

**From:** [Russ Leavitt](#)  
**To:** [Anne Nounou](#)  
**Cc:** [Adrian Veliz](#); [Melody LaBella](#)  
**Subject:** CDDP23- 03012 - South Camino Pablo Annexation and Subdivision; Central San DA 188  
**Date:** Tuesday, April 25, 2023 4:26:04 PM  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[image003.png](#)  
[image005.png](#)  
[image004.jpg](#)  
[image007.png](#)

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I am responding to your request for information about Central Contra Costa Sanitary District's (CCCSD) jurisdiction and willingness to provide wastewater utility service to this potential thirteen-lot subdivision.

### Jurisdiction

This project site is just outside the Central Contra Costa Sanitary District (Central San) Sphere of Influence (SOI) and service boundaries. An SOI change and annexation of this parcel to Central San would be required before service could be provided. The SOI change and annexation would require the approval of the CCCSD Board of Directors and the Contra Costa Local Agency Formation Commission (LAFCO). These issues must be identified and discussed in the project's environmental document.

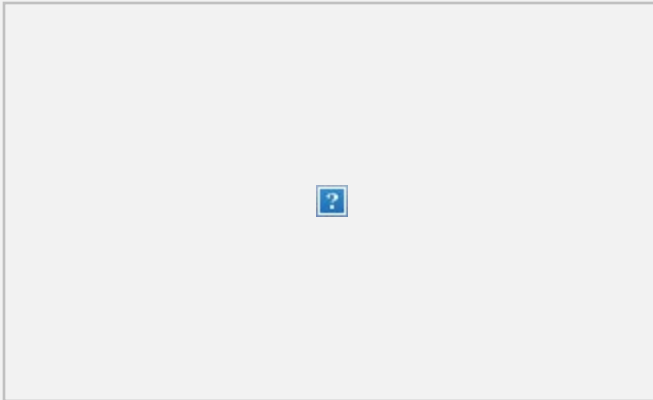
### Plans to Provide Service

LAFCO will take the following information into consideration when considering whether Central San should provide service to the project site.

1. Central San is the only wastewater utility service provider serving the Moraga area.
2. Wastewater from the subject property can flow by gravity into Central San's sewer system. An existing eight-inch diameter public main sewer is located in Camino Pablo. The project developer will need to extend an eight-inch diameter public main sewer up the project roadway to serve each new lot.
3. Central San has completed a limited analysis for the sewer system downstream of the proposed project. This analysis consisted of a review of Central San's records for capacity deficiencies and a determination that the proposed project will generate less wastewater than our "trigger" for further analysis. The existing main sewer is adequate for the additional wastewater that will be generated by this project.
4. Central San prefers to annex properties that are: a) developed, but converting from septic system to public sewer service; or b) undeveloped, but have been approved for development by a land use planning agency. An application for annexation and development has been submitted to Contra Costa County.

Based on these factors, and Central San's policies and practices, once the subject property receives development approval, there is no indication that LAFCO would object changing the SOI and allowing Central San to annex and serve the property.

If you have any questions regarding these comments, please contact me at 925-229-7255.



**From:** Anne Nounou <Anne.Nounou@dcd.cccounty.us>

**Sent:** Tuesday, April 25, 2023 12:40 PM

**To:** Russ Leavitt <RLeavitt@centralsan.org>

**Subject:** Anne Nounou shared "CDDP23- 03012 - Agency Comment" with you.



## Anne Nounou shared a file with you

File No CDS23-09646, CDRZ23-03270, CDDP23-03012  
Agency Comment Request



[CDDP23- 03012 - Agency Comment](#)



This link only works for the direct recipients of this message.

To: Adrian Veliz  
From: Cathy Remick  
Date: May 17, 2023  
Subject: County Files CDDP23-03012, CDSD23-09646, CDRZ23-03270, and CDGP21-00004 -  
Camino Pablo, Moraga (APN #258-290-029)

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Following is Housing Programs' response to the Agency Comments Request dated April 25, 2023, for approval of a vesting tentative map for a proposed subdivision on approximately 23.90 acres. The applicant plans to rezone the project site and create 13 single-family residential lots and a 16-acre open space parcel.

Inclusionary Housing Ordinance

In a residential development of five or more for-sale units, at least fifteen percent of the for-sale units shall be developed and sold as inclusionary units under the terms and conditions of Section 822.4.410(b). At least twenty percent of the inclusionary units shall be sold at an affordable sales price to lower-income households. The remaining inclusionary units shall be sold to moderate-income households at an affordable price. An in-lieu fee may be paid under Section 822-4.404 of the Inclusionary Housing Ordinance as an alternative to providing some or all the required inclusionary units.

An Inclusionary Housing Plan was not included in the application. The application will be considered incomplete until a housing plan has been submitted and preliminarily approved. A copy of the Inclusionary Housing Plan checklist is attached for your reference and use.

**From:** [Lou Ann Texeira](#)  
**To:** [Anne Nounou](#); [Adrian Veliz](#); [Bret Wickham](#); [Christine Louie](#); [Daniel Barrios](#); [David Brockbank](#); [Eric Fung](#); [Gabriel Lemus](#); [Jeffrey Valeros](#); [John Cunningham](#); [Joson, Loriezel](#); [Larry Gossett](#); [McGregor, Jennifer](#); [Nestor Baligod](#); [Planning.review](#); [Robert Sarmiento](#); [Simone Saleh](#); [Takeya Foster](#); [Will Nelson](#); [fire@cccfd.org](#); [Jocelyn LaRocque](#); [Solid.Waste@cchealth.org](#); [mark.delao@pw.cccounty.us](#); [monish.sen@pw.cccounty.us](#); [jshannon@contracostamosquito.com](#); [chien.wang@ebmud.com](#); [david.rehnstrom@ebmud.com](#)  
**Subject:** RE: Anne Nounou shared "CDDP23- 03012 - Agency Comment" with you.  
**Date:** Tuesday, April 25, 2023 1:46:08 PM  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[image003.png](#)  
[image005.png](#)  
[image006.png](#)

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Greetings,

Thank you for sending the attached to LAFCO.

Please note that the project site is outside the spheres of influence (SOI) and service boundaries of both Central Contra Costa Sanitary District and East Bay Municipal Utility District. Should the project require these municipal services, then SOI and annexation applications will be needed.

Please let us know if you have any questions.

Lou Ann Texeira, Executive Officer  
Contra Costa LAFCO  
40 Muir Road, 1<sup>st</sup> Floor  
Martinez, CA 94553  
925-313-7133  
[LouAnn.Teixeira@lafco.cccounty.us](mailto:LouAnn.Teixeira@lafco.cccounty.us)

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**From:** Anne Nounou <Anne.Nounou@dcd.cccounty.us>  
**Sent:** Tuesday, April 25, 2023 11:48 AM  
**To:** Adrian Veliz <Adrian.Veliz@dcd.cccounty.us>; Bret Wickham <Bret.Wickham@dcd.cccounty.us>; Christine Louie <Christine.Louie@dcd.cccounty.us>; Daniel Barrios <Daniel.Barrios@dcd.cccounty.us>; David Brockbank <David.Brockbank@dcd.cccounty.us>; Eric Fung <eric.fung@cchealth.org>; Gabriel Lemus <Gabriel.Lemus@dcd.cccounty.us>; Jeffrey Valeros <jeff.valeros@pw.cccounty.us>; John Cunningham <John.Cunningham@dcd.cccounty.us>; Joson, Loriezel <ljoson@ebmud.com>; Larry Gossett <larry.gossett@pw.cccounty.us>; Lou Ann Texeira <LouAnn.Teixeira@lafco.cccounty.us>; McGregor, Jennifer <jennifer.mcgregor@ebmud.com>; Nestor Baligod <Nestor.Baligod@dcd.cccounty.us>; Planning.review <planning.review@ebmud.com>; Robert Sarmiento <Robert.Sarmiento@dcd.cccounty.us>; Simone Saleh <Simone.Saleh@pw.cccounty.us>; Takeya Foster <TAKEYA.FOSTER@CCHEALTH.ORG>; Will Nelson <Will.Nelson@dcd.cccounty.us>; fire@cccfd.org; Jocelyn LaRocque <jlaro@pw.cccounty.us>; Solid.Waste@cchealth.org; mark.delao@pw.cccounty.us; monish.sen@pw.cccounty.us; jshannon@contracostamosquito.com; chien.wang@ebmud.com; david.rehnstrom@ebmud.com  
**Subject:** Anne Nounou shared "CDDP23- 03012 - Agency Comment" with you.





## AGENCY COMMENT REQUEST

Date \_\_\_\_\_

We request your comments regarding the attached application currently under review.

**DISTRIBUTION**

**INTERNAL**

☐ Building Inspection      ☐ Grading Inspection  
☐ Advance Planning      ☐ Housing Programs  
☐ Trans. Planning      ☐ Telecom Planner  
☐ ALUC Staff      ☐ HCP/NCCP Staff  
☐ APC PW Staff      ☐ County Geologist

**HEALTH SERVICES DEPARTMENT**

☐ Environmental Health    ☐ Hazardous Materials

**PUBLIC WORKS DEPARTMENT**

☐ Engineering Services (1 Full-size + 3 email Contacts)  
☐ Traffic  
☐ Flood Control (Full-size)    ☐ Special Districts

**LOCAL**

☐ Fire District \_\_\_\_\_  
     ☐ San Ramon Valley – (email) [rwendel@srvfire.ca.gov](mailto:rwendel@srvfire.ca.gov)  
     ☐ Consolidated – (email) [fire@cccfdp.org](mailto:fire@cccfdp.org)  
     ☐ East CCC – (email) [brodriguez@cccfdp.org](mailto:brodriguez@cccfdp.org)  
☐ Sanitary District \_\_\_\_\_  
☐ Water District \_\_\_\_\_  
☐ City of \_\_\_\_\_  
☐ School District(s) \_\_\_\_\_  
☐ LAFCO  
☐ Reclamation District # \_\_\_\_\_  
☐ East Bay Regional Park District  
☐ Diablo/Discovery Bay/Crockett CSD  
☐ MAC/TAC \_\_\_\_\_  
☐ Improvement/Community Association  
☐ **CC Mosquito & Vector Control Dist (email)**

**OTHERS/NON-LOCAL**

☐ CHRIS (email only: [nwic@sonoma.edu](mailto:nwic@sonoma.edu))  
☐ CA Fish and Wildlife, Region 3 – Bay Delta  
☐ Native American Tribes

**ADDITIONAL RECIPIENTS**

\_\_\_\_\_

\_\_\_\_\_

*Please submit your comments to:*

Project Planner \_\_\_\_\_

Phone # \_\_\_\_\_

E-mail \_\_\_\_\_

County File # \_\_\_\_\_

Prior to \_\_\_\_\_

\* \* \* \* \*

We have found the following special programs apply to this application:

☐ Active Fault Zone (Alquist-Priolo)  
☐ Flood Hazard Area, Panel # \_\_\_\_\_  
☐ 60-dBA Noise Control  
☐ CA EPA Hazardous Waste Site  
     High or Very High FHSZ

\* \* \* \* \*

**AGENCIES:** Please indicate the applicable code section for any recommendation required by law or ordinance. Please send copies of your response to the Applicant and Owner.

Comments: ☐ None    ☐ Below    ☐ Attached

Print Name \_\_\_\_\_

Signature \_\_\_\_\_ DATE \_\_\_\_\_

Agency phone # \_\_\_\_\_



## ANNEXATION TO EBMUD CURRENT SERVICE AREA REQUIREMENTS

Changes to East Bay Municipal Utility District's (EBMUD's) water supply commitments, such as supplying water to lands outside EBMUD's existing customer service area, requires EBMUD to seek and obtain approval from the U.S. Bureau of Reclamation (USBR), with whom EBMUD has a contract for Central Valley Project (CVP) water supply in dry years. USBR maintains a detailed map of EBMUD's Contractor's Service Area that it will modify any time it approves making any changes to EBMUD's contract regarding the areas that EBMUD serves. To support its approval of any expansion of EBMUD's Contractor's Service Area, USBR requires environmental documentation that extends beyond what is typically needed to meet the CEQA requirements. This documentation is required to satisfy federal environmental laws including the National Environmental Protection Act (NEPA), the Endangered Species Act (ESA), and Section 106 of the National Historic Preservation Act (NHPA). EBMUD will require any developer requesting annexation to provide such documentation, which EBMUD will use to support its request for USBR's consent to the provision of water service to the annexed area. In evaluating the adequacy of this environmental documentation, USBR typically consults with other federal agencies, including the U.S. Fish and Wildlife Service. In situations where the U.S. Army Corps of Engineers (Corps) is responsible for fulfilling its obligations for issuing permits and documenting environmental impacts under the Clean Water Act, ESA, NEPA and other federal environmental laws, USBR has indicated to EBMUD recently that it would prefer that the Corps complete all of its requirements under these laws, after which USBR would augment the documentation only as necessary to fulfill its own requirements to support the expansion of EBMUD's Contractor's Service Area. The exact process and requirements can vary, and the applicant is encouraged to consult with EBMUD early.

*If the proposed annexation lies outside a broad area known as the Central Valley Project's Consolidated Place of Use as authorized by the State Water Resources Control Board, substantial delays may be experienced as USBR determines what action to take, including seeking approval from the State Water Resources Control Board, to allow water supply to the area proposed for annexation.*

Since CEQA requirements are generally similar to, but in certain important ways different from NEPA requirements, it is advisable when undertaking work to satisfy CEQA, to also be cognizant of the parallel NEPA requirements that go beyond CEQA requirements. Early discussions with EBMUD in this regard are highly recommended.

Because the NHPA Section 106 requirements are generally less well understood than other environmental requirements under USBR's purview, new guidelines have recently been issued for conducting studies and preparing documentation to address these requirements. In particular, USBR requires a stand-alone report addressing Section 106 requirements. EBMUD will review the developers' Section 106 report and submit it for USBR's approval. Once satisfied with Section 106 report, USBR may forward it to the State Historic Preservation Officer for approval.

It is important to note that EBMUD's CVP water supply contract requires payment of USBR's costs incurred to review the relevant documentation supporting any annexation request and to fulfill its own documentation responsibilities under the applicable federal laws. EBMUD requires the developer of any proposed annexation to reimburse EBMUD for these costs. Once a developer approaches EBMUD for annexation approval, EBMUD will require the developer to enter into an agreement (or separate agreements, if necessary) to advance sufficient funds for any related studies or work, including CEQA documentation if necessary, as well as the USBR costs that will be charged to EBMUD.

Charges and agreements related to installation of water delivery facilities and connections are subject to the EBMUD's Regulations Governing Water Service to Customers of EBMUD.



August 14, 2023

Adrian Veliz, Senior Planner  
Contra Costa County  
Department of Conservation & Development  
Community Development Division  
30 Muir Road  
Martinez, California 94553

**Subject: Geologic Peer Review / 30-Day Comments**  
CDS23-09396, CDDP23-03021 & Related Applications  
APN 258-290-029 / 13 lots + Parcel A (total 23.9 ac.)  
dk Engineering (appli.) / Dobbins Prop., LLC (owner)  
Moraga Area, Contra Costa County  
DMA Project 3021.23

Dear Adrian,

Based on your authorization we have reviewed project plans for a proposed residential subdivision that is proposed within a hillside area showing evidence of existing landslides. The project civil engineers for the applicant is dk Engineering.<sup>1</sup> The application was accompanied by engineering geologic and geotechnical reports prepared by Engeo, Inc.<sup>2 3 4</sup> The 2014 report presented an overview of the geologic setting on the project site that was based on review of published geologic maps and report, geologic analysis of historic aerial photographs flown during the period 1952 through 1983, and subsurface exploration (logging of 8 test pits and one fault trench). A primary product of that investigation was an original geologic map of the project site, which shows the distribution of landslides as well as providing data on Engeo's interpretation of bedrock geology. In 2015 Engeo issued a report documenting supplemental geotechnical exploration of the site. It should be noted that the 2015 report was not intended for the issuance of grading or building permits. Its intent was to a) review the Vesting Tentative Map (dated July 2015); b) drilling of five (5) exploratory borings that reached depths of up to 35½ ft., c) laboratory testing of selected samples to enable characterizing the engineering properties of soil, slide debris and bedrock; d) perform slope stability analysis using the engineering properties of the on-site earth materials; e) development of Preliminary Remedial Grading Plan; and f) preparation of report which documents the investigation and presents the consultant's findings and preliminary geotechnical recommendations.

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<sup>1</sup> dk Engineering, 2023, *General Plan Amendment, Rezoning, Final Development Plan & Testing Tentative Map for Subdivision #9396, Contra Costa County, California*, (14 Sheets), dk Job # 13-1060-12 (date stamped received by DCD on April 12, 2023).

<sup>2</sup> Engeo, Inc., 2014, *Preliminary Geologic Exploration, 2111 Camino Pablo Property, Moraga, California*, Engeo Job #10741.000.000 (report dated January 21, 2014).

<sup>3</sup> Engeo, Inc., 2015, *Supplemental Geotechnical Exploration, South Camino Pablo Annexation Project, Subdivision 9396, Moraga California*, Engeo Job #10741.000.000 (report dated October 26, 2015).

<sup>4</sup> Engeo, Inc., 2023, *General Plan Amendment Plan Review, Camino Pablo – Subdivision 9646, Contra Costa County, CA*, Engeo Job #10741.000.001 (plans dated June 29, 2023).

After a gap of 8 years, Engeo issued a third report in June of 2023. The purpose of that report was to review project plans and provide a professional opinion on conformance of revised plans with the geotechnical recommendations presented in their 2015 report. Briefly summarized, Engeo notes that the depth of cut and the thickness of engineered fill in the project ranges up to 30 ft. Design gradients for engineered slopes range from 2:1 (h:v) to 3:1 (h:v), and graded slopes are up to 60 ft. in height are shown. Engeo concludes the project is in substantial compliance with recommendations presented in their 2015 report. Engeo recommends use of slopes with gradient of unreinforced 2:1 slopes be limited to a vertical height no greater than 8 ft. Higher 2:1 slopes shall require special mitigation measures (e.g. geogrid reinforcement). Engeo states that a design level geotechnical report will be needed prior to issuance of construction permits. In summary, the intent of the 2014 and 2015 reports were to provide the local jurisdiction with sufficient information on potential geologic and geotechnical hazards to allow processing of the Vesting Tentative Map and related applications through the public hearing stage of the planning process, as well as providing guidance to their client's design team on potential and approaches to mitigation of those hazards that were confirmed to be present on the project site.

### ***Purpose***

The purpose of our review is to provide a professional opinion on the adequacy of geologic and soils reports and maps issued by public agencies and professional organizations, in combination with the reports issued by Engeo, Inc. The application was also accompanied by plans prepared by the project civil engineers (e.g., topographic map, grading plans, drainage plans, utility plans, typical sections and plan details for road and drainage improvements, and a preliminary stormwater control plan. Prior to deeming the application complete, the County requires sufficient data on site conditions to allow: (a) delineation the potential geologic hazards based on adequate subsurface data, and (b) the data must be sufficient to serve as the primary basis for preparation of the "Geology and Soils" chapter of the CEQA document. Appendix G of the CEQA Guidelines issued by the *State of California identifies the potential geologic and seismic hazards that must be evaluated by the CEQA document* (see Table 1 for a list of the potential hazards that must addressed by the CEQA document).

### ***Understanding of the Project***

The application effects a 7.9 ac. portion of a 23.9 ac. *Mother Parcel*. Figure 1 shows boundaries of the Mother Parcel with a red line. The base map for Figure 1 shows parks and open space, creeks, and the Alquist-Priolo Earthquake Fault Zones delineated by the California Geological Survey (CGS). Additionally, the map shows bedrock faults with no proven Holocene displacement (i.e., inactive faults) as mapped by the U.S. Geological Survey (USGS).<sup>5</sup> The entire 23.9 ac. Mother Parcel is currently designated *Agricultural Land* (AL) by the adopted County General Plan and it is zoned General Agriculture (A-2). The application requests that the southernmost portion of this parcel be approved for residential use. Specifically, the applicant requests approval of a General Plan Amendment (from AL to SM), rezoning (from A-2 to P-1), and approval of a Vesting Tentative Subdivision Map (VTSD) and a Final Development Plan (FDP). As Figure 2 indicates, there are 13 proposed residential lots. All residential lots are to take immediate access from a proposed private road that would intersect Camino Pablo directly opposite the existing Camino Pablo/ Tharp Drive intersection. The project civil engineers prepared a preliminary Grading and Drainage Plan (see Figure 3). The grading shown indicates a grading easement will be required from the owner of the parcel located east of the project site, and it identifies the gradient and height of the proposed engineered slopes. Also shown are bio-retention basins that are intended to comply with the C.3 requirements of the Regional Water Quality Control Board (the location of proposed bio-retention basins

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<sup>5</sup> Graymer, R., D.L. Jones & E.E. Brabb, 1994. *Preliminary Geologic Map Emphasizing Bedrock Formations in Contra Costa County, California*. U.S. Geological Survey Open File Report 94-622.

are shaded blue). Architectural drawings submitted with the application include site plans, floor plans and elevations, including preliminary information on materials and colors. All of the proposed residences are to be 2-story structures.

**Table 1**  
**Appendix G of State CEQA Guidelines**

<b>7. GEOLOGY AND SOILS – Would the project:</b>				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## ***Geologic & Seismic Setting***

### **1. Active Faults**

The site is located chiefly in the unincorporated in the Moraga area of Contra Costa County (Figure 2 show the boundary separating the lands in the Town of Moraga from the project site). Figure 1, Vicinity Map, shows the location of the site with respect to freeways and the Alameda/ Contra Costa County line. Additionally, the Vicinity Map shows the location of faults that are considered active by the California Geological Survey (CGS). Specifically, the northwest-trending Hayward fault passes approximately 3¼ mi. southwest of the site; the Calaveras and Concord faults pass approximately 7 mi. east-southeast and 8¼ mi. northeast of the site, respectively. (The Alquist-Priolo *Earthquake Fault Zone* is represented by northwest trending bands that that encompasses recently active and potentially active traces of these faults which are shaded orange.) There are no other known active faults in the vicinity of the project site. Note that Figure 1 also shows inactive faults that are derived from geologic mapping of the USGS.) One of the faults mapped by the USGS is shown passing tangent to the Camino Pablo frontage of the project site.

## 2. Bedrock Geology

In 2000 the U.S. Geological Survey (USGS) issued a digitized geologic map of Contra Costa County that emphasized bedrock formations.<sup>6</sup> Figure 4 indicates that the property is located within the outcrop belt of the Mulholland Formation, lower member (Tmll). By extrapolation from nearby measurement, bedding on the project site can be inferred to strike northwesterly and dip to the northeast 70°. The fault mapped by the USGS that is shown passing tangent to the Camino Pablo frontage of the site is indicated to be a northwest-trending thrust fault (fault plane dipping steeply to the southwest).

In 1995 the USGS issued a report that provides descriptions of bedrock units that occur in hillside areas.<sup>7</sup> This report describes the bedrock unit that occurs in the site as Unit 129. Its composition is described as follows:

*The lower member of the Mulholland Formation (Tmll) consists of interbedded sandstone and mudstone, minor persistent beds of limestone, tuff and bentonite. The sandstone and mudstone generally occur in about equal proportions. Most sandstone is weathered or partially weathered to depths of 30 ft.; locally sandstone can be found that is weathered to depths of 50 ft.; mudstone is weathered to depths of 5 to 10 ft. Typically the weathered sandstone and mudstone is firm, but some weathered rock is soft. Some to most bedrock is expansive and clayey rock is severely expansive; the alluvial, colluvial and soils that overlie bedrock tends to be clayey and are significantly expansive and locally severely expansive.*

*Conversely, the upper member of the Mulholland Formation (Tmlu) is significantly coarser grained, consisting chiefly of interbedded sandstone, conglomerate with interbeds of variably silty mudstone. The sandstone varies from fine- to coarse-grained, well- to moderately- sorted, with a clay and silt matrix material filling pores. Conglomerate consists of hard pebbles and cobbles in a poorly sorted matrix material.*

## 3. Landslides

In 1975 the USGS issued photo-interpretation maps of landslide and other surficial deposits of Contra Costa County and adjacent Counties.<sup>8</sup> Figure 5 presents the USGS landslide map of the site vicinity at a scale of 1 in. = 800 ft., using topographic contours as a base map. The *Mother Parcel* is outlined in green. The proposed residential development area (labeled *Project Site*) is identified with a pink crosshatch pattern. The landslides shown are mapped solely on the basis of photointerpretation, without the benefit of a site visit or any subsurface data. The landslides are not classified on the basis of the activity status (i.e., active or dormant), depth of slide plane (shallow or deep seated), or type of landslide deposit. Nevertheless, the map fulfills its function, which is to *red flag* sites that may be at risk of landslide damage, where detailed geologic and geotechnical investigations are required to evaluate risks and develop measures to reduce risks to a practical minimum. Note that the landslide mapping shown in Figure 5 was based on interpretation of stereo pairs of aerial photographs flown in the 1960s and early 1970s. Consequently, the USGS map does

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<sup>6</sup> Graymer, R.W., 2000, *Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa & San Francisco Counties*, U.S. Geological Survey Miscellaneous Field Studies Map MF 2342.

<sup>7</sup> Ellen, S.D., and C.M. Wentworth, 1995. *Hillside Materials and Slopes of the San Francisco Bay Region, California*. U.S. Geological Survey Professional Paper 1357.

<sup>8</sup> Nilsen, T.H., 1975. *Preliminary Photointerpretation Map of Landslide and Other Surficial Deposits of the Oakland East 7.5-Minute Quadrangle, Contra Costa & Alameda Counties*, U.S. Geological Survey, Open File Maps 75-277-41.



not show landslides that may have occurred in the last 48 years; and the map is not a substitute for a detailed, site-specific geotechnical investigation. It should only be used to identify at-risk sites.

In summary, Figure 5 presents the portion of the USGS map showing the project site and vicinity. Two landslides are shown within the area proposed for residential uses. The project site is located on the west-facing slope of a prominent north-northwest trending ridge that is pock marked with ten landslides. Each of these slides are within the outcrop belt of Tmll. The concentration of slides on this slope is evidence of pervasive slope instability. On that basis even the intervening area between mapped landslides must be considered marginally stable and sensitive to grading and the activities of man.

#### 4. Liquefaction Potential

The Safety Element of the General Plan presents a hazard map that divides lands within Contra Costa County into three categories: “generally high,” “generally moderate to low,” and “generally low” liquefaction potential (see General Plan, pg. 10-15). This map was prepared by a geotechnical engineering firm retained by the County in the late 1980s. The approach of the consultant was to utilize available data on a) soil types, b) elevation of the water table, and c) seismicity of their study area and d) limited review of available subsurface data (e.g., borehole logs for land development projects within the County).

The Liquefaction Potential Map has been used as a “screening criteria” by Contra Costa County since 1990. During the processing of land development applications, the County utilized this map to establish standards for evaluation of liquefaction potential (i.e., the County has consistently required rigorous evaluation of liquefaction potential in project sites classified *Generally High* Liquefaction Potential, and less comprehensive screening investigations are demanded for project sites classified *Generally Moderate to Low* Liquefaction Potential. The classification *Generally Low* liquefaction potential does not require evaluation of liquefaction potential for ordinary risk structures. According to the Safety Element map, which is presented in Figure 5, the project site and upland area adjacent area is classified *Generally Low* (L) Liquefaction Potential. This is because the bedrock and clayey soil and colluvial deposits are anticipated to be near the ground surface. These materials are considered to be too cohesive to pose a risk of liquefaction, and the underlying bedrock is too consolidated to pose a hazard of liquefaction. Conversely, the floor of the narrow upland valley bottom area (including the portion of the project site that is immediately adjacent to the Camino Pablo frontage) is rated *Moderate to Low* (M) liquefaction potential. In such areas there is potential for relatively clay-free sands and silts that, if saturated, may pose a risk of liquefaction.

#### 5. Seismic Hazard Zone Map

The provisions of the Seismic Hazard Mapping Act can be found in the California Public Resources Code, Chapter 7.8, Sections 2690-2699.6. This law is similar in many respects to the Alquist-Priolo Earthquake Fault Zone Mapping Act, which has been implemented by Contra Costa County for the past 40+ years. However, Seismic Hazard Zone (SHZ) maps issued by the CGS identify areas that are at risk of earthquake triggered landslides and earthquake triggered liquefaction. Since 1990, the Safety Element of the Contra Costa County General Plan has included hazard maps for liquefaction and landslide potential (see pages 10-15 & 10-24, respectively), along with adopted General Plan goal statements and policies. We consider those policies statements to be comprehensive. They are intended to mitigate hazards posed by liquefaction and landslides, and we do not expect those policies to be invalidated by the SHZ maps. As the official SHZ maps are adopted by the State Mining & Geology Board, the County is required to implement the provisions of this state law (i.e., upon issuance of SHZ maps by the CGS, the SHZ maps supersede the liquefaction and landslide hazard maps in the Safety Element). To date the CGS has only issued SHZ maps for the northeastern portion of Contra Costa County (including lands in the Cities of Brentwood, Antioch and Pittsburg, as well as the adjacent unincorporated areas.) The CGS has not yet issued a SHZ map of the



Contra Costa County portion of the Oakland East 7.5-Minute Quadrangle. It is for that reason our review has focused on Safety Element hazard maps.

## 6. Soil Survey

The soil series that occurs on the project site is the Los Osos clay loam (LhE, 15-30% slopes; LhF, 30 to 50% slopes).<sup>9</sup> The typical soil profile is 24 to 38 inches deep. The A-horizon extends from the ground surface to a depth of 10 inches and is a gray to dark grayish-brown, and is characterized by a weak moderately defined sub-granular, blocky structure; the underlying Bt-horizon is a gray to dark grayish brown or yellowish-brown color and is characterized by transported clays coating grains and in the voids, resulting in a heavy clay loam texture. The Bt horizon is underlain by weathered bedrock at depths of 32 to 38 in. below the ground surface. With regard to engineering properties, the Los Osos clay loam is regarded by the soil survey map as having a high expansion and high corrosion potential. The risks of damage associated with these adverse conditions can be mitigated through uses of appropriate foundation systems and other measures are available to control the corrosion hazard to ferrous metals and concrete (i.e., specification or materials used by underground contractors and specifications for the concrete mix, in combination with efficient drainage design).

## 7. Safety Element Policies

County General Plans historically have classified major slope areas in excess of 26% as “not readily developable” and “undevelopable”, recognizing the cost and engineering difficulties of grading in areas of steep slopes (Policy 10-29); and density is expected to decrease as slopes increase above 15% (Policy 10-28). Landslides and ground slippages may be triggered by strong ground motion accompanying a major earthquake. Areas that are subject to slides and slippages from other natural causes may be very hazardous under earthquake conditions. Earthquake effects will be more extensive if a major earthquake occurs during the rainy season when ground conditions are favorable to mobilization of dormant landslide deposits and/or triggering of earthflows, debris flows, etc. Whether a landslide will or will not occur at any specific, presently stable slope usually cannot be predicted under “natural conditions” because of the range of natural conditions span a broad range. However, land which has experienced landslide displacement in the past is believed to be generally more slide-prone, and also is more sensitive to man-induced changes, such as grading, watering, removing or changing the type of vegetation, and changing drainage patterns, among many possible factors. The Safety Element of the County General Plan contains policies that are directed to protect development from landslide hazards and minimize grading of steep slopes. Those which appear most applicable to the project site are presented in Table 2.

With regard to liquefaction potential, the classifications *Generally Moderate to Low* liquefaction potential does not imply the presence of liquefiable sands on a parcel. The map attempts to be conservative of the side of safety. Where geologically recent fluvial deposits or sand bars could exist in the subsurface, the map considers such areas to be potentially at-risk. It should also be recognized that a 1997 USGS Quaternary Geologic Map classifies the surficial deposits on the floor of the narrow upland valley bottom as site as alluvial fan and fluvial deposits of Holocene age.<sup>10</sup> In the experience of the County Peer Review Geologist only 1 acre out of every 1,000 acres in this category have the properties required to pose a risk of liquefaction. Nevertheless, sites rated *Moderate to Low* liquefaction potential warrant a *screening investigation* to provide site-specific data on this potential hazard. The Safety Element includes policies indicating that at-risk areas require evaluation of liquefaction potential and effective mitigation of the

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<sup>9</sup> Welch, L.E. et. al., 1977, Soil Survey of Contra Costa County, California, USDA Soil Conservation Service

<sup>10</sup> Helley E.J. and R.W. Graymer, 1997, *Quaternary Geology of Contra Costa County and Surrounding Parts of Alameda, Marin, Sonoma, Solano, Sacramento and San Joaquin Counties, California*. A Digital Database. U.S. Geological Survey, Open File Report 97-98.

hazard where liquefiable soils are confirmed to be present in the subsurface. Policy 10-21 also requires monitoring during construction to ensure that recommendations in the geotechnical report are properly interpreted by the contractor and implemented during construction. Operative General Plan policies are presented in Table 3.

**Table 2**  
**General Plan Ground Failure and Landslide Hazard Policies**

- Policy 10-22.** Slope stability shall be a primary consideration in the ability of land to be developed or designated for urban uses.
- Policy 10-23.** Slope stability shall be given careful scrutiny in the design of developments and structures, and in the adoption of conditions of approval and required mitigation measures.
- Policy 10-24.** Proposed extensions of urban or suburban land uses into areas characterized by slopes over 15 percent and/or generally unstable land shall be evaluated with regard to the safety hazard prior to the issuance of any discretionary approvals.
- Policy 10-25.** Development on open hillsides and significant ridgelines throughout the County shall be restricted, and hillsides with a grade of 26 percent or greater shall be protected through implementing zoning measures and other appropriate actions
- Policy 10-26.** Approvals of public and private development projects in areas subject to slope failures shall be contingent on geologic and engineering studies which define and delineate potentially hazardous conditions and recommend adequate mitigation.
- Policy 10-27.** Soil and geological reports shall be subject to the review and approval of the County Planning Geologist.
- Policy 10-28.** Generally, residential density shall decrease as slope increases, especially above a 15 percent slope.
- Policy 10-29.** Significant hillsides shall be considered unsuitable for types of development which require extensive grading or other land disturbance.
- Policy 10-30.** Development shall be precluded in areas when landslides cannot be adequately repaired.
- Policy 10-31.** Subdivisions approved on hillsides which include individual lots to be resold at a later time shall be large enough to provide flexibility in finding a stable buildable site and driveway location.
- Policy 10-32.** The County shall not accept dedication of public roads in unstable hillside areas, or allow construction of private roads there which would require an excessive degree of maintenance and repair costs.

**Table 3**  
**General Plan Liquefaction Policies**

- Policy 10-18.** This General Plan shall discourage urban or suburban development in areas susceptible to high liquefaction dangers and where appropriate subject to the policies of 10-20 below, unless satisfactory mitigation measures can be provided, while recognizing that there are low intensity uses such as water-related recreation and agricultural uses that are appropriate in such areas.
- Policy 10-19.** To the extent practicable, the construction of critical facilities, structures involving high occupancies, and public facilities shall not be sited in areas identified as having a high liquefaction potential, or in areas underlain by deposits classified as having a high liquefaction potential.
- Policy 10-20.** Any structures permitted in areas of high liquefaction damage shall be sited, designed and constructed to minimize dangers from damage due to earthquake-induced liquefaction.
- Policy 10-21.** Approvals to allow the construction of public and private development projects in areas of high liquefaction potential shall be contingent on geologic and engineering studies which define and delineate potentially hazardous geologic and/or soils conditions, recommend means of mitigating these adverse conditions, and on proper implementation of the mitigation measures.

## 6. Discussion and Conclusions

Engeo considers the project feasible from a geologic/ geotechnical standpoint provided their geotechnical recommendations in combinations with mitigation of geologic hazards and sound engineering practices are incorporated into the design and construction of the project. The primary geotechnical design considerations are (a) presence of landslides and unstable colluvial deposits on slopes, (b) on-site expansive soils and bedrock, and (c) earthquake-induced strong ground shaking. The discussion presented in Table 5 is intended to highlight and summarize (not supersede) the evaluation of the project geotechnical engineers. Not addressed by Table 5 is the potential for direct or indirect potential for destruction of a unique paleontological resource or unique geologic feature. We are not aware of any unique geologic feature on the project site, but the site, but the Mulholand Formation is a non-marine formation of Pliocene age. Its deposition occurred on a floodplain within a broad area containing drainage channels and perhaps some shallow lakes. There were mammals, invertebrates, insects as well as vegetation that included woodlands and grassy meadows. There is an unknown (but potentially significant) risk that fossils may be exposed during the grading required for the residential development of the project site.

**Table 5**  
***Engeo Evaluation of Potential Hazards***

**Landslide Hazards.** Four landslides are mapped within the area proposed for residential development. The subsurface investigation indicates that the slides range from 5 to 15 ft. thick and involve primary soil and weathered bedrock. The described as relatively shallow slumps and earthflows, and portions of the mapped slides are considered active.

**Compressible Soil.** Soil is subject to consolidation settlement when a new load is introduced. The time required for settlement is highly dependent on the permeability of the soil material. Other factors include the depth, thickness and stress history of the compressible soil, as well as the magnitude/ shape/ size of the applied load. Engeo estimates that under the anticipated loads about 2 to 3 inches of settlement of the native colluvial material is possible under the loads associated with the placement of fills (estimated to range up to 30ft. in thickness). The geotechnical engineer states that the majority of settlement will be completed within 1 year (possibly within several months). Measures to mitigate the hazard posed by compressible soils are presented in the Engeo report.

**Expansive Soil.** Laboratory testing has been performed by Engeo confirms that the clayey soils, colluvium and clayey bedrock are characterized by a moderate to high plasticity and a moderate to critically high expansion potential. Expansive soils shrink and swell as a result of seasonal fluctuation in moisture content which can cause heaving and cracking of slabs-on-grade, pavements and structures founded on shallow foundations. Successful construction on expansive soils can be reduced by proper foundation design. It is imperative that exposed soils be kept moist by watering for sever days before placement of concrete. Additional analysis should be conducted during the design-level exploration to further characterize expansive soils at the site.

the presence of clayey alluvial deposits in the subsurface. Based on their origin (i.e. floodplain deposits) Engeo concludes that the fine-grained alluvial deposits and clay matrix material of sandy lenses are likely to be expansive, and will need to be evaluated during the design-level geotechnical report. Special engineering approaches identified by Engeo, include to mitigate the potential damage of expansive soils, Engeo recommends (i) selective grading or blending to create relatively low expansion potential engineered fill at the ground surface, (ii) using a rigid mat foundation system, (iii) deepening foundations below the zone of moisture fluctuation, and/or (iv) using lime treatment in the upper 18 inches of the building pad soil to reduce its expansion potential. The scope of the 2015 Engeo investigation did not include laboratory testing to evaluate the corrosion potential of soils on the site. Engeo does recommend that the scope of the design-level report include laboratory testing of foundation grade soils. That testing would also provide the opportunity for testing the corrosion potential of the soils. If testing confirms the presence of corrosive soils



on the project site, measure can be employed to mitigate that hazard (e.g., if subsurface transformers are proposed within the project for underground utilities, soil samples be tested in accordance with recommendations set forth by Pacific Gas & Electric).

**Fault Hazards** The site is not within an Alquist-Priolo Earthquake Fault Zone, but at least one geologic map has indicated the presence of a fault crossing the project site. Although there was no evidence of active faulting associated with the inferred fault trace, even inactive faults can adversely impact foundations and/or slope stability (e.g., the sheared rock in a fault zone can contain weak, highly expansive material). For that reason Engeo recommends that during grading operations the conditions exposed along the mapped fault be inspected by the project engineering geologist to determine if special recommendations are warranted. Engeo also concludes that the site is not within an Alquist-Priolo Earthquake Fault Zone and their fault investigation provides evidence that the fault mapped by Crane through the project site is not active. Therefore, the risk of surface fault rupture is less-than-significant.

### **Seismic Hazards**

- **Ground Shaking.** The site is within the seismically active San Francisco Bay Region area, where a moderate to high magnitude earthquake is a foreseeable event. The risk of damage from ground shaking is controlled by using sound engineering judgement and compliance with the latest provisions of the California Building Code (CBC), as a minimum. The seismic design provisions of the CBC prescribe minimum lateral forces applied statistically to the structure(s), combined with the gravity forces and dead-and-live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the comparable forces that would be associated with a major earthquake. The intent of the code is to enable structures to (a) resist minor earthquakes without damage, (b) resist moderate earthquakes without structural damage but with some non-structural damage, and (c) resist major earthquakes without collapse but with some structural as well as non-structural damage. On pg. 9 of their report Engeo provides CBC seismic design parameters. Since the Engeo report was issued the CBC has been updated. Consequently, in the design-level report, Engeo should provide new CBC Seismic Design Parameters that are based on the prevailing edition of the CBC that is operative at that time.
- **Ground Lurching.** Ground lurching is defined by Engeo, indicating that the rolling motion imparted during violent ground shaking can cause ground cracks. Engeo states (a) ground failure associated with rolling earthquake motion is considered greater at contacts between deep alluvium and bedrock, and (b) although the risk of this type of ground failure is considered low on the project site, the risks of this hazard will be further reduced through implementation of the proposed approach to corrective grading.
- **Earthquake-Induced Landsliding.** The concentration of landslides in the immediate area of the project site indicates a significant potential for ground shaking to induce landslide displacement. To mitigate this hazard, Engeo provides recommendations for corrective grading that will remove unstable soils down to in-place bedrock. Removal areas will be backfilled with drained engineered fills.
- **Liquefaction.** Liquefaction is characterized as a phenomenon in which saturated, relatively clay free sand is subject to a temporary loss of shear strength because of a buildup of pore pressure. Based on data gathered during the subsurface investigation, Engeo states that the soils and colluvium on the site are too cohesive to pose a potential liquefaction hazard, and the bedrock is too well consolidated to liquefy. Note that Borings 1-B1 and 1-B3 are immediately adjacent to the floor of the narrow valley bottom area. These borings did not contain any clean sands of inferred Holocene age, and the water table in Boring 1-B1 was at a depth of 24 ft. and 1-B3 did not encounter free water to the depth explored (25 ft.). Note: we consider the screening investigation for liquefaction performed by Engeo to be adequate (i.e., further evaluation of this hazard is not required).
- **Lateral Spreading.** Lateral spreading is a failure within weak soils, typically due to liquefaction, which causes the soil mass to move toward an open channel or down even a gentle slope. The Engeo report indicates that the risk of a lateral spreading failure is anticipated to be negligible.



## 7. Slope Stability Analysis

Commencing on pg. 10 of their report, Engeo provides slope stability analysis. The data utilized data on the engineering properties of engineered fill, colluvium and bedrock. The methodology employed is presented on pg. 11 of the report. The method of analysis used to evaluate slope stability was based on Spencer's Method of Slices. Spencer's method provides an iterative solution that satisfies both force and moment equilibrium and assumes all slice side forces have the same inclination. The Factor of Safety (FS) is defined as the sum of available shear strength resistance divided by mobilized shear strength. An FS of less than 1.0 indicates slope instability, and the greater the FS the greater the anticipated stability of the slope. Spencer's method is often the basis of the computer programs developed to analyze slope stability. The pseudo-static seismic coefficient selected for use by Engeo in their analysis was 0.25g.

For their analysis the criteria adopted by Engeo to judge satisfactory performance a static safety factor of 1.5; and for the pseudo-static analysis Engeo adopted a safety factor of 1.0 (i.e., the forces resisting slope displacement are balanced with the forced exerted by the slope resisting slope movement). It should be recognized that slope stability analysis is only a guide to professional judgement. It is not a guarantee of satisfactory performance. In our opinion greater assurance of adequate performance is essential given the geologic and seismic setting of the site (project site is within a landslide area that is located less than 4 mi. mile from the *Earthquake Fault Zone* (EFZ) that encompasses recently active and potentially active traces of the Hayward fault; the EFZ's that encompass the active Concord and Calaveras faults pass 7 mi. northeast and southeast of the site, respectively).

Engeo's slope stability analysis was performed for two geologic cross-sections, which are labeled A-A' and B-B' (see Figure 2 for the lines-of-section). The geologic cross-sections are shown on Figure 9. The analysis was based on full implementation of the corrective grading recommendations of Engeo. Specifically, the sections indicate over-excavation of landslide debris and soils, and backfilling of the overcut area with engineered fill that is continuously benched into bedrock, constructed with subdrain facilities and constructed with full compliance with Engeo's recommendations.

Engeo's analysis indicates the calculated FS for Section A-A' was 2.1 (for the static analysis); and 1.1 (for the pseudo-static analysis). For Section B-B' the calculated FS was 3.0 (for the static analysis); and 1.8 (for the pseudo-static analysis). These results are compliant with the FS standards adopted by Engeo.

## 8. Preliminary Recommendations

Engeo provides recommendations that are intended for initial land planning and preliminary estimating purposes that commence on pg. 12 of their report. Final recommendations are to be provided after a future design-level investigation has been performed, which includes subsurface exploration (borings), laboratory testing of selected samples, and additional engineering analysis of the data gathered. Nevertheless, the 2015 report provides preliminary recommendations that address (a) earthwork (including site preparation work, grading, compressible colluvium mitigation, landslide & colluvium removal, keyway design, use of geogrid slope reinforcement, subdrains, debris benches and recommended gradient of engineered slopes, and (b) preliminary foundation design recommendations, including measures pertaining to pad preparation for cut/fill transition lots, and differential fill thickness lots. Additionally, Engeo's recommendations conclude with provisions addressing (c) monitoring & testing during construction and (d) erosion control of the disturbed areas of the project site.

We anticipate that the design level report will provide specific criteria, standards, and specifications for (e) pavement, slabs-on-grade (e.g., driveways) and flatwork, (f) surface drainage improvements, (g) backfilling of utility trenches, (h) location and design of bio-retention basins, (i) wet weather construction, (j) evaluation of the corrosion potential of soils and mitigation of any significant impacts that are confirmed



to be present on the site, and (k) address the critical importance of long term monitoring and maintenance of slopes and drainage facilities.

The report includes a bibliography listing 18 key references, and maps that presents typical sections for the corrective grading recommended for landslides (including standards for the basal keyway) and continuous benching into the bedrock slopes; subdrain locations include at the backcut of the basal keyway and at other locations within the slide repair as recommended by the geotechnical engineer (based on field observations). Another exhibit presents details of the subdrain design, and there is an exhibit for pad preparation in areas of cut/ fill transitions and for pad preparation in areas of differential fill thickness lots. Figure 8 of the 2015 Engeo report presents their recommendations for corrective grading of the project. Obviously, the design details shown on the revised VTM has modified some project details, but the exhibit in the Engeo report indicates *Geotechnical Improvement Plan* that has been recommended for the project. Note that Figure 8 indicates the daylighting of the major cut slope at or just downslope of the ridge crest (locally extending beyond the project boundary), and the exhibit shows the location of a major keyway just upslope of the proposed private road; other keyways are shown along the south and west boundaries of the project site. All major graded slopes are to be designed with a gradient of 3:1 (h:v); use of engineered slopes with gradients of 2:1 (h:v) is restricted to slopes that are up to 8 ft. in height (max). Where these standards are not consistent with project objectives, Engeo recommends use of special engineering (i.e., geogrid reinforcement).

The Engeo concludes with a *Statement of Limitations and Uniformity of Conditions*. It expressly states that it is the responsibility of the owner to transmit the information and data presented in the Engeo report to the design team that has been assembled for the project. Furthermore, Engeo states that their conclusion and recommendations are solely professional opinions. Engeo then explains the limitations of the investigative methods used, and states that during site conditions may differ from those that are the basis of Engeo's preliminary recommendations. Updated recommendations will be presented in the design level report, and field conditions may necessitate clarifications, adjustments, modifications or other changes prior to issuance of construction permits (i.e., as a result of plan review) or during the construction period. (Note that any changes to the approved plans after issuance of construction permits require review and approval by the professional staff of the Building Inspection Division (BID) of the Community Development Department.)

## ***DMA Evaluation***

### **1. General**

The immediate need of the Department of Conservation & Development is to determine if there is sufficient data to allow the processing of the pending applications, including preparation of the California Environmental Quality Act (CEQA) document. The provisions of CEQA and associated case law acknowledge that final design studies are not needed for the purposes of CEQA compliance. However, there must be sufficient information on the extent of potential geologic and geotechnical hazards, and guidance must be provided to the project designers pertaining to the layout of the planned improvements. Therefore, the type of data needed at this stage of the land development process is limited to the following:

- i.* Evaluation of the project plans by the geotechnical engineers to ensure the layout is sensitive to geologic and geotechnical constraints.
- ii.* The assessment of hazards identified by Engeo addresses the gamut of potential geologic, seismic and geotechnical hazards identified in Appendix G of the CEQA Guidelines issued by the State of California (see Table 1). In our experience, the expectation of the County is that the project geologists



and geotechnical engineers provide at least a preliminary evaluation of potential geologic hazards and provide recommendations to mitigate any significant hazards that are confirmed to be present. We believe that threshold has been satisfied by the Engeo report (Table 4 presents a summary of impacts and preliminary mitigations). We note that preliminary assessment of potential hazards and associated recommendation intended as guidance on geotechnical constraints will require further evaluation in the design-level geotechnical report. The purpose of that aspect of the design-level report will confirm (or modify) Engeo's preliminary assessment and add needed specificity to the mitigation measures. The future geotechnical report will also provide specific standards and criteria for site grading, drainage and foundation design that are based on the specific approach to development.

It is our opinion there is sufficient available data available from the Engeo report, in combination with reconnaissance data presented herein, to deem the application complete.

## 2. Geologic Hazard Abatement District

The concentration of landslides on the project site and the steepness of the natural slope are evidence that the project site unstable/ marginally stable at present. Engeo has provided what we consider to be prudent measures aimed at creating stable slopes. Those measures include over-excavation of all landslides and colluvial deposits, instillation of efficient surface and subsurface drainage improvements, and foundations that take into account the adverse effects of expansive soils, cut/fill transition pads and differential fill thickness pads. Nevertheless, even in a conservatively designed and properly instructed project, there remain residual risks. There are no guarantees of long-term satisfactory performance of improvements. Drainage improvements require regular inspections and maintenance to ensure they perform as designed/ constructed. If an area of heavy erosion develops on the slope area, effective measures will be needed to control erosion. If there is evidence of incipient slope failure, a prompt response is needed to ensure that effective measures can be implemented to protect the nearby home(s). A homeowner's association is not the best option to provide the required level of monitoring and maintenance. Given site conditions, we consider the project site to be a candidate for inclusion in a *Geologic Hazard Abatement District* (GHAD). A GHAD would provide regular monitoring to ensure that slopes and drainage facilities are performing as designed. Additionally, if a homeowner sees features on the slope that may be incipient landslide displacement, the GHAD will make a site visit and view the features that are of concern and take appropriate action. The *Plan of Control* for the GHAD's specify the duties of the GHAD. Typically, the GHAD will have responsibility for slide repairs in open space areas that pose a threat to improvements. Other tasks that are routinely addressed by the Plan of Control include maintenance of drainage improvements, mowing of open space areas in compliance with the standards of the Orinda Moraga Fire Protection District.

### ***DMA Recommendation***

The following are recommended mitigation measures and/or conditions of approval.

**GEO-1** At least 60 days prior to recording the final Subdivision Map, requesting issuance of construction permits or installation of utility improvements, the project proponent shall submit a design-level geotechnical report for the project, based on adequate subsurface exploration, laboratory testing and engineering analysis. The scope of the geotechnical investigation should address to fully evaluated the following potential geologic/ geotechnical and seismic hazards, including corrosion potential testing. The report shall also provide a) recommendations and specifications pertaining to foundation design, including any proposed foundation retaining walls, b) pavement design, c) evaluation of the drainage design, including the proposed bio-retention facilities and their effect on planned improvements. The report shall also address d) temporary shoring and support of excavations, e) updated California Building Code seismic



parameters, and f) outline the recommended geotechnical monitoring, which shall include the monitoring of foundation related work as it pertains to geotechnical recommendations. Two monitoring reports shall be required: One following rough grading, which shall present all test data gathered as well as geologic mapping of exposures created during grading, and a map showing the location and estimated depth of subdrains and the location of all cleanouts, and the geotechnical engineer's opinion on the compliance of the as graded project with the recommendations in the design level report. Lastly, a monitoring report shall be required prior to the final building inspection. It shall document monitoring of final grading, backfilling of utility, foundation preparation and subgrade preparation work for improvements, etc., and shall be submitted prior to requesting the final building inspection for each lot. (This monitoring report can be segmented so that one letter can document monitoring performed on all lots, or a grouping of lots or a series of monitoring reports for each lot).

**GEO-2** The geotechnical report shall be subject to review by the County's peer review geologist, and review/approval of the Zoning Administrator. Improvement, grading and building plans shall carry out the recommendations of the approved report.

**GEO-3** The geotechnical report required by GEO-1 routinely includes recommended geotechnical observation and testing services during construction. These services are essential to the success of the project. They allow the geotechnical engineer to (i) ensure geotechnical recommendations for the project are properly interpreted and implemented by contractors, (ii) allow the geotechnical engineer to view exposed conditions during construction to ensure that field conditions match those that were the basis of the design recommendations in the approved report, and (iii) provide the opportunity for field modifications of geotechnical recommendations (with BID approval), based on exposed conditions. The monitoring shall commence during clearing, and extend through grading, placement of engineered fill, installation of recommended drainage facilities, and foundation related work. A *hard hold* shall be placed on the "final" grading inspection, pending submittal of a report from the project geotechnical engineer that documents their observation and testing services to that stage of construction, including monitoring and testing of backfilling required for utility and drainage facilities.

Similarly, a *hard hold* shall be placed on the final building inspection apartment building, pending submittal of a letter-report from the geotechnical engineer documenting the monitoring services associated with implementation of final grading, drainage, and foundation-related work. The geotechnical monitoring shall include documentation of conformance of retaining wall, pier hole drilling/ foundation preparation work and installation of drainage improvements.

**GEO-4** All grading, excavation and filling shall be conducted during the dry season (April 15 through October 15) only, and all areas of exposed soils shall be revegetated to minimize erosion and subsequent sedimentation. After October 15, only erosion control work shall be allowed by the grading permit. Any modification to the above schedule shall be subject to review by the Grading Inspector, and the review / approval of the Zoning Administrator.

**GEO-5** It is our opinion that the proposed project is an excellent candidate for annexation into an existing Geologic Hazard Abatement District. The two nearest GHADs are the Moraga and the Orinda GHADs. Prior to filing of the Final Map the project proponent shall join with an existing GHAD or create a new independent GHAD formed pursuant to Public Resources Code Section 26500. The GHAD documents are subject to review and approval by the Lead Agency. GHAD formation requires a Plan of Control and an Engineers Report. These documents must be prepared by licensed professionals (engineering geologists and geotechnical engineers) and are subject to technical review by the Department of Conservation & Development. The project proponent is responsible for funding the technical review.



- A. If the GHAD is to own the open space parcels, it will assume responsibilities that relate to their position as a GHAD and also the duties as a responsible property owner. The GHAD is charged with responsibilities relate to the prevention, mitigation, abatement, or control of geologic hazards, which includes (a) maintenance of facilities that enhance geologic as well as hydrogeologic stability, such as drainage facilities and associated improvements. The drainage facilities to be maintained by the GHAD shall include retaining on open space parcels, BMP water quality treatment facilities, concrete lined drainage ditches and open space storm drainage facilities, and other peripherally-related open space responsibilities (e.g. erosion control, mowing).
- B. The Plan of Control shall include (a) background information on the project and the open space, (b) characterize the geologic and seismic setting of the site, (c) provide a detailed evaluation of potential geologic hazards, (d) provide criteria for GHAD responsibility, (e) address activation of assessments and outline the process for transferring responsibility to the GHAD, (f) describe general landslide mitigation, (g) establish priorities for GHAD expenditures, and (h) outline the monitoring and maintenance schedule, including provision for monitoring performance of GHAD maintained facilities in the aftermath of an earthquake that yields strong to violent earthquake shaking in the West County area. The engineers report shall provide the financial details needed to implement the Plan of Control.

**GEO-6** A recorded deed disclosure shall provide notice to all the owners of the 13 residential lots of the existence of the Geologic Hazard Abatement District (GHAD) and its responsibilities, in addition to any easements and improvements granted to the GHAD. This notice may include provision for removal of landscaping or structures within the easements granted to the District without compensation.

### ***Purpose and Limitations.***

The purpose of our review was to provide a professional opinion on the adequacy of reconnaissance data for the full processing of the request for multiple variances, a tree permit and issuance of construction permits for the proposed project. Specifically, we provide technical advice to assist the Community Development Division of DCD with discretionary permit decisions. Our opinions and conclusions are made in accordance with generally accepted principles and practices of the engineering geology profession. We trust this letter provides the evaluation and comments that you requested. Please call if you have any questions.

Sincerely,  
DARWIN MYERS ASSOCIATES



Darwin Myers, CEG 946  
Principal

