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**GEOLOGY AND SOILS/MINERAL
RESOURCES**

8.1 INTRODUCTION

The Geology and Soils/Mineral Resources chapter of the EIR describes the geologic and soil characteristics of the proposed project site and evaluates the extent to which implementation of the proposed project could be affected by unstable earth conditions and various geologic and geomorphic hazards. In addition, the chapter evaluates known mineral resources on the project site, and evaluates any potential adverse effects of the proposed project on the availability of such resources. The discussions and mitigation measures presented in each technical section apply to all the properties included in the project site, as well as any off-site improvement areas, unless otherwise stated.

Information from this chapter is primarily drawn from Geotechnical Engineering Reports prepared by Wallace Kuhl and Associates for each of the Haight,¹ Ogg,² and Placer Greens properties,³ as well as both the six- and 25-acre areas of the Pruett property (see Appendix G).⁴ In addition, information was sourced from the Placer County General Plan,⁵ the Placer County General Plan EIR,⁶ and the Dry Creek-West Placer Community Plan (DCWPCP).⁷

8.2 EXISTING ENVIRONMENTAL SETTING

Background setting information on the geology, soils, and seismicity of the project site and the surrounding region, as well as mineral resources present on the project site, is provided below.

Regional Setting

The proposed project site is located in the southeastern corner of the DCWPCP area of Placer County, California, directly north of the Sacramento County line. The DCWPCP area lies within the eastern portion of the Sacramento Valley, which extends from Redding in the north to the Sacramento-San Joaquin Delta region in the south. The Sacramento Valley is bordered by the

¹ Wallace Kuhl and Associates. *Geotechnical Engineering Report, 12-Acre Haight Property*, WKA No. 10217.02. September 16, 2014.

² Wallace Kuhl and Associates. *Geotechnical Engineering Report, 19-Acre Ogg Property*, WKA No. 10218.02. September 15, 2014.

³ Wallace Kuhl and Associates. *Geotechnical Engineering Report, Placer Greens Property*, WKA No. 10281.02. September 17, 2014.

⁴ Wallace Kuhl and Associates. *Geotechnical Engineering Report, 6-Acre Pruett Property*, WKA No. 10216.02. September 12, 2014.

Wallace Kuhl and Associates. *Geotechnical Engineering Report, 25-Acre Pruett Property*, WKA No. 10215.02. September 12, 2014.

⁵ Placer County. *Countywide General Plan Policy Document*. August 1994 (updated May 2013).

⁶ Placer County. *Countywide General Plan EIR*. July 1994.

⁷ Placer County. *Dry Creek-West Placer Community Plan*. Amended May 12, 2009.

Coast Ranges to the west and the Sierra Nevada foothills to the east. The following section describes the geology and seismicity of the project region.

Regional Geology

The geology of the DCWPCP area is generally categorized by sedimentary or metasedimentary rocks.⁸ Such underlying rock formations are primarily composed of alluvium, an unconsolidated sediment of relatively recent geologic age deposited by flowing water. The three general types of rocks found within the DCWPCP area fall into the following categories:

- Riverbank Formation – Pleistocene deposits of alluvium;
- Turlock Lake Formation – Pleistocene deposits of partially consolidated sand, silt, and gravel derived primarily from Sierran granitic and metamorphic rocks, generally found outside the Dry Creek floodplain; and
- Modesto-Riverbank Formation – Pleistocene deposits of alluvium generally found within the Dry Creek floodplain.

Regional Seismicity

A fault is defined as a fracture or zone of closely associated fractures along which rocks on one side have been displaced with respect to those on the other side. A fault zone is a zone of related faults that is commonly braided and subparallel, but may be branching or divergent. Movement within a fault causes an earthquake. When movement occurs along a fault, the energy generated is released as waves that cause ground shaking. Ground shaking intensity varies with the magnitude of the earthquake, the distance from the epicenter, and the type of rock or sediment the seismic waves move through.

The potential risk of fault rupture is based on the concept of recency and recurrence. The more recently a particular fault has ruptured, the more likely the fault would rupture again. The California Geological Survey defines an “active fault” as one that has had surface displacement within the past 11,000 years (Holocene). Potentially active faults are defined as those that have ruptured between 11,000 and 1.6 million years before the present (Quaternary). Faults are generally considered inactive if evidence of displacement is not present during the Quaternary. Per the California Department of Conservation, potentially active faults with Holocene-epoch surface displacement are not known to exist within the project region.

According to the Placer County General Plan, Placer County lies within a seismically active area of the western United States, but beyond the influence of the highly active faults found along California’s coast. The western portion and central portions of the County are generally characterized by low seismicity, while the eastern area of the County in the vicinity of Lake Tahoe has relatively higher seismicity.⁹ The areas of Placer County with the largest groundshaking risk are in the vicinity of Stampede Valley and Tahoe faults in the Truckee-Tahoe area.

⁸ Placer County. *Dry Creek-West Placer Community Plan* [pg. 101-102]. Amended May 12, 2009.

⁹ Placer County. *Countywide General Plan EIR* [pg. 9-1]. July 1994.

Project Site Characteristics

The site comprises an assemblage of properties owned by four different titleholders: Placer Greens, Ogg, Haight, and Pruett; however, as noted above, the discussion contained in the following section applies to all the properties included in the project site, as well as any off-site improvement areas, unless otherwise stated.

The geologic conditions on the project site are discussed below in further detail, including descriptions of current soil conditions, seismic conditions, potential for earthquake-induced liquefaction, expansive soils, and underlying groundwater conditions. In addition, this section includes a description of known mineral resources within the project site.

Site Geology and Subsurface Soil Conditions

The project site is mapped as being underlain by the Turlock Lake Formation, which consists of sands, silts, and gravels deposited as alluvial fans over 600,000 years ago. Per Section 16.13.3.2 of the 2016 California Building Code (CBC), based on site soil properties, sites must be classified as either Site Classification A, B, C, D, E, or F, in accordance with Chapter 20 of the American Society of Civil Engineers (ASCE) 7 standards. The site classification system provides an indication of the seismic design force required for overlying structures. The Turlock Lake Formation has been identified as a material meeting Site Classification C, which is characterized by very dense soil and soft rock.

Soils are commonly identified by similar or dissimilar characteristics, such as the erosion potential, shrink-swell properties, permeability, available water capacity, and runoff potentials. In order to evaluate subsurface soils on the project site, Wallace Kuhl and Associates conducted drilling and sampling of numerous borings on each of the properties within the project site. The soil types encountered in each of the borings are summarized in Table 8-1 below. Further details of the soils on-site are included in the Geotechnical Engineering Reports, which are included in Appendix G to this EIR.

Seismicity and Ground Shaking

Ground shaking is described as strong ground motion of sufficient strength to affect people and their environment or ground movement recorded on a strong-motion instrument or seismograph. Ground shaking intensity is partly related to the size of an earthquake, distance to a site, and the response of the geologic materials that underlie a site. As a rule, the greater the earthquake magnitude and the closer the fault rupture to a site, the greater the intensity of ground shaking. Violent ground shaking is generally expected at and near the epicenter of a large earthquake; however, different types of geologic materials respond differently to earthquake waves. For example, deep unconsolidated materials can amplify earthquake waves and cause longer periods of ground shaking. In addition, some structures experience substantially more damage than others. The age, material, type, method of construction, size, and shape of a structure are all factors that contribute to how a structure performs during an earthquake.

Table 8-1 Subsurface Soil Conditions		
Property	Depth (feet below existing grade)	Soil Types
Haight	0 to 16.5	Variably cemented sandy and clayey silts and silty sands
	10 to 15	Discontinuous layer of very dense, clean sand
	0.5 to 5	Silty clays
Ogg	0 to 16	Variably cemented sandy and clayey silts and silty sands
	8.5 to 15	Discontinuous layer of very dense, clean sand
	0 to 5	Silty clays
Placer Greens	0 to 15	Alternating layers of dense and partially cemented sandy and clayey silts and silty sands
	1.5 to 2	Sandy and silty clays
25-acre Pruett	0 to 15.5	Alternating layers of sandy and clayey silts and silty sands
	0.5 to 2	Silty clays
Six-acre Pruett	0 to 14	Alternating layers of sandy and clayey silts and silty sands
	3.5	Discontinuous layer of clayey sand
	0 to 4	Undocumented fill
	1.5 to 2	Silty clays

Source: Wallace Kuhl and Associates, 2014.

According to Wallace Kuhl and Associates, the proposed project site is not underlain by any active faults and is not located within an Alquist-Priolo Fault Study Zone. Therefore, the proposed project site would not likely be subject to the high-intensity ground shaking typically associated with areas near active faults. Furthermore, as noted above, the western portion of Placer County, in which the proposed project site is located, is characterized by relatively low seismicity.

Liquefaction

Liquefaction is a phenomenon in which certain soils, when saturated with water and subjected to considerable seismic events, temporarily lose their solid structure and effectively move as a liquid and generate ground failure. The potential for liquefaction depends on the duration and intensity of earthquake shaking, particle size distribution of the soil, density of the soil, and elevation of the groundwater. Areas at risk due to the effects of liquefaction are typically those with a high groundwater table and underlying loose to medium-dense, granular sediments, particularly younger alluvium and artificial fill. Based on the results of subsurface exploration conducted on the project site, as well as known geologic, seismologic, groundwater, and soil conditions on the site, the potential for liquefaction to occur at the project site is very low. Additional details related to groundwater and soil conditions are discussed below.

Expansive Soils

Expansive soils are characterized by their ability to undergo significant volume change due to variation in moisture content. Changes in soil moisture content can result from rainfall, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or other factors and may cause unacceptable settlement of structures. According to Wallace Kuhl and Associates, laboratory testing of near-surface soils on the project site indicated that the majority of on-site soils have a

low expansion potential. However, the silty clays encountered on each of the five properties are capable of exerting significant expansion pressures on building foundations, interior floor slabs, and exterior flatwork.

Groundwater

Permanent groundwater was not encountered within the borings conducted on the project site, which extended to maximum depths of 14 to 16.5 feet below the existing grade. Per available California Department of Water Resources (DWR) records for a well approximately 0.5-mile northwest of the project site, ground measurements obtained from the well indicated a historic high groundwater elevation of +62 above mean sea level (msl) (approximately 80 feet below existing grades at the well) and a low groundwater elevation of -1 msl (approximately 143 feet below existing grades at the well). Based on the elevation of the project site (110 to 160 feet msl), the permanent groundwater table is likely to be at least 100 feet below the existing ground surface of the site. However, perched groundwater could potentially occur, especially during winter or early spring months.

Mineral Resources

The California Department of Conservation, Division of Mines and Geology, classifies land by various Mineral Resource Zones (MRZs) based on the presence, absence, or likely occurrence of significant mineral deposits. Per the Division of Mines and Geology, the proposed project site is classified as MRZ-4, indicating that significant resources are not expected to be present on the site based on existing geologic data.¹⁰ In addition, per the Phase I and Phase II Environmental Site Assessments (ESAs) prepared for the proposed project, the project site has not been formerly used for mineral resource extraction.

8.3 REGULATORY CONTEXT

The following section is a brief summary of the regulatory context under which soils, geology, seismic hazards, and mineral resources are managed at federal, State, and local levels.

Federal Regulations

Federal Earthquake Hazards Reduction Act

Passed by Congress in 1977, the Federal Earthquake Hazards Reduction Act is intended to reduce the risks to life and property from future earthquakes. The Act established the National Earthquake Hazards Reduction Program (NEHRP). The goals of NEHRP are to educate and improve the knowledge base for predicting seismic hazards, improve land use practices and building codes, and to reduce earthquake hazards through improved design and construction techniques.

¹⁰ California Department of Conservation, Division of Mines and Geology. *Mineral Land Classification of Placer County, California*. 1995.

International Building Code

The Uniform Building Code (UBC) was first published in 1927 by the International Council of Building Officials and is intended to promote public safety and provide standardized requirements for safe construction. The UBC was replaced in 2000 by the new International Building Code (IBC), published by the International Code Council (ICC), which is a merger of the International Council of Building Officials' UBC, Building Officials and Code Administrators International's National Building Code, and the Southern Building Code Congress International's Standard Building Code. The intention of the IBC is to provide more consistent standards for safe construction and eliminate any differences between the three preceding codes. All State building standard codes are based on the federal building codes.

State Regulations

The following are the State environmental laws and policies relevant to soils, geology, seismic hazards, and mineral resources.

Alquist-Priolo Earthquake Fault Zoning Act

The 1972 Alquist-Priolo Earthquake Fault Zone Act was passed to prevent the new development of buildings and structures for human occupancy on the surface of active faults. The Act is directed at the hazards of surface fault rupture and does not address other forms of earthquake hazards. The locations of active faults are established into fault zones by the Alquist-Priolo Zone Act. Local agencies regulate any new developments within the appropriate zones in their jurisdiction.

The Alquist-Priolo Zone Act regulates development near active faults so as to mitigate the hazard of surface fault rupture. The Alquist-Priolo Zone Act requires that the State Geologist (Chief of the California Department of Mines and Geology [CDMG]) delineate "special study zones" along known active faults in California. Cities and counties affected by these zones must regulate certain development projects within these zones. The Alquist-Priolo Zone Act prohibits the development of structures for human occupancy across the traces of active faults. According to the AP Zone Act, active faults have experienced surface displacement during the last 11,000 years. Potentially active faults are those that show evidence of surface displacement during the last 1.6 million years. A fault may be presumed to be inactive based on satisfactory geologic evidence; however, the evidence necessary to prove inactivity sometimes is difficult to obtain and may not exist.

Seismic Hazards Mapping Act

The California Seismic Hazards Mapping Act of 1990 (California Public Resources Code Section 1690-2699.6) addresses non-surface rupture earthquake hazards, including liquefaction, induced landslides, and subsidence. A mapping program is also established by this Act, which identifies areas within California that have the potential to be affected by such non-surface rupture hazards. The Seismic Hazards Mapping Act specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

California Building Standards Code

The State of California regulates development within the State through a variety of tools that reduce or mitigate potential hazards from earthquakes or other geologic hazards. The 2016 CBC California Code of Regulations (CCR), Title 24, governs the design and construction of all building occupancies and associated facilities and equipment throughout California. In addition, the CBC governs development in potentially seismically active areas and contains provisions to safeguard against major structural failures or loss of life caused by earthquakes or other geologic hazards. The California building standards include building standards in the IBC, building standards adapted from the IBC to meet California conditions, and building standards adopted to address particular California concerns.

Local Regulations

Relevant goals and policies from the Placer County General Plan and the DCWPCP, as well as various other local guidelines and regulations related to geology, soils, seismicity, and mineral resources, are discussed below.

Placer County General Plan

The following goals and policies from the Placer County General Plan are applicable to the proposed project:

- Policy 1K.4 The County shall require that new development incorporates sound soil conservation practices and minimizes land alterations. Land alterations should comply with the following guidelines:
- a. Limit cuts and fills;
 - b. Limit grading to the smallest practical area of land;
 - c. Limit land exposure to the shortest practical amount of time;
 - d. Replant graded areas to ensure establishment of plant cover before the next rainy season; and
 - e. Create grading contours that blend with the natural contours on site or with contours on property immediately adjacent to the area of development.
- Goal 8.A To minimize the loss of life, injury, and property damage due to seismic and geological hazards.
- Policy 8.A.2 The County shall require submission of a preliminary soils report, prepared by a registered civil engineer and based upon adequate test borings, for every major subdivision and for each individual lot where critically expansive soils have been identified or are expected to exist.
- Policy 8.A.3 The County shall prohibit the placement of habitable structures or individual sewage disposal systems on or in critically expansive soils unless suitable

mitigation measures are incorporated to prevent the potential risks of these conditions.

DCWPCP

The following policy from the Environmental Resources Management Element of the DCWPCP is applicable to the proposed project.

Policy 23 Require the application of measures which mitigate soil erosion and air and water pollution from earth-disturbing activities related to land development.

Placer County Code

Articles 15.01 and 15.48 of the Placer County Code are applicable to the proposed project and are summarized below.

California Building Codes

Article 15.01, California Building Codes, of the Placer County Code, includes definitions, standards, and enforcement guidelines to ensure all new development comply with the latest CBC. Section 15.04.121 outlines the violations and penalties for any person who violates or fails to comply with any of the provisions in Article 15.01 of the Code.

Grading Ordinance

Article 15.48, Grading, Erosion and Sediment Control, of the Placer County Code, establishes regulations to limit the pollution of watercourses with hazardous materials, nutrients, sediments, and/or other earthen materials on or caused by surface runoff. Per Section 15.48.580, all drainage facilities must be designed and engineered consistent with the West Placer Storm Water Quality Design Manual. Section 15.48.630 establishes erosion and sediment controls for grading operations, including, but not limited to, use of stabilization methods to control erosion, preservation of natural features, limiting of runoff discharged from the site, and limiting the transport of dust off the project site or into any drainage course or body of water.

8.4 IMPACTS AND MITIGATION MEASURES

The following section describes the standards of significance and methodology utilized to analyze and determine the proposed project's potential impacts related to geology, soils, and mineral resources. In addition, a discussion of the project's impacts, as well as mitigation measures where necessary, is also presented.

Standards of Significance

Consistent with Appendix G of the CEQA Guidelines and the County's Initial Study Checklist, a significant impact would occur if the proposed project would result in any of the following:

- Expose people or structures to unstable earth conditions or changes in geologic substructures;
- Result in significant disruptions, displacements, compaction or overcrowding of the soil;
- Result in substantial change in topography or ground surface relief features;
- Result in the destruction, covering or modification of any unique geologic or physical features;
- Result in any significant increase in wind or water erosion of soils, either on or off the site;
- Result in changes in deposition or erosion or changes in siltation which may modify the channel of a river, stream, or lake;
- Result in exposure of people or property to geologic and geomorphological (i.e. Avalanches) hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards;
- Be located on a geological 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;
- Be located on expansive soils, as defined in Chapter 18 of the California Building Code, creating substantial risks to life or property;
- The loss of availability of a known mineral resource that would be of value to the region and the residents of the state; and/or
- The loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

Method of Analysis

The analysis of the proposed project's impacts related to geology and soils is primarily based on the Geotechnical Engineering Reports prepared by Wallace Kuhl and Associates for the various properties on the project site. The Geotechnical Engineering Reports relied on a number of analytical tasks, including the following:

- A site reconnaissance;
- A review of historic USGS topographic maps and geologic maps of the site;
- A review of previous geotechnical reports prepared for other projects in the vicinity of the site;
- Subsurface exploration of each of the properties within the project site, including the drilling and sampling of 37 total borings to depths of approximately 9.0 to 16.5 feet below existing grades;
 - Borings were conducted with a CME-75 truck-mounted drill rig equipped with six-inch diameter solid helical augers. At various intervals, relatively undisturbed soil samples were recovered with a modified California sampler driven by an automatic 140-pound hammer freely falling 30 inches. The samples were visually classified by a field engineer and subsequently submitted for laboratory testing.
- Bulk sampling of on-site near-surface soils;
- Laboratory testing of selected soil samples;

- Engineering analysis; and
- Development of geotechnical engineering conclusions and recommendations for the design and construction of the proposed single-family structures and associated residential subdivision improvements.

Information regarding mineral resources was sourced from the California Division of Mines and Geology,¹¹ as well as the DCWPCP. The proposed project's components are compared to the existing conditions of the project site, and the standards of significance identified above to determine the severity of potential impacts.

Project-Specific Impacts and Mitigation Measures

If significant impacts are identified for the construction and operational phases of the proposed project, recommended mitigation measures have been included to reduce the identified impacts to less-than-significant levels.

8-1 Expose people or structures to unstable earth conditions or changes in geologic substructures, or result in exposure of people or property to geologic and geomorphological (i.e., Avalanches) hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards. Based on the analysis below, the impact is less than significant.

According to the Placer County General Plan, Placer County lies within a seismically active area of the western United States, but beyond the influence of the highly active faults found along California's coast. The western portion of the County, in which the proposed project is located, is generally characterized by low seismicity, and is not in an area at risk for severe ground shaking associated with earthquakes.¹² In addition, as discussed above, the proposed project site is not underlain by any active faults and is not located within an Alquist-Priolo Fault Study Zone. While lower-intensity earthquakes could potentially occur at the site, the design of all project structures would be required to adhere to the provisions of the 2016 CBC. The 2016 CBC contains provisions to safeguard against major structural failures or loss of life caused by earthquakes or other geologic hazards. Furthermore, because the project site does not contain any steep slopes and is not located at or near any active or potentially active faults, the risk of landslide, mudslide, ground failure, or similar hazards would not be substantial. Therefore, the proposed project would not expose people or structures to unstable earth conditions, changes in geologic substructures, or geologic and geomorphological (i.e., Avalanches) hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards. Consequently, a *less-than-significant* impact would occur.

Mitigation Measure(s)

None required.

¹¹ California Department of Conservation, Division of Mines and Geology. *Mineral Land Classification of Placer County, California*. 1995.

¹² Placer County. *Countywide General Plan EIR* [pg. 9-1]. July 1994.

8-2 Result in significant disruptions, displacements, compaction or overcrowding of the soil, or in substantial change in topography or ground surface relief features. Based on the analysis below and with implementation of mitigation, the impact is *less than significant*.

The most unique topographic feature of the site is the riparian corridor paralleling two unnamed tributaries to Dry Creek along the eastern portion of the Placer Greens property. Aside from the riparian corridor, the topography of the site consists primarily of gently rolling terrain, with elevations ranging from 110 to 160 feet msl.

The proposed project would include grading for building pads, roads, and other associated project improvements. However, as discussed in Chapter 3, Project Description, the riparian corridor and the immediate surrounding area would be owned and maintained by the homeowners association and protected from development. Grading would not occur within the riparian corridor. Furthermore, portions of the site have been previously developed with single-family residences, orchard trees, a commercial nursery, and various other structures.

Nonetheless, the proposed project would include site preparation, grading, paving, utility placement, and various other construction activities which would disrupt on-site soils. For example, the small knoll located along the northern boundary of the Placer Greens property, south of PFE Road, would be graded such that the development area would be essentially level. As such, soils on the project site would be reworked as necessary to support the development, potentially resulting in disruptions, displacements, compaction, or overcrowding of the soils. The proposed project would include modifications to the proposed project site that would alter the existing topography and ground surface relief features. Thus, the proposed project could result in significant disruptions, displacements, compaction or overcrowding of on-site soils, and/or substantial change in topography or ground surface relief features, and a *significant* impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the above impact to a *less-than-significant* level.

- 8-2(a) *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 Division (ESD) for review and approval. The plans shall show all physical improvements as required by the conditions for the project as well as pertinent topographical features both on and off site. All existing and proposed utilities and easements, on site 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, if applicable,*

Placer County Fire Department Improvement Plan review and inspection fees, with the 1st Improvement Plan submittal. (NOTE: Prior to plan approval, all applicable recording and reproduction costs 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. If the Design/Site Review process and/or Development Review Committee (DRC) review is required as a condition of approval for the project, said review process 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 ESD in both hard copy and electronic versions in a format to be approved by the ESD prior to acceptance by the County of site improvements.

Conceptual landscape plans submitted prior to project approval may require modification during the Improvement Plan process to resolve issues of drainage and traffic safety.

Any Building Permits associated with this project shall not be issued until, at a minimum, the Improvement Plans are approved by the ESD.

8-2(b) *The Improvement Plans shall show all proposed grading, drainage improvements, vegetation and tree removal and all work shall conform to provisions of the County Grading Ordinance (Ref. Article 15.48, Placer County Code) and Stormwater Quality Ordinance (Ref. Article 8.28, 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 a maximum of 2:1 (horizontal: vertical) unless a soils report supports a steeper slope and the Engineering and Surveying Division (ESD) concurs with said recommendation.*

The applicant shall revegetate all disturbed areas. 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 ensure proper installation and maintenance of erosion control/winterization before, during, and after project construction. Soil stockpiling or borrow areas, shall have proper erosion control measures applied for the duration of the construction as specified in the Improvement 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 percent 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. One year after the County's acceptance of improvements as complete, if there are no erosion or runoff issues to be corrected, 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.

8-2(c) *The Improvement Plan submittal shall include a final geotechnical engineering report produced by a California Registered Civil Engineer or Geotechnical Engineer for Engineering and Surveying Division (ESD) review and approval. The report shall address and make recommendations on the following:*

- A. Road, pavement, and parking area design;*
- B. Structural foundations, including retaining wall design (if applicable);*
- C. Grading practices;*
- D. Erosion/winterization;*
- E. Special problems discovered on-site, (i.e., groundwater, expansive/unstable soils, etc.); and*
- F. Slope stability.*

Once approved by the ESD, two copies of the final report shall be provided to the ESD and one copy to the Building Services Division for its use. 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.

8-3 Result in destruction, covering or modification of any unique geologic or physical features. Based on the analysis below, the impact is *less than significant*.

As discussed in Chapter 7, Cultural Resources, of this EIR, unique geologic features are not known to exist within the proposed project site. Specifically, according to a

Paleontological Records Search prepared for the proposed project, geologic maps show that the general area of the proposed project site consists solely of Pleistocene alluvial sediments.¹³ The sediments, from youngest to oldest, are the Modesto Formation (Qm), the Riverbank Formation (Qr), undifferentiated Modesto-Riverbank formations (Qmr), and the Turlock Lake Formation (Qtl). The widespread Turlock Lake Formation covers the entire project site. Therefore, the proposed project would not result in the destruction, covering or modification of any unique geologic or physical features, and a *less-than-significant* impact would occur.

Mitigation Measure(s)

None required.

8-4 Result in any significant increase in wind or water erosion of soils, either on or off the site, or result in changes in deposition, erosion, or siltation which may modify the channel of a river, stream, or lake. Based on the analysis below and with implementation of mitigation, the impact is *less than significant*.

Buildout of the proposed project would involve construction-related activities, including utility excavation, grading, and leveling of the site. During such stages of construction, and prior to overlaying the ground surface with structures, the potential exists for wind erosion to occur, which could affect the project area and potentially inadvertently transport eroded soils to downstream drainage facilities.

Improvement Plans provided to the County prior to authorization of construction would conform to provisions of the County Grading Ordinance (Article 15.48 of the Placer County Code) and the Stormwater Quality Ordinance (Article 8.38 of the Placer County Code) that are in effect at the time of submittal. The preparation of and compliance with a stormwater pollution prevention plan (SWPPP) would be part of the project's NPDES construction stormwater quality permit, issued by the Central Valley Regional Water Quality Control Board (CVRWQCB). Before Improvement Plan approval, the Placer County ESD would require evidence of the State-issued Waste Discharge Identification Number or filing of the Notice of Intent and fees. The SWPPP would include strategies to manage stormwater from the construction site and treat runoff before being discharged from the site. The site-specific SWPPP developed for the project would have protocols to be followed and monitored during construction, including effective response actions if necessary. The SWPPP is considered a "living document" that could be modified as construction activities progress.

Topsoil exposure would be temporary during early construction activities; upon development of the site with buildings and structures, as well as landscaped ground cover, the amount of exposed soil that may be lost or displaced due to wind would be minimized. As such, development on the project site would preclude erosion, and erosion would not be considered an issue during operation of the proposed project.

¹³ Kenneth L. Finger. *Paleontological Records Search for the Placer Greens Project (PLN15-00053)*. October 6, 2015.

Nevertheless, due to the potential exposure of topsoil on the proposed project site during construction activities, implementation of the proposed project could result in a significant increase in wind or water erosion of soils, either on or off the site, and result in changes in deposition, erosion, or siltation which could modify the channel of downstream water bodies. Thus, a *significant* impact associated with such could occur.

Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the above impact to a *less-than-significant* level.

8-4(a) *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 Division [ESD] such as the Stormwater Quality Design Manual for the Sacramento and South Placer Regions).*

Construction (temporary) BMPs for the project may include, but are not limited to: Fiber Rolls (SE-5), Straw Bale Barrier (SE-9), Straw Wattles, Storm Drain Inlet Protection (SE-10), Velocity Dissipation Devices (EC-10), Silt Fence (SE-1), Wind Erosion Control (WE-1), Stabilized Construction Entrance (TC-1), Hydroseeding (EC-4), revegetation techniques, and dust control measures.

8-4(b) *Prior to construction commencing, the applicant shall provide evidence to the ESD of a WDID number generated from the State Regional Water Quality Control Board's Stormwater Multiple Application & Reports Tracking System (SMARTS). This serves as the Regional Water Quality Control Board approval or permit under the National Pollutant Discharge Elimination System (NPDES) construction stormwater quality permit.*

8-5 Be located on a geological 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, or on expansive soils, as defined in Chapter 18 of the California Building Code, creating substantial risks to life or property. Based on the analysis below and with implementation of mitigation, the impact is *less than significant*.

Issues associated with unstable geologic units and/or soils, including lateral spreading, subsidence, liquefaction, collapse, and expansive soils are discussed below.

Lateral Spreading

Lateral spreading is associated with terrain near free faces such as excavations, channels, or open bodies of water. Currently, the most substantial slope on the project site is located at the riparian corridor adjacent to the eastern boundary of the Placer Greens property. As discussed previously, the riparian corridor and the immediate surrounding area would be owned and maintained by the homeowners association and protected from development. As such, the proposed project would not be subject to risks related to lateral spreading.

Subsidence

Subsidence, or settlement, occurs when loose, sandy soils settle during earthquake shaking. As noted previously, while lower-intensity earthquakes could potentially occur at the site, the design of all project structures would be required to adhere to the provisions of the 2016 CBC. Therefore, subsidence-related risks would not occur.

Liquefaction

Liquefaction is a type of seismic-related ground failure in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Liquefaction is most likely to occur in water-saturated silts, sands, and gravels having low to medium density. Based on the results of the subsurface exploration conducted by Wallace Kuhl and Associates, the potential for liquefaction to occur at the site is low.¹⁴ It should be noted that the permanent groundwater table is indicated to be at least 100 feet below the existing ground surface, and would not be a significant factor in design, construction, or performance of the proposed structures.

Collapse

As noted above, all structures included in the proposed project would be designed in accordance with the adopted edition of the CBC requirements in place at the time of construction. Structures built according to the seismic design provisions of current building codes would be able to resist major earthquakes without collapse, but with some structural, as well as non-structural damage. Given the project's adherence to the CBC requirements, the proposed project would not be subject to risks associated with building collapse.

Expansive Soils

Laboratory testing of near-surface soils on the project site indicated that the majority of on-site soils have a low expansion potential. However, the silty clays encountered in some of the exploratory borings on-site are capable of exerting significant expansion pressures on

¹⁴ Wallace Kuhl and Associates. *Geotechnical Engineering Report, 12-Acre Haight Property* [pg. 5].; Wallace Kuhl and Associates. *Geotechnical Engineering Report, 19-Acre Ogg Property* [pg. 5]; Wallace Kuhl and Associates. *Geotechnical Engineering Report, Placer Greens Property* [pg. 5]; Wallace Kuhl and Associates. *Geotechnical Engineering Report, 25-Acre Pruett Property* [pg. 5]; and Wallace Kuhl and Associates. *Geotechnical Engineering Report, 6-Acre Pruett Property* [pg. 5].

building foundations, interior floor slabs, and exterior flatwork. Specific recommendations to reduce the effects of expansive soils, including moisture conditioning and presaturation of the slab subgrade, are presented in the Geotechnical Engineering Reports prepared for the proposed project.

Conclusion

Based on the above, development of the site with single-family residences would not result in substantial risks related to on- or off-site landslide, lateral spreading, liquefaction, or collapse. In addition, all grading activities would be required to comply with the County's Grading and Erosion Prevention Ordinance (Article 15.48 of the County Code), which provides specific regulations related to excavation, fill placement, fill compaction, ground preparation for fill placement, and fill slopes. Compliance with the Ordinance would help to minimize adverse effects related to on-site soils. While the project would involve development of structures on potentially expansive soils, specific recommendations have been included in the Geotechnical Engineering Reports to ensure that expansive soils would not pose a substantial risk to the project. However, implementation of such recommendations would be required in order to ensure adequate support of the proposed improvements. Therefore, the proposed project could potentially create substantial risks to life and/or property associated with expansive soils, and a *significant* impact associated with expansive soils could occur.

Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the above impact to a *less-than-significant* level.

8-5(a) *Implement Mitigation Measure 8-2(c).*

8-5(b) *For pad graded lots, prior to final acceptance of project improvements or consideration of early Building Permits, and after the completion of the pad grading for all lots, the applicant shall submit to the Engineering and Surveying Division (ESD) for review and approval a soil investigation of each lot produced by a California Registered Civil or Geotechnical Engineer (Section 17953-17955 California Health and Safety Code). Once approved by the ESD, two copies of the final soil investigation and certification for each lot shall be provided to the ESD and one copy to the Building Services Division for its use.*

The soil investigations shall include recommended corrective action that is likely to prevent structural damage to each proposed dwelling. In addition, the applicant shall include in the Development Notebook (or modify the Development Notebook) to include the soil problems encountered on each specific lot as well as the recommended corrective actions. A note shall be included on the Improvement Plans, Conditions, Covenants and Restrictions (CC&Rs), and the Informational Sheet filed with the Final Subdivision Map(s), which indicates the requirements of this condition.

If the soils report indicates the presence of critically expansive or other soil problems that, if not corrected, could lead to structural defects, a certification of completion of the requirements of the soils report shall be required for subdivisions, prior to issuance of Building Permits. This certification may be completed on a lot-by-lot basis or on a tract basis.

8-6 The loss of availability of a known mineral resource that would be of value to the region and the residents of the State, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. Based on the analysis below, the impact is *less than significant*.

According to the California Division of Mines and Geology, significant mineral resources are not expected to be present on the proposed project site based on existing geologic data.¹⁵ In addition, per the Phase I and Phase II Environmental Site Assessments (ESAs) prepared for the proposed project, the project site has not been formerly used for mineral resource extraction. The DCWPCP does not identify mineral resources within the project area. Therefore, development of the proposed project site with residential uses would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. Thus, a *less-than-significant* impact would occur.

Mitigation Measure(s)

None required.

¹⁵ California Department of Conservation, Division of Mines and Geology. *Mineral Land Classification of Placer County, California*. 1995.