EXHIBIT E

MILLER PACIFIC ENGINEERING GROUP

December 9, 2019
File: 2875.001REVrpt.doc

Lyons Hillside Vineyards
8280 Wild Horse Valley Road
Napa, California 94558

Attn: Mr. Cap Lyons

Re: Geotechnical Investigation – Vineyard Development (Updated)
Lyons Hillside Vineyards
8220 Wild Horse Valley Road (APN 033-190-004)
Napa, California

Introduction

This letter summarizes the results of our Phase 1 Geotechnical Investigation for your planned new vineyard development at 8220 Wild Horse Valley Road (APN 033-190-004) in rural eastern Napa, California. A Site Location Map is presented on Figure 1. Our work has been performed in accordance with our Agreement for Professional Engineering Services dated May 10, 2019. The purpose of our Phase 1 services is to evaluate site geologic conditions and provide geotechnical recommendations and criteria for use in project design and construction.

The scope of our Phase 1 services is outlined in our proposal letter dated March 25, 2019 and includes review of readily-available regional geologic mapping and geotechnical background data, subsurface exploration with one half-day of exploratory test pits, laboratory testing of recovered samples, geologic hazards evaluation, and development of recommendations and criteria for site grading, drainage, and other geotechnical items. Issuance of this letter completes our Phase 1 scope of services. Future phases of work could include supplemental investigation/consultation, geotechnical plan review, and/or observation and testing during construction.

Project Description

The project includes development of about 19-acres of new vineyard spread across 5 individual blocks. Although no project details have been provided, we anticipate the project grading will be relatively minimal, and limited generally to thin cuts and fills to create level avenues and soil ripping where new vines will be planted. We understand that no new terraces, other significant grading, or new structures are planned at this time.

Regional Geology

Napa County lies within the Coast Ranges geomorphic province of California, a region characterized by active seismicity, steep, young topography, and abundant landsliding and erosion owing partly to its relatively high annual rainfall. The regional basement rock consists of sedimentary, igneous, and metamorphic rock of the Jurassic-Cretaceous age (65-190 million years ago) Franciscan Complex and marine sedimentary strata of the Great Valley Sequence, which is of similar age. Within central and northern California, the Franciscan and Great Valley rocks are locally overlain by a variety of late Cretaceous and Tertiary-age sedimentary and volcanic rocks which have been deformed by episodes of folding and faulting. The youngest geologic units in the region are Quaternary-age (last 1.8 million years) sedimentary deposits. These unconsolidated deposits partially fill many of the valleys of the region.

As shown on Figure 3, regional geologic mapping[1] indicates the site is underlain by Dacite of Mt. George (map symbol Tsvdg), which is characterized as flows, domes, and shallow intrusions of gray to tan porphyritic dacite which is strongly flow banded. The site is shown as lying just east of the Green Valley Fault zone. Mapping shows the north-northwest trending fault just passing through the southwestern corner of the parcel.

Site Reconnaissance and Geologic Mapping

We performed a site reconnaissance on November 5, 2019 to observe existing conditions and map site geology. Note that our mapping was generally limited to the proposed vineyard development areas and did not focus on other areas of the property.

The site is located generally along the southern crest of the Howell Mountains, about 0.15-miles north of the Napa-Solano County Line. Throughout the site, topography is defined by narrow, north-trending ridgelines separated by moderately-incised drainages. Surface elevations within the development area generally range from about +1650 at the northern edge of Block B to a maximum of about +1,800-feet along the south-central boundary of Block D. Natural slopes are typically inclined between about 3:1 (horizontal:vertical) and 5:1, although slopes locally approach 2:1 below the western edge of Block D (along the east bank of the drainage which marks the location of the primary trace of the Green Valley Fault. The proposed vineyard areas are currently undeveloped, and vegetation generally consists of oak trees, low grasses, and other ground cover.

During our reconnaissance, we observed that the property is underlain entirely by Sonoma Volcanics bedrock, a group of lava and ash-flow deposits which generally ranges from about 2.5- to 9-million years old. Constituent rock types observed during our reconnaissance included rhyolite lava flows (map unit Tvr), andesite lava flows (unit Tva), and welded ash-flow tuff (unit Tvt). Rhyolite and andesite rocks are typically dark gray, fresh and deep red-brown where weathered, very hard, and very strong. Ash tuff bedrock is buff to light gray in color, moderately hard, and moderately strong. Throughout each of the proposed vineyard blocks, we observed scattered bedrock outcrops interspersed with relatively thin silty soil deposits. We did note an anomalous zone of expansive soil near the west edge of Block E, in the area underlain by tuff bedrock.

During our reconnaissance, we observed an approximate 20- to 30-foot wide zone of gouged rock and confirmed the regionally-mapped location of what is apparently the primary trace of the Green Valley Fault, passing through the southwest corner of the parcel. We observed exposures of brecciated andesite in the creekbanks just north of Blocks B and C, and also noted apparently unconformable contacts between tuff and andesite bedrock in the ravine separating Blocks B and C, which we suspect are fault-related. Our geologic map of the vineyard is shown on Figure 2.

Subsurface Exploration and Laboratory Testing

Subsurface conditions were explored at the site on November 5, 2019 with five test pits excavated at the approximate locations shown on Figure 2. Test pits were excavated to maximum depths between 9- and 55-inches, using a wheeled Deere 210G backhoe equipped with a 24-inch bucket and "rock" teeth. Soil and rock materials encountered were logged by our Geologist, and samples were collected at select locations for laboratory testing. Brief discussions of the terms and

[1] McLaughlin, R.J. et al (2004), "Geology, Tephrochronology, Radiometric Ages, and Cross-Sections of the Mark West Springs 7.5-Minute Quadrangle, Sonoma and Napa Counties, California", United States Geological Survey Scientific Investigations Map 2858 (Map Scale 1:24,000).

methodology used in classifying earth materials are shown on the Soil and Rock Classification Charts, Figures A-1 and A-2, respectively. Exploratory Test Pit Logs are shown on Figures A-3 through A-7.

Disturbed samples of soil and rock materials were collected from select test pits, and laboratory testing included determination of in-situ moisture content and Plasticity Index in general accordance with applicable ASTM standards. Moisture content test results are presented on the test pit logs, while plasticity index results are shown on Figure A-8. The subsurface exploration and laboratory testing program are discussed in further detail in Appendix A.

Subsurface Conditions

Subsurface conditions encountered in our test pits were generally consistent with regional and site-specific mapping discussed above. In general, areas mapped as rhyolite and tuff (Tva and Tvt) expose weathered bedrock at or within about 12-inches of the ground surface. Areas mapped as andesite (Tva) are underlain by up to about 4-feet of residual soils, composed of silty coarse gravel over weathered rock.

We noted that, with the exception of ash tuff encountered in Test Pit 2, excavation into weathered bedrock became increasingly difficult very quickly. Effective refusal was encountered in very hard rhyolite bedrock at a depth of about 9-inches in Test Pit 4. Test Pits 1, 3, and 5, each encountered fractured andesite bedrock and reached refusal or near-refusal at depths between about 3- and 4.5-feet below the ground surface. At test Pit 2, we noted only moderately difficult excavation in ash tuff bedrock.

Standing groundwater was not encountered in any of our test pits. However, since pits were not left open for an extended period of time, a stabilized depth to groundwater may not have been observed. Based on experience with similar sites in similar geologic environments, we do not anticipate significant shallow groundwater in ridgeline areas underlain by volcanic rocks, although local “perched” groundwater could exist, typically near the soil/rock interface where rock is especially dense. Locally shallow groundwater may also exist and/or emerge in the form of springs and seeps where faults are mapped.

Geologic Hazards Evaluation

We have considered a variety of geologic hazards which could affect the site. We judge that the primary hazards to be considered during project design include strong seismic shaking, surface fault rupture, slope instability, and erosion. Other hazards, such as settlement, flooding, liquefaction, and others are judged relatively insignificant with regard to the proposed work and are not discussed in detail. A brief summary of the significant hazards along with corresponding mitigation measures are presented below.

STRONG SEISMIC GROUND SHAKING

The site will likely experience seismic ground shaking similar to other areas in the seismically active San Francisco Bay Area. Earthquakes along several active faults in the region, as shown on Figure 4, could cause moderate to strong ground shaking at the site. Estimates of peak ground accelerations are based on either deterministic or probabilistic methods.

Deterministic methods use empirical relations developed from data collected during previous earthquakes to provide estimates of median peak ground accelerations. A summary of the active faults that could most significantly affect the site, their maximum credible magnitude, closest distance to the project area, and probable peak accelerations is provided in Table A.

TABLE A
DETERMINISTIC HAZARD ANALYSIS
ESTIMATED SEISMIC GROUND MOTIONS
Lyons Hillside Vineyard
Napa, California

Fault	Moment Magnitude for Characteristic Earthquake [1]	Closest Estimated Distance (kilometers) [1]	Median Peak Ground Acceleration (g) [1,2]	84th Percentile Ground Acceleration (g) [2,3]
Green Valley	6.8	0.01[4]	0.52[3]	0.94[3]
Cordelia	6.5	3.3	0.41	0.72
Great Valley	6.7	14.2	0.35	0.48

(1) Values determined using Caltrans ARS Online (2017) (web-based seismic acceleration spectra calculator tool), http://dap3.dot.ca.gov/ARS_Online/, accessed November 14, 2019.
(2) Values determined using Vs^{30} = 760 m/s for Site Class "B" ("Rock" Conditions) in accordance with the 2016 CBC and 2010 ASCE-7, which are applicable to most portions of the project site. Note actual ground accelerations may be higher or lower depending on the exact location and underlying geologic conditions.
(3) Values determined using Pacific Earthquake Engineering Research Center (PEER) NGA-West2 Excel Spreadsheet, http://peer.berkeley.edu/ngawest2/databases/.
(4) Distance to fault based on field mapping as shown on Figure 2.

The potential for strong seismic shaking at the project site is high. The Green Valley and Cordelia faults are the closest and most likely sources of significant future earthquakes. The most significant adverse impact resulting of strong seismic shaking with respect to the planned vineyard project is an increased risk of slope instability and subsequent damage to planted areas and associated improvements and structures.

Evaluation: *The risk of strong seismic shaking is high.*
Recommendations: *New structures (if planned) should be designed in accordance with the latest edition of the California Building Code. Although there is a low risk of seismically-induced instability, the proposed vineyard development will have no net effect on the likelihood of such an event and as such no special engineering measures are recommended.*

FAULT SURFACE RUPTURE
Under the Alquist-Priolo Earthquake Fault Zoning Act, the California Geological Survey (CDMG)/California Geologic Survey (CGS) (1972, 2000) produced 1:24,000 scale maps showing all known active faults and defining zones within which special fault studies are required. The western portions of Blocks A and D lie within the Alquist-Priolo Earthquake Fault Zone associated with the Green Valley Fault.

During our site reconnaissance, we observed an approximately 20- to 30-foot wide zone of gouged, sheared volcanic bedrock in the north-trending creek channel west of Blocks A and D, which is indicative of historic fault activity. Local topography is defined by narrow ridges and intervening valleys which generally mirror the northerly trend of the confirmed fault trace. Observations of gouged/brecciated bedrock in test pits and during field mapping, as well as interpretation of site geomorphology, indicates additional branch or secondary faults may cross the site as shown on Figure 2.

Given the historic rate and magnitude of seismic activity on the Green Valley Fault, we judge the risk of surface rupture within the development area is moderate to high.

Evaluation: *No significant impact.*
Recommendations: *Since no new structures are planned, we judge that the most significant possible effect of faulty surface rupture is likely limited to offset of linear features such as vine trellises, irrigation/utility lines and similar. We judge that, given the intended land use, no special engineering measures are required to mitigate the potential for surface rupture.*

SLOPE INSTABILITY
Regional geologic mapping (as shown on Figure 3) indicates that the northeastern part of the site (generally including portions of Blocks B and C) are underlain by the debris fields of massive landslides which extend from the crest of the ridge down to the bottom of Wooden Valley, some 2-miles northeast of the site. During our site reconnaissance, we noted that topography could be related either to faulting or to massive landsliding. We note that onsite areas mapped regionally as being underlain by slide debris exposed variably-weathered bedrock at or near the surface, and as such the mapped slide (if it exists) is likely a very large bedrock block slide.

During our site reconnaissance, we did not observe any evidence of apparent historic or incipient (developing) instability within the planned vineyard areas. Given that the majority of the site is underlain by relatively competent bedrock at shallow depth, we judge that the risk of “global” or deep-seated instability impacting the site is generally low. The risk of slope instability will generally be higher during the winter months and/or a seismic event. Finally, we note the vineyard development should have no adverse impact in the very large, regionally-mapped bedrock slide, if it exists.

Evaluation: *Less than significant.*
Recommendations: *No special engineering measures are required.*

EROSION
Surface soils across the project site generally consist of medium-dense silty gravels and medium-stiff sandy silts which may be prone to erosion on moderate to steep slopes. In general, areas

underlain by volcanic rocks at or very near the surface are relatively resistant to deeper erosion, while residual soils will be more prone. Based on our reconnaissance observations, the majority of the areas appear relatively unaffected by significant erosion to-date.

Evaluation: *The risk of damage due to erosion is moderate*

Recommendations: *Careful attention should be paid to design of finished grades to avoid diverting surface water from natural drainage paths and avoid areas of concentrated surface water runoff. New surface and subsurface drainage improvements should be considered in erosion-prone swale areas. Erosion control measures implemented during and after construction should conform to the recommendations of the latest edition of the California Stormwater Quality Association (CASQA) Best Management Practices Handbook for New Development or similar standards. All disturbed areas should be seeded as soon as practical, and the site should be closely monitored throughout the winter months for signs of erosion or adverse drainage patterns. Additional discussion and recommendations for site drainage and erosion control are provided in the Conclusions and Recommendations section of this report.*

Conclusions and Recommendations

Based on our subsurface exploration, laboratory testing, and review of site geologic conditions, we judge that the proposed vineyard development is feasible from a geotechnical perspective. Based on our observations, the site is generally underlain by relatively shallow, and typically very hard and strong bedrock, and is largely resistant to deep-seated erosion and instability under static (non-earthquake) conditions. Geotechnical recommendations and criteria for use in vineyard plan development and construction are presented below.

Site Grading

Site grading within proposed vineyard blocks will be generally limited to “ripping” to facilitate new vine growth, and we understand no significant new cut or fill slopes are planned. Large rocks that remain following ripping may also be removed. We anticipate that thin local excavations and fills up to about 1-foot high could be needed to better “blend” site grades. Site grading should be performed in accordance with the following recommendations.

1. Surface Preparation – Clear all over-size debris, grass, brush, roots, and other organic matter from areas where grading is planned. Any construction debris or abandoned utilities should be removed from the site. All excavations for removal of boulders, or root balls, or other materials should be backfilled with compacted fill in accordance with subsequent sections in this report.

2. Excavations – Subsurface conditions at the site will generally include up to 4-feet of rocky, silty residual soil over very hard and strong volcanic bedrock. Based on our exploration, we anticipate that while some of the onsite excavations may be reasonably accomplished with “traditional” equipment, such as medium-size dozers and excavators, it is likely that significant portions of the development area (particularly ridgeline areas underlain by andesite or rhyolite bedrock) will encounter harder rock which require heavier equipment (such as large dozers) or special techniques (jackhammers or hoe-rams) to excavate.

3. Fill Materials – Soil and rock mixtures generated from excavations in onsite soils may be suitable for re-use as new fill, provided it can be processed to meet the specifications presented below. Cobbles and boulders larger than about 18-inches should be removed and stockpiled for rip-rap armor or other use. All fill material should consist of soil and rock mixtures that: (1) are free of organic material, and (2) have a maximum particle size of 18-inches. Highly-expansive soils derivative of mélange soils should be avoided.

4. Fill Compaction and Soil Ripping – Given the ultimate intended (vineyard) land use and limited fill thickness, we judge that relatively cursory compaction operations are sufficient for the majority of the work. To limit the potential for future erosion and slope instability, we recommend that, following rough grading, finish grading should include track-walking disturbed slopes in an upslope-downslope direction. Soil ripping should be performed on a cross-slope to limit the potential for development of rill-and-gully erosion on steeper slopes. To reduce the risk of instability, we recommend soil ripping be limited to a depth of about 18-inches where slopes exceed 3:1, and a depth of about 36-inches in other areas. If sufficient water is available, a cover crop should be planted immediately following soil ripping; alternatively, erosion-control mats or jute netting may be used to limit erosion in steeper areas.

Geotechnical Site Drainage

Based on our reconnaissance observations, the majority of the planted vineyard areas appear relatively unaffected by significant erosion or instability. We recommend that careful attention be given to design of site finished grades to encourage positive drainage, avoid concentrated water discharge, and avoid disturbing existing drainage patterns. From a geotechnical perspective, and given the shallow, hard rock at the site, subdrains are not required.

Supplemental Services

Supplemental services are anticipated to include geotechnical consultation and plan review during preparation of project construction and erosion-control plans. If significant new structures or fill slopes are incorporated into the plans, we should be consulted to provide supplemental recommendations. We should also be present intermittently during construction of new improvements to determine whether the work is performed in accordance with the intent of our recommendations.

December 9, 2019

We trust that this letter contains the information you require at this time; please call us if there are any questions or if we can be of further assistance.

Yours very truly,
MILLER PACIFIC ENGINEERING GROUP

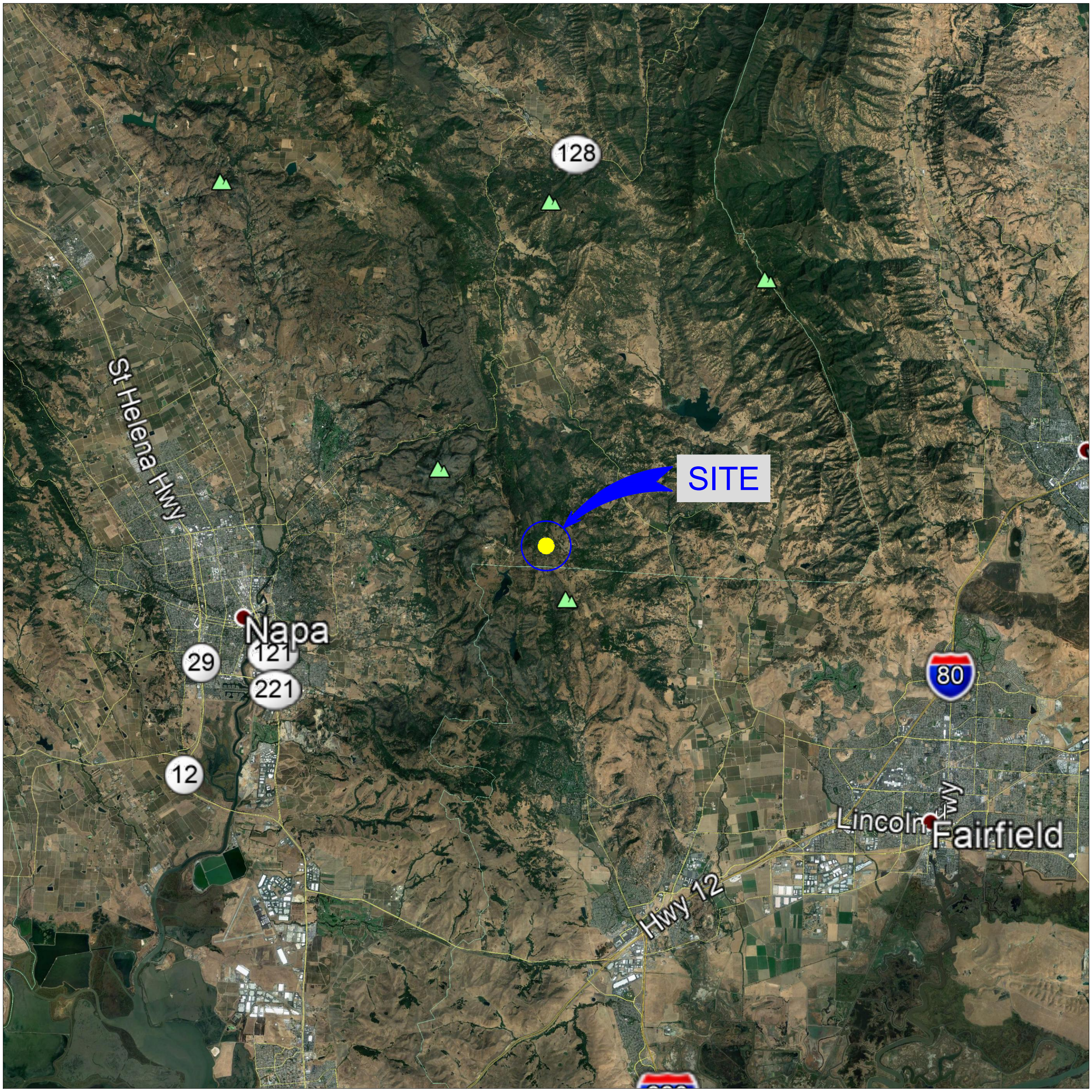
REVIEWED BY:

Mike Jewett
Engineering Geologist No. 2610
(Expires 1/31/21)

Michael Morisoli
Geotechnical Engineer No. 2541
(Expires 12/31/20)

Attachments: Figures 1-5, Appendix A

Cc: Omar Reveles, Acme Engineering



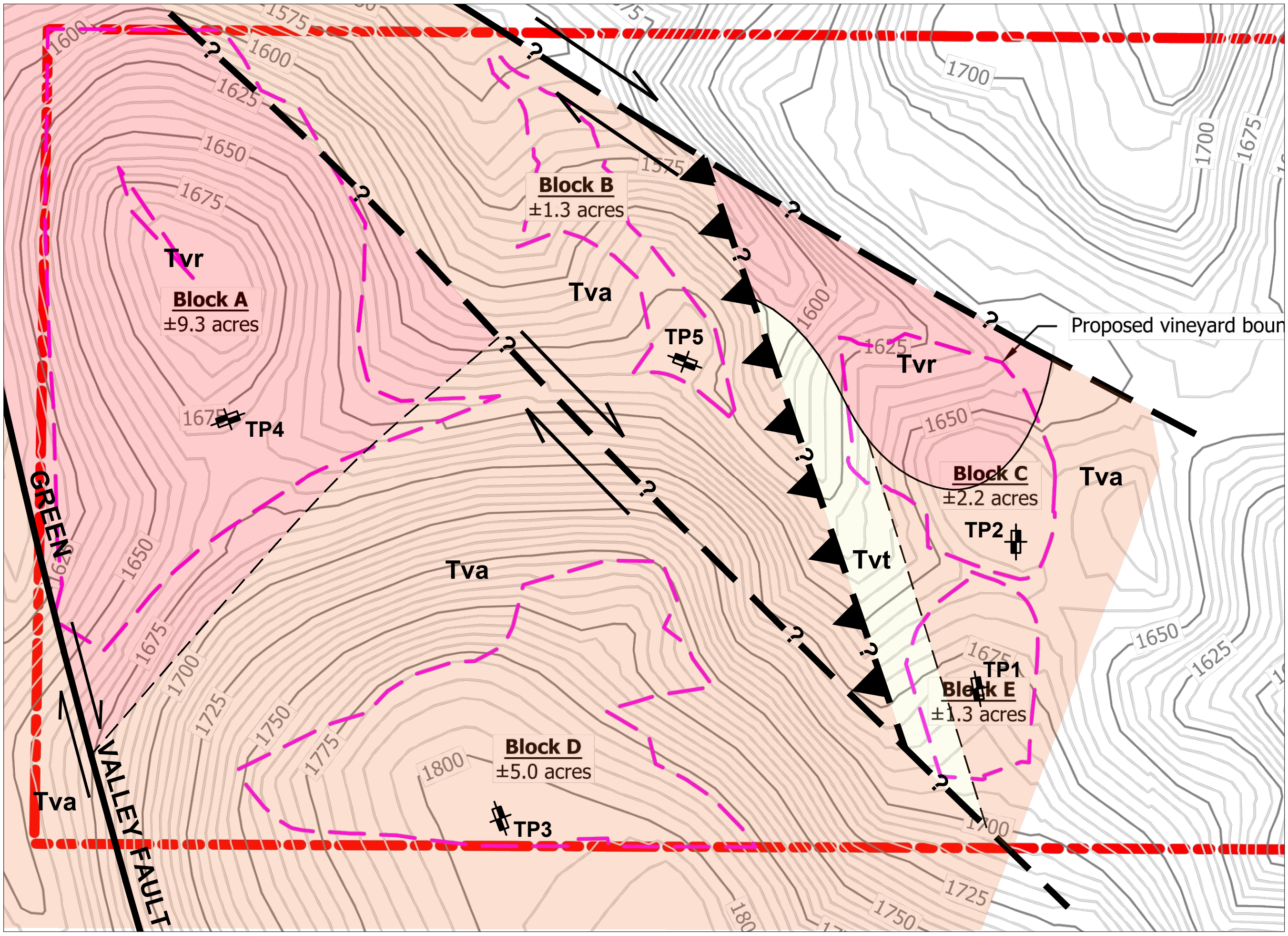
SITE COORDINATES
LAT. 38.3217°
LON. -122.1772°

SITE LOCATION
N.T.S.

NORTH

REFERENCE: Google Earth, 2019

MPEG MILLER PACIFIC ENGINEERING GROUP	504 Redwood Blvd. Suite 220 Novato, CA 94947 T 415 / 382-3444 F 415 / 382-3450 www.millerpac.com	SITE LOCATION MAP		
FILENAME: 2875.001 Figures.dwg		Lyons Hillside Vineyard APN 033-190-004 Napa, California Project No. 2875.001 Date: 11/15/2019	Drawn NGK Checked	1 FIGURE



SITE PLAN AND GEOLOGIC MAP

SCALE

0 150 300 600 FEET

NORTH

Tvr	RHYOLITE (TERTIARY) Densely-welded rhyolitic lava flows, primarily devitrified glass with variable lithic content, typically deep red-brown, very hard, very strong.
Tvt	ASF TUFF (TERTIARY) Densely-welded ash-lapilli tuff, typically buff to light gray, moderate hardness, moderately strong.
Tva	ANDESITE (TERTIARY) Densely-welded andesitic lava flows, mafic/aphantiic groundmass with variable quartz and plagioclase content, typically dark gray, very hard, and very strong.

- Geologic contact, dashed where approximate
- Reverse Fault, dashed where approximate, queried where uncertain. Teeth on upper plate.
- Approximate proposed vineyard boundary
- Approximate parcel boundary
- Test pit by Miller Pacific (2019)

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SITE PLAN AND GEOLOGIC MAP

Lyons Hillside Vineyard
APN 033-190-004
Napa, California

Project No. 2875.001 Date: 11/15/2019

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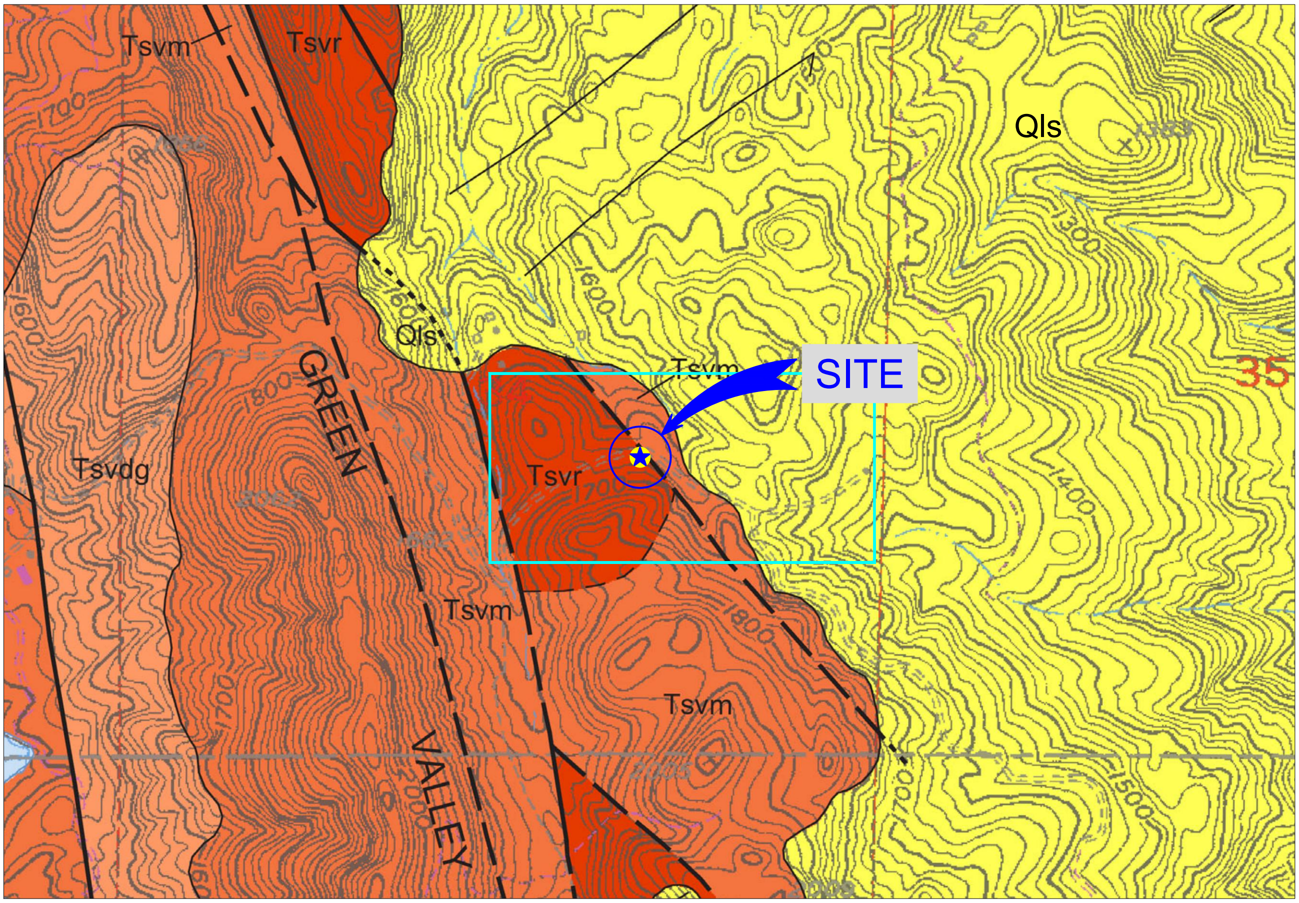
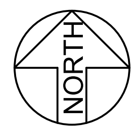
2
FIGURE



REGIONAL GEOLOGIC MAP



LEGEND:

Qls **Landslide Deposits (Holocene and Pleistocene) -** Includes debris flows and block slides.

Tsvr **Rhyolite Ash Flow Tuff -** Black vitrophyre with angular lithic clasts overlying welded tuff with flattened pumice lapilli and unwelded pumice lapilli tuff.

Tsvdg **Dacite of Mt. George -** Flows, domes, and shallow intrusion of gray and tan porphyritic dacite that is typically strongly flow banded.

Tsvm **Mafic Flows and Breccias -** Basalt, basaltic andesite, and andesite flows and breccias, interbedded with volcanic agglomerate and tuff.

Geologic Contact - Solid where accurately located, dashed where approximate, and dotted where concealed.

Fault - Solid where accurately located, dashed where approximate, and dotted where concealed.

Approximate Parcel Boundary

Reference: Bezore, Stephen P., et al, (2004), "Geologic Map of the Mt. George 7.5' Quadrangle, Napa and Solano Counties, California: A Digital Database," California Department of Conservation, California Geological Survey, Scale 1:24,000.

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REGIONAL GEOLOGIC MAP

Lyons Hillside Vineyard
APN 033-190-004
Napa, California

Project No. 2875.001 Date: 11/15/2019

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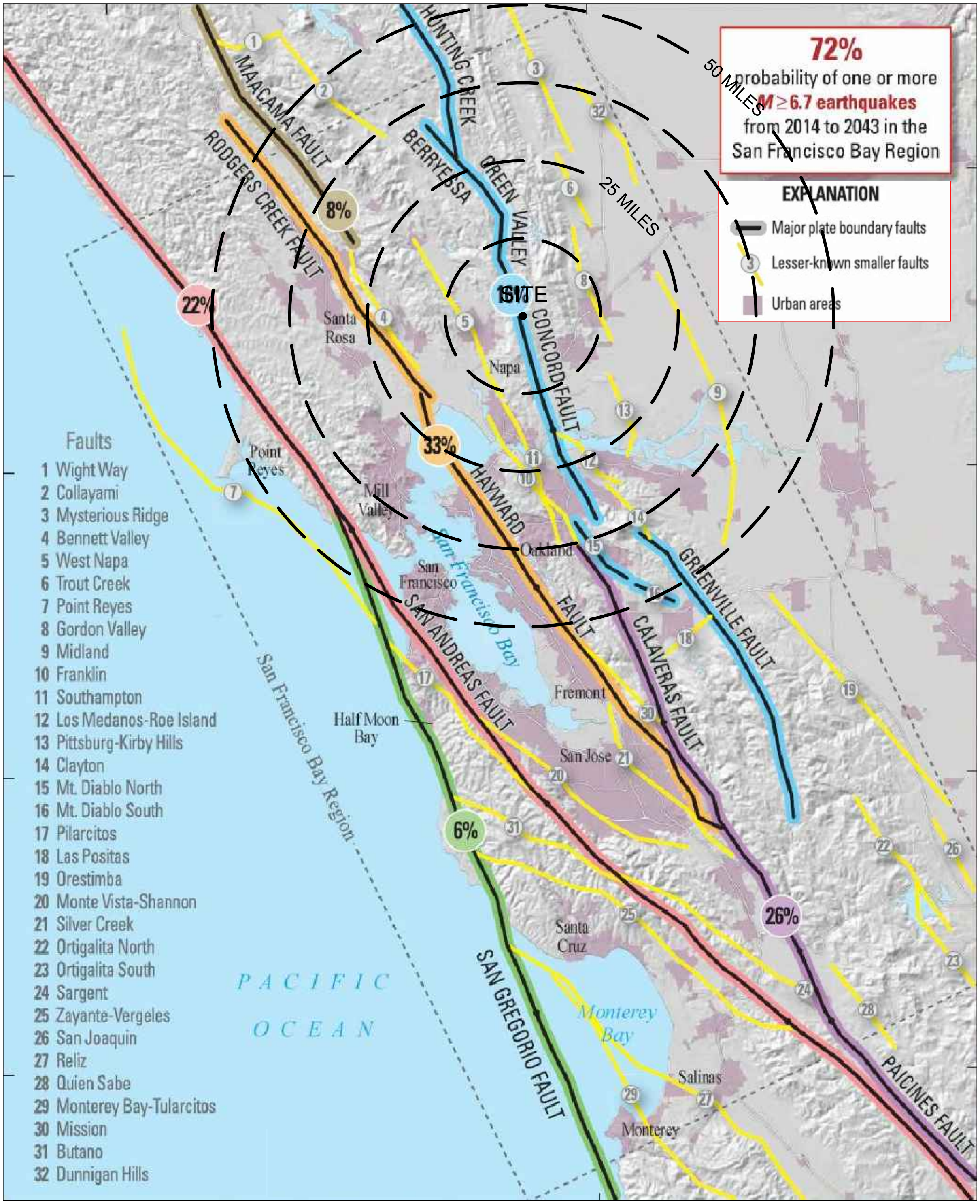
3
FIGURE



SITE COORDINATES
LAT. 38.3217°
LON. -122.1772°

SCALE
0 12.5 25 50 MILES

NORTH

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ACTIVE FAULT MAP

Lyons Hillside Vineyard
APN 033-190-004
Napa, California

Project No. 2875.001 Date: 11/15/2019

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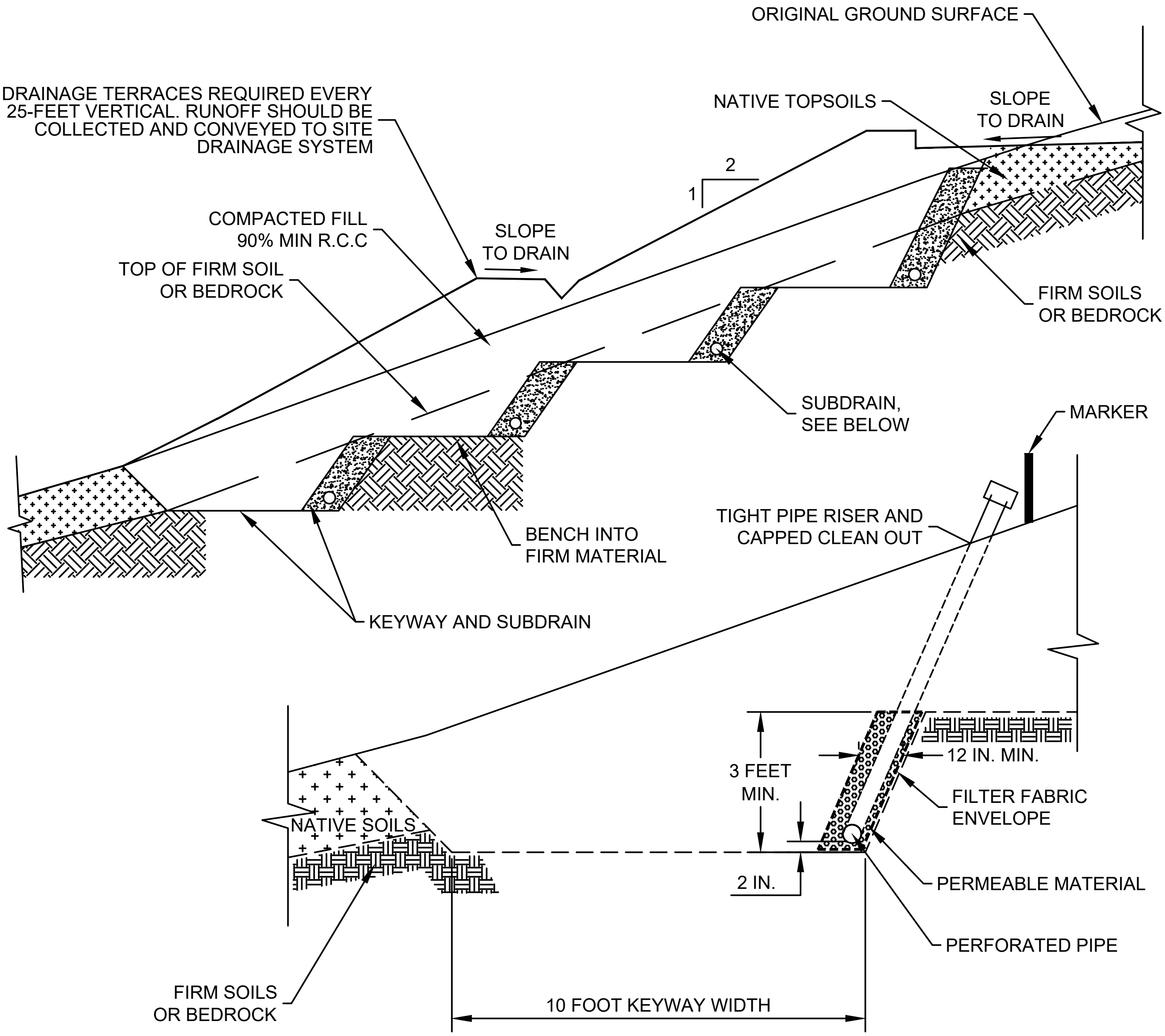
4
FIGURE



NOTES:

1. Subdrain drainage shall consist of clean, free draining 3/4 inch crushed rock (Class 1B Permeable Material) wrapped in filter fabric (Mirafi 140N or equivalent) or Class 2 Permeable Material.
2. Perforated pipe shall be SCH 40 or SDR 35 for depths less than 20 feet. Use SCH 80 or SDR 23.5 perforated pipe for depths greater than 20 feet. Place pipe perforations down and slope at 1% to a gravity outlet, with tight pipe to gravity discharge.
3. Clean outs should be installed at the upslope end and at all significant direction changes of the perforated pipe. Additionally, all angled connections shall be long bend sweep connections.
4. All work and materials shall conform with Section 68 of the latest edition of the Caltrans Standard Specifications.

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TYPICAL HILLSIDE CONSTRUCTION DETAIL

Lyons Hillside Vineyard
APN 033-190-004
Napa, California

Project No. 2875.001 Date: 11/15/2019

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5
FIGURE

APPENDIX A
SUBSURFACE EXPLORATION AND LABORATORY TESTING

A. Soil and Rock Classification Systems

We explored subsurface conditions at the site with five exploratory test pits excavated on November 5, 2019. Test pits were excavated to depths between about 9- and 55-inches below the ground surface by use of a Deere 210G backhoe equipped with a 24-inch bucket.

The soils encountered were logged and identified by our field geologist in general accordance with ASTM Standard D 2487, "Field Identification and Description of Soils (Visual-Manual Procedure)." This standard is briefly explained on Figure A-1, Soil Classification Chart and Key to Log Symbols and Figure A-2, Rock Classification Chart. The exploratory test pits logs are presented on Figures A-3 through A-7.

B. Laboratory Testing

We conducted laboratory tests on selected “grab” samples to verify field identifications and to evaluate engineering properties. Samples were examined in the field, sealed to prevent moisture loss, and carefully transported to our laboratory. The following laboratory tests were conducted in in general accordance with the ASTM standard test method cited:

- Laboratory Determination of Water (Moisture Content) of Soil, Rock, and Soil-Aggregate Mixtures, ASTM D 2216;

- Percent of Material Finer than the No. 200 Sieve, ASTM D 1140; and

- Liquid Limit, Plastic Limit, and Plasticity Index of Soils, ASTM D 4318.

Moisture content and percent passing the No. 200 test results are shown on the exploratory test pit logs, Figures A-3 through A-7, while Plasticity Index test results are presented on Figure A-8. The exploratory test pit logs, description of soils encountered and the laboratory test data reflect conditions only at the location of the excavation at the time they were excavated or retrieved. Conditions may differ at other locations and may change with the passage of time due to a variety of causes including natural weathering, climate, and changes in surface and subsurface drainage.

MAJOR DIVISIONS		SYMBOL	DESCRIPTION
COARSE GRAINED SOILS over 50% sand and gravel	CLEAN GRAVEL	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
	GRAVEL with fines	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	CLEAN SAND	SW	Well-graded sands or gravelly sands, little or no fines
		SP	Poorly-graded sands or gravelly sands, little or no fines
	SAND with fines	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS over 50% silt and clay	SILT AND CLAY liquid limit <50%	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	SILT AND CLAY liquid limit >50%	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS		PT	Peat, muck, and other highly organic soils
ROCK			Undifferentiated as to type or composition

KEY TO BORING AND TEST PIT SYMBOLS

CLASSIFICATION TESTS

PI	PLASTICITY INDEX
LL	LIQUID LIMIT
SA	SIEVE ANALYSIS
HYD	HYDROMETER ANALYSIS
P200	PERCENT PASSING NO. 200 SIEVE
P4	PERCENT PASSING NO. 4 SIEVE

SAMPLER TYPE

- MODIFIED CALIFORNIA
- HAND SAMPLER
- STANDARD PENETRATION TEST
- ROCK CORE
- THIN-WALLED / FIXED PISTON
- X DISTURBED OR BULK SAMPLE

NOTE: Test boring and test pit logs are an interpretation of conditions encountered at the excavation location during the time of exploration. Subsurface rock, soil or water conditions may vary in different locations within the project site and with the passage of time. Boundaries between differing soil or rock descriptions are approximate and may indicate a gradual transition.

STRENGTH TESTS

TV	FIELD TORVANE (UNDRAINED SHEAR)
UC	LABORATORY UNCONFINED COMPRESSION
TXCU	CONSOLIDATED UNDRAINED TRIAXIAL
TXUU	UNCONSOLIDATED UNDRAINED TRIAXIAL
	UC, CU, UU = 1/2 Deviator Stress

SAMPLER DRIVING RESISTANCE

Modified California and Standard Penetration Test samplers are driven 18 inches with a 140-pound hammer falling 30 inches per blow. Blows for the initial 6-inch drive seat the sampler. Blows for the final 12-inch drive are recorded onto the logs. Sampler refusal is defined as 50 blows during a 6-inch drive. Examples of blow records are as follows:

25	sampler driven 12 inches with 25 blows after initial 6-inch drive
85/7"	sampler driven 7 inches with 85 blows after initial 6-inch drive
50/3"	sampler driven 3 inches with 50 blows during initial 6-inch drive or beginning of final 12-inch drive

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FILENAME: 2875.001 TP.dwg

SOIL CLASSIFICATION CHART

Lyons Hillside Vineyard
APN 033-190-004
Napa, California

Project No. 2875.001 Date: 11/21/2019

Drawn NGK
Checked

A-1
FIGURE

FRACTURING AND BEDDING

Fracture Classification	Spacing	Bedding Classification
Crushed	less than 3/4 inch	Laminated
Intensely fractured	3/4 to 2-1/2 inches	Very thinly bedded
Closely fractured	2-1/2 to 8 inches	Thinly bedded
Moderately fractured	8 to 24 inches	Medium bedded
Widely fractured	2 to 6 feet	Thickly bedded
Very widely fractured	greater than 6 feet	Very thickly bedded

HARDNESS

Low	Carved or gouged with a knife
Moderate	Easily scratched with a knife, friable
Hard	Difficult to scratch, knife scratch leaves dust trace
Very hard	Rock scratches metal

STRENGTH

Friable	Crumbles by rubbing with fingers
Weak	Crumbles under light hammer blows
Moderate	Indentations <1/8 inch with moderate blow with pick end of rock hammer
Strong	Withstands few heavy hammer blows, yields large fragments
Very strong	Withstands many heavy hammer blows, yields dust, small fragments

WEATHERING

Complete	Minerals decomposed to soil, but fabric and structure preserved
High	Rock decomposition, thorough discoloration, all fractures are extensively coated with clay, oxides or carbonates
Moderate	Fracture surfaces coated with weathering minerals, moderate or localized discoloration
Slight	A few stained fractures, slight discoloration, no mineral decomposition, no affect on cementation
Fresh	Rock unaffected by weathering, no change with depth, rings under hammer impact

NOTE: Test boring and test pit logs are an interpretation of conditions encountered at the location and time of exploration. Subsurface rock, soil and water conditions may differ in other locations and with the passage of time.

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ROCK CLASSIFICATION CHART

Lyons Hillside Vineyard
APN 033-190-004
Napa, California

Project No. 2875.001 Date: 11/21/2019

Drawn NGK
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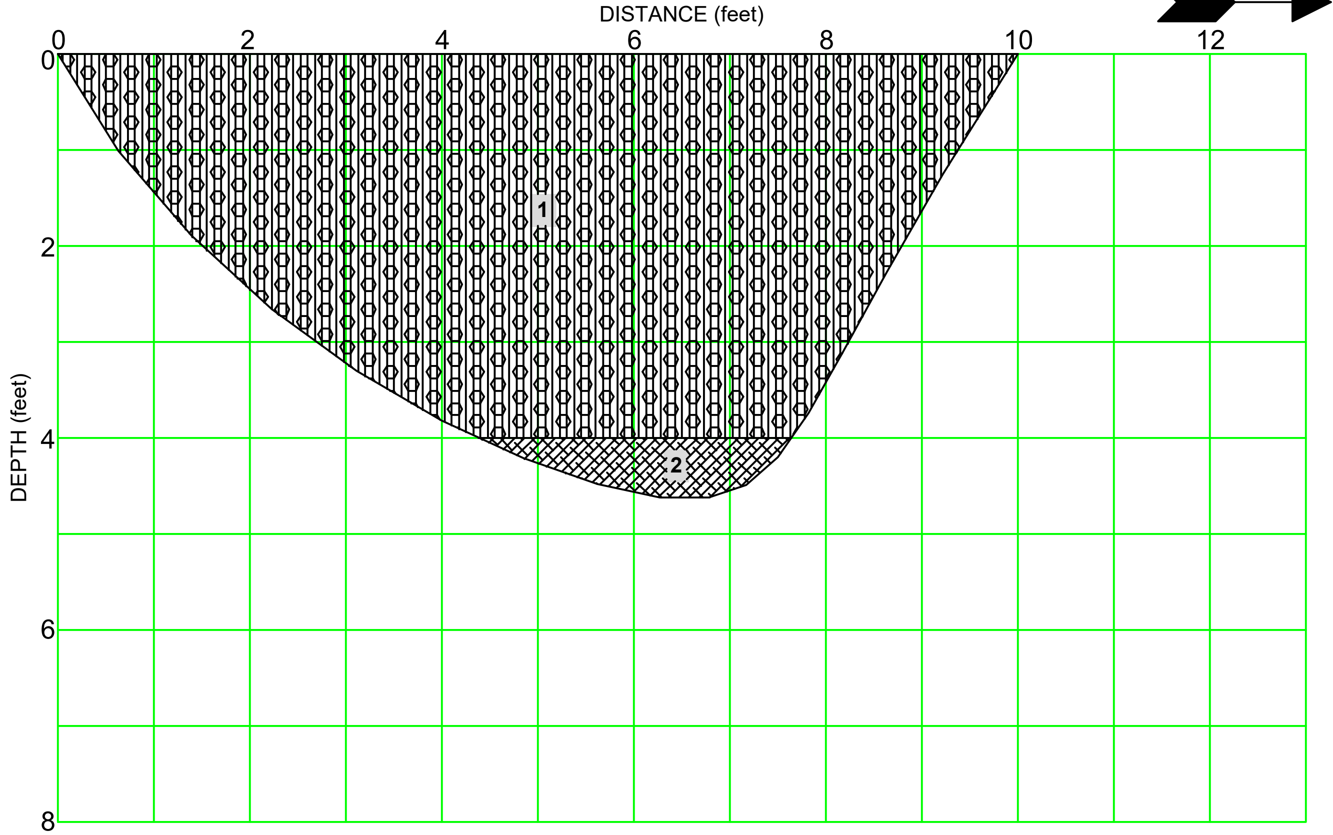
A-2
FIGURE

EQUIPMENT: Deere 210G backhoe with 24-inch bucket
DATE: 11/5/19
ELEVATION[1]: +/-1,685-feet

TEST PIT 1

N10°W



Sample Depth	Liquid Limit	Plastic Limit	Plasticity Index
0-48"	45	33	12

Layer	Description
1	SILTY GRAVEL (GM-GP) Medium red-brown, moist, medium-dense, ~75% angular volcanic cobbles to 24-inches embedded in low-plasticity silty matrix. [RESIDUAL SOIL]
2	ANDESITE LAVA FLOW Dark gray groundmass with ~20% each euhedral quartz and plagioclase, rare potassium feldspar. Low hardness, weak, highly weathered, extensively gouged/brecciated [SONOMA VOLCANICS] Very difficult excavation/near-refusal noted at 55".

NOTES: (1) REFERENCE: Acme Engineering (2019)

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TEST PIT LOG

Lyons Hillside Vineyard
APN 033-190-004
Napa, California

Project No. 2875.001 Date: 11/21/2019

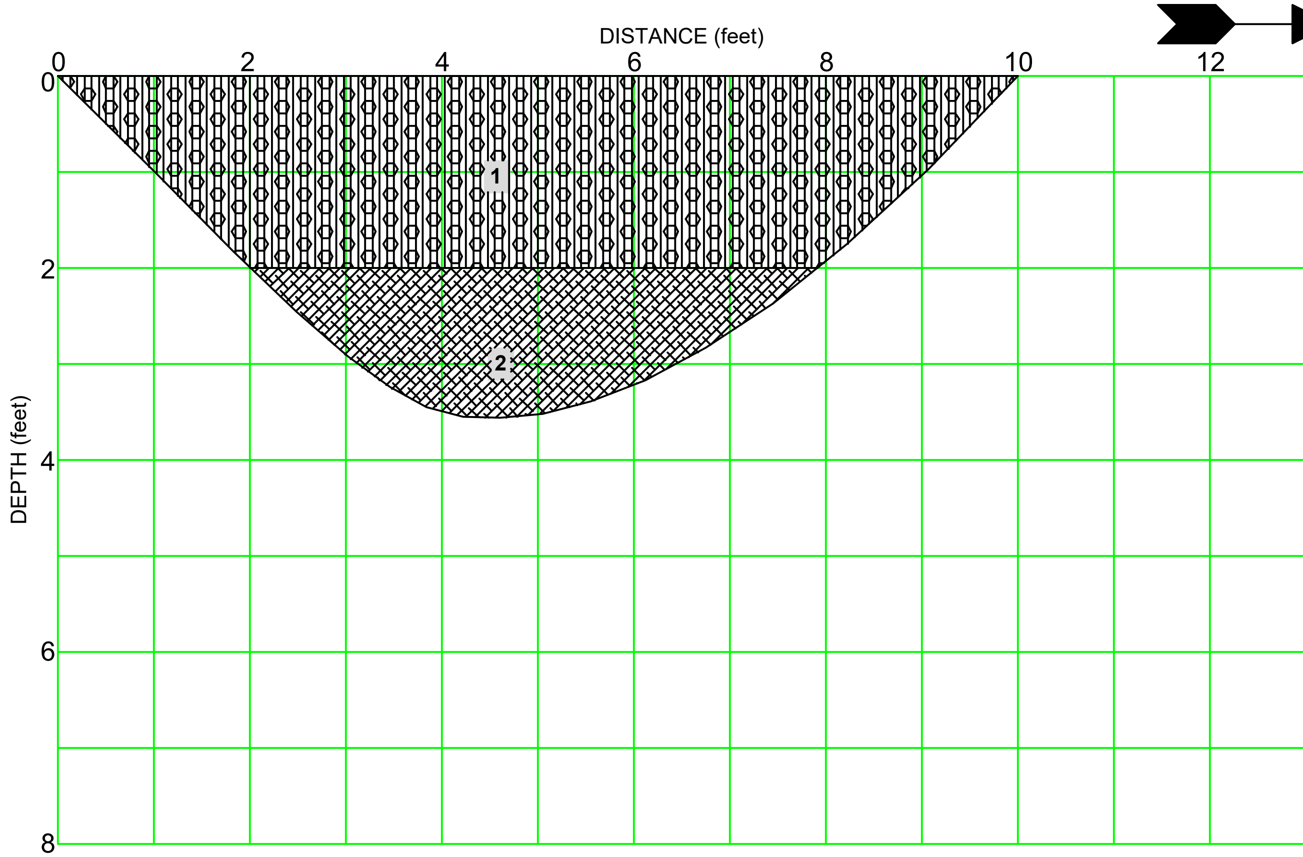
Drawn NGK
Checked

A-3
FIGURE

EQUIPMENT: Deere 210G backhoe with 24-inch bucket
DATE: 11/5/19
ELEVATION[1]: +/-1,660-feet

TEST PIT 2

DUE SOUTH



Sample Depth	Liquid Limit	Plastic Limit	Plasticity Index
24-36"	67	36	31

Layer	Description
1	SILTY GRAVEL (GM-GP) Medium red-brown, moist, medium-dense, ~75% angular volcanic cobbles to 24-inches embedded in high-plasticity silty matrix. [RESIDUAL SOIL]
2	ASH-LAPILLI TUFF Light gray, completely weathered (as very stiff clay), grades moderately weathered, friable at 36". [SONOMA VOLCANICS] Moderately difficult excavation noted at 42".

NOTES: (1) REFERENCE: Acme Engineering (2019)

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TEST PIT LOG

Lyons Hillside Vineyard
APN 033-190-004
Napa, California

Project No. 2875.001 Date: 11/21/2019

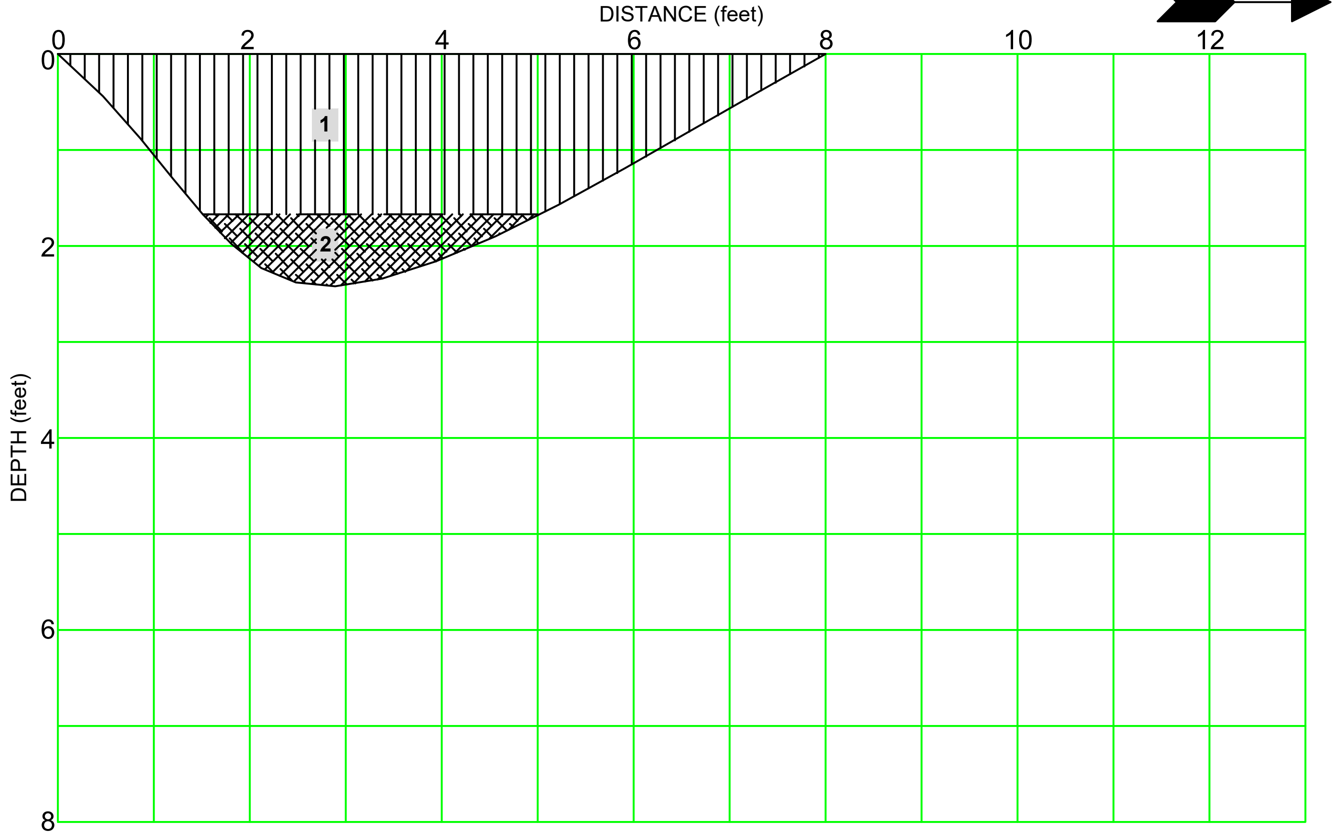
Drawn NGK
Checked

A-4
FIGURE

EQUIPMENT: Deere 210G backhoe with 24-inch bucket
DATE: 11/5/19
ELEVATION[1]: +/-1,805-feet

TEST PIT 3

S20°E



Sample Depth	Liquid Limit	Plastic Limit	Plasticity Index
0-12"	37	30	7

Layer	Description
1	SANDY SILT (ML) Medium red-brown, moist, medium-stiff, low-plasticity, with +/-25% fine sand, +/-15% angular andesite fragments. [RESIDUAL SOIL]
2	ANDESITE LAVA FLOW Dark gray groundmass with ~20% each euhedral quartz and plagioclase, rare potassium feldspar. Moderately weathered, moderately fractured, very hard. [SONOMA VOLCANICS] Equipment refusal noted at 29".

NOTES: (1) REFERENCE: Acme Engineering (2019)

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TEST PIT LOG

Lyons Hillside Vineyard
APN 033-190-004
Napa, California

Project No. 2875.001 Date: 11/21/2019

Drawn NGK
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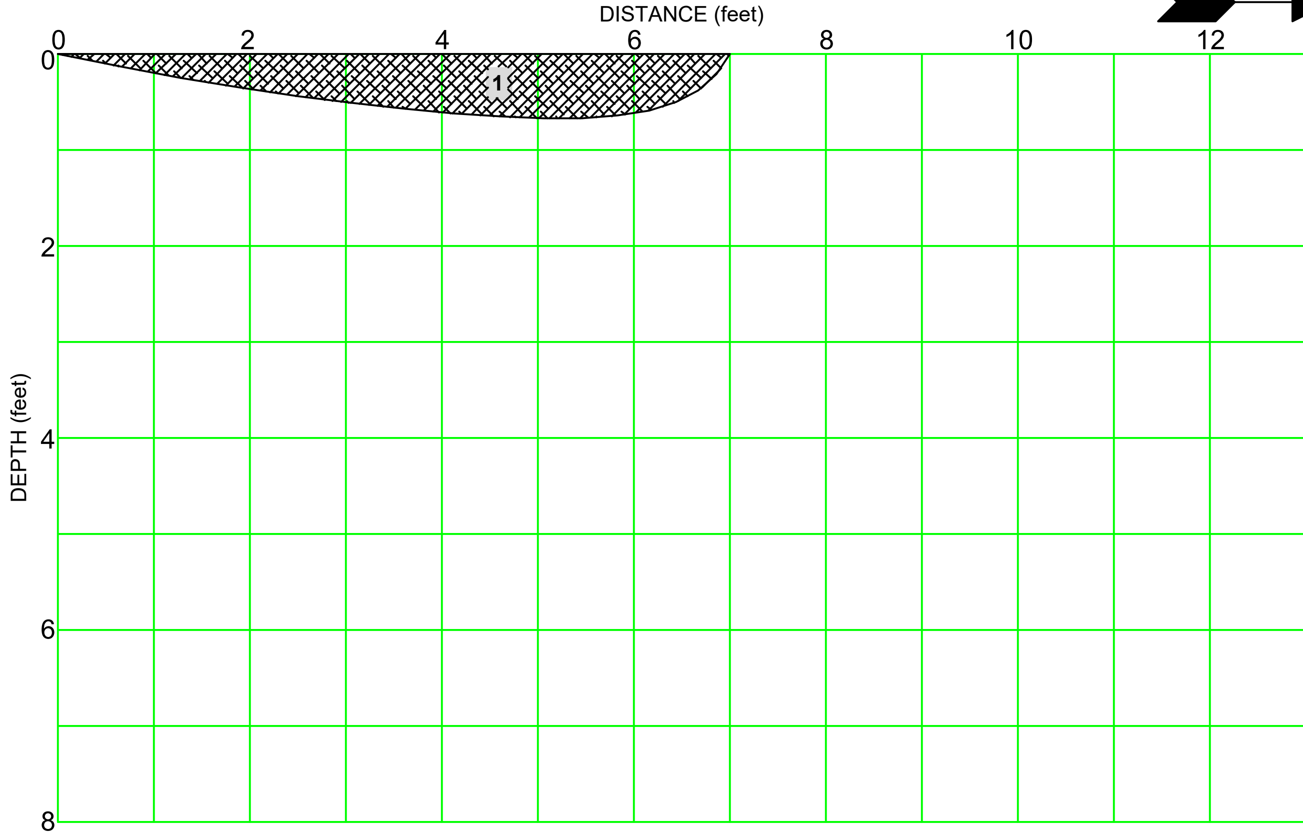
A-5
FIGURE

EQUIPMENT: Deere 210G backhoe with 24-inch bucket
DATE: 11/5/19
ELEVATION[1]: +/-1,675-feet

TEST PIT 4

N70°E



Sample Depth	Moisture Content	Liquid Limit	Plasticity Index

Layer	Description
1	RHYOLITE LAVA FLOW Dark red-brown, aphantic, very hard, very strong, slightly weathered to fresh. [SONOMA VOLCANICS] Equipment refusal noted at 9".

NOTES: (1) REFERENCE: Acme Engineering (2019)

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TEST PIT LOG

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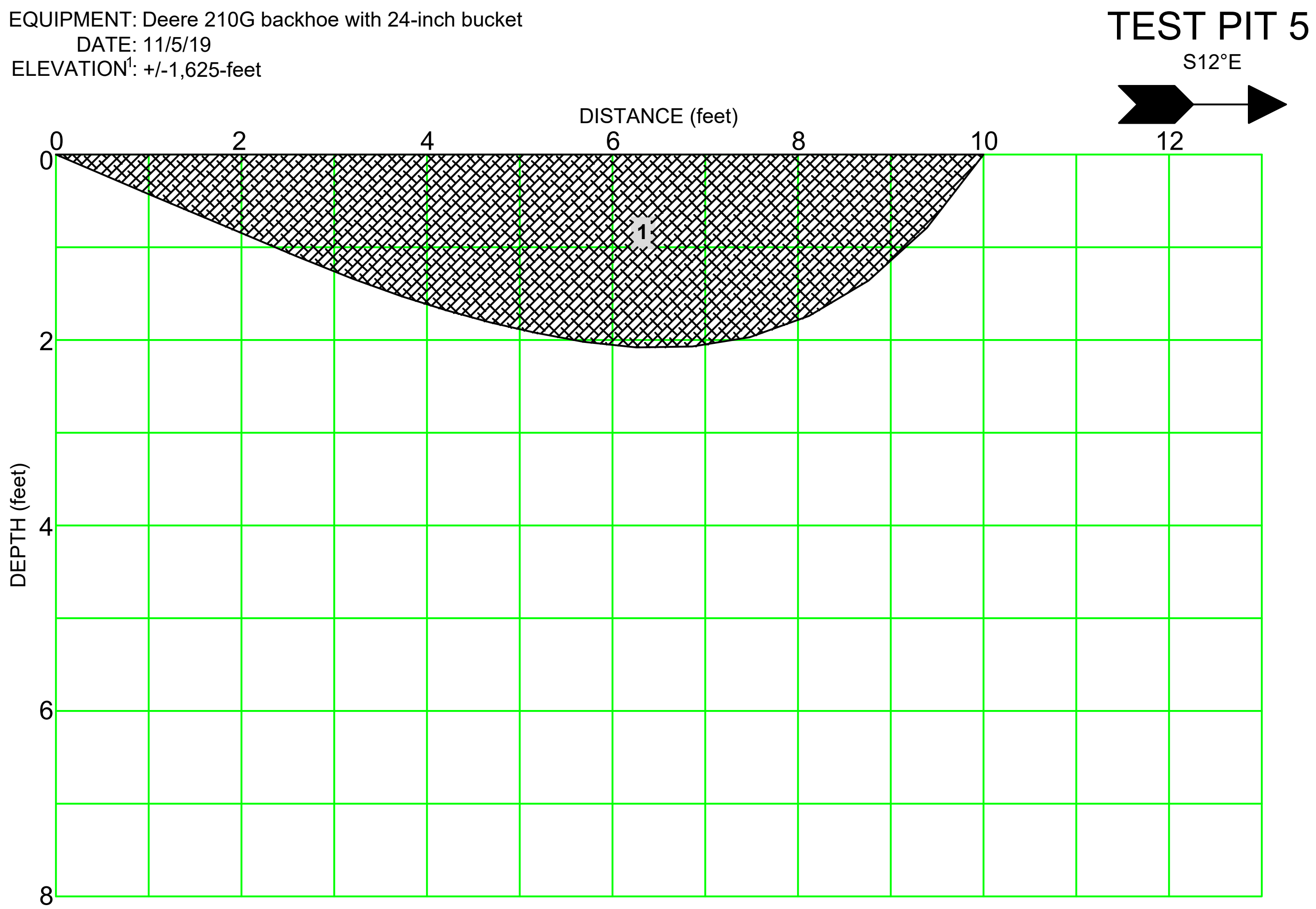
Project No. 2875.001 Date: 11/21/2019

Drawn NGK
Checked

A-6
FIGURE

EQUIPMENT: Deere 210G backhoe with 24-inch bucket
DATE: 11/5/19
ELEVATION[1]: +/-1,625-feet

TEST PIT 5



Sample Depth	Moisture Content	Liquid Limit	Plasticity Index

Layer	Description
1	ANDESITE LAVA FLOW Dark gray groundmass with ~20% each euhedral quartz and plagioclase, rare potassium feldspar. Slightly weathered, very hard, very strong, closely to moderately fractured [SONOMA VOLCANICS]

NOTES: (1) REFERENCE: Acme Engineering (2019)

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TEST PIT LOG

Lyons Hillside Vineyard
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Napa, California

Project No. 2875.001 Date: 11/21/2019

Drawn NGK
Checked

A-7
FIGURE

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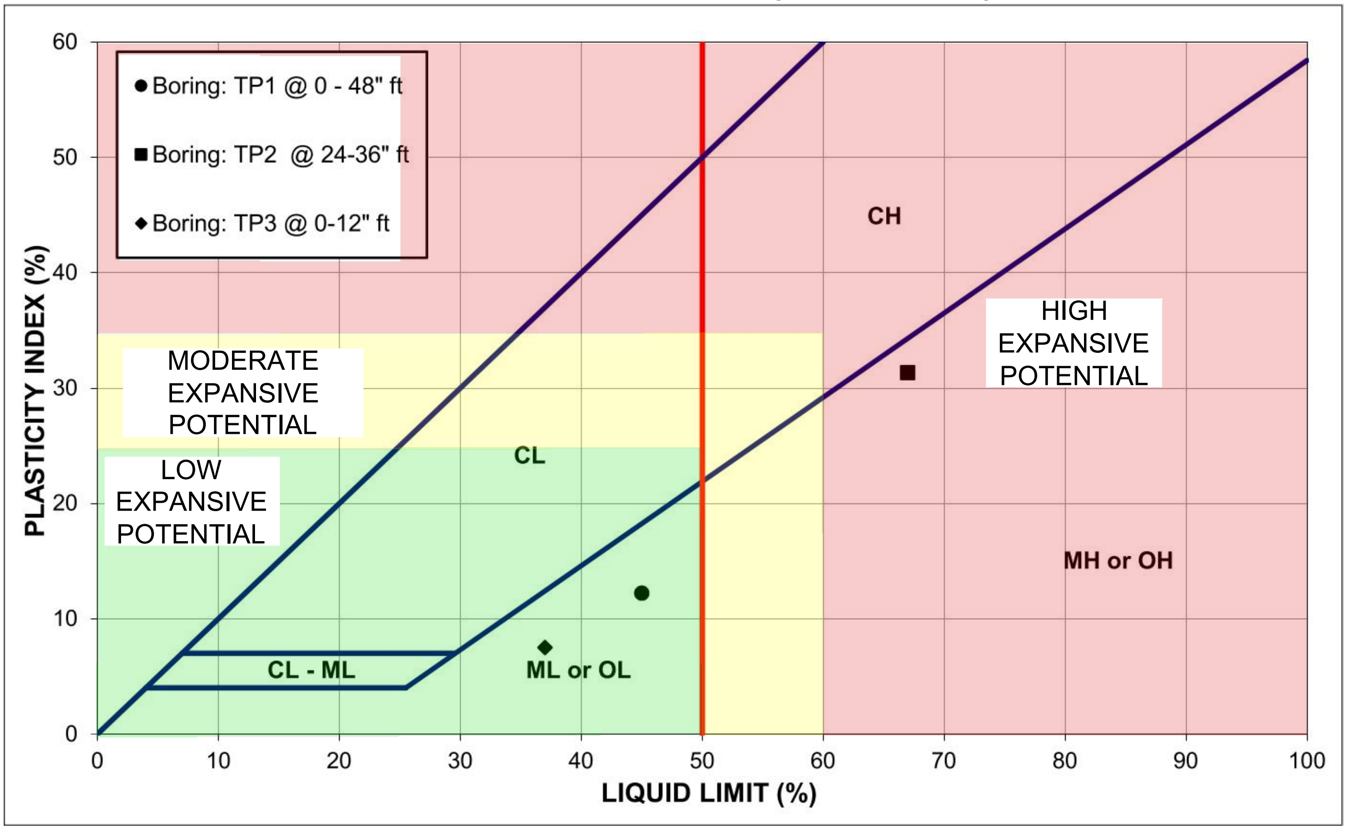
ATTERBERG LIMITS TEST (ASTM D 4318)



Sample	Classification	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
Boring: TP1 @ 0 - 48" ft	Silty GRAVEL (GM-GP) medium brown	45	33	12
Boring: TP2 @ 24-36" ft	Silty GRAVEL (GM-GP) tan/light brown	67	36	31
Boring: TP3 @ 0-12" ft	Sandy SILT (ML) Medium brown	37	30	7

PI = 0-3: Non-Plastic
PI = 3-15: Slightly Plastic
PI = 15-30: Medium Plasticity
PI = >30: High Plasticity

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PLASTICITY INDEX TEST RESULTS

Lyons Hillside Vineyard
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Project No. 2875.001 Date: 11/21/2019

Drawn NGK
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A-8
FIGURE