



**CONDOR EARTH**  
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## MEMORANDUM

RECEIVED

DEC 27 2018

Napa County Planning, Building  
& Environmental Services

**TO:** Jeremy Nickel, The Vineyard House

**COPY:** Craig Norris, The Vineyard House  
Paul Kelley, Paul Kelley Architecture  
Beth Painter, Balanced Planning, Inc.  
Mike Muelrath, PE, Applied Civil Engineering Incorporated

**FROM:** Scott Lewis, CEG No. 1835  
Andy Kositsky, GE No. 2532

**DATE:** November 30, 2018

**PROJECT:** 6994

**SUBJECT:** **Proposed Winery Cave and Portals**  
**1581 Oakville Grade, Oakville, CA**  
**APN 027-360-012-000**  
**Geologic Assessment and Preliminary Recommendations**

As requested, Condor Earth (Condor) has reviewed the project site conditions, available published data, and in accordance with our discussion with you and the team, we herein present our findings regarding geologic assessment of the site.

### PRELIMINARY FINDINGS

The proposed project site is located approximately 1.3 miles southwest of Oakville and occupies the flank of a low ridge near the base of the Mayacamas Mountain Range on the west side of Napa Valley, as shown on Figure 1. The parcel has been previously improved, including a historic residence, a relatively new barn, and vineyard and landscaped areas. The proposed winery cave is located west of the barn and underlying an east-facing hillside supporting oak woodland and vineyards (Figure 2). The understory vegetation of the oak woodland area has been cleared and reveals a moderately-sloping hillside. The existing ground surface rises about 60 feet from the location of the proposed main cave portal near the existing barn to the rear portion of the proposed cave.

The site geology in the project vicinity appears to be varied. An excerpt from a 2005 published geologic map of the area is included in Figure 3. Figure 3 shows that the cave site is underlain by Tertiary age Sonoma Volcanics andesitic lava rock (termed "andesite flow breccia of Stags Leap" on the map). However, Cretaceous age Great Valley Sequence (shale, siltstone, sandstone and conglomerate) rock is shown just west of the site, and older faulting is shown nearby. Our visual observations during our site reconnaissance are consistent with the distribution of rock types shown on the geologic map. An existing stream drainage generally follows the approximate contact between the mapped distribution of Sonoma Volcanics and Great Valley rocks along the western parcel boundary.

Figures 4A and 4B show that the older faults mentioned above are along the general trend of the West Napa Fault located to the southeast, but that the site is not located within an active fault zone (closest active fault zone is approximately 6.5 miles from the site). Published maps (Figures 3 and 5) do not show landslides at the project site; we also did not observe topographic features suggesting prior landslide activity at the wine cave or portal locations during our site reconnaissance.

Figure 6 illustrates that the site is not underlain by ultramafic rock (rock that could potentially contain naturally-occurring asbestos). Figure 7 illustrates that Napa County is located within a zone of low potential for natural radon hazard.

Notable proposed cave features include two cave entries (portals), typical approximately 14-foot wide barrel storage tunnels, and a 40-foot diameter dome-shaped chamber.

### **PRELIMINARY RECOMMENDATIONS**

We suggest that, from a geologic and tunnel engineering point of view, that the proposed facilities are feasible, but that construction may be technically challenging. In our opinion, based on anticipated ground conditions and our experience, and provided that properly-designed and installed temporary and permanent tunnel supports are provided during construction, that tunnel complex can be constructed as illustrated by the project architect in the Use Permit documents.

Given that the site geologic conditions are varied, we recommend that a comprehensive subsurface geologic exploration program (including drilling, monitoring well installation and test pits) be performed to confirm our findings prior to tunnel engineering and Building Permit submittal.

We recommend that the team should meet to discuss our findings and consider next steps regarding geologic exploration and tunnel engineering.

### **ADDITIONAL SERVICES**

Once the overall project scope is confirmed, Condor can provide a proposal for design phase geotechnical services, including site investigation, geotechnical report for the cave and cave portal/shaft features; tunnel/portal/shaft engineering; and construction phase services.

To confirm site conditions prior to permitting and construction, we recommend geologic/geotechnical exploration to investigate natural ground temperatures, potential groundwater seepage conditions, and to optimize the cave/portal design and estimate probable construction costs.

### **LIMITATIONS**

The descriptions and other data contained in this memorandum are for preliminary design purposes for the proposed site development described above in Napa County, California. These data are not valid for other sites.

The preliminary findings submitted in this memorandum are based upon the data obtained from a limited site reconnaissance, literature review and our experience in the project site vicinity. This memorandum does not reflect subsurface variations that usually occur at project sites. The nature and extent of such variations will not likely become evident until subsurface investigation is performed, and construction is initiated.



The validity of the findings contained in this memorandum is also dependent upon proper engineering design, and an adequate testing and observation program during the construction phase. Our firm assumes no responsibility for construction compliance with the design concepts or recommendations unless we have been retained to perform onsite testing and observation during construction.

This memorandum was prepared in accordance with the generally accepted standards of engineering geologic practice that exists in Napa County at the time the letter was written. No other warranty, express or implied, is made.

## **CLOSURE**

We trust this memorandum contains the information required. Please contact Scott Lewis at 209.536.7370 or 209.601.5585 with questions.

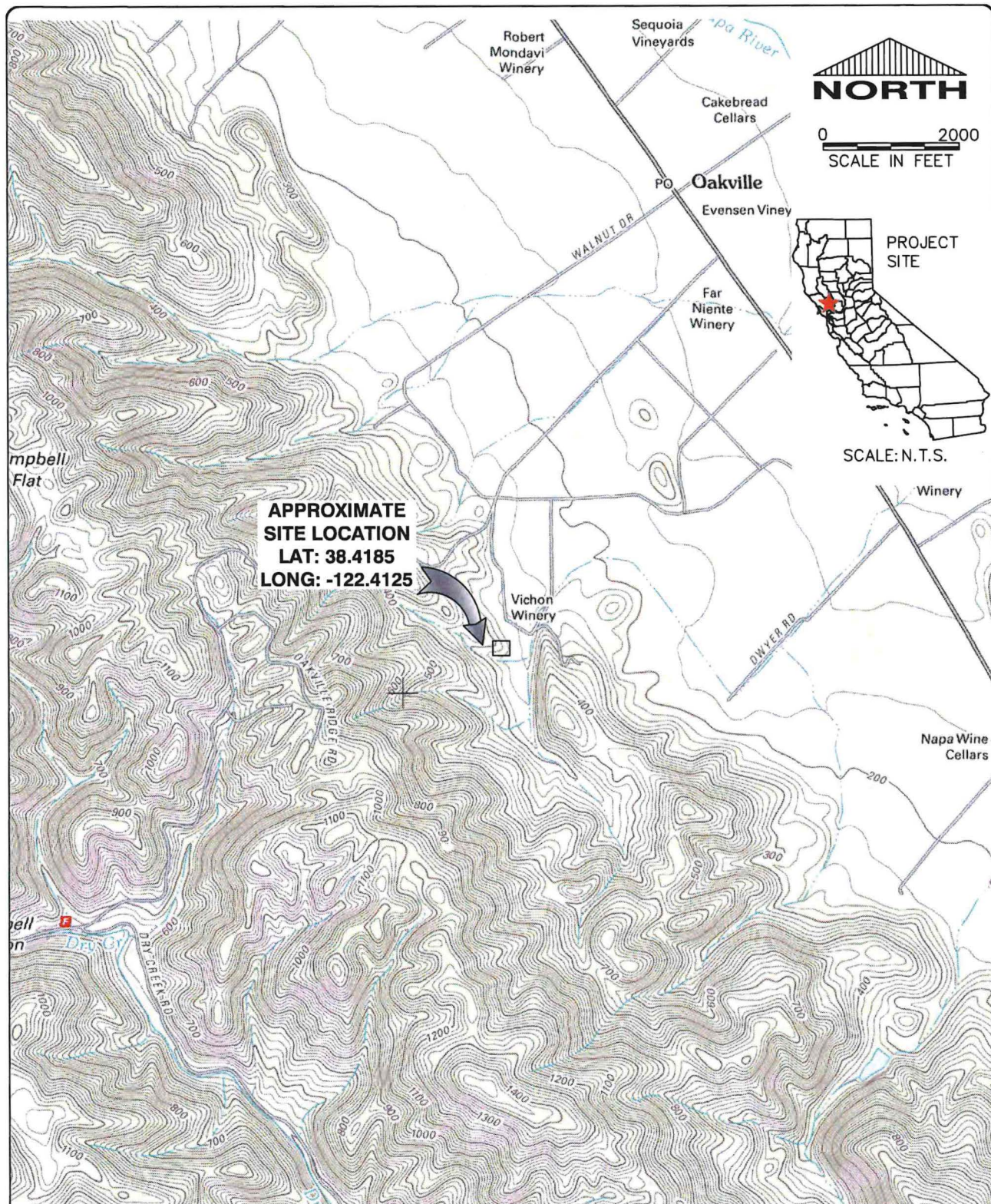
### **Attachments:**

- Figure 1 Vicinity Map
- Figure 2 Site Map
- Figure 3 Geologic Map (2005)
- Figure 4A Region Fault Map
- Figure 4B Alquist Priolo Map
- Figure 5A Landslide Map (plan)
- Figure 5B Landslide Map (legend)
- Figure 6 Ultramafic Rock Map
- Figure 7 Radon Hazard Map

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BACKGROUND IMAGE: USGS 7.5 MINUTE QUADRANGLE, RUTHERFORD 2012



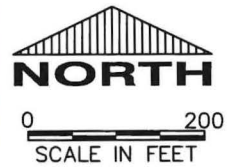
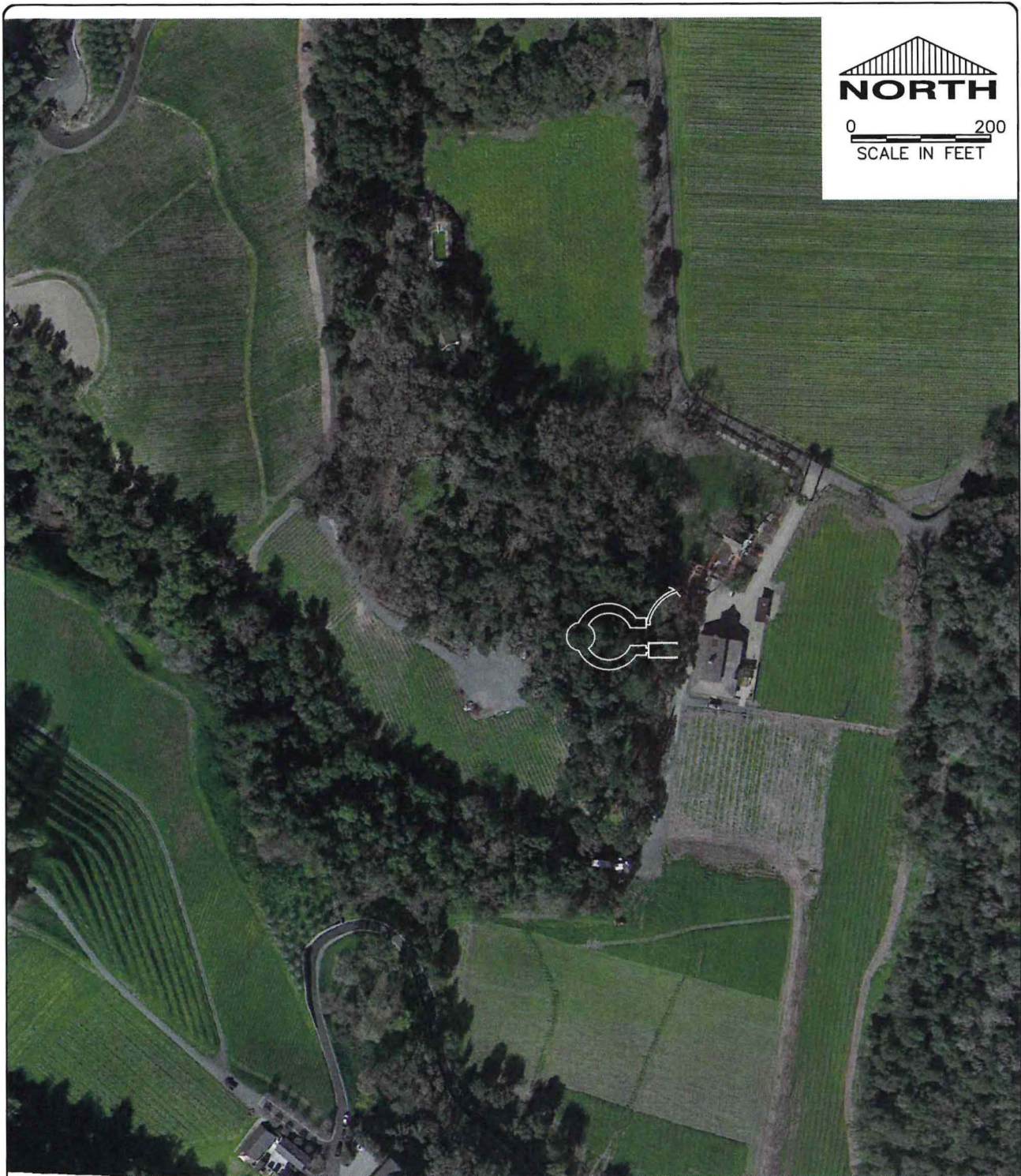
Job No.	6994
Date	27 JULY 2018
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**VICINITY MAP**  
**THE VINEYARD HOUSE WINERY**  
**1581 OAKVILLE GRADE**  
**OAKVILLE, CALIFORNIA 94562**


**FIGURE**  
**1**

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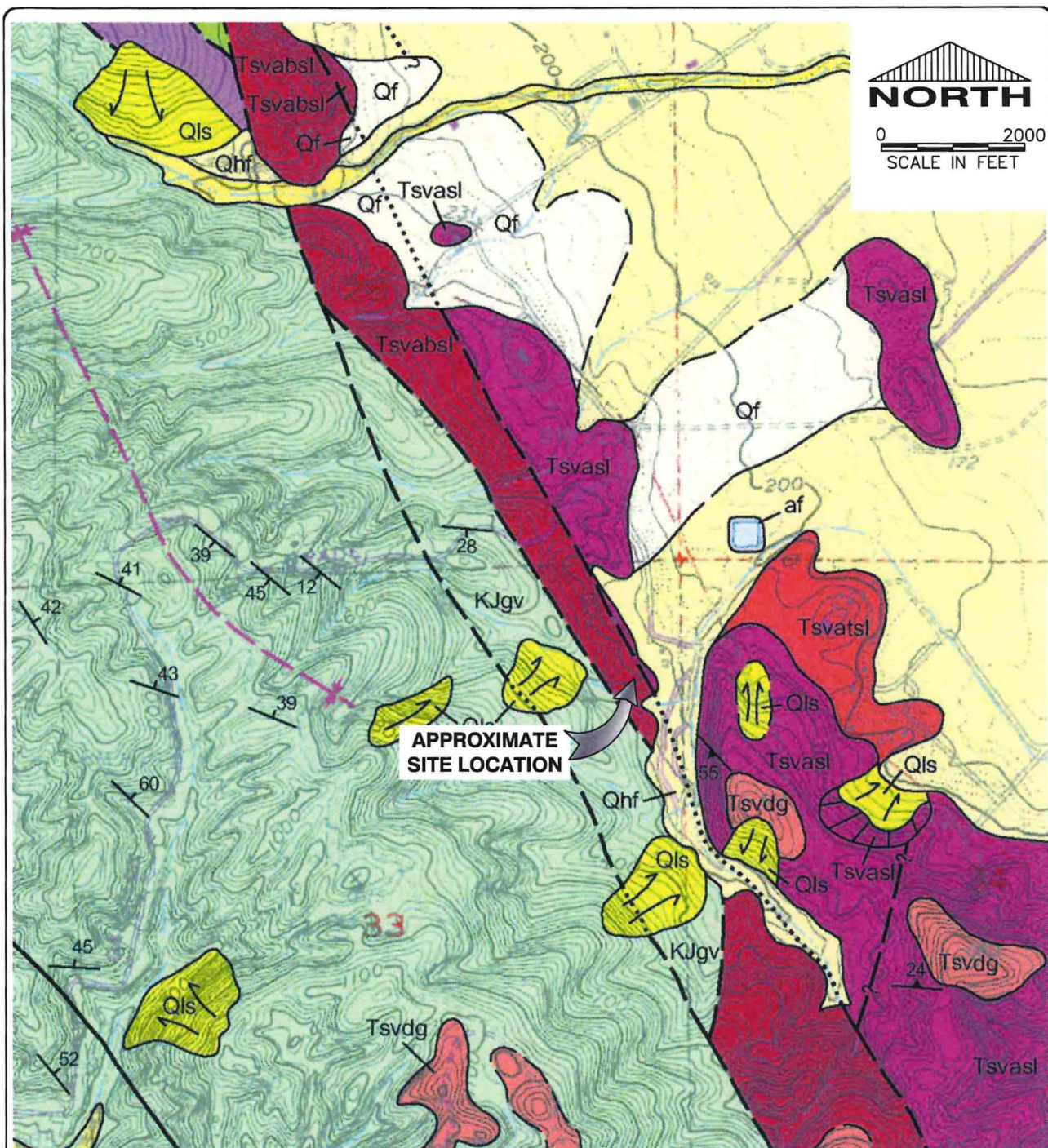
BACKGROUND IMAGE: GOOGLE EARTH IMAGERY 02/05/2018

 <p><b>CONDOR EARTH</b> 21663 Brian Lane P.O. Box 3905 Sonoma, CA 95370 (209) 532-0361 fax(209) 532-0773 www.condorearth.com</p>	Job No. 6994	<p><b>SITE MAP</b> <b>THE VINEYARD HOUSE WINERY</b> <b>1581 OAKVILLE GRADE</b> <b>OAKVILLE, CALIFORNIA 94562</b></p>	<p><b>FIGURE</b> <b>2</b></p>
	Date 17 NOV 2018		
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- KJgv** Great Valley Sequence (Early Cretaceous and Late Jurassic) - Sandstone, pebble conglomerate, siltstone, and shale.
- Qls** Landslide deposits (Holocene and Pleistocene) - includes debris flows and block slides.
- Tsvabsl** Andesite flows of Stags Leap.
- Tsvasl** Andesite flow breccia of Stags Leap.
- Tsvdvg** Andesite ash flow tuff and tuff breccia of Stags Leap.

**Tsvdvg** Debris of Mt. George - Flows, domes and shallow intrusions of gray to tan porphyritic dacite. This dacite is typically strongly flow banded. The upper surfaces of flows and the margins of domes and intrusions are commonly perlitic. The base of the flows is a black porphyritic pitchstone and pitchstone breccia. K-Ar ages for the dacite are 4.3±0.2 and 3.73±1.23 Ma (Markinen, 1972; Fox and others, 1985).

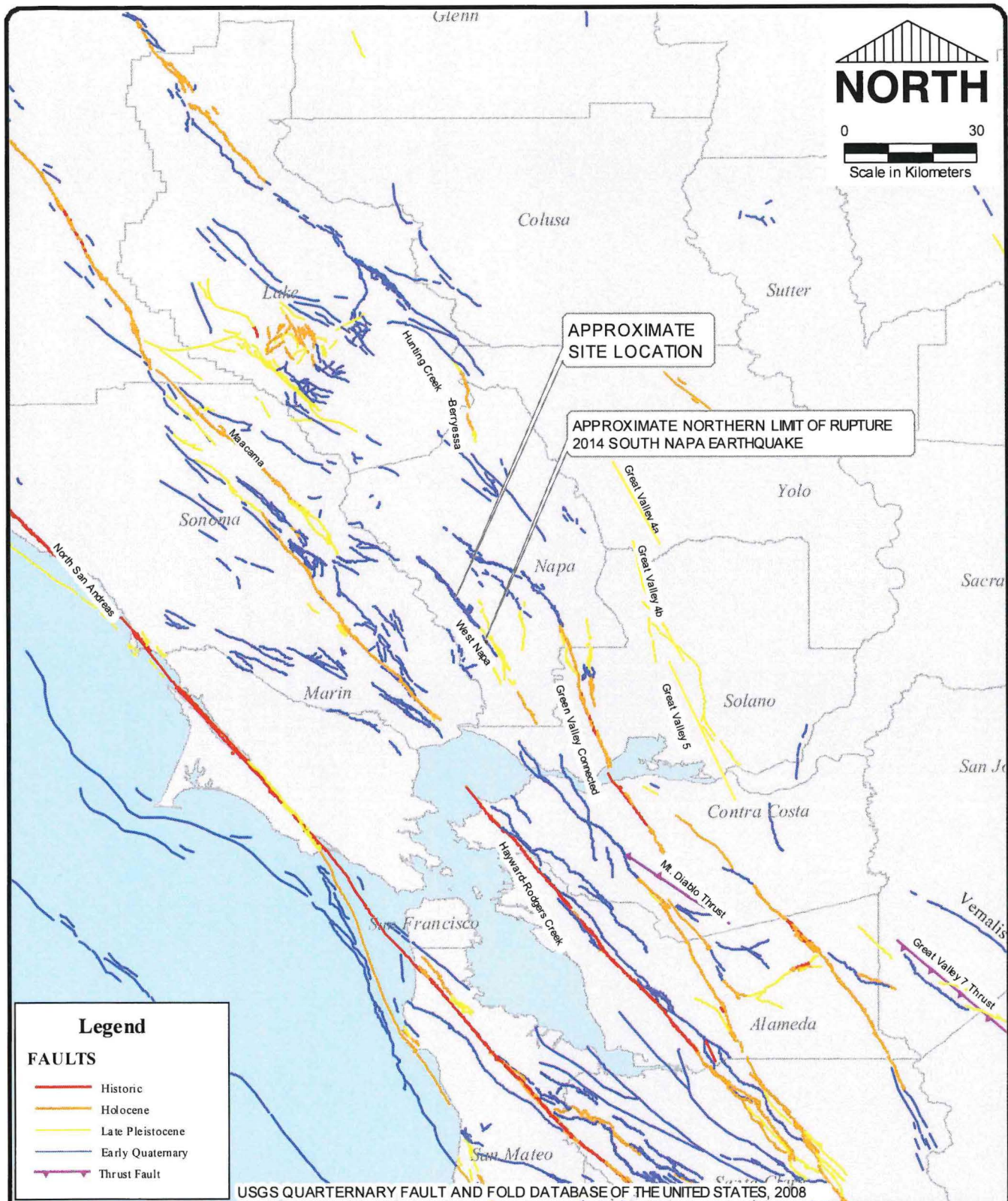
GEOLOGIC MAP OF THE RUTHERFORD 7.5' QUADRANGLE, SONOMA AND NAPA COUNTIES, CALIFORNIA 2005

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	Date 27 JULY 2018		
	Scale AS SHOWN		
	Drawn KGM	Chk'd SWL	

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Job No.	6994
Date	31 Jul 2018
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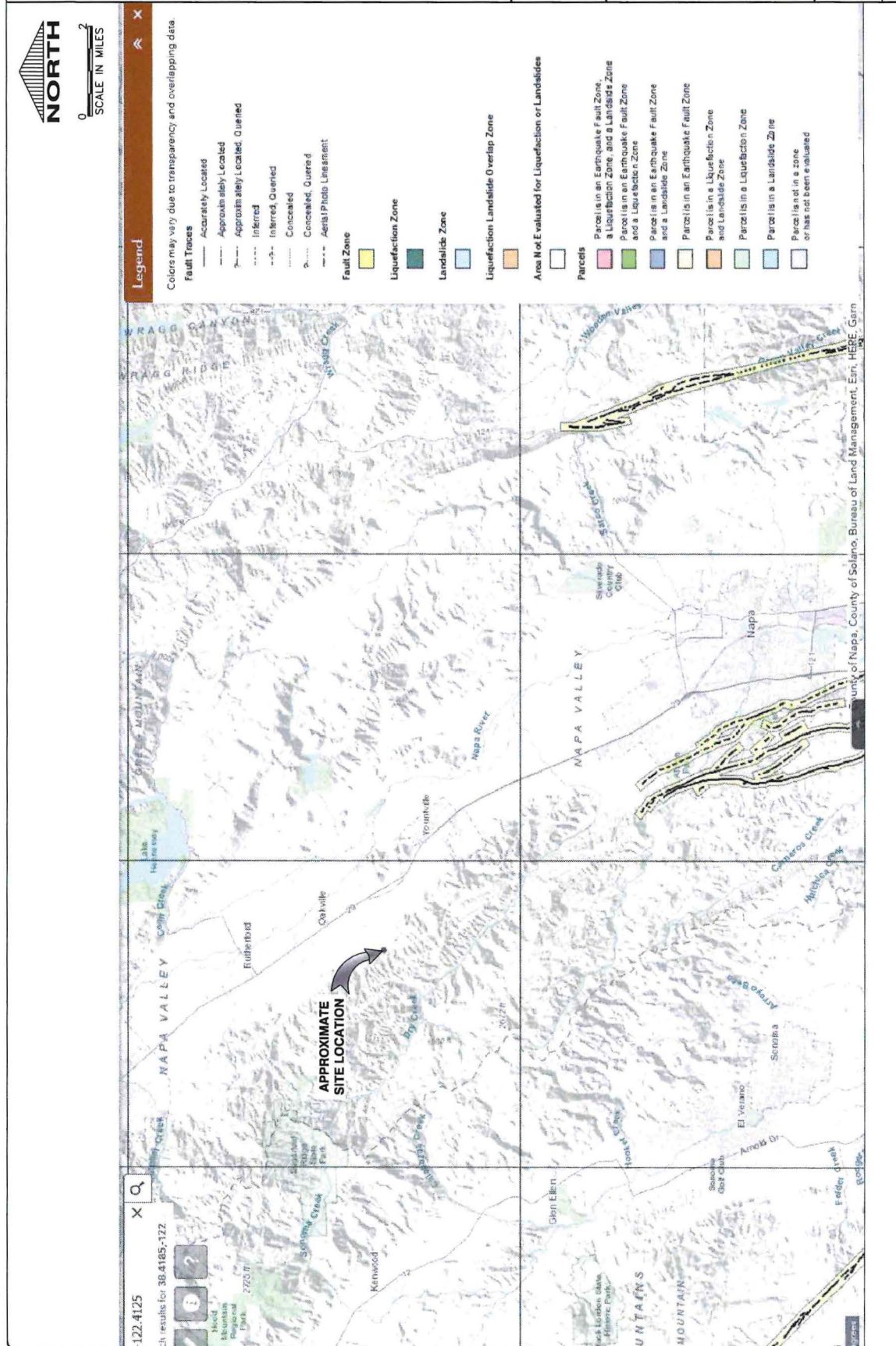
REGIONAL FAULT MAP  
THE VINEYARD HOUSE WINERY  
1851 OAKVILLE GRADE  
OAKVILLE, CALIFORNIA 94562

**FIGURE**  
**4A**

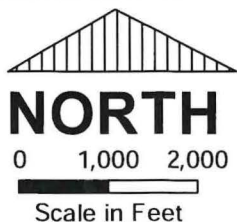
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**NORTH**

0 1,000 2,000

Scale in Feet

PROJECT  
SITE



VICINITY MAP  
N.T.S.

**APPROXIMATE  
SITE LOCATION**



SOURCE: RECONNAISSANCE PHOTOINTERPRETATION MAP OF LANDSLIDES IN 24 SELECTED 7.5-MINUTE QUADRANGLES IN LAKE, NAPA, SOLANO AND SONOMA COUNTIES, CALIFORNIA. M.J.DWYER 1975

PROJ. LAT.: 38.1485 N  
PROJ. LONG.: 122.4125 W  
USGS QUAD NAME: RUTHERFORD, CA



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**LANDSLIDE MAP  
THE VINEYARD HOUSE WINERY  
1581 OAKVILLE GRADE  
OAKVILLE, CALIFORNIA 94562**

**FIGURE  
5A**

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LANDSLIDE.MXD

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### LARGE LANDSLIDE DEPOSITS

Landslide which is 50 ft or more in maximum dimension. Arrows indicated general direction of downslope movement (omitted for lack of space on some landslides and on all questionable landslides). Double barbed arrows indicated primarily slump of block slump landslide movement. Single barbed arrows indicated primarily flow movement, while a combination of double and single barbed arrows indicated a complex movement, slump or block slump with earthflow extending downslope from foot. Smaller arrows within a large landslide indicated smaller more recent landslides occurring on a large landslide mass. Capital letters shown on each landslide have the following designations: D, DEFINITE landslide activity; P, PROBABLE landslide deposits; Q, QUESTIONABLE landslide deposits; R, landslides features on photographs strongly suggest a RAPID rate of slide movement. A, landslide features on photographs strongly suggest recent ACTIVITY. Hachured lines show the approximate position of inferred landscape scarps.

Recognition of some or all of the following landslide-formed features, if well defined and readily observable in aerial photographs, lead to interpretation of definite landslide (D on map): (1) broken ground, including scarps and fissures; (2) primary and secondary slump blocks; (3) sag ponds; (4) slide toes; (5) hummocky topography; (6) springs and seeps often with water-loving vegetation; (7) abrupt and irregular changes in slope and drainage pattern and stream gradient.

Topographic features recognized with the following landforms are interpreted as being very probable of landslide origin (P on maps): (1) continuous, relatively sharp breaks on slope interpreted as being poorly preserved and/or poorly developed slide scarps; (2) topographic flats, or benches interpreted as being poorly preserved and/or poorly developed slump blocks; (3) small, presently free-draining areas, of gently relief interpreted as old bog ponds which have become infilled by sediment.

Topographic features whose outlines are subdued by weathering and/or largely obscured by vegetation but whose overall form is suggestive of landslide origin are called questionable landslides (? on maps).



### SMALL LANDSLIDE DEPOSITS

100 to 500 feet maximum dimension. Arrows indicated general direction of downslope movement and are centered over the location of deposits. Meaning of symbols: arrows, D, P, ?, R and A are the same as for LARGE LANDSLIDE DEPOSITS.



### SOIL CREEP


Areas of suspected soil creep, the shallow and gradual downhill movement of soil and loose rock material. Undulating arrows indicated general direction of creep and are centered over the location of creep areas. Areas with a maximum dimension of less than 500 feet are shown only by undulating arrows.



### LANDSLIDE ZONE

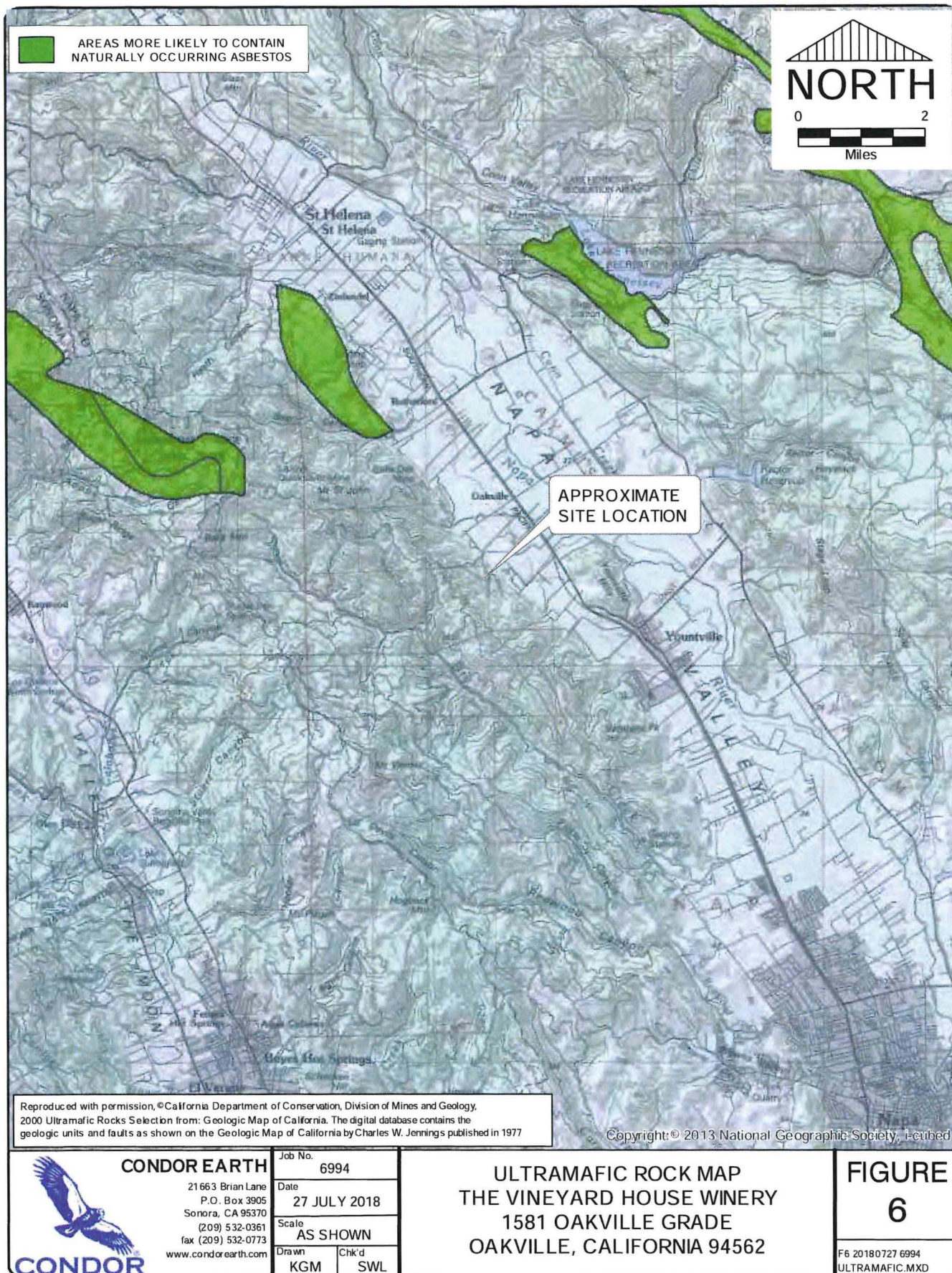
Slide area consisting of numerous coalesced and superposed landslides of various sizes, types of movement, and degree of activity. Because of spatial complexity, it is generally not feasible to delineate individual slides composing these zones. Meaning of symbols: D, P, and A are the same as of LARGE LANDSLIDE DEPOSITS. The following symbols are used only for the LANDSLIDE ZONES: D-DA, landslide zone consists primarily DEFINITE TO DEFINITE and ACTIVE landslide deposits; P-?, landslide zone consists primarily PROBABLE to QUESTIONABLE landslide deposits; S, Stable appearing areas within a landslide zone.

SOURCE: RECONNAISSANCE PHOTOINTERPRETATION MAP OF LANDSLIDES IN 24 SELECTED 7.5-MINUTE QUADRANGLES IN LAKE, NAPA, SOLANO AND SONOMA COUNTIES, CALIFORNIA, M.J.DWYER 1975

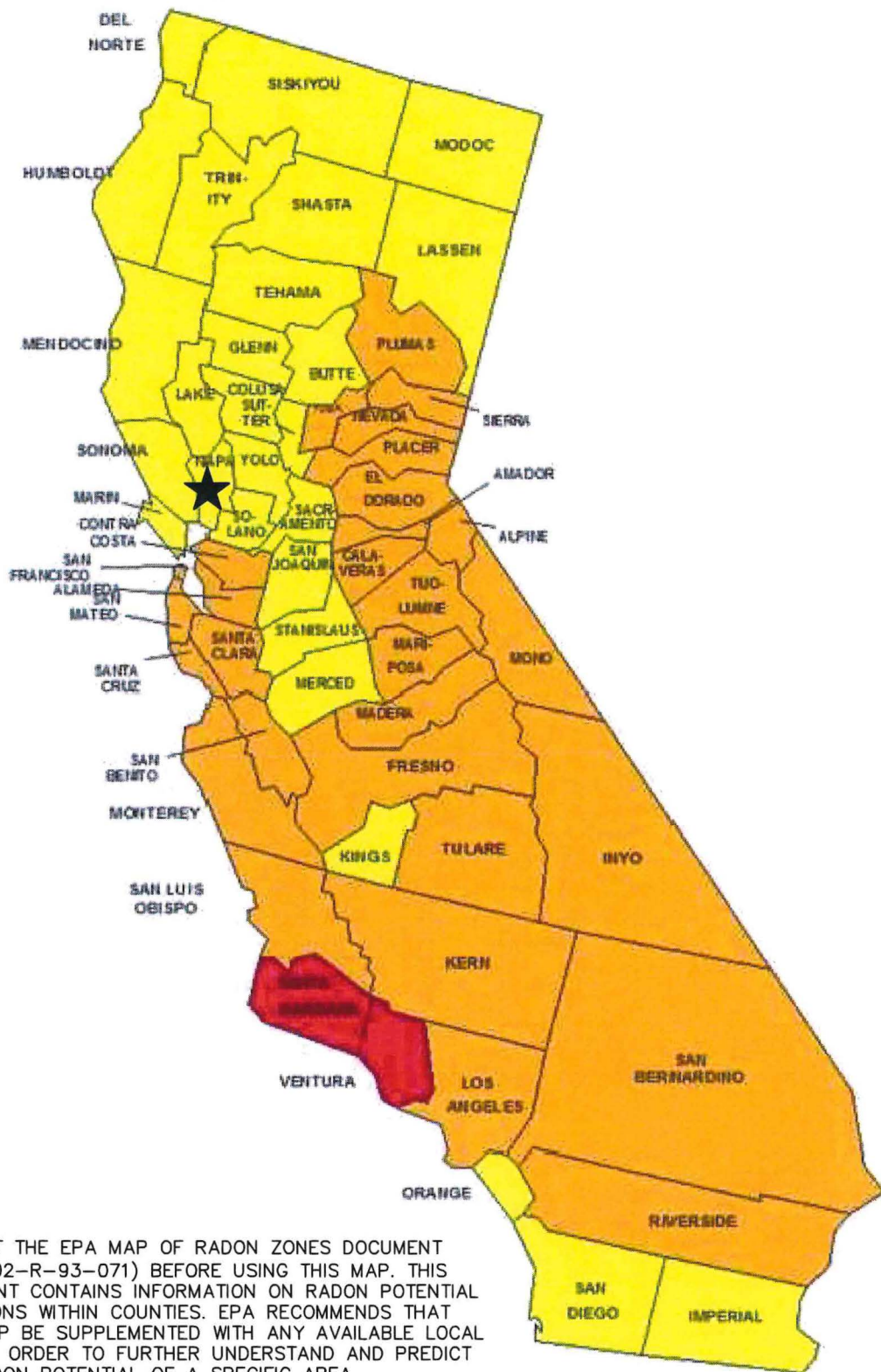
 <b>CONDOR EARTH</b> 21663 Brian Lane P.O. Box 3905 Sonoma, CA 95370 (209) 532-0361 fax (209) 532-0773 www.condorearth.com	Job No.	6994	<b>LANDSLIDE MAP - LEGEND</b> <b>THE VINEYARD HOUSE WINERY</b> <b>1581 OAKVILLE GRADE</b> <b>OAKVILLE, CALIFORNIA 94562</b>	<b>FIGURE</b> <b>5B</b>
	Date	27 JULY 2018		
	Scale	AS SHOWN		
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	FSB 20180727 6994 LEGEND.MXD			

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**FIGURE**  
**7**



**CONDOR EARTH**  
**RADON HAZARD MAP**

- ZONE 1 = HIGHEST POTENTIAL ( $>4$  pCi/L)
- ZONE 2 = MODERATE POTENTIAL (2–4 pCi/L)
- ZONE 3 = LOW POTENTIAL ( $<2$  pCi/L)

pCi/L – PICOCURIES PER LITER



# The Vineyard House Winery

## ESTIMATED TUNNEL SPOILS CALCULATIONS

CET Prj. No. 6994

11/27/2018

Tunnel	Width (ft)	Length (ft)	Approx. floor area (sf)	Excavated face area (sf)	Height (ft)	Cubic Yards		
Tunnel	14.00	206.3	2,888.5	207.5	12.00	1,586		
Fermentation	40.00	40.0	1,256.6	781.7	20.00	826		
		246.3	4,145.1					
Totals			4,145.1			2,412		
			Raw Spoils Volume (cy)					2,412
			Bulking Factor (%)					40%
			Bulking Factor (cy)					965
			Estimated Spoils Volume (cy)				3,377	