

---

---

# CHAPTER 10

## GEOLOGY & SOILS

---

---

## CHAPTER 10 GEOLOGY AND SOILS

### 10.1 ENVIRONMENTAL SETTING

#### Topography

##### ***Regional Setting***

The Sacramento Valley is the northern portion of the Central Valley, which is a broad and flat valley approximately 42,000 square miles in area. While the valley floor is nearly flat, topographic features defining the Sacramento Valley boundaries are the Coast mountain range to the west, the Klamath and Cascade mountain ranges to the north, and the Sierra Nevada to the east. The community of Penryn is situated on the east side of the Sacramento Valley at the base of the western slope of the Sierra Nevada at an elevation of approximately 500 feet relative to mean sea level. *Figure 3-1 Site and Vicinity Map* in **CHAPTER 3 PROJECT DESCRIPTION** displays the general topography of the area.

##### ***Project Site Conditions***

The project site has an undulating surface cut by two drainage swales and scattered rock outcroppings. The approximate elevations in the project site are ±475 feet at Penryn Road to the east of the site, ±460 feet in the central portion of the project site, and ±480 feet at Taylor Road. The onsite drainage swales and associated rolling terrain continue to the north and south. Elevations generally increase to the immediate north and west and decrease to the immediate south and east.

#### Geology

##### ***Regional Setting***

As documented in the Draft Removal Action Workplan (RAW) for the project site [Wallace-Kuhl & Associates (WKA) 2008], which is provided as Appendix C to this Draft EIR, the project site is located on the eastern perimeter of the Great Valley geomorphic province of California. This geomorphic province consists of two valleys lying end-to-end, with the Sacramento Valley to the north and the San Joaquin Valley to the south. The Sacramento and San Joaquin Valleys have been filled to their present elevations with thick sequences of sediment derived from both marine and continental sources. These sedimentary deposits range in thickness from relatively thin deposits on the eastern valley edge to more than 25,000 feet in the south-central portion of the province. The younger sediments are continentally derived with their main source being the Sierra Nevada range (WKA 2008).

##### ***Project Site Conditions***

According to the 1981 *Geologic Map of the Sacramento Quadrangle*, prepared by the California Division of Mines and Geology (CDMG), the project site is underlain by Mesozoic granodiorite (granitic) rocks, commonly referred to as the Penryn and Rocklin plutons. These granitic rock units are a large-scale intrusive body that is part of a series of magmatic intrusions that helped form portions of the Sierra Nevada. The rock is characterized as a light gray, coarse-grained igneous rock composed of minerals such as quartz, feldspar, hornblende, and biotite. This rock may also contain occasional xenoliths (an inclusion of a pre-existing rock fragment within the magma) of various sizes and shapes, as well as quartz veins. The Penryn and Rocklin plutons

cover an area of approximately 150 square miles between the vicinity of the City of Folsom and the vicinity of the City of Auburn. The Preliminary Geotechnical Reports for the project site, which are provided in Appendix H to this Draft EIR, indicate that the primary geologic unit onsite is Penryn Quartz Diorite, overlain with alluvial deposits (WKA 2004a and 2004b).

## **Mineral Resources**

### ***Regional Setting***

Various mineral deposits are found in Placer County and throughout the foothills region, including sand, gravel, quarry rock, and gold. Some commercial mineral extraction operations exist within the County. The *Horseshoe Bar/Penryn Community Plan* states that there are no active quarries or mining sites in the Plan area. According to the California Department of Conservation, Division of Mines and Geology (CDMG), Mineral Land Classification of Placer County (OFR 95-10 1995), two inactive mining sites for the extraction of decomposed granite and crushed rock exist in the northwestern portion of the Plan area along I-80.

### ***Project Site Conditions***

No existing or previous mineral extraction operations are located on the project site. The project site is not classified as a site with known or potential for significant mineral deposits.

## **Soils**

When evaluating potential impacts of development, soils are typically considered for their resource value in agricultural production or for their potential development characteristics or constraints. Some soils are susceptible to erosion and/or expansive behavior while others are more suitable for compaction for construction.

### ***Regional Setting***

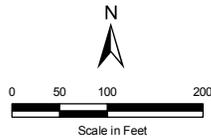
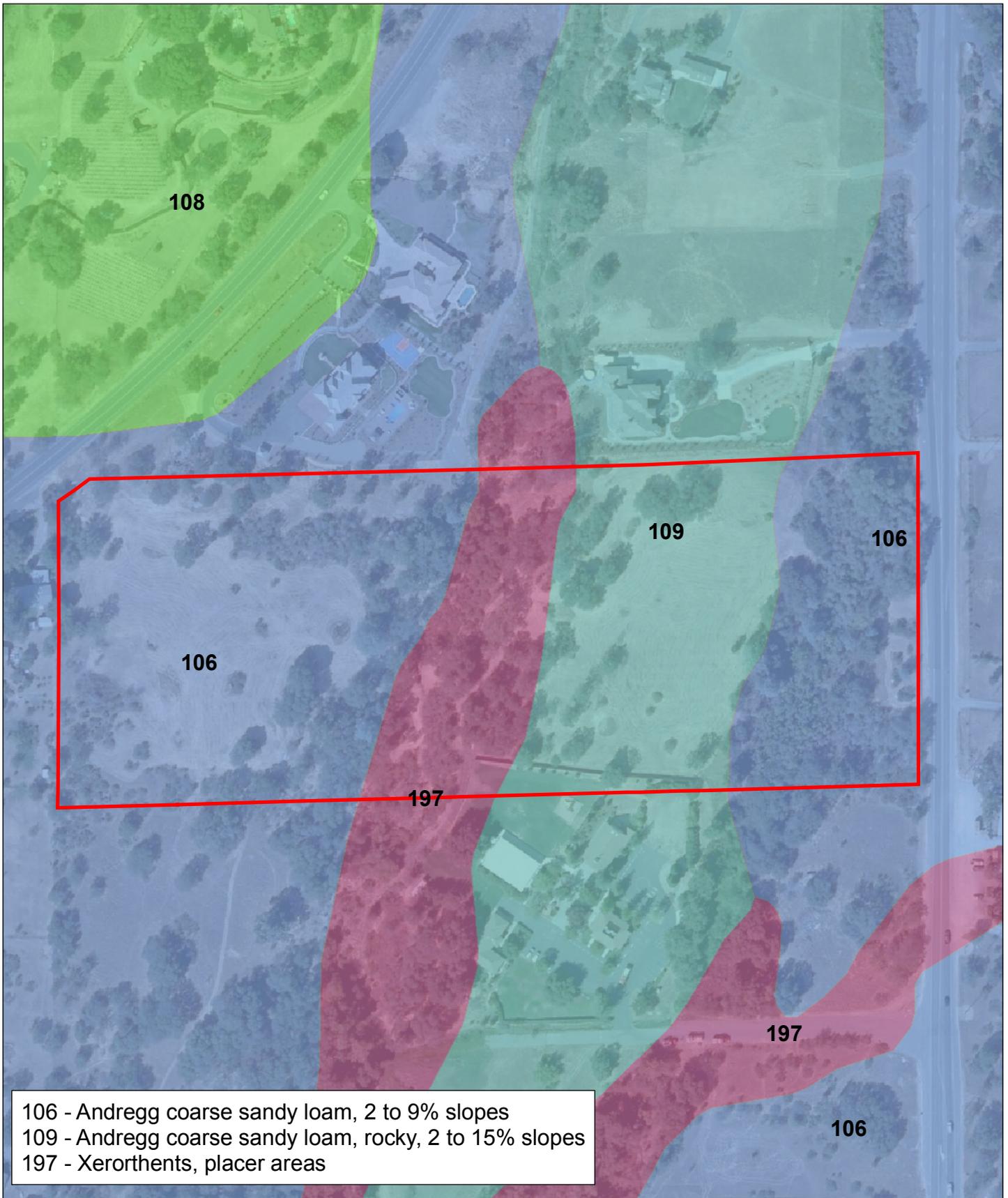
Soils found within the community of Penryn and throughout the foothills region are derived from weathered granite producing fine-grained and well-drained soils. According to the *Horseshoe Bar/Penryn Community Plan*, these soils are typically 12 to 40 inches deep over a granitic bedrock unit.

### ***Project Site Conditions***

The WKA field investigation conducted during preparation of the Preliminary Geotechnical Reports confirmed that the surface and near surface soils consist of clayey silty sands to depths approximately two feet below grade. These soils are underlain by weathered granitic rock. As shown on *Figure 10-1 Soil Survey of Placer County, California Western Part*, near surface soils at the site consist primarily of Andregg sandy loam 2 to 9 percent slopes; Andregg coarse sandy loam, rocky, with 2 to 15 percent slopes; and Xerorthents.

#### **Andregg coarse sandy loam, 2 to 9 percent slopes**

Andregg soil types are moderately deep, gently rolling, well-drained soils that are underlain by weathered granitic bedrock. This soil type exhibits moderately rapid permeability, medium surface runoff, and moderate erosion hazard, although exposed



 Study Area

Source Data: USDA-NRCS  
 Aerial Photo: November 2008

**Figure 10-1**

**SOIL MAP**  
 Orchard at Penryn  
 Placer County, CA

soils erode rapidly. Depth of the soil to bedrock is 29 to 33 inches. Limitations to development are limited to slopes. This soil type does not exhibit expansive characteristics.

**Andregg coarse sandy loam, rocky, 2 to 15 percent slopes**

As above, this soil type is moderately deep, gently rolling, well-drained, underlain by weathered granitic bedrock, and does not exhibit expansive characteristics. This soil type also exhibits moderately rapid permeability, medium surface runoff, and moderate erosion hazard, although exposed soils erode rapidly. Depth of the soil to bedrock is 20 to 40 inches. Limitations to development are limited to slopes.

**Xerorthents**

These soils are commonly found adjacent to streams where placer mining operations have occurred and are a mixture of rocks and silt. Because the soils are varied in their constituents, it exhibits variable permeability, runoff, and erosion hazard. Limitations to development on this soil type include slopes, flooding, and saturation. This soil type does not exhibit expansive characteristics. The occurrence of this soil type on the project site follows the drainage swale that courses from north to south through the center of the project site.

**Seismicity**

***Regional Setting***

The California Geological Survey (CGS) classifies this region as a low severity earthquake area. The major fault systems in the region tend to occur along the interface between differing geologic materials. The major fault system closest to the community of Penryn is the Foothills Fault System, which traverses Amador, El Dorado, and Placer counties in a path more than 350 kilometers long and several kilometers wide. Two segments of this system are relatively close to Penryn: the segment of the Bear Mountain Fault Zone (Spenceville Fault) between Folsom and Auburn, and the Melones Fault Zone, about 15 miles to the east. No active faults are known to exist in Placer County, and no Alquist-Priolo Special Studies Zones are designated in the County. The nearest known active fault that has been mapped is the Dunnigan Hills Fault, well to the northwest of Penryn across the Central Valley. However, investigations performed for the proposed Auburn Dam indicate that the Foothill Fault System may be undergoing reactivation in the vicinity of Folsom Lake and may be capable of producing a magnitude 6.5 Richter Scale event (Town of Loomis 2001). In 1975, a magnitude 5.7 earthquake was recorded on the Cleveland Hills Fault within the Foothills Fault System near Oroville, in a region thought at the time to be relatively free of seismic events of this severity. Consequently, even though the Bear Mountain and Melones faults have not ruptured in the past 200 years, they are considered potentially active. The last seismic event recorded in the area with a magnitude of 4.0 or greater was in 1908, with an epicenter between Auburn and Folsom, possibly associated with the Bear Mountain Fault (WKA 2008).

The underlying geologic foundation of the region is a relatively unbroken granitic batholith that extends along the Sierra Nevada. During seismic events, this material tends to react as a uniform block, which has the effect of reducing ground movement, acceleration, and the likelihood of ground rupture. Consequently, the California Division of Mines and Geology

(CDMG) classifies the region as a low severity earthquake area. The maximum expected intensity in a zone of this classification would range between VI and VII on the Modified Mercalli Scale. Events of this intensity level could result in cracks in weak masonry and chimneys, shaking or rustling of trees and bushes, furniture movement, and breaking of glassware.

### ***Project Site Conditions***

According to the *Horseshoe Bar/Penryn Community Plan*, there are no known active faults zoned beneath or near the study area and no active fault trace is known to pass beneath the project site.

### ***Liquefaction, Ground Shaking, Ground Lurching***

Liquefaction is the transformation of uncemented, saturated sand or silt to a liquefied state, typically caused by seismic shaking. Liquefaction typically occurs in loose, saturated soils or sediments of primarily sandy composition, in the presence of ground accelerations generally greater than 1.98 meters per second. When liquefaction occurs, the material involved has a total or substantial loss of shear strength and behaves like a liquid or semi-viscous substance. The excess hydrostatic pressure generated by ground shaking can result in the formation of sand boils, mud spouts, or seepage of water through cracks in the ground. On sloping ground, liquefaction usually results in slope failure. Liquefaction can cause structural distress or failure as a result of settlement, a loss of bearing capacity in the foundation soils and sediments, and the buoyant rise of buried structures. The Preliminary Geotechnical Engineering Reports indicate that onsite soils are not considered to be prone to liquefaction due to the distance from known active faults and anticipated depth to regional ground water.

## **10.2 REGULATORY SETTING**

### **Federal Regulations**

The Clean Water Act, administered by the U.S. Army Corps of Engineers, regulates soils disturbance as it affects wetlands and other waters of the U.S. The National Pollutant Discharge Elimination System is a federal regulation intended to protect surface water quality. These regulations may influence the extent and methodology of soil disturbance allowed to occur onsite. However, since the intent of these regulations is primarily to protect hydrologic and biological resources, they are discussed in **CHAPTER 5 BIOLOGICAL RESOURCES** and **CHAPTER 11 HYDROLOGY AND WATER QUALITY**.

### **State Regulations**

#### ***Building Codes and Standards***

Construction within Placer County is required to conform to the California Building Code (CBC), which is based on the Uniform Building Code (UBC) used nationwide. The CBC incorporates the UBC and includes numerous more detailed and/or more stringent regulations to reflect conditions specific to the state of California. Where no other building codes apply, Chapter 18 of the UBC/CBC regulates excavation, foundations, and retaining walls, and Appendix Chapter A33 regulates grading activities, including drainage and erosion control, and construction on expansive soils. The project would be required to conform to the applicable adopted building codes in effect at the time building permits are issued.

In addition, Section (§) 19100 et. seq. of the California Health and Safety Code requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. Specific minimum seismic safety requirements are set forth in Chapter 16 of the UBC/CBC. The UBC/CBC identifies seismic factors that must be considered in structural design. It provides seismic design and construction standards applicable to Seismic Zones 3 and 4. Zone 4 standards are more stringent than Zone 3 standards, but seismic standards in both zones are more stringent than those generally applied elsewhere in the United States. The project site is located in Seismic Zone 3 of the CBC Seismic Zone Map.

### **Seismic Safety**

The Alquist-Priolo Earthquake Fault Zoning Act was passed by the State Legislature in 1972 to reduce potential earthquake hazards to structures used for human occupancy, primarily by prohibiting construction of buildings used for human occupancy on the surface of active faults.

The Seismic Hazards Mapping Act, passed in 1990, addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides. This act requires the California Department of Conservation to identify Seismic Hazard Zones within the state based on the probable seismic shaking exposure and soil conditions in a given area. Areas that may be subject to substantial shaking, or where soil conditions indicate the area may be prone to liquefaction or earthquake-induced landslides are included in Seismic Hazard Zones.

Both acts require the state to identify areas with substantial risks related to earthquakes and faults. The project site is not located in an Alquist-Priolo earthquake hazard zone nor is it located in a Seismic Hazard zone.

### **Other State Regulations**

Similar to the Clean Water Act discussed above, the State Water Resources Control Board and California Department of Fish and Game have developed standards and guidelines related to disturbance of hydrologic and biological resources. These standards and guidelines may influence the extent and methodology of soil disturbance allowed to occur onsite. In particular, these agencies require the use of Best Management Practices to control soil erosion from entering waterways. Because the intent of these standards and guidelines is primarily to protect hydrologic and biological resources, they are discussed in more detail in **CHAPTER 5 BIOLOGICAL RESOURCES, CHAPTER 11 HYDROLOGY AND WATER QUALITY.**

### **Local Regulations**

#### **Placer County General Plan**

The *Placer County General Plan* contains a range of goals and policies related to the treatment of geologic and soil resources, as well as safety considerations related to geology and seismicity. The scale and extent of grading operations may be affected by the County's basic land use goals, as well as goals related to preserving other resources (especially visual and biological resources). This chapter focuses on the potential impacts to geologic and soil resources and the potential safety hazards associated with geologic conditions at the project site. The goal listed below is applicable to the analysis of the proposed project's impacts associated with geology and seismicity. The General Plan does not contain any goals specifically related to preservation

of soil resources. An analysis of the project's consistency with General Plan policies that support the goal listed below, as well as other goals related to resource protection, is provided in Appendix B to this Draft EIR.

Goal 8.A To minimize the loss of life, injury, and property damage due to seismic and geological hazards.

### ***Horseshoe Bar / Penryn Community Plan***

The *Horseshoe Bar/Penryn Community Plan* provides 19 General Community Goals which are applicable to the entire Plan area. The General Community Goal relevant to the analysis of impacts related to geology, soils, and seismicity include:

- ❖ Ensure a balanced environment where physical development can occur with minimal adverse effect on the natural resources of the area.

In addition, the following goals of *Horseshoe Bar/Penryn Community Plan* Natural Resources Management element pertaining to geology, soils, and seismicity are applicable to the proposed project and to this chapter's analysis of the project's potential impacts related to geologic and soil resources:

Goal V.B.1.a.1 Conservation of soils as a valuable natural resource.

Goal V.B.1.a.2 Minimize soil loss due to accelerated erosion.

Goal V.B.2.a.1 Minimize loss of life, injury, damage to property, and impacts to human health resulting from geologic hazards.

Goal V.B.2.a.2 Identify and protect important geologic and mineral resources in the Plan area.

Appendix B of this Draft EIR provides an evaluation of the project's consistency with Community Plan policies adopted for the purpose of avoiding or reducing impacts to geologic and soil resources and avoiding or reducing impacts related to seismic and geologic hazards.

### ***Placer County Grading Ordinance***

The Placer County Grading Ordinance establishes requirements for grading, erosion control, and stormwater management. Development projects must comply with these requirements during grading and construction. The grading ordinance is codified in Article 15.48 of the *Placer County Code*. The primary goals of the ordinance are to ensure public safety; avoid pollution of watercourses with hazardous materials, nutrients, and sediments caused by surface runoff; and ensure that the intended use of a site for which a grading permit is sought complies with all applicable County and state codes and regulations, including the CBC.

The grading ordinance requires a grading permit for most projects within unincorporated Placer County. Grading permit conditions are detailed in §15.48.240 of the *Placer County Code*. These conditions include requirements for control of dust, erosion, sediment, and noise; and to mitigate adverse environmental impacts identified in any environmental review document. When issuing a grading permit, the County may impose any condition necessary to protect public health and welfare and avoid any hazardous conditions.

### 10.3 IMPACTS

#### Significance Criteria

The analysis in the Initial Study found that the project would have no impact related to the following criterion:

- ❖ Located on expansive soils.

The analysis below evaluates the potential for the project to result in significant geologic and soil related impacts related to the following criteria:

- ❖ Expose people or structures to unstable earth conditions or changes in geologic substructures;
- ❖ Result in significant disruptions, displacements, compaction, or overcrowding of the soil;
- ❖ Substantially alter topography;
- ❖ Destroy, cover, or modify any unique geologic or physical features;
- ❖ Result in significant increase in wind or water erosion;
- ❖ Result in changes in deposition, erosion, or siltation that may modify any water body;
- ❖ Expose people to geologic and/or geomorphological hazards (earthquakes, landslides, etc); and
- ❖ Be located on a geological unit or soil that is unstable or would become unstable/exposure to hazards such as landslide, lateral spreading, subsidence, liquefaction, or collapse.

#### Impacts

**IMPACT 10.1:** Exposure to Unstable Earth Conditions or Changes in Geologic Substructures

---

**SIGNIFICANCE BEFORE MITIGATION:** *LESS THAN SIGNIFICANT*

Mitigation Measures: No mitigation measures are proposed or recommended.

**SIGNIFICANCE AFTER MITIGATION:** *LESS THAN SIGNIFICANT*

---

According to the Preliminary Geotechnical Engineering Reports prepared for the project site, the undisturbed native soils as well as engineered fills composed of native or approved soils at the site are capable of supporting the proposed two story residential structures, associated parking, the recreation center, and necessary infrastructure. Site topography is gently rolling with elevations that range from ±460 feet to ±480 feet. The geotechnical engineering reports did not identify any specific safety or construction feasibility concerns relative to the existing slopes on the project site. Exploratory trenches excavated during the geotechnical study found weathered granite rock and silty sands, which possess a low expansion potential. The pavement subgrade soils on the site will provide adequate support for asphalt concrete pavements. According to the Preliminary Geotechnical Engineering Reports prepared for the project site, the majority of earthwork would be completed using conventional construction and trenching equipment. Construction is not expected to alter any geologic substructures onsite.

With implementation of the excavation and fill placement methods recommended in the Preliminary Geotechnical Engineering Reports, the RAW, and compliance with the UBC, impacts associated with potential soil instability are considered less than significant. Residents and structures are not expected to be exposed to unstable earth conditions.

**IMPACT 10.2:** Significant Disruptions, Displacements, Compaction, or Overcrowding of the Soil

**SIGNIFICANCE BEFORE MITIGATION:** *SIGNIFICANT*

Mitigation Measures

*Proposed:* Mitigation Measures 10.2a

**Significance with Proposed Mitigation: Significant**

*Recommended:* Mitigation Measures 10.2b through 10.2e

**SIGNIFICANCE AFTER MITIGATION:** *LESS THAN SIGNIFICANT*

Site remediation to remove contaminated soil from the site will require vegetation removal and excavation of soil from approximately half of the project site. Construction of the proposed 150 multi-family residential units, recreation center, and associated infrastructure will require additional cuts and fills, soil compaction, and construction of retaining walls that will alter the existing landform and soil conditions. The disrupted soil areas may contribute to other project impacts such as increasing dust emissions and degrading the visual character of the project area, as evaluated in other chapters in this Draft EIR. Estimates for determining the area of disturbance are shown in *Table 10.1*.

**Table 10.1**  
**Estimated Construction Impact**

Project Component	Soil Quantity (in cubic yards)	Total Cuts (in cubic yards)	Total Fills (in cubic yards)
Excavated for Site Remediation	11,600	43,147 <sup>1</sup>	n/a
Site Grading Soil Cuts	31,547		
Fills to Replace Excavated Soils	11,600	n/a	55,177 <sup>2</sup>
Site Grading Soil Fills	43,577		

1. Of the total cuts, 11,600 cubic yards would be exported offsite.

2. Of the total fills, 11,600 cubic yards would be imported to replace the excavated soil and 12,030 cubic yards would be imported to balance cuts and fills onsite. A total of 23,630 cubic yards would be imported.

Source: Morton & Pitalo 2011

Implementation of the RAW will disrupt and displace soil. The RAW recommends excavating ±11,600 cubic yards of soil from ±7.11 acres of the project site prior to development. The contaminated soils would be transported and disposed of offsite. Soil excavations necessary for the remediation would occur between primarily 12 and 18 inches below ground surface, with excavations up to 24 inches in limited areas.

According to the Preliminary Geotechnical Engineering Reports prepared for the project site, the majority of earthwork would be completed using conventional construction and trenching

equipment. Large boulders and less weathered granodioritic rock will require more heavy-duty equipment for excavation.

The disruption of site soils and topography is an unavoidable result of both the remediation plan as well as development of the site. Grading of roadways and building sites and excavations for drainage features and utility infrastructure would result in significant changes to the site's current condition. The proposed grading plan minimizes changes in site topography and provides transition between graded areas and adjacent properties. Generally, the proposed grading plan indicates changes in grade of no more than three to four feet, except in the southwest quadrant of the site. In this location, an existing hill would be removed, with finished ground elevations as much as ten feet lower than existing conditions. This proposed use of sensitive grading techniques would minimize soil disruptions onsite.

The draft RAW includes an Erosion Prevention and Sediment Control plan. *Mitigation Measure 10.2a* stipulates adherence to the Erosion Prevention and Sediment Control plan during RAW implementation. This would minimize effects associated with soil disturbance conducted as part of the site remediation work. Components of this plan include:

- ❖ The construction site entrance point will be lined with gravel to minimize tracking soil onto Penryn Road.
- ❖ A truck decontamination area will be maintained near the entrance. Any rinse water generated will be collected and retained in drums or other containers for analysis and proper disposal.
- ❖ Fiber roll dikes or earthen berms will protect excavation areas and stockpiles where necessary to prevent run-on, runoff, and erosion. Excavation areas will drain inward to prevent sediment escape. During construction, the contractor shall apply sufficient water to roadways, excavation and stockpile areas as necessary to prevent fugitive dust. The contractor may elect to apply a dust palliative.
- ❖ Stockpiled soils will be kept within a designated area enclosed within fiber roll dikes or berms. Stockpiled soils will be covered.
- ❖ Where required, erosion and sediment control measures will remain in place until further planned site grading activities begin.

In accordance with the recommendations of the project's Preliminary Geotechnical Engineering Reports, *Mitigation Measure 10.2b* requires preparation of a final Geotechnical Engineering Report to address project construction. The final report is subject to County approval. *Mitigation Measures 10.2c* through *10.2e* require that all grading plans conform to the Placer County Grading Ordinance and implement the recommendations of the Geotechnical Engineering Report.

Implementation of these mitigation measures would minimize the changes to soils associated with RAW implementation and with project construction, and would ensure that all earthwork onsite complies with Placer County's grading standards. While soil disruption would still occur, the mitigation measures require the use of specific techniques to prevent or minimize indirect effects such as increased dust emissions and sedimentation of waterways. The

environmental effects associated with disruptions, displacements, and compaction of the soils would therefore be reduced to less than significant levels.

**IMPACT 10.3: Substantially Alter Topography**

**SIGNIFICANCE BEFORE MITIGATION:** *LESS THAN SIGNIFICANT*

Mitigation Measures: No mitigation measures are proposed or recommended.

**SIGNIFICANCE AFTER MITIGATION:** *LESS THAN SIGNIFICANT*

The project site is currently vacant, supports natural topsoil, and consists of gently rolling topography. The difference between existing elevation and proposed finished ground elevations is a maximum of ten feet. With the minimal changes in topography, this impact is considered less than significant. Adherence to the Placer County Grading Ordinance will also ensure smooth transitions to neighboring properties, as shown on the *Figure 10-2 Grading Plan*. Proposed retaining walls are indicated on the Site Plan in *Figure 3-3* in **CHAPTER 3 PROJECT DESCRIPTION**.

Alterations to topography and retaining wall construction associated with the proposed project include the following changes in each quadrant of the project site:

- ❖ *Northeast Quadrant and North-central Area* - Ground level would be raised slightly (approximately three to four feet), and a retaining wall with a maximum height of  $\pm$ three feet would be constructed along  $\pm$ 120 feet of the northern property boundary. An existing rock outcropping east of the recreation center would be preserved as open space. A retaining wall with a height ranging from one to six feet would be constructed south and east of the rocks. An open space area would be established through the center of the northern portion of the site, west of the recreation center. This area would not be graded. A retaining wall ranging from one to seven feet in height would be constructed southwest of the property management office/recreation area.
- ❖ *Southeast Quadrant and South-central Area* - Finished ground elevations would be generally the same as existing conditions. A retaining wall with a maximum height of  $\pm$ four feet would be constructed along the southern property boundary, extending  $\pm$ 220 feet west from the edge of the landscape easement to just west of the existing drainage swale in this area. A stormwater detention basin would be created in the center of the site near the southern property boundary.
- ❖ *Southwestern Quadrant* - Finished ground elevations along the southern property boundary would be generally two to three feet higher than existing conditions. A retaining wall with a maximum height of  $\pm$ five feet would be constructed along  $\pm$ 120 feet of the southern boundary west of the detention basin. An existing hill in the southwest quadrant of the site would be removed, with finished ground elevations as much as ten feet lower than existing conditions. A retaining wall ranging in height from one to four feet would be constructed along  $\pm$ 200 feet of the western property boundary.
- ❖ *Northwestern Quadrant* - An existing rock outcropping area would be preserved as open space. A retaining wall with a maximum height of  $\pm$ four feet would be constructed south of a portion of this outcropping. Another retaining wall with a maximum height

of ±four feet would be constructed along ±75 feet of the northern property boundary east of the outcropping. Finished ground elevations in this quadrant would be generally the same as existing conditions.

**IMPACT 10.4:** Destroy, Cover, or Modify Unique Geologic or Physical Features

---

**SIGNIFICANCE BEFORE MITIGATION:** *LESS THAN SIGNIFICANT*

Mitigation Measures: No mitigation measures are proposed or recommended.

**SIGNIFICANCE AFTER MITIGATION:** *LESS THAN SIGNIFICANT*

---

The project site supports several existing rock outcroppings. Many of these rock outcroppings will not be altered by project construction and will be preserved in open space. Several less prominent rock outcroppings would be destroyed through site remediation, grading, and construction.

The project also supports two existing drainage swales. The 100-year floodplain associated with the eastern drainage swale generally ranges from 40 to 60 feet wide. The 100-year floodplain associated with the central drainage swale ranges from 10 to 100 feet wide. It is ±40 feet wide at the northern property boundary and ±70 feet wide at the southern property boundary. The existing floodplains associated with the southern portion of the central swale and the full length of the eastern drainage swale would be destroyed as a result of site remediation and project construction. These modifications to the existing floodplains would represent a less than significant change in physical features of the project site as related to this analysis of impacts to geologic and soil resources. Analysis of the aesthetic effect associated with changes in physical features of the project site is provided in **CHAPTER 6 VISUAL RESOURCES** while changes to hydrologic functions in the area associated with changes in the floodplains are evaluated in **CHAPTER 11 HYDROLOGY AND WATER QUALITY**.

**IMPACT 10.5:** Significantly Increase Wind or Water Erosion

---

**SIGNIFICANCE BEFORE MITIGATION:** *SIGNIFICANT*

Mitigation Measures

*Proposed:* Mitigation Measure 10.5a

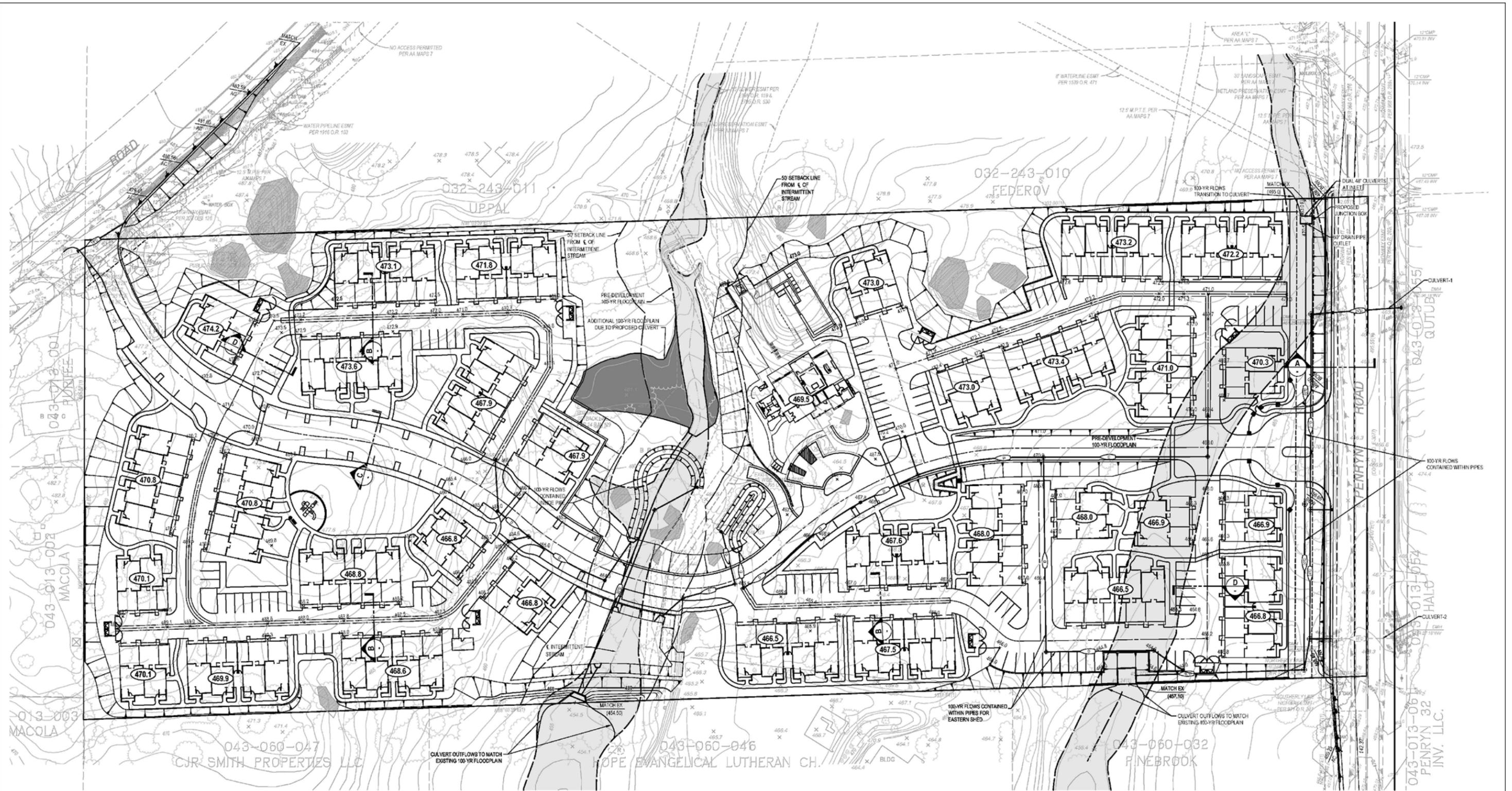
**Significance with Proposed Mitigation: Significant**

*Recommended:* Mitigation Measures 10.5b through 10.5g

**SIGNIFICANCE AFTER MITIGATION:** *LESS THAN SIGNIFICANT*

---

The proposed project would construct 150 multi-family residential units, a recreation center, roadways, drainage features, and utility infrastructure. Construction activities resulting in areas of exposed soil could lead to wind and water erosion. The resultant dust and sediment could degrade air quality and water quality. To control erosion impacts during completion of the site remediation described in the RAW, *Mitigation Measure 10.5a* requires that the Erosion Prevention and Sediment Control Plan provided as Appendix H of the RAW be implemented. *Mitigation Measures 10.5b* through *10.5g* require that grading and construction conform to the Placer County Grading Ordinance, use of Best Management Practices to minimize wind and water erosion and protect water quality, implementation of a dust and erosion control plan,



Data Source: Morton & Pitalo, Inc.

**Figure 10-2**  
**GRADING PLAN**  
 Orchard at Penryn  
 Placer County, CA

placement of soil stockpiles far from existing residences and protected resources, and that the applicant obtain a National Pollutant Discharge Elimination System construction stormwater quality permit. With implementation of these measures, the potential for wind and water to cause erosion of site soils would be minimized and potential erosion impacts caused by project grading would be reduced to less than significant levels.

**IMPACT 10.6: Modify a Water Body Through Changes in Deposition, Erosion, or Siltation**

---

**SIGNIFICANCE BEFORE MITIGATION:      *SIGNIFICANT***

Mitigation Measures

*Proposed:* No mitigation measures are proposed

**Significance with Proposed Mitigation: Significant**

*Recommended:* Mitigation Measure 10.6a

**SIGNIFICANCE AFTER MITIGATION:      *LESS THAN SIGNIFICANT***

---

The project site contains two floodplains, ranging from 10 to 100 feet wide, which run through the central and eastern portions of the project site. Drainage from the site flows south to Secret Ravine. The proposed project includes destroying all of the eastern drainage swale and the southern portion of the central swale as part of the site remediation. Erosion generated during construction or operation of the project could affect water quality in the preserved portion of the central swale and could also affect water quality in Secret Ravine and other downstream waterways.

Implementation of the RAW would modify the onsite drainages by excavating all soil and vegetation associated with the eastern swale and all soil and vegetation associated with the southern portion of the central swale. As part of project construction, underground stormwater pipes would be installed to convey drainage originating from offsite areas through the project site. While the water bodies would be significantly altered, piping the drainage through the project site would minimize the potential for onsite activities to cause modifications to the offsite portions of these swales.

Underground stormwater drainage pipes would be installed within the project site to convey drainage originating from the project site to the center of the project site. These pipes would discharge to two created bioswales north of the detention basin, which would allow for sediment in the drainage to settle out. The proposed stormwater detention basin along the southern property boundary would also minimize the amount of sediment leaving the project site and contributing to offsite soil deposition and siltation of drainageways.

To ensure additional erosion control, *Mitigation Measure 10.6a* requires that project activities conform to the Placer County Grading Ordinance and implement Best Management Practices. With implementation of these measures, the potential for deposition, erosion, or siltation to cause modification of the drainages and offsite water bodies would be reduced to less than significant levels.

**IMPACT 10.7: Exposure to Geologic and Geomorphological Hazards**

---

**SIGNIFICANCE BEFORE MITIGATION:** *LESS THAN SIGNIFICANT*

Mitigation Measures: No mitigation measures are proposed or recommended.

**SIGNIFICANCE AFTER MITIGATION:** *LESS THAN SIGNIFICANT*

---

The California Geological Survey classifies this region as a low severity earthquake area. The project has a low potential for substantial earthquake activity. No active faults are known to exist in Placer County, and no Alquist-Priolo Special Studies Zones are designated in the County. Compliance with the CBC, as required by Placer County standards, will ensure that impacts related to geologic and/or geomorphological hazards would be less than significant.

**IMPACT 10.8: Exposure to Hazards Related to Soil Stability**

---

**SIGNIFICANCE BEFORE MITIGATION:** *LESS THAN SIGNIFICANT*

Mitigation Measures: No mitigation measures are proposed or recommended.

**SIGNIFICANCE AFTER MITIGATION:** *LESS THAN SIGNIFICANT*

---

According to the Preliminary Geotechnical Engineering Reports, the project site contains stable soils capable of supporting the proposed two-story residential structures, associated parking, the recreation center, and necessary infrastructure. Exploratory trenches excavated during the geotechnical study found weathered granite rock and silty sands, which possess a low expansion potential. Based on the findings of the Preliminary Geotechnical Engineering Reports, impacts associated with an unstable geological unit, soil type, or soil condition are considered less than significant.

**10.4 MITIGATION MEASURES**

**Exposure to Unstable Earth Conditions or Changes in Geologic Substructures**

This impact is determined to be Less than Significant. No mitigation measures are required.

**Significant Disruptions, Displacements, Compaction, or Overcrowding of the Soil**

***Proposed Mitigation***

***Mitigation Measure 10.2a:*** The project applicant shall implement *Mitigation Measure 8.1b*, which requires implementation of the Erosion Prevention and Sediment Control Plan included as Appendix H of the Removal Action Workplan and any other measures included in the grading permit during site remediation.

***Recommended Mitigation***

***Mitigation Measure 10.2b:*** The Improvement Plan submittal shall include a final geotechnical engineering report produced by a California Registered Civil Engineer or Geotechnical Engineer. The report shall address and make recommendations on the following:

- a. Road, pavement, and parking area design
- b. Structural foundations, including retaining wall design

- c. Grading practices
- d. Erosion/winterization
- e. Special problems discovered onsite, (i.e., groundwater, expansive/unstable soils)
- f. Slope stability

Once approved by the Engineering and Surveying Department (ESD), two copies of the final report shall be provided to the ESD and one copy to the Building Department for their use. If the soils report indicates the presence of critically expansive or other soils problems which, if not corrected, could lead to structural defects, a certification of completion of the requirements of the soils report will be required prior to issuance of Building Permits. This shall be so noted on any Codes, Covenants and Restrictions and on the Informational Sheet filed with the Final Map. It is the responsibility of the developer to provide for engineering inspection and certification that earthwork has been performed in conformity with recommendations contained in the report.

**Mitigation Measure 10.2c:** Prior to Improvement Plan approval and/or issuance of a grading permit, Placer County shall verify that the applicant has obtained Department of Toxic Substances Control approval of the final Removal Action Workplan (RAW). The applicant shall submit the final RAW to Placer County.

**Mitigation Measure 10.2d:** The applicant shall prepare and submit Improvement Plans, specifications and cost estimates (per the requirements of Section II of the Land Development Manual (LDM) that are in effect at the time of submittal) to the Engineering and Surveying Department for review and approval. All existing and proposed utilities and easements, onsite and adjacent to the project, which may be affected by planned construction, shall be shown on the plans. All landscaping and irrigation facilities within the public right-of-way (or public easements), or landscaping within sight distance areas at intersections, shall be included in the Improvement Plans. The applicant shall pay plan check and inspection fees and Placer County Fire Department Improvement Plan review and inspection fees. (NOTE: Prior to plan approval, all applicable recording and reproduction cost shall be paid). The cost of the above-noted landscape and irrigation facilities shall be included in the estimates used to determine these fees. It is the applicant's responsibility to obtain all required agency signatures on the plans and to secure department approvals. Design Review shall be completed prior to submittal of Improvement Plans. Record drawings shall be prepared and signed by a California Registered Civil Engineer at the applicant's expense and shall be submitted to the Engineering and Surveying Department prior to acceptance by the County of site improvements.

**Mitigation Measure 10.2e:** All proposed grading, drainage improvements, vegetation and tree removal shall be shown on the Improvement Plans and all work shall conform to provisions of the Placer County Grading Ordinance (Ref. Article 15.48, formerly Chapter 29, Placer County Code) that are in effect at the time of submittal. No

grading, clearing, or tree disturbance shall occur until the Improvement Plans are approved and all temporary construction fencing has been installed and inspected by a member of the Development Review Committee (DRC). All cut/fill slopes shall be at 2:1 (horizontal:vertical) unless a soils report supports a steeper slope and the Engineering and Surveying Department (ESD) concurs with said recommendation.

The applicant shall revegetate all disturbed areas in accordance with the Improvement Plans. Revegetation undertaken from April 1 to October 1 shall include regular watering to ensure adequate growth. A winterization plan shall be provided with project Improvement Plans. It is the applicant's responsibility to assure proper installation and maintenance of erosion control/winterization during project construction. Where soil stockpiling or borrow areas are to remain for more than one construction season, proper erosion control measures shall be applied as specified in the Improvement Plans/Grading Plans. Provide for erosion control where roadside drainage is off of the pavement, to the satisfaction of the ESD.

The applicant shall submit to the ESD a letter of credit or cash deposit in the amount of 110% of an approved engineer's estimate for winterization and permanent erosion control work prior to Improvement Plan approval to guarantee protection against erosion and improper grading practices. Upon the County's acceptance of improvements, and satisfactory completion of a one-year maintenance period, unused portions of said deposit shall be refunded to the project applicant or authorized agent.

If, at any time during construction, a field review by County personnel indicates a significant deviation from the proposed grading shown on the Improvement Plans, specifically with regard to slope heights, slope ratios, erosion control, winterization, tree disturbance, and/or pad elevations and configurations, the plans shall be reviewed by the DRC/ESD for a determination of substantial conformance to the project approvals prior to any further work proceeding. Failure of the DRC/ESD to make a determination of substantial conformance may serve as grounds for the revocation/modification of the project approval by the appropriate hearing body.

### **Substantially Alter Topography**

This impact is determined to be Less than Significant. No mitigation measures are required.

### **Destroy, Cover, or Modify Unique Geologic or Physical Features**

This impact is determined to be Less than Significant. No mitigation measures are required.

### **Significantly Increase Wind or Water Erosion**

#### ***Proposed Mitigation***

***Mitigation Measure 10.5a:*** The project applicant shall implement *Mitigation Measure 8.1b*, which requires implementation of the RAW Erosion Prevention and Sediment Control Plan and any other measures included in the grading permit during site remediation.

**Recommended Mitigation**

**Mitigation Measure 10.5b:** The project applicant shall implement *Mitigation Measure 10.2d*, which requires that Improvement Plans be submitted to and approved by the County prior to commencement of site preparation and construction activities.

**Mitigation Measure 10.5c:** The project applicant shall implement *Mitigation Measure 10.2e*, which requires all site work to meet the Placer County Grading Ordinance requirements and identifies requirements for erosion control measures to be included in the project Improvement Plans.

**Mitigation Measure 10.5d:** A dust and erosion control plan shall be prepared and submitted to the Placer County Air Pollution Control District (APCD) for review and approval prior to approval of Improvement Plans and commencement of construction activities (including grading to support project construction but excluding implementation of the Removal Action Workplan). The dust control plan shall be submitted to the APCD no later than 45 days prior to groundbreaking. The applicant shall not break ground prior to receiving APCD approval of the dust control plan. The plan shall comply with Placer County's Erosion Control standards and the Placer County Grading Ordinance. The plan shall incorporate Best Management Practices (BMPs) for dust and erosion control during construction of site roadways and driveways, and during building pad grading. BMPs to minimize wind and water erosion shall include:

- ❖ Timing grading activities to minimize the amount of exposed areas during the wet season, to the extent feasible.
- ❖ Revegetating all areas that have been graded and will remain undeveloped during the rainy season by mid October. Revegetation shall use native vegetation. Revegetated areas shall be secured from the possibility of erosion.
- ❖ Preventing eroded soil from entering site drainageways through measures such as placement of hay bales or other acceptable materials such as sediment barriers, installation of temporary earth berms, use of fabric silt fences, spreading hay or straw on exposed areas, and/or development of temporary settling areas. Sediment collected at the erosion control sites shall be collected and disposed of once vegetation has become established.
- ❖ Preventing dust emissions through measures such as maintaining an operational water truck onsite at all times and applying water to areas prior to and after disturbance to maintain adequate moisture in the soil to avoid dust emissions; suspending construction activities during periods of high winds; installing wind barriers to prevent dust emissions from leaving the project site; restricting vehicle and equipment speed to 15 miles per hour in construction areas; and controlling storage piles by keeping them wet, establishing and maintaining surface crusting, covering with tarp or vegetative cover, or installing wind barriers of fifty percent porosity around three sides of the pile.

**Mitigation Measure 10.5e:** The Improvement Plans shall show that water quality treatment facilities/Best Management Practices (BMPs) shall be designed according to the

guidance of the California Stormwater Quality Association Stormwater Best Management Practice Handbooks for Construction, for New Development/Redevelopment, and for Industrial and Commercial (or other similar source as approved by the Engineering and Surveying Department). The Stormwater Quality Design Manual for the Sacramento and South Placer Regions is an additional guidance document that may be used as a reference for post construction BMPs.

Construction (temporary) BMPs for the project include, but are not limited to: Fiber Rolls (SE-5), Hydroseeding (EC-4), Stabilized Construction Entrance (LDM Place C-4), Straw Bale Barriers (SE-9), Storm Drain Inlet Protection (SE-10), Silt Fence (SE-1), revegetation techniques, dust control measures, and concrete washout areas.

**Mitigation Measure 10.5f:** Prior to Improvement Plan approval, the applicant shall obtain a State Regional Water Quality Control Board National Pollutant Discharge Elimination System construction stormwater quality permit and shall provide to the Engineering and Surveying Department evidence of a state-issued Waste Discharge Identification number or filing a Notice of Intent and fees.

**Mitigation Measure 10.5g:** The project applicant shall implement *Mitigation Measure 6.1d*, which requires that stockpiling areas be identified on the Improvement Plans and be located as far as practical from existing dwellings and protected resources.

### **Modify a Water Body Through Changes in Deposition, Erosion, or Siltation**

#### ***Proposed Mitigation***

No mitigation measures are proposed.

#### ***Recommended Mitigation***

**Mitigation Measure 10.6a:** The project applicant shall implement *Mitigation Measure 10.2d* and *Mitigation Measure 10.2e* which require that all grading and construction shall be in accordance with the Placer County Grading Ordinance and shown on the Improvement Plans, which must be approved by the County prior to commencement of construction activities (including grading to support project construction but excluding implementation of the RAW).

### **Exposure to Geologic and Geomorphological Hazards**

This impact is determined to be Less than Significant. No mitigation measures are required.

### **Exposure to Hazards Related to Soil Stability**

This impact is determined to be Less than Significant. No mitigation measures are required.