SUPPLEMENTAL FAULT EXPLORATION

OAK KNOLL

OAKLAND, CALIFORNIA

Submitted to:
Mr. Mike Turner
Oak Knoll Venture Acquisition, L.L.C.
2392 Morse Avenue
Irvine, CA 92614

Prepared by:
ENGEO Incorporated

June 23, 2015

Project No:
5750.300.000

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5750.300.000

Mr. Mike Turner
Oak Knoll Venture Acquisition, L.L.C.
2392 Morse Avenue
Irvine, CA 92614

Subject: Oak Knoll
8750 Mountain Blvd.
Oakland, California

SUPPLEMENTAL FAULT EVALUATION

Dear Mr. Turner:

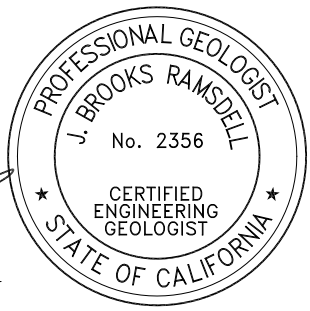
With your authorization, we have completed a supplemental fault exploration at the Oak Knoll site located in Oakland, California (Figure 1). This letter presents a summary of our field exploration and our conclusions regarding the mapped fault located at the eastern portion of the site.

Based on the findings of our exploration, the fault mapped across the eastern portion of the site is not considered active and may actually represent a depositional contact. In our opinion, no setback zone is required.

Additional design-level exploration services will be required in the future in order to present grading, drainage, and foundation design recommendations. We are pleased to have been of service to you on this project and are prepared to consult further with you and your design team as the project progresses.

Sincerely

ENGEO Incorporated



J. Brooks Ramsdell, CEG

Raymond P. Skinner, CEG

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this supplemental fault exploration has been to evaluate the fault hazards associated with the fault mapped near the eastern boundary of the site in the vicinity of Keller Avenue. This study included the following scope of services:

- Review of published geologic maps and literature pertinent to the site.
- Geologic reconnaissance mapping was performed by an ENGEO geologist.
- Aerial photographs were examined to identify geomorphic features that may be related to faulting, landsliding and other geologic conditions.
- Excavation and logging of one exploratory trench (3-T1) and two test pits to evaluate the potential for faulting in the western portion of the site.
- Preparation of this letter summarizing our findings, conclusions.

We prepared this report exclusively for you and your design team consultants. ENGEO should review any changes made in the character, design or layout of the development to modify the conclusions and recommendations contained in this report, as necessary. This document may not be reproduced in whole or in part by any means whatsoever, nor may it be quoted or excerpted without the express written consent of ENGEO.

1.2 BACKGROUND

ENGEO performed previous fault explorations at the site that included the excavation of seven exploratory trenches to evaluate previously mapped faults crossing the west and central portion of the site. Based on the findings of the previous exploration, the potential for fault rupture at the previously explored portions of the site were concluded to be low.

At the time of our previous fault exploration, development was not planned at the eastern portion of the site. We recommended additional fault exploration be performed if development was planned near the eastern edge of the site. The current plans include the development of lots along the eastern boundary of the site (Figure 2).

2.0 GEOLOGIC SETTING

The site is located in the Coast Ranges geomorphic province of California. In this part of the province, bedrock is mapped predominantly as late Jurassic-age keratophyre and quartz keratophyre, a fine-grained volcanic rock (Figure 3 - Graymer, 2000). Late Jurassic and early

Cretaceous Knoxville formation is mapped near the eastern property line and in the southwestern portion of the site.

2.1 FAULTING

The site is not located within a State of California Earthquake Fault Zone (CDMG, 1982) for known active faults. The nearest known active fault is the Hayward fault located about ½ mile to the southwest of the site.

As discussed above, previously explored un-named faults have been mapped crossing the site by Radbruch (1969), Crane (1988), Graymer (1995), and Dibblee (2005). None of these faults are considered active by the State of California (1982) and our previous exploratory trenches found no zones of shearing, clay gouge, slickensides, or other indications of faulting.

One of the mapped faults crosses a relatively small area near the eastern edge of the site. As previously discussed, this fault was not evaluated in conjunction with previous exploration of the site. According to Radbruch (1969), and Dibblee (2005) the subject fault is the Chabot fault. The Chabot fault represents a bedrock discontinuity that juxtaposes rocks of the Jurassic Coast Range ophiolite, the Franciscan complex and lower portions of the Great Valley sequence against Late Cretaceous and Tertiary bedrock units. In the vicinity of the site Graymer (2000) maps a western splay of the Chabot fault that juxtaposes Late Jurassic Keratophyre of the Coast Range ophiolite against a sliver of Late Jurassic to Early Cretaceous Knoxville formation. This western fault splay is mapped along the eastern boundary of the site. According to Graymer (2000) and the USGS 2008 National Seismic Hazard Maps, the main trace of the Chabot fault is mapped approximately 200 feet northeast of the eastern boundary of the site along the southwest facing cut slope along the east side of Keller Avenue (Figure 3).

3.0 REVIEW AND EXPLORATION

3.1 AERIAL PHOTOGRAPH INTERPRETATION

Aerial photographs were examined to study geomorphic features that could be associated with faulting in the vicinity of the mapped trace of the Chabot fault. Stereo-paired aerial photographs from 1939 exhibited a prominent linear valley along the eastern edge of the site in the same general vicinity where Graymer maps the main trace of the Chabot fault.

3.2 FIELD MAPPING

Geologic field mapping was performed along the northeast facing cut slope along Keller Avenue and along the southwest facing slope (Figure 2). Shale of the Knoxville Formation was mapped along the lower portions of the northeast facing cut slope. Bedding within the Knoxville Formation was observed to be northwest striking and dipping towards the southwest. Jurassic volcanics comprising keratophyre were encountered further up the slope. No distinct shear zone or fault gouge was observed along the contact between the two formations. The location of the contact between the Knoxville Formation and the Jurassic volcanics is well constrained within

the cut slope located west of Keller Avenue. Jurassic volcanics were observed in outcrop along the west-facing slope below the existing ridgeline road in the vicinity of proposed Lots 7 through 14. Tuffaceous mudstone was observed interbedded with the volcanics at this location.

3.3 FIELD EXPLORATION

The field exploration for this study was conducted on June 3 and 4, 2015, and consisted of excavating one exploratory trench and two test pits at the approximate locations shown on Figure 2. The trench location was obtained by GPS coordinates and taping from existing fence lines shown on the site plan and should be considered accurately located to the degree implied by the method used.

The exploratory trench was excavated to observe and provide additional assessment of the geologic conditions and possible faulting at the study site. The excavation was made using a track-mounted excavator (CAT 312) equipped with a 30-inch-wide bucket. The exploratory trench extended approximately 70 feet long and ranged from 5 to 12 feet in depth below the existing ground surface. Test pit 3-TP1 and 3-TP2 were 2 and 14 feet in depth, respectively.

An ENGEO Geologist logged the trench and test pits. An exploratory trench log is included as Figure 5. Test pit logs are included in Appendix A of this report. Once logging of the trench and test pits was completed, they were backfilled using nominal compactive effort by the excavator bucket and trackwalking the surface. Depending on future grading activities in this area, it should be anticipated that the trench spoils will need to be removed and replaced as engineered fill.

4.0 FINDINGS

Exploratory Trench 3-T1 encountered approximately 3 to 5 feet of fill from Stations 0+00 to 0+35. The existing fill encountered in the trench appeared to be associated with the grading for the existing roadway along the eastern property boundary. A thin organic rich soil was encountered within the upper 1 to 2 feet from Stations 0+35 to 0+70. Below the upper thin soil and fill a 2 to 7 foot thick layer of colluvium was encountered overlying bedrock. The colluvium thickened from west to east. Bedrock comprising, extremely weathered pale reddish brown volcaniclastic breccia was encountered from Station 0+05 to 0+30. Gray to pale gray brown tuffaceous mudstone was encountered from Stations 0+30 to 0+65. The Tuffaceous mudstone was massive and closely fractured to crushed. Extremely weathered, pale reddish brown, yellowish brown and pale yellow, rhyolitic breccia was encountered from Station 0+62 to the west end of the trench. The attached trench log, Figure 5, depicts conditions that were exposed on the south wall of the trench.

Bedding was not discernible due to the massive and disrupted nature of the rock. A pervasive structural fabric composed of closely spaced fractures was observed striking N80W and dipping 55 to 60 degrees towards the southwest. No clear indication of faulting or fault features was observed in the bedrock or overlying soil profile.

Test pit 3-TP1 encountered massive, altered rhyolitic tuff below a thin residual soil. Test pit 3-TP2 encountered approximately 12 feet of fill overlying massive, fine grained, highly altered rhyolitic tuff.

The tuffaceous mudstone encountered in the trench fits the description provided by Wakabayashi and Moores (1998) and Jones and Curtis (1991) in describing the upper units of the Jurassic Volcanics exposed in the Hillside east of Hiller Drive in the Oakland Hills west of the Caldecott Tunnel. The contact has been described as a depositional contact of tuffaceous shales or siliceous argillite that pass downward into thin-bedded radiolarian cherts that directly overlie the volcanic rocks (Wakabayashi and Moores 1998; and Jones and Curtis, 1991).

5.0 CONCLUSIONS AND RECOMMENDATIONS

A fault zone was not encountered within our trench or test pits excavated at the site. The test pits and trench indicate that the contact between the Jurassic Volcanics and the Knoxville Formation is located east of site boundary at the southeast portion of the site as shown on Figure 2. Mapping along the west side of Keller Avenue further constrain the location of the contact.

Further north Test pit 2-TP7, excavated during our previous exploration at the site, encountered claystone interpreted as Knoxville Formation. Jurassic volcanics were mapped in outcrop roughly 35 feet southwest of this test pit constraining the fault contact to within this 35-foot wide zone at this location as shown on Figure 2.

The absence of evidence of shearing and fault gouge mapped along the contact indicate the possibility that the contact between the Jurassic Volcanics and the Knoxville Formation at this location is depositional as described by Wakabayahsi and Moores (1998). This would place the location of the Chabot fault at the contact between the Knoxville Formation and the Joaquin Miller Formation as mapped by Graymer (2000) and the USGS Quaternary Fault and Fold Database (USGS, 2015) along the east side of Keller Avenue.

As discussed previously the Chabot fault is not considered active and is not included on the State of California Earthquake Fault Zone map (CDMG, 1982) for known active faults. In addition, a geologic study related to the seismic stability of the EBMUD South Reservoir performed by ESA Consultants and Williiam Lettis and Associates (1996), concluded that the Chabot fault has not moved within the past 35,000 years. According to this study, the fault is overlain by un-faulted middle to late Pleistocene gravel deposits that are in excess of 35,000 years old. The Chabot fault is also not considered to be an active seismic source according to the USGS 2008 National Seismic Hazard Maps.

In our opinion, the fault mapped across the eastern portion of the site is not considered active and may actually represent a depositional contact. In our opinion no setback zone is required. The contact between the Jurassic Volcanics and the Knoxville Formation should be further examined during grading for the project to determine if supplemental corrective grading measures are needed to address potential engineering issues such as weak sheared material or a groundwater barrier.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

This preliminary report is issued with the understanding that it is the responsibility of the owner to transmit the information and recommendations of this preliminary report to developers, owners, buyers, architects, engineers, and designers for the project so that the necessary steps can be taken by the contractors and subcontractors to carry out such recommendations in the field. The conclusions and recommendations contained in this preliminary report are solely professional opinions.

The professional staff of ENGEO strives to perform its services in a proper and professional manner with reasonable care and competence but is not infallible. There are risks of earth movement and property damages inherent in land development. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our services.

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SELECTED REFERENCES

Bortugno, E. J.; et al, 1991, Map Showing Recency of Faulting, San Francisco-San Jose Quadrangle USGS Map Sheet 5A.

California Division of Mines and Geology, 1982, State of California Special Studies Zones Map, Diablo Quadrangle, California.

California Geological Survey, 2008, Guidelines for Evaluating and Mitigating Seismic Hazards in California; Special Publication 117.

Crane, R. C.; 1988, Geologic Map of the Diablo 7.5 minute Quadrangle, NCGS Field Trip Guide to the Geology of the San Ramon Valley & Environs.

Dibblee Jr., T. W., 1980, Preliminary Geologic Map of Diablo Quadrangle, Contra Costa and Alameda Counties, California, USGS Open-File Map 80-546.

Dibblee Jr., T. W., 2005, Geologic Map of Diablo Quadrangle, Contra Costa and Alameda Counties, California, Dibblee Geology Center Map #DF-162.

ENGEO, Fault Exploration, Golden Skate Property, San Ramon, California, June 20, 2014, Project No. 11226.000.000.

ENGEO, Supplemental Exploration, Golden Skate Property, San Ramon, California, February 19, 2015, Project No. 11226.000.000.

ENGEO, Final Letter Regarding Supplemental Exploration, Golden Skate Property, San Ramon, California, April 3, 2015, Project No. 11226.000.001.

ENGEO, Alquist-Priolo Seismic Hazards Investigation, Edwards Property, Parcel Number 208-250-38, San Ramon, California, February 15, 1980, Project No. N9 1504-B1.

Graymer, R. W. et al., 1994, Preliminary Geologic Map Emphasizing Bedrock Formations in Contra Costa County, California: Derived from the Digital Database Open-File 94-622, U.S. Geological Survey.

Jennings, C. W. and Bryant, W. A., 2010, Fault Activity Map of California, California Geological Survey, California Geologic Data Map Series, Map No. 6.

Majmundar, H. H., 1996, Landslide Hazard in the Las Trampas Ridge Quadrangle and parts of the Diablo Quadrangle, Alameda and Contra Costa Counties, California, DMG Open File Report 95-15.

Nilsen, T. H. 1975, Preliminary Photointerpretation Map of Landslide and Other Surficial Deposits of the Diablo 7½' Quadrangle, Contra Costa County, California, U. S. Geological Survey, Open File Map 75-277-14.

Pacific Aerial Surveys, November 3, 1978, Black and White Aerial Photographs AV1616-1-4 and 5.

Pacific Aerial Surveys, April 10, 1979, Color Infra Red Aerial Photograph, AV1693-1-1.

Google Earth, 1939, online Google Earth imagery.

FIGURES

LIST OF FIGURES

N

0 FEET 2000

0 METERS 1000

BASE MAP SOURCE: GOOGLE EARTH PRO

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VICINITY MAP

OAK KNOLL

OAKLAND, CALIFORNIA

PROJECT NO.: 5750.300.000		FIGURE NO. 1
SCALE: AS SHOWN		
DRAWN BY: PC	CHECKED BY: RPS	

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ORIGINAL FIGURE PRINTED IN COLOR

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- 3-T1 — FAULT TRENCH (ENGEO, 2015)
- 3-TP2 — TEST PIT (ENGEO, 2015)
- TP2-12 — TEST PIT (ENGEO, DECEMBER 2007)
- TP-38 — TEST PIT (ENGEO, 2006)
- 2-B2 — ROCK CORE (ENGEO, OCTOBER 2006)
- EB-4 — BORING (ENGEO, 2006)
- GEOLOGIC CONTACT
- CHABOT FAULT (LOCATION BASED ON ENGEO FIELD MAPPING AND SUBSURFACE EXPLORATION
- **Qaf** — EXISTING FILL
- **Qls** — LANDSLIDE
- **Qc** — COLLUVIUM
- **Qa** — ALLUVIUM
- **Jsv** — KERATOPHYRE AND QUARTZ KERATOPHYRE EXPOSED IN OUTCROP
- **KJk** — KNOXVILLE FORMATION EXPOSED IN OUTCROP
- SOIL CREEP

KELLER AVENUE

STREET "G"

STREET "I"

EMERGENCY ACCESS

TITLE REPORT PARCEL 4 42700 CIVIL NO. 22057-R

EXCEPTION (2) FROM TITLE REPORT PARCEL 4 PARCEL "1" RE 5703 IM 51

0 FEET 100

0 METERS 50

BASE MAP SOURCE: BKF, 2015

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SITE PLAN
OAK KNOLL
OAKLAND, CALIFORNIA

PROJECT NO.: 5750.300.000
SCALE: AS SHOWN
DRAWN BY: LL
CHECKED BY: RPS

FIGURE NO. 2

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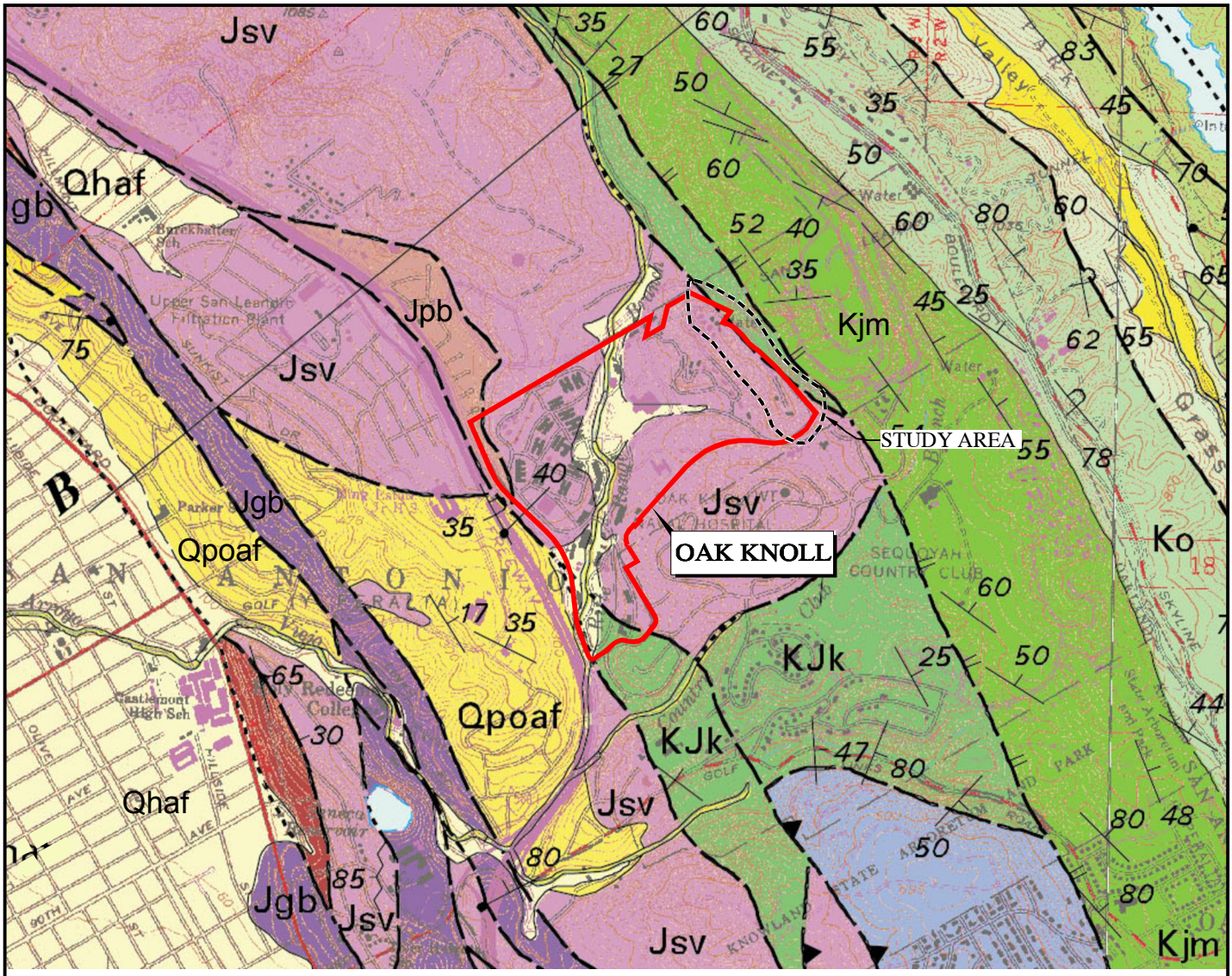

EXPLANATION

Qhaf	ALLUVIAL FAN AND FLUVIAL DEPOSITS
Qpoaf	OLDER ALLUVIAL FAN DEPOSITS
Kjm	JOAQUIN MILLER FORMATION
Ko	OAKLAND CONGLOMERATE
KJk	KNOXVILLE FORMATION
Jsv	KERATOPHYRE AND QUARTZ KERATOPHYRE
Jpb	PILLOW BASALT, BASALT BRECCIA AND MINOR DIABASE
Jgb	GABBRO

N

0 FEET 2000

0 METERS 1000

BASE MAP SOURCE: GRAYMER, 2000

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REGIONAL GEOLOGIC MAP

OAK KNOLL

OAKLAND, CALIFORNIA

PROJECT NO.: 5750.300.000			FIGURE NO. 3
SCALE: AS SHOWN			
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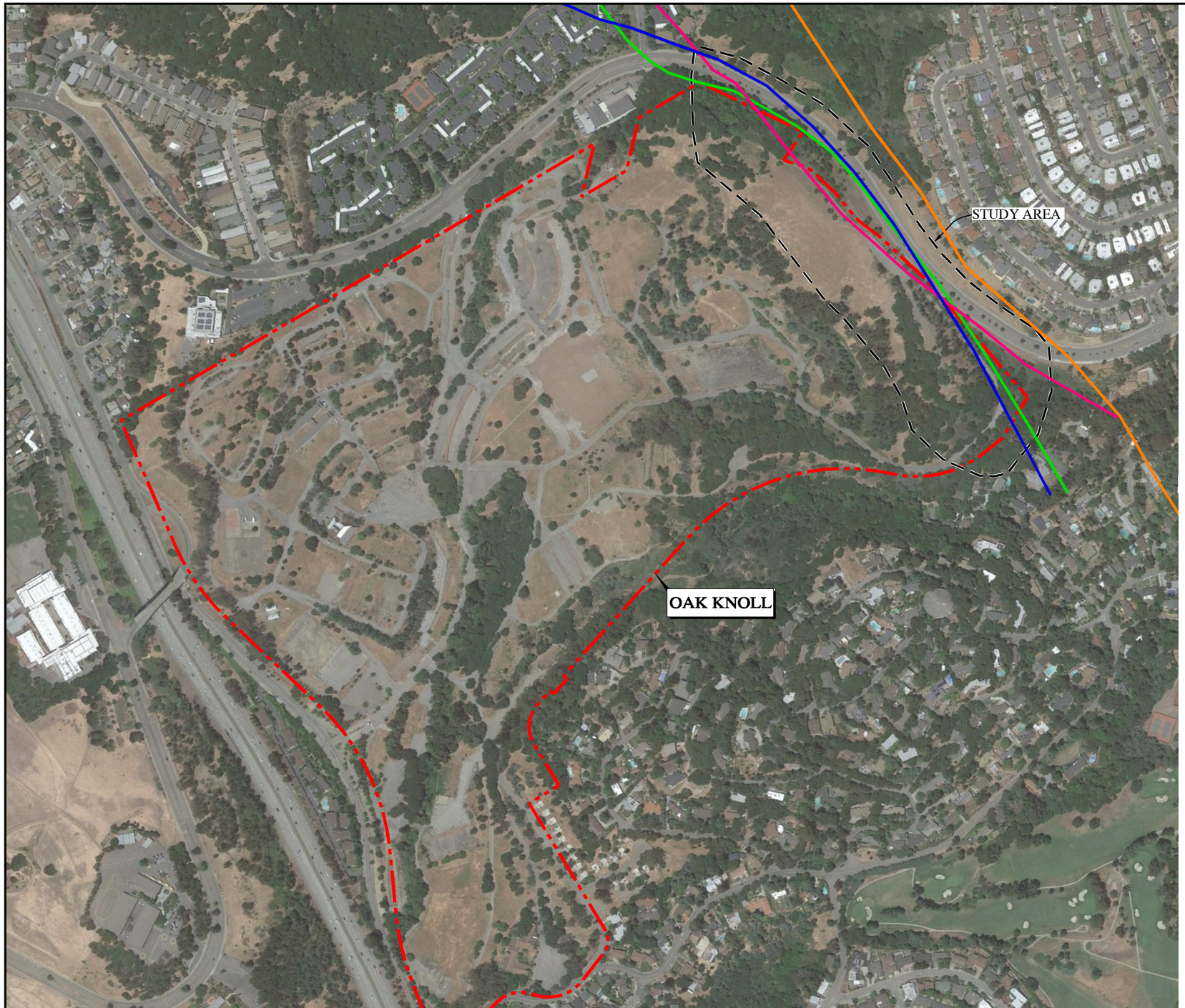

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- GRAYMER 1995 - CHABOT FAULT MAIN TRACE
- GRAYMER 1995 - CHABOT FAULT WESTERN SPLAY
- FAULT, CRANE 1988
- FAULT, RADBRUCH 1969

N

0 FEET 500

0 METERS 250

BASE MAP SOURCE: U.S.G.S.

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PUBLISHED FAULT MAP

OAK KNOLL

OAKLAND, CALIFORNIA

PROJECT NO.: 5750.300.000		FIGURE NO. 4
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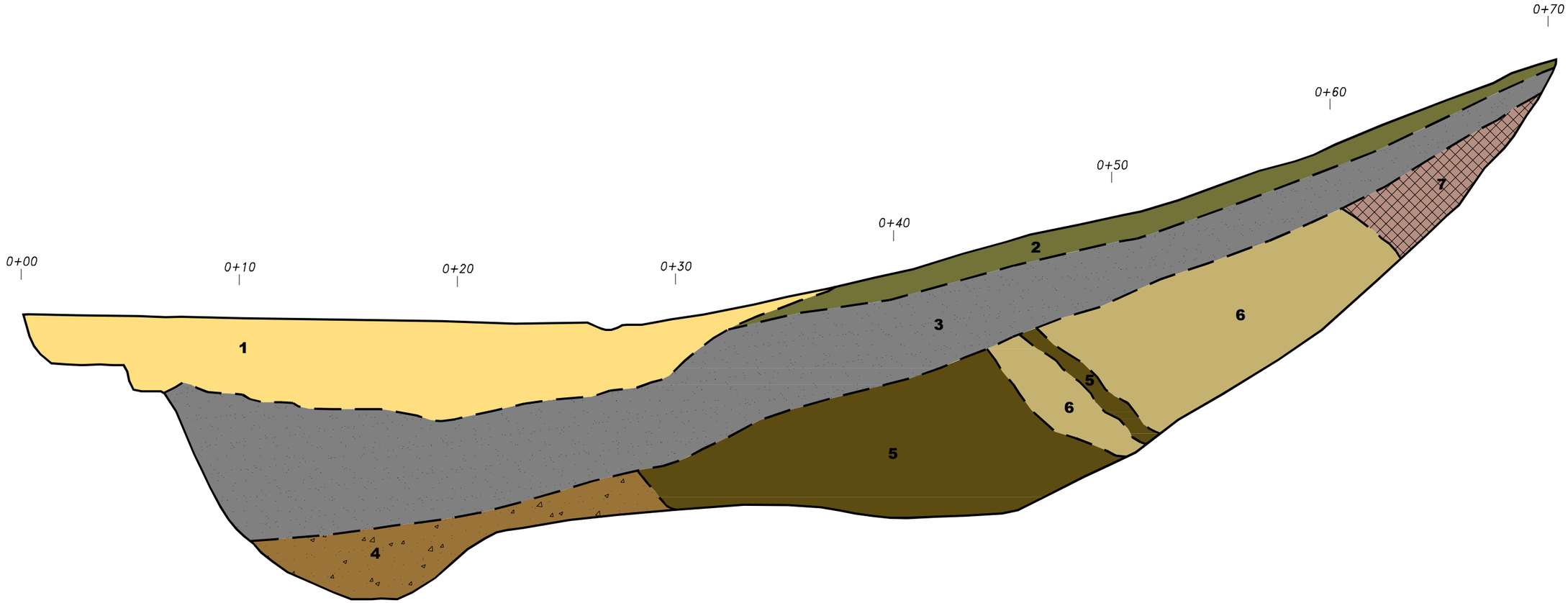

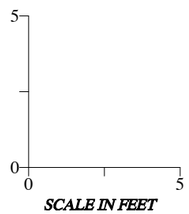

EXPLANATION

1	Lean CLAY with gravel and gravelly lean CLAY (CL-GC), mottled yellowish brown, dark gray brown, dry within upper 18", slightly moist, hard and dense, angular fragments of keratophyre and tuff (Artificial fill).
2	Lean CLAY vertisols (CL), gray brown to dark gray brown, dry, stiff, scattered subangular fine gravel sized volcanic clasts, roots and organics (Residual soil).
3	Lean CLAY (cl), mottled reddish brown, gray brown and brown, moist, hard, some sand and gravel, subangular gravel sized fragments of keratophyre, tuff and tuffaceous mudstone (colluvium).
4	Volcaniclastic BRECCIA, pale reddish brown, pale gray brown, very weak, extremely weathered to residual soil, massive.
5	Tuffaceous MUDSTONE, gray brown and pale reddish brown on iron oxide coated fractures, very weak, crushed, highly weathered, massive.
6	Tuffaceous MUDSTONE, pale gray brown on fresh conchoidal fracture surfaces, reddish brown and yellowish brown on iron oxide coated fractures, weak, crushed, highly weathered, massive.
7	Rhyolitic BRECCIA, pale reddish brown, yellowish brown, and pale yellow, extremely weak, crushed, extremely weathered, sand sized clasts within an ashy matrix.

GEOLOGIC CONTACT

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TRENCH LOG - 3-T1
OAK KNOLL
OAKLAND, CALIFORNIA

PROJECT NO.: 5750.300.000
SCALE: AS SHOWN
DRAWN BY: BR
CHECKED BY: RPS

FIGURE NO. 5

ORIGINAL FIGURE PRINTED IN COLOR

APPENDIX A

Test Pit Logs

APPENDIX A

TEST PIT LOGS

Oak Knoll Supplemental Fault Exploration 5750.300.000		Logged By: Curtis Hall Logged Date: June 4, 2015
Test Pit Number	Depth (feet)	Description
3-TP-1 37.769130° -122.139019°	0 - 0.5 0.5 - 2 (sample)	Lean Sandy CLAY (CL), gray brown to dark gray brown, stiff, dry, scattered angular fragments of underlying volcanic bedrock, roots and organics (Thin Residual Soil) RHYOLITIC TUFF (Jsv), mottled reddish brown, pale gray and yellowish brown on iron oxide coated surfaces, weak to medium strong, moderately to extremely weathered, closely fractured to crushed, clasts are medium strong and consist of greywacke, clay films around clasts, iron staining. Bottom at approximately 2 feet. No groundwater encountered.
3-TP-2 37.769213° -122.138937°	0 – 12 12 – 12.5 12 - 14	Sandy CLAY (CL) and Clayey GRAVEL (GC), mottled reddish brown, yellowish brown and light grayish brown, stiff and medium dense, dry within upper 1.5 feet moist below, angular clasts of rhyolite tuff up to 3 inches diameter (Artificial Fill) Lean Sandy CLAY (CL), dark gray brown and reddish brown, stiff, moist, scattered angular fragments of underlying volcanic bedrock (Thin Residual Soil) RHYOLITIC BRECCIA (Jsv), yellowish brown and pale reddish brown, extremely weak, extremely weathered, massive, sand sized particles in an ashy matrix. Bottom at approximately 14 feet. No groundwater encountered.