ALLUVIUM - Qal - (0' - 15') X SPT 8 11.0 -2.5' - Medium to dark brown very fine- to fine-grained silty sand, slightly moist, loose. SPT 9 12.4 -5' - 10' - Medium brown very fine- to fine-grained silty sand, dry, firm. . 1 х 52 39.9 7.1 104.9 SPT 26 -35.9 1 ſ 10 SPT 20 27,6 4 SPT 27.6 20 . 12.5'- 15' - Light to medium brown very fine- to fine-grained silty sand to SPT 50 for 5" sandy silt, slightly moist, dense. х 50 for 5" 107.4 12.6 SAUGUS FORMATION - Ts - (15' - 22.5') - gray siltstone. SPT _ 50 for 3" 20 SPT 50 for 4" 1 _ SPT 50 for 2" 1 End at 22.5 • -. 30 _ 40 50 -. . 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 22.5' REFUSAL/CAVING: NO **GROUNDWATER: NO** BACKFILLED: YES



#### SUB-SURFACE DATA

#### BORING LOG NO. B-17

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/18/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS GRAPHIC LOO MOISTURE % 200 SCREEN DEPTH (FT) % PASSING FIELD (N) N(60) DENSITY BULK RING 0 ALLUVIUM - Qal - (0' - 5') Ţ. SPT 5 6.9 2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose. _ SPT 15.2 -11 SAUGUS FORMATION - Ts - (5' - 15') .4 Х 68 52.1 10.0 -98.1 5' - 7.5' - Medium to dark brown fine- to medium-grained silty sand, humid, slightly lfirm. *L.*.. . 7.5' - 15' - Medium brown fine- to medium-grained silly to sandy clay, humid, 10 SPT 28 38.6 very dense. _ -SPT 56 77.3 چنے یہ نسر. -SPT _ 50 for 5" End at 15' -_ 20 . . ..... 30 -40 -. 50 _ . . 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 15 GROUNDWATER: NO **REFUSAL/CAVING: NO** BACKFILLED: YES

## SUB-SURFACE DATA

#### BORING LOG NO. B-18

PRO.	JECT	: D.	R. HOR	TON - LY	ONS C	ANYO	N RAN	CH, S	SANTA C	LARITA FILE NO.: GC14-122536
ELEV	ATIC	)N:	SEE PL	ATE 1				•		DATE: 02/18/15
метн	HOD:	6-inc	h Hollow	/ Stem A	uger					DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS
<b>DEPTH (FT)</b>	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC	
0         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         - <td< td=""><td>SPT SPT SPT SPT</td><td>x x</td><td>The f</td><td>13.8 20.7 or 3" or 3" or 3"</td><td>8.2 g corr</td><td>105.0 ection</td><td>facto</td><td></td><td></td><td>ALLUVIUM - Qai - (0' - 7.5') 2 5' - Dark brown very fine- to fine-grained silty sand, moist, slightly firm. 5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense. SAUGUS FORMATION - Ts - (7.5' - 10') - Dark brown fine- to coarse-grained silty sand, slightly moist, very dense. End at 10' 10' 10' 10' 10' 10' 10' 10'</td></td<>	SPT SPT SPT SPT	x x	The f	13.8 20.7 or 3" or 3" or 3"	8.2 g corr	105.0 ection	facto			ALLUVIUM - Qai - (0' - 7.5') 2 5' - Dark brown very fine- to fine-grained silty sand, moist, slightly firm. 5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense. SAUGUS FORMATION - Ts - (7.5' - 10') - Dark brown fine- to coarse-grained silty sand, slightly moist, very dense. End at 10' 10' 10' 10' 10' 10' 10' 10'
Note	<u></u>	- 1. 	NTAL *	JEDTU		enole	$\frac{1}{100000}$		2 (371	Sampler without liner); Cs = 2/3 (California Sampler)
NOR	7 <b>3</b> .	11		12218.	10	GRU	UNDI	NAI	ER: NU	REFUSAL/CAVING: NO BACKFILLED: YES
										PLATE 2.18

## SUB-SURFACE DATA

## BORING LOG NO. B-19

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/19/15										
ELE	/ATIC	)N:	SEE PL	ATE 1						DATE: 02/19/15
MET	HOD:	6-inc	h Hollow	v Stem A	uger			_		DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOG	
	SPT SPT SPT SPT SPT	X	LL 20 16 80 58 32 50 fr 80	27.6 22.1 61.3 80.0 44.2 or 5" 110.4	9.8	91.5	%	# 20	CITY CR	ALLUVIUM - Qal - (0' - 7.5') - Medium brown fine-grained silty sand, dry, slightly firm. PICO FORMATION - Tp - (7.5' - 15') 7.5' - 12.5' - Medium brown claystone to siltstone. 12.5' - 15' - Dark brown claystone to siltstone. End at 15'
Con	nme	nts:	The f	ollowín	a corr	ection	l facto	ors M	l /ere uti	Ized to determine N(m) (Per SP117)
	Cb	= 1.	15 (8" I	Diamet	er Boi	rehole	); Cs	s ≕ 1.	2 (SP1	Sampler without liner); Cs = 2/3 (California Sampler)
Not	es:	Ţ	OTAL L	DEPTH:	15'	GRO	UND	WAT	ER: NO	REFUSAL/CAVING: NO BACKFILLED: YES
										PLATE 2.19

<b>SII</b>		· · · · · · · · · · · · · · · · · · ·					GEUSERVICES, INC.	
	3-SUI	RFA	CE	DAT	ΓA		BORING LOG NO. B-20	
ELEVATION METHOD: 6- SAMPI	D.R. HOR : SEE PL inch Hollow E BLOW	ATE 1 v Stem A COUNT			SI SUSSE	SCREEN A	SANTA CLARITA FILE NO.: GC14-122536 DATE: 02/19/15 DRILLING CO.: HD DRILLING DESCRIPTION AND REMARKS	
Ing     0       0     -       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -     SPT       -	20 20 50 f 50 f 79 50 f	12.4 27.6 or 3" or 5" 109.0 or 2"	0W	103.9		# 200	δ         ALLUVIUM - Qal - (0' - 7.5')         2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, sightly firm.         5' - Medium brown fine- to medium-grained silty sand, humid, firm.         PICO FORMATION - Tp - (7.5' - 12.5') - Medium brown siltstone         End at 12.5	
- 50 - - - - - - - - - - - - - - - - - -	<b>is:</b> The f 1.15 (8" I	ollowin Diamet DEPTH:	g corr er Bo 12.5'	rection rehole	facto ); C:	ors v s = 1	were utilized to determine N(60) (Per SP117) 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) ATER: NO REFUSAL/CAVING: NO BACKER LED: YES	

## SUB-SURFACE DATA

(F.7)

DEPTH

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10

20

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30

40

50

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SPT

SPT

SPT

Х

34

40

46.9

55.2

6.7

114.3

50 for 4"

57 for 5"

**B-21 BORING LOG NO.** PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/13/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS Š 200 SCREEM Ê PASSING **MOISTURE** GRAPHIC N(60) DENSITY ELD BULK RING 11 % ALLUVIUM - Qal - (0' - 47.5') SPT 3 4.1 2.5' - 5' - Medium to dark brown very fine- to medium-grained silty sand, humid, loose. SPT 3 4.1 Х 26 19.9 5.7 99.0 :, { SPT 13 17.9 7.5' - 10' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm. SPT 1 8 11.0 SPT 9 12.5' - 22.5' - Medium to dark brown very fine- to fine-grained silty sand, 12.4 SPT 6 8.3 humid, slightly firm. 15 Х 11.5 9.2 104.6 SPT 8 11.0 SPT 14 19.3 SPT 19 26.2 SPT 20 27.6 33 25.3 9.8 108.7 x SPT 0.0 31 42.8 27.5' - 30' - Medium brown fine- to coarse-grained pebbly silty sand, humid, SPT 29 40.0 dense. 14 SPT 33 45.5 35' - Medium reddish brown fine- to coarse-grained pebbly sand, humid, 0 SPT 28 38.6 dense. D Х 58 44.5 18.8 107.9 37.5' - 47.5' - Medium brown fine- to medium-grained silty sand to sandy silt, moist, SPT 32 44.2 firm. SPT 33 45.5 SPT 30 41.4

> i, t SAUGUS FORMATION - TS - (47.5' - 50') - Medium reddish brown fine- to very coarse-grained clayey to silty sand, moist to saturated, dense. End at 50'

60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 50' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES PLATE 2.21

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#### BORING LOG NO. **B-22**

SUB-SURFACE DATA PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/13/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS % GRAPHIC LOQ 200 SCREEN DEPTH (FT) E % PASSING MOISTURE N(60) DENSITY FIELD BULK RING 0 ALLUVIUM - Qai - (0' - 17.5') SPT 2 2.8 ļ 2.5' - 5' - Dark brown fine- to medium-grained silly sand, humid, loose. SPT -3 41 Х 24 18.4 3.8 103.7 7.5' - 15' - Dark brown fine- to very coarse-grained silty sand, humid, SPT 15 20.7 slightly firm. 10 SPT 15 20.7 SPT 19 26.2 SPT 11 15.2 8.7 х 60 46.0 119.1 Ĩ, _**∖**1 SPT 70 96.6 SAUGUS FORMATION - TS - (17.5' - 32.5') Ge. 17.5' - 27.5' - Medium yellowish brown medium- to very coarse-grained sand, SPT 20 53 73.1 humid, very dense. SPT 68 93.8 SPT 65 89.7 х 50 for 3" 12.6 110.4 27.5' - 32.5' - Medium yellowish brown medium- to very coarse-grained silty SPT 50 for 6" sand, slightly moist, very dense. SPT 30 50 for 6° */ SPT 50 for 5" End at 32.5' 40 50 -

60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 32.5' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES



#### SUB-SURFACE DATA

#### BORING LOG NO. B-23

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/16/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS **GRAPHIC LO** PASSING SCREEI Ê DEPTH (FT) VIOISTURE DENSITY N(60) ELD BULK RING 200 * 0 ALLUVIUM - Qal - (0' - 27.5') SPT 3 4.1 2.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly moist, loose. SPT 15 20.7 5' - Dark brown very fine- to medium-grained clayey to silty sand, х 57 43.7 8.0 97.0 humid, firm. * * * SPT 30 41.4 17.5' - 10' - Medium to dark brown fine- to coarse-grained clayey to silty 7 sand, humid, firm. ÷ SPT 10 14 19.3 रें इ SPT 12 16.6 12.5' - 17.5'- Medium to dark brown fine- to coarse-grained clayey to SPT 5 6.9 silty sand, slightly moist, slightly firm.  $\overline{\phantom{a}}$ 27 х 20.7 11.5 107.4 SPT 12 16.6 . 20 SPT 13 17.9 20' - 27.5' - Medium to dark brown fine- to very coarse-grained gravelly to J. pebbly clayey to silty sand, humid to slightly moist, slightly firm. 1°52 SPT 18 -24.8 • SPT 13 . 17.9 SAUGUS FORMATION - Ts - (27.5' - 30') 43 33.0 4.3 х 111.7 25' - 27.5' - Medium yellowish brown fine- to coarse-grained silty sand Ör / SPT 46 63.5 containing peobles, humid, firm to dense. 10 ÍSPT 30 50 for 5" 30' - Rock/boulder 40 -50 . . 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 30' **GROUNDWATER: NO** REFUSAL/CAVING: NO BACKFILLED: YES



#### **GOLD COAST GEOSERVICES, INC.** SUB-SURFACE DATA BORING LOG NO. **B-24** PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/16/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS GRAPHIC LOO 200 SCREEN (FT) Z PASSING MOISTURE N(60) DENSITY ELD ( DEPTH × RING BUL * Ð ALLUVIUM - Qal - (0' - 27.5') 6 $\sim$ SPT 2.5' - Dark brown fine- to medium-grained clayey to silly sand, slightly moist, 8.3 . slightly firm. _ SPT 24 33.1 5' - 10' - Dark brown fine- to medium-grained clayey to silty sand, humid, 1 χ 55 42.2 8.6 83.1 firm to dense. , , 4 SPT 20 27.6 . $\mathbf{N}$ 10 SPT 13 17.9 SPT -17 23.5 12.5' - 27.5' - Medium brown fine- to medium-grained clayey silt to silty clay, SPT 8 11.0 r humid to slightly moist, firm to dense. N : 39 29.9 х 15.9 95.6 SPT 21 29.0 20 SPT 13 17.9 **ISPT** 57 78.7 _ ÷ SPT -24 33.1 PICO FORMATION - Tp - (27.5' - 37.5') ÷ 18.5 50 for 4" 101.1 x 27.5' - 35' - Medium to dark grayish brown fine-grained clayey silt to silty clay, <u>----</u> SPT 50 for 5" . moist, dense. . ... 30 SPT 64 88.3 SPT 60 82.8 ~ . . SPT 42 58.0 35' - 37.5' - Dark brown claystone to siltstone, very dense. End at 37.5' х 50 for 5" 27.5 94.9 SPT 50 for 4" 40

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 60

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 Comments: The following correction factors were utilized to determine N(60) (Per SP117)

 Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

 Notes:
 TOTAL DEPTH: 37.5'

 GROUNDWATER: NO
 REFUSAL/CAVING: NO
 BACKFILLED: YES

PLATE

2.24

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# GOLD COAST GEOSERVICES, INC.SUB-SURFACE DATABORING LOG NO. B-25

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/16/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT DESCRIPTION AND REMARKS SIEVE 2 GRAPHIC LOG 200 SCREEN % PASSING DEPTH (FT) Ē NOISTURE N(60) DENSITY FIELD BULK RING 0 ALLUVIUM - Qal - (0' - 17.5') SPT 14 19.3 2.5' - Medium to dark brown fine- to medium-grained silty sand, humid, firm. SPT 41 56.6 5' - 12.5' - Medium brown fine- to coarse-grained clayey to silty sand, humid, به بر ÷ х 82 62.9 7.5 99.1 firm to dense. SPT 28 38.6 10 SPT 20 27.6 SPT 29 40.0 SPT ... 8 11.0 15' - 17.5' - Light yellowish brown very fine- to fine-grained silty sand to sandy silt, х 50 for 3" humid, slightly firm. SPT 70 96.6 SAUGUS FORMSTION - Ts - (17.5' - 27.5') 17.5' - Medium reddish brown fine- to medium-grained clayey to silty sand, SPT 20 31 42.8 dry, very dense. 20' - Medium reddish brown silfstone, very dense. SPT 50 for 6" 22.5' - Light grayish brown siltstone, very dense. SPT 40 55.2 25' - Medium gray siltstone, very dense · 2 х 50 for 3" End at 27.5' 30 40 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 27.5' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

PLATE

2.25

## GEOTECHNICAL BORING LOG

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SHEET 1 OF 2

PROJE DATE DATE DRILLI TYPE	ECT NO START FINISH ER OF DR	). TED IED		102453- 5/20/01 5/20/01 dezma D		PROJECT NAME Lyons Canyon Ranch GROUND ELEV. <u>1317</u> BORING DESIG. GW DEPTH (FT) <u>67</u> LOGGED BY DRIVE WT. <u>See Note</u> NOTE <u>0-24' 35</u> DROP <u>12 inches</u> 2577# 4	48#: 24	8-1 CRN -47'		
DEPTH (feet)	ELEV,	SAMPLE	BLOWS/FT	ГІТНОГОСҮ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
	1315-					ALLUVIUM (Qal): Sandy Silt to Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, firm/moderately dense.				
5-	1310-	R/B	1				7.3	102.0	31	
	1305-	R	1				7.0	96.4	25	
15	1300-	R	1			Sandy Silt to Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, firm/moderately dense, some interbedded pabble lenses.	10.2	102.4	44	
- 20-	1295-	R/B	1			Silty Sand; fine- to coarse-grained with some pebbles and few cobbles, moderate to dark yellowish brown, moist, moderately dense.	4.9	112.2	26	
- 25	1290-					n g∴n n s		· · · · · · · · · · · · · · · · · · ·		
	1285-	<u> </u>				Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, moderately dense to dense.				
35	1280-									
SAMP B	PLE TY RING SPT ( BULK	'PES: (DRIV SPLIT SAMF	(E) SAM SPOOM PLE	IPLE N) SAMP	LE E SAMPLE	CONTACT WATER SEEP BEDDING JOINTING SI SHEAR	C S EER	OIL	<b>s</b> 5, IN Plat	I <b>C.</b> Έ Α-1

#### SHEET 2 OF 2

#### GEOTECHNICAL BORING LOG

1317

67

**PROJECT NAME** GROUND ELEV. GW DEPTH (FT) DRIVE WT.

DROP

Lyons Canyon Ranch See Note 12 inches

BORING DESIG. B-1 LOGGED BY CRN NOTE 0-24' 3548#: 24-47' 2577#: 47-73' 1648#



PROJECT NO.

DRILLER

DATE STARTED

DATE FINISHED

TYPE OF DRILL RIG

102453-T

6/20/01

5/20/01

Ledezma Drilling



SHEET 2 OF 2

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#### **GEOTECHNICAL BORING LOG**

PROJECT NO.

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DATE STARTED DATE FINISHED

102453-T

6/20/01 6/20/01

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PROJECT NAME Lyons Canyon Rench GROUND ELEV. 1325 GW DEPTH (FT) 53 DRIVE MT. San Visite ...... DRIVE WT. See Note Ledezma Drilling

BORING DESIG. <u>B-2</u> LOGGED BY <u>CRN</u> NOTE <u>0-24' 3548#; 24-47'</u>

DRILLI	LLLER PE OF DRILL RIG <u>30" Bucket Auger</u>			Drilling Auger	DRIVE WT. DROP	See Note 12 inches	NOTE	0-24' 35 2577# 4	48#; 24 17-73' 1	-47' 648#			
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	ATTITUDES	GE	OTECHNICAL DESC	CRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS
  	1285	R	8			Silty Sand; fine moderate yellov	- to very coarse-grained wish brown, slightly moi	l with peobles st to moist, de	hnse.	6.5	122.2	51	
- 45 - -	1280	B											
- 50-	1275-	R	6			Sand; fine- to c yellowish browr	oarse-grained with pebt	bles, pale to n nse to dense.	noderate	5.5	135.5	61	
-					2	Water at 53± fe	et. <u>to 54+ feet.</u>		······································				
						Total Depth 54 Water at 53 fee Caving from 52 Hole backfilled	feet. t. to 54 feet. with native materials an	nd tamped.					
SAMF	LE TY RING	PES: (DRIVE	E) SAM	PLE		¥ GROUNDV				C S EER	DILS	3 . IN	
B	BULK	SAMP		T TUB	E SAMPLE		S SHEAR			· · ·	F		Е А-4

PROJE	ECT NO START FINISH ER OF DR	). TED IED ILL RI		102453 6/20/0 6/20/0 dezma l "Bucket	3-T 11 Drilling Auger	PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1331     BORING DESIG.       GW DEPTH (FT)     LOGGED BY       DRIVE WT.     See Note     NOTE       DROP     12 inches     2577# 4	18#; 24 7-73' 1	B-3 CRN -47' 648#		
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	ГІТНОГОВУ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY		OTHER TESTS
	1330					ALLUVIUM (Qal): Silty Sand; very fine- to fine-grained, pale yellowish brown, dry, loose. Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, dry to slightly moist, loose to moderately dense.				
10 - - - 15 - - -	1320-	B	1			1 to 2 <u>+</u> feet thick boulder lense with 6 to 12 <u>+</u> inch boulders. Silty Sand; fine to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, moderately dense.	2.3	106.7	11	
20-	1310-	R/B	2			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	5.7	115.3	35	
	1305-					Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, moderately dense.	<b></b>			
35-	1300 -	R	3			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	4.9	114.1	28	
SAMI B	PLE TY RING SPT ( BULK	PES: (DRIV SPLIT SAM	ve) san I spooi Ple	IPLE N) SAMI	PLE BE SAMPLE	V GROUNDWATER LEVEL WATER SEEP CO CONTACT B BEDDING F FAULT JOINTING S SHEAR	C SO EER	JILS SILS	5 5, IN 21 AT	

#### **GEOTECHNICAL BORING LOG**

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SHEET 1 OF 2

PLATE A-5

PROJECT NO, <u>102453-T</u> DATE STARTED <u>6/20/01</u> DATE FINISHED <u>6/20/01</u>			102453 6/20/0 6/20/0	<u>-T</u> <u>1</u>	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1331 BORING GW DEPTH (FT) LOGGEI	30RING DESIG. <u>B-3</u> .OGGED BY CRN			· · · ·	,,, -,,,ετι <b>ε</b> Σ	
ORILLE TYPE (	er Dé dri	ll àic	<u>Le</u> 5 <u>_ 30'</u>	dezma D Bucket	hilling Auger	DRIVE WT. <u>See Note</u> NOTE DROP <u>12 inches</u>	0-24' 3548 2577#: 47-	#: 24- 73' 16	<u>47</u> 548#	······	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	MORTIRE	CONT. (%)	DRY (pc) DENSITY	SAT- URATION	OTHER TESTS
	1290-	R/B	6				<b>1</b>	0.4 1	115.0	63	
45-								****			
	-					SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Sandstone; very fine- to fine-grained, medium lingray, slightly moist, moderately hard to hard.	ght				
50-	1280-	R/B	18			Siltstone; mottled olive gray and light gray, slightly moin hard. Total Depth 51 feet. No water and no caving. Hole backfilled with native materials and tamped	st, 1	5.7 1	115.7	97	
						note backfilled with native materials and tamped.					
<b>.</b>											
SAMP	LE TYF RING ( SPT (S	PES: DRIVE PLIT :	E) SAM SPOON	PLE I) SAMP	LE	Y GROUNDWATER LEVEL     Seep C CONTACT     B BEDDING     E FAULT     B BEDDING     E FAULT	ACIFIC	SC ERI	DILS NG	5 i, IN	IC.

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		G	EOTECHNICAL BORING LOG	SHEET 1 OF
PROJECT NO. DATE STARTED DATE FINISHED DRILLER TYPE OF DRILL RI	102453 6/20/0 6/20/0 Ledezma ( G 30" Bucket	S-T I1 Drilling Auger	PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1342     BORING DESIG.       GW DEPTH (FT)     14     LOGGED BY       DRIVE WT.     See Note     NOTE 0-24' 3548#       DROP     12 inches     2577#: 47-7	B-4 CRN : 24-47' 3' 1548#
DEPTH (feel) ELEV. SAMPLE TYPE	BLOWS/FT	ATTITUDES	GEOTECHNICAL DESCRIPTION	CONT. (%) DRY (pcf) DENSITY SAT- URATION (%) OTHER TESTS
	1	AT	Attuvium (Cal):       Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, slightly moist to moist, moderately dense.         Silty Sand to Sandy Silt; very fine-grained with few pebbles, dark yellowish brown, slightly moist to moist, moderately dense. Water seep and caving from 7 to 9± feet.         Pebbly Sand; coarse-grained with abundant cobbles, dark yellowish brown, wet, moderately dense.         Water at 14± feet, caving from 14 to 16± feet.         Total Depth 16 feet.         Water and caving at 7 to 9 feet and 14 to 16 feet.         Hole backfilled with native materials and tamped.	1.8 108.3 96
SAMPLE TYPES: IRI RING (DRIV IS) SPT (SPLIT IE) BULK SAMF	(E) SAMPLE SPOON) SAMP PLE (T) TUB	PLE E SAMPLE	SROUNDWATER LEVEL WATER SEEP B BEDDING FAULT JOINTING S SHEAR MARCIFIC ENGINEE	SOILS RING, INC.

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					1	G	EOTECHNIC	AL BORING	LOG			SHE	E	1 OF 1
PROJE	CT NO	D.		102453	-T		PROJECT NAME	Lyons Canyon I	Ranch					
DATE	START	ED		6/20/0	1		GROUND ELEV.	1388	BO	RING DESIG. GGED BY		B-5		
 DRILLE	ER		Leo	lezma D	villing		DRIVE WT.	See Note	NC	TE 0-24' 35	48#: 24	-47:		
TYPE (	OF DR	ILL RI	G <u>30"</u>	Bucket.	Auger		DROP	12 inches		2577#;	<u>47-73' 1</u>	648#		
F⊋	>	ы Ш	S/FT	OGY	IDES						URE (%)	<u>1</u>	NO	ER TS
DEP (fee		SAMF	BLOW	LITHOL	АТТІГ		GEO	TECHNICAL DE	SCRIPTION		MOIST	DRY (	NRAT URAT	OTH TES
5	- 1385 - - 1380						<u>ALLUVIUM (Qal):</u> fine-grained, mode within top 3 <u>+</u> , feet dense/firm at dept	Silty Sand to San erate yellowish bro becoming slightly h.	dy Silt; very ī wn, dry and k moist and mo	ne- to pose/soft derately				
10	-	R/B	Push		þ		Water seep at 101	feet.						
	- 1375 -													
15-	-					<b>Y</b> .	Water at 15+ feet.	16+ feet						
							Vater at 10 and 1 Caving from 14 to Hole backfilled wit	rt. 5 feet. h native materials	tamped.					
SAMP	LE TY	PES:	(È) ★				🗴 groundwa			PACIF	C S	DIL	S	
	RING	(DRI\	E) SAM	PLE	( <del>)</del>		> WATER SEEP			FNGIN	FFR	INC	IN	IC
لغنا ا	5∺t(\$ माध⊮	SPLI CVM	5700N 91 = 1	i) SAMP TTIDA				E FAULT					-y #83 	
	DOLK	071111	- LLI		- onwrte	- ]							-LAI	Ε A-δ

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SHEET 1 OF 1

#### **GEOTECHNICAL BORING LOG**

PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP

PROJECT NO.

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DATE STARTED DATE FINISHED

102453-T

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6/20/01 6/20/01

Lyons Canyon Ranch 1384 See Note 12 inchas -----

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BORING DESIG. <u>B-6</u> LOGGED BY CRN LOGGED BY <u>CRN</u> NOTE <u>0-24' 3548#; 24-47'</u> 2577#; 47-73' 1648#

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DRILLE	ER OF DR	ILL R	IG <u>Le</u> 1G <u>30</u> "	dezma I Bucket	Drilling Auger	DRIVE WT. DROP	See Note 12 inches	NOTE <u>0-24' 3</u> _2577#	548#; 24 ; 47-73' 1	1-47 648#	<u>.</u>	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	птногосу	ATTITUDES	GEC	DTECHNICAL DESCRI	PTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS
	1380	SAW G	Bounce	LITHO	ATTT	ALLUVIUM (Qal) fine-grained with yellowish brown, becoming slightly at depth. Top 3 <u>+</u> Boulders; 1 <u>+</u> fool <u>Refusal</u> Total Depth 7 fee No water and no Refusal due to ro Hole backfilled w	: Silty Sand to Sandy Silt some pebbles and some dry and loose/soft within moist to moist and mode feet is porous. I in diameter. No sample it. caving. ocks. ith native materials and ta	t; very fine- to cobbles, dark top 1 to <u>3+</u> feet, erately dense/firm due to rocks.		DRY DEN		OT
SAMP R S B	LE TY RING SPT (f BULK	PES: (DRIN SPLIT SAM	/E) SAM ~ SPOON PLE	PLE I) SAMF	PLE E SAMPLE	¥ GROUNDWA WATER SEE B BEDDING	ATER LEVEL EP CONTACT E FAULT S SHEAR	PACIF ENGIN	IC SO	OILS	5 , IN ?LAT	<b>С.</b> Е А-9



#### GEOTECHNICAL BORING LOG

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PROJECT NO. 102453-T DATE STARTED 6/25/01 DATE FINISHED 5/26/01 DRILLER Ledezma Drilling TYPE OF DRILL RIG 30" Bucket Auger						PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1388     BORING DESIG.       GW DEPTH (FT)     LOGGED BY       DRIVE WT.     See Nota     NOTE     0-24' 35       DROP     12 inches     2577# 4	48#; 24 17-73' 1	B-7 CRN -47' 648#		
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	ПТНОТОВУ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcl) DENSITY	SAT- URATION (%)	OTHER TESTS
	1385	R/S	4 4 for 3" Bounce		<ul> <li>C: N75W 44NE</li> <li>B: N60W 41NE</li> <li>B: N80W 59NE</li> </ul>	COLLUVIUM/ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, dry and loose top 3± feet, slightly moist and moderately dense at depth, abundant roots and rootlets throughout. 1± inch thick yellowish red lense at contact. SAUGUS FORMATION- SUNSHINE RANCH MEMBER (Tar); Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, grayish orange, slightly moist, hard, moderately to well indurated, slight to moderate bedding. 1± foot thick, scour/infill structure - infill with fine-grained Sand (attitude from top of Sand infill). 2± foot thick, scour/infill structure - infill with fine-grained Sand (attitude from top of infill). Silty Sandstone; fine-grained, light gray, slightly moist, hard, well indurated. Used ripper and core bucket from 18 to 19± feet. Refusal at 19± feet. Total Depth 19 feet. No water, no caving. Hole backfilled with native materials and tamped.	4.6	114.8	27 25	
	RING SPT (S BULK	(DRI) SPLI1 SAM	VE) SAM I SPOON PLE	PLE I) SAMI T) TUE	PLE IE SAMPLE	WATER SEEP     CONTACT     B BEDDING     FAULT     JOINTING     S SHEAR	C S EER	UIL: INC P	5 6, IN Late	<b>IC.</b> E A-11

#### GEOTECHNICAL BORING LOG PROJECT NO. PROJECT NAME 102453-T Lyons Canyon Ranch DATE STARTED 6/25/01 GROUND ELEV. 1353 BORING DESIG. <u>B-8</u> GW DEPTH (FT) DATE FINISHED 6/25/01 LOGGED BY CRN 19 NOTE 0-24' 3548#; 24-47' DRILLER Ledezma Drilling DRIVE WT. See Nole 30" Bucket Auger TYPE OF DRILL RIG DROP 12 inches 2577#, 47-73 1648# ATTITUDES MOISTURE CONT. (%) LITHOLOG 20 **BLOWS/FT** <u>b</u> OTHER TESTS DEPTH (feet) ELEV. SAMPLI URATI (%) GEOTECHNICAL DESCRIPTION DEN COLLUVIUM/ALLUVIUM (Qal): Silty Sand to Sandy Silt; tine- to coarse-grained with pebbles, cobbles, some clay pods, slightly moist to moist, loose/soft to moderately dense/firm at depth. 1350 5 1345 10 increasing pebbles and cobbles. 1340 15 10.7 122.3 81 R/B 6 1335 Water at 19 feet. 20 SAUGUS FORMATION-SUNSHINE RANCH MEMBER 14.1 121.5 98 10 R (Tsr): Silty Sandstone to Sandy Siltstone; very fine- to fine-grained, light olive, moist, moderately hard, moderately в to well indurated, thinly bedded to laminated, weathered. 1330 Silty Sandstone; fine to coarse-grained, medium light gray, 25 slightly moist, hard, moderately to well indurated. 9.8 122.0 73 Total Depth 26 feet. Water at 19 feet. No caving. Hole backfilled. SAMPLE TYPES: **X GROUNDWATER LEVEL PACIFIC SOILS** R RING (DRIVE) SAMPLE ► WATER SEEP C CONTACT **ENGINEERING, INC.** S SPT (SPLIT SPOON) SAMPLE F FAULT B BEDDING B BULK SAMPLE S SHEAR

**TUBE SAMPLE** 

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PLATE A-12

#### SHEET 1 OF 2

#### **GEOTECHNICAL BORING LOG** PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1327

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PROJECT NO. 102453-T DATE STARTED 6/25/01 DATE FINISHED 6/25/01 DRILLER Ledezma Drilling TYPE OF DRILL RIG 30" Bucket Auger				102453 6/25/0 6/25/0 dezma I ' Bucket	3-T )1 Drilling Auger	PROJECT NAME         Lyons Canyon Ranch           GROUND ELEV.         1327         BORING DESIG.         B-9           GW DEPTH (FT)         LOGGED BY         CRN           DRIVE WT.         See Note         NOTE         0-24' 3548#, 24-47'           DROP         12 inches         2577#; 47-73' 1648#
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	птногосу	ATTITUDES	GEOLECHNICAT DESCLIDION
-	1325 -		•			ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, top 6± feet dry to moist at depth, loose top 3± feet to moderately dense at depth.
5	1320-					
10- - -		R/5	Push			Sandy Silt to Silty Sand; fine-grained, moderate to dark 13.9 115.1 84 yellowish brown, moist, firm/moderately dense, porous, abundant rootlets.
15-	- - 1310 - -					
20	- - 1305	R	1			Silty Sand; fine- to medium-grained, moderate to dark 12.1 111.7 64 yellowish brown, moist, moderately dense, micaceous.
25-	- 1300 -					
30- - -	- - 1295 -	R/B	Push			Silty Sand to Sandy Silt; fine- to coarse-grained with some 18.0 112.0 100 pebbles, moderate yellowish brown, moist to very moist, moderately dense, micaceous.
35	1290 -					
_	- -	в				(Tsr): Silty Sandstone; fine to medium-grained, light olive gray, moist, moderately hard, moderately indurated, slightly
SAMF R S B	PLE TY RING SPT (8 BULK	PES: (DRIV SPLIT SAMI	'E) SAM SPOON PLE	PLE I) SAMP T] TUB	LE E SAMPLE	CONTACT B BEDDING JOINTING C CONTACT B BEDDING C CONTACT C C CONTACT C C CONTACT C C C C C C C C C C C C C C C C C C C

#### SHEET 2 OF 2

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	GEOTECHNIC	AL BORING LOG	•
102453-T	PROJECT NAME	Lyons Canyon Ranch	
6/25/01	GROUND ELEV.	1327	BORING DESIG.
6/25/01	GW DEPTH (FT)		LOGGED BY
1 15 1/11	Pro des da Jama da esta	· · · ·	ALOTTE O DAL DE LO L

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BORIN	G DESIG.	<u>B-9</u>	_
LOGGE	DBY	CRN	_
NOTE	0-24' 35	48#; 24-47'	
	25775-2	7.73' 1648#	

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PROJECT NO. DATE STARTE DATE FINISHE DRILLER TYPE OF DRIL	0 D L RIG3	102453 6/25/0 6/25/0 edezma D 0" Bucket	-T 1 f f fuger Auger	PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP	Lyons Canyon F 1327 See Note 12 Inches	Ranch BOI LOC NO	16#; 24 7-73' 1	B-9 CRN -47' 548#				
DEPTH (feet) ELEV.	BLOWS/FT	гітногосу	ATTITUDES	GEOT	ECHNICAL DES	SCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS	
1285 -	R 5			to moderately weat Total Depth 41 feet No water, no caving Hole backfilled with	hered. j. native materials a	and tamped.	PACIFIC	10.0 C SC	117.9	63		
S SPT (SF B BULK S	AMPLE		LE SAMPLE		C CONTACT E FAULT S SHEAR		ENGINE	ER	ING Pl	<b>, IN</b> .ate	<b>C.</b> A-14	
	PROJE DATE DATE DRILLI	CT NO	D. FED HED		10245 4/25/ 4/26/ ave's D	3-T 02 02 92 91(ling	PROJECT NAME Lyons Canyon Rang GROUND ELEV. 1635 GW DEPTH (FT) DRIVE WT. See Note	h BORING DESIG. LOGGED BY NOTE <u>0-27' 45</u>	<u></u>	8-10 CRN '-52'		
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-	YPE			G <u></u>	виске				1000#.		<u> </u>	
	DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTRUDES	GEOTECHNICAL DESCR	IPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY		OTHER TESTS
		1635~ 1630-	B			B: N75W 45NE	PICO FORMATION (Tp): Sandy Siltstone Sand, pale yellowish brown, slightly mois (abundant bi-valves); interbedded with Si fine- to fine-grained, pale yellowish brown hard, scour-fill into Siltstone; both units jo infill, both units laminated to 8± inch thick	; very fine-grained t, hard, fossiliferous ity Sandstone; very i, slightly moist, inted with caliche bedding,				
	- 10- -	1525-	R/B	4 for 5"		B: 800W 54NE	Interbedded Silty Sandstone; fine-grained grayish orange, slightly moist to moist, ha Siltstone; mottled grayish orange and pal moist to moist, hard; both units laminated bedding.	d, pale yellowish to ard; with Sandy e olive gray, slightly I to 2 <u>+</u> inch thick	8.8	115.4	54	
	15-	1620-				B: N05W 53NE	Some interlayered Silty Claystone; olive moderately firm to firm, laminated, 1 to 2 some caliche along bedding.	gray, moist, <u>+</u> mm thick layers,				
	20-	1615-	R/B	5 for 4"		(8: 880W 45NE)	Silty Sandstone; fine- to medium-grained brown staining, slightly moist, hard, lamir thick bedding./	, light gray with light nated to 1/4 <u>+</u> inch	5.8	108.0	29	· · · · · · · · · · · · · · · · · · ·
-	25	1610 <i>-</i>				B: N70W 51NE	Some isolated cobble lenses, quartzite a composition.	nd gneissic				
	- 30- - -	1605-	R/8	8 for 8"		8: N70W 50NE	Sandy to Clayey Siltstone; very fine-grain gray, moist, moderately hard to hard, lan thick bedding, some gypsum strands alor 1/4± inch thick. Some isolated Clay lenses and pods; dai moist, moderately firm to firm, concentral planes.	ned Sand; light olive sinated to 1/4 <u>+</u> Inch ng bedding up to rk brownish black, ted along bedding	. 11.0	115.4	69	
	35- - -	1600-				8: N65W 49NE	Claystone layer; 1/4± inch thick, olive gra abundant well formed, gypsum crystals.	ay, moist, soft,				
	SAMF	1595 LE TY RING	PES: (DRIV	/E) SAM	PLE	<u> </u>	X GROUNDWATER LEVEL		C S		5 5	<u>i</u> Ir

					G	EOTECHNICAL BORING LOG	SH	EET	2 OF 3
PROJI DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	). 'ED IED ILL R	IG <u>30</u> °	10245 4/25/ 4/26/ ave's D Bucke	3-T D2 D2 Drilling t Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1535 BORING DESIG GW DEPTH (FT) LOGGED BY DRIVE WT. <u>See Note</u> NOTE 0-27' 4500# DROP 12 inches 3500#; 52-8 80-104' 180	8-10 CRN 27-52' 0' 2500# 0#	······································	-
DEPTH (feat)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	CONT. (%) DRY (pcf) DENSITY	SAT- URATION	OTHER TESTS
	1595	R	8 for 6"		B: N\$0W 47NE	Sandy Siltstone; fine-grained Sand; olive gray, moist, hard, some laminated to 1/4± inch bedding, generally massive, with abundant cross-cutting gypsum seams. Cobbie layers; 1± foot thick, set in pebbly sand matrix, medium- to very coarse-grained, moist, moderately hard to hard, quartizite cobbles and pebbles.	121.2	2 73	
-					B: NB5W 57NE	Silty Sandstone; fine-grained, reddish brown, slightly molst to moist, hard; interlayered with Sandy Siltstone; very fine- to fine-grained Sand, moist, moderately firm to firm, some very firm layers, laminated; both units 6 to 12 inch beds.			
50 - -	1585 -	R/B	8 for 5"			Silty Sandstone; fine-grained, pale olive gray, moist, hard. 7.	.2 113.	41	
- - - - -	1580-	······································			8: N76W 48NE. 8: N75W 50NE	Pebble lense; medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary. Some isolated Clay lenses and pods along bedding, 1± inch thick to 6± inches long, medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.			
- - - - - -	1575-	R	10 for 5"		B: N50E 47NW	Silty Sandstone; layered fine- to medium-grained, pale ofive gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to $1/2\pm$ inch thick bedding. Siltstone concretion; $1\pm$ inch thick, light to olive gray, slightly moist, very hard, massive, slightly jointed with light brown staining along joints.	.3 113.	0 42	
65	1570-				B: E-W 51N	Some gypsum along bedding; up to 1/4± inch thick.			e F
- - 70- -	1565-	R/B	10 for 5'	N MANY NAVANANA NA MANY NA MANY NA MANY NA MANY NA MANY NA MANY NA MANY NA MANY NA MANY NA MANY NA MANY NA MANY	5: 660W 48NE	Clayey Sandstone; very fine- to fine-grained, layered, pale yellowish brown to olive gray, moist, hard, friable, generally massive, some gypsum strands.	2.1 109.	6 63	
75	1560 -					Clayey Siltstone to Clayey Sandstone layers; 1± foot thick, very fine-grained, medium light to medium gray, moist, hard, micaceous, massive.			
					3: N75W 46NE	Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, laminated to 1 <u>+</u> inch thick bedding.			
SAM	PLETY	PES				T GROUNDWATER LEVEL	SOII	S	
R	RING   SPT (   BULK	(DRI SPLI SAM	ve) sam T spoon Iple	PLE 1) SAM T   TUE	PLE BE SAMPLE	WATER SEEP     C CONTACT     B BEDDING     FAULT     JOINTING     S SHEAR		G, R	NC.

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PROJE DATE S DATE I DRILLE TYPE (	ICT NO START FINISH ER DF DR	). TED IED ILL RI	G <u>30</u> "	10245 4/26/ 4/26/ ave's D Bucke	3-T D2 D2 Irilling t Auger	PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1592     BORING DESIG.       GW DEPTH (FT)     LOGGED BY       DRIVE WT.     See Note     NOTE     0-27' 450'       DROP     12 inches     80-104'	00#; 27 2-80' 2	B-11 CRN -52' 500#		
DEPTH (feel)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	MO(STURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER TESTS
						PICO FORMATION (Tp):	1			
	1580-				5: N50W 45SN J: N50E Vertical J: N10W 52NE	Sandy Siltstone; very fine-grained Sand, layered light to olive gray and light brown, slightly moist, moderately hard to hard, laminated to 1/2+ inch thick bedding, jointed/weathered, abundant roots.				
	- 1575 - -				F: N90W 62NE F: N50W 63SW	Fault Gouge: 1/4 to 1/2± inch thick, plastic Clay layer; olive gray, moist, soft to firm, flaky, abundant roots and rootlets.				
10-	- - 1570 -	R/B	5		J: N45W 78SW F: N55E 85NW	Fault Gouge: plastic Clay layer; olive gray, moist, soft, flaky, abundant roots.	13.0	119.4	89	
- 15-	-				8: N50E 48NW					
20-	1565 - - -	R/B	5 for 6"		B: N40E 49NW	Some medium sized bi-valves. Sandy Siltstone; very fine-grained Sand, medium dark gray,	13.2	122.3	<del>9</del> 9	
	1560 - - -					bivalves.				
25-	1555-				j: N50W 865W J: N40E 66NW	Clay lined joint 1-2 mm thick. Gypsum lined joint 2-3 mm thick.				
30	1550-	R/B	8 far 6"		B: N60W 755W	Sandy Siltstone; very fine-grained Sand, greenish gray, slightly molst, firm, massive, fossiliferous (small bi-valves); interlayered plastic with Silty Sandstone, medium gray, slightly moist, hard, slightly layered to massive; some Interlayered Claystone, medium dark to dark gray, moist, soft	12.2	123.5	95	
35	-					to moderately firm, laminated, flaky.				
-	1545-		<u> </u>			Some isolated concretionary pods, 2 to 6± inches in diameter, very hard.				
SAMP	LE TY	PES: (DRI)	/E) SAM	PLE		T GROUNDWATER LEVEL	CS	DIL	S	
S B	SPT ( BULK	SPLIT SAM	SPOON PLE	I) SAM	PLE BE SAMPLE	B BEDDING F FAULT	EEK	INC P	<b>i, in</b> Late	I <b>G.</b> E A-18

## GEOTECHNICAL BORING LOG

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#### SHEET 2 OF 3

2201		3		10245	G			LOG	,		SHE	ET 2	2 OF 3
DATE	START	ED ED		4/26/	02	GROUND ELEV.	1582	BOF	RING DESIG.	·	<u>B-11</u>		
DRILL	ER		<u>D</u>	4/26/ ave's D	uz Irilling	DRIVE WT.	See Note	NOT	GED BY 'E <u>0-27' 45</u>	00#: 27	<u>'-52'</u>		
	OF DR		iG <u>30</u> "	Bucka	<u>t Auger</u>	DROP _	12 inches		<u>3500#: {</u> 80-104'	52 <u>-80' 2</u> 100 <i>0#</i>	500#;		
DEPTH (feel)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	ATTITUDES	GEOT	ECHNICAL DES	SCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER TESTS
-	1540	R	-8 for 6"		B: N20£ 55NW	Clayey to Sandy Si to dark greenish gra massive.	ltstone; very fine-g ay, slightly moist, i	grained Sand, firm, laminated	greenish I to	12.3	119.7	85	
45-	1535-				B. N60W 55SW (Approx.)								
	-					Hard drilling.							
- 50 -		R/8	10 for 6"			Clayey Siltstone; m slightly laminated, g	edium dark gray, s generally massive.	slightly moist, -	firm,	11.9	122.1	89	
55-					B: N55W 75SW								
-	1525 -				B: N20W 57NE (Approx.)	Siltstone concretior massive.	n lense; 8 to 10 <u>+</u> ir	nches thick, ve	ery hard,				
60 -	- 1520 -	R	15 for 6"		D. NOTA	Clayey Siltstone; of laminated, general	ive gray, slightiy n y massive, few sn	noist, firm, slic nall bi-valve sl	ihtiy nelis.	10.5	121.0	76	
65	-		ſ		Ventical	Ripple marks, smai	amphtude.						
-	- 1515 -				B: N50W 52SW B: N50W 43SW								
70-	-					Onnale Difficience		٩٠ - ــــ المريد	t <b></b>			,44	
- - -	- 1510- -	R	15 far 5"		B: NOCE SASE	sandy Sitistone; ve slightly moist, hard, bedding, generally Clay lense; 2 to 3 <u>+</u> soft, pliable.	ny fine-grained Sa slightly laminated massive. inches thick, med	and, medium d 3 to 1/2 <u>+</u> inch lium dark gray	lark gray, thick , moist,	10.3	105.0	47	
75-	1505 ~~				B: N50W 75SW								
SAMF R	PLE TY RING SPT (S	PES: (DRI\ SPLIT	/E) SAM	PLE I) SAME	PLE	✗ GROUNDWATI ► WATER SEEP B BEDDING	ER LEVEL		PACIFI ENGIN	C S( EER	DILS ING	S , IN	C.
B	BULK	SAM	PLE	T TUB	SE SAMPLE		SHEAR				PL	.ATE	A-19

					G	EOTECHNIC.	AL BORING	LOG			SHE	ET	3 OF 3
PROJI DATE	ECT NO	). Ted	<del></del>	10245	3-T 02	PROJECT NAME	Lyons Canyon F 1582	Ranch BO	RING DESIG.		B-11		
DATE	FINISH	IED		4/26/	32	GW DEPTH (FT)		LO	GGED BY	) 	CRN		
	er Of dr		IG <u>30</u> '	rave's C ' Bucke	rilling t Auger	DRIVE WT.	<u>See Note</u> 12 joches	NO	1E 0-27 45	00#; 27 ;2-80' 2	<u>-52'</u> 500#		
- · · · ·					·				80-104	1006#			
DEPTH (feel)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOT	ECHNICAL DES	CRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
		R	25 for				· · · · · · · · · · · · · · · · · · ·			10.8	120.8	78	
	1500-	R	25 for 3.5"			Total Depth 81 fee No water, no cavin Hole backfilled with	g. i native materials a	and tamped.		10.8	120.8	78	
SAME	ן א ד דע			<u> </u>	<u> </u>	T COOLINDIALAT					<u> </u>	l	<u> </u>
SAMF R S S	YLE TY RING SPT (1 BULK	PES: (DRIN SPLIT SAM	/E) SAM SPOON PLE [	PLE 1) SAMI []] TUB	PLE IE SAMPLE	¥ GROUNDWAT ► WATER SEEP	ER LEVEL C CONTACT F FAULT S SHEAR	PS	PACIFI	C S( EER	DILS ING PI	S i <b>, IN</b> Late	<b>IC.</b> E A-20
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## GEOTECHNICAL BORING LOG

PROJE DATE DATE DRILLE TYPE	ECT NO START FINISH ER OF DR	). TED IED ILL RI	G <u>30"</u>	10245 4/29/ 4/29/ eve's C Bucke	3-T 02 02 07 June 1 Auger	PROJECT NAME         Lyons Canyon Ranch           GROUND ELEV.         1557         BORING DESIG.         B-12           GW DEPTH (FT)         LOGGED BY         CRN           DRIVE WT.         See Note         NOTE         D-27' 4500#; 27-52'           DROP         12 inches         3500#; 52-80' 2500#;	
DEPTH (feel)	ELEV.	SAMPLE	BLOWS/FT	LITHOLOGY	ATTITUDES		OTHER TESTS
5	1555 - - - 1550 -				B: NGOW 57NE	PICO FORMATION (Tp): Sandy Silistone; very fine- to fine-grained Sand; yellowish brown, slightly moist to moist, moderately hard, laminated to 1/2± inch thick bedding; interlayered with Silty Sandstone; fine-grained, mottled moderate yellowish brown and pale olive, slightly moist, moderately hard, laminated to 1/2± inch thick bedding; abundant caliche, both units highly to moderately weathered.	
- 10	- - 1549	R/B	5 for 10"		6: N80E 72NW	Abundant penecontemporaneous deformation. 12.9 117.6 64 Sandy Siltstone; very fine-grained Sand; light olive gray, slightly moist to moist, moderately hard to hard, slightly laminated generally massive; some interlayered Silty Sandstone, fine-grained, layered vellowish gray and light	
15	- 1540 ~ -				8: N50W 65NE	brown, slightly moist, moderately hard to hard, laminated to 1/4± inch thick bedding; some fine-grained gypsum along bedding bottom of "high to moderate" weathering zone.	
20	1535 -	R/B			B: N70W 73NE	Clayey Siltstone; mottled light to olive gray and moderate brown, slightly moist to moist, moderately hard to hard, massive, micaceous, some fine-rained gypsum strands. Silty Sandstone to Clayey Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some small isolated bi-valves and gastropods.	
	- 1530 - -				B. E.W.GAN		
30	1525-	R/B	10 for 10°		(Аџргох.)	Sandy Siltstone; very fine-grained, medium dark gray, slightly moist to moist, hard, slightly laminated, generally massive, slightly fossiliferous, micaceous.	,
35	1520 -						
SAMF R S B	PLE TY RING SPT (I BULK	PES: (DRIV SPLIT SAMI	/E) SAMI SPOON PLE [	PLE ) SAM T) TUE	PLE 3E SAMPLE	CONTACT BEDDING JOINTING CONTACT FAULT SHEAR CONTACT FAULT SHEAR PACIFIC SOILS ENGINEERING, II PLAT	NC. E A-21

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FROJE		).	<b></b>	10245	G 3-T	PROJECT NAME Lyons Canyon Ranch	01-3
DATE	START	ED IED		<u>4/29/</u> 4/29/	02 02	GROUND ELEV. <u>1557</u> BURING DESIG. <u>B-12</u> GW DEPTH (FT) LOGGED BY <u>CRN</u>	
DRILL	ER		D	ave's C	rilling	DRIVE WT. <u>See Note</u> NOTE <u>0-27' 4500#; 27-52'</u>	
IYPE	of Dr	ILL R	IG <u>30</u> "	Bucke	I Auger	DROP <u>12 inches</u> <u>3500#; 52-80; 2500#;</u> 80-104; 1000#	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	TESTS
	1515-				B: N70W 69NE	Sandy Siltstone to Silty Sandstone; very fine-grained Sand, medium dark gray, slightly moist to moist, hard, slightly laminated generally massive, slightly fossiliferous, micaceous; some interlayered Silty Sandstone, very fine-grained, light gray, slightly moist, hard, and Claystone, brownish to olive black, moist, moderately firm, laminated.14.2 118.614.2 95	
45	- 1510- -				8: N50W 57NE (Approx.)		
- 50-	-	R/B	8 for 8"			Silty sandstone; very fine- to fine-grained, medium dark to 13.4 (120.6 96 olive gray, slightly moist, hard, slightly laminated, generally	
_	1505- -					massive, micaceous, slightly fossiliferous.	
55	-						
60							
-	- 1495-	R/B	15 for 8"		8: N60W 53NE	Silty Sandstone; very fine- to fine-grained, medium dark gray, 13.2 120.6 94 slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous; some interbedded Claystone lenses, 1 to 2± thick, brownish to olive black, moist, moderately firm to firm, laminated.	
65-	-				B: N60W 53NE	Silty Sandstone lense; 8± inches thick, light to medium light gray, fine-grained, moist, moderately hard, fossiliferous; underlain by 1 to 2± inch_thick soft Claystone lense.	
-	1490 - -				B: N50W 52NE		
70-	- 1485 -	R	15 for 8"			Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	
75-	1480 -				B: N25W 77NE		
SAME	- ינב דע	PES					
R S B	RING SPT (I BULK	(DRIN SPLIT SAM	VE) SAM I SPOON PLE [	PLE I) SAMI T] TUE	PLE 3E SAMPLE	WATER SEEP C CONTACT B BEDDING E FAULT JOINTING S SHEAR PLATE	<b>C</b> . A-22

					G	EOTECHNICAL BORING LOG	SH	ÈET	3 OF 3
PROJE		Э.		10245	3-T	PROJECT NAMELyons Canyon Ranch			
DATE	START	ED		4/29/	02	GROUND ELEVBORING DESIG	<u>B-12</u>		
DAIE	FINISE	IED		4/29/	U2	GW DEPTH (FT) LOGGED BY	CRN		· ·
TYPE	IN DE DR		IG <u>30</u> "	Sucke	t Auger	DROP 12 inches 3500# 52-80	2500#		
				waana			2. <u>000</u> 17,		
			L L	γ	S	Ш.Э.	0	7	
HO	>	μ	S,F	ŏ	i i i i i i i i i i i i i i i i i i i	1	1 aE	<u>_</u>	E S
EE E	Щ	12 N	Ň	₫	Ĕ	GEOTECHNICAL DESCRIPTION	1 ZZ	XX8	E S
<u>م</u>		S_	L L L	É	Ę			Ш.	0 H
					4	20		ļ	
		R/B	20 for 6"			13.3	1108.9	68	
								1	
-	1475-	1			B: NGSVV 46NE	Silly Sandstorie lense; interbedded with Sandy Silistone, dark		1	
						massive 1/2 to 1+ inch thick beds			
85-	-	1			B: NSDW 63NE	1			
	-								
	1470 -							1	
								1	
	-								
-	-								
90 -	-	<u> </u>				4.00			
		R	25 for 5"			12.3	104.8	56	
						Total Depth 91 feet.			
						No water, no caving.	ļ	1	
						Hole backlilled with native materials and tamped.	1		
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SAMF	LE TY	PES:				GROUNDWATER LEVEL	OIL	S	
R	RING	(DRI)	VE) SAMI	PLΕ			~:L' }{}!/	₩ FB	
S	SPT (S	SPLIT	SPOON	) SAMI	PLE		UNG	3, IP	wu: ∖
B	BULK	SAM	PLE [	T) TUE	E SAMPLE	JJOINTING S SHEAR	р	LAT	E A-23
<b>L</b>						· · · · · · · · · · · · · · · · · · ·	•		

						G	EOTECHNIC	AL BORIN	g log			SHE	ET	1 OF 2
	PROJE		D.		10245	<u>3-T</u>	PROJECT NAME	Lyons Canyo	n Ranch					
	DATE	START	red		5/1/0	2	GROUND ELEV.	1445	90	DRING DESIG.		<u>B-13</u>		
		rivisn ¤g	15.0	n:	<u>່ວ/1/ປ</u> ລບຂ່າງ ເຖິ	iz		See Note	د. ان	) TE 0-27'45	30#: 27	<u>-52'</u>	<u></u>	
	TYPE	OF DR	ILL R	IG 30"	Buckel	t Auger	DROP	12 inches		3500#: 5	2-80' 2	500#;		
		1				······				A0-104	1000#			<b>1</b>
	-		w	Ŀ	S -	Su					影	£≻	Z	<b>X</b> 10
	E I	2	ц Ц Ц	ISI	þ	9			ECODIDITION	l		<u>e</u> r	-0- 	ΨĔ
	近の	1	₹Ľ	ð	P		GEQ	IECHNICAL D	ESCRIPTION	ł	SN .	¥ Z Z Z	ო≩≘	ÉĔ
	-		S	в	ЦТ	AT					Σŭ		5	
		1445-					SAUGUS FORMA	TION - SUNSHIN	E RANCH ME	MBER				
	-	-					(Tsr): Silly Sandst	one; fine- to coar	rse-grained wit	h pebbles,				
	_	- 1				1	very pale orange t	o pale yellowish	brown, dry, mo	derately				
						-	nard to hard, abun	dant scour-milli,	normai gradinį	3.	ļ	i		
						B: NBOE 55NW		,				i.		
		-	1											
	5-	1440-								-	t			
	-		-											
												1		
		-												
	10-	1435	0/0	E for 5"		8: N80E 39NW	Silly Sandstone: fi	ne- to coarse-ora	ained pale vell	owish .	4.5	116.1	28	
			100	01010			brown, dry to sligh	tly moist, modera	ately hard to ha	ard.				
								-	·					
												1		
											1			
	_	-	1			B: N70E SONW	Some interlayered	Clayey Siltstone	e lavers; 6+ inc	hes thick,			ļ	
	15-	1430-	-				pale olive gray, m	oist, moderately l	hard, laminated	d.	1			
	-													
		-					1 foot thick lense (	of 6 to 8± inch di	ameter cobbles	s, scour/infill				
		-					with lower contact	into underlying a	Siltstone.	Bue erev	1			
	20-	1425-	D/D	C 400 CB			moist, moderately	hard to hard, slid	philv laminated	ive gray, denerally	1111	120 1	78	
	-		r(/5	5 101 6			massive.		g	generally	1 1.1			
											2			
			-											
												1		
			-											
	25	1420 -									-			
	-	-	-											
		-	-								Ì			!
		_	}											
			1			8: E-W 40N	Silly Sandstone; f	ne- to coarse-gra	ained with som	e pebble				
		-	1				lenses, grayish or	ange to light olive	e gray, slightly	moist to				
	30-	1415-		the fact the			bedding, cross-be	ddina.		т, угаосо	1.5.1	105.6	24	
	_	-		01010								100.0	-	
												1	-	
		-												
	35	1410-				B: NEOW 43NE					†			
	-	-	-											
		-									1	-		
i			]											
			1										1	
	SAME	1405-	PES-	<u>i l</u>						1		<u> </u>	<u></u>	
		RING	(DRIN	VE) SAMI						PACIFI	CS	UIL	5	
	S	SPT	SPLN	SPOON	) SAM	PLE	BI BEDDING	- <u>LU</u> CONTAC		ENGIN	EER	INC	), IN	IC.
		BULK	SAM	PLE	រី] របទ	SE SAMPLE	JJOINTING	S SHEAR	NS 24			D	Ι ΔΤΙ	= <u>A</u> 54
										J			L 🕂 ! [	- ^~2.4

PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT.

102453-T

5/1/02 5/1/02

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PROJECT NO.

DATE STARTED DATE FINISHED DRILLER

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Lyons Canyon Ranch 1445 See Note 12 inches 

 BORING DESIG.
 B-13

 LOGGED BY
 CRN

 NOTE
 0-27' 4500#; 27-52'

 3500#; 52-80' 2500#;

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	ER OF DR	ILL R	IG <u>30</u> "	ave's D Bucket	rillina Auger	DRIVE WT. DROP	See Note 12 inches	NOTE _0-27' _3500	4500#; #:52-8	27-52	# <u>;</u>	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	GROUP SYMBOL	GEOTE	CHNICAL DESCRIPTION	4	MOISTURE CONT. (%)	DRY (pc) DENSITY	SAT- URATION (%)	OTHER TESTS
		R/B	8 for 6"			Silty Sandstone; ve slightly moist to moi interlayered Silty Sa pebbles, grayish or hard.	ry fine- to fine-grained, pale ist, moderately hard to hard; andstone, fine- to coarse-gra ange, slightly moist, modera	olive gray, some ained with tely hard to	3.8	112.5	21	
45-	1400-							***				
-						Silty Sandstone; fin cobbles, moderate y moderately hard to	e- to coarse-grained with pe yellowish to moderate brown hard.	bbles and n, moist,				
- 50	1395-	8	N/R			Discontinuous Pale coarse-grained darl thick.	osol; Silty Sand to Sandy Si k yeliowish brown, moist, so	lt, fine- to ft, 6 <u>+</u> inches -				
-						Silty Sandstone; fin cobbles, some boul yellowish to modera massive 50/50± cla @ 50 feet; no samp	e- to coarse-grained with pe ders up to 10 <u>+</u> inches, mod ate brown, moist, moderateh st-malrix supported. ble recovery due to cobbles.	bbles and erate y hard to hard,				
55- -	1390-							-				
60- -	1385~	R/B	10 for 5"			Silty Sandstone; fin some cobbles, mod moist, hard.	e- to coarse-grained with pe lerate yellowish to moderate	bbles and brown,	7.5	112.7	43	
-	-					FAULT ZONE: Clay moderately hard to some scour-infill wit	vey Sillstone; dusky blue gro hard, massive, some polish Ih overlying Sandstone.	een, moist, ed surfaces,				
65-	1380-											
- - -						FAULT: Claystone; slightly pliable, abur laminated to 1± incl @ 66'; Trend and p 42W. Sitty Sandstone; ye	olive gray, moist, moderate ndant polished surfaces and h thick bedding. lunge of striations on fault p	ly firm, d striations, lane: N60E		9		
70 - 	1375 -	R/B	10 for 10'			bedding. Silty Sandstone; fin cobbles, moderate scour-infil, general	e- to coarse-grained with pe yellowish brown, moist, mod y massive, matrix supported	ebbles and derately hard, d.	14.6	119.0	99	
- 75-	1370-							-		- - -		
-		B										
-						Total Depth 78 feet Hole backfilled with	No water, no caving, native materials and tampe					
SAMF	LE TY	PES:			-	Ground Water MAX - Max, Dens	Seepage	PACI	FIC	SOI	_S	<u> </u>
E E E	KING ( SPT (8		E) SAMP SPOON	ILE SAMP	LE	DS - Direct Shear HYDR - Hydrome ASCE - Expansio	ter Analysis n Index		NEE	RIN	G, IN	IC.
	DULK	GANA	ິພະນີ [	1UB	L SAMPL	- CONS - Consolidi	alion				PLAT	= A-25

## GEOTECHNICAL BORING LOG

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PROJI DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	), Ted IED ILL RIG		10245: 5/2/0 5/2/0 ave's D ' Bucket	3-T 2 2 rilling Auger	PROJECT NAME <u>Lyons Canyon Ranch</u> GROUND ELEV. <u>1338</u> GW DEPTH (FT) DRIVE WT. <u>See Note</u> DROP <u>12 Inches</u>	BORING DES LOGGED BY NOTE <u>0-27'</u> .3590 80-11	IG 4500#; #: 52-8 14: 100	B-1- CRI 27-52 )′ 2500	¶ ≹	
DEPTH (feet)	ELEV.	SAMPLE	aLows/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		MOISTURE CONT. (%)	DRY (pc) DENSITY	SAT- URATION (%)	OTHER TESTS
5 - - - -	1333 - 	B PES: DRIVE	) SAMF			Y Ground Water Seepage MAX - Max. Density/Opt. Moist. Doired Start	to dant fine- to yellowish and cobbles, ark yellowish , stratified a, some erate to t.	FIC	SOI		
IS B	SPT (S BULK	SPLIT S SAMPI	SPOON Le [	I) SAMF	ⁱ LE E SAMPLI	HYDR - Hydrometer Analysis ASCE - Expansion Index E CONS - Consolidation		NEE	KIN	<b>g, in</b> Plati	<b>IC.</b> E A-26

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## **GEOTECHNICAL BORING LOG**

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PROJE DATE DATE DATE DRILLE TYPE	ECT NO START FINISH ER OF DR	). ED ED ILL RIG		102453 5/2/0 5/2/0 ave's D Bucket	3-T 2 2 rilling Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1338 BORING DES GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE 0-27 DROP 12 inches 350	6IG. <u>' 4500#</u> )#: 52-8	<u>E-14</u> <u>CRI</u> : 27-52 0' 250(	B v #:	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
5		B				SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, pale yellowish brown, dry, very loose, abundant rootlets and gopher holes. ALLUVIUM (Oal): Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, dry, loose to moderately dense, stratified, some boulders to 10 <u>+</u> inches. Increase moisture to: slightly moist. Boulder layer; up to 3 <u>+</u> feet in diameter, moderate caving.				
10	1328 - - - 1323 - - -	B				Boulder layer; up to 2± feet in diameter, predominantly Sandstone and Pebbly Sandstone, some granite. Clayey Siltstone layer; 1 to 2± inch thick, mottled moderate yellowish brown and pale olive, moist to wet (perched/saturated), soft. Boulder layer, need rippers/core to continue. Refusal. Total Depth 14 feet. No water. Moderate caving throughout. Refusal - Boulders. Hole backfilled.				
20-	- - - - - - - - - - - - - - -		•			e				
30- 	- 1308 - - - - 1303 -									
SAMP	PLE TY RING ( SPT (S BULK	PES: DRIVE SPLIT S	) SAMF SPOON LE [	PLE 4) SAMF	PLE E SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	FIC	SOI	LS IG, IN	IC.

PLATE A-27

# GEOTECHNICAL BORING LOG

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PROJE DATE DATE DRILLI TYPE	ECT NO STARI FINISH ER OF DR	). TED IED ILL RIC	3	102453 4/4/0 4/4/0 A & W Dr Rotary M	3.T 2 2 illing Jash	PROJECT NAME       Lyons Canyon Ranch         GROUND ELEV.       1323         BORING I         GW DEPTH (FT)       LOGGED         DRIVE WT.       See Note       NOTE _1         DROP       30 inches       ri	)ESIG BY 40# for <u>SP</u> ng sample	<u>RW-</u> TMI T; 400#	1 ) for	
DEPTH (feel)	ELEV.	SAMPLE TYPE	ELOWS/FT	гітногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pc() DENSITY	SAT- URATION (%)	OTHER TESTS
-	-					ALLUVIUM (Qai):				
5	- 1318 - - -	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.				
- 10 - -	- 1313 - - -	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.				
15	- 1308 - - -	SPT	15			Silty Sand; brown with pebbles, slightly moist, medium dense.				
20-	- 1303 - -	SPT	26		:	Silty Sand; light brown with pebbles, slightly moist, medium dense.				
25	1298 - - -	SPT	60			Gravelly Sand; brown, slightly moist, very dense.				
30-	1293 -	R	25			Silty Sand; fine- to medium-grained, light brown, moist, medium dense, 2 <u>+</u> feet thick layer.	12.0	108.4	61	
35-	- 1288 -	SPT	40			Sand; fine- to medium-grained, brown with gravel, moist, dense.				
 	~	<b></b>				Very firm drilling.				
SAMP R	LE TY RING ( SPT (\$ BUT K	I I PES: DRIVE SPLIT I SAMP	) SAM SPOOI	III PLE N) SAMP	PLE F SAMPI	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index     Section Statements     Sec	CIFIC GINEE	SOII RIN	_S G, IN	۱Ċ.

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PROJE DATE DATE DRILLI TYPE	ECT NO START FINISH ER OF DR	D. FED IED ILL RI	  	10245 4/4/0 4/4/0 & W D Rotary V	3-T 2 2 rilling Vash	GEOTECHNICAL BORING LOG         PROJECT NAME       Lyons Canyon Ranch         GROUND ELEV.       1323         GW DEPTH (FT)       LOGGED BY         DRIVE WT.       See Note         DROP       30 Inches	3IG. <u>+ for SP</u> sample	RW- TMI T: 4007	1 <u>1</u> <u>2</u> <i>t</i> for	2 01 2
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногобу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
		SPT	34			Gravelly Sand; fine- to medium-grained, brown, slightly moist, dense, some silt.				
45-	1278	SPT	17 for 12"			Gravelly Sand; fine- to medium-grained, brown, moist, dense.	-			
						SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr):				
 50 	1273	SPT	75 for 6"			Harder drilling. Sandstone; medium- to coarse-grained with gravel, grayish brown.				
55-	1268	SPT	75 for 5*			Silty Sandstone; fine- to coarse-grained with gravel, grayish brown.				
- - - 60	1263	SPT	50 for 1"		•	No recovery.				
65-	1258	R	50 for 4"			- <u>Sandstone: medium- to coarse-grained, brown, hard.</u> Total Depth 65 feet. No apparent water or caving. Hole backfilled.				
SAMF		PES:				¥ Ground Water Seepage				
R	RING SPT ( BULK	(DRIV SPLIT SAMI	e) Samř Spoon Ple [	PLE I) SAMF	PLE E SAMPL	MAX - Max, Density/Opt, Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	inee	soii Rin	L <b>S</b> G, IN PLAT	<b>NC.</b> E A-29

SHEET 1 OF 2



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SHEET 2 OF 2

PROJE DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	D. TED IED ILL R		10245: 4/4/0 4/4/0 & W D Rotary V	3-T 2 2 Vash	PROJECT NAME       Lyons Canyon Ranch         GROUND ELEV.       1318       BORING DE         GW DEPTH (FT)       69       LOGGED BY         DRIVE WT.       See Note       NOTE       140         DROP       30 inches       Ling	SIG # for SP sample	RVV- TMI T: 4004	2 5	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	тиногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	DTHER TESTS
	-	R	32			Sand; fine to coarse-grained brown, slightly moist, dense, soil retrieved from sampler tip with large rock fragment.				
45	1273 -	R	28		- -	Sand; with gravel, medium to coarse-grained, red brown, slightly moist, slightly dense, Siltstone fragments in sampler tip.	11.0	121.7	81	
50	1268 -	SPT	57 for 6"			Silty Sand; fine to coarse-grained with gravel, light brown, slightly moist, very dense, sample may be from side of boring.	-			
55-	1263 -	SPT	22			Sandy to Silty Clay; dark brown, moist, very stiff, soil obtained by driving ring samplet 6".				
60-	1258 -	SPT	18			Sandy to Silty Clay; dark brown, moist, very stiff, soil obtained by driving ring sampler 6".				
65-	1253	SPT	15			Sandy Silty Clay; fine-grained Sand, light brown, slightly moist, stiff, soil obtained by driving ring sampler 6".				
70-	1248	SPT	32			SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): slightly Sandy Silty Clay; fine-grained Sand, grayish brown, soil obtained by driving ring sampler 6".				
75-	1243 -	SPT	22 for 12"			Silty Sandstone; gray. Total Depth 75 feet. Water at 69 feet. No apparent caving. Hole backfilled.				
SAMF R S B	PLE TY RING SPT ( BULK	i Pes: Driv Split Sam	'E) SAMI ' SPOOI PLE	1 PLE N) SAMI T TUB	PLE IE SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	IFIC INEE	SOI RIN	LS G, II PLAT	<b>VC.</b> E A-31



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						GEOTECHNICAL B	ORING LOG			S	HEET	2 OF 2
	ECT NO	). ten		10245	<u>3-T</u>		ns Canyon Ranch		10	DIA	2	
DATE	FINISH	ED		4/5/0	2	GW DEPTH (FT)		OGGED BY	(a. <u></u>	TME	<u>}</u>	
TYPE	OF DR	ILL R	IG	Rotary V	Vash	DROP 30 inc	thes		ample		- 101	
				7		<u></u>	······································		₩@	\$	z	·
HLA fa	N.	PE PE	NS/F	OLOC	00LP MBOI	GEOTECHNICA	DESCRIPTION		TUF TUF	SITC SITC	,0 [] [] []	HER STS
l He	ា	SAN	io 19	TH	SYA GR				NOC	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NR NR NR	БЩ
		SPT	30			Silty Sand: medium- to coars	e-orained, with gravel	. lioht				
-			for 11"			brown, slightly moist, very der	1se.	- <b>-</b>		:		
-												
45-	1285-	ļ						-				
-		SPT	19			Sandy Silt; fine-grained, light	brown, slightly moist,	very stiff.				
-	-											
					:							
-											-	
50	1280-	SPT	50 for			Slightly Silty Sand; fine-graine	d, reddish brown, mo	ist, very				
			10.5"			dense.						
-												
-					1							
55-	1275-		64			Soody Silfy Clay fina arained	. Nahthrown maint h					
-	-	SPI	31	}		obtained from ring sampler, d	, iight browd, moist, n. riven 6".	aru, son				
-												
-	-	-										
-	4070					SAUGUS FORMATION - SUN	SHINE RANCH MEM	BER				
50-	1270-	SPT	75			(Isr): Slightly Clayey Sand; medium	)- to coarse-grained, g	ray.				
-			10f 5"									
-	-											
-	-	•						•				
55-	1265 -	R	60			Sandstone; medium to coarse	-grained; gray. No sa	ample _/ -				
		~	for 6"			Total Depth 65 feet.						
						No apparent caving.						
						Hole backfilled.						
			•									
									ļ			
									8			
C A A 17						N Oracle 1			ļ			
	rle I Y RING (	rea; DRIV	E) SAMÍ	≥LE		<ul> <li>Ground Water Seepage</li> <li>MAX - Max. Density/Opt. Moi</li> <li>DS - Direct Share</li> </ul>	st.	PACI	FIC S	SOIL	S	
S	SPT (	SPLIT	SPOON	) SAMP	LE	HYDR - Hydrometer Analysis		ENGI	NEE	RIN	G, IN	IC.
	BULK	SAM	PLE	<u>T</u> TUB	E SAMPL	CONS - Consolidation		IJ		. 1	PLATE	E A-33

## GEOTECHNICAL BORING LOG SHEET 1 OF 1

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—	PROJ DATE DATE DRILL TYPE	ECT N STAR FINISF ER OF DR	D. TED HED HLL R		10245 4/5/0 4/5/0 & W D Rotary V	3-T 2 rilling Vash	PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP	Lyons Canyon R 1408 See Note 30 inches	BORIN BORIN LOGGI NOTE	IG DESIG ED BY 140# for SP ring_sample	<u>RW-</u> TMI T: 400/	4 ) ! for	
	DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	птногосу	GROUP SYMBOL	GEOTECI	HNICAL DESCRI	PTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
		1398 1398	SPT SPT	7 7 11 35 for 11" 75 for 11"	ГШНО	GRG	ALLUVIUM (Qal): ALLUVIUM (Qal): Sandy Silty Ciay; fine- moist, firm. Silty Sand; light brown SAUGUS FORMATIO (Tsr): Slightly Clayey Verv fine Sandy Siltst. Total Depth 20 feet. No apparent groundw Hole backfilled.	-grained Sand, light n, slightly moist, me <u>N - SUNSHINE RAI</u> Siltstone; grayish I one: gray, hard. ater or caving.	t brown, slightly dium dense.	ed.	119.3		410
	SAME	LE TY RING ( SPT ( BULK	PES: DRIV SPLIT SAMI	E) SAMP SPOON PLÉ [	PLE SAMF	PLE E SAMPL	<ul> <li>✓ Ground Water Se MAX - Max. Density: DS - Direct Shear HYDR - Hydrometer ASCE - Expansion Is CONS - Consolidation</li> </ul>	epage /Opt. Moist. Analysis ndex			SOII RIN	-S G, IN PLATE	I <b>C.</b> E A-34

SHEET 1 OF 2

and the statement of the

	PROJECT NO. DATE STARTED DATE FINISHED DRILLER TYPE OF DRILL RI			 	10245 4/5/0 4/5/0 & & W D Rotary V	3-T 2 2 rilling Vash	PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP	Lyons Canyon R 1348 17 See Note 30 inches	BORING DI LOGGED B NOTE 14	ESIG. Y 0# for SP	<u>RW-</u> TMI T: 4004	5 ) for	
	DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	ГІТНОLOGY	GROUP SYMBOL	GEOTEC	CHNICAL DESCRI	PTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
		- - 1343 • - -	SPT	17			<u>ALLUVIUM (Qal);</u> Silty Sand; fine-grain dense.	ed, light brown, sligt	ntly moist, medium				
	10	1338 ~ -  	SPT	8			Silty Sand to Sandy S	Silt; dark brown, moi:	st, loose.				
			R	5			Silty Sand; fine- to m moist, slightly dense. Clavev to Sitty Sand;	edium-grained, dark brown, moist, loose	brown, slightly	17.3	112.9	<u>99</u>	
	25-	- - - 1323 - - -	SPT	10			Clayey to Sandy Silt;	gray, very moist, sti	ff.				
	30	- 1318 - - -	SPT	50 for 8"			Some gravel. Silly fine- to medium-	grained Sand; gray,	moist, very dense.	-		· · · · ·	
(	35-	- 1313 - -  	SPT	57			SAUGUS FORMATIC (Tst): Silty Sandstor	<u>PN - SUNSHINE RAN</u> ne/Sandy Siltstone; I	<u>ICH MEMBER</u> brown/gray.				
	SAMP Rif S B	LE TYI RING (i SPT (S BULK	PES: DRIVE SPLIT SAMF	e) Samf Spoon Ple (	2LE I) SAMP	LE E SAMPLI	Ground Water St MAX - Max. Density DS - Direct Shear HYDR - Hydrometer ASCE - Expansion I CONS - Consolidati	eepage //Opt. Moist. r Analysis Index on	PAC ENC		SOIL RIN	.S G, IN PLATE	<b>IC.</b> A-35

							GEOTECHNIC	AL BORING	LOG			S	HEET	2 OF 2
	PROJE		). 160	<del></del> .	102453	<u>3-T</u>	PROJECT NAME	Lyons Canyon F	Ranch			BIAL	5	
	DATES	INISH	ED		4/5/0	2	GROUND ELEV. GW DEPTH (FT)	1348	LO	GGED BY		TM	<u>)</u>	
· <b>-</b> ·	DRILLE TYPE C	ir DF DR	ILL R	IG F	<u>&amp; W Di</u> Rotary V	<u>illing</u> Vash	DRIVE WT. DROP	See Note 30 inches	NC	TE <u>140</u>	for SP sample	<u>r: 400</u> #	for	
:	<b></b>													······
	E_	~	ЩШ	NFT	о <u></u> б	뤽 익					17E (%)	<u>⊐</u> 27	NO NO	ຜູທ
	EPT	ELEY		SMC	ģ	MB MB	GEOTEC	HNICAL DESCRI	PTION		NT.	Z SNSI	LEE®	THE EST
		ш	ଌୄୖ	BLC	5	იზ					80 80	66	IJ	0 -
	F		R	50 for 10			Silty Sandstone; med	ium- to coarse-grai	ned, gray, ha	ard/	·····-	••••••		
							Total Depth 40 feet.							
							Groundwater at 17 fe	et.						
			1				Hole Dackfilled.							
												:		
				:										
	1													
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											[	1		
	SAMPI	ETY	I   PES:				Ground Water Se	96540ë		<b>D</b> A O				
	RF	RING (	DRIV	E) SAMF	PLE		MAX - Max. Density DS - Direct Shear	/Opt. Moist.	Ð	FACI		SUII MIUC	_3 ^ !^	
	S	SPT (S	SPLIT	SPOON	) SAMF	LE	HYDR - Hydromete ASCE - Expansion	r Analysis Index	S	CNG		RIN	G, If	4 <b>.</b> ,
		SULK	SAM		TIOB	e Sampl	E CONS - Consolidati	on					PLATI	: A-36

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						GEOTECHNICAL BORING LOG		S	1EET	1 OF 1
PROJ DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	o. Ted 1ed IILL R		10245 4/5/0 4/5/0 & & W D Rotary V	3-T 2 2 rilling Vash	PROJECT NAME     Lyons Canyon Ranch       GROUND ELEV.     1379     BORING DESI       GW DEPTH (FT)     18     LOGGED BY       DRIVE WT.     See Note     NOTE     140#       DROP     30 Inches     ring s	G for SP ample_	RW- TMI T; 400#	5 } for	
DEPTH (feel)	ELEV,	SAMPLE TYPE	BLOWS/FT	гітногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
	1374	SPT SPT R R	5 14 23 11 50 for 6'			ALLUVIUM (Qal):         Silty Sand; brown, slightly moist, bose.         Gravelly Sand; fine- to medium-grained, brown, some silt, slightly moist, medium dense.         Gravelly Sand; fine- to medium-grained, with some silt, reddish brown, very moist, medium dense.         SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silly medium- to coarse-grained Sand; red brown, with gravel, ring sample disturbed.         Sandy Siltstone: very fine-grained Sand, bluish gray, hard. Total Depth 25 feet. No apparent caving. Water at 17.5 feet. Hole backfilled.	15.6	116.6	99	
SAMF RI SI	PLE TY RING ( BULK	PES: DRIV SPLIT SAM	E) SAMI SPOOP PLE	PLE N) SAMP	PLE E SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	FIC :	SOII	.S G, IN PLATI	<b>IC.</b> Ξ Α-37

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End         And         Hast         Log         Object         GEOTECHNICAL DESCRIPTION         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Object         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast         Hast <thhast< th=""> <thhast< th=""> <thhast< th=""></thhast<></thhast<></thhast<>	PROJE DATE DATE DRILLE TYPE	PROJECT NO.     102453-T       DATE STARTED     7/31/01       DATE FINISHED     7/31/01       DRILLER     Gregg In-Situ       TYPE OF DRILL RIG     See Note       E a     See Note			9-1 01 -Situ ote	GEOTECHN PROJECT NAM GROUND ELEN GW DEPTH DRIVE WT. DROP	ICAL BOR Lyons Ca 1317 140 lbs 30 inches	ING LOG	BORING DI LOGGED B NOTE <u>Co</u> _MO 	ESIG Y ombo Rig ounted. A- ash_SPT	S CPT/SI CRI - Truck 1/2" Ro & CPT	HEET PT-1 N	1 OF 3	
SAMPLE TYPES       Begin CPT - Stop CPT - (Unable to advance) Drill through gravely layers.         Solutions (DRVE) SAMPLE       Begin CPT - Stop CPT - (Unable to advance) Drill through gravely layers.         Solutions (DRVE) SAMPLE       Begin CPT - Stop CPT - (Unable to advance) Drill through gravely layers.         Stop CPT - Stop CPT - Stop CPT - (Unable to advance) Drill through gravely layers.       Begin CPT - Stop CPT - (Unable to advance) Drill through gravely layers.         Stop CPT - Stop CPT - Stop CPT - (Unable to advance) Drill through gravely layers.       Begin CPT - Stop CPT (6± inches of advancement). Drill         Stop CPT - Stop CPT - Stop CPT (6± inches of advancement).       Drill         Stop CPT - Stop CPT - Stop CPT (6± inches of advancement).       Drill         MAX_MAX_Density(Soft Moist)       PACIFIC SOILS         EIERNAG (DRVE) SAMPLE       Groups Water Sepage         MAX_MAX_Density(Soft Moist)       PACIFIC SOILS	DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногоду	GROUP SYMBOL	GEOT	ECHNICAL DE	SCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
5 - 1312       Begin CPT.         10 - 1307       -         15 - 1302       -         20 - 1297       -         30 - 1297       -         30 - 1297       Begin CPT - Drill through gravelly layers.         30 - 1297       Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers.         30 - 1297       Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers.         30 - 1287       Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers.         30 - 1287       Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers.         30 - 1287       Begin CPT - Stop CPT (6± inches of advancement). Drill         55 - 1282       -         35 - 1282       -         36 - 1287       Begin CPT - Stop CPT (6± inches of advancement). Drill         CPT - Stop CPT (6± inches of advancement). Drill       -         State Considy(Opt Mater Seepage Max - Max Densidy(Opt Mater)       -         GIB prively SAMPLE       -         CPT - Stop CPT Max - Densidy(Opt Mater)       -         36 - 1282       -       -         37 - 1282       -       -         38 - 1282       -       -         39 - 1282       -       -         39 - 1282       -							ALLUVIUM (Qal): B-1 for descriptive	(Note: See adjac log of Alluvium	cent exploratory from 0 to 70 <u>+</u> fe	y boring eet).				
10-1307       -         15-1302       -         20-1297       -         25-1292       Begin CPT - Drill through gravelly layers.         30-1287       SET 50 for 5"         Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers.         30-1287       SET 50 for 5"         Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers.         30-1287       SET 50 for 5"         Begin CPT - Stop CPT (6± inches of advancement). Drill         35-1282       -         35-1282       -         36-1287       SET 50 for 5"         SAMPLE TYPES:       -         MAR LETYPES:       -         MAR LETYPES:       -         Begin CPT - Stop CPT (6± inches of advancement). Drill         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -	5-	1312 -					Begin CPT.							
15-1302       -         20-1257       -         20-1257       -         20-1257       -         30-1257       -         30-1257       -         30-1257       -         30-1257       -         30-1257       -         30-1257       -         30-1257       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267       -         30-1267 </td <td>10-</td> <td>- 1307 - -</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td>	10-	- 1307 - -									-			
20-1297       -         25-1292       -         30-1287       -         30-1287       -         30-1287       -         30-1287       -         30-1287       -         30-1287       -         30-1287       -         30-1287       -         30-1287       -         SPT 50 for 5"       -         Begin CPT - Stop CPT - (Unable to advance) Drill through gravely layers.         Begin CPT - Stop CPT (6± inches of advancement). Drill         Through gravely layers.         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       -         -       - <t< td=""><td>- 15 </td><td>1302 -</td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	- 15 	1302 -		-										
Stop CPT - Drill through gravelly layers. Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers. Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers. Begin CPT - Stop CPT (6± inches of advancement). Drill through gravelly layers. SAMPLE TYPES: BRING (DRIVE) SAMPLE IS SET ESPOND SAMPLE SAMPLE TYPES: BRING (DRIVE) SAMPLE SAMPLE T	20	1297	~ • • • • • • • • • • • • • • • • • • •											
25       1292         30       1287         5       1287         SPT       50 for 5"         Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers.         Begin CPT - Stop CPT (6± inches of advancement). Drill         .35       1282         1287       SPT 50 for 5"         Begin CPT - Stop CPT (6± inches of advancement). Drill         through gravelly layers.         SAMPLE TYPES:         BRING (DRIVE) SAMPLE         [S] SPT (SPI IT SPDOD) SAMPLE         [S] SPT (SPI IT SPDOD) SAMPLE         [S] SPT (SPI IT SPDOD) SAMPLE	⊷. ]	-					Stop CP1 - Drill th	rough gravelly la	iyers.					
30-1287       SPT 50 for 5"         -1287       SPT 50 for 5"         -1282	25-	1292					Begin CPT - Stop gravelly layers.	CPT - (Unable 1	o advance) Dri	ll through				
35-1282       -         35-1282       -         SAMPLE TYPES:       Image: Construction of the second	30	- 1287 - -	SPTS	50 for 5"			Begin CPT - Stop through gravelly la	CPT (6± inches iyers.	of advancemen	nt). Drill				
SAMPLE TYPES:	.35-	- 1282 - - -	······································								-			
SAMPLE TYPES: BRING (DRIVE) SAMPLE SI SPT (SPI IT SPOON) SAMPLE SI SPT (SPI IT SPOON) SAMPLE SI SPT (SPI IT SPOON) SAMPLE SI SPT (SPI IT SPOON) SAMPLE	- 													
	SAMP RI	ILE TY RING ( SPT (1	PES: DRIVE SPLIT	E) SAMF SPOON	PLE	٩LE	▲ Ground Wate MAX - Max. Der DS - Direct She HYDR - Hydrom	r Seepage Isily/Opt. Moist. ar eter Analysis	R	PAC ENC	CIFIC GINEE	SOI RIN	LS G, II	VC.



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SHEET 3 OF 3



SHEET 1 OF 2



						GEOTECHNICAL BORING LOG			S	HEET	2 OF 2
PROJE	CT NC	). ED		10245 7/31/(	3-T	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1363	BORING DES	iG		<u>97-2</u>	
DRILLE	ER ER DF DRI		G	iregg in See N	- <u>Situ</u> ofe	DRIVE WT. <u>140 lbs.</u> DROP <u>30 inches</u>	NOTE Comi	o Rig Vert 4-	- Truck	stary	-
				7			M/ast	SPT WG	& CPT	7	- 
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/F	гітногое	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		MOISTUR CONT. (%	DRY (pcf DENSITY	SAT- URATION (%)	OTHER TESTS
SAMP		PES: DRM	50 for 3" E) SAMF	2LE DISAMI		Silty Sandstone; fine- to coarse-grained, medium slightly moist, hard to very hard. Total Depth 41 feet. Groundwater at 15 feet. No apparent caving. Hole backfilled.	gray,	FIC	SOII	LS €.	NC-
B	BULK	SAMF	PLE (	TTUB	E SAMPL	E ASCE - Expansion Index CONS - Consolidation				PLAT	E A-42



						GEOTECHNICA	L BORING	LOG			S	HEET	2 OF 2
PROJ	ECT NO	). 'ED		10245	3-T		Lyons Ranc	<u>h</u> BC	RING DESI	-	. B. 10	17	
DATE	FINISH	ED		1/13/	04	GW DEPTH (FT)		LO	GGED BY			<u>v</u>	
DRILL	er of dr		30	JN Dril Bucket	ling	DRIVE WT.	See Note	NC	TE <u>0-24'</u>	3548::	#: <u>24-4</u> 3' 164	17' R#	
· · · · · · · · · · · · · · · · · · ·							<u></u>			· · · · · · · · · · · ·	4. <u>+_1</u> 4791	ur .	-
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHN	NICAL DESCRI	IPTION		MOISTURE CONT. (%)	DRY (pc) DENSITY	SAT- URATION (%)	OTHER TESTS
						Total Depth 40 <u>+</u> feet. No water. Some raveling 34 to 36 <u>+</u> Hole backfilled.	<u>-</u> feet.			ΣO			
	RING (	DRIVE	) SAM	LE		MAX - Max. Density/O DS - Direct Shear	page pt. Molst.	A		SIC S	SOII RIN	LS G IN	JC
B	] SPT (SPLIT SPOON) SAMPLE ] BULK SAMPLE [T] TUBE SAMPLE					ASCE - Expansion indi CONS - Consolidation	nalysis EX		۲ <b>ب</b> و اسم			PLATI	E A-44
						· · · · · · · · · · · · · · · · · · ·						*****	

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## **GEOTECHNICAL BORING LOG**

PROJECT NAME GROUND ELEV. 1323 GW DEPTH (FT) DRIVE WT. DROP

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102453-T

1/13/04

JN Drilling

1/13/04

PROJECT NO.

DATE STARTED

DATE FINISHED DRILLER

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Lyons Ranch See Note 12 inches

BORING DESIG. _____B-102 LOGGED BY <u>CRN</u> NOTE <u>0-24', 3548::#: 24-47'</u> <u>2577#: 47-75', 1648#</u> .....

TYPE	OF DR	ILL R	IG <u>30'</u>	' Bucket	Auger	DROP <u>12 inches</u>	_2577#	47-7	5', 164	3#	-
DEPTH (feet)	ELEV	SAMPLE TYPE	BLOWS/FT	ГІТНОГОВҮ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
						SOL: Sandy Silt; very fine- to fine- with some medium-grained Sand, dark yellowish brown, moist, very loose, abundant roots and rootlets. ALLUVIUM (Qal): Sand Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist to moist, loose.	/				
-		R/B	٦			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, loose, porous, some rootlets.		4.8	100.7	19	
10	1313 -	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, voose, porous, some rootlets.	very	9.4	105.1	42	
15-	1308 -	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, moderate yellowish brown, slightly moist to moist, very loose.		9.8	106.8	45	
20-	1303 -	R/B	1			Sandy Sill to Silly Sand; fine- to medium- with some coarse-grained Sand and pebbles, colour change to moderate yellowish brown, moisture increase to slightly moist to moist, dry to slightly moist, loose.		8.1	107.0	38	
25-	1298 -	R/B	2			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose to medit dense.	ım	3.0	115.6	16	
30	1293 -					Increase abundance of pebbles and cobbles.					
- - - 35-	- - 1258 -	RB	З			Pebbly to Cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist to moist, medit dense; Interlayered with Silty Sand; fine- to coarse-grai with pebbles, pale to moderate yellowish brown, slightly moist, medium dense.	ım ned	3.8	118.3	24	
-						Change to cork-screw auger due to abundant cobbles a boulders (up to 12 <u>+</u> inches). 34 to 38 <u>+</u> faet, moderate to severe raveling of <u>coarse-grained materials</u> . SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr)(?): Clayey to Sandy Silt; fine-grained Sand; moderate yellowish brown, moist, so	na  ft.				
SAM	PLE TY RING (	PES: DRIV	E) SAMI	⊃LE		Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear			SOI	_S	
ISI B	SPT (S BULK	SPLIT SAMI	' SPOON Ple	I) SAMF []] TUB	PLE E SAMPL	HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	IIUVI.	NEE	IN	U, IN PLAT	ч <b>с.</b> Е А-45
<u> </u>		•			~~~~~						

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PROJE DATE DATE DRILLI TYPE	PROJECT NO. 102453-T DATE STARTED 1/13/04 DATE FINISHED 1/13/04 DRILLER JN Drilling TYPE OF DRILL RIG 30" Bucket Auger		3-T 04 04 04 04 100 100 100 100	PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP	Lyons Ranc 1323 See Note 12 Inches	sh BC LC NC	DRING DES DGGED BY DTE <u>0-24'</u> 2577	IG. . <u>3548;</u> #: 47-7	B-10 CRt ≇: 24-4 5', 164	12 17 ¹ . 8#	-		
DEPTH (feel)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	GROUP SYMBOL	GEOTÈC	HNICAL DESCRI	IPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
SAMP	LE TYI RING (	PES: DRIVE	E) SAMF	ΡLΕ		Y Ground Water Se MAX - Max. Density DS - Direct Shear	aveling 34 to 38± fe	er tip/refusat	PACI		SOIL	-S	
B	SPT (S BULK	IPLIT SAMF	SPOON Ple [	I) SAMF	'LE E SAMPLI	ASCE - Hydromelai ASCE - Expansion I CONS - Consolidati	Analysis ndex on	S	C14011	₹ 8000 Бал	a NEIN	D, IN PLATE	E A-46

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### **GEOTECHNICAL BORING LOG**

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PROJECT NO.

DRILLER

DATE STARTED DATE FINISHED 102453-T 1/13/04 1/13/04

JN Drilling

<u>.....</u>..

 PROJECT NAME
 Lyons Ranch

 GROUND ELEV.
 1324
 BORING DESIG.
 B-103

 GW DEPTH (FT)
 LOGGED BY
 CRN

 DRIVE WT.
 See Note
 NOTE
 0-24', 3548;;#; 24-47',

 DROP
 12 inches
 2577#; 47-75', 1648#

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TYPE	OF DR	ILL R	IG <u>30</u>	' Bucket	Auger	DROP	12 inches	_2577	#: 47-7	5'. 1648	谜	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	GROUP SYMBOL	GEO	TECHNICAL DESCRIPT	ION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
-	-					ALLUVIUM (Qal Sand, dark to m abundant roots a	I): Sandy Silt; very fine- to fi oderate yellowish brown, mo and rootlets.	ne-grained bist, very loose,				
	1319 - -	R	Push			Silty Sand; fine- brown, slighty m Increase abunda	to medium-grained, modera loist, very loose. ance of pebbles.	ite yellowish	4.0	103.1	17	
	- 1314 -	R	Push			Silty Sand; fine- yellowish brown	to coarse-grained with pebi , slighty moist, loose to med	oles, moderate dium dense.	8.6	104.8	38	
-	-					Some cobbles a	and boulders (up to 12± inch	es).				
15~ - -	1309 -	R	Push			Silty Sand; fine- moderate yellow dense.	to medium-grained with sor vish brown, slightly moist, loo	ne pebbles, ose to medium	8.9	107.4	42	
	1304 -	R	1			Silty Sand; fine- moderate yellow	to medium-grained with sor vish brown, slightly moist, loo	ne pebbles, ose.	11.1	104,8	49	
25-	1299 -	R	1			Silty Sand; tine- moderate yellow	to coarse-grained with pebf vish brown, slightly moist, lo	bles, pale to	4.8	114.9	28	
- 30 - -	 1294 - - -	R	З			Silty Sand; fine- pale to moderati dense,	to coarse-grained with pebl e yellowish brown, slightly π	ples and cobbles, [–] hoist, medium	6.3	111.5	33	
	- 1289 - - -					Pebbly to cobbly yellowish brown	y Sand; fine- to coarse-grain , slightly moist, medium den	ed, moderate se to dense.				
SAMF	LE TY	PES:			<u> </u>	Y Ground Wi MAX - Max D	ater Seepage	PACI	FIC	SOII	<u>.</u>	
L S	LRIRING (DRIVE) SAMPLE S SPT (SPLIT SPOON) SAMPLE HYDR - Hydrometer Analysis ASCE - Expansion Index ENGINEERING, INC.											
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PROJECT NAME	
GROUND ELEV.	
GW DEPTH (FT)	
DRIVE WT	St
DROP	12

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102453-T

1/13/04 1/13/04

JN Drilling

PROJECT NO.

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DATE STARTED DATE FINISHED DRILLER

Lyons Ranch 1324 ___ ee Note Linches

 BORING DESIG.
 B-103

 LOGGED BY
 CRN

 NOTE
 0-24', 3548; #; 24-47',

 2577#; 47-75', 1648#

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TYPE OF DRILL RIG 30" Bucket Auger				'Bucket	Auger	DROP <u>12 inches</u> 257	7 <u>#: 47-7</u>	<u>#: 24-1</u> 5', 164	8#	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	REPLACE	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pc) DENSITY	SAT- URATION (%)	OTHER TESTS
-		B				Pebbly to cobbly Sand; fine- to coarse-grained with some boulders up to 12± inches, moderate yellowish brown, slightly moist, dense.				
45	1279 -					Increase abundant of cobbles and boulders.				
	-					SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and Cobble Conglomerate; fine to very coarse-grained Sand matrix, pale vellowish gray, dry to slighty moist, hard. Total Depth 49 feet. No water. No caving. Hole backfilled.				
SAMPLE TYPES:       I Ground Water See         IRING (DRIVE) SAMPLE       MAX - Max. Density/C         IS SPT (SPLIT SPOON) SAMPLE       DS - Direct Shear         B BULK SAMPLE       TUBE SAMPLE         B BULK SAMPLE       TUBE SAMPLE						Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion index CONS - Consolidation	FIC INEE	SOII RIN	LS G, IN Plati	<b>NC.</b> E A-48

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# GEOTECHNICAL BORING LOG PROJECT NAME _____Lyons Ranch

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<u>.</u>

PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP

PROJECT NO.

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DATE STARTED DATE FINISHED DRILLER 102453-T

1/13/04

1/13/04

JN Drilling

TYPE OF DRILL RIG 30" Bucket Auger

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ME <u>Lyon</u> V. <u>1315</u> T) <u>See Note</u> 12 inches

BORING DESIG. <u>B-104</u> LOGGED BY <u>CRN</u> NOTE <u>0-24', 3548; #, 24-47'</u> 2577#; 47-75', 1648#

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DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
				5		ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, loose to medium dense. Sandy Silt; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.				
5	1310- - -	R	1			Silty Sand; very fine- to fine-grained Sand, moderate yellowish brown, moist, toose.	6.8	103.8	29	
10 -	1305 - -	R/B	2			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, medium dense.	6.4	100.4	25	
	1300-	R	3			Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, slightly moist, medium dense.	2.4	120.7	16	
20	- 1295 - - -	R	1			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.3	103.4	27	
25	- 1290 - -	в				Pebbly to Cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist to moist, medium dense. Some boulders up to $12 \pm inches$ .				
- - 30	- 1285 -	R	2			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.9	108.2	33	
35-	- - 1280 -	R	3			Interlayered 1± foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense. Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slightly moist, medium dense.	3.5	107.7	17	
		R	2			Interlayered 1+ foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense.	4.0	111.1	21	
SAMP R S B	SAMPLE TYPES:       Image: Construct of the system of the sy									

GEOTECHNICAL BORING LOG SHEET 2 OF 2 PROJECT NO. 102453-T PROJECT NAME Lyons Ranch DATE STARTED 1/13/04 GROUND ELEV. BORING DESIG. _____ B-104 1315 DATE FINISHED 1/13/04 GW DEPTH (FT) LOGGED BY CRN NOTE 0-24', 3548; #: 24-47 JN Drilling DRILLER DRIVE WT. See Note TYPE OF DRILL RIG 30" Bucket Auger DROP 2577#: 47-75, 1648# ____12 inches URATION MOISTURE CONT (%) LITHOLOGY BLOWS/FT щ **GROUP** SYMBOL DRY (pc) OTHER TESTS DEPTH (feet) SAMPL TYPE ELEV. **GEOTECHNICAL DESCRIPTION** 45-1270 4.3 108.3 21 Silly Sand; fine- to coarse-grained with pebbles, moderate R/B 3 yellowish brown, slightly moist, medium dense. Interlayered 1± foot: Pebbly to Cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense. 50--1265 8.4 104.0 37 Silly Sand; very fine- to medium-grained with some pebbles, R 4 moderate yellowish brown, slightly moist, medium dense. Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist, medium dense. 55-1260 Silty Sand; fine- to very coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, medium dense. 60 1255 65-1250 ₿ Silty Sand; fine- to very coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, medium dense. Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist, medium dense. SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and cobble Conglomerate; medium to coarse-grained Sand matrix, pale 70-1245 vellowish gray, dry to slighty moist, hard. Total Depth 70 feet. No water. No caving. Hole backfilled. SAMPLE TYPES: Ground Water Seepage PACIFIC SOILS MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation **R**RING (DRIVE) SAMPLE ENGINEERING, INC. S SPT (SPLIT SPOON) SAMPLE B BULK SAMPLE T TUBE SAMPLE

PLATE A-50

Î
#### TABLE II

Exploratory Pits	Depth (feet)	Logged by: CRN Description Date Logged: 07/05/01
EP-1	0 to 6	<u>COLLUVIUM (Ocol)</u> : Silty Sand to Sandy Silt; fine- to medium- grained, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense/soft to firm, abundant roots and rootlets.
	6 to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, olive gray, slightly moist, moderately hard to hard, abundant white carbonate stringers, moderately weathered top $1\pm$ foot.
		Total Depth 8 feet. No water, no caving.
EP-2	0 to 15	<u>ALLUVIUM (Qal)</u> : Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant roots and rootlets.
		Total Depth 15 feet No water, no caving.
EP-3	0 to 2½	SOIL: Silty Sand to Sandy Silt; fine- to medium-grained, moderate yellowish brown, dry, loose/soft, abundant roots and rootlets.
	2½ to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light olive, slightly moist, top $2\pm$ feet highly weathered and loose with abundant roots and rootlets, moderately hard at depth, massive.
		Total Depth 8 feet. No water, no caving.

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Logged by: CRNDescriptionDate Logged: 07/05/01
EP-4	0 to 5	<u>COLLUVIUM (Qcol)</u> : Silty Sand; fine- to medium-grained with pebbles and some cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense, abundant roots and rootlets.
	5 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to coarse-grained with pebbles and cobbles, light yellowish gray, slightly moist, moderately hard, some interbedded pebbles lenses, generally massive.
		Bedding Attitude: @ 7 feet, N40W, 42NE
		Total Depth 9 feet. No water, no caving.
EP-5	0 to 8	<u>ALLUVIUM (Qal)</u> : Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant root, and rootlets.
	8 to 10	Cobbly Sand; medium- to coarse-grained with pebbles, slightly moist, loose to moderately dense, roots to depth.
	10 to 13	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light olive gray, slightly moist, moderately hard, slight to moderate weathering, massive.
		Total Depth 13 feet.

No water, no caving.

### TABLE II

Exploratory Pits	Depth (feet)	Logged by: CRNDescriptionDate Logged: 07/0	<u>)5/01</u>
EP-6	0 to 2	SOIL: Siliy Sand; fine- to coarse-grained with pebbles and cobb moderate yellowish brown, dry, loose, abundant roots and rootle	oles, :ts.
	2 to 4	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (T Cobble Conglomerate; coarse-grained Sand matrix, slightly moin moderately hard.	<u>sr}:</u> st,
	4 to 7	Siltstone; light bluish gray, slightly moist, moderately hard, lami	inated.
		Bedding Attitude: @ 5 feet, N50W, 37 NE	
		Total Depth 7 feet.	
EP-7	0 to ½	<u>SOIL</u> : Silty Sand; fine- to coarse-grained with pebbles and cobb moderate yellowish brown, dry, loose, abundant roots and rootle	oles, ets.
	½ to 2	<u>SAUGUS FORMATION – SUNSHINE RANCH MEMBER (T</u> Pebble Conglomerate; medium- to coarse-grained Sand matrix, s moist, loose, abundant roots.	<u>sr):</u> slightly
	2 to 5	Silty Sandstone; fine- to medium-grained, light yellowish gray, s moist, moderately hard, abundant roots.	slightly
		Bedding Attitude: @ 3 feet, N60W, 35 NE	
		Total Depth 5 feet.	

Exploratory <u>Pits</u>	Depth (feet)	Logged by: CRNDescriptionDate Logged: 07/05/01		
EP-8	0 to 1	<u>SOIL</u> : Sandy Silt; light to moderate yellowish brown, drabundant roots and rootlets.	ry, soft,	
	1 to 3	SAUGUS FORMATION – SUNSHINE RANCH MEM Sandy Siltstone; light olive gray, slightly moist, moderat abundant white carbonate, highly jointed, slightly lamins massive.	<u>BER (Tsr):</u> tely hard, ated, generally	
	3 to 5	Claystone; reddish brown, moist, moderately hard, highl abundant white carbonate along joints.	y jointed,	
		Bedding Attitude: @ 4 feet, N70W, 45NE		
		Total Depth 5 feet. No water, no caving.		
EP-9	0 to 6	<u>COLLUVIUM (Qcol):</u> Silty Sand; fine- to coarse-grain and cobbles, dark yellowish brown, dry to slightly moist to moderately dense at depth, abundant root and rootlets	ed with pebbles at depth, loose	
	6 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEM Pebble and Cobble Conglomerate; medium to coarse-gra matrix, slightly moist, moderately hard, poorly indurated	BER (Tsr); nined Sand I.	
	9 to 12	Silty Sandstone; fine-grained, light olive gray, slightly n moderately hard, moderately indurated, moderately bedd	ioist, ied.	
		Bedding Attitude: @ 10 feet, N60W, 45NE		
		Total Depth 12 feet. No water, no caving.		

Exploratory <u>Pits</u>	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-10	0 to 2	SOIL: Sandy Silt; yellowish brown, mois rootlets.	st, firm, abundant roots and
	2 to 5 <u>SAUG</u> Clayey slightly yellowi general	SAUGUS FORMATION SUNSHINE I Clayey Siltstone; light olive gray, moist, n slightly fractured; overlies Silty Sandston yellowish gray, slightly moist, moderately generally massive.	RANCH MEMBER (Tsr): moderately hard, massive, e; fine-grained, light y hard, slightly bedded,
		Bedding Attitude: @ 3 feet, N45W, 47N	E
		Total Depth 5 feet. No water, no caving.	
EP-11	0 to 3	<u>ALLUVIUM (Qal):</u> Silty Sand; fine- to r yellowish brown, top $2\pm$ feet dry and loos moderately dense at depth, abundant root	nedium-grained, moderate se, slightly moist to and rootlets, porous.
	3 to 20	Pebbly Sand; fine- to coarse-grained with yellowish brown, slightly moist to moist,	cobbles, light to moderate moderately dense.
		Total Depth 20 feet. No water, no caving.	

### TABLE II

Exploratory Pits	Depth (feet)	Logged by: CRN Description Date Logged: 07/05/01
EP-12	0 to 3	<u>SOIL:</u> Sandy Silt to Silty Sand; fine to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist, soft/loose, abundant roots and rootlets.
	3 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; fine- to coarse-grained Sand matrix, slightly moist, moderately hard, poorly to moderately indurated, moderately bedded.
		Bedding Attitudes: @ 5 feet, N50W, 44NE @ 8 feet, N45W, 42NE
		Total Depth 10 feet. No water, no caving.
EP-13	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate to dark yellowish brown, dry to slightly moist, loose to moderately dense, porous, abundant roots and rootlets.
	6 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, moderately hard, moderately indurated, moderately bedded.
		Bedding Attitude: @ 8 feet, N50W, 46NE
		Total Depth 9 feet. No water, no caving.

#### TABLE II

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-14	0 to 6	<u>COLLUVIUM (Ocol)</u> : Silty Sand; fine- to yellowish brown, dry to slightly moist, loc porous, abundant roots and rootlets.	o medium-grained, dark ose to moderately dense,
	6 10 8	SAUGUS FORMATION – SUNSHINE F Clayey Siltstone; olive to light olive gray, hard, massive, abundant white carbonate.	ANCH MEMBER (Tsr): moist, soft to moderately
		Total Depth 8 feet. No water, no caving.	
EP-15	0 to 2½	<u>SOIL</u> : Silty Sand; fine- to medium-graine to slightly moist, loose, porous, abundant holes.	ed, dark yellowish brown, dry roots and rootlets, gopher
	2½ to 7	SAUGUS FORMATION – SUNSHINE F Sandstone; fine- to medium-grained with slightly moist, moderately hard, slightly b lenses of pebbles and cobbles with scour-	CANCH MEMBER (Tsr): pebbles, yellowish orange, edded; some interbedded fill basal contacts.
		Approximate Bedding Attitude: @ 5 feet.	, N50W, 38NE
		Total Depth 7 feet.	
		No water, no caving.	

#### TABLE II

Exploratory <u>Pits</u>	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-16	0 to 3	<u>SOIL</u> : Silty Sand to Sandy Silt; fine to yellowish brown, dry to slightly moist rootlets.	o medium-grained, moderate , loose/soft, abundant roots and
	3 to 5	SAUGUS FORMATION – SUNSHIN Pebble Conglomerate; medium- to coa moist, loose, highly weathered, abunda	<u>IE RANCH MEMBER (Tsr):</u> arse-grained Sand matrix, slightly ant roots.
		@ 5 feet, Claystone; 1 to $4\pm$ inch thick yellowish brown and olive gray, moist surfaces, discontinuous layer.	k layer, mottled moderate t, soft, flaky, some polished
	5 to 9	Sandstone; fine-grained, light olive gra hard, highly weathered, abundant joint	ay, slightly moist, moderately ts, abundant roots along joints.
		Bedding Attitude: @ 5 feet, N60W, 3	2NE
		Total Depth 9 feet. No water, no caving.	
EP-17	0 to ½	<u>SOIL:</u> Sandy Silt; dark yellowish brov rootlets.	vn, dry, soft, abundant roots and
	½ to 8	SAUGUS FORMATION – SUNSHIN Sandstone; fine- to medium-grained, li moist, moderately hard to hard, top 1 <u>+</u> slight to moderate bedding with some	VE RANCH MEMBER (Tsr): ight yellowish gray, slightly foot moderately weathered, rootlets along bedding planes.
		Bedding Attitudes: @ 3 feet, N65W, @ 6 feet, E-W, 49	43NE 9N
		Total Depth 8 feet. No water, no caving.	

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged; 07/05/01
EP-18	0 to 2	<u>SOIL</u> : Silty Sand; finc- to coarse-graine cobbles, light to moderate yellowish brow and rootlets.	d with pebbles and some wn, dry, loose, abundant roots
	2 to 7	SAUGUS FORMATION – SUNSHINE Silty Sandstone; fine-grained, mottled re moist, hard, top 2 <u>+</u> feet slightly jointed, r	RANCH MEMBER (Tsr): ddish orange and olive gray, moderately bedded.
		Bedding Attitude: @ 5 feet, N60W, 40S	W
		Total Depth 7 feet. No water, no caving.	
EP-19	0 to ½	SOIL: Silty Sand; fine-grained, light to dry, loose, abundant roots and rootlets.	moderate yellowish brown,
	½ to 6	SAUGUS FORMATION – SUNSHINE Sandstone; fine-grained, light olive gray, hard to hard, moderately bedded.	RANCH MEMBER (Tsr): , slightly moist, moderately
		Bedding Attitude: @ 4½ feet, N65W, 40	)NE
		Total Depth 6 feet. No water, no caving.	
EP-20	0 to 9	<u>ALLUVIUM (Qal)</u> : Cobbly Sand; fine- t abundant pebbles, light yellowish brown slightly moist to moist and moderately d to 12± inches diameter, abundant roots a caving throughout. Total Depth 9 feet	to coarse-grained with , top $2\pm$ feet dry and loose, ense to depth, some cobbles up nd rootlets to depth. Severe
		No water, caving from 0 to 9 feet.	

### TABLE II

Exploratory	Depth	Description Detail or 2005/01
<u>PIIS</u>	(1eet)	Description Date Loggeu: 07/05/01
EP-21	0 to 13	<u>ALLUVIUM (Qal)</u> : Silty Sand to Sandy Silt; fine- to medium-grained with some pebbles and cobbles; moderate yellowish brown, top $2\pm$ feet dry and loose, slightly moist to moist and moderately dense to depth, poorly consolidated, some roots to depth.
	13 to 14	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium to coarse-grained Sand matrix, moist, moderately hard to hard, weathered.
		Total Depth 14 fect No water, no caving.
EP-22	0 to 7	<u>ALLUVIUM (Qal)</u> : Silty Sand; fine- to medium-grained with some pebbles, dark yellowish brown, top $2\pm$ feet loose and dry, slightly moist to moist and moderately dense to depth, basal cobbles, abundant roots and rootlets.
	7 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Siltstone: moderate yellowish brown, moist, moderately hard, laminated, moderately fractured, some tectonic shears along bedding, some roots and rootlets.
	10 to 12	Silty Sandstone; very fine- to fine-grained, olive gray, slightly moist to moist, moderately hard, slightly fractured.
		Bedding Attitude: @ 10 feet, N60W, 40NE
		Total Depth 12 feet.
		No water, no caving.

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### TABLE II

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-23	0 to 1	SOIL: Silty Sand; fine- to coarse-grained w brown, dry, loose, abundant roots and rootle	vith pebbles, dark yellowish ets.
	1 to 5	SAUGUS FORMATION – SUNSHINE RA Sandstone; fine- to medium-grained, pale ye moist, moderately hard to hard, some rootle depth.	ANCH MEMBER (Tsr): ellowish gray, slightly ats from 1 to 3 <u>+</u> feet in
		Bedding Attitude: @4 feet, N60W, 45NE	
		Total Depth 5 feet. No water, no caving.	
EP-24	0 to 1	SOIL: Silty Sand; fine- to coarse-grained w dark yellowish brown, dry, loose, abundant	vith pebbles and cobbles, roots and rootlets.
	1 to 4	SAUGUS FORMATION – SUNSHINE RA Pebble and Cobble Conglomerate; mcdium- matrix, slightly moist, moderately hard to h	ANCH MEMBER (Tsr): - to coarse-grained Sand ard, few roots to depth.
	4 to 5	Sandstone; fine- to medium-grained, light y moist, moderately hard, moderately bedded	ellowish gray, slightly
		Bedding Attitude: @ 4½ feet, N60W, 40N	E
		Total Depth 5 feet. No water, no caving.	

#### LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Logged by: CRNDescriptionDate Logged: 07/05/01
EP-25	0 to 2½	<u>COLLUVIUM (Ocol)</u> : Silty Sand to Sandy Silt; very fine- to fine- grained with some isolated pebbles, moderate to dark yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets, porous.
	2½ to 5	Clayey Silt; moderate to dark yellowish brown, slightly moist, soft to firm, porous, abundant caliche.
	5 to 9	<u>PICO FORMATION (Tp)</u> : Clayey Siltstone; mottled pale olive gray and light brown, slightly moist, moderately firm, laminated to $\frac{1}{2}$ -inch thick bedding, weathered to a depth of 7± feet.
		Bedding Attitudes: @ 6 feet, N50E, 32SE @ 8 feet, N80E, 35SE
		Total Depth 9 feet. No water, no caving.
EP-26	0 to 1½	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry to slightly moist, loose, abundant roots and rootlets, porous.
	1½ to 6	<u>PICO FORMATION (Tp):</u> Clayey Siltstone; pale olive, slightly moist, moderately firm, laminated to massive $2\pm$ -inch thick bedding, weathered with roots and caliche to a depth of $3\frac{1}{2}$ feet.
		Bedding Attitudes: @ 4 feet, N30W, 40NE @ 4½ feet, N10W, 30NE @ 5 feet, N30E, 29SE
		The start in the start start

Total Depth 6 feet. No water, no caving.

#### LOG OF EXPLORATORY PITS

Exploratory	Depth	Logged by: CRN
Pits	(feet)	Description Date Logged: 07/05/01
EP-27	0 to 1	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets.
	1 to 5	<u>PICO FORMATION (Tp)</u> : Sandy Siltstone; fine-grained, pale olive gray, slightly moist, moderately hard, 1 to $6\pm$ inch thick laminated beds; jointed/fractured, interbedded with Clayey Siltstone; pale olive to olive gray, moderately firm, laminated to $3\pm$ -inch thick massive beds; top $1\frac{1}{2}\pm$ feet highly weathered.
		Bedding Attitudes: @ 4 feet, N50W, 39NE
		Total Depth 5 feet. No water, no caving.
EP-28	0 to 1	SOIL: Sandy Silt; very fine- to fine-grained, pale to moderate yellowish brown, dry, loose, abundant roots and rootlets.
	1 to 7	<u>PICO FORMATION (Tp)</u> : Interbedded Silty Sandstone; very fine- to fine-grained, pale olive, slightly moist, moderately hard, 2 to $6\pm$ -inch laminated bedding; with Clayey Siltstone, pale to dark olive, slightly moist to moist, moderately firm, laminated to $2\pm$ -inch thick bedding; top $3\pm$ feet highly weathered and abundant roots.
		Bedding Attitudes: @ 5 feet, EW, 49N @ 6 feet, N70E, 73NW
		Total Depth 7 feet

Total Depth 7 feet. No water, no caving.

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-29	0 to 11	ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine- grained, moderate yellowish brown, dry to slightly moist at $6\pm$ feet to depth, loose/soft to moderately dense/firm with depth.	
	11 to 12	PICO FORMATION (Tp): Silty Claystone; dark olive green, moist, moderately firm to firm, laminated to ½+-inch thick bedding.	
		Total Depth 12 feet. No water; no caving.	
EP-30	0 to 14	<u>COLLUVIUM (Ocol)</u> : Clayey to Sandy Sil pale to moderate yellowish brown, dry to sli abundant rootlets and roots.	t; very fine-grained Sand, ghtly moist, soft, porous,
		Total Depth 14 feet. No water, no caving.	
EP-31	0 to 1	SOIL: Clayey To Sandy Silt; very fine- to f brown, slightly moist to moist, soft, porous, rootlets.	inc-grained, dark yellowish abundant roots and
	1 to 2	<u>PICO FORMATION (Tp):</u> Claystone; mott brown, slightly moist to moist, moderately f abundant roots.	led olive gray and light irm, highly weathered,
	2 to 3	Silty Sandstone; light gray lenses 3 to $4\pm$ ind with light brown core, slightly moist, moder fill bottom, flat top.	ches thick at top and bottom ately hard, massive, scour-
	3 to 4	Silty Sandstone to Sandy Siltstone; pale oliv highly weathered, blocky, abundant caliche.	e gray, slightly moist, firm,
	4 to 5	Sandy to Clay Siltstone; pale to dark olive g moderately hard, laminated to $\frac{1}{2}$ -inch bedd	ray, slightly moist to moist, ling.
		Bedding Attitudes: @ 3 feet, N80W, 59SW @ 4 feet, N65W, 35SW	' (overturned) ' (overturned)
		Total Depth 5 feet. No water, no caving.	

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-32	0 to 5	<u>COLLUVIUM (Qcol):</u> Sandy Silt; ve moderate yellowish brown, dry to slig rootlets.	ry fine-grained Sand, pale to htly moist, soft, abundant
	5 to 8	PICO FORMATION (Tp): Silty Sand pale to olive gray, slightly moist to mo to 3 <u>+</u> -inch beds.	Istone; very fine- to fine-grained, pist, moderately hard, laminated
		Bedding Attitude: @ 6 feet, N70E, 54	INW
		Total Depth 8 feet. No water, no caving.	
EP-33	0 to 12	<u>COLLUVIUM (Qcol)</u> : Sandy Silt; ve yellowish brown, dry to slightly moist foot diameter boulder at $2\pm$ feet.	ry fine- to fine-grained Sand, pale , loose/soft, abundant rootlets, 2 <u>+</u>
~~~~~		No water, no caving.	
EP-34	0 to ½	SOIL: Clayey Silt; moderate yellowis roots and rootlets.	h brown, dry, loose, abundant
	½ to 4	PICO FORMATION (Tp): Silty Sand pale to olive gray, slightly moist, mod abundant roots and rootlets.	lstone; very fine- to fine-grained, erately firm, highly weathered,
	4 to 6	Silty Sandstone; fine-grained, pale olimoderately hard, massive.	ve gray, slightly moist,
		Bedding Attitudes: @ 3 feet, N45E, 6 @ 5 feet, N70E, 5	55SE (overturned) 59SE (overturned)
		Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory <u>Pits</u>	Depth (feet)	Description		Logged by: CRN Date Logged: 07/05/01
EP-35	0 to 14	ALLUVIUM (Qal): some medium-grain loose/soft, slightly n slightly porous, pocl	Silty Sand to Sandy Silt ed, moderate yellowish c noist to moist and moder ket of pebbles and cobble	t; very fine- to fine- with brange, top $2\pm$ feet dry and ately dense/firm at depth, es @ $12\pm$ feet.
		Total Depth 14 feet. No water, no caving		
EP-36	0 to ½	<u>SOIL:</u> Sandy Silt; v dry, soft, abundant r	ery fine-grained Sand, n oots and rootlets.	noderate yellowish brown,
	½ to 6	<u>PICO FORMATION</u> pale olive gray, sligl bedding, upper 3 <u>+</u> fe	<u>N (Tp):</u> Silty Sandstone; htly moist, moderately has eet slightly creep affected	very fine- to fine-grained, ard, laminated to 3±-inch 3.
	6 to 8	Silty Sandstone, fine moderately hard, ma	e-grained, pale olive gray ssive.	y, slightly moist,
		Bedding Attitudes:	 @ 2 feet, N10E, 50NW @ 4 feet, N30W, 30SW 	
		Total Depth 8 feet.		

No water, no caving.

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Logged by: CRNDescriptionDate Logged: 07/05/01
EP-37	0 to ½	SOIL: Sandy Silt; very fine-grained, moderate yellowish brown, dry, loose, abundant roots and rootlets.
	½ to 5	<u>PICO FORMATION (Tp):</u> Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard, laminated to $1 \pm$ inch bedding, possibly creep affected.
	5 to 7	Silty Sandstone; fine-grained, pale olive, slightly moist, moderately hard to hard, massive.
		Bedding Attitudes: @ 2 feet, N10E, 36NW @ 5 feet, N50E, 42 NW
		Total Depth 7 feet. No water, no caving.
EP-38	0 to ½	<u>SOIL</u> : Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, dry, loose, porous, abundant roots and rootlets.
	½ to 2	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; medium- to very coarse-grained with pebbles and cobbles of quartzite and granitics (Mt. Lowe), pale yellowish orange, slightly moist, moderately hard, poorly cemented, slightly layered generally massive.
	2 to 6	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; very fine-grained, moderate yellowish brown, slightly moist, moderately hard/firm, slightly laminated, generally massive.
		Contact Attitude: @ 2 feet, N65W, 67NE Bedding Attitude: @ 4 feet, N55W, 54NE
		Total Depth 6 feet.

No water, no caving.

Exploratory <u>Pits</u>	Depth (feet)	Description I	Logged by: CRN Date Logged: 07/05/01
EP-39	0 to 17	<u>COLLUVIUM (Qcol):</u> Sandy Silt; very fine- yellowish brown, dry to slightly moist at dept wet at bottom.	grained Sand, moderate h, soft to firm at depth,
		Total Depth 17 feet. No water, no caving.	
EP-40	0 to 9	<u>ALLUVIUM (Qal):</u> Silty Sand to Sandy Silt; yellowish brown, dry to slightly moist at dept moderately dense/firm at depth, roots to 5 <u>+</u> fe	; fine-grained, moderate th, loose/soft to eet in depth.
	9 to 10	SAUGUS FORMATION – SUNSHINE RAN Silty Sandstone; fine- to medium-grained, yel massive.	<u>NCH MEMBER (Tsr);</u> llowish gray, moist, hard,
		Total Depth 10 fect. No water, no caving.	
EP-41	0 to 1	SOIL: Silty Sand; fine- to coarse-grained, da loose, abundant roots and rootlets.	rk yellowish brown, dry,
	1 to 3	SAUGUS FORMATION – SUNSHINE RAN Pebbly Sandstone; medium- to very coarse-gr slightly moist, moderately hard, abundant roo	NCH MEMBER (Tsr): rained, yellowish gray, ots, normal grading.
	3 to 5	Silty Sandstone; fine- to medium-grained, yel moist, moderately hard, massive.	llowish gray, slightly
		Bedding Attitude: @ 3 feet, N70W, 32NE	
		Total Depth at 5 feet. No water, no caving.	

TABLE II

Exploratory Pits	Depth (feet)	I Description D	Logged by: CRN Date Logged: 07/05/01
EP-42	0 to 1½	SOIL: Silty Sand; fine- to coarse-grained with dark yellowish brown, dry, loose, abundant ro	h pebbles and cobbles, ots and rootlets.
	1½ to 6	SAUGUS FORMATION – SUNSHINE RAN Silty Sandstone; fine- to medium-grained, mo light brown, slightly moist, hard, ¼ to 3±-inch	CH MEMBER (Tsr): ttled yellowish gray and h beds.
		@ 4 feet; $6\pm$ inch thick carbonaceous layer, bi sulfur deposits.	rownish black, abundant
		Bedding Attitude: @ 4 feet, N65W, 28NE	
		Total Depth 6 feet. No water, no caving.	
EP-43	0 to 1½	SOIL: Sandy Silt; very fine-grained, dark yel slightly moist, soft, abundant rootlets.	lowish brown, dry to
	1½ to 6	SAUGUS FORMATION – SUNSHINE RAN Silty Sandstone; very fine- to fine-grained, pa moist, moderately hard to hard, slightly bedde	ICH MEMBER (Tsr): le olive gray, slightly ed generally massive.
		Bedding Attitude: @ 4 feet, N70W, 45NE	
		Total Depth 6 feet. No water, no caving.	

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-44	0 to 1	<u>SOIL</u> : Sandy Silt to Silty Sand; ver dark yellowish brown, slightly mois rootlets.	ry fine- to fine-grained, moderate to st, soft/loose, abundant roots and
	1 to 5	SAUGUS FORMATION – SUNSH Silty Sandstone; fine- to medium-g layers with pebbles, pale yellowish hard, bedded.	HNE RANCH MEMBER (Tsr): rained with some coarse-grained gray, slightly moist, moderately
		Bedding Attitude: @ 4 feet, N60W	7,43NE
		Total Depth 5 feet. No water, no caving.	
EP-45	0 to 7	<u>ALLUVIUM (Qal):</u> Silty Sand; ver moderate yellowish brown, dry to s moderately dense at depth.	ry fine- to medium-grained, pale to lightly moist at depth, loose to
	7 to 14	Pebbly Sand; medium- to coarse-gr yellowish brown, moist, moderately	ained with cobbles, moderate y dense.
		Total Depth 14 feet. No water, no caving.	

TABLE II

Exploratory	Depth	Logged by: CRN
Pits	(feet)	Description Date Logged: 07/05/01
EP-46	0 to 2½	SOIL: Silty Sand; fine- to coarse-grained, dark yellowish brown, dry, loose, abundant roots and rootlets.
	2½ to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone, medium- to coarse-grained with cobbles, yellowish orange, slightly moist, moderately hard to hard, bedded.
		Bedding Attitudes: @ 5 feet, N55W, 36NE @ 8 feet, N40W, 32NE
		Total Depth 9 feet. No water, no caving.
EP-47	0 to 5	<u>COLLUVIUM (Ocol)</u> : Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, dry, loose to moderately dense, abundant roots and rootlets.
	5 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; medium- to coarse-grained with pebbles and cobbles, yellowish gray, slightly moist, moderately hard to hard, slightly layered, generally massive, some scour in fill structures.
		Bedding Attitude - Approximate: @ 8 feet, N50W, 30NE
		Total Depth 9 feet. No water, no caving.

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-101	0 to 2	<u>SOIL</u> : Sandy Silt; fine-, dark yellowish brown, sl: abundant roots, and rootlets.	ightly moist, loose, soft,
	2 to 7	<u>PICO FORMATION (Tp):</u> Clayey Siltstone; pale moist, moderately hard, massive to slightly beddee	yellowish green, slightly d.
		Attitude: Bedding @ 4 feet, N30E 50 SE	
		Total Depth 7 feet.	
EP-102	0 to 7	<u>COLLUVIUM (Qcol)</u> : Sandy Silt to Silty Sand; fi light yellowish brown to yellowish green at depth, abundant roots and rootlets.	ne-grained, moderate to slightly moist, loose,
	7 to 9	<u>PICO FORMATION (Tp):</u> Clayey Siltstone; pale moist, moderately hard, massive to slightly beddee	yellowish green, slightly d, moderately weathered.
		Attitude: Bedding @ 8 feet, N70E 41 SE	
<u></u>		Total Depth 9 feet.	
EP-103	0 to 2	SOIL: Sandy Silt; fine-grained, moderate yellowis loose, abundant roots and rootlets.	sh brown, slightly moist,
	2 to 6	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; fine-g green, dry to slightly moist, moderate hard, massiv highly weathered with abundant roots and rootlets	grained, pale yellowish ve, upper 3 to 4 <u>+</u> feet
		Total Depth 6 feet.	

Log	Depth		Logged: 1-26-04
No.	(ft.)	Description	By: CRN
EP-104	0 to 2	SOIL/COLLUVIUM (Qcol): Clayey Silt; moderat slightly moist, soft, abundant roots and rootlets.	e yellowish brown,
	2 to 7	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; fine-gr green, dry to slightly moist, moderate hard, massive some shell fragments, some roots to depth.	ained, pale yellowish e, weathered $2\pm$ feet,
		Total Depth 7 feet.	
EP-105	0 to 5	<u>COLLUVIUM (Qcol)</u> : Sandy to Claycy Silt; mode pale yellowish green, slightly moist, loose, abundar	rate yellowish brown to at roots and rootlets.
	5 to 8	PICO FORMATION (Tp): Sandy Siltstone; fine-gr green, dry to slightly moist, moderate hard, massiv some shell fragments, some roots to depth.	ained, pale yellowish e, weathered 2 <u>+</u> feet,
		Total Depth 8 feet.	
EP-106	0 to 10	COLLUVIUM (Qcol): Sandy to Clayey Silt; mode pale yellowish green, slightly moist, loose, abundar	rate yellowish brown to at roots and rootlets.
	10 to 12	<u>PICO FORMATION (Tp):</u> Clayey Siltstone; pale moist, moderately hard, massive, moderately weath carbonate.	yellowish green, slightly hered, some white
		Total Depth 12 feet.	

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-107	0 to 1	<u>SOIL</u> : Sandy to Claycy Silt; fine-grained, moderate slightly moist, loose, abundant roots and rootlets.	e yellowish brown,
	1 to 7	<u>PICO FORMATION (Tp)</u> : Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to $\frac{1}{2+}$ inch bedding, top $2+$ feet highly weathered with abundant roots and rootlets, some white carbonate.	
		Attitude: Bedding @ 6 feet, N50E 53NW	
		Total Depth 7 feet.	
EP-108	0 to 1	SOIL: Sandy to Clayey Silt; fine-grained, moderate slightly moist, loose, abundant roots and rootlets.	e ycllowish brown,
	1 to 6	<u>PICO FORMATION (Tp):</u> Silty Sandstone; fine-gr green, slightly moist, moderately hard to hard at de generally massive, upper 2 <u>+</u> feet highly weathered	rained, pale yellowish pth, slightly bedded, with abundant roots.
		Attitude: Bedding @ 5 feet, N10E 56NW	
<u></u>	· · · · ·	Total Depth 6 feet.	
EP-109	0 to 2	<u>SOIL</u> : Sandy to Clayey Silt; fine-grained, moderate slightly moist, loose, abundant roots and rootlets.	e yellowish brown,
	2 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-gr green, slightly moist, moderately hard, laminated to 2± feet highly weathered.	rained, pale yellowish 5 $\frac{1}{2}$ inch bedding, top
		Attitude: Bedding @ 6 feet, N80E 36NW	
		Total Depth 7 feet.	

TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-110	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, in slightly moist, loose, abundant roots and rootle	noderate yellowish brown, ts.
	2 to 8	<u>PICO FORMATION (Tp):</u> Silty to Clayey Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to $\frac{1}{2+}$ inch bedding, top 2 <u>+</u> feet highly weathered.	
		Attitude: Bedding @ 6 feet, E-W 57N	
		Total Depth 8 feet.	
EP-111	0 to 7	<u>COLLUVIUM (Ocol):</u> Silty to Clayey Sand; fi yellowish brown, slightly moist, loose, abunda	ne-grained, dark to moderate nt roots and rootlets.
	7 to 9	<u>PICO FORMATION (Tp):</u> Silty Sandstone; fin grained, pale yellowish green, slightly moist, n bedded, generally massive.	e- with some medium- noderately hard, slightly
		Attitude: Bedding @ 8 feet, N50W 47NE	
		Total Depth 9 feet.	
EP-112	0 to 1	SOIL: Silty Sand to Sandy Silt; fine-grained, mainted states and rootle slightly moist, loose, abundant roots and rootle	noderate yellowish brown, ts.
	1 to 6	PICO FORMATION (Tp): Silty Sandstone; fin green, slightly moist, moderately hard, top 2 to	ne-grained, pale yellowish $3\pm$ feet highly weathered.
		Attitude: Bedding @ 5 feet, N60E 52NE	
		Total Depth 6 feet.	

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TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-113	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, mo slightly moist, loose, abundant roots and rootlets	oderate yellowish brown, s.
	2 to 7	PICO FORMATION (Tp): Silty Sandstone; fine green, slightly moist, moderately hard, slightly l	e-grained, pale yellowish bedded, generally massive.
		Total Depth 7 feet.	
EP-114	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silty to Clayey Sand; fin brown to moderate yellowish brown at depth, sl abundant roots and rootlets.	e-grained, dark yellowish ightly moist, loose,
	6 to 8	<u>PICO FORMATION (Tp):</u> Silty Claystone; mot reddish brown, moist, firm, generally massive, a	ttled olive and moderate abundant white carbonate.
		Attitude: Bedding @ 7 feet, N70W 46NE	
		Total Depth 8 feet.	
EP-115	0 to 3	SOIL: Sandy to Clayey Silt; fine-grained, mode moist, loose, abundant roots and rootlets.	rate yellowish brown,
	3 to 7	<u>PICO FORMATION (Tp):</u> Clayey Sandstone; f slightly moist to moist, moderately hard, lamina highly weathered with abundant white carbonate	ine-grained, pale olive, ated to massive, top 2 <u>+</u> feet e.
		Attitude: Bedding @ 5 feet, EW33N	
		Total Depth 7 feet.	
EP-116	0 to 2	<u>SOIL</u> : Silty Sand; very fine- to fine-grained, mo moist, loose, abundant roots and rootlets.	oderate yellowish brown,
	2 to 9	<u>PICO FORMATION (Tp):</u> Silty Sandstone; ver some interbeded, medium- to coarse-grained Sa yellowish gray, dry to slightly moist, medium h	y fine- to fine-grained, nd with pebbles, pale ard, generally massive.
		Attitude: Bedding @ 7 feet, E-W 37N	

Total Depth 9 feet.

TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-117	0 to ½	<u>SOIL</u> : Silty Sand to Sandy Silt; fine-grained, moderate yellowish bro slightly moist, loose, abundant roots and rootlets.	
	½ to 6	<u>PICO FORMATION (Tp)</u> : Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, massive, some shell fragments,	
-		Total Depth 6 feet.	
EP-118	0 to 4	SOIL/COLLUVIUM (Qcol): Silty Sand to Sand moderate yellowish brown, slightly moist, loose rootlets.	ly Silt; fine-grained, e, abundant roots and
	4 to 6	<u>PICO FORMATION (Tp):</u> Clayey Sandstone; f yellowish green, slightly moist, moderate hard, massive.	inc-grained, moderate slightly bedded, generally
		Attitude: Approximate Bedding @ 5 feet; E-W 2	27N
	<u>.</u>	Total Depth 6 feet.	
EP-119	0 to 2	<u>SOIL</u> : Silty Sand to Sandy Silt; fine-grained, mostightly moist, loose, abundant roots and rootlet	oderate yellowish brown, s.
	2 to 8	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, moderate yellowish brown, slightly moist, loose, laminated to ¹ / ₂ + inch bedding.	
		Attitude: Bedding @ 6 feet, N70W 55NE	
·····		Total Depth 8 feet.	
EP-120	0 to 5	<u>COLLUVIUM (Qcol)</u> : Silty to Clayey Sand; fir yellowish brown, slightly moist to moist, loose, rootlets.	ne-grained, moderate abundant roots and
	5 to 7	<u>PICO FORMATION (Tp)</u> : Clayey Siltstone; pa moderately hard, massive, top $1\pm$ foot highly we white carbonate.	le olive, slightly moist, eathered with abundant
		Total Depth 7 feet.	

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TABLE II

Log	Depth		Logged: 1-26-04
<u>No.</u>	(ft.)	Description	By: CRN
EP-121	0 to 1	SOIL: Silty Sand; fine-grained, moderate yellowish loose, abundant roots and rootlets.	1 brown, slightly moist,
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; fine-g slightly moist, moderately hard to hard at depth, ½	gained, pale yellowish, + inch bedding.
		Attitude: Bedding @ 4 feet, E-W 40N	
		Total Depth 6 feet.	
EP-122	0 to 1	SOIL: Silty Sand; fine-grained, moderate yellowish loose, abundant roots and rootlets.	n brown, slightly moist,
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; fine-, moist, moderately hard to hard at depth, laminated	pale yellowish, slightly to $\frac{1}{2}$ inch bedding.
		Attitude: Bedding @ 5 feet, N80E 46NW	
		Total Depth 6 feet.	
EP-123	0 to 1	SOIL: Sandy Silt to Silty Sand; fine-grained, mode slightly moist, loose, abundant roots and rootlets.	erate yellowish brown,
	1 to 7	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; fine-g slightly moist, moderately hard, laminated to $\frac{1}{2+}$ in highly weathered.	rained, pale olive, nch bedding, top 2± feet
		Attitude: Bedding @ 5 feet, N70E 48NW	
		Total Depth 7 feet.	

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN	
EP-124	0 to ½	<u>SOIL</u> : Sandy Silt to Silty Sand; fine-grained, m slightly moist, loose, abundant roots and rootlet	oderate yellowish brown, is.	
	½ to 6	<u>PICO FORMATION (Tp):</u> Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to $\frac{1}{2+}$ inch bedding, top 2+ feet highly weathered.		
		Attitude: Bedding @ 4 feet, N70E 52NE Joint @ 4 feet, N25E Vertical		
<u></u>		Total Depth 6 feet.		
EP-125	0 to 1	SOIL: Sandy Silt to Silty Sand; fine- to coarse-grained with some pebble and cobbles, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.		
	1 to 5	<u>PICO FORMATION (Tp):</u> Silty Sandstone; fine-grained, pale yellowish grey, dry to slightly moist, moderately hard to hard at depth, some thinly interlayered medium- to coarse-grained Sand lenses, generally massive.		
		Attitude: Bedding @ 4 feet, N80W 52NE		
		Total Depth at 5 feet.		
EP-126	126 1 to 3 <u>SOIL/COLLUV1UM (Qcol)</u> : Silty Sand to Sand, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and ro		d, Silt; fine-grained, bundant roots and rootlets.	
	3 to 7	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; fin yellowish green, dry to slightly moist, moderate top $2\pm$ feet highly weathered with abundant wh	e-grained Sand, pale ely hard, ½± inch bedding, ite carbonate.	
		Attitude: Bedding @ 6 feet, N80E 36NW		
		Total Depth 7 feet.		

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-127	0 to 9	<u>COLLUVIUM (Qcol)</u> : Silty Sand to Sand, Silt yellow brown, slightly moist, loose, abundant r	; fine-grained, moderate roots and rootlets.
	9 to 10	<u>PICO FORMATION (Tp):</u> Silty Claystone; olive, moist, moderately firm to firm, some white carbonate.	
		Total Depth 10 feet.	
EP-128	0 to 4	<u>COLLUVIUM/ALLUVIUM (Qcol/Qal)</u> : Silty Sand to Sandy Silt; fine grained, moderate yellow brown, moist, loose to medium dense with depth, some roots and rootlets.	
	4 to 6	<u>PICO FORMATION (Tp):</u> Claystone; olive, m laminated to $1\pm$ inch bedding, slightly plastic, s	ioist, moderately firm, some white carbonate.
		Attitude: Bedding @ 5 feet, N60W 52NE	
~		Total Depth 6 feet.	
EP-129	0 to 5	<u>COLLUVIUM/ALLUVIUM (Qcol/Qal)</u> : Silty grained with some basal cobbles, moderate yel medium dense with depth, some roots and root	Sand to Sandy Silt; fine- low brown, moist, loose to lets.
	5 to 7	<u>PICO FORMATION (Tp):</u> Claystone; olive, m laminated to $1\pm$ inch bedding, slightly plastic, s	noist, moderately firm, some white carbonate.
		Attitude: Bedding @ 6 feet, N60W 42NE	
		Total Depth 7 feet.	

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TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-130	0 to 1	SOIL: Silty Sand to Sandy, Silt; fine-grained, mod slightly moist, loose, abundant roots and rootlets.	lerate yellow brown,
	1 to 7	<u>PICO FORMATION (Tp)</u> : Sandy Siltstone to Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to $\frac{1}{2}$ inch bedding, top 2 to 3 \pm feet highly weathered with some roots and rootlets.	
		Attitude: Bedding @ 6 feet, N30E 33NW	
		Total Depth 7 Feet.	
EP-131	0 to 1½	<u>SOIL</u> : Silty Sand to Sandy, Silt; fine-grained, mod slightly moist, loose, abundant roots and rootlets.	lerate yellow brown,
	1½ to 6	<u>PICO FORMATION (Tp) (south side of pit)</u> : Silty olive and moderate yellowish brown, slightly mois laminated to $1\pm$ inch bedding, highly jointed/fracta rootlets to depths.	 Claystone; mottled st, moderately hard, ured, some roots and
		Attitude: Bedding @ 5 feet, N40E 48NW	
		FAULT (2 to 3+ inches thick zone): Silty Sand; fine-grained, pale grey, dry, loose, some roots.	
		Attitude: Fault @ 5 feet, N60W Vertical	
	1½ to 6	<u>PICO FORMATION (Tp) (north side of pit)</u> : Silty grained, layered pale grey and pale olive, slightly 1 to $6\pm$ inch bedding, top $2\pm$ feet moderately weat	 Sandstone; fine- moist, moderately hard, hered.
		Attitude: Bedding @ 5 feet, N60W Vertical	
		Total Depth 6 feet.	

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-132	0 to 1	SOIL: Clayey Silt; moderate yellow brown, slight roots, rootlets and white carbonate.	ly moist, loose, abundant
	1 to 7	<u>PICO FORMATION (Tp)</u> : Interbedded Silty Claystone; mottled olive and moderate yellowish brown, slightly moist, moderately hard, laminated to $1\pm$ inch bedding; with Silty Sandstone, fine-grained, pale olive, slightly moist, moderately hard, 2 to $3\pm$ inch bedding, top $3\pm$ inch bedding, top $3\pm$ feet highly weathered.	
		Attitudes: Bedding @ 5 feet, N60W Vertical Bedding @ 6 feet, N30W Vertical	
		Total Depth 7 feet.	
EP-133	0 to ½	SOIL: Clayey Silt; moderate yellow brown, slight roots, rootlets and white carbonate.	ly moist, loose, abundant
	½ to 6	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; very pale yellowish green, slightly moist, moderately h inch bedding, top $2\pm$ feet highly weathered with a some white carbonate.	fine- to fine-grained, ard, laminated to $1\pm$ bundant rootlets and
		Attitude: Bedding @ 5 feet, N60E 69NW	
		Total Depth 6 feet.	
EP-134	0 to 3	SOIL: Clayey Silt with Sand; fine-grained, moder slightly moist, loose, abundant roots, rootlets and	ate yellow brown, white carbonate.
	3 to 5	PICO FORMATION (Tp): Silty Sandstone; fine- grey, dry, moderately hard, massive, abundant she	to coarse-grained, pale Hs.
	5 to 8	Silty Claystone; mottled olive and moderate yellow moderately hard, slightly bedded generally massiv	w brown, slightly moist, e.
		Attitude: Bedding @ 7 feet, N50W 58NE	
		Total Depth 8 feet.	

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Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-135	0 to 2½	SOIL: Sandy Silt; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	2½ to 7	<u>PICO FORMATION (Tp):</u> Silty Sandstone; moderate yellow brown, slightly moist, loose, top $2\pm$ feet highly weathered with roots and rootle	
		Attitude: Bedding @ 6 feet, N60W 49NE	
		Total Depth 7 feet.	
EP-136	0 to 1	SOIL: Sandy Silt; fine-grained, moderate yellow b moist, loose, abundant roots and rootlets.	rown, dry to slightly
	1 to 8	<u>PICO FORMATION (Tp):</u> Silty Claystone; moder slightly moist, loose, top $3\pm$ feet highly weathered, some interbedded Silty Sandstone, fine-grained, pa yellowish grey, dry, moderately hard, 1 to $2\pm$ inch	ate yellow brown, with roots and rootlets; le to moderate bedding.
		Attitude: Bedding @ 7 feet, N40W 72SW	
		Total Depth 8 feet.	
EP-137	0 to 5	SOIL/COLLUVIUM (Qcol): Sandy Silt to Silty Samoderate yellow brown, dry to slightly moist, loos rootlets.	and; fine-grained, e, abundant roots and
	5 to 12	<u>PICO FORMATION (Tp)</u> : Silty Claystone; moder slightly moist, loose, top $3\pm$ feet highly weathered, some interbedded Silty Sandstone, fine-grained, pa yellowish grey, dry, moderately hard, 1 to $2\pm$ inch	ate yellow brown, , with roots and rootlets; ile to moderate bedding.
		Attitude: Bedding @ 11 feet, N50W 52NE	
		Total Depth 12 feet.	

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-138	0 to 7	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure.	
		Attitude: Bedding @ 6 feet, N40W 37NE	
		Note: Soil removed by dozer during recent fire fig	hting operations.
		Total Depth 7 feet.	
EP-139	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with peb moderate yellowish brown, slightly moist, loose, s	bles and cobbles, come roots and rootlets.
	½ to 5	SAUGUS FORMATION-SUNSHINE RANCH M Sandstone; fine- to coarse-grained with pebbles an yellowish brown to pale grey, slightly moist, mode bedded generally massive with some scour fill stru	<u>fEMBER (Tsr):</u> Silty ed cobbles, pale crately hard, slightly ecture.
		Attitude: Approximate Bedding @ 4 feet E-W 30N	
/ <u></u>	·····	Total Depth 5 feet.	
EP-140	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pel moderate yellowish brown, slightly moist, loose, s	obles and cobbles, some roots and rootlets.
	½ to 6	SAUGUS FORMATION-SUNSHINE RANCH M Sandstone; fine- to coarse-grained with pebbles ar yellowish brown to pale grey, slightly moist, mode bedded generally massive with some scour fill stru	<u>fEMBER (Tsr):</u> Silty nd cobbles, pale erately hard, slightly neture.
		Attitude: Bedding @ 5 feet, N80E 28NW	
		Total Depth 6 feet.	

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TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-141	0 to 3	SOIL: Silty to Clayey Sand; very fine- to medium pebbles, dark yellowish brown, moist, soft, some	n-grained with some roots and rootlets.
	3 to 8	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Gravelly Sandstone; fine- to coarse-grained with pebbles and cobbles, some boulders up to $18\pm$ inches, pale yellowish brown, slightly moist, moderately hard, massive, matrix supported, top $2\pm$ feet highly weathered	
		Total Depth 8 feet.	
EP-142	0 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand; fine- to pebbles and cobbles, moderate to dark yellow bro roots and rootlets.	coarse-grained with own, moist, loose some
	3 to 9	SAUGUS FORMATION-SUNSHINE RANCH Gravelly Sandstone; fine- to coarse-grained with yellowish grey to pale grey, slightly moist, mode interlayered pebbles and cobbles lenses.	MEMBER (Tsr): pebbles and cobbles, pale rately hard, massive with
		Attitude: Bedding @ 8 feet, E-W 33N	
		Total Depth 9 feet.	
EP-143	0 to ½	SOIL: Silty Sand; fine- to medium-grained, mod- slightly moist, loose, some roots and rootlets. Note: Some soil removed during recent fire fight	erate yellowish brown, ing operations.
	½ to 6	SAUGUS FORMATION-SUNSHINE RANCH Sandstone; fine- to medium-grained, pale grey, s hard, slightly bedded generally massive.	MEMBER (Tsr): Silty lightly moist, moderately
		Attitude: Bedding @ 4 feet, N60W 32NE	
		Total Depth 6 feet.	

-

TABLE II

EXPLORATORY PITS

_	Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
-	EP-144	0 to 5	5 <u>SOIL/COLLUVIUM (Qcol)</u> : Silty Sand; fine- to medium-grained, moderate yellow brown, slightly moist to moist, loose, abundant root rootlets.	
		5 to 9	SAUGUS FORMATION-SUNSHINE RANCH Sandstone; fine- to coarse-grained, pale grey, sh hard, massive with some interlayered pebble and Attitude: Bedding @ 7 feet, N70W 32NE	<u>MEMBER (Tsr):</u> Pebbly ightly moist, moderately d cobbles lenses.

Total Depth 9 feet.
TABLE I

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EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-201	0 to 2	SOIL: Sandy Clay; dark yellowish brown, slightly m common, clusters of small bi-valve shells.	oist, finn, rootlets
	2 to 9	SAUGUS FORMATION - SUNSHINE RANCH ME Siltstone; light olive gray with reddish brown stain, d fractured, weathered.	<u>MBER (Tsr):</u> Sandy ry, soft, highly
	@ 9	Fine- to medium-grained Sandstone, pinkish gray, sol some pebbles, probable cross-bed.	ft, poorly cemented,
		Bedding Attitude: N65E, 28NW	
		Total Depth 9 feet.	
EP-202	0 to 2	SAUGUS FORMATION - SUNSHINE RANCH ME to medium-grained Sandstone, pinkish gray, dry, soft small cobbles.	<u>MBER (Tsr):</u> Fine- , many pebbles and
	2 to 5	Sandy Siltstone, pale yellowish brown, slightly moist fractured, rootlet to depth.	, soft, moderately
	5 to 6	Sandstone, pinkish gray, dry, soft.	
		Bedding Attitude: N55W, 35NE	
		Total Depth 6 feet.	
EP-203	0 to 2	SOIL: Sandy Silt; dark yellowish brown, slightly mo pebbles.	bist, stifī, mæny
	2 to 4 ¹ / ₂	SAUGUS FORMATION - SUNSHINE RANCH ME to medium-grained Sandstone, pinkish gray, slightly cemented.	MBER (Tsr): Fine- moist, soft, poorly
	4½ to 7	Siltstone, light olive gray, slightly moist, soft to mode	erately hard.
		Bedding Attitude: N80E, 45NW	
		Total Depth 7 feet.	

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-204	0 to 6½	SAUGUS FORMATION - SUNSHINE RANCH MEM coarse-grained Sandstone, soft to moderately hard, dry, pebble and small cobble beds and lenses.	<u>IBER (Tsr):</u> Fine- to poorly cemented,
		Bedding Attitude: EW, 40N	
		Total Depth 6½ feet.	
EP-205	0 to 2	SOIL: Silty Clay; dark yellowish brown, moist, stiff, p	orous.
	2 to 10	SAUGUS FORMATION - SUNSHINE RANCH MEM Siltstone, light olive gray, slightly moist, soft to moder	<u> </u>
	@6&8	white carbonate pods common.	
	-	Silty Sandstone; very light olive gray, slightly moist, m 12 inch thick interbeds.	oderately hard, 6 to
		Bedding Attitude: N85W, 30NE	
		Ring and Bulk samples at 6 and 10 feet.	
		Total Depth 8 feet.	
EP-206	0 to ¼	SOIL: Sandy Silt; moderate yellowish brown, dry, firm	n, porous.
	¼ to 5	SAUGUS FORMATION - SUNSHINE RANCH MEN medium-grained Sandstone, pinkish gray, dry, soft to n poorly cemented, roots to depth.	<u>ABER (Tsr):</u> Fine- to noderately hard,
	@ 3	8 to 10-inch thick Silty Sandstone-pebble conglomerate dry, soft, one small cobble.	e, grayish orange,
		Bedding Attitude: N70W, 45NE	
		Total Depth 5 feet.	

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-207	0 to ½	SOIL: Sandy Silt; dark yellowish brown, moist, firm	, abundant rootlets.
	½ to 3½	PICO FORMATION (Tp): Silty Sandstone; very pal yellowish gray, slightly moist, soft, red brown stain c	e orange to ommon.
		Bedding Attitude: N55W, 40NE	

Total Depth 3½ feet.

SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

ELEVATION: SEE PLATE 1

BORING LOG NO. B-1

FILE NO .: GC14-122536

DATE: 02/09/15

METH	THOD: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING												
	SAM	PLE	BLOW	COUNT			SIE	EVE		DESCRIPTION AND REMARKS			
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOG				
0 -	SPT		2	2.8				- 12	1. N. J.	ALLUVIUM - Qal - (0' - 60')			
-	ерт		5	60					× 1	2.5' - Dark brown very fine- to fine-grained silty sand with			
	SFI	x	13	10.0	94	98.9			-'-	5' - Medium brown, very fine-grained silty sand slightly moist loose.			
-	SPT	~	6	8.3	0.1	00.0				7.5' - Light to medium brown very fine-grained silty sand, damp, slightly firm.			
- 10	SPT		12	16.6					:ŀ.,	10' - Medium brown fine- to medium-grained sand, slightly damp, slightly firm.			
-									1				
-	SPT		4	5.5					· ./	12.5' - 15' - Medium to dark brown very fine-grained silty sand, slightly			
-	SPT		4	5.5					. Ti	damp, slightly firm.			
-	ерт	X	13	10.0	9.7	100.6			C	17.5' 20' Dark brown year fine grained eith eand elightly down firm			
-	0.07		5	0.9					.1:	17.5 - 20 - Dark brown very line-grained sity sand, signify damp, linn.			
20	SPI		15	20.7					· · · .				
-	SPT		32	44.2					·	22.5' - 25' - Medium brown fine- to coarse grained sand containing			
	SPT		35	483						27.5' - 30' - Medium brown fine- to coarse-grained sand, slightly damp			
	JSF1	x	57	43.7	83	104.3				firm			
-	SPT	1	34	46.9		101.0							
30	SPT		32	44.2									
-									1.0				
:	SPT		32	44.2					00	32.5' - Cobble/boulder			
-	SPT		39	53.8					:	35' - 40' - Medium brown fine- to medium-grained silty sand, dry, firm.			
-		X	59	45.2	9.2	106.7							
-	SPT		43	59.3					1				
40	SPI	1.1	40	55.2		10.0			0.1	40' - Medium to dark brown fine-grained silty sand containing gravel, slightly			
1	SPT		35	483					2.	Moist, dense			
1.2				40.0	1					slightly moist firm			
2	SPT		35	48.3									
-		x	62	47.5	7.8	110.4			5 Terry	47.5' - Medium brown very fine- to medium-grained silty sand, humid, firm.			
16	SPT		32	44.2					20				
50	SPT	1	37	51.1					tree-	50' - 55' - Medium brown fine- to coarse-grained gravelly silty sand,			
1	SPT		46	63.5					0.6	humid, firm.			
•									.0				
•	SPT	1.	40	55.2						[55' - 60' - Medium brown fine- to coarse-grained silty gravelly sand, humid,			
	ent	X	64	49.1	7.6	113.3			0.0	firm.			
- 60	SPI		46	60.7					00	End at 60'			
Co	mme	nte	The	followi		rection	n fac	tore	Wereut	tilized to determine N(co) (Per SD117)			
	Cb	= 1	.15 (8"	Diame	ter Bo	prehole	a); (s =	1.2 (SP	T Sampler without liner): $Cs = 2/3$ (California Sampler)			
Not	tes:	1	OTAL	DEPTH	: 60'	GRO		JWA					
						011	5 514						
										PLAIE 2.1			

SUB-SURFACE DATA

ELEVATION: SEE PLATE 1

METHOD: 6-inch Hollow Stem Auger

SAMPLE BLOWCOUNT

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

SIEVE

BORING LOG NO. B-2

FILE NO .: GC14-122536 DATE: 02/09/15 DRILLING CO .: HD DRILLING DESCRIPTION AND REMARKS

TH (FT)	~	(1)	(N)	l(60)	sture %	SITY	ASSING	SCREEN	оніс гоо				
EP.	SULF	NNN NNN	Ē	2	NOI	DEN	% P/	200	RAF				
		<u> </u>						#		ALLUVIUM - Qal - (0' - 60')			
-	SPT		7	9.7					14	2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.			
-									N.,				
-	SPT		9	12.4					~ 1	5' - Medium brown very fine-grained silty sand, humid, slightly firm.			
-		x	18	13.8	11.4	98.2			•				
-	SPT		6	8.3					÷	7.5' - Medium brown very fine-to fine-grained silty sand, humid, slightly firm.			
10	CDT	l	6	83					Ľ	10' - Dark brown very fine- to fine-grained silty sand humid slightly firm			
-	SFI		0	0.5					6.	To a Dark brown very line to line-granico sity sand, namid, signey linn.			
-	SPT		7	9.7					11	12.5' - 15' - Medium brown very fine- to fine-grained silty sand, humid,			
-	SPT		5	6.9			l		1 CV -	loose to slightly firm.			
-		х	18	13.8	10.7	104.7			7				
-	SPT		11	15.2			l		1	17.5' - 27.5' - Dark brown very fine-grained silty sand, humid, slightly firm.			
-									_[-1				
20	SPT		18	24.8		ļ	II.		e				
-				20.4					1				
-	SPI		22	30.4			1		7.7				
-	SPT		28	38.6					1				
-		x	48	36.8	10.3	107.3	1			27.5' Medium to dark brown fine- to very coarse-grained silty sand			
-	SPT		28	38.6					1.1.				
30	SPT		29	40.0			N.		Nº Si	30' - 32.5' - Dark brown to medium reddish brown fine- to coarse-grained			
-									0:	silty sand containing pebbles to gravel, humid, firm.			
	SPT		27	37.3			1		0.2				
-										35' - Medium brown fine- to medium-grained silty sand, slightly moist, firm.			
-	SPT		29	40.0			-		15.				
-		X	55	42.2	8.2	112.8			1.15	37.5' - 40' - Medium reddish brown fine- to very coarse-grained pebbly			
-	SPT		42	58.0	ll –				0, 0%	silty sand, humid, dense.			
40	SPT		36	49.7					1.0.3				
-	I CDT		20	52.4	ll l					12 El Madium brown your final to final grained aloyay to silty cond			
	JSP1		30	52.4					Eir	42.5 - Medium blown very line- to line-grained clayey to sitty sand,			
	SPT		40	55.2	-				5.5	45' - Medium reddish brown fine- to very coarse-grained pebbly to gravelly			
-		x	68	52.1	8.4	118.0			0.0	sand, slightly moist, dense,			
-	SPT		37	51.1					. 0 .				
50	SPT		39	53.8						47.5' - 50' - Dark brown very fine- to fine-grained clayey to silty sand,			
-	1	1			1				5-1-1	-slightly moist, firm.			
-	SPT	1	56	77.3						52.5' - 60' - Medium brown fine- to coarse-grained pebbly to gravelly sand,			
× 1					ï –	1	1		.0.	humid, dense.			
-	SPI		50	for 6"					0.2				
-	lepi	-	50	for 6"	1	1	1		1:5				
60	SPI		30	101 0					0	End at 60'			
Co	comments: The following correction factors were utilized to determine N(60) (Per SP117)												
	Cb	= 1.	15 (8"	Diame	eter Bo	orehole	e); C	s =	1.2 (SP	T Sampler without liner); Cs = 2/3 (California Sampler)			
Not	tes:	Т	OTAL	DEPTH	: 57.5	G	ROU	NDW	ATER:	NO REFUSAL/CAVING: NO BACKFILLED: YES			
										PLATE 2.2			

SUB-SURFACE DATA

BORING LOG NO. B-3

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/09/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING DESCRIPTION AND REMARKS SAMPLE BLOWCOUNT SIEVE 200 SCREEN **GRAPHIC LO** (FT) PASSING Z MOISTURE N(60) IELD (DENSITY DEPTH BULK RING % 0 ALLUVIUM - Qal - (0' - 60') . SPT 4 2.5' - 5' - Medium to dark brown very fine- to fine-grained silty sandy clay 5.5 1. Y containing pebbles, moist, slightly firm. SPT 3 1.1 5' - 15' - Dark brown very fine-grained silty sand, humid, loose. -4.1 х 11 102.0 -8.4 15.9 SP' 4 5.5 10 SPT 4 5.5 2 SPT 3 4.1 --SPT 11 15.2 15' - Medium brown fine- to medium-grained silty sand, humid, slightly firm. .l... 105.8 34 26.1 х 5.5 17.5' - 30' - Medium brown fine- to coarse-grained silty sand, humid, dense. .Y. -SPT 18 24.8 1. 1 .F SPT 20 17 23.5 SPT 28 38.6 -SPT 27 37.3 -. х 48 36.8 6.0 115.4 SPT 27 37.3 -; . 30 SPT 25 34.5 30' - Medium brown very fine- to fine-grained silty sand, humid, firm. (.... SPT 27 37.3 _ 32.5' - Medium to dark brown fine- to coarse-grained silty sand containing 0:0 gravel, humid, dense. SPT 55 FOR 6" 35' - Cobble/boulder -15 х -51 39.1 8.3 114.3 37.5' - 42.5' - Medium brown very fine- to fine-grained silty sand, humid, firm. SPT 32 44.2 . 21 40 SPT 35 48.3 1 -1 -SPT 43 59.3 42.5' - 47.5' - Medium brown fine- to medium-grained silty sand containing • • 0 gravel, humid, dense. SPT 32 44.2 . O. х 57 43.7 5.6 116.2 O SPT 34 46.9 1. SPT 50 37 r.k 51.1 50' - Medium brown fine-grained silty sand, humid, dense. 1. 5 SPT 33 45.5 52.5' - Medium brown very fine- to fine-grained clayey to silty sand, slightly moist, firm. SPT 60 82.8 55' - 60' - Medium reddish brown fine- to very coarse-grained silty sand, -.. х 82 62.9 4.3 126.2 humid, dense. 15 SPT 67 FOR 6" -11 60 SPT 64 FOR 5" End at 60' Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) TOTAL DEPTH: 60' Notes: **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES



SUB-SURFACE DATA

BORING LOG NO. B-4

FILE NO .: GC14-122536

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

DATE: 02/10/15

MET	10D: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING													
	SAM	PLE	BLOW	COUNT			SIE	EVE		DESCRIPTION AND REMARKS				
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC					
0 -	SPT		8	11.0					: 1 . 4 	ALLUVIUM - Qal - (0' - 50') 2.5' - Dark brown fine- to coarse-grained silty sand, slightly moist, firm.				
-	SPT		7	9.7					$\sum_{i=1}^{n}$	5' - 17.5' - Light to medium brown very fine- to fine-grained sand, dry, firm.				
:	SPT	х	26 13	19.9 17.9	9.4	83.9			1. J.					
- 10	SPT		12	16.6					: . (`·					
•	SPT		8	11.0					- [:					
-	SPT		13	17.9					Ň.					
-		х	20	15.3	8.6	93.0			1.1					
-	SPT		8	11.0					1	17.5' - Dark brown very fine- to fine-grained clayey to silty sand, slightly moist, slightly firm,				
20	SPT		16	22.1					1. 2	20' - Dark brown very fine- to fine-grained silty sand, humid, loose to				
	SPT		22	30.4					11.1	22.5' - 25' - Medium brown very fine- to fine-grained clayey to silty sand,				
	SPT		27	37.3		1.11			5.2	in a sugary man.				
4		x	48	36.8	12.0	104.4			1.1.					
4	SPT	11	25	34.5		111			1-1-	27.5' - 30' - Medium brown fine- to coarse-grained clayey to silty sand,				
30	SPT		24	33.1					1.1.1	humid to slightly moist, firm.				
-	SPT		27	37.3					1:1-	32.5' - 35' - Medium brown fine- to very coarse-grained clayey to silty sand, humid to slightly moist, firm.				
-	SPT		24	33.1					· perior	37.5 ' - 50' - Medium brown to medium reddish brown fine- to very coarse-				
-		х	46	35.3	8.3	111.0			17:	grained silty sand, humid, dense.				
-	SPT		34	46.9					1:20					
40	SPI		29	40.0					5.1					
-	SPT		36	49.7					1					
-	SPT		50	69.0					Ľ.					
•	ODT	X	50 f	or 6"	6.7	114.6								
- 50	SPI		50 f	or 6"					· /.					
-	SFI		10	90.0										
-														
-														
-														
1														
60														
Cor	omments: The following correction factors were utilized to determine N(60) (Per SP117)													
	Cb	= 1.	15 (8"	Diamet	er Bo	rehole); C	s = 1	.2 (SP	T Sampler without liner); Cs = 2/3 (California Sampler)				
Not	tes: TOTAL DEPTH: 50' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES													
	PLATE 24													

SUB-SURFACE DATA

N(60)

2.8

5.5

13.0

8.3

9.7

11.0

11.0

18.4

16.6

20.7

22.1

23.5

24.5

31.7

27.6

33.1

49.7

77.3

92.5

ELEVATION: SEE PLATE 1

(FT)

DEPTH BULK RING

0

-

-

-

10 SPT

-

-SPT

. 20 SPT

-

-

-

-SPT

-

-SPT

30 SPT

-

-

-

.

40

_

--_ 50 SPT

SPT -

SPT .

SPT

SPT -

SPT

SPT

SPT -

SPT

SPT

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х

х

х

METHOD: 6-inch Hollow Stem Auger

SAMPLE BLOWCOUNT

(z)

FIELD

2

4

17

6

7

8

8

24

12

15

16

17

32

23

20

24

36

56

67

50 for 6"

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

MOISTURE

9.7

7.5

2.8

5.1

SIEVE

% PASSING

DENSITY

105.8

99.4

108.9

117.6

200 SCREEN

LOO

GRAPHIC

11

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humid, firm.

1

BORING LOG NO. **B-5**

FILE NO .: GC14-122536 DATE: 02/11/15 DRILLING CO .: HD DRILLING DESCRIPTION AND REMARKS ALLUVIUM - Qal - (0' - 40') 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose. 5' - Medium to dark brown very fine- to fine-grained silty sand, humid to slightly moist, slightly firm. 7.5' - 17.5' - Medium brown to dark brown fine- to medium-grained silty sand, humid, loose to slightly firm.

17.5' - Medium brown very fine- to fine-grained silty sand, humid, firm

20' - 25' - Light to medium brown very fine- to fine-grained silty sand, humid, firm.

25' - Medium brown fine- to medium-grained silty sand, humid, firm.

30' - 40' - Light to medium brown fine- to very coarse-grained silty sand containing gravel, humid, dense very dense.

25' - 30' - Medium brown fine- to very coarse-grained silty sand,

.10 in' 40' - Refusal (Saugus Formation ?) End at 40'

-											
60											
Con	nme	nts:	The f	ollowin	g corr	rection	factors w	vere uti	lized to determine N(60) (Per	SP117)	
	Cb :	= 1.1	5 (8" I	Diamet	er Bo	rehole); Cs = 1	.2 (SPT	Γ Sampler without liner); Cs =	= 2/3 (California	Sampler)
Note	es:	TC	DTAL D	DEPTH:	40'	GRO	UNDWAT	ER: NO	REFUSAL/CAVING: NO	BACKFILLED: Y	YES
										PLATE	2.5

SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

ELEVATION: SEE PLATE 1

BORING LOG NO. B-6

FILE NO.: GC14-122536 DATE: 02/10/15

DATE. 02/10/15

MET	HOD:	6-inc	h Hollow	Stem A	uger				DRILLING CO.: HD DRILLING					
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS				
DEPTH (FT)	BULK	RING	EIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOG					
0									A 11	ALLUVIUM - Qal - (0' - 60')				
-	SPT		2	2.8					. j	2.5' - Dark brown very fine- to medium-grained silty sand, slightly moist,				
	SPT		10	13.8						ioose. 5' - 10' - Light brown very fine- to fine-grained silty sand humid firm				
-		х	22	16.9	4.9	96.9								
-	SPT		10	13.8					. <i>∶</i> ∫.					
-														
10	SPT		9	12.4						10' - Dark brown very fine- to fine-grained silty sand, humid, firm.				
	SPT		13	17.9						12.5' Dark brown yory find to find grained alougy to aith, and humid firm				
-	SPT		6	8.3						15' - Medium to dark brown fine- to medium-grained clayey to slity sand, numid, firm.				
-		x	18	13.8	7.5	99.8			1.	humid, slightly firm.				
-	SPT		9	12.4					. /	17.5' - 35' - Medium brown very fine- to medium-grained silty sand, humid,				
-							l		L.	firm.				
20	SPI		12	16.6					- :					
	SPT		27	37.3						•				
-									· j.					
-	SPT		25	34.5					- 1					
-		х	46	35.3	6.1	103.8								
-	SPT		38	52.4					/ 1-	· · · · · · · · · · · · · · · · · · ·				
30	SPT		31	42.8			ll –		1					
-	епт		22	45.5					-1					
	5-1		33	45.5										
-	SPT		47	64.9	1		1			35'- 50' - Medium brown fine- to very coarse-grained silty sand, humid				
-		x	62	47.5	6.0	104.2			1.1.1	dense.				
-	SPT		36	49.7					12:00					
40	SPT		35	48.3					1 3					
-	ерт		20	52.0					in					
	SPI		39	53.8					1.1					
	SPT		37	51.1			l		`-`					
-		x	66	50.6	6.4	104.8			`.`					
-	SPT		39	53.8										
50	SPT		35	48.3					· morente	50' - 55' - Dark brown medium- to very coarse-grained clayey to silty sand,				
•	SDT		24	100					2.	slightly moist, dense.				
	351		54	40.9					5-2	· · · · ·				
	SPT		33	45.5					14-					
	x		62	47.5	23.9	106.1			5,12	57.5' - Dark brown fine- to coarse-grained clavey to silty sand, moist dense				
•	SPT		37	51.1						60' - Dark brown fine- to coarse-grained clayey to silty sand, saturated, dense.				
60	SPT		36	49.7					12.	End at 60'				
Con	nme	nts:	The f	ollowin	g corr	rection	fact	ors v	vere uti	lized to determine N(60) (Per SP117)				
	Cb	= 1.	15 (8" [Jiamet	er Boi	rehole); Cs	s = 1	.2 (SP1	Sampler without liner); Cs = 2/3 (California Sampler)				
Not	tes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES													
										PLATE 2.6				

GOLD COAST GEOSERVICES, INC. SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

ELEVATION: SEE PLATE 1

BORING LOG NO. B-7

FILE NO.: GC14-122536 DATE: 02/11/15

MET	HOD: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING												
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS			
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC				
0 -	SPT		4	5.5					X	ALLUVIUM -Qal - (0' - 60') 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.			
	SPT		1	14					5	51 201 Medium brown for to fire and the set to the set of the			
-		х	15	11.5	9.4	88.9			Y	firm.			
-	SPT		7	9.7									
- 10	SPT		10	13.8					-1.				
	SPT		q	12.4					:/·r				
-	SPT		6	8.3					~				
-		х	16	12.3	8.2	90.6			1				
-	SPT		6	8.3					-				
20	SPT		6	8.3						20' - Medium brown fine- to coarse-grained silty sand, humid, firm.			
	SDT		23	317					1.11				
			20	51.7			1		. V.				
-	SPT		22	30.4	1					25' - Medium brown fine-grained silty sand, humid, slightly firm.			
-		x	52	39.9	8.1	104.4	1		1.1				
-	SPT		49	67.6					1	27.5' - 35' - Medium reddish brown fine- to very coarse-grained sand			
30	SPT		54	74.5					0.1	containing gravel, dry, dense.			
•	SDT		30	11.2					:0				
	SFI		52	44.2					2.7.				
-	SPT		26	35.9						35' - Medium to dark brown very fine- to fine-grained clavey to silty sand			
-		х	30	23.0	11.3	103.4			1.	slightly moist, slightly firm.			
-	SPT		30	41.4					11-1-				
40	SPT		35	48.3	l					37.5' - 45' - Medium brown fine- to very coarse-grained pebbly to gravelly			
-	SPT		39	53.8					0.1.	sand, dry, dense.			
E.	-					1.1			S'd'	La second de la companya de la seconda de la companya de			
1	SPI	v	30	41.4	0.0	440.7			A. S. S.	45' - 50' - Dark brown fine- to coarse-grained clayey to silty sand containing			
	SPT	^	31	42.8	9.9	116.7			0.5	peobles, slightly moist, firm to dense.			
50	SPT		44	60.7					0.0	50' - 60' - Medium reddish brown fine- to coarse-prained pebbly to gravelly			
0.0	SPT	1.131	50 f	or 6"					31	silty sand, slightly moist, dense.			
-									1:0				
-	SPT		63	86.9					<u>"</u> '				
-	X		50 f	or 6"	3.5	110.0	1						
-	SPT		50 f	or 6"					- 80	60' - Rock/boulder			
60	SPT	nto	50 f	or 6"			6			End at 60'			
Con	omments: The following correction factors were utilized to determine $N(60)$ (Per SP117)												
Not	ofes: TOTAL DEPTH: 60' CROUNDWATED: NO DEFLICATION (CALIFORNIA SAMPLER)												
NOU		1			00	GRU	UND	WAI	EK: NO	REFUSAL/CAVING: NO BACKFILLED: YES			
										PLATE 2.7			

SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

BORING LOG NO. B-8

FILE NO .: GC14-122536 DATE: 02/12/15 DRILLING CO .: HD DRILLING

MET	HOD: 6-inch Hollow Stem Auger DRILLING CO.: HD DRILLING												
	SAM	PLE	BLOW	COUNT			SI	EVE		DESCRIPTION AND REMARKS			
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC				
0 -	SPT		5	6.9					2.1	ALLUVIUM - Qal - (0' - 60') 2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose.			
-	SDT		12	16.6						CL OOL Madium have a first to first a little and have to be it to the			
		x	21	16.1	7.1	89.3				5 - 20 - Wedium brown very fine- to fine-grained silty sand, humid, 'slightly			
-	SPT		15	20.7					- 7				
-									1.	×			
10	SPT		10	13.8					N.'				
-	SDT		13	17.0					- 1				
	SPT		11	15.2					- t.				
-	· · ·	x	28	21.5	4.8	101.2			>				
-	SPT		16	22.1									
-									1.2.				
20	SPT		21	29.0					1.	20' - Medium reddish brown fine- to medium-grained silty sand, humid,			
-	SPT		30	11.1					1.	dense.			
-				41.4					Í.	,			
-	SPT		22	30.4					in anon	25' - Medium reddish brown fine- to very coarse-grained pebbly sand.			
-		x	42	32.2	5.1	107.8			0,0	humid, dense.			
-	SPT	_	24	33.1						27.5' - Medium brown fine- to medium-grained silty sand, humid, dense.			
30	SPT	1911	28	38.6					20	30' - 47.5' - Medium reddish brown fine- to very coarse-grained pebbly to			
-	CDT		27						10.	gravelly silty sand, humid, dense.			
	SPI		31	51.1					1.1.				
-	SPT		28	38.6			1		.16				
-		x	50	38.3	5.9	109.5	1		101				
	SPT		27	37.3					.7				
40	SPT	613	35	48.3									
-	SPT		36	49.7					-1				
-	SPT		31	120					1:				
	SFI	x	50 f	42.0	71	110.0			- 01				
-	SPT	^	50	69.0	1	110.0				47.5' - 55' - Medium reddish brown fine, to year coarse grained eilty condy			
50	SPT		46	63.5			ļ		07	iclay containing gravel, moist, dense,			
-									- 6				
-	SPT		63	86.9			1)		1				
-	CDT		01	105.0			ll –		0-				
	X		50 f	125.6					-1	155' -60' - Medium gray fine- to medium-grained sandy clay, slightly moist, dense.			
-				l			1		1				
60									1	End at 60'			
Con	omments: The following correction factors were utilized to determine N(60) (Per SP117)												
	Cb	= 1.	15 (8"	Diamet	ter Bo	rehole); C	s = 1	.2 (SP	Γ Sampler without liner); Cs = 2/3 (California Sampler)			
Not	es:	Т	OTAL D	DEPTH:	60'	GRO	UND	WAT	ER: NC	REFUSAL/CAVING: NO BACKFILLED: YES			

PLATE 2.8

SUB-SURFACE DATA

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA

BORING LOG NO. B-9

FILE NO .: GC14-122536

DATE: 02/11/15

ELEVATION: SEE PLATE 1 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT DESCRIPTION AND REMARKS SIEVE **GRAPHIC LOC** 200 SCREEN (FT) Z PASSING MOISTURE N(60) IELD DENSITY DEPTH BULK RING 0 N: ALLUVIUM - Qal - (0' - 47.5') SPT 1 1.4 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose. ~ SPT 11 15.2 5' - 12.5' - Light to medium brown very fine- to fine-grained silty sand, dry, firm. х 34 26.1 6.3 101.3 SPT 8 11.0 10 SPT 9 12.4 SPT ; 15.2 11 12.5' - Medium to dark brown fine- to coarse-grained silty sand, dry, firm. SPT 9 12.4 15' - 20' - Medium to dark brown fine-grained silty sand, humid, firm. х 7.7 26 19.9 104.4 SPT 10 13.8 20 SPT 14 19.3 . SPT 22 30.4 22.5' - 35' - Medium reddish brown very fine- to medium-grained silty sand, humid, firm. SPT 24 33.1 ł 50 for 5" х 6.4 105.6 SPT 21 29.0 SPT 30 22 30.4 1 SPT 25 34.5 SPT 30 41.4 35' - 45' - Dark brown very fine- to coarse-grained clayey to silty sand, х 54 41.4 5.7 111.3 1.--slightly moist, firm. SPT 39 53.8 40 SPT 38 52.4 SPT 44 60.7 SPT 47 64.9 45' - Medium gray very fine- to medium-grained sandy clay to clayey sand, х 50 for 6" 5.8 112.2 moist, very dense. SPT 50 for 5" SAUGUS FORMATION - Ts - (47.5' - 57.5') - Medium gray medium- to very coarse-50 SPT 72 99.4 12 grained clayey sand, moist, very dense. -SPT 50 for 4" SPT 50 for 5" End at 57.5' -60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 55' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES



SUB-SURFACE DATA

BORING LOG NO. B-10

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

FILE NO .: GC14-122536 DATE: 02/12/15

MET	HOD:	6-inc	h Hollow	v Stem A	uger					DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW	COUNT			SIE	EVE		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOG	
0	SPT		14	19.3					1.1	ALLUVIUM - QaI - (0' - 27.5') 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, firm.
	SPT		31	42.8						5' - 17.5' - Medium brown fine- to coarse-grained silty sand dry firm
-		x	37	28.4					P	
-	SPT		12	16.6					1	
10	SPT		12	16.6					51	
-	SPT		14	19.3			1		:	
	SPT		14	19.3						
-		x	35	26.8	4.8	97.2			. 1.4	
-	SPT		16	22.1					17	
-									3.	

-	SPI		14	19.3								
-		X	35	26.8	4.8	97.2	- 1 1					
-	SPT		16	22.1			57					
-												
20	SPT		13	17.9			20' - 22.5' - Medium brown fine- to coarse-grained pebbly silty sand, dry,					
-							dense.					
-	SPT		43	59.3								
-			ļ									
-	SPT		44	60.7			22.5' - 27.5' - Light to medium brown very fine- to fine-grained silty sand, dry					
-		x	75	57.5	4.3	115.3	slightly firm.					
-	SPT		50 f	or 4"			SAUGUS FORMATION - Ts - (27.5' - 30') - Medium brown fine- to very coarse-					
30	SPT	-	50 f	or 2"			Y unrained silty sand dry very dense					
				1			End at 30'					
							End at 50					
			1		1							
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60			L	L								
Cor	nme	nts:	Thef	ollowin	g corr	ection	factors were utilized to determine N(60) (Per SP117)					
	Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)											
Not	es:	T	OTAL	DEPTH:	30'	GRO	UNDWATER: NO REFUSAL/CAVING: NO BACKELLED: YES					

		1.1.20	
PL	ATE	2.	10

SUB-SURFACE DATA

METHOD: 6-inch Hollow Stem Auger

SAMPLE BLOWCOUNT

1

BORING LOG NO. B-11

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

SIEVE

FILE NO .: GC14-122536 DATE: 02/17/15 DRILLING CO .: HD DRILLING DESCRIPTION AND REMARKS

Y mon Y mon <th< th=""><th>FT)</th><th></th><th></th><th>Î</th><th></th><th>3E %</th><th></th><th>ВN</th><th>EEN</th><th>LOG</th><th></th></th<>	FT)			Î		3E %		ВN	EEN	LOG	
B E E F O B E E S 0 SPT 5 6.9 12 166 6.8 109.7 2.5 - Dark brown very fine- to fine-grained silty sand, sightly molet, loose. 10 SPT 2 30.4 8 109.7 5 6.9 109.7 10 SPT 50 for 4* 7 5 6.8 109.7 5 5.04 dim gray very fine- to medium-grained silty sand, sightly molet, loose. 10 SPT 50 for 6* 7 5 Medium ford hor to redium-grained silty sand, dry, dense. 10 SPT 50 for 6* 109.7 5 5.0 for 6* 12.5 - Dark brown very fine- to medium-grained silty sand, dry, dense. 12.5 Dark brown very fine- to medium-grained silty sand, dry, dense. 12.5 - Dark brown very fine- to were dum-grained silty sand, sightly molet, very silft. 20 SPT 50 for 6* 1 </td <td>рТН (I</td> <td>×</td> <td>U</td> <td>ELD (</td> <td>N(60)</td> <td>ISTUF</td> <td>VSITY</td> <td>ASSI</td> <td>) SCR</td> <td>PHIC</td> <td></td>	рТН (I	×	U	ELD (N(60)	ISTUF	VSITY	ASSI) SCR	PHIC	
0 SPT 5 6.9 12 10.6 6.8 109.7 12 10.6 6.8 109.7 12 10.6 6.8 109.7 13 50 for 4" 50 for 4" 50 for 4" 14 50 for 4" 50 for 4" 50 for 4" 15 50 for 4" 50 for 4" 10.7 16 SPT 50 for 4" 50 for 4" 15 50 for 4" 50 for 4" 10.7 10 SPT 50 for 4" 50 for 4" 16 SPT 50 for 4" 10.7 17 50 for 4" 10.7 Medium gray very fine- to medium-grained silty sand, slightly moist, dense. 12.5 Dark brown very fine- to medium-grained silty sand, slightly moist, dense. 11.5 18 17.7.5 Light to medium gray very fine-grained silty clay, moist, very stiff. 19 10 Medium form fine- to very coarse-grained silty clay, moist, very stiff. 10 10 11.5 11.7.5 10 11.5 11.5 11.5 10 11.5 11.2 11.2 11	DEF	BUL	RIN	FIE		MOI	DEN	% P.	# 200	GRA	
No. 1 0 0.5 SPT 12 16.6 SPT 22 30.4 SPT 50 for 4" SPT 50 f	0	SPT		5	6.9					5.7.	ALLUVIUM - Qal - (0' - 10')
18PT X 12 106 6.8 109.7 10 SPT 22 30.4 109.7 22 30.4 10 SPT 50 for 4" 1 1 1 10 SPT 50 for 6" 1 1 1 10 SPT 50 for 6" 1 1 1 10 SPT 50 for 6" 1 1 1 10 SPT 50 for 6" 1 1 1 10 SPT 50 for 6" 1 1 1 10 SPT 50 for 6" 1 1 1 1 10 Netium brown fine- to medium-grained silty sand, dip, dense. 15 -17.5 - Light to medium gray very fine-grained silty sand, dip, dense. 15 10 Netium brown fine- to wery coarse-grained silty sand, silphtly moist, dense. 15 -17.5 - Light to medium-grained silty sand, dip, dense. 15 10 Image: dense dens		0-1		5	0.9					- · ·	2.3 - Dark brown very tine- to tine-grained silty sand, sightly moist, loose.
SPT 1 22 00.4 100.5 <td>-</td> <td>SPT</td> <td>x</td> <td>12</td> <td>16.6 33.0</td> <td>6.8</td> <td>109.7</td> <td></td> <td></td> <td>1.1</td> <td>5' - Medium gray very fine- to medium-grained clayey to silty sand, slightly</td>	-	SPT	x	12	16.6 33.0	6.8	109.7			1.1	5' - Medium gray very fine- to medium-grained clayey to silty sand, slightly
10 SPT 50 for 4" SPT 50 for 4"	-	SPT	Â	22	30.4	0.0	100.7				7.5' - Medium reddish brown fine- to medium-grained silty sand, dry, dense.
SPT 50 for 6" SPT 50 for 4" <td< td=""><td>10</td><td>SPT</td><td></td><td>50 f</td><td>or 4"</td><td></td><td></td><td></td><td></td><td>20</td><td>SAUGUS FORMATION - Ts - (10' - 17.5')</td></td<>	10	SPT		50 f	or 4"					20	SAUGUS FORMATION - Ts - (10' - 17.5')
SPT 50 for 4" SPT 50 for 4" <td< td=""><td>1</td><td>COT</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td>10' - Medium brown fine- to very coarse-grained silty sand, dry, dense.</td></td<>	1	COT								1	10' - Medium brown fine- to very coarse-grained silty sand, dry, dense.
SPT 50 for 4" 20 15" + 17.5" - Light to medum gray very fine-grained silty clay, moist, very stiff. 20 15" + 17.5" - Light to medum gray very fine-grained silty clay, moist, very stiff. 30 1 30 1 40 1 50		SPI		50 1	or o'					1:1:	12.5° - Dark brown very fine- to medium-grained clayey to silty sand, slightly moist, dense.
20 20 20 20 20 20 20 20 20 20	1	SPT		50 f	or 4"					1-1-	15' - 17.5' - Light to medum gray very fine-grained silty clay, moist, very stiff.
20 30 30 40 50 50 60 Comments: The following correction factors were utilized to determine N(so) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5" GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES										-	
30 30 40 40 50 50 60 Comments: The following correction factors were utilized to determine N(so) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5" GRUNDWATER: NO REFUSAL/CAVING: NO BLIATE BLIATE	20 -										
30 40 40 50 50 60 Comments: The following correction factors were utilized to determine N(so) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH; 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	-										
30 40 40 50 50 50 60 Comments: The following correction factors were utilized to determine N(so) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED; YES	-										
30	-										
40 40 50 50 60 Comments: The following correction factors were utilized to determine N(so) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED; YES	30										
40 40 50 50 50 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	-										
40 40 50	-							-			
40 40 50	-										
50 50 50 50 60 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	- 40										
- - 50 - 50 - - - <td< td=""><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	-										
50 50 50 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	-										
50 50 50 60 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	-										
50 - - -	-										
Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	50										
Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	-										
60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	-										
60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BLATE 0.111	-										
Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	- 60										
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	Con	nme	nts:	The f	ollowin	g corr	ection	fact	ors v	vere uti	lized to determine N(60) (Per SP117)
NOLES: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES	Net	Cb	= 1.1	15 (8"	Diamet	er Bo	rehole); Cs	5 = 1	.2 (SP1	Sampler without liner); Cs = 2/3 (California Sampler)
	NOL	es:	10		JEPTH:	17.5	GF	OUN	DW/	ATER: N	IO REFUSAL/CAVING: NO BACKFILLED: YES

SUB-SURFACE DATA

BORING LOG NO. B-12 PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/18/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING

	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOO	
0 	SPT SPT SPT	x nts:	6 19 72 50 fd 50 ft	8.3 26.2 55.2 or 5" or 3"	6.2	117.9 ection	fact	Ors w	vere uti	ALLUVIUM - QaI - (0' - 7.5') - Medium reddish brown very fine- to fine-grained silty sand, slightly moist slightly firm. SAUGUS FORMATION - Ts - (7.5' - 10') - Medium brown fine-grained silty sand, humid, very dense. End at 10'
	Cb	= 1.1	15 (8" [Diamet	er Bo	rehole); Cs	s = 1	.2 (SP1	Sampler without liner); Cs = 2/3 (California Sampler)
Not	es:	Т	OTAL D	DEPTH:	10'	GRO	UND	WAT	ER: NO	REFUSAL/CAVING: NO BACKFILLED: YES

P	LATE	2.1	2

SUB-SURFACE DATA

BORING LOG NO. B-13

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/18/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS **GRAPHIC LOD** 200 SCREEN Z PASSING (FT) MOISTURE N(60) DENSITY FIELD DEPTH BULK RING % 0 ALLUVIUM - Qal - (0' - 15') SPT 6 8.3 2.5' - 5' - Medium reddish brown very fine- to fine-grained silty sand, humid, -firm. . SPT 9 12.4 Х 33 25.3 10.9 93.8 -SPT 17 -23.5 7.5' - 10' - Medium brown fine- to medium-grained silty sand to sandy silt, 1 humid, firm. 10 SPT 11 15.2 54 12.5' - 15' - Medium brown fine- to coarse-grained silty sand, dry, firm. SPT 15.2 -11 . SPT 40 55.2 SAUGUS FORMATION - Ts - (15' - 17.5') - Medium brown fine- to medium-grained Х 50 for 6" _ 8.1 silty sand to sandy clay, slightly moist, very dense. SPT 50 for 3" -End at 17.5' -20 --30 -40 -50 -60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 17.5' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES



SUB-SURFACE DATA

BORING LOG NO. **B-14**

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

DATE: 02/17/15

FILE NO .: GC14-122536

	INC	00	

METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT DESCRIPTION AND REMARKS SIEVE **GRAPHIC LOG** IELD (N) 200 SCREEN % PASSING DEPTH (FT) MOISTURE N(60) DENSITY BULK RING II. 0 ALLUVIUM - Qal - (0' - 12.5') 1 SPT 6 8.3 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose. ~ SPT 9 -12.4 5' - Light to medium brown very fine-grained silty sand, humid, slightly firm. 33 . х 25.3 8.0 97.9 21 SPT 17 23.5 7.5' - 12.5' - Medium brown very fine- to fine-grained silty sand to sandy silt, . < humid, dense. 11 SPT 10 11 15.2 -: SPT 50 for 6" SAUGUS FORMATION - Ts - (12.5' - 20') - Medium brown fine- to medium-grained . SPT 50 for 5" clayey to silty sand, humid to slightly moist, dense. х 50 for 6" 13.8 97.7 • -SPT 50 for 3" ·'`~ 20 SPT 50 for 4" End at 20' 30 40 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 20' GROUNDWATER: NO **REFUSAL/CAVING: NO** BACKFILLED: YES



SUB-SURFACE DATA

BORING LOG NO. B-15

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/17/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS MOISTURE % 200 SCREEN GRAPHIC LOO DEPTH (FT) PASSING FIELD (N) N(60) DENSITY BULK RING % 0 ALLUVIUM - Qal - (0' - 7.5') ~ 7 1.6 SPT 9.7 -2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose. SPT 7 9.7 -5' - Light to medium brown very fine-grained silty sand, humid, slightly firm. 11. 0 Х 50 for 5" 7.5 98.2 SPT 69 -95.2 SAUGUS FORMATION - Ts - (7.5' - 20') 17 -7.5' - 17.5' - Medium brown very fine- to fine-grained silty sand to sandy silt, 1 10 SPT 50 for 4" humid, very dense. 7: SPT -50 for 5" SPT -50 for 5" х 50 for 4" 13.2 100.0 1 SPT -50 for 5" : .- -20 SPT 50 for 4" 20' - Medium brown fine- to medium-grained clayey to silty sand, humid to slightly moist, very dense. -End at 20' -_ -30 ----40 ---50 ----. 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) TOTAL DEPTH: 20' Notes: **GROUNDWATER: NO** REFUSAL/CAVING: NO BACKFILLED: YES



SUB-SURFACE DATA

BORING LOG NO. B-16

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO.: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/17/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS 200 SCREEN **GRAPHIC LOD** % PASSING DEPTH (FT) ŝ MOISTURE N(60) DENSITY FIELD (BULK RING 0 ALLUVIUM - Qal - (0' - 15') 1 SPT 8 11.0 2.5' - Medium to dark brown very fine- to fine-grained silty sand, slightly moist, loose. SPT 9 12,4 5' - 10' - Medium brown very fine- to fine-grained silty sand, dry, firm. 1 52 39.9 X 7.1 104.9 26 SPT 35.9 10 SPT 20 27.6 6 20 SPT 27.6 -12.5'- 15' - Light to medium brown very fine- to fine-grained silty sand to SPT 50 for 5" sandy silt, slightly moist, dense. х 50 for 5" 107.4 12.6 SAUGUS FORMATION - Ts - (15' - 22.5') - gray siltstone. SPT -50 for 3" 20 SPT 50 for 4" SPT 50 for 2" End at 22.5' -1 --30 -40 . 50 . . 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) TOTAL DEPTH: 22.5' Notes: GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.16

SUB-SURFACE DATA

BORING LOG NO. B-17

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/18/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS **GRAPHIC LOO** 200 SCREEN DEPTH (FT) % PASSING FIELD (N) MOISTURE N(60) DENSITY BULK RING 0 ALLUVIUM - Qal - (0' - 5') . SPT 5 6.9 2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose. SPT 15.2 -11 SAUGUS FORMATION - Ts - (5' - 15') х 68 10.0 14 52.1 98.1 5' - 7.5' - Medium to dark brown fine- to medium-grained silty sand, humid, slightly -. firm. 1... . 7.5' - 15' - Medium brown fine- to medium-grained silty to sandy clay, humid, . . 10 SPT 28 38.6 very dense. 77 . 1.1 -SPT 56 77.3 7.2 SPT -50 for 5" End at 15' -. 20 ----. 30 ---40 -. -50 . . . -• 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 15 GROUNDWATER: NO **REFUSAL/CAVING: NO** BACKFILLED: YES

PLATE 2.17

SUB-SURFACE DATA

BORING LOG NO. B-18

PROJEC	CT:	D.F	R. HORT	TON - LY	ONS C	ANYON	RAN	CH, S	SANTA (CLARITA FILE NO.: GC14-122536
ELEVAT	ION	1:	SEE PL	ATE 1						DATE: 02/18/15
METHO	D: 6	-incl	h Hollow	Stem A	uger					
SA	MP	LE	BLOW	COUNT			SIE	VE	1	DESCRIPTION AND REMARKS
<u> </u>	Τ		<u> </u>		%		()	Ϋ́.	8	
DEPTH (FT BULK		RING	FIELD (N	N(60)	MOISTURE	DENSITY	% PASSING	# 200 SCRE	GRAPHIC L	
0 0 0 SF - SF	nen	∞x	LL 10 15 50 fc 50 fc 50 fc 50 fc	13.8 20.7 or 6" or 3" or 3"	8.2	a 105.0	facto	prs w = 1		ALLUVIUM - Qal - (0' - 7.5') 2.5' - Dark brown very fine- to fine-grained silty sand, moist, slightly firm. 5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense. SAUGUS FORMATION - Ts - (7.5' - 10') - Dark brown fine- to coarse-grained silty sand, slightly moist, very dense. End at 10' fized to determine N(so) (Per SP117) Sempler without liner): Ce = 2/3 (California Sempler)
Notes		<u>т</u>		FPTU	10'	GPO		- 1. NAT	ER. NO	
		-			10	ONO				DI ATE 040
										PLAIE 2.18

SUB-SURFACE DATA

BORING LOG NO. B-19

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/19/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT DESCRIPTION AND REMARKS SIEVE 200 SCREEN **GRAPHIC LOC** (Z PASSING MOISTURE DEPTH (FT) N(60) FIELD (DENSITY BULK RING % 0 ALLUVIUM - Qal - (0' - 7.5') - Medium brown fine-grained silty sand, dry, slightly 1 2.1 SPT 20 27.6 firm. . 1. SPT 16 22.1 -1 х 80 61.3 9.8 91.5 SPT 58 80.0 PICO FORMATION - Tp - (7.5' - 15') 1 7.5' - 12.5' - Medium brown claystone to siltstone. 10 SPT 32 44.2 SPT 50 for 5" ~ 12.5' - 15' - Dark brown claystone to siltstone. SPT 80 110.4 End at 15' 20 30 40 50 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 15' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

PLATE 2.19

			GC) (:0/	45	T	GE	OSERVICES, INC.
	sι	JB	SUF	RFA	CE	DAT	٢A			BORING LOG NO. B-20
PRO ELE\ MET	JECT /ATIC HOD:	: D. DN: 6-inc	R. HORT SEE PL	TON - LY ATE 1 v Stem A	ONS C	CANYO	NRAN	NCH, S	SANTA (CLARITA FILE NO.: GC14-122536 DATE: 02/19/15 DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW	COUNT			SIE	VE		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOC	
0 - - - - - - - - - - - - - - - - - - -	SPT SPT SPT	x	9 50 fr 50 fr 79 50 fr	12.4 27.6 or 3" 109.0 or 2"	8.1	103.9		**		ALLUVIUM - Qai - (0' - 7.5') 2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, sightly firm. 5' - Medium brown fine- to medium-grained silty sand, humid, firm. PICO FORMATION - Tp - (7.5' - 12.5') - Medium brown siltstone End at 12.5
60 Con	nme	nts:	The f	ollowin	g corr	ection	fact	ors v	vere uti	lized to determine N(60) (Per SP117)
Net	Cb	= 1.	15 (8" [Diamet	er Bo	rehole); C	s = 1	.2 (SP1	Sampler without liner); Cs = 2/3 (California Sampler)
NOT	es:	Ť		JEPTH:	12.5'	GR	OUN	IDWA	ATER: N	O REFUSAL/CAVING: NO BACKFILLED: YES
										PLATE 2.20

SUB-SURFACE DATA

DEPTH (FT)

0

-

10

-

20

-

30

40

50

BORING LOG NO. **B-21** PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/13/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS Š 200 SCREEN z PASSING MOISTURE GRAPHIC N(60) DENSITY FIELD BULK RING ALLUVIUM - Qal - (0' - 47.5') SPT 3 2.5' - 5' - Medium to dark brown very fine- to medium-grained silty sand, 4.1 humid, loose. SPT 3 4.1 х 26 19.9 5.7 99.0 SPT 13 17.9 7.5' - 10' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm. SPT 8 11.0 7 SPT 9 12.5' - 22.5' - Medium to dark brown very fine- to fine-grained silty sand, 12.4 SPT 6 8.3 humid, slightly firm. Х 15 11.5 9.2 104.6 1. SPT 8 11.0 SPT 14 19.3 SPT 19 26.2 SPT 20 27.6 33 25.3 108.7 х 9.8 0.0 SPT 31 42.8 27.5' - 30' - Medium brown fine- to coarse-grained pebbly silty sand, humid, SPT 29 40.0 dense. × .1 SPT 33 45.5 35' - Medium reddish brown fine- to coarse-grained pebbly sand, humid, 0 SPT 28 38.6 dense. 0 х 58 44.5 18.8 107.9 37.5' - 47.5' - Medium brown fine- to medium-grained silty sand to sandy silt, moist, SPT 32 44.2 firm. 1 SPT 33 45.5 SPT 30 41.4 il SPT 34 46.9 х 50 for 4" 6.7 114.3 SPT 40 55.2 i.t SAUGUS FORMATION - TS - (47.5' - 50') - Medium reddish brown fine- to very SPT 57 for 5" coarse-grained clayey to silty sand, moist to saturated, dense.

End at 50' 60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 50' GROUNDWATER: NO **REFUSAL/CAVING: NO** BACKFILLED: YES PLATE 2.21

SUB-SURFACE DATA

BORING LOG NO. B-22

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

DATE: 02/13/15

FILE NO .: GC14-122536

MET	HOD:	6-ind	h Hollow	Stem A	Auger					DRILLING CO.: HD DRILLING
	SAM	PLE	BLOW	COUNT			SIE	EVE		DESCRIPTION AND REMARKS
DEPTH (FT)	BULK	RING	FIELD (N)	N(60)	MOISTURE %	DENSITY	% PASSING	# 200 SCREEN	GRAPHIC LOG	
0 -	SPT		2	2.8				#	1	ALLUVIUM - Qal - (0' - 17.5') 2.5' - 5' - Dark brown fine- to medium-grained silty sand, humid, loose.
-	SPT		3	4.1					.7	
-	SPT	х	24 15	18.4 20.7	3.8	103.7				7.5' - 15' - Dark brown fine- to very coarse-grained silty sand, humid, slightly firm.
10	SPT		15	20.7					2.1	
-	SPT		19	26.2					1	
-	SPT	x	60 70	46.0	8.7	119.1			1	SAUGUS FORMATION - TS - $(17.5' - 32.5')$
20	SPT	5.1	53	73.1					Ny.	17.5' - 27.5' - Medium yellowish brown medium- to very coarse-grained sand, humid, very dense.
•	SPT		68	93.8					1.	
•	SPT		65	89.7						
	SPT	x	50 f	or 3" or 6"	12.6	110.4			1.7	27.5' - 32.5' - Medium yellowish brown medium- to very coarse-grained silty sand, slightly moist, very dense.
30 -	SPT		50 f	or 6"					1.1	
-	SPT		50 f	or 5"					<u> </u>	End at 32.5'
-										
40										
-										
-										
- 50										
-										
-										
-										
60 Con	nme	nts	The f	ollowin			fact	ore	Are uti	lized to determine N(w) (Per CD117)
	Cb	= 1.	15 (8" [Diamet	ter Bo	rehole); Cs	s = 1	.2 (SP1	Sampler without liner); Cs = 2/3 (California Sampler)
Not	es:	Т	OTAL D	EPTH:	32.5'	GR	OUN	IDW/	ATER: N	IO REFUSAL/CAVING: NO BACKFILLED: YES
										PLATE2.22

SUB-SURFACE DATA

BORING LOG NO. **B-23**

PLATE 2.23

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA ELEVATION: SEE PLATE 1

DATE: 02/16/15

FILE NO.: GC14-122536

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METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS L00 SCREEN DEPTH (FT) Z PASSING MOISTURE GRAPHIC N(60) DENSITY ELD BULK RING 200 % 0 ALLUVIUM - Qal - (0' - 27.5') . SPT 3 4.1 2.5' - Dark brown very fine- to medium-grained clayey to silty sand, " slightly moist, loose. SPT 15 20.7 -5' - Dark brown very fine- to medium-grained clayey to silty sand, 1 : х 57 43.7 8.0 97.0 - humid, firm. ... SPT 30 41.4 7.5' - 10' - Medium to dark brown fine- to coarse-grained clayey to silty 7 + sand, humid, firm. 10 SPT 14 19.3 1 1 -Tur SPT 12 16.6 12.5' - 17.5'- Medium to dark brown fine- to coarse-grained clayey to . .. SPT 5 6.9 silty sand, slightly moist, slightly firm. 27 20.7 11.5 107.4 х SPT 12 16.6 20 SPT 13 17.9 20' - 27.5' - Medium to dark brown fine- to very coarse-grained gravelly to 1_1 Y. pebbly clayey to silty sand, humid to slightly moist, slightly firm. 50 SPT 18 24.8 -SPT 13 17.9 -SAUGUS FORMATION - Ts - (27.5' - 30') × 43 33.0 4.3 х 111.7 25' - 27.5' - Medium yellowish brown fine- to coarse-grained silty sand SPT 46 63.5 containing pebbles, humid, firm to dense. 10 SPT 30 50 for 5" 30' - Rock/boulder 90 -40 -50 ----60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: TOTAL DEPTH: 30' **GROUNDWATER: NO REFUSAL/CAVING: NO** BACKFILLED: YES

GOLD COAST GEOSERVICES, INC. SUB-SURFACE DATA BORING LOG NO. **B-24** PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/16/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS GRAPHIC LOO 200 SCREEN 2 PASSING (FT) MOISTURE N(60) DENSITY ELD DEPTH BULK RING ī. % 0 ALLUVIUM - Qal - (0' - 27.5') -SPT 6 8.3 -2.5' - Dark brown fine- to medium-grained clayey to silty sand, slightly moist, · . slightly firm. -SPT 33.1 5' - 10' - Dark brown fine- to medium-grained clayey to silty sand, humid, 24 ţ. 1 Х 42.2 55 8.6 83.1 firm to dense. 5: SPT 20 27.6 -1. 10 SPT 13 17.9 SPT -17 23.5 12.5' - 27.5' - Medium brown fine- to medium-grained clayey silt to silty clay, SPT 8 11.0 -~ humid to slightly moist, firm to dense. 1: 39 29.9 х 15.9 95.6 SPT 21 29.0 1-20 SPT 13 17.9 SPT 57 78.7 -~ SPT -24 33.1 PICO FORMATION - Tp - (27.5' - 37.5') - 10 50 for 4" 18.5 101.1 х 27.5' - 35' - Medium to dark grayish brown fine-grained clayey silt to silty clay, 12 50 for 5" SPT ~ moist, dense. 30 SPT 64 88.3 SPT 60 82.8 ~ . _ SPT 42 58.0 35' - 37.5' - Dark brown claystone to siltstone, very dense. End at 37.5' х 50 for 5" 27.5 94.9 SPT 50 for 4" 40 .

-												
-												
- 60												
Con	nme	nts	The f	ollowin	a corr	oction	factors u			d to determine N() (D		·
	Cb :	= 1.1	15 (8" [Diamet	er Bor	ection	; <u>Cs = 1</u> .	2 (SPT	Sa Sa	a to determine N(60) (Per S ampler without liner); Cs =	SP117) 2/3 (California S	Sampler)
Not	es:	Т	OTAL D	DEPTH:	37.5'	GR	OUNDWA	TER: N	0	REFUSAL/CAVING: NO	BACKFILLED:	YES
											PLATE	2.24

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GOLD COAST GEOSERVICES, INC.SUB-SURFACE DATABORING LOG NO. B-25

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA FILE NO .: GC14-122536 ELEVATION: SEE PLATE 1 DATE: 02/16/15 METHOD: 6-inch Hollow Stem Auger DRILLING CO .: HD DRILLING SAMPLE BLOWCOUNT SIEVE DESCRIPTION AND REMARKS **GRAPHIC LOG** 200 SCREEM % PASSING DEPTH (FT) Z NOISTURE N(60) DENSITY FIELD BULK RING 0 ALLUVIUM - Qal - (0' - 17.5') . -SPT 14 19.3 2.5' - Medium to dark brown fine- to medium-grained silty sand, humid, firm. ./ SPT -41 56.6 5' - 12.5' - Medium brown fine- to coarse-grained clayey to silty sand, humid, 17:4 х 82 62.9 7.5 99.1 firm to dense. SPT 38.6 28 17 10 SPT 20 27.6 SPT 29 40.0 SPT 8 11.0 15' - 17.5' - Light yellowish brown very fine- to fine-grained silty sand to sandy silt, х 50 for 3" humid, slightly firm. SPT 70 96.6 SAUGUS FORMSTION - Ts - (17.5' - 27.5') 17.5' - Medium reddish brown fine- to medium-grained clayey to silty sand, SPT 20 31 42.8 dry, very dense. 20' - Medium reddish brown siltstone, very dense. SPT 50 for 6" 22.5' - Light grayish brown siltstone, very dense. SPT 40 55.2 25' - Medium gray siltstone, very dense. 50 for 3" х End at 27.5' 30 40 --50 -60 Comments: The following correction factors were utilized to determine N(60) (Per SP117) Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler) Notes: **GROUNDWATER: NO** TOTAL DEPTH: 27.5' **REFUSAL/CAVING: NO** BACKFILLED: YES

2.25

PLATE

GEOTECHNICAL BORING LOG

SHEET 1 OF 2





SHEET 2 OF 2

Horse Horse Horse Horse Horse Geotechnical description 1325 1320 1325 1 ALLUVIUM (Gal): Silt; moderate yellowish br slightly moist, soft to firm at depth. 5-1320 1 Silty Sand; very fine- to fine-grained, moderate brown, slightly moist, moderately dense, som lenses of coarse-grained Sand and Pebbles, organic pods. Silty Sand; very fine- to fine-grained, moderately dense, som lenses of coarse-grained Sand and Pebbles, organic pods. 20-1305 R 1 Increasing pebbles and some cobbles.	ON Gry to	CONT. (%)	DRY (pcf) DENSITY	RATION (%)	
1326 ALLUVIUM (Qal): Silt; moderate yellowish br slightly moist, soft to firm at depth. 5-1320- Silty Sand; very fine- to fine-grained, moderate brown, slightly moist, moderately dense, som lenses of coarse-grained Sand and Pebbles, organic pods. 10-1315 R 11-1315 R 12-1310 Increasing pebbles and some cobbles.	own, dry to			D	OTHER
Silty Sand; very fine- to fine-grained, moderate brown, slightly moist, moderately dense, som lenses of coarse-grained Sand and Pebbles, organic pods.	Ī				-
20 - 1305 - R = 1 25 - 1300 - 10	e yellowish a interlayered some small	7.7	102.0	32	
25-1300- Increasing pebbles and some cobbles.		8.7	105.0	40	
	Ī				
Bebbly Sand; fine- to very coarse-grained, pa	le yellowish	3.7	121.6	27	

SHEET 1 OF 2

GEOTECHNICAL BORING LOG

SHEET 2 OF 2

(feet)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER
	1 285 -	R	8			Silty Sand; fine- to very coarse-grained with pebbles, moderate yellowish brown, slightly moist to moist, dense.	6.8	122.2	51	
45-	1280- -	B								
50-	- 1275-	R	6			Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, moist, moderately dense to dense.	5.5	135.5	61	
						Water at 53 <u>+</u> feet. <u>Caving from 52 to 54+ feet.</u> Total Depth 54 feet. Water at 53 feet. Caving from 52 to 54 feet. Hole backfilled with native materials and tamped.	-			
		-								
AMP	LE TY RING SPT (PES: (DRIV SPLIT	E) SAM	PLE I) SAMP	LE	GROUNDWATER LEVEL	C S	DIL	S I, IN	c.

SHEET 1 OF 2

GEOTECHNICAL BORING LOG

PROJECT NO. PROJECT NAME Lyons Canyon Ranch 102453-T BORING DESIG. 6/20/01 GROUND ELEV. B-3 DATE STARTED 1331 LOGGED BY DATE FINISHED 6/20/01 GW DEPTH (FT) CRN Ledezma Drilling DRIVE WT. NOTE 0-24' 3548#; 24-47' DRILLER See Note TYPE OF DRILL RIG 30" Bucket Auger DROP 12 inches 2577#: 47-73' 1648# MOISTURE CONT. (%) URATION ATTITUDES LITHOLOG' DRY (pcf) DENSITY OWS/FT **DTHER TESTS** DEPTH (feet) ELEV SAMPL GEOTECHNICAL DESCRIPTION B ALLUVIUM (Qal): Silty Sand; very fine- to fine-grained, 1330 pale yellowish brown, dry, loose. Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, dry to slightly moist, loose to moderately dense. 5 1325 10 В 1320 1 to 2+ feet thick boulder lense with 6 to 12+ inch boulders. Silty Sand; fine to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, moderately dense. 15-2.3 106.7 11 R 1 1315 20 115.3 35 Silty Sand; very fine- to fine-grained with pebbles, moderate 5.7 R/B 2 1310 yellowish brown, slightly moist to moist, moderately dense. 25 Silty Sand; fine- to coarse-grained with pebbles and cobbles, 1305 moderate yellowish brown, slightly moist, moderately dense. 30 Silty Sand; very fine- to fine-grained with pebbles, moderate 4.9 114.1 28 R 3 1300 yellowish brown, slightly moist to moist, moderately dense. 35 1295 SAMPLE TYPES: **Y** GROUNDWATER LEVEL PACIFIC SOILS R RING (DRIVE) SAMPLE

WATER SEEP

B BEDDING

JOINTING

S SPT (SPLIT SPOON) SAMPLE

T TUBE SAMPLE

B BULK SAMPLE

C CONTACT

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ENGINEERING, INC. PLATE A-5

PROJI DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	d. Ted Ied Ill Ric	G	102453 6/20/0 6/20/0 edezma D "Bucket	-T 1 Drilling Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1331 BORING DESIG. GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE 0-24' 3548#; 2 DROP 12 inches 2577#; 47-73'	B-3 CRN 4-47' 1648#		
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	лтногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	DRY (pcf) DENSITY	URATION	OTHER
	1290-	R/B	6			10.4	115.0	63	
45-	- 1285 -					SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Sandstone; very fine- to fine-grained, medium light gray, slightly moist, moderately hard to hard.			
50-	1280-	R/B	18			Siltstone; mottled olive gray and light gray, slightly moist, hard.	115.7	97	
	0					No water and no caving. Hole backfilled with native materials and tamped.			
									-
									-
SAMI R	PLE TY RING SPT (BULK	PES: (DRIV SPLIT SAMP	E) SAN SPOO PLE	APLE N) SAMP	LE E SAMPLE	Y GROUNDWATER LEVEL WATER SEEP B BEDDING JOINTING S SHEAR Y GROUNDWATER LEVEL PACIFIC S ENGINEER		S G, IN	

TYPE OF DRI	LL RIG	6/20/01 Ledezma Drilling 30" Bucket Auge	GROUND ELEV. 1342 BORING DES GW DEPTH (FT) 14 LOGGED BY DRIVE WT. See Note NOTE 0-24' DROP 12 inches 2577	3548#; 24 #; 47-73'	B-4 CRN 4-47' 1648#	-	
DEPTH (feet) ELEV.	SAMPLE TYPE BI OWSTET	LITHOLOGY	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER
- 1340- 	R/B	1	ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, slightly moist to moist, moderately dense. Silty Sand to Sandy Silt; very fine-grained with few pebbles, dark yellowish brown, slightly moist to moist, moderately dense. Water seep and caving from 7 to 9± feet. Pebbly Sand; coarse-grained with abundant cobbles, dark yellowish brown, wet, moderately dense. Water at 14± feet, caving from 14 to 16± feet. Total Depth 16 feet. Water and caving at 7 to 9 feet and 14 to 16 feet. Hole backfilled with native materials and tamped.	19.8	108.3	96	

PROJECT NO. <u>102453-T</u> DATE STARTED <u>6/20/01</u> DATE FINISHED <u>6/20/01</u> DRILLER <u>Ledezma Drilling</u> TYPE OF DRILL RIG <u>30" Bucket Auger</u>			102453 6/20/0 6/20/0 dezma D Bucket	-T 1 1 Drilling Auger	Instruction Instruction Instruction Instruction PROJECT NAME Lyons Canyon Ranch BORING DESIG. B-5 GROUND ELEV. 1388 BORING DESIG. B-5 GW DEPTH (FT) 15 LOGGED BY CRN DRIVE WT. See Note NOTE 0-24' 3548#; 24-47; DROP 12 inches 2577#; 47-73' 1648#						
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ГІТНОГОСУ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER	
5-	1385-					ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry and loose/soft within top 3±, feet becoming slightly moist and moderately dense/firm at depth.					
10	1380-	R/B	Push		A	Water seep at 10 <u>+</u> feet.					
15-						Water at 15 <u>+</u> feet. <u>Caving from 14 to 16+ feet.</u> Total Depth 16 feet. Water at 10 and 15 feet. Caving from 14 to 16 feet. Hole backfilled with native materials tamped.					
SAMP	PLE TY RING	PES: (DRIV	E) SAM	PLE		GROUNDWATER LEVEL	IC S	OIL	S		

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SHEET 1 OF 1

GEOTECHNICAL BORING LOG

PROJE DATE DATE DRILLI TYPE	EGT NC START FINISH ER OF DRI). ED ED LL RIG	 	102453 6/20/0 6/20/0 lezma D Bucket	I 1 Drilling Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1384 BORING DESIG. GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE 0-24' 3548 DROP 12 inches 2577#: 47-	(#; <u>24</u> -73' 1	B-6 CRN -47' 648#		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS
5-	1380-	R/B E	lounce			ALLUVIUM (Oal): Silty Sand to Sandy Silt; very fine- to fine-grained with some pebbles and some cobbles, dark yellowish brown, dry and loose/soft within top 1 to 3± feet, becoming slightly moist to moist and moderately dense/firm at depth. Top 3± feet is porous. Boulders; 1± foot in diameter. No sample due to rocks. <u>Refusal</u> Total Depth 7 feet. No water and no caving. Refusal due to rocks. Hole backfilled with native materials and tamped.				
SAMF R S B	PLE TYP RING (SPT (S BULK)	PES: DRIVE SPLIT S) SAMF SPOON	PLE) SAMP T TUBI	LE E SAMPLE	Image: Second second	SC	DILS	S , IN PLAT	I C.

PROJE	ECT NO START FINISH ER DF DR	D. TED HED ILL R	IG 30"	102453 6/25/0 6/25/0 lezma D Bucket	-T 1 Drilling Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1385 BORING DESIG. GW DEPTH (FT) LOGGED BY LOGGED BY DRIVE WT. See Note NOTE 0-24' 35 DROP 12 inches 2577# 4	48#; 24	B-6B CRN 1-47' 1648#		
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гиногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS
	-1305-			Í.	ġ	ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine- to coarse-grained with pebbles, moderate to dark yellowish brown, top 1+ foot dry and loose/soft, becoming moist and moderately dense/firm at depth.				
5-	1380-	R	2			2 to $3\pm$ foot thick, boulder lenses; 2-1/2 foot diameter boulder at $6\pm$ feet in depth.	9.1	116.9	58	
10-	1375-	R/B	6 for 6"			SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Weathered Silty Sandstone; very fine- to fine-grained, mottled moderate brown and medium light gray, moist, moderately hard, poorly indurated.	13.4	123.0	98	
15-	1370-	B R	11 for 6"			Silly Sandstone; very fine- to fine-grained, medium light gray, moist, moderately hard, moderately indurated.	13.4	120.6	91	
						No water, no caving. Hole backfilled with native materials and tamped.				
								-		
SAMP R S B	RING SPT (BULK	PES: (DRIN SPLIT SAM	VE) SAMP SPOON PLE [PLE) SAMP T TUBI	LE E SAMPLE	GROUNDWATER LEVEL WATER SEEP B BEDDING JOINTING S SHEAR C CONTACT FAULT JOINTING S SHEAR C CONTACT FAULT	C S EER		5 , IN _ATE	IC.

SHEET	1 OF 1
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PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP

102453-T 6/25/01

6/25/01

PROJECT NO.

DATE STARTED DATE FINISHED

Lyons Canyon Ranch 1388 See Note 12 inches

BORING DESIG. B-7 LOGGED BY CRN NOTE 0-24' 3548#; 24-47' 2577#; 47-73' 1648#

(feet)	ELEV.	SAMPLE	BLOWS/FT	ПТНОLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcl) DENSITY	URATION	OTHER
1 1 1	1385 -					COLLUVIUM/ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, dry and loose top 3+ feet, slightly moist and moderately dense at depth, abundant roots and rootlets throughout.				
5-		R/B	4		C: N75W 44NE	1± inch thick yellowish red lense at contact. SAUGUS FORMATION- SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, grayish orange, slightly moist, hard, moderately to well indurated, slight to moderate bedding.	4.6	114.8	27	
10-	1380-	R/B	4 for 3" Bounce		B: NBOW 41NE	1± foot thick, scour/infill structure - infill with fine-grained Sand (attitude from top of Sand infill).	3.4	121.9	25	
	1375- - - - 1370- -				B: N70W 54NE B: N80W 50NE	2± foot thick, scour/infill structure - infill with fine-grained Sand (attitude from top of infill). Silty Sandstone; fine-grained, light gray, slightly moist, hard, well indurated. Used ripper and core bucket from 18 to 19± feet. <u>Refusal at 19+ feet.</u> Total Depth 19 feet. No water, no caving. Hole backfilled with native materials and tamped.				
AMF R S	PLE TY RING SPT (S BULK	PES: (DRI' SPLIT	VE) SAMP SPOON PLE	PLE) SAM T) TUI	PLE BE SAMPLE	GROUNDWATER LEVEL WATER SEEP C CONTACT B BEDDING FAULT JOINTING S SHEAR FAULT	CS		S i, IN	IC.

PROJE DATE DATE DRILLI TYPE	ECT NO START FINISH ER OF DR	D. TED IED ILL RIG	G 30	102453 6/25/0 6/25/0 edezma D " Bucket	-T 1 Drilling Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1353 BORING DESIG GW DEPTH (FT) 19 LOGGED BY DRIVE WT. See Note NOTE 0-24' 3 DROP 12 inches 2577#.	548#; 24 47-73' 1	B-8 CRN 1-47' 1648#		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ЛОПОНТИ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER TESTS
	1350-					COLLUVIUM/ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine- to coarse-grained with pebbles, cobbles, some clay pods, slightly moist to moist, loose/soft to moderately dense/firm at depth.				
- - - 10-	1345-					Increasing peoples and cobbles.	4			
-	1340-						-			
15-	1335-	R/B	6				10.7	122.3	81	
20	1330-	R B	10		1	Water at 19 feet. SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone to Sandy Siltstone; very fine- to fine-grained, light olive, moist, moderately hard, moderately to well indurated, thinly bedded to laminated, weathered.	14.1	121.5	98	
25-						Silty Sandstone; fine to coarse-grained, medium light gray, slightly moist, hard, moderately to well indurated. Total Depth 26 feet. Water at 19 feet. No caving. Hole backfilled.	9.8	122.0	73	
SAMF R S B	RING SPT (BULK	PES: (DRIV SPLIT SAMP	e) san Spoo Ple	MPLE N) SAMP	LE E SAMPLE	V GROUNDWATER LEVEL WATER SEEP B BEDDING J JOINTING C CONTACT F FAULT S SHEAR PACIF ENGIN	IC S		, IN	IC.

GEOTECHNICAL BORING LOG SHEET 1 OF 1

SHEET	1	OF	2
SHELL	- 2	0	

(feet)	ELEV.	SAMPLE	BLOWS/FT	гитногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER
5-	1325 -					ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, top 6± feet dry to moist at depth, loose top 3± feet to moderately dense at depth.	7			
1 1 1 1	- 1320 - -									
10-	- - 1315 - -	R/B	Push			Sandy Silt to Silty Sand; fine-grained, moderate to dark yellowish brown, moist, firm/moderately dense, porous, abundant rootlets.	13.9	115.1	84	
5-	1310-						1			
1 1 1 1	1305-	R	1			Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, moist, moderately dense, micaceous.	12.1	111.7	64	
5	1300-						+			
0	- 1295 -	R/B	Push			Silty Sand to Sandy Silt; fine- to coarse-grained with some pebbles, moderate yellowish brown, moist to very moist, moderately dense, micaceous.	18.0	112.0	100	
15-	1290-						1			
		в		-1		SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silly Sandstone; fine to medium-grained, light olive gray, moist, moderately hard, moderately indurated, slightly	1			

PROJI DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	D. FED HED	G_30	102453 6/25/0 6/25/0 dezma D "Bucket	-T 1 1 Drilling Auger	BEOTECHNICAL BORING LOG PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1327 BORING DESIG GW DEPTH (FT) See Note NOTE 0-24' 3 DROP 12 inches 2577#;	548#; 24 47-73'	8-9 <u>CRN</u> 4-47' 1648#		2 OF
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ГІТНОГОСУ	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
	1285	R	5			to moderately weathered. Total Depth 41 feet. No water, no caving. Hole backfilled with native materials and tamped.	10.0	117.9	63	
SAMF R S B	PLE TY RING SPT (BULK	PES: (DRIV SPLIT SAMF	e) Sam Spoot Ple	IPLE N) SAMP	LE E SAMPLE	Y GROUNDWATER LEVEL WATER SEEP C CONTACT B BEDDING F FAULT J JOINTING	IC S IEER		S S, IN	IC. E A-14

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PROJE DATE DATE DRILLE YPE	ECT NO START FINISH ER OF DR	d. Ted Ied Ill Ri	G	10245 4/25/ 4/26/ ave's I Bucke	3-T 02 02 Drilling t Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1635 BORING DESIG. GW DEPTH (FT) LOGGED BY LOGGED BY DROP 12 inches 3500#; 5	00#; 27	B-10 CRN 7-52' 2500#:		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER
	1635	B		_	B: N75W 46NE	PICO FORMATION (Tp): Sandy Siltstone; very fine-grained Sand, pale yellowish brown, slightly moist, hard, fossiliferous (abundant bi-valves); interbedded with Silty Sandstone; very fine- to fine-grained, pale yellowish brown, slightly moist, hard, scour-fill into Siltstone; both units jointed with caliche infill, both units laminated to 8± inch thick bedding.				
10-	1625 -	R/B	4 for 5"		B: 860W 54NE	Interbedded Silty Sandstone; fine-grained, pale yellowish to grayish orange, slightly moist to moist, hard; with Sandy Siltstone; mottled grayish orange and pale olive gray, slightly moist to moist, hard; both units laminated to 2 <u>+</u> inch thick bedding.	8.8	115.4	54	
15-	1620-				B: N85W 53NE	Some interlayered Silty Claystone; olive gray, moist, moderately firm to firm, laminated, 1 to 2±mm thick layers, some caliche along bedding.	+			
20-	1615-	R/B	5 for 4"		B: 880W 45NE	Silty Sandstone; fine- to medium-grained, light gray with light brown staining, slightly moist, hard, laminated to 1/4 <u>+</u> inch thick bedding./	5.8	108.0	29	
25-	1610-				B: N70W 51NE	Some isolated cobble lenses, quartzite and gneissic composition.				
30-	1605-	R/B	8 for 8"		B: N70W 50NE	Sandy to Clayey Siltstone; very fine-grained Sand; light olive gray, moist, moderately hard to hard, laminated to 1/4± inch thick bedding, some gypsum strands along bedding up to 1/4± inch thick. Some isolated Clay lenses and pods; dark brownish black, moist, moderately firm to firm, concentrated along bedding planes.	11.0	116.4	69	
- 30	1000-				8: N65W 49NE	Claystone layer; 1/4+ inch thick, olive gray, moist, soft, abundant well formed, gypsum crystals.				
SAMF R S	LE TY RING SPT (PES: (DRIN SPLIT SAMI	/E) SAMI SPOON PLE	PLE) SAM	IPLE BE SAMPLE	CONTACT B BEDDING JOINTING B SHEAR C CONTACT B SHEAR C CONTACT C C CONTACT C C CONTACT C C C C C C C C C C C C C C C C C C C	C S EEF		S S, IN	IC.

DRILLER Day TYPE OF DRILL RIG 30" B	4/26/02 re's Drilling lucket Auger	GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE 0-27' 45 DROP 12 inches 3500#.5 80-104'	CRN 500#; 27-52' 52-80' 2500#; 1' 1000#					
DEPTH (feet) ELEV. SAMPLE TYPE BLOWS/FT	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION			
1595 R 8 for 6"	B: N80W 47NE	Sandy Siltstone; fine-grained Sand; olive gray, moist, hard, some laminated to 1/4± inch bedding, generally massive, with abundant cross-cutting gypsum seams. Cobble layers; 1± foot thick, set in pebbly sand matrix, medium- to very coarse-grained, moist, moderately hard to hard, quartzite cobbles and pebbles.	10.0	121.2	73			
45-1590-	B: N85W 57NE	Silty Sandstone; fine-grained, reddish brown, slightly moist to moist, hard; interlayered with Sandy Siltstone; very fine- to fine-grained Sand, moist, moderately firm to firm, some very firm layers, laminated; both units 6 to 12 inch beds.						
50 - 1585 R/B 8 for 5"		Silty Sandstone; fine-grained, pale olive gray, moist, hard.	7.2	113.1	41			
	B: N70W 49NE	Pebble lense; medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale						
55-1580-	B: N75W SONE	olive gray, slightly moist, very hard, slightly concretionary. Some isolated Clay lenses and pods along bedding, 1± inch thick to 6± inches long, medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.	1					
60 - 1575 - R 10 for 5"	B: NBOE 47NW	Silty Sandstone; layered fine- to medium-grained, pale olive gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to 1/2 <u>+</u> inch thick bedding. Siltstone concretion; 1 <u>+</u> inch thick, light to olive gray, slightly moist, very hard, massive, slightly jointed with light brown staining along joints.	7.3	113.0	45			
65-1570-	B: E-W 51N	Some gypsum along bedding; up to 1/4+ inch thick.						
70-1565- R/B 10 for 5"		Clayey Sandstone; very fine- to fine-grained, layered, pale yellowish brown to olive gray, moist, hard, friable, generally massive, some gypsum strands.	12.1	109.6	6			
	B: 880W 48NE							
75-1560-		Clayey Siltstone to Clayey Sandstone layers; 1± foot thick, very fine-grained, medium light to medium gray, moist, hard, micaceous, massive.	-					
	8: N75W 48NE	Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, laminated to 1± inch thick bedding.						



PROJE	ECT NO START FINISH ER OF DR	D. TED IED ILL RIG	; 	10245 4/26/ 4/26/ ave's [Bucke	3-T 02 02 Drilling ot Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1582 BORING DESIG. GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE 0-27' 45 DROP 12 inches 3500#; 5 B0-104'	00#; 27 52-80' 2	B-11 CRN -52' 500#:		
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER
						PICO FORMATION (Tp):			1	
	1580 -				B: N50W 45SN J: N60E Vertical J: N10W 62NE F: N60W 62NE F: N50W 63SW	Sandy Siltstone; very fine-grained Sand, layered light to olive gray and light brown, slightly moist, moderately hard to hard, laminated to 1/2 <u>+</u> inch thick bedding, jointed/weathered, abundant roots. Fault Gouge: 1/4 to 1/2 <u>+</u> inch thick, plastic Clay layer; olive gray, moist, soft to firm, flaky, abundant roots and rootlets.	-			
	1575-	R/B	5		J: N45W 78SW F: N55E 65NW	Fault Gouge: plastic Clay layer; olive gray, moist, soft, flaky, abundant roots.	13.0	119.4	89	
15-					B: N50E 48NW		-			
20-	1565 - 1560 -	R/B 5	i tor 6"		B: N40E 49NW	Some medium sized bi-valves. Sandy Sillstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some isolated small to medium bi-valves.	13.2	122.3	99	
25-	1555-				J: N50W 86SW J: N40E 66NW	Clay lined joint 1-2 mm thick. Gypsum lined joint 2-3 mm thick.	-			
30-	1550-	R/B 8) for 6"		B: N60W 75SW	Sandy Siltstone; very fine-grained Sand, greenish gray, slightly moist, firm, massive, fossiliferous (small bi-valves); interlayered plastic with Silty Sandstone, medium gray, slightly moist, hard, slightly layered to massive; some Interlayered Claystone, medium dark to dark gray, moist, soft to moderately firm, laminated, flaky.	12.2	123.5	95	
35	1545-					Some isolated concretionary pods, 2 to 6± inches in diameter, very hard.	- Contraction of the contraction			
R	PLE TY RING SPT (BULK	PES: (DRIVE SPLIT : SAMP	E) SAMI SPOON LE	PLE I) SAN	IPLE BE SAMPLE	GROUNDWATER LEVEL	C S EER		S, IN	IC.

SHEET 2 OF 3

GEOTECHNICAL BORING LOG

T	OF DR	ш.	E	DUCKE		DROP <u>12 incres</u> <u>3500#.</u> 80-104	52-80'2 1000# 出家	500#:	N	~
(feet)	ELEV	SAMPL	BLOWS/	ГІТНОГО	ATTITUD	GEOTECHNICAL DESCRIPTION	MOISTU CONT. (DRY (po	SAT- URATIC (%)	OTHEF
1 1 1	1540-	R	8 for 6"		B: N20E 55NW	Clayey to Sandy Siltstone; very fine-grained Sand, greenish to dark greenish gray, slightly moist, firm, laminated to massive.	12.3	119.7	85	
45-	- - 1535-				В: N60W 55SW (Арргох.)		-			
						Hard drilling.				
50-	- - 1530-	R/B	10 for 6"			Clayey Siltstone; medium dark gray, slightly moist, firm, slightly laminated, generally massive.	11.9	122.1	89	
					B: N55W 75SW		-			
1 1 1 1	1525 -				B: N20W 67NE (Approx.)	Siltstone concretion lense; 8 to $10\pm$ inches thick, very hard, massive.				
50 -	- 1520 - -	R	15 for 6"		B: N60W Vertical	Clayey Siltstone; olive gray, slightly moist, firm, slightly laminated, generally massive, few small bi-valve shells, Ripple marks, small amplitude.	10.5	121.0	76	
65-	-				B: N50W 52SW		-			
1	- 1515				B: N50W 43SW					
70-	- - 1510- -	R	15 for 5"		B: N80E 59SE	Sandy Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, slightly laminated to 1/2± inch thick bedding, generally massive. Clay lense; 2 to 3± inches thick, medium dark gray, moist, soft, pliable.	10.3	105.0	47	
75-	- - 1505 -				B: NBOW 75SW		-			
AMP	LE TY RING	PES:	/E) SAMF	LE		GROUNDWATER LEVEL		DILS	3	

PROJE DATE DATE DRILLI	START	D. TED IED	D	102453 4/26/0 4/26/0 ave's Dr	2 2 2 illing	PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT.	Lyons Canyon Ranch 1582 See Note	BORIN LOGG NOTE	IG DESIG ED BY)#; 27	B-11 CRN -52'	_	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	КЭОТОНЦІ	ATTITUDES	GEOTEC	HNICAL DESCR	IPTION	_3500#;32 80-104'-10	MOISTURE 5 0 CONT. (%) #	DRY (pcf)	URATION	OTHER
	1500-	R	25 for 3.5"			Total Depth 81 feet. No water, no caving. Hole backfilled with na	tive materials and t	amped.		10.8	120.8	78	
SAMF R S B	LE TY RING SPT (BULK	PES: (DRIN SPLIT SAM	/E) SAM SPOON PLE [PLE) SAMP	LE E SAMPLE	CROUNDWATER	C CONTACT			S SC		S I, IN	IC

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ATE ATE RILLI YPE	TE STARTED TE STARTED TE STARTED 4/29/02 4/29/02 100000 10000 100000 1000000 100000 10000 10000 100000				02 02 Drilling et Auger	GROUND ELEV. 1557 BORING DESIG. GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE 0-27' 450 DROP 12 inches 3500#; 5 80-104'	00#; 27 2-80' 2 1000#	B-12 CRN -52' 500#:		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION (%)	OTHER
5					B: N60W 57NE	PICO FORMATION (Tp): Sandy Siltstone; very fine- to fine-grained Sand; yellowish brown, slightly moist to moist, moderately hard, laminated to 1/2± inch thick bedding; interlayered with Silty Sandstone; fine-grained, mottled moderate yellowish brown and pale olive, slightly moist, moderately hard, laminated to 1/2± inch thick bedding; abundant caliche, both units highly to moderately weathered.				
10-	1555	R/B	5 for 10"		B: NBOE 72NW	Abundant penecontemporaneous deformation. Sandy Siltstone; very fine-grained Sand; light olive gray, slightly moist to moist, moderately hard to hard, slightly laminated generally massive; some interlayered Silty	12.9	117.6	84	
15 -	1540-				8: N50W 65NE	Sandstone, fine-grained, layered yellowish gray and light brown, slightly moist, moderately hard to hard, laminated to 1/4+ inch thick bedding; some fine-grained gypsum along bedding bottom of "high to moderate" weathering zone.				
20-	1535	R/B			B: N70W 73NE	Clayey Siltstone; mottled light to olive gray and moderate brown, slightly moist to moist, moderately hard to hard, massive, micaceous, some fine-rained gypsum strands. Silty Sandstone to Clayey Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some small isolated bi-valves and gastropods.	14.6	115.8	90	
30-	1530 - - - 1525 -	R/B	10 for 10°		B: E-W 64N (Approx.)	Sandy Siltstone; very fine-grained, medium dark gray, slightly moist to moist, hard, slightly laminated, generally massive, slightly fossiliferous, micaceous.	12.6	123.0	97	
	1520 -									

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DATE DATE DATE DRILLE	START FINISH ER OF DR	ED IED ILL RI	IG <u>30"</u>	4/29/ 4/29/ ave's 0 Bucke	02 02 Drilling th Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1557 BORING DESIG. B-12 GW DEPTH (FT) LOGGED BY CRN DRIVE WT. See Note NOTE 0-27' 4500#: 27-52' DROP 12 inches 3500#: 52-80' 2500#: 80-104' 1000#	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ΓΙΤΗΟΓΟGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	OTHER
- - 45- -	1515- - - - 1510-				B: N70W 69NE B: N50W 57NE (Approx.)	Sandy Siltstone to Silty Sandstone; very fine-grained Sand, medium dark gray, slightly moist to moist, hard, slightly laminated generally massive, slightly fossiliferous, micaceous; some interlayered Silty Sandstone, very fine-grained, light gray, slightly moist, hard, and Claystone, brownish to olive black, moist, moderately firm, laminated.	
50-	1505 -	R/B	8 for 8"			Silty sandstone; very fine- to fine-grained, medium dark to olive gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	
55	1500-						
60- - -	- 1495 - -	R/B	15 for 8"		B: N60W 63NE B: N60W 53NE	Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous; some interbedded Claystone lenses, 1 to 2± thick, brownish to olive black, moist, moderately firm to firm, laminated. Silty Sandstone lense; 8± inches thick, light to medium light gray, fine-grained, moist, moderately hard, fossiliferous;	
65-	1490-				B: N50W 52NE	underlain by 1 to 2+ inch thick soft Claystone lense.	
70-	1485-	R	15 for 8"			Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	
75-	1480-				B: N25W 77NE		
SAMF	PLE TY RING SPT (S	PES: (DRIV	/E) SAMF	PLE) SAM	PLE	Y GROUNDWATER LEVEL WATER SEEP B BEDDING F FAULT B BEDDING C CONTACT F FAULT D BEDDING	10

PROJI DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	D. FED HED ILL R	IG	10245 4/29/ 4/29/ ave's I Bucke	i3-T 02 Drilling et Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1557 BORING DESIG. GW DEPTH (FT) LOGGED BY LOGGED BY DRIVE WT. See Note NOTE 0-27' 45 DROP 12 inches 80-104' 80-104'	00#; 27 2-80' 2 1000#	B-12 CRN 7-52' 2500#:		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER
- - 85-	1475-	R/B	20 for 6"		8: N55W 46NE 8: N50W 63NE	Silty Sandstone lense; interbedded with Sandy Siltstone, dark gray, slightly moist, hard, slightly lamainted, generally massive, 1/2 to 1± inch thick beds.	13.3	108.9	68	
90-		R	25 for 5"			Total Depth 91 feet. No water, no caving. Hole backfilled with native materials and tamped.	12.3	104.8	56	
SAMF (R) (S)	PLE TY RING SPT (S BULK	PES: (DRI) SPLIT	VE) SAMP SPOON) PLE	PLE SAM	PLE BE SAMPLE	¥ GROUNDWATER LEVEL ► WATER SEEP B BEDDING B BEDDING F FAULT J JOINTING S SHEAR C CONTACT F FAULT S SHEAR	C SO	DILS	S S, IN	IC.

ROJE ATE ATE RILLI YPE	ECT NO START FINISH ER OF DR	D. TED HED ILL RI	G <u>30"</u>	10245 5/1/0 5/1/0 ave's D Bucke	i3-T D2 D2 Drilling Dt Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1445 BORING DESIG. GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE 0-27' 45 DROP 12 inches 80-104'	00#: 27	B-13 CRN -52' 2500#:		
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER TESTS
	1440-				B: N80E 55NW	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (<u>Tsr</u>): Silly Sandstone; fine- to coarse-grained with pebbles, very pale orange to pale yellowish brown, dry, moderately hard to hard, abundant scour-infill, normal grading.				
- 10- -	1435-	R/B	5 for 5"		B: NBOE 39NW	Silty Sandstone; fine- to coarse-grained, pale yellowish brown, dry to slightly moist, moderately hard to hard.	4.5	116.1	28	
15-	1430-				B: N70E 50NW	Some interlayered Clayey Siltstone layers; 6± inches thick, pale olive gray, moist, moderately hard, laminated.				
	1425-	R/B	5 for 6"			1 foot thick lense of 6 to 8± inch diameter cobbles, scour/infill with lower contact into underlying Siltstone. Sandy Siltstone; very fine- to fine-grained, pale olive gray, moist, moderately hard to hard, slightly laminated generally massive.	11.1	120.1	78	
25-	1420	-			B: E-W-40N	Silty Sandstone; fine- to coarse-grained with some pebble lenses, gravish grange to light olive gray, slightly moist to				
30-	1415-	R	B for 6"			moist, moderately hard to hard, abundant scour-fill, graded bedding, cross-bedding.	5.1	105.6	24	
- 35- - -	1410-				B: N80W 43NE					
AMF	1405 PLE TY RING SPT (PES: (DRIV SPLIT	E) SAME SPOON	PLE) SAM		GROUNDWATER LEVEL WATER SEEP G CONTACT B BEDDING FAULT JUOINTING SI SHEAR SI SHEAR	C S EER		5 5, 11	4C.

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PROJE DATE DATE DATE DRILLI TYPE	ECT NO START FINISH ER OF DR	D. TED IED ILL R	IG _30"	10245 5/1/0 5/1/0 ave's D Bucket	3-T 2 2 rilling : Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1445 BORING DES GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE 0-27' DROP 12 inches 3500 BORING DES BORING DES	4500#; #; 52-8	B-13 CRM 27-52 0' 2500	3 4 #:	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ГІТНОГОСУ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER
		R/B	8 for 6"			Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist to moist, moderately hard to hard; some interlayered Silty Sandstone, fine- to coarse-grained with pebbles, grayish orange, slightly moist, moderately hard to hard.	3.8	112.5	21	
45-	1400-					Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, moderate yellowish to moderate brown, moist, moderately hard to hard.				
50-	1395 -	B	N/R			Discontinuous Paleosol; Silty Sand to Sandy Silt, fine- to coarse-grained dark yellowish brown, moist, soft, 6± inches - thick. Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, some boulders up to 10± inches, moderate yellowish to moderate brown, moist, moderately hard to hard, massive 50/50± clast-matrix supported. @ 50 feet; no sample recovery due to cobbles.				
55-	1390-									
00	1365	R/B	10 for 5"			Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish to moderate brown, moist, hard. <u>FAULT ZONE:</u> Clayey Siltstone; dusky blue green, moist, moderately hard to hard, massive, some polished surfaces, some scour-infill with overlying Sandstone.	7.5	112.7	43	
65- - - - - - - - - - - - - - - - - - -	1380 -	R/B	10 for 10''			 <u>FAULT</u>: Claystone; olive gray, moist, moderately firm, slightly pliable, abundant polished surfaces and striations, laminated to 1± inch thick bedding. @ 66'; Trend and plunge of striations on fault plane: N60E 42W. Silty Sandstone; very fine- to fine-grained, light olive gray, moist, moderately hard, laminated to 2± inch, massive bedding. Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, moist, moderately hard, scourcinfill generally massive matrix supported. 	14.5	119.0	99	
	1370-	B				Total Depth 78 feet. No water, no caving.	-			
SAMP R S	PLE TY RING SPT (PES: DRIV SPLIT	E) SAMP SPOON	LE) SAM	PLE	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index	FIC NEE	SOII	LS G, II	NC.

SHEET 2 OF 2

PLATE A-25

PROJE	ECT NO START FINISH ER DF DR	D. TED IED ILL RIG	 	10245 5/2/0 5/2/0 Dave's D ' Bucket	3-T 2 2 07illling t Auger	PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP	Lyons Canyon Ra 1338 See Note 12 inches	nch BORING DES LOGGED BY NOTE 0-27' 	IG. 4500#; #; 52-8 14' 100	B-1- CRI 27-52 0' 2500	4 V U#;	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ГІТНОГОВУ	GROUP SYMBOL	GEOTECH	INICAL DESCRIP	TION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
5- 	1333 -	B				SOIL: Sandy Silt; very moderate yellowish bra rootlets. ALLUVIUM (Gal): San medium-grained with p brown, dry, loose. Silty Sand; fine- to coa some boulders up to 1 brown, slightly moist, I cobbles consist of gne quartzite. Increase moisture con Boulder lense: 2-1/2 to major caving. Total Depth 8 feet. No water. Moderate to Hole backfilled.	fine- to fine-grained own, dry, very loose dy Silt to Silty Sand lebbles and cobbles rse-grained with pe 0± inches, moderately iss, granite and san tent to slightly moist 3± feet in diameter o major caving 5 to 3	t, pale to , abundant ; very fine- to , pale yellowish bbles and cobbles, e to dark yellowish - dense, stratified ddstone, some t, moderate to 8± feet.				
RSB	RING (SPT (DRIVE	SAMP POON	PLE I) SAMP	PLE E SAMPL	MAX - Max. Density/ DS - Direct Shear HYDR - Hydrometer ASCE - Expansion In CONS - Consolidatio	Dpt. Moist. Analysis dex	PACI ENGI	FIC : NEE	RIN	G, IN	NC.

DATE STARTED DATE FINISHED DRILLER FYPE OF DRILL RI	1024 5/2/ 5/2/ 5/2/ Dave's G 30" Buck	53-T /02 /02 Drilling et Auger	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1338 BORING DES GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE DROP 12 inches 320	SIG 7 4500# 0#: 52-8	B-14 CRI ; 27-52	HB N / D#:	
DEPTH (feet) ELEV. SAMPLE TYPE	LITHOLOGY BLOWS/FT	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
5- 1333 B 10- 1328 - 10- 1328 - 20- 1318 - - - - - - - - - - - - - - - - - - -			SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, pale yellowish brown, dry, very loose, abundant rootlets and gopher holes. ALLUVIUM (Qal): Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, dry, loose to moderately dense, stratified, some boulders to 10 <u>+</u> inches. Increase moisture to: slightly moist. Boulder layer; up to 3 <u>+</u> feet in diameter, moderate caving. Increase moisture to: slightly moist to moist. Boulder layer; up to 2 <u>+</u> feet in diameter, predominantly Sandstone and Pebbly Sandstone, some granite. Clayey Siltstone layer; 1 to 2 <u>+</u> inch thick, mottled moderate yellowish brown and pale olive, moist to wet (perched/saturated), soft. Boulder layer, need rippers/core to continue. Refusal. Total Depth 14 feet. No water. Moderate caving throughout. Refusal - Boulders. Hole backfilled.				



SHEET 2 OF 2

ATE I	ECT NO START FINISH ER OF DR	d. Ted Ied Ill Ri	G F	10245 4/4/0 4/4/0 & W D Rotary V	3-T 2 2 rilling Vash	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1323 GW DEPTH (FT) LOGGED DRIVE WT. See Note DROP 30 inches	DESIG BY 40# for SP ing sample	RW TM T; 400	-1 D # for	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	гітногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER
		SPT	34			Gravelly Sand; fine- to medium-grained, brown, slightly moist, dense, some silt.				
45-	1278 -	SPT	17 for 12"			Gravelly Sand; fine- to medium-grained, brown, moist, dense.	1			
						SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr):				
50-	1273	SPT	75 for 6"			Harder drilling. Sandstone; medium- to coarse-grained with gravel, grayish brown.				
55-	1268 -	SPT	75 for 5"			Silty Sandstone; fine- to coarse-grained with gravel, grayist brown.	n –			
-	1762									
	1205	SPT	50 for 1"		•	No recovery.				
65-	1258	R	50 for 4"			Sandstone; medium- to coarse-grained, brown, hard. Total Depth 65 feet. No apparent water or caving. Hole backfilled.				
AMP	LE TY	PES: DRIVI	E) SAMF	2LE		¥ Ground Water Seepage MAX - Max. Density/Opt. Moist. PA	CIFIC	SOI	LS	

(feet)	ELEV.	SAMPLE	BLOWS/FT	ГІТНОГОВУ	GROUP	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER
						ALLUVIUM (Qal):				
5-	1313	SPT	4			Sandy Silt; fine-grained, brown, slightly moist, soft.				
10-	1308 -	SPT	16			Silty Sand; brown, slightly moist, medium dense, fine- to medium-grained with small pebbles, sample from spoils screen.				
	1303 -	SPT	36	-		Slightly Silty Sand; brown, moist, dense, fine- to medium-grained with pebbles, sample obtained by driving ring sampler 6".				
20	1298 -	TUR	22			Cobbles. Gravelly Silty Sand; fine- to coarse-grained, red/brown, slightly most, medium dense, with pebbles.				
	1293 -	SPT	18			Sandy Silt; brown, slightly moist, very stiff.				
	1288 -	SPT	19			Silty Sand to Sandy Silt; fine-grained Sand, light brown, moist, very stiff.	-			
35-	- 1283 - - -	SPT	35			Silty Sand; fine- to coarse-grained, with gravel, light brown, slightly moist, dense.	_			

SHEET 2 OF 2





GEOTECHNICAL BORING LOG SHEET 2 OF 2

(feet)	ELEV.	SAMPLE	BLOWS/FT	ТТНОГОСУ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	AOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
		SPT	30 for 11"	-		Silty Sand; medium- to coarse-grained, with gravel, light brown, slightly moist, very dense.	-			
45-	1285-	SPT	19			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
- 50 -	1280-	SPT	50 for 10.5"			Slightly Silty Sand; fine-grained, reddish brown, moist, very dense.				
- 55- -	1275-	SPT	31		1	Sandy Silty Clay; fine-grained, light brown, moist, hard, soil obtained from ring sampler, driven 6".				
50 -	1270 -	SPT	75 for 5"			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Slightly Clayey Sand; medium- to coarse-grained, gray.				
55-	1265-	R	60 for 6"			Sandstone; medium to coarse-grained; gray. No sample retrieved. Total Depth 65 feet. Groundwater at 54 feet. No apparent caving. Hole backfilled.				

PROJI DATE DATE DRILL TYPE	ECT N STAR FINISH ER OF DF	D. TED HED	A	10245 4/5/0 4/5/0 & W D Rotary V	3-T 12 Irilling Vash	GEOTECHNICAL BORING LOG PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1408 BORING DESI GW DEPTH (FT) LOGGED BY LOGGED BY DRIVE WT. See Note NOTE 140# DROP 30 Inches ring.s 100	G. for SP ample	S RW- TMI T; 4007	HEET 4 2 7 for	1 OF 1
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ИНОГОСУ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
1 1 1 1						ALLUVIUM (Qal):				
5	1403	TR	7			Sandy Silty Clay; fine-grained Sand, light brown, slightly moist, firm.				
10	1398	SPT	11			Silty Sand; light brown, slightly moist, medium dense.				
	1393 -	SPT	35 for 11"			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Slightly Clayey Siltstone; grayish brown, weathered.				
- 20-	- 1388 -	R	75 for 11"			<u>Very fine Sandy Siltstone; gray, hard.</u> Total Depth 20 feet. No apparent groundwater or caving. Hole backfilled.	14.5	.119.3	100	
SAMP	LE TY RING (SPT (S	PES: DRIV SPLIT	E) SAMP SPOON	LE) SAMF	²LE	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index	IC S	SOIL	.S G, IN	IC.

ATE FINISHED	4/5/02 4/5/02 A & W Drilli Rotary Wa	ingsh	GROUND ELEV. <u>1348</u> GW DEPTH (FT) <u>17</u> DRIVE WT. <u>See Note</u> NOTE <u>14</u> DROP <u>30 inches</u>	BORING DESIG LOGGED BY NOTE140# for SPT ting_sample						
(feet) (feet) ELEV. SAMPLE TYPE BLOWS/FT	Линогоел	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER			
5-1343			ALLUVIUM (Qal):							
10-1338 SPT 8			Silty Sand; tine-grained, light brown, slightly moist, medium dense.							
15-1333 R 5			Silty Sand; fine- to medium-grained, dark brown, slightly	17.3	112.9	99				
20-1328 SPT 6		×.	Clayey to Silty Sand; brown, moist, loose.	-						
25-1323 SPT 10	,		Clayey to Sandy Silt; gray, very moist, stiff.	-						
30-1318 SPT 50 fo	r 8"		Some gravel. Silty fine- to medium-grained Sand; gray, moist, very dense.	-						
35-1313 SPT 57			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone/Sandy Siltstone; brown/gray.	-						

-1	PROJE DATE DATE DRILLE TYPE	ECT NO START FINISH ER OF DR	D. FED HED		10245 4/5/0 4/5/0 & W D Rotary V	3-T 2 2 rilling Vash	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1348 GW DEPTH (FT) 17 DRIVE WT. See Note DROP 30 inches	BORING DES LOGGED BY NOTE 140# 	IG for SP sample			
	DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ланогову	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	ON	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
			R	50 for 10'			Silty Sandstone; medium- to coarse-grained, Total Depth 40 feet. No apparent caving. Groundwater at 17 feet. Hole backfilled.	gray, hard/				
							**					
1 _j.												
	SAMP R S	RING SPT (BULK	PES: (DRIV SPLIT SAM	/E) SAMF F SPOON IPLE	PLE) SAMP	PLE E SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	PACIENG	FIC	SOI RIN	LS IG, II	VC.

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PROJE DATE DATE DRILLI TYPE	ECT N STAR FINISH ER OF DR	D. TED HED HLL RIG		10245 4/5/0 4/5/0 & W D Rotary V	3-T 12 12 rilling Vash	PROJECT NAME GROUND ELEV. Lyons Canyon Ranch GROUND ELEV. 1379 BORING DE GW DEPTH (FT) 18 LOGGED B' DRIVE WT. See Note NOTE 140 DROP 30 inches Lring	SIG Y g.sample	RW- TMI T; 400;	-6 D # for	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	ПТНОГОСУ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pc) DENSITY	SAT- URATION (%)	OTHER TESTS
5-	1374	SPT	6			ALLUVIUM (Qal): Silty Sand; brown, slightly moist, loose.				
	1369	SPT	14			Gravelly Sand; fine- to medium-grained, brown, some silt, slightly moist, medium dense.				
	1364	SPT	23		-	Gravelly Sand; fine- to medium-grained, with some silt, reddish brown, very moist, medium dense.	-			
20-	1359	R	11			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty medium- to coarse-grained Sand; red brown, with gravel, ring sample disturbed.				
25-	1354	R 50) for 6"			- <u>Sandy Siltstone: very fine-grained Sand, bluish gray, hard.</u> Total Depth 25 feet. No apparent caving. Water at 17.5 feet. Hole backfilled.	15.6	116.6	99	
SAMP R S	PLE TY RING (SPT (PES: DRIVE) SPLIT S) SAM	PLE I) SAMF	PLE	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis	IFIC	SOI	LS IG, IN	1C.

PROJE DATE DATE DATE DRILLE	ECT NO START FINISH ER OF DR), TED IED ILL RIC	102453-T 7/31/01 7/31/01 Gregg In-Situ See Note			PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1317 BOR GW DEPTH (FT) LOG DRIVE WT. 140 lbs. NOT DROP 30 inches	ING DESI GED BY E <u>Comb</u> Moun	DESIG. <u>CPT/SPT-1</u> DBY <u>CRN</u> Combo Rig - Truck Mounted, 4-1/2" Rotary Wash SPT & CPT							
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	ГІТНОГОВҮ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		MOISTURE CONT. (%)	DRY (Pcf) DENSITY	SAT- URATION (%)	OTHER				
1 1 1						ALLUVIUM (Qal): (Note: See adjacent exploratory bori B-1 for descriptive log of Alluvium from 0 to 70 <u>+</u> feet).	ing								
5-	1312 -					Begin CPT.									
10-	1307 -														
	1302 -						-								
20-	1297						-								
•.						Stop CPT - Drill through gravelly layers.									
25-	1292					Begin CPT - Stop CPT - (Unable to advance) Drill thro gravelly layers.	ough –								
30-	1287 -	SPT 5	0 for 5'			Begin CPT - Stop CPT (6± inches of advancement). If through gravelly layers.	Drill -								
35-	1282 -														
SAMF	ILE TY	PES:				Ground Water Seepage	PACI	FIC	SOI	LS					

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DODING LOG ----- - -

SHEET 2 OF 3

DATE DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR). Ted Ied Ill Ri		102453 7/31/0 7/31/0 regg In See No	3-T 01 -Situ ote	PROJECT NAME Lyons Canyon Ranch GROUND ELEV. 1317 BORING D GW DEPTH (FT) LOGGED I DRIVE WT, 140 lbs. NOTE C DROP 30 inches M	SIG. <u>CPT/SPT-1</u> Y <u>CRN</u> mbo Rig - Truck nunted, 4-1/2" Rotary ash, SPT & CPT.							
(feet)	ELEV.	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER				
45	1272 - 1267 - 1267 - 1262 -					Begin CPT. Stop CPT. Drill through gravelly layers. Pebbles in auger tip. Gravel lense. Begin CPT. Stop CPT. Drill through gravelly layers. Begin CPT. Stop CPT. Drill through gravelly layers.								
	1252 - 1247 - 1242 -	SPT1	02 for 4'			Gravelly Sand; medium to coarse-grained with pebbles, moderate yellowish brown, moist to wet, dense, interlayered pebble lenses.		SOI	15					

SHEET 3 OF 3

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	гітногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER
1 1 1		SPT	70			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine to coarse-grained with some pebbles, yellowish gray, moist to wet, moderately hard.				
85-	1232 -							4.		
90-	1227 -	SPT	50 for 2"			Gravelly Sandstone to Pebbly Conglomerate; medium to very coarse-grained, light to medium gray, moist, moderately hard.	-			
95-	1222									
100-	1217 -	SPT	50 for 3"			Claystone; 1 to 2± foo thick layer/lense, olive gray, moist to wet, soft to firm. @ 100 feet; No recovery of SPT sample.				
						Hole backfilled with on-site cuttings.				
SAME	PIFTY	PES				Cround Water Seepage				



PROJE DATE S DATE F DRILLE TYPE (CT NO STAR INISH R DF DR	D. TED HED	G	10245 7/31/0 7/31/0 regg In See N	3-T 01 01 01 0-Situ 0te	GEOTECHNICAL BORING LOG PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP DROP GEOTECHNICAL BORING LOG Lyons Canyon Ranch 1363 LOGGED NOTE C 30 inches	DESIG. BY Combo Rig Mounted, 4- Vash SPT	CPT/S CRI Truck 1/2" R(& CPT	HEET PT-2 N	2 OF 2
DEPTH (feet)	ELEV.	SAMPLE	11/SWO18	YOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	AOISTURE	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
		SPT	률 50 for 3"			Silty Sandstone; fine- to coarse-grained, medium gray. slighty moist, hard to very hard. Total Depth 41 feet. Groundwater at 15 feet. No apparent caving. Hole backfilled.			5	
SAMP Rif S B	LE TY RING SPT (BULK	PES: (DRIV SPLIT SAMI	E) SAMP SPOON PLE	LE) SAMI	PLE DE SAMPL	E Constitution Index E Constitution F Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation CONS - Consolidation	CIFIC GINEE	SOI	LS IG, IN PLATI	NC. E A-42



PROJE DATE : DATE I DRILLE TYPE (PROJECT NO. <u>102453-T</u> DATE STARTED <u>1/13/04</u> DATE FINISHED <u>1/13/04</u> DRILLER <u>JN Drilling</u> TYPE OF DRILL RIG <u>30" Bucket Auger</u>				3-T 04 04 ling Auger	GEOTECHNICAL BORING LOG PROJECT NAME GROUND ELEV. GW DEPTH (FT) DRIVE WT. DROP See Note 12 inches	BORING DES LOGGED BY NOTE 0-24 _257	SHEET 2 OF BORING DESIG. <u>B-101</u> LOGGED BY <u>CRN</u> NOTE <u>0-24', 3548;;#; 24-47',</u> _2577#; 47-75', 1648#					
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	ЛТИНОГОСИ	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS		
						Total Depth 40± feet. No water. Some raveling 34 to 36± feet. Hole backfilled.							
SAMP Rif S B	LE TY RING SPT (BULK	PES: (DRIVE SPLIT SAMP	E) SAMP SPOON LE	PLE 1) SAMF [T] TUB	PLE E SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Molst. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation	PAC	FIC	SOI	LS G, IN PLATE	IC. E A-44		
SHEEL T	JF .	2											
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GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T PROJECT NAME Lyons Ranch DATE STARTED DATE FINISHED 1/13/04 GROUND ELEV. BORING DESIG. 1323 B-102 GW DEPTH (FT) LOGGED BY 1/13/04 CRN NOTE 0-24', 3548;;#; 24-47' DRILLER JN Drilling DRIVE WT. See Note TYPE OF DRILL RIG 30" Bucket Auger DROP 12 inches 2577#: 47-75', 1648#

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DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
	1318					SOIL: Sandy Silt; very fine- to fine- with some medium-grained Sand, dark yellowish brown, moist, very loose, abundant roots and rootlets. ALLUVIUM (Qal): Sand Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist to moist, loose.				
-		R/B	1			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, loose, porous, some rootlets.	4.8	100.7	19	
- 10- - -	1313	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, very loose, porous, some rootlets.	9.4	105.1	42	
15-	1308	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, moderate yellowish brown, slightly moist to moist, very loose.	9.8	106.8	46	
20	1303 -	R/B	1			Sandy Sill to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, colour change to moderate yellowish brown, moisture increase to slightly moist to moist, dry to slightly moist, loose.	8.1	107.0	38	
25-	1298	R/B	2			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose to medium dense.	3.0	115.6	18	
30-	1293 -					Increase abundance of pebbles and cobbles.				
1 0 1		R B	3			Pebbly to Cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist to moist, medium dense; Interlayered with Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly	3.8	118.3	24	
35-	1288 -					moist, medium dense. Change to cork-screw auger due to abundant cobbles and boulders (up to 12+ inches). 34 to 38+ feet, moderate to severe raveling of coarse-grained materials. SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr)(?): Clayey to Sandy Silt; fine-grained Sand; moderate yellowish brown, moist, soft.	1			
SAMP RI S B	PLE TY RING (SPT (BULK	PES: DRIVI SPLIT SAME	e) Samp Spoon Ple (PLE I) SAMP T TUB	PLE E SAMPL	Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation PACI ENGI	FIC	SOII	S G, IN	IC. E A-45

Handler Handler Handler Handler Handler Handler Handler Handler GEOTECHNICAL DESCRIPTION Handler Handler Handler More and an analysis GEOTECHNICAL DESCRIPTION Handler Handler More and analysis GEOTECHNICAL DESCRIPTION Handler Handler More and analysis More analysis More analysis Total Depth 38 feet. No water. Moderate to severe raveling 34 to 38± feet. Hole backfilled. Hole backfilled.	PROJE DATE DATE DRILLE TYPE	ECT NO. STARTED FINISHED ER OF DRILL R	NG	102453 1/13/0 1/13/0 JN Drill 0" Bucket	3-T 04 04 ling Auger	GEOTECHNICAL BORING LOG PROJECT NAME Lyons Ranch GROUND ELEV. 1323 BC GW DEPTH (FT) LC LC DRIVE WT. See Note NC DROP 12 inches NC	ORING DES OGGED BY DTE 0-24 2577	IG , 3548; #: 47-7	B-1(CRI #: 24-4 5', 164)2 N 47' 8#	2 0 2
\weathered Tsr?). "Hard Drilling" at auger tip/refusal. Total Depth 38 feet. No weter. Moderate to severe raveling 34 to 38± feet. Hole backfilled.	DEPTH (feel)	ELEV. SAMPLE TYPE	BLOWS/FT	гітногосү	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION		MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER TESTS
			Ð			\weathered Tsr?). "Hard Drilling" at auger tip/refusal Total Depth 38 feet. No water. Moderate to severe raveling 34 to 38± feet. Hole backfilled.		20			
SAMPLE TYPES: Image: Construction of the second	SAMP Rif	PLE TYPES: RING (DRIVI SPT (SPLIT	E) SAM	PLE N) SAMP	LE		PACI	FIC S	SOIL	_S G, IN	IC.

ATE ATE RILL YPE	START FINISH ER OF DR	ied IED	IG _30"	1/13/0 1/13/0 JN Drill Bucket	04 04 04 ling Auger	PROJECT NAME Lyons Ranch GROUND ELEV. 1324 BORING DES GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE DROP 12 inches 2577	G 3548; #: 47-7	B-10 CRN #; 24-4 5', 1648	3 1 7', 3#	
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	гітногоду	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT- URATION (%)	OTHER
						ALLUVIUM (Qal): Sandy Silt; very fine- to fine-grained Sand, dark to moderate yellowish brown, moist, very loose, abundant roots and rootlets.	ţ,			Ī
5-	1319 -	R	Push			Silty Sand; fine- to medium-grained, moderate yellowish brown, slighty moist, very loose. Increase abundance of pebbles.	4.0	103.1	17	
10-	1314 -	R	Push			Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slighty moist, loose to medium dense.	8.6	104.8	38	
	-					Some cobbles and boulders (up to 12+ inches).				
15-	1309 -	R	Push			Silty Sand; fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, loose to medium dense.	8.9	107.4	42	
20-	1304 -	R	1			Silty Sand; fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, loose.	11.1	104.8	49	
25-	1299 -	R	1			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose.	4.8	114.9	28	
30-	1294	R	3			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, medium dense.	6.3	111.6	33	
35-	1289 -					Pebbly to cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist, medium dense to dense.				

RING (DRIVE) SAMPLE S SPT (SPLIT SPOON) SAMPLE B BULK SAMPLE T TUBE SAMPLE MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-47

PROJE	ECT NO STARTI FINISHI ER OF DRI	ED ED LL RIC	G <u>30</u>	10245 1/13/(1/13/(JN Dril Bucket	3-T 04 04 ling t Auger	PROJECT NAME Lyons Ranch GROUND ELEV. 1324 BORING DES LOGGED BY DRIVE WT. See Note DROP 12 inches	IG . 3548; #; 47-7	B-10 CRI #; 24-4 5', 164	13 N 17', 8#	2 OF
DEPTH (feet)	ELEV.	SAMPLE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (Pc) DENSITY	SAT- URATION (%)	OTHER
	-	B	1			Pebbly to cobbly Sand; fine- to coarse-grained with some boulders up to 12± inches, moderate yellowish brown, slightly moist, dense.				
45-	1279 -					Increase abundant of cobbles and boulders.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and Cobble Conglomerate; fine to very coarse-grained Sand matrix, pale vellowish gray, dry to slighty moist, hard. Total Depth 49 feet. No water. No caving. Hole backfilled.				
AMPI RF	LE TYP RING (D SPT (S BULK S	PES: DRIVE) SAMP	PLE I) SAMF	PLE	AX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index	FIC	SOII	LS G, IN	IC.

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SHEET	1	OF	2
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PROJI DATE DATE DATE DRILL TYPE	ECT NO START FINISH ER OF DR	D, TED HED HLL RI	G _ 30	10245 1/13/0 1/13/0 JN Dril "Bucke	3-T 04 04 ling t Auger	PROJECT NAME Lyons Ranch GROUND ELEV. 1315 BORING DES GW DEPTH (FT) LOGGED BY DRIVE WT. See Note NOTE DROP 12 inches 2577	IG , <u>3548;</u> #: 47-7	B-10 CRI #: 24-4 5', 164	N N 8#	
DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	птногосу	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	URATION	OTHER
		-				ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, loose to medium dense. Sandy Silt; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.				
5-	1310-	R	1			Silty Sand; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.	6.8	103.8	29	
10-	1305-	R/B	2			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, medium dense.	6.4	100.4	25	
15-	1300-	R	3			Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, slightly moist, medium dense.	2.4	120.7	16	
20-	1295 -	R	t			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.3	103.4	27	
25-	1290-	B				Pebbly to Cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist to moist, medium dense. Some boulders up to 12± inches.				
30-	1285-	R B	2			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.9	108.2	33	
35-	1280 -	R	3			Interlayered 1+ foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense. Silly Sand; fine- to coarse-grained with pebbles, moderate	3.5	107.7	17	
1 1 1		R	2			yellowish brown, slightly moist, medium dense. Interlayered 1± foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense.	4.0	111.1	21	

✓ Ground Water Seepage MAX - Max. Density/Opt. Moist. DS - Direct Shear HYDR - Hydrometer Analysis ASCE - Expansion Index CONS - Consolidation

SAMPLE TYPES: RING (DRIVE) SAMPLE S SPT (SPLIT SPOON) SAMPLE

B BULK SAMPLE

T TUBE SAMPLE

PACIFIC SOILS ENGINEERING, INC.

PLATE A-49



SHEET 2 OF 2

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01				
EP-1	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silty Sand to Sandy Silt; fine- to medium- grained, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense/soft to firm, abundant roots and rootlets.					
	6 to 8	<u>SAUGUS FORMATION – SUNSHINE RANCH MEMBER</u> Sandstone; fine- to medium-grained, olive gray, slightly moi moderately hard to hard, abundant white carbonate stringers, moderately weathered top $1\pm$ foot.					
		Total Depth 8 feet.					
		No water, no caving.					
EP-2	0 to 15	<u>ALLUVIUM (Qal)</u> : Silty Sand; fine- to coarse-grained with per and cobbles, moderate yellowish brown, dry to slightly moist a loose to moderately dense at depth, abundant roots and rootlets					
		Total Depth 15 feet					
		No water, no caving.					
EP-3	0 to 2½	SOIL: Silty Sand to Sandy Silt; yellowish brown, dry, loose/soft	fine- to medium-grained, moderate , abundant roots and rootlets.				
	2½ to 8	SAUGUS FORMATION – SUN Sandstone; fine- to medium-grai feet highly weathered and loose moderately hard at depth, massiv	NSHINE RANCH MEMBER (Tsr): ned, light olive, slightly moist, top 2 <u>+</u> with abundant roots and rootlets, we.				
		Total Depth 8 feet.					
		No water, no caving.					

TABLE II

Exploratory Pits	Depth (feet)	Logged by: CRN Description Date Logged: 07/05/01					
EP-4	0 to 5	<u>COLLUVIUM (Qcol)</u> : Silty Sapebbles and some cobbles, more moist at depth, loose to moderate	JVIUM (Qcol): Silty Sand; fine- to medium-grained with and some cobbles, moderate yellowish brown, dry to slightly t depth, loose to moderately dense, abundant roots and rootlets.				
	5 to 9	SAUGUS FORMATION – SU Sandstone; fine- to coarse-grain yellowish gray, slightly moist, pebbles lenses, generally massi	INSHINE RANCH MEMBER (Tsr): ned with pebbles and cobbles, light moderately hard, some interbedded ive.				
		Bedding Attitude: @ 7 feet, N	40W, 42NE				
		Total Depth 9 feet.					
		No water, no caving.					
EP-5	0 to 8	ALLUVIUM (Qal): Silty Sand and cobbles, moderate yellowis loose to moderately dense at de	d; fine- to coarse-grained with pebbles sh brown, dry to slightly moist at depth, epth, abundant root, and rootlets.				
	8 to 10	Cobbly Sand; medium- to coars loose to moderately dense, root	se-grained with pebbles, slightly moist, ts to depth.				
	10 to 13	SAUGUS FORMATION – SU Sandstone; fine- to medium-gra moderately hard, slight to moderately hard, slight to mode	INSHINE RANCH MEMBER (Tsr): ained, light olive gray, slightly moist, erate weathering, massive.				
		Total Depth 13 feet. No water, no caving.					

TABLE II

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01				
EP-6	0 to 2	SOIL: Silty Sand; fine- to co moderate yellowish brown, d	ilty Sand; fine- to coarse-grained with pebbles and cobbles, yellowish brown, dry, loose, abundant roots and rootlets.				
	2 to 4	<u>SAUGUS FORMATION – S</u> Cobble Conglomerate; coarse moderately hard.	UNSHINE RANCH MEMBER (Tsr): e-grained Sand matrix, slightly moist,				
	4 to 7	Siltstone; light bluish gray, sl	ightly moist, moderately hard, laminated.				
		Bedding Attitude: @ 5 feet, 1	N50W, 37 NE				
		Total Depth 7 feet.					
EP-7	0 to ½	SOIL: Silty Sand; fine- to co moderate yellowish brown, di	arse-grained with pebbles and cobbles, ry, loose, abundant roots and rootlets.				
	½ to 2	<u>SAUGUS FORMATION – S</u> Pebble Conglomerate; mediu moist, loose, abundant roots.	UNSHINE RANCH MEMBER (Tsr): m- to coarse-grained Sand matrix, slightly				
	2 to 5	Silty Sandstone; fine- to med moist, moderately hard, abun	ium-grained, light yellowish gray, slightly dant roots.				
		Bedding Attitude: @ 3 feet, 1	N60W, 35 NE				
		Total Denth 5 feet					

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-8	0 to 1	lerate yellowish brown, dry, soft,	
	1 to 3	SAUGUS FORMATION – SU Sandy Siltstone; light olive gra abundant white carbonate, high massive.	NSHINE RANCH MEMBER (Tsr): y, slightly moist, moderately hard, ily jointed, slightly laminated, generally
	3 to 5	Claystone; reddish brown, mois abundant white carbonate along	st, moderately hard, highly jointed, g joints.
		Bedding Attitude: @ 4 feet, N	70W, 45NE
		Total Depth 5 feet. No water, no caving.	
EP-9	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silty Sa and cobbles, dark yellowish bro to moderately dense at depth, a	and; fine- to coarse-grained with pebbles own, dry to slightly moist at depth, loose bundant root and rootlets.
	6 to 9	SAUGUS FORMATION – SU Pebble and Cobble Conglomera matrix, slightly moist, moderate	NSHINE RANCH MEMBER (Tsr): ate; medium to coarse-grained Sand ely hard, poorly indurated.
	9 to 12	Silty Sandstone; fine-grained, 1 moderately hard, moderately in	ight olive gray, slightly moist, durated, moderately bedded.
		Bedding Attitude: @ 10 feet, N	V60W, 45NE
		Total Depth 12 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01			
EP-10	0 to 2	SOIL: Sandy Silt; yellowish brown, moist, firm, abundant roo rootlets.				
	2 to 5	SAUGUS FORMATION Clayey Siltstone; light olive slightly fractured; overlies S yellowish gray, slightly moi generally massive.	SUNSHINE RANCH MEMBER (Tsr): gray, moist, moderately hard, massive, Silty Sandstone; fine-grained, light st, moderately hard, slightly bedded,			
		Bedding Attitude: @ 3 feet.	, N45W, 47NE			
		Total Depth 5 feet.				
		No water, no caving.				
EP-11	0 to 3	<u>ALLUVIUM (Qal):</u> Silty S yellowish brown, top 2 <u>+</u> fee moderately dense at depth, a	and; fine- to medium-grained, moderate at dry and loose, slightly moist to abundant root and rootlets, porous.			
	3 to 20	Pebbly Sand; fine- to coarse yellowish brown, slightly m	e-grained with cobbles, light to moderate oist to moist, moderately dense.			
		Total Depth 20 feet. No water, no caving.				

TABLE II

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-12	0 to 3	<u>SOIL</u> : Sandy Silt to Silty Sand; fine to coarse-grained with pebbles cobbles, moderate yellowish brown, dry to slightly moist, soft/loose, abundant roots and rootlets.			
	3 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; fine- to coarse-grained Sand matrix slightly moist, moderately hard, poorly to moderately indurated, moderately bedded.			
		Bedding Attitudes: @ 5 feet, N50W, 44NE @ 8 feet, N45W, 42NE			
		Total Depth 10 feet. No water, no caving.			
EP-13	0 to 6	<u>COLLUVIUM (Qcol):</u> Silty S and some cobbles, moderate to moist, loose to moderately der	Sand; fine- to coarse-grained with pebbles o dark yellowish brown, dry to slightly use, porous, abundant roots and rootlets.		
	6 to 9	<u>SAUGUS FORMATION – SU</u> Pebble and Cobble Conglomer matrix, slightly moist, modera moderately bedded.	JNSHINE RANCH MEMBER (Tsr): rate; medium- to coarse-grained Sand tely hard, moderately indurated,		
		Bedding Attitude: @ 8 feet, N	50W, 46NE		
		Total Depth 9 feet. No water, no caving.			

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01			
EP-14	0 to 6	<u>COLLUVIUM (Qcol)</u> : Silt yellowish brown, dry to slig porous, abundant roots and	y Sand; fine- to medium-grained, dark htly moist, loose to moderately dense, rootlets.			
	6 to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Clayey Siltstone; olive to light olive gray, moist, soft to moderately hard, massive, abundant white carbonate.				
		Total Depth 8 feet.				
		No water, no caving.				
EP-15	0 to 2½	SOIL: Silty Sand; fine- to r to slightly moist, loose, pore holes.	nedium-grained, dark yellowish brown, dry ous, abundant roots and rootlets, gopher			
	2½ to 7	SAUGUS FORMATION – Sandstone; fine- to medium slightly moist, moderately h lenses of pebbles and cobble	SUNSHINE RANCH MEMBER (Tsr): -grained with pebbles, yellowish orange, ard, slightly bedded; some interbedded es with scour-fill basal contacts.			
		Approximate Bedding Attitu	ude: @ 5 feet, N50W, 38NE			
		Total Depth 7 feet.				
		No water, no caving,				

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01			
EP-16	0 to 3	SOIL: Silty Sand to Sandy Silt; fine to medium-grained, moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots an rootlets.				
	3 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr) Pebble Conglomerate; medium- to coarse-grained Sand matrix, slig moist, loose, highly weathered, abundant roots.				
		@ 5 feet, Claystone; 1 to yellowish brown and oliv surfaces, discontinuous 1	4 <u>+</u> inch thick layer, mottled moderate ve gray, moist, soft, flaky, some polished ayer.			
	5 to 9	Sandstone; fine-grained, light olive gray, slightly moist, modera hard, highly weathered, abundant joints, abundant roots along jo				
		Bedding Attitude: @ 5 f	eet, N60W, 32NE			
		Total Depth 9 feet. No water, no caving.				
EP-17	0 to ½	SOIL: Sandy Silt; dark yellowish brown, dry, soft, abundant roots an rootlets.				
	½ to 8	SAUGUS FORMATION Sandstone; fine- to medi moist, moderately hard to slight to moderate beddin	N - SUNSHINE RANCH MEMBER (Tsr): um-grained, light yellowish gray, slightly o hard, top 1± foot moderately weathered, ng with some rootlets along bedding planes.			
		Bedding Attitudes: @ 3 @ 6	feet, N65W, 43NE feet, E-W, 49N			
		Total Depth 8 feet. No water, no caving.				

WDJ-cp-2453RT03-pits

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Logged by: CRN Description Date Logged: 07/05/01		
EP-18	0 to 2	<u>SOIL</u> : Silty Sand; fine- to coarse-grained with pebbles and some cobbles, light to moderate yellowish brown, dry, loose, abundant roots and rootlets.		
	2 to 7	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine-grained, mottled reddish orange and olive gray, moist, hard, top 2 <u>+</u> feet slightly jointed, moderately bedded.		
		Bedding Attitude: @ 5 feet, N60W, 40SW		
		Total Depth 7 feet. No water, no caving.		
EP-19	0 to ½	SOIL: Silty Sand; fine-grained, light to moderate yellowish brown, dry, loose, abundant roots and rootlets.		
	½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine-grained, light olive gray, slightly moist, moderately hard to hard, moderately bedded.		
		Bedding Attitude: @ 41/2 feet, N65W, 40NE		
		Total Depth 6 feet. No water, no caving.		
EP-20	0 to 9	<u>ALLUVIUM (Qal)</u> : Cobbly Sand; fine- to coarse-grained with abundant pebbles, light yellowish brown, top $2\pm$ feet dry and loose, slightly moist to moist and moderately dense to depth, some cobbles up to $12\pm$ inches diameter, abundant roots and rootlets to depth. Severe caving throughout.		
		Total Depth 9 feet No water, caving from 0 to 9 feet.		

TABLE II

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-21	0 to 13	<u>ALLUVIUM (Qal)</u> : Silty Sand to Sandy Silt; fine- to medium-grain with some pebbles and cobbles; moderate yellowish brown, top $2\pm$ f dry and loose, slightly moist to moist and moderately dense to depth poorly consolidated, some roots to depth.			
	13 to 14	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium to coarse-grained Sand matrix, moist, moderately hard to hard, weathered.			
		Total Depth 14 feet			
		No water, no caving.			
EP-22	0 to 7	ALLUVIUM (Qal): Silty Sa pebbles, dark yellowish brow to moist and moderately dens and rootlets.	nd; fine- to medium-grained with some n , top $2\pm$ feet loose and dry, slightly moist se to depth, basal cobbles, abundant roots		
	7 to 10	SAUGUS FORMATION – S Siltstone; moderate yellowish laminated, moderately fractur some roots and rootlets.	UNSHINE RANCH MEMBER (Tsr): a brown, moist, moderately hard, red, some tectonic shears along bedding,		
	10 to 12	Silty Sandstone; very fine- to moist, moderately hard, sligh	fine-grained, olive gray, slightly moist to tly fractured.		
		Bedding Attitude: @ 10 feet	, N60W, 40NE		
		Total Depth 12 feet.			
		No water, no caving.			

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TABLE II

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-23	0 to 1	SOIL: Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, dry, loose, abundant roots and rootlets.			
	1 to 5	<u>SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr):</u> Sandstone; fine- to medium-grained, pale yellowish gray, slightly moist, moderately hard to hard, some rootlets from 1 to $3\pm$ feet in depth.			
		Bedding Attitude: @ 4 feet, N60W, 45NE			
		Total Depth 5 feet. No water, no caving.			
EP-24	0 to 1	SOIL: Silty Sand; fine- to coad dark yellowish brown, dry, loo	arse-grained with pebbles and cobbles, ose, abundant roots and rootlets.		
	1 to 4	SAUGUS FORMATION – SI Pebble and Cobble Conglome matrix, slightly moist, modera	UNSHINE RANCH MEMBER (Tsr): rate; medium- to coarse-grained Sand ately hard to hard, few roots to depth.		
	4 to 5	Sandstone; fine- to medium-g moist, moderately hard, mode	rained, light yellowish gray, slightly rately bedded.		
		Bedding Attitude: @ 41/2 feet	, N60W, 40NE		
		Total Depth 5 feet.			
		No water, no caving.			

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description		Logged by: CRN Date Logged: 07/05/01	
EP-25	0 to 2½	<u>COLLUVIUM (Qcol)</u> : Silty Sand to Sandy Silt; very fine- to fine- grained with some isolated pebbles, moderate to dark yellowish brown dry to slightly moist, loose/soft, abundant roots and rootlets, porous.			
	2½ to 5	Clayey Silt; moderate to dark yellowish brown, slightly moist, soft to firm, porous, abundant caliche.			
	5 to 9	<u>PICO FORMATION (Tp):</u> Clayey Siltstone; mottled pale olive and light brown, slightly moist, moderately firm, laminated to 3 thick bedding, weathered to a depth of 7± feet.			
		Bedding Attitudes:	@ 6 feet, N50E, 32SE @ 8 feet, N80E, 35SE		
		Total Depth 9 feet. No water, no cavin	g.		
EP-26	0 to 1½	<u>SOIL:</u> Silty Sand to yellowish brown, do rootlets, porous.	to Sandy Silt; very fine- t Iry to slightly moist, loos	to fine-grained, moderate se, abundant roots and	
	1½ to 6	PICO FORMATIC moderately firm, la weathered with roc	<u>N (Tp):</u> Clayey Siltston minated to massive 2±-i ots and caliche to a depth	e; pale olive, slightly moist, nch thick bedding, of 3½ feet.	
		Bedding Attitudes:	@ 4 feet, N30W, 40NE @ 4½ feet, N10W, 30P @ 5 feet, N30E, 29SE	E NE	
		Total Depth 6 feet. No water, no caving.			

TABLE II

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01			
EP-27	0 to 1	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots an rootlets.				
	1 to 5	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; fine-grained, pale oliv gray, slightly moist, moderately hard, 1 to $6\pm$ inch thick laminated beds; jointed/fractured, interbedded with Clayey Siltstone; pale oliv olive gray, moderately firm, laminated to $3\pm$ -inch thick massive be top $1\frac{1}{2}\pm$ feet highly weathered.				
		Bedding Attitudes:	: @ 4 feet, N50W, 39NE			
		Total Depth 5 feet. No water, no cavin	ng.			
EP-28	0 to 1	SOIL: Sandy Silt; very fine- to fine-grained, pale to moderate yellowish brown, dry, loose, abundant roots and rootlets.				
	1 to 7	PICO FORMATIC fine-grained, pale of laminated bedding moist to moist, mo top 3 <u>+</u> feet highly	<u>DN (Tp):</u> Interbedded Silty Sandstone; very fine- to olive, slightly moist, moderately hard, 2 to $6\pm$ -inch g; with Clayey Siltstone, pale to dark olive, slightly oderately firm, laminated to $2\pm$ -inch thick bedding; weathered and abundant roots.			
		Bedding Attitudes:	 @ 5 feet, EW, 49N @ 6 feet, N70E, 73NW 			
		Total Depth 7 feet.				
		No water, no cavin	ng.			

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description		Logged by: CRN Date Logged: 07/05/01		
EP-29	0 to 11	<u>ALLUVIUM (Qal)</u> : Silty Sand to Sandy Silt; very fine- to fine- grained, moderate yellowish brown, dry to slightly moist at $6\pm$ feet to depth, loose/soft to moderately dense/firm with depth.				
	11 to 12	PICO FORMATIC moderately firm to	ON (Tp): Silty Clayst firm, laminated to ¹ / ₂	one; dark olive green, moist, +-inch thick bedding.		
		Total Depth 12 fee No water; no cavir	t. ıg.			
EP-30	0 to 14	<u>COLLUVIUM (Qcol)</u> : Clayey to Sandy Silt; very fine-grained Sand, pale to moderate yellowish brown, dry to slightly moist, soft, porous, abundant rootlets and roots. Total Depth 14 feet. No water, no caving.				
EP-31	0 to 1	<u>SOIL</u> : Clayey To Sandy Silt; very fine- to fine-grained, dark yellowish brown, slightly moist to moist, soft, porous, abundant roots and rootlets.				
	1 to 2	<u>PICO FORMATION (Tp):</u> Claystone; mottled olive gray and light brown, slightly moist to moist, moderately firm, highly weathered, abundant roots.				
	2 to 3	Silty Sandstone; light gray lenses 3 to $4\pm$ inches thick at top and botton with light brown core, slightly moist, moderately hard, massive, scourfill bottom, flat top.				
	3 to 4	Silty Sandstone to Sandy Siltstone; pale olive gray, slightly moist, f highly weathered, blocky, abundant caliche.				
	4 to 5	Sandy to Clay Siltstone; pale to dark olive gray, slightly moist to n moderately hard, laminated to ^{1/2+} -inch bedding.				
		Bedding Attitudes:	@ 3 feet, N80W, 59 @ 4 feet, N65W, 33	9SW (overturned) 5SW (overturned)		
		Total Depth 5 feet. No water, no cavin	ıg.			
WDJ-cp-2453R	T03-pits					

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	_	Logged by: CRN Date Logged: 07/05/01		
EP-32	0 to 5	<u>COLLUVIUM (Qcol)</u> : Sandy Silt; very fine-grained Sand, pale to moderate yellowish brown, dry to slightly moist, soft, abundant rootlets.				
	5 to 8	<u>PICO FORMATION (Tp)</u> : Silty Sandstone; very fine- to fine-grained, pale to olive gray, slightly moist to moist, moderately hard, laminated to 3±-inch beds.				
		Bedding Attitude:	@ 6 feet, N70E, 54NW	V		
		Total Depth 8 feet No water, no cavir	1g.			
EP-33	0 to 12	<u>COLLUVIUM (Qcol)</u> : Sandy Silt; very fine- to fine-grained Sand, pal yellowish brown, dry to slightly moist, loose/soft, abundant rootlets, 2-foot diameter boulder at $2+$ feet.				
		No water, no cavir	ng.			
EP-34	0 to ½	SOIL: Clayey Silt; moderate yellowish brown, dry, loose, abundant roots and rootlets.				
	½ to 4	PICO FORMATIC pale to olive gray, abundant roots and	<u>DN (Tp):</u> Silty Sandstor slightly moist, moderate t rootlets.	ne; very fine- to fine-grained, ely firm, highly weathered,		
	4 to 6	Silty Sandstone; fi moderately hard, n	ne-grained, pale olive g nassive.	ray, slightly moist,		
		Bedding Attitudes	@ 3 feet, N45E, 65SI @ 5 feet, N70E, 59SI	E (overturned) E (overturned)		
		Total Depth 6 feet. No water, no cavir	ıg.			

WDJ-cp-2453RT03-pits

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description		Logged by: CRN Date Logged: 07/05/01	
EP-35	0 to 14	ALLUVIUM (Qal) some medium-grain loose/soft, slightly slightly porous, poo	: Silty Sand to Sandy ned, moderate yellowin moist to moist and mo thet of pebbles and col	Silt; very fine- to fine- with sh orange, top $2\pm$ feet dry and derately dense/firm at depth, obles @ $12\pm$ feet.	
		Total Depth 14 feet No water, no caving	 g.		
EP-36	0 to ½	SOIL: Sandy Silt; very fine-grained Sand, moderate yellowish brown, dry, soft, abundant roots and rootlets.			
	½ to 6	<u>PICO FORMATIO</u> pale olive gray, slig bedding, upper 3 <u>+</u> i	<u>N (Tp):</u> Silty Sandsto htly moist, moderately feet slightly creep affe	ne; very fine- to fine-grained, y hard, laminated to 3±-inch cted.	
	6 to 8	Silty Sandstone, fin moderately hard, m	ne-grained, pale olive g assive.	gray, slightly moist,	
		Bedding Attitudes:	@ 2 feet, N10E, 50N @ 4 feet, N30W, 309	TW SW	
		Total Depth 8 feet. No water, no caving	g.		

WDJ-cp-2453RT03-pits

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description		Logged by: CRN Date Logged: 07/05/01		
EP-37	0 to 1/2	SOIL: Sandy Silt; very fine-grained, moderate yellowish brown, dry, loose, abundant roots and rootlets.				
	½ to 5	<u>PICO FORMATION (Tp)</u> : Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard, laminated to $1\pm$ inch bedding, possibly creep affected.				
	5 to 7	Silty Sandstone; fine-grained, pale olive, slightly moist, moderately hard to hard, massive.				
		Bedding Attitudes: @ 2 feet, N10E, 36NW @ 5 feet, N50E, 42 NW				
		Total Depth 7 feet. No water, no caving.				
EP-38	0 to ½	<u>SOIL</u> : Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, dry, loose, porous, abundant roots and rootlets				
	½ to 2	SAUGUS FORMA Silty Sandstone; me cobbles of quartzite slightly moist, mod generally massive.	TION – SUNSHINE RAN edium- to very coarse-grain and granitics (Mt. Lowe) erately hard, poorly cemer	<u>JCH MEMBER (Tsr):</u> ned with pebbles and , pale yellowish orange, nted, slightly layered		
	2 to 6	PICO FORMATIO moderate yellowish slightly laminated,	<u>N (Tp):</u> Sandy Siltstone; brown, slightly moist, mo generally massive.	very fine-grained, oderately hard/firm,		
		Contact Attitude: Bedding Attitude:	@ 2 feet, N65W, 67NE @ 4 feet, N55W, 54NE			
		Total Depth 6 feet. No water, no caving	3.			

WDJ-cp-2453RT03-pits

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-39	0 to 17	<u>COLLUVIUM (Qcol)</u> : Sandy Silt; very fine-grained Sand, moder yellowish brown, dry to slightly moist at depth, soft to firm at dept wet at bottom.	
		Total Depth 17 feet. No water, no caving.	
EP-40	0 to 9	<u>ALLUVIUM (Qal):</u> Silty San yellowish brown, dry to slight moderately dense/firm at dept	ad to Sandy Silt; fine-grained, moderate ly moist at depth, loose/soft to h, roots to $5\pm$ feet in depth.
	9 to 10	<u>SAUGUS FORMATION – SI</u> Silty Sandstone; fine- to medi massive.	UNSHINE RANCH MEMBER (Tsr): um-grained, yellowish gray, moist, hard,
		Total Depth 10 feet. No water, no caving.	
EP-41	0 to 1	SOIL: Silty Sand; fine- to coa loose, abundant roots and root	arse-grained, dark yellowish brown, dry, ilets.
	1 to 3	<u>SAUGUS FORMATION – SI</u> Pebbly Sandstone; medium- to slightly moist, moderately har	UNSHINE RANCH MEMBER (Tsr): o very coarse-grained, yellowish gray, d, abundant roots, normal grading.
	3 to 5	Silty Sandstone; fine- to medi moist, moderately hard, massi	um-grained, yellowish gray, slightly ve.
		Bedding Attitude: @ 3 feet, 1	170W, 32NE
		Total Depth at 5 feet. No water, no caving.	

WDJ-cp-2453RT03-pits

TABLE II

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-42	0 to 11/2	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	1½ to 6	<u>SAUGUS FORMATION – SI</u> Silty Sandstone; fine- to medi light brown, slightly moist, ha	UNSHINE RANCH MEMBER (Tsr): um-grained, mottled yellowish gray and ard, ¼ to 3±-inch beds.
		@ 4 feet; $6\pm$ inch thick carbor sulfur deposits.	naceous layer, brownish black, abundant
		Bedding Attitude: @ 4 feet, N	N65W, 28NE
		Total Depth 6 feet.	
		No water, no caving.	
EP-43	0 to 1½	SOIL: Sandy Silt; very fine-g slightly moist, soft, abundant	rained, dark yellowish brown, dry to rootlets.
	1½ to 6	SAUGUS FORMATION – SI Silty Sandstone; very fine- to moist, moderately hard to hard	UNSHINE RANCH MEMBER (Tsr): fine-grained, pale olive gray, slightly d, slightly bedded generally massive.
		Bedding Attitude: @ 4 feet, N	N70W, 45NE
		Total Depth 6 feet.	
		No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-44	0 to 1	SOIL: Sandy Silt to Silty Sand; very fine- to fine-grained, moderate to dark yellowish brown, slightly moist, soft/loose, abundant roots and rootlets.			
	1 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Ts Silty Sandstone; fine- to medium-grained with some coarse-grain layers with pebbles, pale yellowish gray, slightly moist, moderate hard, bedded.			
		Bedding Attitude: @ 4 feet, 1	N60W, 43NE		
		Total Depth 5 feet. No water, no caving.			
EP-45	0 to 7	<u>ALLUVIUM (Qal):</u> Silty Samoderate yellowish brown, d moderately dense at depth.	nd; very fine- to medium-grained, pale to ry to slightly moist at depth, loose to		
	7 to 14	Pebbly Sand; medium- to coa yellowish brown, moist, mod	rse-grained with cobbles, moderate erately dense.		
		Total Depth 14 feet. No water, no caving.			

TABLE II

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01		
EP-46	0 to 2½	SOIL: Silty Sand; fine- to coarse-grained, dark yellowish brown, dry loose, abundant roots and rootlets.			
	2½ to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (7 Pebbly Sandstone, medium- to coarse-grained with cobbles, yel orange, slightly moist, moderately hard to hard, bedded.			
		Bedding Attitudes: @ 5 @ 8	feet, N55W, 36NE feet, N40W, 32NE		
		Total Depth 9 feet. No water, no caving.			
EP-47	0 to 5	COLLUVIUM (Qcol): 5 pebbles, dark yellowish 1 abundant roots and rootle	Silty Sand; fine- to coarse-grained with prown, dry, loose to moderately dense, ets.		
	5 to 9	SAUGUS FORMATION Pebbly Sandstone; media cobbles, yellowish gray, slightly layered, generall	I – SUNSHINE RANCH MEMBER (Tsr): im- to coarse-grained with pebbles and slightly moist, moderately hard to hard, y massive, some scour in fill structures.		
		Bedding Attitude - Appr	oximate: @ 8 feet, N50W, 30NE		
		Total Depth 9 feet.			
		No water, no caving.			

TABLE II

Depth Logged: 1-26-04 Log No. (ft.) Description By: CRN EP-101 0 to 2 SOIL: Sandy Silt; fine-, dark yellowish brown, slightly moist, loose, soft, abundant roots, and rootlets. 2 to 7 PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive to slightly bedded. Attitude: Bedding @ 4 feet, N30E 50 SE Total Depth 7 feet. EP-102 0 to 7 COLLUVIUM (Qcol): Sandy Silt to Silty Sand; fine-grained, moderate to light yellowish brown to yellowish green at depth, slightly moist, loose, abundant roots and rootlets. 7 to 9 PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive to slightly bedded, moderately weathered. Attitude: Bedding @ 8 feet, N70E 41 SE Total Depth 9 feet. EP-103 0 to 2 SOIL: Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets. 2 to 6 PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale vellowish green, dry to slightly moist, moderate hard, massive, upper 3 to 4+ feet highly weathered with abundant roots and rootlets. Total Depth 6 feet.

EXPLORATORY PITS

WDJ-cp-2453RT03-EP101-144

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-104	0 to 2	SOIL/COLLUVIUM (Qcol): Clayey Silt; slightly moist, soft, abundant roots and roo	moderate yellowish brown, otlets.
2 to 7 <u>PICO FORMATION (Tp)</u> : Sandy Siltstone; fine-grain green, dry to slightly moist, moderate hard, massive, w some shell fragments, some roots to depth.		e; fine-grained, pale yellowish l, massive, weathered 2 <u>+</u> feet,	
	_	Total Depth 7 feet.	
EP-105	0 to 5	COLLUVIUM (Qcol): Sandy to Clayey Silt; moderate yellowish brown to pale yellowish green, slightly moist, loose, abundant roots and rootlets.	
	5 to 8	PICO FORMATION (Tp): Sandy Siltstone green, dry to slightly moist, moderate hard some shell fragments, some roots to depth.	e; fine-grained, pale yellowish l, massive, weathered $2\pm$ feet,
	-	Total Depth 8 feet.	10-1
EP-106	0 to 10	<u>COLLUVIUM (Qcol):</u> Sandy to Clayey Si pale yellowish green, slightly moist, loose,	ilt; moderate yellowish brown to , abundant roots and rootlets.
	10 to 12	PICO FORMATION (Tp): Clayey Siltston moist, moderately hard, massive, moderate carbonate.	ne; pale yellowish green, slightly ely weathered, some white
		Total Depth 12 feet.	

WDJ-cp-2453RT03-EP101-144

TABLE II

EXPLORATORY PITS

0 to 1	SOIL: Sandy to Clayey Silt; fine-grained slightly moist, loose, abundant roots and	, moderate yellowish brown,
	and a second sec	rootlets.
1 to 7	<u>PICO FORMATION (Tp)</u> : Silty Sandston green, slightly moist, moderately hard, la 2 <u>+</u> feet highly weathered with abundant r carbonate.	ne; fine-grained, pale yellowish minated to $\frac{1}{2}$ inch bedding, top roots and rootlets, some white
	Attitude: Bedding @ 6 feet, N50E 53NW	7
	Total Depth 7 feet.	
0 to 1	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
1 to 6	<u>PICO FORMATION (Tp):</u> Silty Sandston green, slightly moist, moderately hard to generally massive, upper 2 <u>+</u> feet highly v	ne; fine-grained, pale yellowish hard at depth, slightly bedded, weathered with abundant roots.
	Attitude: Bedding @ 5 feet, N10E 56NV	v
	Total Depth 6 feet.	
0 to 2	SOIL: Sandy to Clayey Silt; fine-grained slightly moist, loose, abundant roots and	, moderate yellowish brown, rootlets.
2 to 7	PICO FORMATION (Tp): Silty Sandston green, slightly moist, moderately hard, la 2± feet highly weathered.	ne; fine-grained, pale yellowish minated to $\frac{1}{2}$ inch bedding, top
	Attitude: Bedding @ 6 feet, N80E 36NW	V
	Total Depth 7 feet.	
	0 to 1 1 to 6 0 to 2 2 to 7	 green, slightly moist, moderately hard, la 2± feet highly weathered with abundant rearbonate. Attitude: Bedding @ 6 feet, N50E 53NW Total Depth 7 feet. 0 to 1 <u>SOIL</u>: Sandy to Clayey Silt; fine-grained slightly moist, loose, abundant roots and 1 to 6 <u>PICO FORMATION (Tp)</u>: Silty Sandsto green, slightly moist, moderately hard to generally massive, upper 2± feet highly v Attitude: Bedding @ 5 feet, N10E 56NV Total Depth 6 feet. 0 to 2 <u>SOIL</u>: Sandy to Clayey Silt; fine-grained slightly moist, loose, abundant roots and 2 to 7 <u>PICO FORMATION (Tp)</u>: Silty Sandsto green, slightly moist, moderately hard, la 2± feet highly weathered. Attitude: Bedding @ 6 feet, N80E 36NV Total Depth 7 feet.

WDJ-cp-2453RT03-EP101-144

TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-110 0 to 2		SOIL: Silty Sand to Sandy Silt; fine-grained slightly moist, loose, abundant roots and ro	d, moderate yellowish brown, otlets.
	2 to 8	<u>PICO FORMATION (Tp)</u> : Silty to Clayey yellowish green, slightly moist, moderately bedding, top $2\pm$ feet highly weathered.	Sandstone; fine-grained, pale hard, laminated to ½± inch
		Attitude: Bedding @ 6 feet, E-W 57N	
		Total Depth 8 feet.	
EP-111 0 to 7		COLLUVIUM (Ocol): Silty to Clayey Sand yellowish brown, slightly moist, loose, abu	d; fine-grained, dark to moderate ndant roots and rootlets.
7 to 9	7 to 9	<u>PICO FORMATION (Tp):</u> Silty Sandstone grained, pale yellowish green, slightly mois bedded, generally massive.	; fine- with some medium- st, moderately hard, slightly
		Attitude: Bedding @ 8 feet, N50W 47NE	
		Total Depth 9 feet.	
EP-112	0 to 1	SOIL: Silty Sand to Sandy Silt; fine-grained slightly moist, loose, abundant roots and ro	d, moderate yellowish brown, otlets.
	1 to 6	PICO FORMATION (Tp): Silty Sandstone green, slightly moist, moderately hard, top	; fine-grained, pale yellowish 2 to $3\pm$ feet highly weathered.
		Attitude: Bedding @ 5 feet, N60E 52NE	
		Total Depth 6 feet.	

TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-113 0 to 2		SOIL: Silty Sand to Sandy Silt; fine-grain slightly moist, loose, abundant roots and r	ed, moderate yellowish brown, ootlets.
	2 to 7	PICO FORMATION (Tp): Silty Sandston green, slightly moist, moderately hard, slip	e; fine-grained, pale yellowish ghtly bedded, generally massive
		Total Depth 7 feet.	
EP-114 0 to 6		<u>COLLUVIUM (Qcol)</u> : Silty to Clayey Sat brown to moderate yellowish brown at dep abundant roots and rootlets.	nd; fine-grained, dark yellowish pth, slightly moist, loose,
	6 to 8	PICO FORMATION (Tp): Silty Clayston reddish brown, moist, firm, generally mas	e; mottled olive and moderate sive, abundant white carbonate.
		Attitude: Bedding @ 7 feet, N70W 46NE	
	~	Total Depth 8 feet.	
EP-115 (0 to 3	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, moist, loose, abundant roots and rootlets.	
	3 to 7	<u>PICO FORMATION (Tp)</u> : Clayey Sandst slightly moist to moist, moderately hard, 1 highly weathered with abundant white car	one; fine-grained, pale olive, aminated to massive, top $2\pm$ fee bonate.
		Attitude: Bedding @ 5 feet, EW33N	
_		Total Depth 7 feet.	
EP-116	0 to 2	SOIL: Silty Sand; very fine- to fine-graine moist, loose, abundant roots and rootlets.	ed, moderate yellowish brown,
	2 to 9	PICO FORMATION (Tp): Silty Sandston some interbeded, medium- to coarse-grain yellowish gray, dry to slightly moist, med	ne; very fine- to fine-grained, ned Sand with pebbles, pale ium hard, generally massive.
		Attitude: Bedding @ 7 feet, E-W 37N	
		Total Depth 9 feet.	

TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-117	0 to ½	SOIL: Silty Sand to Sandy Silt; fine-grain slightly moist, loose, abundant roots and r	ed, moderate yellowish brown, rootlets.
	½ to 6	<u>PICO FORMATION (Tp):</u> Silty Sandston pale yellowish green, slightly moist, mode massive, some shell fragments.	e; very fine- to fine-grained, erately hard, slightly bedded,
	_	Total Depth 6 feet.	
EP-118	0 to 4	SOIL/COLLUVIUM (Qcol): Silty Sand to moderate yellowish brown, slightly moist, rootlets.	o Sandy Silt; fine-grained, , loose, abundant roots and
	4 to 6	PICO FORMATION (Tp): Clayey Sandst yellowish green, slightly moist, moderate massive.	one; fine-grained, moderate hard, slightly bedded, generally
		Attitude: Approximate Bedding @ 5 feet;	E-W 27N
		Total Depth 6 feet.	
EP-119	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown slightly moist, loose, abundant roots and rootlets.	
	2 to 8	<u>PICO FORMATION (Tp):</u> Clayey Sandst yellowish brown, slightly moist, loose, lar	cone; fine-grained, moderate ninated to $\frac{1}{2}$ inch bedding.
		Attitude: Bedding @ 6 feet, N70W 55NE	
		Total Depth 8 feet.	
EP-120	0 to 5	<u>COLLUVIUM (Qcol):</u> Silty to Clayey Sar yellowish brown, slightly moist to moist, 1 rootlets.	nd; fine-grained, moderate loose, abundant roots and
	5 to 7	<u>PICO FORMATION (Tp)</u> : Clayey Siltston moderately hard, massive, top 1 <u>+</u> foot high white carbonate.	ne; pale olive, slightly moist, hly weathered with abundant
		Total Depth 7 feet.	

TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-121	0 to 1	SOIL: Silty Sand; fine-grained, moderate yel loose, abundant roots and rootlets.	llowish brown, slightly moist,
1 to 6		<u>PICO FORMATION (Tp):</u> Clayey Siltstone; slightly moist, moderately hard to hard at dep	fine-grained, pale yellowish, pth, ½± inch bedding.
		Attitude: Bedding @ 4 feet, E-W 40N	
		Total Depth 6 feet.	
EP-122 0 to 1 to	0 to 1	SOIL: Silty Sand; fine-grained, moderate yel loose, abundant roots and rootlets.	llowish brown, slightly moist,
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; moist, moderately hard to hard at depth, lam	; fine-, pale yellowish, slightly inated to ½± inch bedding.
		Attitude: Bedding @ 5 feet, N80E 46NW	
		Total Depth 6 feet.	
EP-123	0 to 1	SOIL: Sandy Silt to Silty Sand; fine-grained, slightly moist, loose, abundant roots and roo	, moderate yellowish brown, tlets.
	1 to 7	<u>PICO FORMATION (Tp):</u> Sandy Siltstone; slightly moist, moderately hard, laminated to highly weathered.	fine-grained, pale olive, 5 ½± inch bedding, top 2± feet
		Attitude: Bedding @ 5 feet, N70E 48NW	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

No.	(ft.)	Description	Logged: 1-26-04 By: CRN
EP-124	EP-124 0 to ¹ / ₂ <u>SOIL</u> : Sandy Silt to Silty Sand; fine-grained, m slightly moist, loose, abundant roots and rootle		l, moderate yellowish brown, otlets.
	½ to 6	<u>PICO FORMATION (Tp)</u> : Silty Sandstone; pale yellowish green, slightly moist, modera inch bedding, top 2 <u>+</u> feet highly weathered.	, very fine- to fine-grained, ately hard, laminated to $\frac{1}{2+}$
		Attitude: Bedding @ 4 feet, N70E 52NE Joint @ 4 feet, N25E Vertical	
		Total Depth 6 feet.	
EP-125	0 to 1	SOIL: Sandy Silt to Silty Sand; fine- to coar and cobbles, moderate yellowish brown, slip roots and rootlets.	rse-grained with some pebbles ghtly moist, loose, abundant
1 to	1 to 5	<u>PICO FORMATION (Tp):</u> Silty Sandstone; fine-grained, pale yel grey, dry to slightly moist, moderately hard to hard at depth, some interlayered medium- to coarse-grained Sand lenses, generally ma	
		Attitude: Bedding @ 4 feet, N80W 52NE	
		Total Depth at 5 feet.	
EP-126	1 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand to S moderate yellow brown, slightly moist, loos	Sand, Silt; fine-grained, se, abundant roots and rootlets
	3 to 7	<u>PICO FORMATION (Tp)</u> : Sandy Siltstone; yellowish green, dry to slightly moist, mode top $2\pm$ feet highly weathered with abundant	; fine-grained Sand, pale erately hard, ½± inch bedding, white carbonate.
		Attitude: Bedding @ 6 feet, N80E 36NW	
		Total Depth 7 feet.	

WDJ-cp-2453RT03-EP101-144

TABLE II

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-127	0 to 9	<u>COLLUVIUM (Qcol):</u> Silty Sand to Sand, yellow brown, slightly moist, loose, abunda	Silt; fine-grained, moderate ant roots and rootlets.
9 to 10		<u>PICO FORMATION (Tp):</u> Silty Claystone to firm, some white carbonate.	; olive, moist, moderately firm
		Total Depth 10 feet.	
EP-128	0 to 4	<u>COLLUVIUM/ALLUVIUM (Qcol/Qal)</u> : Silty Sand to Sandy Silt; fine- grained, moderate yellow brown, moist, loose to medium dense with depth, some roots and rootlets.	
	4 to 6	<u>PICO FORMATION (Tp)</u> : Claystone; oliver laminated to $1\pm$ inch bedding, slightly plass	e, moist, moderately firm, tic, some white carbonate.
		Attitude: Bedding @ 5 feet, N60W 52NE	
		Total Depth 6 feet.	
EP-129	0 to 5	<u>COLLUVIUM/ALLUVIUM (Qcol/Qal):</u> S grained with some basal cobbles, moderate medium dense with depth, some roots and	Silty Sand to Sandy Silt; fine- e yellow brown, moist, loose to rootlets.
	5 to 7	<u>PICO FORMATION (Tp)</u> : Claystone; olivitation laminated to $1\pm$ inch bedding, slightly plass	e, moist, moderately firm, tic, some white carbonate.
		Attitude: Bedding @ 6 feet, N60W 42NE	
		Total Depth 7 feet.	
TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-130	0 to 1	SOIL: Silty Sand to Sandy, Silt; fine-graine slightly moist, loose, abundant roots and ro	ed, moderate yellow brown, otlets.
	1 to 7	<u>PICO FORMATION (Tp)</u> : Sandy Siltstone to fine-grained, pale yellowish green, slight laminated to $\frac{1}{2}$ inch bedding, top 2 to $3\pm$ some roots and rootlets.	to Silty Sandstone; very fine- tly moist, moderately hard, feet highly weathered with
		Attitude: Bedding @ 6 feet, N30E 33NW	
		Total Depth 7 Feet.	
EP-131	0 to 1½	SOIL: Silty Sand to Sandy, Silt; fine-graine slightly moist, loose, abundant roots and ro	ed, moderate yellow brown, otlets.
	1½ to 6	<u>PICO FORMATION (Tp) (south side of pi</u> olive and moderate yellowish brown, slight laminated to $1\pm$ inch bedding, highly jointer rootlets to depths.	t): Silty Claystone; mottled tly moist, moderately hard, ed/fractured, some roots and
		Attitude: Bedding @ 5 feet, N40E 48NW	
		FAULT (2 to 3+ inches thick zone): Silty S dry, loose, some roots.	Sand; fine-grained, pale grey,
		Attitude: Fault @ 5 feet, N60W Vertical	
	1½ to 6	<u>PICO FORMATION (Tp) (north side of pi</u> grained, layered pale grey and pale olive, s 1 to $6\pm$ inch bedding, top $2\pm$ feet moderate	<u>t):</u> Silty Sandstone; fine- lightly moist, moderately hard, ly weathered.
		Attitude: Bedding @ 5 feet, N60W Vertica	1
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-132	0 to 1	SOIL: Clayey Silt; moderate yellow brown, roots, rootlets and white carbonate.	slightly moist, loose, abundant
	1 to 7	<u>PICO FORMATION (Tp)</u> : Interbedded Silt moderate yellowish brown, slightly moist, n $1\pm$ inch bedding; with Silty Sandstone, fine- moist, moderately hard, 2 to $3\pm$ inch beddin feet highly weathered.	y Claystone; mottled olive and noderately hard, laminated to grained, pale olive, slightly g, top $3\pm$ inch bedding, top $3\pm$
		Attitudes: Bedding @ 5 feet, N60W Vertica Bedding @ 6 feet, N30W Vertica	1 1
		Total Depth 7 feet.	
EP-133	0 to ½	SOIL: Clayey Silt; moderate yellow brown, roots, rootlets and white carbonate.	slightly moist, loose, abundant
	½ to 6	<u>PICO FORMATION (Tp)</u> : Sandy Siltstone; pale yellowish green, slightly moist, modera inch bedding, top $2\pm$ feet highly weathered some white carbonate.	very fine- to fine-grained, ately hard, laminated to $1\pm$ with abundant rootlets and
		Attitude: Bedding @ 5 feet, N60E 69NW	
		Total Depth 6 feet.	
EP-134	0 to 3	SOIL: Clayey Silt with Sand; fine-grained, slightly moist, loose, abundant roots, rootlet	moderate yellow brown, ts and white carbonate.
	3 to 5	PICO FORMATION (Tp): Silty Sandstone; grey, dry, moderately hard, massive, abunda	fine- to coarse-grained, pale ant shells.
	5 to 8	Silty Claystone; mottled olive and moderate moderately hard, slightly bedded generally	e yellow brown, slightly moist, massive.
		Attitude: Bedding @ 7 feet, N50W 58NE	
		Total Depth 8 feet.	

WDJ-cp-2453RT03-EP101-144

PACIFIC SOILS ENGINEERING, INC.

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-135	0 to 2 ¹ / ₂	SOIL: Sandy Silt; fine-grained, moderate yel moist, loose, abundant roots and rootlets.	llow brown, dry to slightly
	2½ to 7	<u>PICO FORMATION (Tp):</u> Silty Sandstone; a slightly moist, loose, top 2 <u>+</u> feet highly weat	moderate yellow brown, hered with roots and rootlets.
		Attitude: Bedding @ 6 feet, N60W 49NE	
		Total Depth 7 feet.	
EP-136	0 to 1	SOIL: Sandy Silt; fine-grained, moderate yel moist, loose, abundant roots and rootlets.	llow brown, dry to slightly
	1 to 8	<u>PICO FORMATION (Tp)</u> : Silty Claystone; r slightly moist, loose, top 3± feet highly weat some interbedded Silty Sandstone, fine-grain yellowish grey, dry, moderately hard, 1 to 2±	moderate yellow brown, hered, with roots and rootlets; hed, pale to moderate <u>+</u> inch bedding.
		Attitude: Bedding @ 7 feet, N40W 72SW	
		Total Depth 8 feet.	
EP-137	0 to 5	SOIL/COLLUVIUM (Qcol): Sandy Silt to S moderate yellow brown, dry to slightly moist rootlets.	ilty Sand; fine-grained, t, loose, abundant roots and
	5 to 12	PICO FORMATION (Tp): Silty Claystone; a slightly moist, loose, top 3± feet highly weat some interbedded Silty Sandstone, fine-grain yellowish grey, dry, moderately hard, 1 to 2±	moderate yellow brown, hered, with roots and rootlets; hed, pale to moderate <u>t</u> inch bedding.
		Attitude: Bedding @ 11 feet, N50W 52NE	
		Total Depth 12 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-138	0 to 7	SAUGUS FORMATION-SUNSHINE R Sandstone; fine- to coarse-grained with p yellowish brown to pale grey, slightly m bedded generally massive with some sco	ANCH MEMBER (Tsr): Silty bebbles and cobbles, pale oist, moderately hard, slightly our fill structure.
		Attitude: Bedding @ 6 feet, N40W 37NI	B
		Note: Soil removed by dozer during rece	ent fire fighting operations.
		Total Depth 7 feet.	
EP-139	0 to ½	SOIL: Silty Sand; fine- to coarse-grained moderate yellowish brown, slightly mois	d with pebbles and cobbles, st, loose, some roots and rootlets.
	½ to 5	SAUGUS FORMATION-SUNSHINE R Sandstone; fine- to coarse-grained with p yellowish brown to pale grey, slightly m bedded generally massive with some sco	ANCH MEMBER (Tsr): Silty bebbles and cobbles, pale oist, moderately hard, slightly our fill structure.
		Attitude: Approximate Bedding @ 4 fee	t E-W 30N
		Total Depth 5 feet.	
EP-140	0 to ½	SOIL: Silty Sand; fine- to coarse-grained moderate yellowish brown, slightly mois	d with pebbles and cobbles, st, loose, some roots and rootlets.
	½ to 6	SAUGUS FORMATION-SUNSHINE R Sandstone; fine- to coarse-grained with p yellowish brown to pale grey, slightly m bedded generally massive with some sco	ANCH MEMBER (Tsr): Silty bebbles and cobbles, pale oist, moderately hard, slightly our fill structure.
		Attitude: Bedding @ 5 feet, N80E 28NV	V
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-141	0 to 3	SOIL: Silty to Clayey Sand; very fine- to me pebbles, dark yellowish brown, moist, soft,	edium-grained with some some roots and rootlets.
	3 to 8	SAUGUS FORMATION-SUNSHINE RAN Gravelly Sandstone; fine- to coarse-grained some boulders up to 18± inches, pale yellow moderately hard, massive, matrix supported	<u>ICH MEMBER (Tsr):</u> with pebbles and cobbles, vish brown, slightly moist, , top 2 <u>+</u> feet highly weathered.
		Total Depth 8 feet.	
EP-142	0 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand; fin pebbles and cobbles, moderate to dark yello roots and rootlets.	ne- to coarse-grained with w brown, moist, loose some
	3 to 9	SAUGUS FORMATION-SUNSHINE RAN Gravelly Sandstone; fine- to coarse-grained yellowish grey to pale grey, slightly moist, n interlayered pebbles and cobbles lenses.	<u>VCH MEMBER (Tsr):</u> with pebbles and cobbles, pale moderately hard, massive with
		Attitude: Bedding @ 8 feet, E-W 33N	
	2-2	Total Depth 9 feet.	
EP-143	0 to ½	<u>SOIL</u> : Silty Sand; fine- to medium-grained, slightly moist, loose, some roots and rootlet Note: Some soil removed during recent fire	moderate yellowish brown, s. fighting operations.
	½ to 6	SAUGUS FORMATION-SUNSHINE RAN Sandstone; fine- to medium-grained, pale gr hard, slightly bedded generally massive.	<u>VCH MEMBER (Tsr):</u> Silty rey, slightly moist, moderately
		Attitude: Bedding @ 4 feet, N60W 32NE	
		Total Depth 6 feet.	

WDJ-cp-2453RT03-EP101-144

PACIFIC SOILS ENGINEERING, INC.

TABLE II

EXPLORATORY PITS

(14)	Description	By: CRN
0 to 5	SOIL/COLLUVIUM (Qcol): Silty Sand moderate yellow brown, slightly moist t rootlets.	; fine- to medium-grained, to moist, loose, abundant roots and
5 to 9	SAUGUS FORMATION-SUNSHINE I Sandstone; fine- to coarse-grained, pale hard, massive with some interlayered pe	RANCH MEMBER (Tsr): Pebbly grey, slightly moist, moderately bble and cobbles lenses.
	Attitude: Bedding @ 7 feet, N70W 32N	Е
	0 to 5 5 to 9	(it.) Description 0 to 5 SOIL/COLLUVIUM (Qcol): Silty Sand moderate yellow brown, slightly moist is rootlets. 5 to 9 SAUGUS FORMATION-SUNSHINE I Sandstone; fine- to coarse-grained, pale hard, massive with some interlayered per Attitude: Bedding @ 7 feet, N70W 32N

Total Depth 9 feet.

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-201	0 to 2	SOIL: Sandy Clay; dark yellowish brown, sligh common, clusters of small bi-valve shells.	ntly moist, firm, rootlets
	2 to 9	SAUGUS FORMATION - SUNSHINE RANC Siltstone; light olive gray with reddish brown st fractured, weathered.	<u>H MEMBER (Tsr):</u> Sandy ain, dry, soft, highly
	@9	Fine- to medium-grained Sandstone, pinkish gra some pebbles, probable cross-bed.	ay, soft, poorly cemented,
		Bedding Attitude: N65E, 28NW	
		Total Depth 9 feet.	
EP-202	0 to 2	SAUGUS FORMATION - SUNSHINE RANC to medium-grained Sandstone, pinkish gray, dry small cobbles.	<u>H MEMBER (Tsr):</u> Fine- y, soft, many pebbles and
	2 to 5	Sandy Siltstone, pale yellowish brown, slightly fractured, rootlet to depth.	moist, soft, moderately
	5 to 6	Sandstone, pinkish gray, dry, soft.	
		Bedding Attitude: N55W, 35NE	
		Total Depth 6 feet.	
EP-203	0 to 2	SOIL: Sandy Silt; dark yellowish brown, slight pebbles.	ly moist, stiff, many
	2 to 4 ¹ ⁄ ₂	SAUGUS FORMATION - SUNSHINE RANC to medium-grained Sandstone, pinkish gray, sli cemented.	<u>H MEMBER (Tsr):</u> Fine- ghtly moist, soft, poorly
	4½ to 7	Siltstone, light olive gray, slightly moist, soft to	moderately hard.
		Bedding Attitude: N80E, 45NW	
		Total Depth 7 feet.	

PACIFIC SOILS ENGINEERING, INC.

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-204	0 to 6½	SAUGUS FORMATION - SUNSHINE RANG coarse-grained Sandstone, soft to moderately h pebble and small cobble beds and lenses.	CH MEMBER (Tsr): Fine- to hard, dry, poorly cemented,
		Bedding Attitude: EW, 40N	
		Total Depth 61/2 feet.	
EP-205	0 to 2	SOIL: Silty Clay; dark yellowish brown, mois	st, stiff, porous.
	2 to 10	SAUGUS FORMATION - SUNSHINE RANG Siltstone, light olive gray, slightly moist, soft t white carbonate pods common	CH MEMBER (Tsr): Sandy to moderately hard at depth,
	@6&8	white carbonate pous common.	
		12 inch thick interbeds.	moist, moderately hard, 6 to
		Bedding Attitude: N85W, 30NE	
		Ring and Bulk samples at 6 and 10 feet.	
		Total Depth 8 feet.	
EP-206	0 to ¼	SOIL: Sandy Silt; moderate yellowish brown.	, dry, firm, porous.
	¼ to 5	SAUGUS FORMATION - SUNSHINE RAN medium-grained Sandstone, pinkish gray, dry, poorly cemented, roots to depth.	<u>CH MEMBER (Tsr):</u> Fine- to , soft to moderately hard,
	@ 3	8 to 10-inch thick Silty Sandstone-pebble con dry, soft, one small cobble.	glomerate, grayish orange,
		Bedding Attitude: N70W, 45NE	
		Total Depth 5 feet.	

RHS:cp-2453RT04logs

PACIFIC SOILS ENGINEERING, INC.

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-207	0 to ½	SOIL: Sandy Silt; dark yellowish brown, moi	st, firm, abundant rootlets.
	1/2 to 31/2	PICO FORMATION (Tp): Silty Sandstone; v yellowish gray, slightly moist, soft, red brown	very pale orange to a stain common.
		Bedding Attitude: N55W, 40NE	
		Total Depth 31/2 feet.	

NUWI – Lyons Canyon, LLC March 19, 2021 2020-200-001

APPENDIX C

LABORATORY TESTING



Appendix March 19, 2021 2020-200-001

APPENDIX C

LABORATORY TESTING

Laboratory tests were performed on selected samples obtained from the test pits to aid in the classification of the soils and to determine their engineering properties.

Direct shear tests were performed on selected undisturbed samples to determine the strength of the soils. The tests were performed after soaking the samples to near-saturated moisture content and at various surcharge pressures. The strength values determined from the direct shear tests are presented on the Shear Test Data page.

Confined consolidation tests were performed on remolded samples. Water was added during the tests to each of the samples to illustrate the effect of moisture on the compressibility. The results of the tests are presented on the Consolidation Test Data pages.

Atterberg limits (liquid and plastic limit) tests were conducted on selected samples to aid in classifying the soils and determining index properties. Test results are presented on the attached graphic, "Atterberg Limit's Test Data."

A sieve analysis was used to determine the distribution of grain sizes in selected soil samples. The results of the sieve analysis tests are presented as an attachment to this report.



















CONSOL





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NUWI – Lyons Canyon, LLC March 19, 2021 2020-200-001

APPENDIX D

SLOPE STABILITY ANALYSES


















Title: Lyons Canyon Comments: 2020-200 Name: Slope Stability G-G' Seismic Pile Supported Retaining Wall 10 kips Horizontal Line Load.gsz Date: 2/5/2021Time: 9:14:56 AM Material #: 1 Wt: 130 C: 200 Phi: 30 Method: Spencer Slip Surface Option: FullySpecified Method: Spencer Horz Seismic Load: 0.15 200 200 10 kips ELEVATION (ft) 100 100 0 0 100 200 0 300 400 500 DISTANCE (ft)

NUWI – Lyons Canyon, LLC March 19, 2021 2020-200-001

APPENDIX E

GREGG CPT SOUNDINGS





January 14, 2021

RT Frankian Attn: Matt Marin

Subject: CPT Site Investigation Lyons Canyon Stevenson Ranch, California GREGG Project Number: D1215005

Dear Mr. Marin:

The following report presents the results of GREGG Drilling Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	\square
2	Pore Pressure Dissipation Tests	(PPD)	\square
3	Seismic Cone Penetration Tests	(SCPTU)	\square
4	UVOST Laser Induced Fluorescence	(UVOST)	
5	Groundwater Sampling	(GWS)	
6	Soil Sampling	(SS)	
7	Vapor Sampling	(VS)	
8	Pressuremeter Testing	(PMT)	
9	Vane Shear Testing	(VST)	
10	Dilatometer Testing	(DMT)	

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact me at 949-903-6873.

Sincerely, Gregg Drilling, LLC.

CPT Reports Team Gregg Drilling, LLC.



Cone Penetration Test Sounding Summary

-Table 1-

CPT Sounding	Date	Termination	Depth of Groundwater	Depth of Soil	Depth of Pore Pressure
Identification		Depth (feet)	Samples (feet)	Samples (feet)	Dissipation Tests (feet)
CPT-03	1/13/2021	34.45	-	-	34.4
CPT-04	1/13/2021	39.7	-	-	39.7
CPT-05	1/13/2021	50.36	-	-	-
SCPT-01	1/13/2021	36.42	-	-	-
SCPT-02	1/13/2021	30.02	-	-	30.0



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Campanella, R.G. and I. Weemees, "Development and Use of An Electrical Resistivity Cone for Groundwater Contamination Studies", Canadian Geotechnical Journal, Vol. 27 No. 5, 1990 pp. 557-567.

DeGroot, D.J. and A.J. Lutenegger, "Reliability of Soil Gas Sampling and Characterization Techniques", International Site Characterization Conference - Atlanta, 1998.

Woeller, D.J., P.K. Robertson, T.J. Boyd and Dave Thomas, "Detection of Polyaromatic Hydrocarbon Contaminants Using the UVIF-CPT", 53rd Canadian Geotechnical Conference Montreal, QC October pp. 733-739, 2000.

Zemo, D.A., T.A. Delfino, J.D. Gallinatti, V.A. Baker and L.R. Hilpert, "Field Comparison of Analytical Results from Discrete-Depth Groundwater Samplers" BAT EnviroProbe and QED HydroPunch, Sixth national Outdoor Action Conference, Las Vegas, Nevada Proceedings, 1992, pp 299-312.

Copies of ASTM Standards are available through www.astm.org

Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*.

The cone takes measurements of tip resistance (q_c) , sleeve resistance (f_s) , and penetration pore water pressure (u_2) . Measurements are taken at either 2.5 or 5 cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating onsite decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the u_2 location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (*PPDT*). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.







Gregg 15cm² Standard Cone Specifications

Dimensions				
Cone base area	15 cm ²			
Sleeve surface area	225 cm ²			
Cone net area ratio	0.80			
Specification	IS			
Cone load cell				
Full scale range	180 kN (20 tons)			
Overload capacity	150%			
Full scale tip stress	120 MPa (1,200 tsf)			
Repeatability	120 kPa (1.2 tsf)			
Sleeve load cell				
Full scale range	31 kN (3.5 tons)			
Overload capacity	150%			
Full scale sleeve stress	1,400 kPa (15 tsf)			
Repeatability	1.4 kPa (0.015 tsf)			
Pore pressure transducer				
Full scale range	7,000 kPa (1,000 psi)			
Overload capacity	150%			
Repeatability	7 kPa (1 psi)			

Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.



Cone Penetration Test Data & Interpretation

(1986). interpretation methods require input of the groundwater level to calculate vertical effective stress. software and does not assume any liability for use of the results in any design or review. The user various geotechnical parameters using current published correlations based on the comprehensive spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and results, but should be verified by the user. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT should be fully aware of the techniques and limitations of any method used in the software. Some the correctness or the applicability of any of the geotechnical parameters interpreted by the geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. does not warranty (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson Robertson (1990) which can be displayed as SBTn, upon request. Robertson (1990). report. The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the For CPT soundings deeper than 30m, we recommend the use of the normalized charts of The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Typical plots display SBT based on the non-normalized charts of Robertson et al The report also includes

referenced in the data are with respect to the existing ground surface. A summary of locations and depths is available in Table 1. Note that all penetration depths

situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type. Note that it is not always possible to clearly identify a soil type based solely on q_t , f_s , and u_2 . In these



Cone Bearing (bar), Qt

3

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Cone Penetration Test (CPT) Interpretation

Gregg uses a proprietary CPT interpretation and plotting software. The software takes the CPT data and performs basic interpretation in terms of soil behavior type (SBT) and various geotechnical parameters using current published empirical correlations based on the comprehensive review by Lunne, Robertson and Powell (1997). The interpretation is presented in tabular format using MS Excel. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

The following provides a summary of the methods used for the interpretation. Many of the empirical correlations to estimate geotechnical parameters have constants that have a range of values depending on soil type, geologic origin and other factors. The software uses 'default' values that have been selected to provide, in general, conservatively low estimates of the various geotechnical parameters.

Input:

- 1 Units for display (Imperial or metric) (atm. pressure, p_a = 0.96 tsf or 0.1 MPa)
- 2 Depth interval to average results (ft or m). Data are collected at either 0.02 or 0.05m and can be averaged every 1, 3 or 5 intervals.
- 3 Elevation of ground surface (ft or m)
- 4 Depth to water table, z_w (ft or m) input required
- 5 Net area ratio for cone, a (default to 0.80)
- 6 Relative Density constant, C_{Dr} (default to 350)
- 7 Young's modulus number for sands, α (default to 5)
- 8 Small strain shear modulus number
 - a. for sands, S_G (default to 180 for SBT_n 5, 6, 7)
 - b. for clays, C_G (default to 50 for SBT_n 1, 2, 3 & 4)
- 9 Undrained shear strength cone factor for clays, N_{kt} (default to 15)
- 10 Over Consolidation ratio number, k_{ocr} (default to 0.3)
- 11 Unit weight of water, (default to $\gamma_w = 62.4 \text{ lb/ft}^3 \text{ or } 9.81 \text{ kN/m}^3$)

Column

- 1 Depth, z, (m) CPT data is collected in meters
- 2 Depth (ft)
- 3 Cone resistance, q_c (tsf or MPa)
- 4 Sleeve resistance, f_s (tsf or MPa)
- 5 Penetration pore pressure, u (psi or MPa), measured behind the cone (i.e. u₂)
- 6 Other any additional data
- 7 Total cone resistance, q_t (tsf or MPa) $q_t = q_c + u (1-a)$



8	Friction Ratio, R _f (%)	$R_f = (f_s/q_t) \times 100\%$
9	Soil Behavior Type (non-normalized), SBT	see note
10	Unit weight, γ (pcf or kN/m³)	based on SBT, see note
11	Total overburden stress, σ _v (tsf)	$\sigma_{vo} = \sigma z$
12	In-situ pore pressure, u _o (tsf)	$u_o = \gamma_w (z - z_w)$
13	Effective overburden stress, σ'_{vo} (tsf)	$\sigma'_{vo} = \sigma_{vo} - u_o$
14	Normalized cone resistance, Q _{t1}	$Q_{t1}=(q_t - \sigma_{vo}) / \sigma'_{vo}$
15	Normalized friction ratio, Fr (%)	$F_r = f_s / (q_t - \sigma_{vo}) \times 100\%$
16	Normalized Pore Pressure ratio, B _q	$B_q = u - u_o / (q_t - \sigma_{vo})$
17	Soil Behavior Type (normalized), SBT _n	see note
18	SBT _n Index, I _c	see note
19	Normalized Cone resistance, Q_{tn} (n varies with $I_{c})$	see note
20	Estimated permeability, k _{SBT} (cm/sec or ft/sec)	see note
21	Equivalent SPT N ₆₀ , blows/ft	see note
22	Equivalent SPT (N1)60 blows/ft	see note
23	Estimated Relative Density, Dr, (%)	see note
24	Estimated Friction Angle, ϕ ', (degrees)	see note
25	Estimated Young's modulus, Es (tsf)	see note
26	Estimated small strain Shear modulus, Go (tsf)	see note
27	Estimated Undrained shear strength, s _u (tsf)	see note
28	Estimated Undrained strength ratio	su/ov
29	Estimated Over Consolidation ratio, OCR	see note

Notes:

1	Soil Behavior	Type (non-normalized)	, SBT (Lunne et al.,	1997 and table below)
---	---------------	-----------------------	----------------------	-----------------------

- 2 Unit weight, γ either constant at 119 pcf or based on Non-normalized SBT (Lunne et al., 1997 and table below)
- 3 Soil Behavior Type (Normalized), SBT_n Lunne et al. (1997)
- 4 SBT_n Index, I_c $I_c = ((3.47 \log Q_{t1})^2 + (\log F_r + 1.22)^2)^{0.5}$
- 5 Normalized Cone resistance, Q_{tn} (n varies with Ic)

 $Q_{tn} = ((q_t - \sigma_{vo})/pa) (pa/(\sigma'_{vo})^n and recalculate I_c, then iterate:$

 $\begin{array}{ll} \mbox{When } I_c < 1.64, & n = 0.5 \mbox{ (clean sand)} \\ \mbox{When } I_c > 3.30, & n = 1.0 \mbox{ (clays)} \\ \mbox{When } 1.64 < I_c < 3.30, & n = (I_c - 1.64) 0.3 + 0.5 \\ \mbox{Iterate until the change in } n, \ensuremath{\Delta n} < 0.01 \\ \end{array}$



7	Equivalent SPT N ₆₀ , blows/ft	Lunne et al. (1997)
	$\frac{(q_t)}{N}$	$\left(\frac{p_{a}}{V_{60}}\right) = 8.5 \left(1 - \frac{I_{c}}{4.6}\right)$
8	Equivalent SPT (N ₁) ₆₀ blows/ft where C_N = (pa/ σ'_{vo}) ^{0.5}	$(N_1)_{60} = N_{60} C_{N_r}$
9	Relative Density, Dr, (%) Only SBTn 5, 6, 7 & 8	D _r ² = Q _{tn} / C _{Dr} Show 'N/A' in zones 1, 2, 3, 4 & 9
10	Friction Angle, φ', (degrees)	$\tan \phi' = \frac{1}{2.68} \left[\log \left(\frac{q_c}{\sigma'_{vo}} \right) + 0.29 \right]$
	Only SBT _n 5, 6, 7 & 8	Show'N/A' in zones 1, 2, 3, 4 & 9
11	Young's modulus, E _s Only SBT _n 5, 6, 7 & 8	E _s = α q _t Show 'N/A' in zones 1, 2, 3, 4 & 9
12	Small strain shear modulus, Go a. $G_o = S_G (q_t \sigma'_{vo} pa)^{1/3}$ b. $G_o = C_G q_t$	For SBT _n 5, 6, 7 For SBT _n 1, 2, 3& 4 Show 'N/A' in zones 8 & 9
13	Undrained shear strength, s _u Only SBT _n 1, 2, 3, 4 & 9	s _u = (q _t - σ _{vo}) / N _{kt} Show 'N/A' in zones 5, 6, 7 & 8
14	Over Consolidation ratio, OCR Only SBTn 1, 2, 3, 4 & 9	OCR = k _{ocr} Q _{t1} Show 'N/A' in zones 5, 6, 7 & 8

The following updated and simplified SBT descriptions have been used in the software:

SBT Zones		SBT _n	SBT _n Zones	
1	sensitive fine grained	1	sensitive fine grained	
2	organic soil	2	organic soil	
3	clay	3	clay	
4	clay & silty clay	4	clay & silty clay	
5	clay & silty clay			

Revised 02/05/2015

6

sandy silt & clayey silt

6



7	silty sand & sandy silt	5	silty sand & sandy silt	
8	sand & silty sand	6	sand & silty sand	
9	sand			
10	sand	7	sand	
11	very dense/stiff soil*	8	very dense/stiff soil*	
12	very dense/stiff soil*	9	very dense/stiff soil*	
*heavily overconsolidated and/or cemented				

Track when soils fall with zones of same description and print that description (i.e. if soils fall only within SBT zones 4 & 5, print 'clays & silty clays')



Estimated Permeability (see Lunne et al., 1997)

Permeability (ft/sec)	(m/sec)
3x 10 ⁻⁸	1x 10 ⁻⁸
3x 10 ⁻⁷	1x 10 ⁻⁷
1x 10 ⁻⁹	3x 10 ⁻¹⁰
3x 10 ⁻⁸	1x 10 ⁻⁸
3x 10 ⁻⁶	1x 10 ⁻⁶
3x 10 ⁻⁴	1x 10 ⁻⁴
3x 10 ⁻²	1x 10 ⁻²
3x 10 ⁻⁶	1x 10 ⁻⁶
1x 10 ⁻⁸	3x 10 ⁻⁹
	Permeability (ft/sec) 3x 10 ⁻⁸ 3x 10 ⁻⁷ 1x 10 ⁻⁹ 3x 10 ⁻⁸ 3x 10 ⁻⁶ 3x 10 ⁻² 3x 10 ⁻⁶ 1x 10 ⁻⁸

Estimated Unit Weight (see Lunne et al., 1997)

Approximate Unit Weight (lb/ft ³)	(kN/m³)
111.4	17.5
79.6	12.5
111.4	17.5
114.6	18.0
114.6	18.0
114.6	18.0
117.8	18.5
120.9	19.0
124.1	19.5
127.3	20.0
130.5	20.5
120.9	19.0
	Approximate Unit Weight (lb/ft ³) 111.4 79.6 111.4 114.6 114.6 114.6 117.8 120.9 124.1 127.3 130.5 120.9



Pore Pressure Dissipation Tests (PPDT)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals can be used to measure equilibrium water pressure (at the time of the CPT). If conditions are hydrostatic, the equilibrium water pressure can be used to determine the approximate depth of the ground water table. A PPDT is conducted when penetration is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure (u) with time is measured behind the tip of the cone and recorded.

Pore pressure dissipation data can be interpreted to provide estimates of:

- Equilibrium piezometric pressure
- Phreatic Surface
- In situ horizontal coefficient of consolidation (*c*_h)
- In situ horizontal coefficient of permeability (k_h)

In order to correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until it reaches equilibrium, *Figure PPDT*. This time is commonly referred to as t_{100} , the point at which 100% of the excess pore pressure has dissipated.

A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1992 and Lunne et al. 1997.

A summary of the pore pressure dissipation tests are summarized in Table 1.



Figure PPDT



Seismic Cone Penetration Testing (SCPT)

Seismic Cone Penetration Testing (SCPT) can be conducted at various intervals during the Cone Penetration Test. Shear wave velocity (Vs) can then be calculated over a specified interval with depth. A small interval for seismic testing, such as 1-1.5m (3-5ft) allows for a detailed look at the shear wave profile with depth. Conversely, a larger interval such as 3-6m (10-20ft) allows for a more average shear wave velocity to be calculated. Gregg's cones have a horizontally active geophone located 0.2m (0.66ft) behind the tip.

To conduct the seismic shear wave test, the penetration of the cone is stopped and the rods are decoupled from the rig. An automatic hammer is triggered to send a shear wave into the soil. The distance from the source to the cone is calculated knowing the total depth of the cone and the horizontal offset distance between the source and the cone. To calculate an interval velocity, a minimum of two tests must be

performed at two different depths. The arrival times between the two wave traces are compared to obtain the difference in time (Δ t). The difference in depth is calculated (Δ d) and velocity can be determined using the simple equation: v = Δ d/ Δ t

Multiple wave traces can be recorded at the same depth to improve quality of the data.

A complete reference on seismic cone penetration tests is presented by Robertson et al. 1986 and Lunne et al. 1997.

A summary the shear wave velocities, arrival times and wave traces are provided with the report.



Figure SCPT



Groundwater Sampling

Gregg Drilling & Testing, Inc. conducts groundwater sampling using a sampler as shown in *Figure GWS*. The groundwater sampler has a retrievable stainless steel or disposable PVC screen with steel drop off tip. This allows for samples to be taken at multiple depth intervals within the same sounding location. In areas of slower water recharge, provisions may be made to set temporary PVC well screens during sampling to allow the pushing equipment to advance to the next sample location while the groundwater is allowed to infiltrate.

The groundwater sampler operates by advancing 44.5mm (1³/₄ inch) hollow push rods with the filter tip in a closed configuration to the base of the desired sampling interval. Once at the desired sample depth, the push rods are retracted; exposing the encased filter screen and allowing groundwater to infiltrate hydrostatically from the formation into the inlet screen. A small diameter bailer (approximately ½ or ¾ inch) is lowered through the push rods into the screen section for sample collection. The number of downhole trips with the bailer and time necessary to complete the sample collection at each depth interval is a function of sampling protocols, volume requirements, and the yield characteristics and storage capacity of the formation. Upon completion of sample collection, the push rods and sampler, with the exception of the PVC screen and steel drop off tip are retrieved to the ground surface, decontaminated and prepared for the next sampling event.

For a detailed reference on direct push groundwater sampling, refer to Zemo et. al., 1992.



Figure GWS



Soil Sampling

Gregg Drilling & Testing, Inc. uses a piston-type push-in sampler to obtain small soil samples without generating any soil cuttings, Figure SS. Two different types of samplers (12 and 18 inch) are used depending on the soil type and density. The soil sampler is initially pushed in a "closed" position to the desired sampling interval using the CPT pushing equipment. Keeping the sampler closed minimizes the potential of cross contamination. The inner tip of the sampler is then retracted leaving a hollow soil sampler with inner 1¼" diameter sample tubes. The hollow sampler is then pushed in a locked "open" position to collect a soil sample. The filled sampler and push rods are then retrieved to the ground surface. Because the soil enters the sampler at a constant rate, the opportunity for 100% recovery is increased. For environmental analysis, the soil sample tube ends are sealed with Teflon and plastic caps. Often, a longer "split tube" can be used for geotechnical sampling.

For a detailed reference on direct push soil sampling, refer to Robertson et al, 1998.



Figure SS





FIELD REP: MATT M

Total depth: 34.45 ft, Date: 1/13/2021

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA



CPeT-IT v.19.0.1.24 - CPTU data presentation & interpretation software - Report created on: 1/14/2021, 10:21:32 AM Project file: C:\CPT-2021\5005SH\REPORT\215005SH.cpt



FIELD REP: MATT M

Total depth: 34.45 ft, Date: 1/13/2021

CLIENT: RT FRANKIAN



CPeT-IT v.19.0.1.24 - CPTU data presentation & interpretation software - Report created on: 1/14/2021, 10:21:32 AM Project file: C:\CPT-2021\5005SH\REPORT\215005SH.cpt



FIELD REP: MATT M

Total depth: 39.70 ft, Date: 1/13/2021

CLIENT: RT FRANKIAN





FIELD REP: MATT M

Total depth: 39.70 ft, Date: 1/13/2021

CLIENT: RT FRANKIAN





FIELD REP: MATT M

Total depth: 50.36 ft, Date: 1/13/2021

CLIENT: RT FRANKIAN





FIELD REP: MATT M

Total depth: 50.36 ft, Date: 1/13/2021

CLIENT: RT FRANKIAN



CPeT-IT v.19.0.1.24 - CPTU data presentation & interpretation software - Report created on: 1/14/2021, 10:21:32 AM Project file: C:\CPT-2021\5005SH\REPORT\215005SH.cpt



FIELD REP: MATT M

Total depth: 36.42 ft, Date: 1/13/2021

CLIENT: RT FRANKIAN





FIELD REP: MATT M

Total depth: 36.42 ft, Date: 1/13/2021

CLIENT: RT FRANKIAN





FIELD REP: MATT M

Total depth: 30.02 ft, Date: 1/13/2021

CLIENT: RT FRANKIAN





FIELD REP: MATT M

Total depth: 30.02 ft, Date: 1/13/2021

CLIENT: RT FRANKIAN



CPeT-IT v.19.0.1.24 - CPTU data presentation & interpretation software - Report created on: 1/14/2021, 10:21:33 AM Project file: C:\CPT-2021\5005SH\REPORT\215005SH.cpt



FIELD REP: MATT M

Total depth: 36.42 ft, Date: 1/13/2021

CLIENT: RT FRANKIAN





FIELD REP: MATT M

Total depth: 30.02 ft, Date: 1/13/2021

CLIENT: RT FRANKIAN







Shear Wave Velocity Calculations

LYONS CANYON

SCPT-05

SCPT-01

Geophone Offset:	0.66 Feet
Source Offset:	1.67 Feet

Waveform Incremental Characteristic Incremental Interval Interval Test Depth Geophone Ray Path Distance Arrival Time Time Interval Velocity Depth (Feet) Depth (Feet) (Feet) (Feet) (Ft/Sec) (ms) (ms) (Feet) 4.92 5.58 30.0000 5.19 5.19 10.50 9.84 9.98 4.79 36.6500 6.6500 719.7 7.38 15.58 14.92 15.02 5.04 43.8500 7.2000 699.7 12.38 20.67 20.01 20.08 5.06 49.1000 5.2500 17.47 964.1 24.50 4.42 25.10 24.44 55.5000 6.4000 690.1 22.22 29.85 29.90 5.40 30.51 57.1500 1.6500 3274.6 27.15 35.10 34.44 34.49 4.59 61.9000 4.7500 965.7 32.15 63.8000 35.76 35.80 689.9 36.42 1.31 1.9000 35.10

01/13/21





Shear Wave Velocity Calculations

SCPT-02

Geophone Offset:	0.66 Feet
Source Offset:	1.67 Feet

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
5.74	5.08	5.35	5.35	14.4500			
10.33	9.67	9.82	4.47	18.7000	4.2500	1051.5	7.38
15.42	14.76	14.85	5.04	23.9500	5.2500	959.3	12.22
20.34	19.68	19.75	4.90	28.9000	4.9500	989.5	17.22
25.26	24.60	24.66	4.91	33.5500	4.6500	1055.3	22.14

01/13/21






GREGG DRILLING & TESTING

Sounding: SCPT-02 Depth (ft): 30.02 Site: LYONS CANYON Engineer: MATT M





Time (seconds)

NUWI – Lyons Canyon, LLC March 19, 2021 2020-200-001

APPENDIX F

SEISMIC PARAMETERS





Search Information

34.369896, -118.562368
1321 ft
2021-02-03T00:42:28.306Z
Seismic
ASCE7-16
II
D



Basic Parameters

Name	Value	Description
SS	2.494	MCE _R ground motion (period=0.2s)
S ₁	0.849	MCE _R ground motion (period=1.0s)
S _{MS}	2.494	Site-modified spectral acceleration value
S _{M1}	* null	Site-modified spectral acceleration value
S _{DS}	1.663	Numeric seismic design value at 0.2s SA
S _{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
Fa	1	Site amplification factor at 0.2s
Fv	* null	Site amplification factor at 1.0s
CR _S	0.908	Coefficient of risk (0.2s)
CR ₁	0.893	Coefficient of risk (1.0s)
PGA	1.062	MCE _G peak ground acceleration
F _{PGA}	1.1	Site amplification factor at PGA
PGA _M	1.168	Site modified peak ground acceleration
ΤL	8	Long-period transition period (s)

https://hazards.atcouncil.org/#/seismic?lat=34.369896&Ing=-118.562368&address=

2	/2/2021		ATC Hazards by Location
	SsRT	2.494	Probabilistic risk-targeted ground motion (0.2s)
	SsUH	2.747	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
	SsD	2.713	Factored deterministic acceleration value (0.2s)
	S1RT	0.892	Probabilistic risk-targeted ground motion (1.0s)
	S1UH	1	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
	S1D	0.849	Factored deterministic acceleration value (1.0s)
	PGAd	1.092	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the report.

U.S. Geological Survey - Earthquake Hazards Program

Uni. ed Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the <u>U.S. Seismic Design Maps web tools</u> (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

∧ Input	
Edition	Spectral Period
Dynamic: Conterminous U.S. 2014 (u	Peak Ground Acceleration
Latitude	Time Horizon
Decimal degrees	Return period in years
34.369896	2475
Longitude	
Decimal degrees, negative values for western longitudes	
-118.562368	
Site Class	
259 m/s (Site class D)	
<u>.</u>	



2/5



Summary statistics for, Deaggregation: Total

Deaggregation targets	Recovered targets
Return period: 2475 yrs	Return period: 3149.6892 yrs
Exceedance rate: 0.0004040404 yr ⁻¹ PGA ground motion: 1.0417615 g	Exceedance rate: 0.00031749164 yr ⁻¹
Totals	Mean (over all sources)
Binned: 100 %	m: 6.85
Residual: 0 %	r: 7.27 km
Trace: 0.04 %	ε.: 1.6 σ
Mode (largest m-r bin)	Mode (largest m-r-ɛº bin)
m: 7.52	m: 7.51
r: 5.72 km	r: 5.72 km
ε ₀ : 1.21 σ	ε.: 1.18 σ
Contribution: 15.27 %	Contribution: 10.16 %
Discretization	Epsilon keys
r: min = 0.0, max = 1000.0, Δ = 20.0 km	ε0: [-∞2.5)
m: min = 4.4, max = 9.4, Δ = 0.2	ε1: [-2.52.0)
ε: min = -3.0, max = 3.0, Δ = 0.5 σ	ε2: [-2.01.5)
	ε3: [-1.51.0)
	ε4: [-1.00.5)
	ε5: [-0.50.0)
	ε6: [0.00.5)
	ε7: [0.51.0)
	ε8: [1.01.5)
	ε9: [1.5 2.0]
	ε10: [2.02.5]

Deaggregation Contributors

Source Set Ly Source	Туре	r	m	ε ₀	lon	lat	az	%
UC33brAvg_FM32	System							38.97
Santa Susana alt 2 [3]	,	5.78	7.15	1.32	118.574°W	34.313°N	189.35	22.61
Northridge Hills [1]		5.64	7.65	1.06	118.608°W	34.305°N	210.41	4.59
Santa Susana alt 2 [2]		6.28	6.47	1.68	118.528°W	34.317°N	152.08	2.52
Northridge [2]		8.54	7.50	1.41	118.576°W	34.358°N	222.71	2.19
Holser alt 2 [1]		6.07	7.49	1.25	118.570°W	34.423°N	353.48	1.09
Santa Susana East (connector) [0]		8.60	6.39	2.27	118.499°W	34.314°N	136.86	1.03
UC33brAvg_FM31	System							35.56
Santa Susana alt 1 [0]		4.83	7.31	1.27	118.576°W	34.329°N	195.65	13.60
Mission Hills 2011 [1]		8.81	6.50	1.61	118.556°W	34.283°N	176.54	5.39
Northridge Hills [1]		5.64	7.65	1.04	118.608°W	34.305°N	210.41	4.73
Northridge [2]		8.54	7.30	1.45	118.576°W	34.358°N	222.71	4.20
Holser alt 1 [2]		4.63	7.06	1.32	118.544°W	34.405°N	22.92	2.94
Santa Susana alt 1 [1]		4.83	7.36	1.20	118.576°W	34.329°N	195.65	1.13
UC33brAvg_FM31 (opt)	Grid							13.35
PointSourceFinite: -118.562, 34.410		6.70	5.73	2.02	118.562°W	34.410°N	0.00	3.32
PointSourceFinite: -118.562, 34.410		6.70	5.73	2.02	118.562°W	34.410°N	0.00	3.32
PointSourceFinite: -118.562, 34.428		7.78	5.84	2.15	118.562°W	34.428°N	0.00	1.41
PointSourceFinite: -118.562, 34.428		7.78	5.84	2.15	118.562°W	34.428°N	0.00	1.41
UC33brAvg_FM32 (opt)	Grid							12.12
PointSourceFinite: -118.562, 34.410		6.69	5.72	2.03	118.562°W	34.410°N	0.00	3.01
PointSourceFinite: -118.562, 34.410		6.69	5.72	2.03	118.562°W	34.410°N	0.00	3.01
PointSourceFinite: -118.562, 34.428		7.80	5.82	2.17	118.562°W	34.428°N	0.00	1.20
PointSourceFinite: -118.562, 34.428		7.80	5.82	2.17	118.562°W	34.428°N	0.00	1.20

NUWI – Lyons Canyon, LLC March 19, 2021 2020-200-001

APPENDIX G

LIQUEFACTION CALCULATIONS



SUMMARY SHEET

CPTLIQ 2004AWRsettlementMSF 92020-200 Lyons CPT-1 through CPT-5 January 2021

WORKBOOK TO CALCULATE LIQUEFACTION POTENTIAL AND SEISMIC SETTLEMENT

REFERENCE: Youd, T. L., Idriss, I. M., plus 19 others, 2001, "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT:	NUWI - Lyons Canyon, LLC		Z	Ic Soil		rd# Referen	ce	·····: (1082)											
PROJ. :	Lyons Canyon		4 <	2.95 Clayey Silt to Silty	Clay	2 Seed &	Idriss mean	n (1983) n (1971) and	Youd (1997)										
BY: DATE:	AWR 02/08/2021		5 <	<2.6 Silty Sand to Sandy 2.05 Clean Sand to Silty	Silt	3 Seed & 4 Idriss &	Idriss lowe Golesorkh	er limit (1971 ni (1997))										
FS – Thrae	hald Easter of Safaty -	1 30	7 <	1.31 Gravelly Sand to Sa	ınd	5 Site-Spe	cific												
NL = Not	liquefiable	1.50				Mag = 6.8	MSF	1.28											
Liquefiabl Seismic Se	e Ic (between 1.5 and 2.6) = ettlement Soil (Type) =	2.60 (usu. 2.05 to 2.6) 3			Fil	Pa = 1.04427 tsf $II Density = 125 pcf$	MSP calc	1.2846274											
	Depth C	PT-1 1-13-21 Sht 1	CPT-2	1-13-21 Sht 2	CI	PT-3 1-13-21 Sht 3	C	PT-4	1-13-21 Sht 4	CI	PT-5 1	-13-21	CP	T-*** 0-0-00 Sht 6	CPT-***	0-0-00 Sht 7	CP7	Γ-***	0-0-00 Sht 8
	Meas. Water> A Water	55.0 55.0	A Water	55.0 55.0	A Water	55.0 55.0	A Water	55.0	55.0	A Water	55.0	55.0	A Water	0.0 0.0	A Water	0.0 0.0	A Water	***	***
	Design Water> D Water Soil Density> Gamma	30.0 30.0 feet 120 120.0 pcf	D Water Gamma	30.0 30.0 feet 120 120.0 pcf	D Water Gamma	30.0 30.0 feet 120 120.0 pcf	D Water Gamma	30.0 120	30.0 feet 120.0 pcf	D Water Gamma	30.0 120	30.0 feet 120.0 pcf	D Water Gamma	0.0 0.0 feet 120 120.0 pcf	D Water Gamma	0.0 0.0 feet 120 120.0 pcf	D Water Gamma	120	*** feet 120.0 pcf
	Site rd> rd	2 2.0	rd D i D	2 2.0	rd David D	2 2.0	rd David D	2 20.0	2.0	rd D i D	2 20 0	2.0	rd D d D	2 2.0	rd D I.D.	2 2.0	rd D d D	2	2.0
	Added Fill> Fill	20.0 feet	Fill	20.0 feet	Fill	35.0 feet	Fill	3.0	feet	Fill	15.0	feet	Fill	0.0 feet	Fill	0.0 feet	Fill	***	feet
3	Ratio>	18.88		9999		9999	-		4.01			2.69	-	#NUM!	-	#NUM!	+		VALUE!
	Liq Settlement Liq. Total After R&R Total	0.16 0.16 inches 0.16 inches	Liq. 0 Total 0	0.00 0.00 inches 0.00 inches	Liq. Total	0.00 0.00 inches 0.00 inches	Liq. Total	0.37	0.37 inches inches	Liq. Total	1.22	1.22 inches inches	Liq. Total	#NUM! #NUM! inches #NUM! inches	Liq. #NU Total #NU	IM! #NUM! inches	Liq. Total	######## #########	######## inches
	meters feet Soil	CPT-1 Ishihara F.S.	Soil C	CPT-2 Ishihara F.S.	Soil '3''AF19	CPT-3 Ishihara F.S.	Soil '4''AF19	CPT-4	Ishihara F.S.	Soil '5''AF19	CPT-5	Ishihara F.S.	Soil	CPT-*** Ishihara F.S.	Soil CPT	*** Ishihara F.S.	Soil '8"AF19	CPT-***	Ishihara F.S.
1	0.05 0.16 7.8	NL	78	NL	78	NL	68		NL	78	-	NL	#NUM! #NUM!	#NUM! #NUM! #NUM!	#NUM! #NU	M! #NUM! #NUM!	#VALUE!	#VALUE!	#VALUE! #VALUE!
3	0.15 0.49 7.8	NL	78	NL	78	NL	68		NL	78		NL	#NUM!	#NUM! #NUM! #NUM!	#NUM! #NU	M! #NUM! #NUM!	#NUM!	#NUM!	#VALUE! #NUM!
5	0.20 0.66 7.8	NL	78	NL NL	65	NL	65		NL	78		NL	#NUM! #NUM!	#NUM! #NUM! #NUM! #NUM! #NUM! #NUM!	#NUM: #NU #NUM! #NU	M: #NUM: #NUM! M! #NUM! #NUM!	#NUM: 0 C	#NUM:	#VALUE! #NUM! #VALUE!
6 7	0.30 0.98 7 8 0.35 1.15 7 8	NL NL	78	NL NL	68	NL NL	65		NL NL	78		NL NL	0 C 0 C	#NUM! #NUM!	#NUM! #NU #NUM! #NU	M! #NUM! #NUM! M! #NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
8 9	0.40 1.31 7 S 0.45 1.48 7 S	NL NL	7 S 7 S	NL NL	6 S 6 S	NL NL	6 S 6 S		NL NL	7 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	#NUM! #NU #NUM! #NU	M! #NUM! #NUM! M! #NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
10	0.50 1.64 7 S 0.55 1.80 7 S	NL NL	7 S 7 S	NL NL	6 S 6 S	NL NL	6 S 6 S		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
12	0.60 1.97 7.8	NL NL	7 S 7 S	NL NL	68	NL NL	68		NL NL	65		NL NL	0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C		#VALUE! #VALUE!
14	0.70 2.30 7.8	NL	65	NL	68	NL	65		NL	65		NL	0 C	#NUM!	00	#NUM! #NUM!	00		#VALUE!
16	0.80 2.62 6 S	NL	68	NL	68	NL	65		NL	65		NL	00	#NUM!	00	#NUM!	00		#VALUE!
17	0.85 2.79 6.8	NL NL	65	NL NL	65	NL	65		NL	65		NL	00	#NUM!	00	#NUM!	00		#VALUE! #VALUE!
20	0.95 3.12 6 S 1.00 3.28 6 S	NL	65	NL NL	65	NL	5 M		NL	65		NL	00	#NUM!	00	#NUM!	00		#VALUE! #VALUE!
21 22	1.05 3.44 6 S 1.10 3.61 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NL NL	5 M 5 M		NL NL	68		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
23 24	1.15 3.77 6 S 1.20 3.94 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NL NL	5 M 5 M		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
25 26	1.25 4.10 6 S 1.30 4.27 6 S	NL NL	6 S 6 S	NL NL	68	NL NL	5 M		NL NL	65		NL NL	0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C		#VALUE! #VALUE!
27	1.35 4.43 6 S	NL	65	NL	68	NL	5 M		NL	68		NL	00	#NUM!	00	#NUM!	0 C		#VALUE!
29	1.45 4.76 6S	NL	65	NL	68	NL	5 M		NL	65		NL	00	#NUM!	00	#NUM!	00		#VALUE!
31	1.55 5.09 6 S	NL	65	NL	65	NL	5 M		NL	65		NL	00	#NUM!	00	#NUM!	00		#VALUE!
32 33	1.60 5.25 6.8 1.65 5.41 6.8	NL	65	NL	65	NL NL	5 M 5 M		NL NL	65		NL NL	000	#NUM! #NUM!	000	#NUM! #NUM!	000		#VALUE! #VALUE!
34 35	1.70 5.58 6 S 1.75 5.74 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NL NL	65		NL NL	68		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
36 37	1.80 5.91 6 S 1.85 6.07 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NL NL	6 8		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
38 39	1.90 6.23 6 S 1.95 6.40 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NL NL	68		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
40	2.00 6.56 6.S	NL	65	NL	65	NL	68		NL	65		NL	00	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C		#VALUE! #VALUE!
42	2.10 6.89 6 S	NL	65	NL	68	NL	68		NL	65		NL	00	#NUM!	00	#NUM!	00		#VALUE!
43	2.15 7.05 6 S 2.20 7.22 6 S	NL NL	65	NL	65	NL	65		NL	65		NL	00	#NUM!		#NUM!	000		#VALUE!
45	2.25 7.58 6.5 2.30 7.55 6.8	NL	65	NL NL	65	NL	65		NL	65		NL	00	#NUM!	00	#NUM!	00		#VALUE! #VALUE!
47 48	2.35 7.71 6 S 2.40 7.87 6 S	NL NL	65	NL NL	68	NL NL	65		NL NL	65		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
49 50	2.45 8.04 6 S 2.50 8.20 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S		NL NL	6 S 6 S		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
51 52	2.55 8.37 6 S 2.60 8.53 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NL NL	65		NL NL	65		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
53 54	2.65 8.69 6 S	NL NL	6 S 6 S	NL NL	68	NL NL	68		NL NL	65		NL NL	0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C		#VALUE! #VALUE!
55	2.75 9.02 6 S	NL	65	NL	68	NL	5 M		NL	65		NL	00	#NUM!	00	#NUM!	00		#VALUE!
57	2.85 9.35 6 S	NL NL	65	NL	65	NL	5 M		NL	65		NL	00	#NUM!		#NUM!	000		#VALUE!
58	2.90 9.51 6.8 2.95 9.68 6.8	NL NL	65	NL NL	65	NL NL	5 M 5 M		NL	65		NL	00	#NUM! #NUM!	00	#NUM! #NUM!	00		#VALUE!
60 61	3.00 9.84 6 S 3.05 10.01 6 S	NL NL	65	NL NL	65	NL NL	5 M 5 M		NL NL	6 S 5 M		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
62 63	3.10 10.17 6 S 3.15 10.33 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
64 65	3.20 10.50 6 S 3.25 10.66 6 S	NL NL	6 S 6 S	NL NL	6 S 6 S	NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
66 67	3.30 10.83 6 S 3.35 10.99 6 S	NL	6 S 6 S	NL NI	6 S 6 S	NL	5 M 6 S		NL NI	65		NL NI	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C		#VALUE! #VALUE!
68	3.40 11.15 68	NL	68	NL	68	NL	68		NL	5 M		NL	00	#NUM!	0 C	#NUM!	0C		#VALUE!

SUMMARY SHEET

CPTLIQ 2004AWRsettlementMSF 92020-200 Lyons CPT-1 through CPT-5 January 2021

of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT: RTF JOB: PROJ. : BY: DATE:	NUWI - L 2020-200 Lyons Ca AWR 02/08/202	Lyons Canyo anyon 21	on, LLC			Z 3 4 5 6	Ic Soil >2.95 Clay t <2.95 Clay t <2.6 Silty 5 <2.05 Clean	o Silty Clay y Silt to Silty and to Sandy Sand to Silty	Clay Silt Sand	rd# 1 2 3 4	Reference Tokimati Seed & I Seed & I Idriss &	e su & Yoshimi (199 driss mean (1971) driss lower limit (Golesorkhi (1997)	3) and Youd (199 1971)	97)									
FS = Thres	hold Factor	of Safety =		1.30			<1.31 Grave	lly Sand to Sa	and amax Mag	= 1.17	g	MSE 12	2										
Liquefiable Seismic Se	e Ic (betweer ttlement Soi	n 1.5 and 2.6 il (Type) =	i) =	2.60 (usu. 2.0	05 to 2.6)				Fill Density	= 1.04427 = 125	tsf pcf	MSP calc 1.284	274										
	Depth	()1)	CPT-1	1-13-21		СРТ	Г-2 1-13-2	21	CPT-3	1-13-21		CPT-4	1-13-21		CPT-5	1-13-21		CPT-***	0-0-00	CPT-***	0-0-00	CPT-***	0-0-00
69 70	3.45 3.50	11.32 11.48	65		NL	65		NL NL	65		NL NL	5 M 5 M		NL NL	65		NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
71	3.55	11.65	68		NL	68		NL	68		NL	68		NL	65		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
73	3.65	11.81	65		NL	65		NL	65		NL	65		NL	65		NL	00	#NUM!	00	#NUM! #NUM!	00	#VALUE!
74	3.70	12.14	68		NL	68		NL	65		NL	68		NL	65		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
75	3.75	12.30	65		NL NL	65		NL	65		NL NL	6 S 5 M		NL NL	65		NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
77	3.85	12.63	6 S		NL	6 S		NL	6 S		NL	5 M		NL	6 S		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
78	3.90	12.80	6 S 5 M		NL NL	5 M 5 M		NL NL	65		NL NL	5 M 6 S		NL NL	65		NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
80	4.00	13.12	5 M		NL	5 M		NL	68		NL	5 M		NL	6 8		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
81 82	4.05	13.29	5 M 6 S		NL NL	6 S 5 M		NL NL	65		NL NL	5 M 5 M		NL NL	6 S 5 M		NL NL	0 C	#NUM! #NUM!	0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
83	4.15	13.62	6 8		NL	6 8		NL	6 S		NL	5 M		NL	5 M		NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
84	4.20	13.78 13.94	65		NL NL	6 S 5 M		NL NL	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
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87	4.35	14.27	68		NL NL	65		NL NL	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	0 C	#NUM! #NUM!	0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
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90	4.50	14.76 14.93	68		NL NL	5 M 5 M		NL NL	65		NL NL	5 M 5 M		NL NL	5 M 6 S		NL NL	0 C	#NUM! #NUM!	0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
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96	4.80	15.75	68		NL NL	5 M 5 M		NL NL	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	0 C	#NUM! #NUM!	0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
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99	4.95	16.24	68		NL NL	5 M 4 C		NL NL	65		NL NL	5 M 5 M		NL NL	5 M 5 M		NL NL	0 C	#NUM! #NUM!	0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
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105	5.20	17.06	65		NL	4 C		NL	65		NL	5 M		NL	5 M		NL	00	#NUM!	00	#NUM!	00	#VALUE!
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155	7.70	25.26	68		NL	5 M		NL	68		NL	5 M		NL	5 M		NL	00	#NUM!	00	#NUM!	00	#VALUE!

Page 2

SUMMARY SHEET

CPTLIQ 2004AWRsettlementMSF 92020-200 Lyons CPT-1 through CPT-5 January 2021

of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT RTF JOE PROJ. : BY: DATE:	202 202 Lyc AW 02/0	WI - Ly 20-200 ons Cany VR (08/2021	ons Canyo yon	n, LLC				Z 3 4 5 6 7	Ic Soil >2.95 Clay <2.95 Clay <2.6 Silty <2.05 Clea <1.31 Gray	o Silty Clay y Silt to Silt Sand to San Sand to Sil	y Clay ly Silt y Sand Sand	rd# 1 2 3 4 5	Reference Tokimat Seed & I Seed & I Idriss & Site-Spec	e su & Yoshi driss mean driss lower Golesorkhi cific	mi (1983) (1971) an limit (197 (1997)	d Youd (19 71)	97)										
FS = Thr NL = Nc	eshold l ot lique	Factor of fiable	f Safety =		1.30			,	- ior oiu	ity build to	amax Mag	= 1.17	7 g	MSF	1.28	0											
Liquefial Seismic	ble Ic (b Settlem	ent Soil	1.5 and 2.6 (Type) =) =	2.60	(usu. 2.05	to 2.6)	CPI	a 112	1	Pa Fill Density	= 1.04427 = 125	7 tsf pcf	MSP calc	1.2846274	1 12 21		CB	F 5 1 1	21		CBT ***	0.0.00	CBT ***	0.0.00	CBT ***	0.0.00
155 156		7.75 7.80	25.43 25.59	5 M 5 M			NL NL	5 M 5 M		NL NL	65 68		NL NL	5 M 5 M			NL NL	5 M 5 M	1-5 1-1	1 1	NL NL	0C 0C	#NUM! #NUM!	0C 0C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
157 158		7.85 7.90	25.75 25.92	5 M 6 S			NL NL	5 M 5 M	-	NL NL	6 S 6 S		NL NL	5 M 5 M			NL NL	5 M 5 M		! !	NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
159		7.95	26.08 26.25	6 S 6 S			NL NL	5 M 5 M	-	NL NL	6 S 6 S		NL NL	5 M 5 M			NL NL	5 M 5 M		1	NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
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165		8.25 8.30	27.07	65			NL NL	5 M 5 M	-	NL NL	65		NL NL	40			NL NL	5 M 5 M		1	NL NL	0 C 0 C	#NUM! #NUM!	00	#NUM! #NUM!		#VALUE! #VALUE!
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178 179		8.90 8.95	29.20 29.36	7 S 6 S			NL NL	5 M 5 M	-	NL NL	5 M 5 M		NL NL	5 M 5 M			NL NL	5 M 5 M		1 1	NL NL	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
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199 200		9.95 10.00	32.64 32.81	6 S 6 S		35.34 35.45	11.26 8.92	0 C 0 C	-		5 M 5 M		2.35 2.88	5 M 6 S	<1> <1>	11.78 11.13	0.51 0.39	5 M 5 M	<1> 1 <1> 1	5.08 0 5.19 0	0.19 0.21	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
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235 236		11.75 11.80	38.55 38.71	0 C 0 C		20.35 20.41		0 C 0 C	-		0 C 0 C			6 S 6 S	<1> <1>	4.17 4.09	0.66 0.64	5 M 5 M	<1> <1>	.16 0 .06 0	0.27 0.35	0 C 0 C	#NUM! #NUM!	0 C 0 C	#NUM! #NUM!	0 C 0 C	#VALUE! #VALUE!
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CPTLIQ 2004AWRsettlementMSF 92020-200 Lyons CPT-1 through CPT-5 January 2021

SUMMARY SHEET

of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CL	ENT:	NUWI - La	vons Canvo	n. LLC		ZI	Ic Soil		rd#	Reference	2					1							
RT	F JOB:	2020-200				3	>2.95 Clay to Silty Clay		1	Tokimats	u & Yoshimi (198	(3)				1							
PR)J. :	Lyons Can	iyon			4	<2.95 Clayey Silt to Silty	Clay	2	Seed & Id	triss mean (1971)	and Youd (19	97)			1.							
BY	TE.	AWR 02/08/2021				5	<2.6 Silty Sand to Sandy	Silt	3	Seed & Id	friss lower limit (19/1)				6							
DA	11.	02/08/2021				7	<1.31 Gravelly Sand to Sany	nd	5	Site-Spec	ific					8							
FS	= Thresh	old Factor o	of Safety =		1.30			amax =	1.17	7 g						1							
NL	= Not li	quefiable						Mag =	6.8	3	MSF 1.2	8											
Liq	uefiable	Ic (between	1.5 and 2.6)=	2.60 (usu. 2.05 to 2.6)			Pa =	1.04427	/ tsf	MSP calc 1.2846	274											
Ser	anic Seu	Depth	(Type) -	CPT-1	1-13-21	CP	F-2 1-13-21	CPT-3	1-13-21	per	CPT-4	1-13-21		СР	T-5	1-13-21		CPT-***	0-0-00	CPT-***	0-0-00	CPT-***	0-0-00
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	263	13.15	43.14		22.00							4.52		5 M	<1>	3.54	0.25		#NUM! #NUM		#NUM! #NUM!		#VALUE!
	265	13.25	43.47	00	22.00	00		00			00	4.55		5 M	<1>	3.46	0.25	00	#NUM!	00	#NUM!	00	#VALUE!
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	279 280	13.95	45.77		22.94	0 C						4.83		65		3.12	3.09		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
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	283	14.15	46.42		23.18							4.91		65		3.16	1.88		#NUM! #NUM!		#NUM! #NUM!		#VALUE! #VALUE!
	285	14.25	46.75	00	23.30	00		00			00	4.95		65		3.18	1.47	00	#NUM!	00	#NUM!	00	#VALUE!
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	295	14.75	48.56	00	23.94	00		00			00	5.14		5 M	<1>	2.80	0.31	00	#NUM!	00	#NUM!	00	#VALUE!
	297	14.85	48.72	0 C	24.00	0 C		00			0 C	5.18		4 C		2.85	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
	298	14.90	48.88	00	24.06	0 C						5.20		30		2.86	NL	000	#NUM! #NUM!	00	#NUM! #NUM!	00	#VALUE!
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	301	15.05	49.38	0 C	24.24	0 C		00			00	5.26		5 M	1	2.85	0.32	0 C	#NUM!	00	#NUM!	0 C	#VALUE!
	302	15.10	49.54	00	24.30	0 C		00			00	5.28		68	1	2.82	0.38	00	#NUM!	0 C	#NUM!	00	#VALUE!
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	306	15.30	50.20 50.36		24.53	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-					5.36		5 M	1	2.71	0.29	00	#NUM! #NUM!		#NUM! #NUM!		#VALUE!
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4	310	15.50	50.85	0 C	24.77	0 C		0 C			0 C	5.44		0 C		2.72		0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!

Page 4



GREGG DRILLING & TESTING, INC.

SCPT-1 Average Unit Weight (psf) 120.00 Depth to Water (ft) 51.00

Interval Depth (ft)	Interval Velocity (ft/sec)	Vs (m/s)	Total Stress (psf)	Effective Stress (psf)	Effective Stress (kpa)	(Pa/∂')	(Pa/∂')0.25	Vsi (m/s)
4.9	9.8	719.7	588.0	588.0	28.1	3.6	1.4	988.1
9.8	14.9	699.7	1176.0	1176.0	56.3	1.8	1.2	807.8
14.9	20	964.1	1788.0	1788.0	85.6	1.2	1.0	1002.3
20	24.4	690.1	2400.0	2400.0	114.9	0.9	1.0	666.6
24.4	29.9	3274.6	2928.0	2928.0	140.2	0.7	0.9	3009.5
29.9	34.4	965.7	3588.0	3588.0	171.8	0.6	0.9	843.6
34.4	35.8	689.9	4128.0	4128.0	197.6	0.5	0.8	581.9



GREGG DRILLING & TESTING, INC.

SCPT-2 Average Unit Weight (psf) 120.00 Depth to Water (ft) 55.00

Interval Denth	Interval Velocity	Vs	Total Stress	Effective Stress	Effective Stress			
(ft)	(ft/sec)	(m/s)	(psf)	(psf)	(kpa)	(Pa/∂')	(Pa/∂')0.25	Vsi (m/s)
5.1	9.7	1051.5	612.0	612.0	29.3	3.4	1.4	1429.2
9.7	14.8	959.3	1164.0	1164.0	55.7	1.8	1.2	1110.3
14.8	19.7	989.5	1776.0	1776.0	85.0	1.2	1.0	1030.5
19.7	24.6	1055.3	2364.0	2364.0	113.2	0.9	1.0	1023.2

Open-File Report 97-12



Plate 1.2 Historically Highest Ground Water Contours and Borehole Log Data Locations, Oat Mountain 7.5-minute Quadrangle, California.

Borehole Site _____ 30 ___ Depth to ground water in feet





general/wells/ Unified Hazard Tool 🚱 Deltek 💕 City of Santa Clarita... 🚱 SupplyPro: Suppl Search Buffer: None V Active Wells Vinactive Wells Happy Feet Child Care Jennifet Pl Jenni Hamkbryn Ave Jennifer PI 6 Wintergreen Ct The Old Rd 5 U Sit 'n Sleep 🙄 Wabuska St Wintergreen Ct Hawkbryn Ave. Wabuska St gasso Cr X Well Number: 5832 Well Status: Inactive Sagecres Well Measurement Data **Historical Well Measurement Data** Last Measure Date 09/27/1965 × Last Measurement State Well ID: EXPORT Mulberry Mobile (Locations are approximate.) Home Park Well ID: 5832 State #: RP Elev: John E. High Measure: 135.80 ON 11/26/1963 Low Measure: 102.20 ON 10/27/1958 Foxtall Ct Sagecrest Cir RP to WS Water Surface Measure Questionable No Measure Hawkbryn Elevation Measure Date (Depth) Well has been 09/27/1965 destroyed 15 11/24/1964 119.40 Sagecrest Cir Ave 11/24/1964 119.40 11/24/1964 119.40 W & J Bathroom The old Rd 11/26/1963 136.80 Remodeling Hawkbryn Ave 11/26/1963 136.80 11/30/1962 115.40 11/30/1962 115.40 12/11/1961 125.90 5 12/11/1961 125.90 12/05/1960 112.50 12/05/1960 112.50 11/30/1959 116.80 11/30/1959 116.80 10/27/1958 103.20 10/27/1958 103.20 yons Ranch The old Rd Ē

NUWI – Lyons Canyon, LLC March 19, 2021 2020-200-001

APPENDIX H

AYERS OIL WELL DOCUMENTATION



GEOPHYSICAL EVALUATION LYONS CANYON RANCH WELL

Santa Clarita, California

PREPARED FOR:

Qtative Development Solutions 100 Spectrum Center Drive, Suite 1400 Irvine, CA 92618

PREPARED BY:

Atlas Technical Consultants, LLC 6280 Riverdale Street San Diego, CA 92120

December 28, 2020



6280 Riverdale Street San Diego, CA 92120 877.215.4321 | oneatlas.com

December 28, 2020

Atlas No. 120513SWG Report No. 1

MR. DEREK BARBOUR QTATIVE DEVELOPMENT SOLUTIONS 100 SPECTRUM DRIVE, SUITE 1400 IRVINE, CALIFORNIA 92618

Subject: Geophysical Evaluation Lyons Canyon Ranch Well Santa Clarita, California

Dear Mr. Barbour:

In accordance with your authorization, Atlas has performed a geophysical evaluation pertaining to the Lyons Canyon Ranch Well project located in Santa Clarita, California. Specifically, our services included the performance of a magnetic (MAG) evaluation for portions of the property. The primary purpose of the study was to assess the presence and location of a former oil well within a study area designated by you and your office. Our services were conducted on December 9, 2020. This report presents the methodology, equipment used, analysis, and findings.

If you have any questions, please call us at 619.280.4321.

Respectfully submitted, Atlas Technical Consultants LLC

Evan C. Anderson Senior Staff Geophysicist

ECA:PFL:pfl:ds Distribution: dbarbour@qtative.com

No. 1043 Exp. 1/31/2022 OFCALIF

Patrick F. Lehrmann, P.G., P.Gp. Principal Geologist/Geophysicist



TABLE OF CONTENTS

1
1
1
1
2
2
2
3

FIGURES

Figure 1	Site Location Map
Figure 2	Site Data Map

- Figure 3 Site Photographs
- Figure 4 Oil Well Depth Estimate



1. INTRODUCTION

In accordance with your authorization, Atlas has performed a geophysical evaluation pertaining to the Lyons Canyon Ranch Well project located in Santa Clarita, California (Figure 1). Specifically, our services included the performance of a magnetic (MAG) evaluation for portions of the property. The primary purpose of the study was to assess the presence and location of former oil wells within three study areas designated by you and your office. Our services were conducted on December 9, 2020. This report presents the methodology, equipment used, analysis, and findings.

2. SCOPE OF SERVICES

Our scope of services included:

- Performance of magnetic evaluations across the study areas using a Geometrics G858 cesium vapor magnetometer, Schonstedt GA-52 magnetic gradiometer and a Trimble Pro XRS global positioning system (GPS) for spatial control.
- Compilation and analysis of the data collected.
- Site reconnaissance and mapping.
- Preparation of this report presenting our findings, conclusions, and recommendations.

3. SITE AND PROJECT DESCRIPTION

The project site is located at Lyons Canyon Ranch in Santa Clarita, California (Figure 1). The study site is currently a vacant and undeveloped lot. Based on historical images, former buildings and/or structures occupied areas adjacent to the study area. However, no structures are currently in the area. The site contains active trails, dirt roads, tall trees, grass and brush. Figure 3 depicts the general site conditions in the study areas.

Based on our discussions with you, it is our understanding that an oil well formerly occupied a portion of the property with GPS coordinates provided by DOGGR.

4. GEOPHYSICAL INSTRUMENTATION AND APPLICATIONS

Our evaluation included the use of a Geometrics G858 cesium vapor magnetometer and Schonstedt GA-52 magnetic gradiometer. These instruments provide real-time results and facilitates the delineation of subsurface ferrous metallic features.

4.1 GEOMETRICS G-858 MAGNETOMETER

The Geometrics G-858 cesium vapor magnetometer measures the strength of the earth's magnetic field and the superposed magnetic field of ferromagnetic materials in its vicinity. The precision of the instrument is approximately 1/10th gamma. The earth's field strength is roughly 46,676 gammas at this latitude. The earth's magnetic field is inclined in the direction of the north



magnetic pole. Because of this inclination, a buried ferromagnetic object generally is expressed as a paired anomaly with a positive (above background) slightly to the south and a negative slightly in the direction of magnetic north, whereas a long vertical ferromagnetic object (i.e., well) would generally be expressed as a positive (monopole). However, it should be noted that surface and subsurface metal objects (i.e., fence poles, fences, and metal debris) can influence the location and size of the magnetic response. In addition, the depth of burial can substantially change the amplitude and areal extent of the magnetic response. Typically, the pipe produces an alignment of high and low responses along the length of the feature. Detection depths of more than 20 feet are possible over large ferrous pipes.

4.2 SCHONSTEDT GA-52C MAGNETIC GRADIOMETER

The magnetic gradiometer has two fluxgate magnetic fixed sensors that are passed closely to and over the ground. When not near a magnetic object, that is, only in the earth's field, the instrument emits an audible sound signal at a low frequency. When the instrument passes over buried iron or steel objects, so that the field is significantly different at the two sensors, the frequency of the emitted sound increases. Frequency is a function of the gradient between the two sensors. The gradiometer is less sensitive to surface features than the single sensor magnetometers. Limitations may include obstructions from surface objects and interference from nearby ferrous magnetic objects.

5. SURVEY METHODOLOGY

Our evaluation of the site primarily included the collection of magnetic (MAG) data using a cesium vapor magnetometer. The MAG data were collected in conjunction with a Trimble Pro XRS Global Positioning System (GPS) with sub-meter accuracy for spatial control. Measurements were collected at 0.2-second intervals along generally north-south and/or east-west traverses spaced approximately 10 feet apart across the study areas. Collected MAG data were downloaded to a portable computer in the field for preliminary analysis. The gradiometer was used to delineate the surface expression of anomalies detected during the MAG study. Detected anomalies were delineated on the surface with pin feathers and/or flags.

6. FINDINGS AND CONCLUSIONS

The primary purpose of our study was to evaluate the presence and location of an abandoned oil well within the designated study area through the collection of magnetic data. The results of the MAG study are presented in Figure 2 with areas of high and low magnetic responses illustrated in the figures by hot (pink/red) and cool (blue/purple) colors, respectively. Our evaluation revealed a significant candidate oil well anomaly in the study area.

The candidate oil well anomaly is located towards the western portion of the study area. The anomaly was found roughly 30 feet northwest of a former excavation and survey stake, and approximately 30 feet southwest of the DOGGR coordinates for the abandoned well. The anomaly produced a relatively high amplitude monopole magnetic response in the shape of a bull's eye



(Figure 2). This feature is similar in magnetic response and shape to former magnetic studies which revealed buried oil wells. Using the Peter's half-slope method and straight slope method, the top and/or cap of the oil well was estimated between 7 $\frac{1}{2}$ feet to 11 feet below the ground surface. Figure 4 details the approach to this estimate.

Our survey utilized industry standard equipment (i.e. magnetic instruments) and was conducted in general accordance with current practice. It should be noted, however, that the presence of existing structures and surface objects (i.e., buildings, metal fences, manholes, etc.) potentially limited the survey. Where obstructions were present subsurface data could not be collected. Moreover, magnetic responses produced by metal surface objects and underground lines can potentially obscure subsurface features.

7. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding the conclusions and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist, and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface surveying will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Atlas should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole responsibility.








OIL WELL DEPTH ESTIMATE	Santa Clar	Santa Clarita, California		
	Project No.: 120513SWG	Date: 12/20	_	



NUWI – Lyons Canyon, LLC September 15, 2023 2020-200-001

APPENDIX K

RESPONSE TO COUNTY COMMENTS

(RTF&A, 2021b)





July 27, 2021

NUWI – Lyons Canyon, LLC 2001 Wilshire Blvd., Suite 401 Santa Monica, California 90403

Job No. 2020-200-001

Attention: Jason Han

Subject:

Response to County Comments Proposed Lyons Canyon Development Tentative Tract Map 83301 Los Angeles County, California

References: See attached References

Ladies and Gentlemen:

R. T. Frankian and Associates, Inc., (RTF&A) is pleased to present this response to address review comments provided by the County of Los Angeles Department of Public Works (County), Geotechnical and Materials Engineering Division (GMED), Geologic and Soils Engineering Sections, in their May 3, 2021 review comments concerning the subject site. The review comments are in response to the R.T. Frankian & Associates (RTF&A) Geotechnical 100-Scale Plan Review, dated March 19, 2021.

The GMED review sheet comments are shown below in bold type. Our response follows each comment in regular type. A copy of the GMED Review sheet is attached near the end of this report.

GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET

S1. Independent analyses for cross-sections C-C' and G-G' do not meet the county's minimum factor of safety for static slope stability of 1.5. Recommend mitigation and provide revised analysis that includes mitigation measures.

Based on this comment, the independent slope stability calculations were requested and provided by the reviewer. The analysis for Section C-C' presented in the referenced report was performed using a single daylighted bedding angle of 24 degrees which was a conservative interpretation of existing site conditions. The true geologic bedding attitudes at the upper portion of Cut Slope CS-11 was measured at a dip of 40 degrees with the lower portion of the slope having a measured true bedding dip of 45 degrees. Based on review of the provided independent slope stability analysis performed by the county, we recommend that the apparent bedding in the upper portion of the slope remain at 24 degrees and the daylighted bedding in the lower portion of the slope be revised from 24 to 35 degrees based on the two bedding attitudes along Section C-C' originally presented in the reviewed report. These bedding for slope stability purposes is indicated on Geologic Section C-C'. Slope stability calculations for the revised bedding shown on Geologic Section C-C' meet County requirements for stable slopes and is presented in the Appendix and shown on Geotechnical Section C-C'.

Relative to Section G-G', additional slope stability calculations have been provided showing deeper failure planes below the bottom of the proposed retaining wall without including the benefit of lateral support provided by the pile supported retaining wall. This includes a calculation on a lower bedding plan that obtains a factor of safety of 1.67, which is greater than 1.5 without relying on any lateral support from the pile supported retaining wall. This bedding plane that meets County factor of safety requirements is at a depth of 15 feet below the bottom of the proposed retaining wall. Accordingly, the proposed piles should neglect passive pressure resistance to a depth of 15 feet below the proposed retaining wall or lowest adjacent grade, whichever is shallower. The piles must be sufficiently stiff to provide resistance of 10 kips per foot of wall at the mid-height of the proposed retaining wall. After a 10 kip horizontal load from the recommended pile is applied at the mid-height of the proposed retaining wall, the factor of safety of all failure planes is increased above 1.5 as presented in the Appendix.

The proposed pile supported retaining wall has not yet been designed but will be under separate permit. The purpose of the provided calculations is to show feasibility that the daylighted bedding could be mitigated by construction of the recommended pile supported retaining wall. Additional evaluation and geotechnical parameters will be provided at the Rough Grading Plan level of approval to support the final pile supported retaining wall design. The final pile supported retaining wall design will be closely coordinated with the Geotechnical Consultant and Project Structural Engineer/Shoring Designer as part of obtaining the separate retaining wall permit



required for wall construction. The following geotechnical pile design parameters are provided for general planning purposes.

For the design of shoring piles spaced at least 2½ diameters on centers, the allowable lateral bearing value (passive value) of the soils starting at a depth of 15 feet below the lowest adjacent grade may be assumed to be zero at the excavated surface, increasing at the rate of 600 psf of depth, to a maximum of 4,500 psf. To develop the full lateral value, provisions should be taken to assure firm contact between the piles and the undisturbed soils. The concrete placed in the pile excavations above the excavation bottom may be a lean-mix concrete. The concrete used in that portion of the shoring pile which is below the planned excavated level should be of sufficient strength to adequately transfer the imposed loads to the surrounding soils. It should be noted that in the unlikely event that groundwater is encountered, it will be required to increase the design strength of concrete by 1,000 pounds per square inch (psi) where it is required to utilize a rigid tremie pipe and cast concrete in standing water more than 12 inches in depth.

The piles 15 feet below the excavated level may be used to resist downward loads, provided that the portion of the piles below the excavated level is backfilled with structural concrete. The frictional resistance between the concrete piles and the soils 15 feet below lowest adjacent grade may be taken as equal to 600 psf.

S2. It appears portions of the drainage channels is located in a mapped area with a potential for liquefaction. Verify and address the potential of liquefaction lateral spreading. Recommend mitigation as necessary.

In general, the site elevation will be raised within the alluvial areas. The mitigation for liquefaction at the site consists of deep removals of either 15 or 20 feet during grading, a general increase in the existing site elevations within liquefaction areas, and structural mitigation.

Lateral spreading can occur when a site is sloped or is adjacent to a free face. The portions of the site subject to liquefaction will be essentially level at the completion of grading and with the recommended removals and general increase in the existing site grades, there will not be any soil layers subject to liquefaction relative to the drainage channels that will present a free face to the site. If the site is graded as recommended, soils that could potentially liquefy and be subject to lateral spreading will be removed and replaced with compacted fill. The potential for lateral spreading occurring at the site after completion of the recommended grading is low.

S3. Show the following on the geotechnical map:

- a. Revised location and dimensions of stabilization fill, if applicable.
- b. All recommended mitigation measures, as necessary.



GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

There were not any revisions to stability fills or mitigation measures recommended as part of our response to GMED comments. Accordingly, the mitigation measures shown on the Geotechnical Map presented in the reviewed report, remain applicable.

S4. The geotechnical consultant(s) must sign, stamp, and indicate the date of signature on all reports and addenda.

Acknowledged.

Submittal of this response to EPIC-LA is referred to Alliance.

REGULATORY STATEMENT

Based on the findings summarized in this submittal, it is our professional opinion that the proposed grading will be safe from hazards of settlement, slippage, or landslide, provided that the recommendations of the referenced reports, this submittal, and those of the County of Los Angeles are incorporated into the proposed construction. Additionally, the proposed site development will not adversely affect the geotechnical conditions on adjacent properties.

LIMITATIONS

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for the client and their design consultants, to be used solely for planning and design of the subject site and its associated grading. The report has not been prepared for use by other parties and may not contain sufficient information for purposes of other parties or other uses.

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The following are attached and complete this report.

- References
- Geologic and Soils Engineering Review Sheet
- Geotechnical Exhibit Figures 1
- Geologic Section C-C' Figure 2
- Geotechnical Sections Figure 3
- Appendix Slope Stability Calculations

Respectfully submitted,

R. T. FRANKIAN & ASSOCIATES

W. Raeplicka

by:

Alan W. Rasplicka Principal Geotechnical Engineer

and: Timothy P. Latiolait Principal Engineering Geologist

TPL/AWR/jh

Distribution: New Urban West, Inc. Attn: Mr. Jason Han, Mr. Jonathan Frankel Alliance Land Planning and Engineering Attn: Mr. Craig Whiteker, Mr. Michael La Bounty, Mr. Chris Stucky Madison Real Estate Consulting, LLC Attn: Mr. Benny Sam



REFERENCES

- Bailey, T. L., and Jahns, R. H., 1954, "Geology of the Transverse Range Province, Southern California," in Geology of Southern California, California Division of Mines Bull 170, Vol. 1, pp. 83-106.
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GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

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PCA <u>GMTR/A864</u> EPIC LA <u>ESTU2021000187</u> Telephone: (626) 458-4925

County of Los Angeles Department of Public Works Geotechnical and Materials Engineering Division GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET 900 S. Fremont Avenue, Alhambra, CA 91803

Tentative Tract /	Parcel Map	83301	Tentative Map Dated	_3/24/21 (Tent/Exhib)	Parent Tract
Grading By Subo	divider? [Y] (Y or N)	2,600,000 yd ³	Location	Lyons Canyor	1
Geologist	R.T. Fran	nkian	Subdivider	NUWI-LYONS C	ANYON, LLC
Soils Engineer	R.T. Fra	nkian	Engineer/Arch.	Alliance Land Plann	ing & Engineering

Review No. 2 of:

Geologic Report(s) Dated:			
Soils Engineering Report(s) Date	id:		
Geotechnical Report(s) Dated:	3/19/21		
References:			

TENTATIVE MAP FEASIBILITY IS NOT RECOMMENDED FOR APPROVAL. PRIOR TO RECOMMENDING APPROVAL OF THE TENTATIVE TRACT OR PARCEL MAP:

- S1. Independent analyses for cross-sections C-C' and G-G' do not meet the county's minimum factor of safety for static slope stability of 1.50. Recommend mitigation and provide revised analysis that includes mitigation measures.
- S2. It appears portions of the drainage channels is located in a mapped area with a potential for liquefaction. Verify and address the potential of liquefaction lateral spreading, Recommend mitigation as necessary.
- S3. Show the following on the geotechnical map:
 - a. Revised location and dimensions of stabilization fill, if applicable.
 - b. All recommended mitigation measures, as necessary.
- S4. The geotechnical consultant(s) must sign, stamp, and indicate the date of signature on all reports and addenda.
- S5. Please submit documents in response to this review using the EPIC-LA system at the following URL: <u>https://epicla.lacounty.gov/SelfService/#/home</u>. The documents must be submitted to the EPIC-LA geotechnical study plan case number ESTU2021000187. Please contact GMED staff at (626) 458-4925 if documents cannot be uploaded to the plan case.
- NOTE: Provide a copy of this review sheet with your resubmittal.

NOTE(S) TO THE PLAN CHECKER/BUILDING AND SAFETY DISTRICT ENGINEER:

- PER THE SOILS ENGINEER:
 - A. ON-SITE SOILS ARE CORROSIVE TO FERROUS METALS.
 - B. EXPANSION INDEX OF NEAR-SURFACE CERTIFIED ENGINEERED FILL ON BUILDING LOTS SHOULD BE EVALUATED AT THE COMPLETION OF GRADING.
 - C. THE SOILS REPORT DATED 3/19/21 INDICATES THERE MAY BE ENVIRONMENTAL CONCERNS REGARDING THE PRESENCE OF OILS WELLS.

TREOFINOE OF	OILO MELLO.	(c)
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	Solis Section / Por california	Date 05/03/21

Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey

NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders. Ptgmepub/Development Review/ICombined Reviews/Tracts and Parcels/83301, Lyons Canyon, 2021-05-03, TM-2-NA.docx



Prepared For:

AS SHOWN Date: 7/27/2021

R. T. FRANKIAN & ASSOCIATES 26027 Huntington Lane, Unit A Santa Clarita, California 91355 (818) 531-1501 www.RTFrankian.com

MAJOR LAND DIVISION VESTING TENTATIVE TRACT MAP NO. 083301 THE TRAILS AT LYONS CANYON LOCATED IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES



Geotechnical Exhibit

NUWI - LYONS CANYON, LLC

Proposed Lyons Canyon Development Tentative Tract Map 83301 Santa Clarita, California Drawn By:

JH

Figure 1

Checked By: AWR

2020-200-001

DATE	
MARCH	11, 2021
SHEET	2
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APPENDIX

SLOPE STABILTY CALCULATIONS



GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY











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NUWI – Lyons Canyon, LLC September 15, 2023 2020-200-001

APPENDIX L

AERIAL IMAGERY AND LIDAR





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Country:	United States	Begin date:	1930-07-18	Note:		
State(s):	California	End date:	1930-08-25	Santa Clarita to Sylmar (River to intersection of In		
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HISTORICAL AERIAL IMAGE - 1930





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Size: frames 9 X 7 inches

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FRANKIAN AND ASSOCIATES 26027 Huntington Lane Unit A Santa Clarita, California 91355 (818) 531-1501 www.RTFrankian.com

NUWI – LYONS CANYON, LLC Prepared For:

Lyons Canyon Development, Vesting Tentative Tract 83301, Los Angeles County, CA



Imagery Report: Flight C-9800 Digital <u>View Index</u>

Country:	United States	Begin date:	1945-10-24	
State(s):	California	End date:	1945-11-26	
	California	Scale:	1:14,400	
Counties:	Los Angeles, Ventura	Overlap:	60%	
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Filed by (collection):	C-9800	Directional orientation:	East-West	
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Imagery Location:	Shelves Room 2552	Lens focal length:	12 inches (304.8mm)	
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Copyright:	Copyright © UC Regents, All Rights Reserved.
Flown by:	Fairchild Aerial Surveys
Contractor/requestor:	Ventura County

Acquired from: Teledyne Est. frame count: 1702

Site:

HISTORICAL AERIAL IMAGE – 1945



FRANKIAN AND ASSOCIATES 26027 Huntington Lane Unit A Santa Clarita, California 91355 (818) 531-1501 www.RTFrankian.com

NUWI – LYONS CANYON, LLC Prepared For:

Date: Lyons Canyon Development, Vesting Tentative Tract 83301, Los Angeles County, CA

N/A	Drawn By:	Project Number: 2020-200-001
May 2023	Checked By: GL	Figure Number:



Imagery Report: Flight TG-2445 Digital <u>View Index</u>

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Index scale:	1:72,000			Contractor/requestor:	County of Los
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Height:	9			Acquired ironi.	Teledyne, Inc.
Width:	9			Est. frame count:	134

HISTORICAL AERIAL IMAGE - 1968



NUWI – LYONS CANYON, LLC Prepared For:

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Site:

Lyons Canyon Development, Vesting Tentative Tract 83301, Los Angeles County, CA



United States Geological Survey – Acquired May 2022

