PJC & Associates, Inc.
Consulting Engineers & Geologists

September 19, 2019 Job No. 7845.02

Famiglia Liberata, LLC.
Attention: Kelly Harrison
855 Bordeaux Way, Suite 210
Napa, CA 94558
Kelly@swgnapa.com
c/o: Munselle Civil Engineering
Attention: Cort Munselle
cort@munsellecivil.com

Subject: Slope Stability Study
Proposed Minor Subdivision
1276 Jensen Lane
Windsor, California

References: Report titled, "Alquist-Priolo Earthquake Fault Study, Proposed Minor Subdivision, 1276 Jensen Lane, Windsor, California," prepared by PJC & Associates, Inc., dated September 5, 2019.

Site Plan titled, "Tentative Map," prepared by Munselle Civil Engineering, dated July 25, 2019.

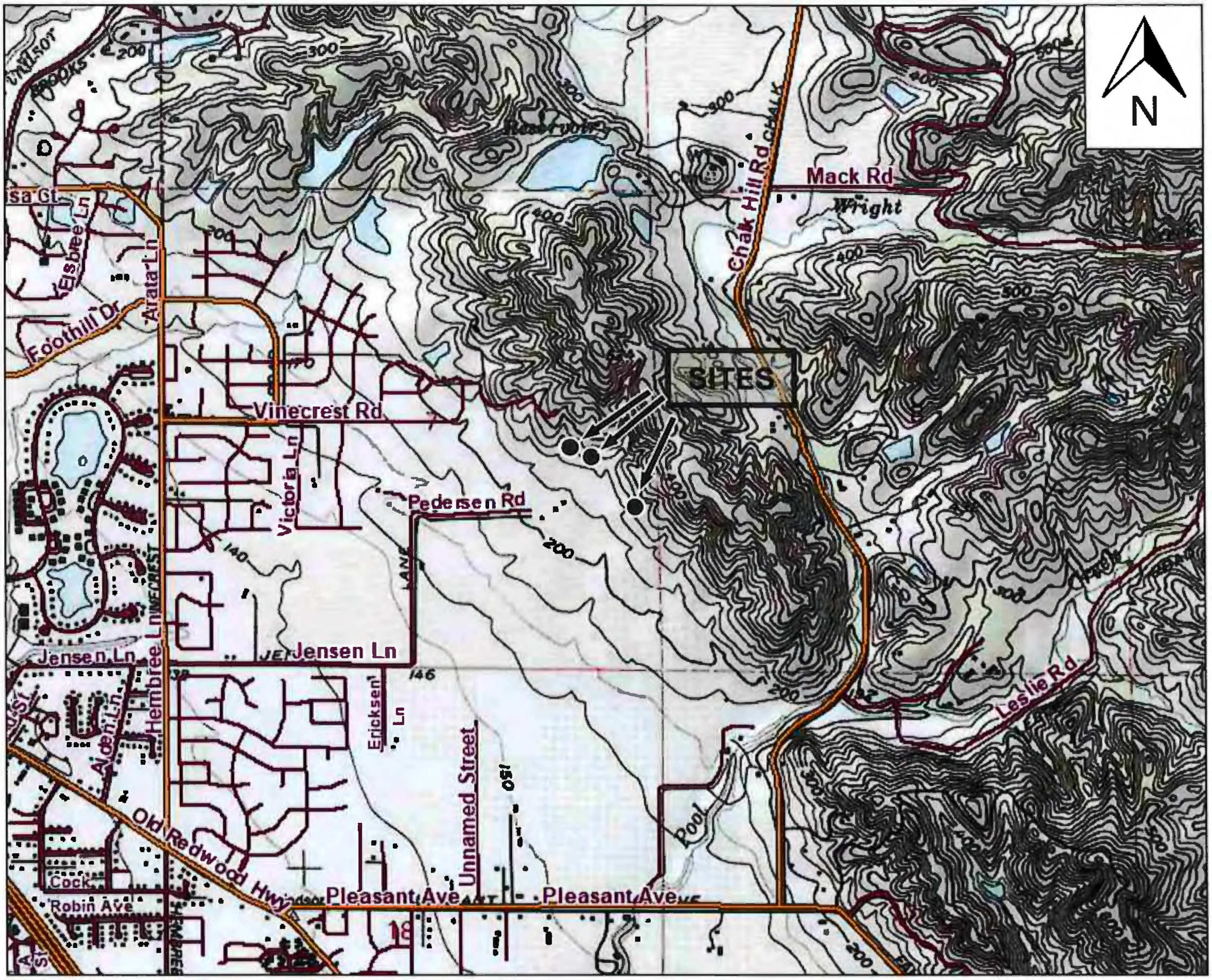
Geologic Map of the Healdsburg 7.5' Quadrangle Sonoma County, California, California Geological Survey, Compiled by Marc Delattre, dated 2011.

Lidar Images, prepared by Earthscope.org, provided by Google Earth, dated 2009.

Geology for Planning in Sonoma County, Special Report 120, California Division of Mines and Geology, 1980.

Dear Famiglia Liberata, LLC:

PJC & Associates, Inc. (PJC) is pleased to submit the results of our slope stability study for the proposed minor subdivision located at 1276 Jensen Lane in Windsor, California. The locations of the potential building envelopes are shown on the Site Location Plan, Plate 1. PJC previously prepared an Alquist-Priolo Earthquake Fault Study (AP Fault Study) for the project and presented the results in a written report dated September 5, 2019. As discussed in our AP Fault Study, the property is located within a State designated active fault zone. In addition to the active fault zone, it is our understanding that Permit Sonoma is concerned with slope stability at and near the potential building envelopes at the property. The following provides the results of our slope stability study at the property, with emphasis on and around the potential building envelopes.



SCALE: 1:24,000

REFERENCE: USGS HEALDSBURG, CALIFORNIA 7.5 MINUTE QUADRANGLE, REVISED 1993.

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PJC & Associates, Inc. Consulting Engineers & Geologists	SITE LOCATION MAP PROPOSED MINOR SUBDIVISION 1276 JENSEN LANE WINDSOR, CALIFORNIA	PLATE 1
	Proj. No: 7845.02 Date: 9/19 App'd by: PJC	

1. PROJECT DESCRIPTION

Based on our review of the referenced site plan prepared by Munselle Civil Engineering dated July 25, 2019, it is our understanding that the project will consist of subdividing the existing property into three separate lots (Lots 1, 2, & 3). In the future, we anticipate the construction of a single-family residence on each of the potential building envelopes. The scope of this analysis consisted of performing a qualitative slope stability study at and near the potential building envelopes at the property. We also performed a quantitative slope stability analysis on Lot 3, which is situated on moderately sloping terrain. A site plan delineating the project area is presented on Plate 2A.

2. PREVIOUS GEOLOGICAL WORK COMPLETED

As referenced above, PJC previously performed a AP Fault Study at the property. Our findings and conclusions are provided in a report dated September 5, 2019. During our exploration, we excavated three exploratory fault trenches. PJC cleaned and logged the fault trenches in detail. Based on the results of our AP Fault Study, we concluded that active faulting was not present at the three potential building sites.

3. WORK PERFORMED

Our scope of services for this slope stability study included the following:

a. Review regional geologic and slope stability maps, aerial photographs, and LIDAR imagery to evaluate slope stability at the site. A regional geologic map is presented on Plate 2B. A regional slope stability map is presented on Plate 2C. A LiDAR image of the site is presented on Plate 2D.

b. Surficial reconnaissance of the potential building sites and surrounding hillsides to observe topography, surface soils, soil creep and landslide areas. The site reconnaissance was performed by our professional geologist and certified engineering geologist.

c. Advancing one exploratory to a depth of five and one-half feet below the existing ground surface to observe the soil, bedrock and groundwater conditions at the potential building envelope on Lot 3. Our certified engineering geologist coordinated the collection of undisturbed samples for visual classification and laboratory testing.

d. Laboratory observation and testing were performed on the selected samples to assist in the evaluation of the engineering properties and strength parameters of the soils and bedrock underlying the project site.

e. Analyze the data collected during our field, laboratory and office studies. Perform static and seismic slope stability analysis in order to establish factor of safeties, and provide an opinion of the soil strength and stability of the site, and the feasibility of development on the potential building envelopes.

f. Preparation of this report presenting the results of this study.

4. SURFACE FEATURES, MAP REVIEW, & SUBSURFACE CONDITIONS

a. Surface Features. At the time of our field investigation, the potential building envelopes were primarily occupied by active vineyard blocks and adjoining vineyard avenues. The remaining areas of the property were generally undeveloped and covered with oak trees, brush, ground vines, and perennial grasses. Topography at the property consists of nearly level terrain to moderately sloping hillsides at the base of the rolling foothills east of the City of Windsor. The slopes immediately west and north of the property are generally undeveloped and covered with oak trees and sloping grassland.

The potential building envelopes on Lots 1 and 2 are situated on nearly level to gently sloping terrain along the topographic transition from gently sloping hillsides to the Santa Rosa Plain. Review of LiDAR images indicates the presence of a relatively large landslide north of Lot 1, see Plate 2D. The location of this landslide appears to generally coincide with a mapped landslide on a geologic map of the Healdsburg 7.5 Minute Quadrangle, prepared by the California Geologic Survey (CGS), see Plate 2B. Furthermore, during our site reconnaissance we documented significant spring activity and a small active landslide in the vineyard block immediately north of the potential building envelope on Lot 2. The landslide is easily recognizable due to the contorted vine rows and significant surface seepage.

Lot 3 is located on moderately sloping terrain which is bordered by a deeply incised seasonal drainage course to the north. Review of LiDAR images and our surficial reconnaissance has revealed the presence of a relatively large landslide deposit south and southeast of the potential building envelope on Lot 3, see Plate 2D. During our site reconnaissance we observed hummocky terrain within the forest and vineyard block south and southeast of the potential building envelope on Lot 3. The location of this landslide appears to generally coincide with a mapped landslide on a geologic map of the Healdsburg 7.5 Minute Quadrangle, see Plate 2B.

The regional geologic map presented on Plate 2C also indicates that the previously discussed large landslides, but as much bigger features. The regional slope stability also indicates that the large landslide north of Lot 1 is a questionable feature, which suggests a degree of uncertainty.

b. Soils Conditions and Bedrock. To further evaluate the subsurface conditions in the potential building envelope on Lot 3, PJC advance one exploratory borehole at the project site. The approximate borehole location is shown on the Borehole Location Plan, Plate 3. The borehole was drilled to observe the soil, bedrock and groundwater conditions and to collect samples of the underlying soils for visual examination and laboratory testing. The soils and bedrock were characterized and described according to Plates 4 and 5. The exploratory borehole encountered a surface topsoil stratum underlain by a near surface residual soil stratum and sandstone/mudstone bedrock of the Glen Ellen Formation which extended to the maximum depths explored. No evidence of slope instability was observed in the exploratory borehole or within any of the fault trenches. Although a prominent polished clay surface was observed in the bank of the incised drainage course north of Lot 3. This feature may suggest previous instability localized to the bank of the drainage course north of the potential building envelope on Lot 3.

c. Groundwater. No groundwater or seepage was encountered in our boring during our subsurface investigation on July 22, 2019. We did not observe the presence of obvious surface seeps or springs at or near the project site. However, like most hillside sites, seepage in the porous soils and bedrock fractures, and/or perched groundwater zones are likely to develop during and following prolonged rainfall. However, based on the conditions observed, we believe these conditions, if they develop, would likely dissipate following seasonal rainfall.

5. GEOMORPHOLOGY AND SLOPE STABILITY DISCUSSION

As previously discussed, review of a LiDAR image indicates the presence of a relatively large landslide feature north of Lot 1. The landslide feature appears to be confined to the sloping terrain north of Lot 1 and is located a significant distance away from the potential building envelope on Lot 1. Therefore, this landslide does not appear to be serious geologic concern for the development on Lot 1.

During our site reconnaissance we documented significant spring activity and a small active landslide in the vineyard block immediately north of the potential building envelope on Lot 2. The landslide is easily recognizable due to the contorted vine rows and significant surface seepage. However, due to relatively small size of the landslide, shallow downslope gradients, and distance away from the potential building envelope on Lot 2, this landslide did not appear to be a significant geologic hazard to the potential building envelope on Lot 2.

Lot 3 is located on moderately sloping terrain which is bordered by a deeply incised seasonal drainage course to the north. Review of a LiDAR image and our surficial reconnaissance has revealed the presence of a relatively large landslide deposit south and southeast of the potential building envelope on Lot 3. During our site reconnaissance we observed hummocky terrain and partially closed topographic depressions within the forest and vineyard block south and southeast of the potential building envelope on Lot 3. The hummocky terrain and unusual topographic features are interpreted as accumulated landslide debris which was derived from a relatively large landslide on the steep slope west facing slope upslope and southeast of the potential building envelope on Lot 3. The subdued nature of the hummocks, and lack of an obvious landslide scarp suggest that this feature was likely an ancient landslide event. This particular landslide appears to be a relatively old feature which was likely triggered during a climatic wet period of the Pleistocene epoch which coincided with a significant seismic event. Based on our site reconnaissance there are no obvious indications that the particular landslide in the vicinity of the project site is actively moving. Furthermore, the potential building envelope on Lot 3 is set-back a significant distance away from this landslide features.

6. STABILITY ANALYSIS

A quantitative slope stability analyses was performed at Lot 3 to further evaluate slope stability. The slope was analyzed by conventional limit equilibrium methods to evaluate factors of safety against sliding. The slope was computer analyzed for trial circular arc failure surfaces using Geo Studio slope stability analysis computer program. The program performs an automatic search for the circular failure surface having the minimum factor of safety based on the Morgenstern-Price Method. The slope was analyzed for static and seismic stability. A seismic yield coefficient of 0.2 was used in the seismic analysis. The following are the results of our analyses:

Table 1
Results of Stability Analysis

Conditions	Factor of Safety	Acceptable Criteria
Static	6.625	2.0
Seismic	2.456	1.5

Based on the results of our analyses, the slope at Lot 3 has substantially adequate safety factors against landsliding during static and seismic conditions. The results of the slope stability analysis are presented on Plates 7 and 8.

7. CONCLUSIONS

Based on the results of our slope stability study, we judge that the project site is relatively stable, and that development of the potential building envelopes as planned, is feasible from a geologic standpoint. Based on the results of original study we judge the potential building envelopes are developable from a geologic point of view.

Due to low slope inclinations, we judge Lot 1 and Lot 2 are relatively stable sites and suitable for development. The relatively large landslide north of Lot 1 is located a significant distance away from the potential building envelope and therefore does not appear to be serious geologic concern for the development on Lot 1. Lot 1 is bordered by a relatively shallow drainage course to the north and Lot 2 is bordered by a relatively shallow drainage course to the east. As a precautionary measure, we recommend that structures and improvements be set-back a minimum distance of 15 feet away from tops of these shallow drainage courses. We also documented significant spring activity and a small active landslide in the vineyard block immediately north of the potential building envelope on Lot 2. This landslide did not appear to be a significant geologic hazard to the potential building envelope on Lot 2 but should be monitored and repaired as the project develops.

Lot 3 is located on moderately sloping terrain which is bordered by a deeply incised seasonal drainage course to the north. Our quantitative slope stability analysis indicates that the potential building envelope on Lot 3 is stable during static and seismic conditions. However, the presence of polished clay surface observed in the nearby incised drainage course suggests possible previous instability. As a precautionary measure, we recommend development on Lot 3 be set-back a distance of at least 25 feet away from the top of the drainage course north of Lot 3. Furthermore, during our site reconnaissance we observed hummocky terrain within the forest and vineyard block south and southeast of the potential building envelope on Lot 3. The subdued nature of the hummocks, and lack of an obvious landslide scarp suggest that this feature was likely an ancient landslide event. This landslide did not appear to be a significant geologic hazard to the potential building envelope on Lot 3.

8. LIMITATIONS

This report has been prepared for the proposed minor subdivision located at 1276 Jensen Lane in Windsor, California. Our services consist of professional opinions and conclusions developed in accordance with generally accepted geologic principles and practices. We provide no other warranty, either expressed or implied. Our conclusions are based on the information provided us regarding the proposed project, the results of our field reconnaissance, and professional judgment. No warranty, either expressed or implied, is intended.

9. ADDITIONAL SERVICES

At this time, we did not consider other potential geologic hazards such as liquefaction, lateral spreading, expansive soils, etc. As the project proceeds and the exact building envelopes have been established, more detailed geotechnical investigations including additional subsurface exploration, laboratory testing, and engineering analysis should be performed at each lot. The geotechnical investigations can provide lot specific foundation options as well as recommendations and design criteria for all structural elements. The geotechnical investigation report should also provide recommendations to control surface and subsurface drainage.

We trust that this is the information you require at this time. If you have any questions concerning the content of this report, please call.

Sincerely,

PJC & ASSOCIATES, INC.

Stephen M. Schurke
Certified Engineering Geologist
CEG 2647, California

CERTIFIED ENGINEERING GEOLOGIST
STEPHEN M. SCHURKE
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EXP 5-31-21
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REGISTERED PROFESSIONAL ENGINEER
PATRICK J. CONWAY
No. 2303
Exp. 10-31-19
GEOTECHNICAL
STATE OF CALIFORNIA

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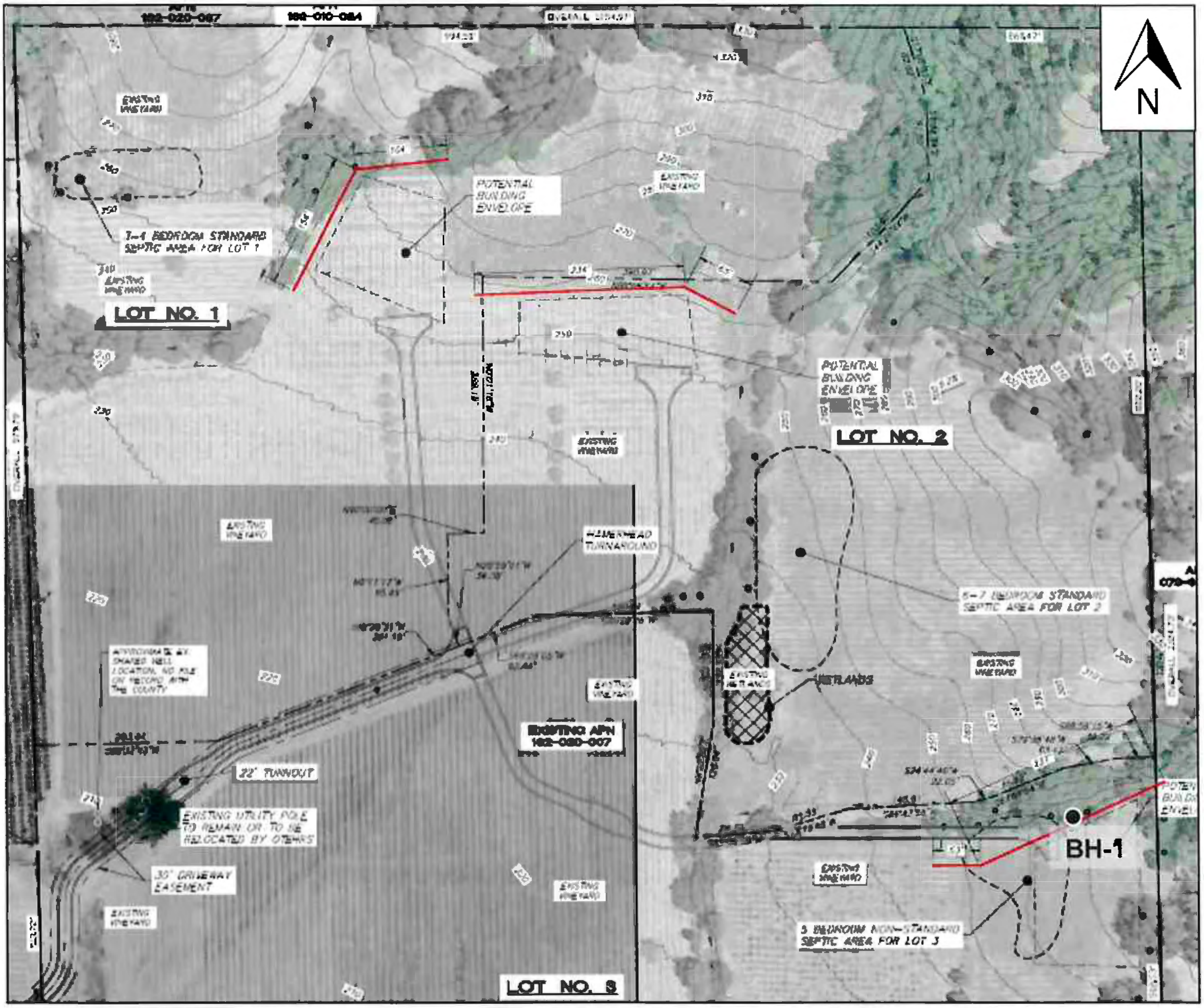

EXPLANATION

APPROXIMATE SCALE: 1" = 150'

FAULT TRENCH LOCATION

● BOREHOLE LOCATION AND DESIGNATION

REFERENCE: SITE PLAN TITLED "TENTATIVE MAP," BY MUNSELLE CIVIL ENGINEERING, DATED JULY 25, 2019.

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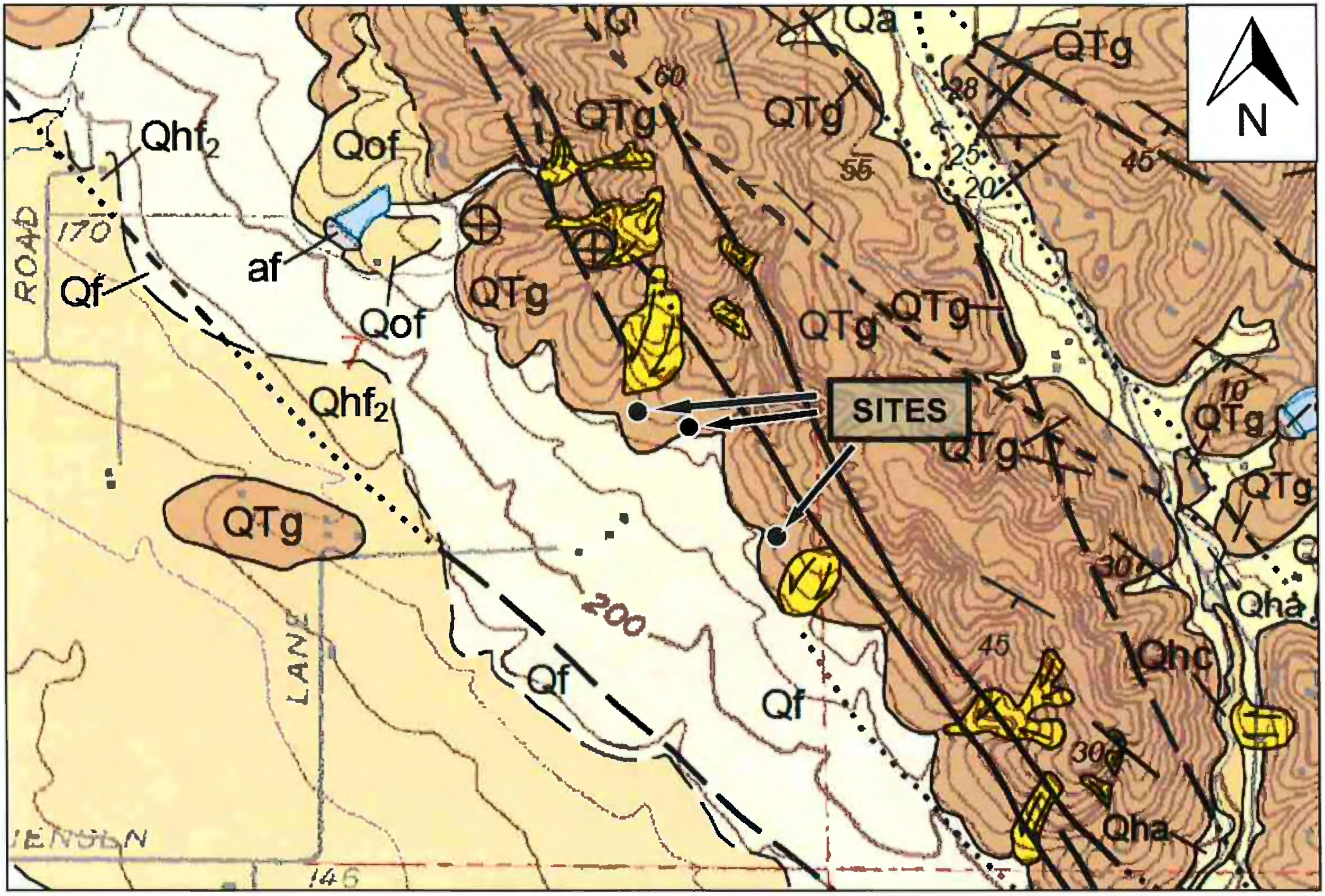
SITE PLAN / BOREHOLE LOCATION PLAN
PROPOSED MINOR SUBDIVISION
1276 JENSEN LANE
WINDSOR, CALIFORNIA

PLATE 2A

Proj. No: 7845.02 Date: 9/19 App'd by: PJC



Reference: Geologic Map of the Healdsburg Quadrangle, 7.5 Minute, prepared by the California Geological Survey, compiled by Mark P. Delattre, and Carlos I. Guiterrez, dated 2011.

APPROXIMATE SCALE: 1" = 850'

EXPLANATION

Qf — **Alluvial fan deposits (Holocene to latest Pleistocene)** – Moderately to poorly sorted deposits of sand, gravel, silt, and clay mapped on sloping, fan-shaped, slightly to moderately dissected, alluvial surfaces.

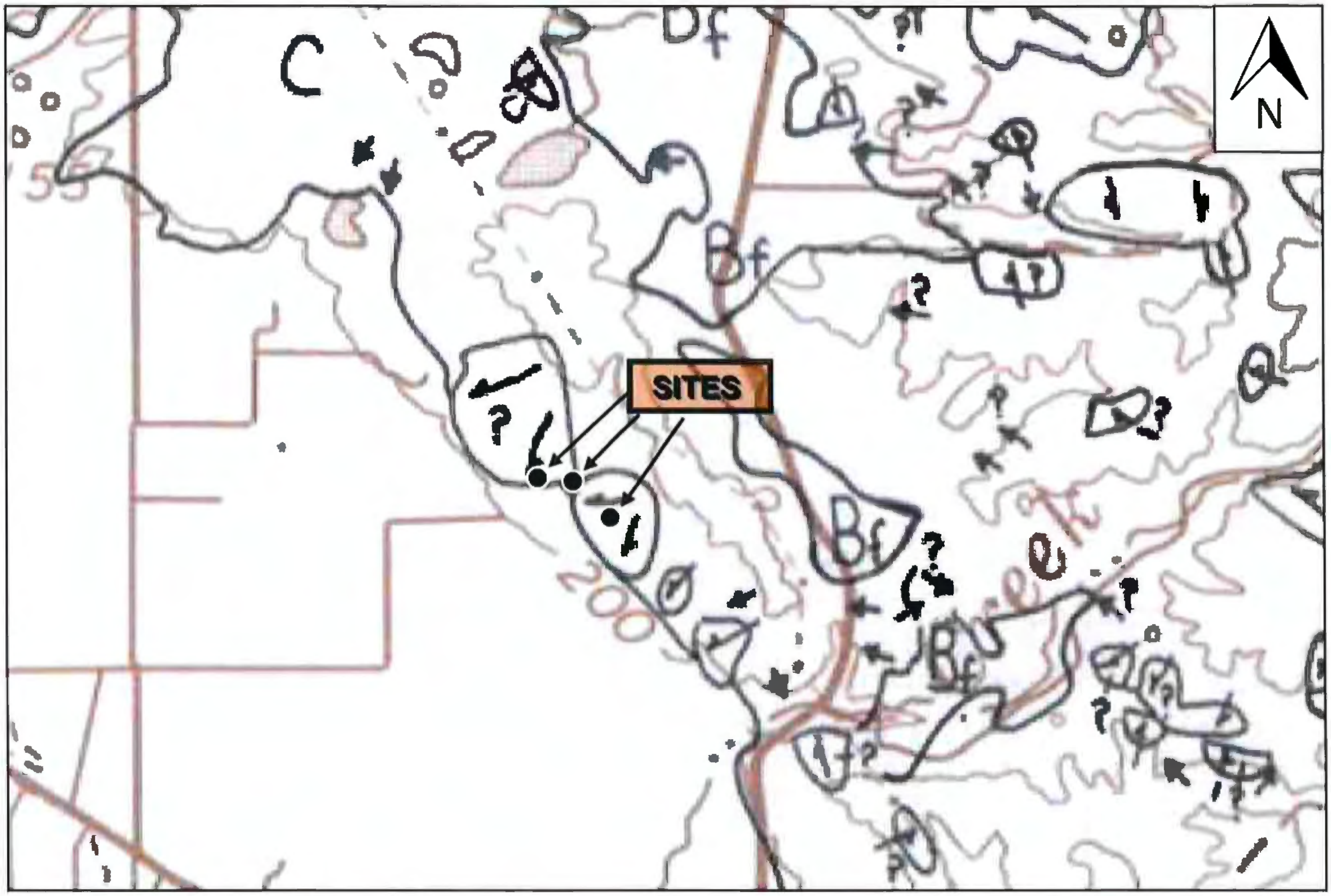
QTg — **Unnamed fluvial deposits (early Pleistocene to Pliocene)** – Light-brown to yellow-brown, weakly consolidated gravel, tuffaceous sand, silt, clay, and reworked tuff. Clasts are derived from Tertiary volcanic and Franciscan basement rocks. Includes gravels previously mapped as Glen Ellen and Huichica formations; names not used here because of unreliable lithologic and age criteria for distinguishing between the units and correlation with the formation type localities (McLaughlin and others, 2008). The unit includes obsidian pebbles (characteristic of the Glen Ellen Formation) in relative abundance throughout the southern portion of the quadrangle west of the Healdsburg Fault, becoming increasingly sparse or absent northward and to the east of the Healdsburg Fault. Gravels east of the Healdsburg Fault include interbeds of ash-flow and air fall tuff that appear to represent interfingering with the upper part of the Sonoma Volcanics (Tsvt).

Landslide - arrows indicate principal direction of movement.

Contact between map units – Solid where accurately located; dashed where approximately located; dotted where concealed, queried where uncertain.

Fault – Solid where accurately located, dashed where approximately located; short dash where inferred; dotted where concealed; queried where uncertain. Dip of fault shown by arrow normal to fault. Relative horizontal movement shown by arrows parallel to fault. Relative vertical movement shown by U on upthrown block; D on down-dropped block.

PJC & Associates, Inc. Consulting Engineers & Geologists	REGIONAL GEOLOGIC MAP PROPOSED MINOR SUBDIVISION 1276 JENSEN LANE WINDSOR, CALIFORNIA	PLATE 2B
	Proj. No: 7845.02 Date: 8/19 App'd by: PJC	



APPROXIMATE SCALE: 1" = 1780'

EXPLANATION

Landslides; arrows show general direction of movement (areas of lowest relative slope stability), question marks indicate possible landslides.

Landslide or severe soil creep area too small to be outlined at the map scale. Question mark adjacent to arrow Indicates landslide is uncertain, or "possible".

C Areas of relatively unstable rock and soil units on slopes greater than 15%, containing abundant landslides.

Bf Locally level areas within hilly terrain; may be underlain or bounded by unstable or potentially unstable rock materials.

REFERENCE: LANDSLIDE & SLOPE STABILITY MAP- NORTHERN SONOMA COUNTY (SR 120), CALIFORNIA DIVISION OF MINES AND GEOLOGY, DATED 1980.

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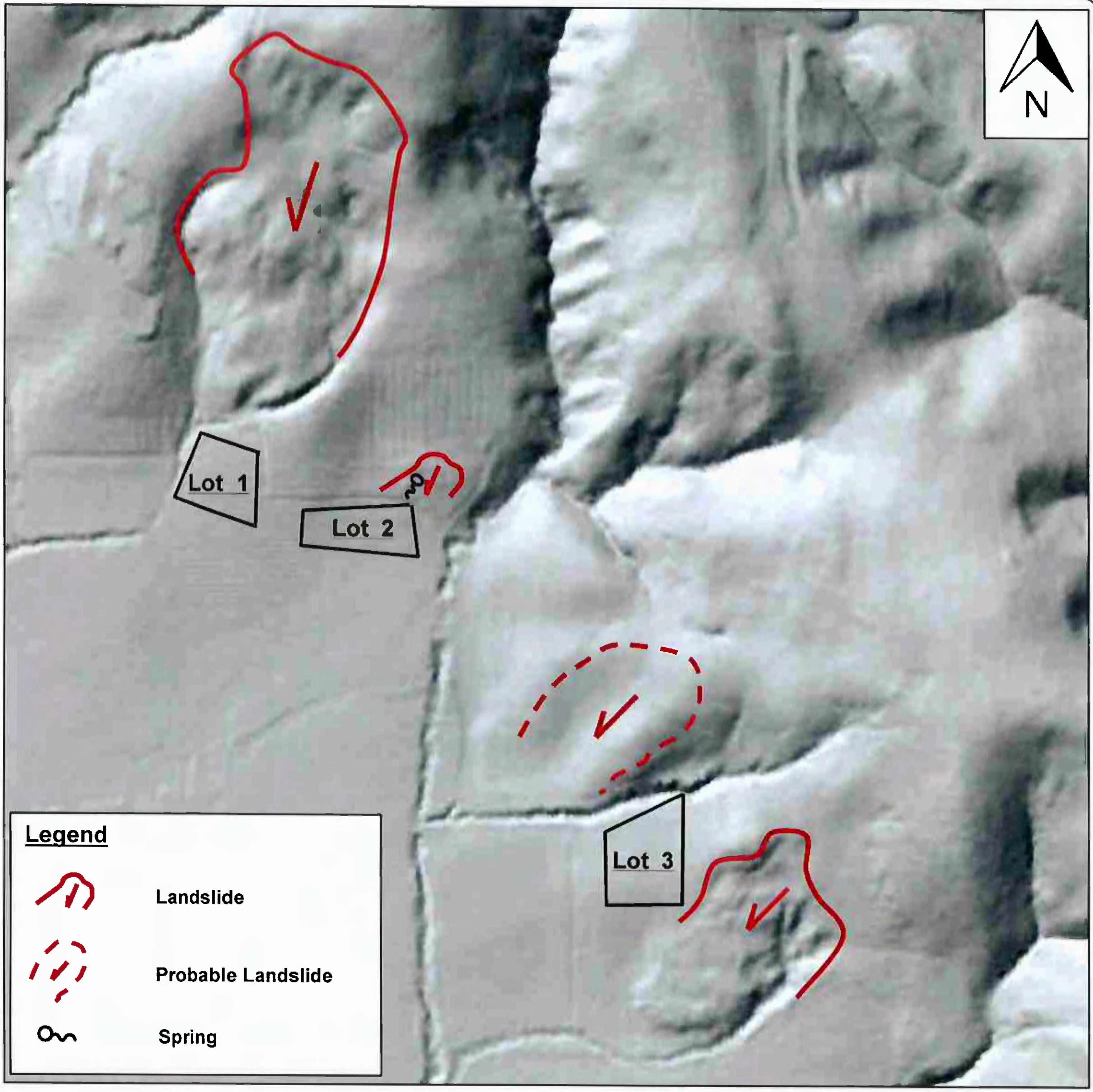
REGIONAL LANDSLIDE & SLOPE STABILITY MAP
PROPOSED MINOR SUBDIVISION
1276 JENSEN LANE
WINDSOR, CALIFORNIA

PLATE 2C

Proj. No: 7845.02 Date: 9/19 App'd by: PJC



APPROXIMATE SCALE: 1" = 250'

REFERENCE: Sonoma County, CA, 2013 Lidar, Sonoma County Vegetation Mapping and LiDAR, Consortium, http://sonomavegmap.org/

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SITE HILLSHADE MAP
PROPOSED MINOR SUBDIVISION
1276 JENSEN LANE
WINDSOR, CALIFORNIA

PLATE 2D

Proj. No: 7845.02 Date: 9/19 App'd by: PJC

PJC & Associates, Inc.

Consulting Engineers & Geologists

BORING NUMBER BH-1

CLIENT Famiglia Liberata, LLC, attn: Kelly Harrison
PROJECT NAME Proposed Minor Subdivision- Lot 3
JOB NUMBER 7845.02
LOCATION 1276 Jensen Lane, Windsor, California
DATE STARTED 7/23/19
COMPLETED 7/23/19
GROUND ELEVATION
HOLE SIZE 4"
DRILLING CONTRACTOR PJC
GROUND WATER LEVELS:
DRILLING METHOD Backhoe
AT TIME OF DRILLING --- No groundwater encountered.
LOGGED BY TC
CHECKED BY
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		0.0' - 1.5'; SANDY CLAY (CL); grayish brown, slightly moist, stiff, low plasticity, porous and weak (TOPSOIL).										
		1.5' - 4.0'; SANDY CLAY WITH GRAVEL (CH); pale to moderate brown, moist, hard, high plasticity (RESIDUAL SOIL).				4.5+ 4.5+	107 107	12 16				
5		4.0' - 5.5'; SANDSTONE/MUDSTONE (QTg); orangish brown, soft to slightly hard, friable to weak, highly weathered. (BEDROCK)										

Bottom of borehole at 5.5 feet.

ORIGINAL GEOTECH BH COLUMNS - GINT STD US.GDT - 9/17/19 12:58 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\7845.02 1276 JENSEN LANE.GPJ

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS More than half is larger than #200 sieve	GRAVELS more than half coarse fraction is larger than no. 4 sieve size	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL-SAND MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND MIXTURES
	SANDS more than half coarse fraction is smaller than no. 4 sieve size	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVEL-SAND MIXTURES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS More than half is smaller than #200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, SILTY OR CLAYEY FINE SANDS, VERY FINE SANDS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS OR LEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

KEY TO TEST DATA

LL — Liquid Limit (in %)
PL — Plastic Limit (in %)
G — Specific Gravity
SA — Sieve Analysis
Consol — Consolidation
■ "Undisturbed" Sample
☒ Bulk or Disturbed Sample
☐ No Sample Recovery

	Shear Strength, psf	Confining Pressure, psf	
*Tx	320	(2600)	Unconsolidated Undrained Triaxial
Tx CU	320	(2600)	Consolidated Undrained Triaxial
DS	2750	(2000)	Consolidated Drained Direct Shear
FVS	470		Field Vane Shear
*UC	2000		Unconfined Compression
LVS	700		Laboratory Vane Shear

Notes: (1) All strength tests on 2.8" or 2.4" diameter sample unless otherwise indicated
(2) * Indicates 1.4" diameter sample

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USCS SOIL CLASSIFICATION KEY
PROPOSED MINOR SUBDIVISION
1276 JENSEN LANE
WINDSOR, CALIFORNIA

PLATE 4

Proj. No: 7845.02 Date: 9/19 App'd by: PJC

MAJOR DIVISIONS					TYPICAL NAMES
COARSE GRAINED SOILS More than half is larger than #200 sieve	GRAVELS more than half coarse fraction is larger than no. 4 sieve size	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP		POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, POORLY GRADED GRAVEL-SAND MIXTURES
			GC		CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND MIXTURES
	SANDS more than half coarse fraction is smaller than no. 4 sieve size	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS, GRAVELLY SANDS
			SP		POORLY GRADED SANDS, GRAVEL-SAND MIXTURES
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC		CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS More than half is smaller than #200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML		INORGANIC SILTS, SILTY OR CLAYEY FINE SANDS, VERY FINE SANDS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS OR LEAN CLAYS
			OL		ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS

KEY TO TEST DATA

LL — Liquid Limit (in %)
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G — Specific Gravity
SA — Sieve Analysis
Consol — Consolidation
■ "Undisturbed" Sample
☒ Bulk or Disturbed Sample
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	Shear Strength, psf	Confining Pressure, psf	
*Tx	320	(2600)	Unconsolidated Undrained Triaxial
Tx CU	320	(2600)	Consolidated Undrained Triaxial
DS	2750	(2000)	Consolidated Drained Direct Shear
FVS	470		Field Vane Shear
*UC	2000		Unconfined Compression
LVS	700		Laboratory Vane Shear

Notes: (1) All strength tests on 2.8" or 2.4" diameter sample unless otherwise indicated
(2) * Indicates 1.4" diameter sample

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USCS SOIL CLASSIFICATION KEY
PROPOSED MINOR SUBDIVISION
1276 JENSEN LANE
WINDSOR, CALIFORNIA

PLATE
5

Proj. No: 7845.02 Date: 8/19 App'd by: PJC

ROCK TYPES

Conglomerate	Shale	Metamorphic Rocks Hydrothermally Altered Rocks
Sandstone	Sheared Shale Melange	Igneous Rocks
Meta-Sandstone	Chert	

Bedding Thickness		Joint, Fracture or Shear Spacing	
Massive	Greater than 6 feet	Very Widely Spaced	Greater than 6 feet
Thickly Bedded	2 to 6 feet	Widely Spaced	2 to 6 feet
Medium Bedded	8 to 24 inches	Moderately Widely Spaced	8 to 24 inches
Thinly Bedded	2-1/2 to 8 inches	Closely Spaced	2-1/2 inches
Very Thinly Bedded	3/4 to 2-1/2 inches	Very Closely Spaced	3/4 to 2-1/2 inches
Closely Laminated	1/4 to 3/4 inches	Extremely Closely Spaced	Less than 3/4 Inch
Very Closely Laminated	Less than 1/4 inch		

HARDNESS

Soft - Pliable, can be dug by hand

Slightly Hard - Can be gouged deeply or carved with a pocket knife

Moderately Hard - Can be readily scratched by a knife Blade; Scratch leaves heavy trace of dust and is readily visible after the powder has been blown away

Hard - Can be scratched with difficulty; scratch produced little powder and is faintly visible

Very Hard - cannot be scratched with pocket knife, leaves metallic streak

STRENGTH

Plastic- Capable of being molded by hand

Friable - Crumbles by rubbing with fingers

Weak - an unfractured specimen of such material will crumble under light hammer blows

Moderately Strong - Specimen will withstand a few heavy hammer blows before breaking

Strong - Specimen will withstand a few heaving ringing hammer blows and usually yields large fragments

Very Strong - Rock will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments

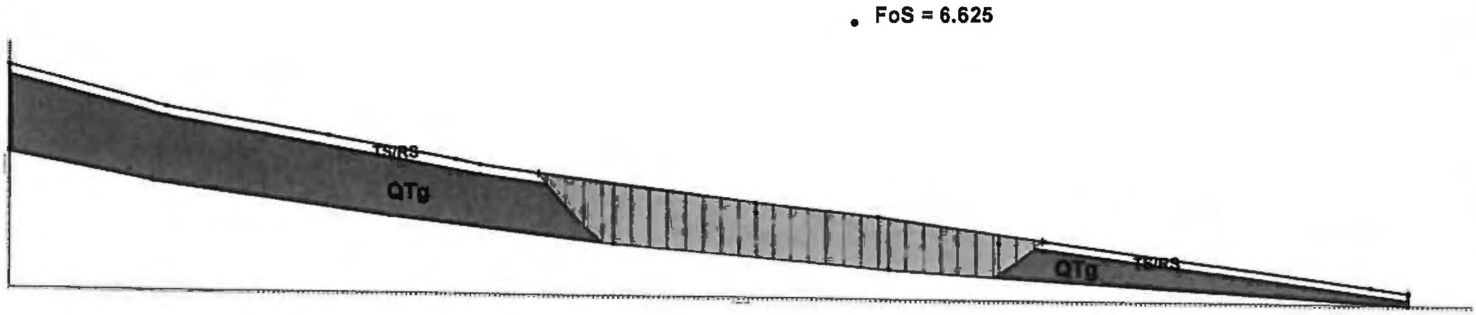
DEGREE OF WEATHERING

Highly Weathered - Abundant fractures coated with oxides, carbonates, sulphates, mud, etc., through discoloration, rock disintegration, mineral decomposition

Moderately Weathered - Some fracture coating, moderate or localized discoloration, little to no effect on cementation, slight mineral decomposition

Slightly Weathered - A few stained fractures, slight discoloration, little to no effect on cementation, no mineral decomposition

Fresh - Unaffected by weathering agents, no appreciable change with depth



EXPLANATION

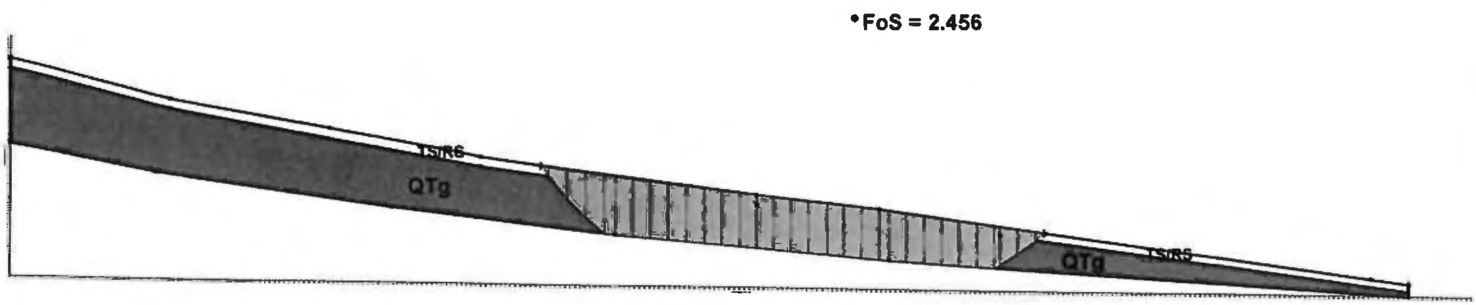
APPROXIMATELY LOCATED GEOLOGIC CONTACT

TS/RS TOPSOIL/RESIDUAL SOIL STRATA

QTg GLEN ELLEN FORMATION

● FACTOR OF SAFETY = 6.625

PJC & Associates, Inc. Consulting Engineers & Geologists	STATIC SLOPE STABILITY ANALYSIS PROPOSED MINOR SUBDIVISION 1276 JENSEN LANE WINDSOR, CALIFORNIA	PLATE **7**
	Proj. No: 7845.02 Date: 9/19 App'd by: PJC	



EXPLANATION

APPROXIMATELY LOCATED GEOLOGIC CONTACT

TS/RS TOPSOIL/RESIDUAL SOIL STRATA

QTg GLEN ELLEN FORMATION

● FACTOR OF SAFETY=2.456

PJC & Associates, Inc. Consulting Engineers & Geologists	SEISMIC SLOPE STABILITY ANALYSIS PROPOSED MINOR SUBDIVISION 1276 JENSEN LANE WINDSOR, CALIFORNIA	PLATE **8**
	Proj. No: 7845.02 Date: 9/19 App'd by: PJC	

APPENDIX A
FIELD INVESTIGATION

1. INTRODUCTION

The field program performed for this study consisted of drilling one exploratory borehole (BH-1) at Lot 3. The exploration was completed July 22, 2019. The borehole location is shown on the Borehole Location Plan, Plate 2A. A Descriptive log of the borehole is presented in this appendix as Plate 3.

2. BOREHOLE

The borehole was advanced using a modified California split-spoon sampler which was pushed with a track-mounted excavator. The soils were classified in accordance with the Unified Soil Classification System, as explained in Plate 4. The bedrock was described according to Plate 5. Relatively undisturbed and disturbed samples were obtained from the exploratory boreholes. All samples collected were labeled and transported to PJC's office for examination and laboratory testing.

APPENDIX B
LABORATORY INVESTIGATION

1. INTRODUCTION

This appendix includes a discussion of test procedures and results of the laboratory investigation performed for the proposed project. The investigation program was carried out by employing currently accepted test procedures of the American Society of Testing and Materials (ASTM).

Undisturbed samples used in the laboratory investigation were obtained during the course of the field investigation as described in this report.

2. INDEX PROPERTY TESTING

In the field of soil mechanics and geotechnical engineering design, it is advantageous to have a standard method of identifying soils and classifying them into categories or groups that have similar distinct engineering properties. The most commonly used method of identifying and classifying soils according to their engineering properties is the Unified Soil Classification System as described by ASTM D-2487-83. The USCS is based on a recognition of the various types and significant distribution of soil characteristics and plasticity of materials. The index properties discussed in this report include the determination of natural water content and dry density and pocket penetrometer testing.

a. Natural Water Content and Dry Density. Natural water content and dry density of the soils were determined, often in conjunction with other tests, on selected undisturbed and disturbed samples. The samples were extruded and visually classified, trimmed to obtain a smooth flat face, and accurately measured to obtain volume and wet weight. The samples were then dried in accordance with the procedures of ASTM 2216-80 for a period of 24 hours in an oven, maintained at a temperature of 100 degrees C. After drying, the weight of each sample was determined and the moisture content and dry density calculated.

b. Pocket Penetrometer. Pocket Penetrometer tests were performed on all cohesive samples. The test estimates the unconfined compressive strength of a cohesive material by measuring the materials resistance to penetration by a calibrated, spring-loaded cylinder. The maximum capacity of the cylinder is 4.5 tons per square foot (tsf).

3. ENGINEERING PROPERTIES

The engineering properties testing to determine strength parameters consisted of direct shear testing.

a. Direct Shear Test. Direct shear tests were performed on selected undisturbed samples. After the initial weight and volume measurements were determined, the sample was placed in the shear machine. The designated normal load was applied and the sample was saturated with water and allowed to consolidate. The sample was then sheared horizontally at a rate of strain of 0.025 inches per minute. Shear stress and sample deformation were monitored throughout the test.