8 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 Whitehawk I (WHI) and Whitehawk II (WHII) project sites and evaluates the extent to which implementation of the proposed projects could be affected by unstable earth conditions and various geologic and geomorphic hazards. In addition, the chapter evaluates known mineral resources on the project sites and evaluates any potential adverse effects of the proposed projects on the availability of such resources.

Information from this chapter is primarily drawn from Geotechnical Engineering Reports prepared by Wallace Kuhl & Associates (WKA) for the WHI and WHII properties (see Appendix F)[1]. In addition, information was sourced from the Placer County General Plan,[2] the Placer County General Plan EIR,[3] and the Granite Bay Community Plan (GBCP).[4]

8.2 Existing Environmental Setting

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

Regional Setting

The proposed WHI and WHII project sites are located within the western portion of the GBCP area. The GBCP area is situated in the western foothills of the Sierra Nevada, at the eastern edge of the Sacramento Valley. The Sierra Nevada is a large fault block composed of granitic and metamorphic rocks tilted gently from the summit near Donner Lake to the west, where the block dips under the sedimentary and alluvial units of the valley. Most of the GBCP area is underlain by granitic rocks. The granitic rocks were intruded in molten form at great depth into layered sedimentary and volcanic rocks, which were folded, faulted, crushed, and uplifted. In the process, the layered rocks were metamorphosed into amphibolite, greenstone, slates, and phyllites. The band of metamorphic rocks trends slightly west of north and has been called the "Mother Lode" because of the gold-rich quartz veins that were intruded along steep faults in the metamorphic rocks.

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1 Wallace Kuhl & Associates. *Geotechnical Engineering Report Addendum, Beaver Creek, Douglas Boulevard, Granite Bay, California, WKA No. 10191.02.* July 29, 2014.
Wallace Kuhl & Associates. *Geotechnical Engineering Report, Creekside Oaks, WKA No. 10110.02.* June 18, 2014.

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

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

4 Placer County. *Granite Bay Community Plan.* Adopted February 28, 2012.

The highly weathered decomposed granite under the soil, or in some cases at the surface, has very low permeability. Ground water occurs only in small openings along fractures. The amount of groundwater within the GBCP area's fracture system is of more limited quantity than in the northern half of the Loomis Basin. Stream erosion during the episodic uplifts of the Sierra Nevada, combined with varied volcanic activity, has produced the variety of sedimentary rock units present in the plan area. Erosion and sedimentation have led to the formation of alluvial deposits. Weathering has produced the present-day landscape. Rounded hills of decomposed granite, scattered outcrops of more resistant rocks, and steep bluffs supported by the Mehrten conglomerate or volcanics are dominant elements of Granite Bay.

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 Coast Ranges to the west of Granite Bay contain numerous active faults that are associated with the northwest-trending San Andreas Fault system, including the Hayward and Calaveras faults. The Coast Ranges-Sierran Block boundary zone, which follows the physiographic boundary between the Coast Ranges and the Great Valley, contains potentially active "blind" thrust faults, such as the Midland Fault. Based on the size of historical events and on the inferred segmentation of the boundary zone, the "blind" thrust faults are capable of producing moderate to large earthquakes. In addition, active faults located to the east of Granite Bay, including the Cleveland Hills and Carson Valley Faults, as well as older, less-active faults (i.e., pre-Holocene in age, or greater than 11,000 years before present) associated with the Foothill Fault System in the Sierra Nevada foothills. Furthermore, the eastern range of the Sierra Nevada is bordered by a series of active faults associated with the Sierra Nevada Frontal Fault System.[5]

Active faults are not known to exist within the GBCP area. The Willows fault, located near the middle of Granite Bay, is believed to have been inactive since the beginning of the Pleistocene epoch. While the aforementioned fault systems in the greater project region could result in limited seismic ground shaking in Granite Bay, the GBCP area is considered relatively seismically inactive.

Project Site Geologic and Mineral Characteristics

The existing conditions of the WHI and WHII sites are discussed below, including descriptions of the site geology, current soil and rock conditions, seismic conditions, potential for earthquake-

[5] Placer County. *Granite Bay Community Plan* [pg. 71]. Adopted February 28, 2012.

induced liquefaction, expansive soils, and underlying groundwater conditions. In addition, the following section includes a description of known mineral resources within both project sites.

Site Geology

WHI and WHII

The northern portions of both the WHI and WHII project sites are mapped as being underlain by Mesozoic granodiorite rock, commonly referred to as the Rocklin and Penryn Plutons. The granitic rock units are a large-scale intrusive body that is part of a series of magmatic intrusions that helped to form portions of the Sierra Nevada Mountains. The rock is typified as a light gray, coarse-grained igneous rock. The bedrock unit likely extends to depths of thousands of feet beneath the surface of the project sites. The central portions of both project sites are mapped as containing mine and dredge tailings from previous mining activities. The dredge tailing materials generally consist of loose sands and gravels placed by mining equipment in areas where mining excavations have taken place. The southern portions of the project sites are mapped as being underlain by Eocene-aged sedimentary material of the Ione Formation. The Ione Formation is composed of claystones and sandstones with occasional layers of lignite.

The soil and rock conditions encountered throughout the project sites during field explorations conducted by WKA in 2014 are generally consistent with the Mesozoic granodiorite rock and dredge tailings previously mapped on the sites. Rock and soil conditions associated with the Ione Formation, which were previously mapped within the southern portions of the project sites, were not observed in the test pits evaluated by WKA. However, such soils may exist in other areas on-site that were not explored. Specific soils encountered on the WHI and WHII sites are discussed in greater detail below.

Soil Conditions

WHI

On July 11, 2014, WKA observed the excavation and sampling of six test pits (TP1 through TP6) on the WHI site (formerly known as, and referred to as such in the WKA report, “Beaver Creek Estates”). The soil conditions encountered by in TP1, TP2, TP5 and TP6 generally consisted of approximately 1.5 to 7.5 feet of sandy silt and/or silty sand underlain by variably weathered rock. The highly weathered rock encountered is similar to a sandy soil and is commonly referred to as "decomposed granite". Upon excavation, the materials broke down primarily into silty, fine to coarse sand. The degree of weathering decreases with depth and becomes harder to excavate. A discontinuous, one-foot thick layer of sandy gravel was encountered in TP1 at a depth of approximately 1.5 feet below existing site grades. Dredge tailings were encountered in TP3 and TP4 from the surface extending to depths ranging from two to five feet below existing site grades. The dredge tailings were underlain by poorly graded sand, highly weathered granodiorite rock (decomposed granite) and cemented, sandy silt to the maximum depth explored of approximately 10 feet below existing site grades.

WHII

On May 14, 2014, WKA observed the excavation and sampling of 10 test pits (TP1 through TP10) on the WHII site (formerly known as, and referred to as such in the WKA report, "Creekside Oaks"). The soil conditions encountered in the test pits generally consisted of approximately one to three feet of silty, fine to coarse sand underlain by variably weathered decomposed granite. Similar to soils encountered on the WHI site, upon excavation, the materials broke down primarily into clayey and silty, fine to coarse sand. A discontinuous, one-foot thick layer of clayey sand was encountered in TP1 and TP8 at a depth of approximately three feet below existing site grades. Dredge tailings were encountered in TP4 and TP6 from the surface extending to the maximum depth explored of approximately 10 feet below existing site grades. Excavations within TP4 and TP6 did not encounter undisturbed native soils within 10 feet of existing grades. Discontinuous layers of sandy silt and sandy gravel were encountered in TP7 at depths of approximately three to six feet and six to ten feet below existing grades, respectively.

Seismicity and Ground Shaking

WHI and WHII

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. 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.

The proposed project sites are not underlain by any active faults and are not located within an Alquist-Priolo Fault Study Zone. Therefore, the proposed project sites would not likely be subject to the high-intensity ground shaking typically associated with areas near active faults. Furthermore, as noted above, the GBCP area, in which the proposed project sites are located, is characterized by relatively low seismicity.

Liquefaction

WHI and WHII

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 both project sites by WKA, as well as known geologic, seismologic, groundwater, and soil conditions on the sites, the potential for liquefaction to occur at the WHI site or the WHII site is very low.[6]

Expansive Soils

WHI and WHII

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 WKA, soils on the project sites have a very low to low expansion potential.[7]

Dredge tailing often contain clay deposits, commonly referred to as "slickens". Slickens are highly plastic and typically possess a high expansion potential and can be detrimental to structures. WKA did not encounter slickens within test pits; however, if encountered during grading, slickens should be removed per the recommendations included in the geotechnical reports.

Groundwater

WHI and WHII

Permanent groundwater was not encountered within the test pits on the project sites, which extended to the maximum depth explored of approximately 10 feet below existing site grades. The permanent groundwater table is indicated to be at a depth of at least 100 feet below existing site grades. However, perched groundwater could potentially occur during winter or early spring months.

Mineral Resources

WHI

Valuable locally important mineral resources have not been identified on the WHI site. According to the Department of Conservation's *Mineral Land Classification of Placer County*,

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6 WKA, *Geotechnical Report Addendum for Beaver Creek*, [pg.7]. July 29, 2014.
WKA, *Geotechnical Engineering Report for Creekside Oaks*, [pg.6]. June 18, 2014.

7 WKA, *Geotechnical Report Addendum for Beaver Creek*, [pg.8]. July 29, 2014.
WKA, *Geotechnical Engineering Report for Creekside Oaks*, [pg.7]. June 18, 2014.

the northwest corner of the property is classified as MRZ-3a for placer gold resources.[8] MRZ-3a is an area of undetermined mineral resource significance and known mineral occurrence. The zone encompasses tertiary gravel deposits previously mined or prospected for placer gold, but whose economic significance cannot be evaluated based on available information. The majority of the WHI site is classified at MRZ-1, an area of no mineral resource significance. For sand and gravel, crushed stone, decomposed granite, clay, shale, quartz, and chromite, the WHI site is classified MRZ-4, an area of no known mineral occurrences where geologic information does not rule out either the presence or absence of significant mineral resources.

WHII

Valuable locally important mineral resources have not been identified on the WHII site. According to the Department of Conservation's *Mineral Land Classification of Placer County*, the project site is classified as MRZ-1, an area of no mineral resource significance, for placer gold. For sand and gravel, crushed stone, decomposed granite, clay, shale, quartz, and chromite, the WHII site is classified MRZ-4, an area of no known mineral occurrences where geologic information does not rule out either the presence or absence of significant mineral resources.

Other Unstable Soil

This section addresses potential unstable soils as a result of remnant mining features.

WHI

The WHI site does not contain remnant mining features that could pose soil stability issues.

WHII

The WHII site contains an open pit or possible collapsed mine shaft measuring 10-feet by 17-feet, and 15-feet deep. A metal water pipe protrudes from the pit/shaft, and modern fragments of steel and milled timber were found adjacent to the feature. It is located approximately 150 feet south of Strap Ravine and north of a concentrated area of dredge mining tailings. Though the age of the feature is unknown, the pit/shaft is likely related to mineral exploitation along Strap Ravine.

The pit/shaft is in poor condition, with erosion and tree roots impacting the feature. Except for the remains of mineral extraction in the form of dredge tailings, no other disturbances or impacts are noted in the vicinity of the resource.

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

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.

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 the special study

zones must regulate certain development projects within the special study 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 California Building Code (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 GBCP, 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 projects:

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.

Granite Bay Community Plan

The relevant goals and policies from the GBCP related to geology, soils, and mineral resources are presented below.

Goal 5.2.1 Preserve and protect the natural features and resources of the community, which is essential to maintaining the quality of life within the community.

Policy 5.3.10 The standards of the Placer County Grading Ordinance and this Resources section of the Granite Bay Community Plan shall be implemented for all projects in the Granite Bay area.

Goal 8.2.1 Protect the lives and property of the citizens of the Granite Bay area from unacceptable risk resulting from seismic and geologic hazards.

Policy 8.2.1 Maintain strict enforcement of seismic safety standards for new construction contained in the Uniform Building Code.

Policy 8.2.2 Review future developments using all available seismic data and considering recommendations from the Health and Safety Chapter of the Countywide General Plan Policy Document.

Policy 8.2.3 Require soils or geologic reports for construction or extensive grading in identified geologic hazard areas.

Placer County Code

Articles 15.01 and 15.48 of the Placer County Code are applicable to the proposed projects 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

This section describes the standards of significance and methodology utilized to analyze and determine the proposed projects' potential impacts related to geology, soils, and mineral resources. In addition, a discussion of the projects' 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 projects 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 CBC, 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 projects' impacts related to geology and soils is primarily based on the Geotechnical Engineering Reports prepared by WKA for both the WHI and WHII sites. The Geotechnical Engineering Reports relied on a number of analytical tasks, including the following:

- Site reconnaissance;
- A review of historic U.S. Geological Service (USGS) topographic maps and geologic maps of the sites;
- A review of previous geotechnical reports prepared for other projects in the vicinity of the sites, as well as the previous 2005 geotechnical report prepared for the WHI property;
- Subsurface exploration of WHI and WHII, including the excavation of six test pits on the WHI site and 10 test pits on the WHII site, to a maximum depth of approximately 10 feet below existing site grade;
    - Test pits were performed by using a Case 580 rubber-tired backhoe equipped with a 24-inch wide bucket. At various intervals, relatively undisturbed soil samples were recovered with a 2'V2-inch O.D., 2-inch I.D. sampler driven by a 10-pound, hand-operated slide hammer. The samples were retained in 2-inch diameter by 6-inch long thin-walled brass tubes contained within the sampler. Immediately after recovery, the soils in the tubes were visually classified by the field engineer and the ends of the tubes were sealed to preserve the natural moisture contents.
- 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.

Project-Specific Impacts and Mitigation Measures

As discussed in Chapter 3, Project Description, of this EIR, although the County has elected to evaluate both the WHI and WHII projects in a single EIR, it is reasonable to consider WHI and WHII as separate projects under the independent utility test, given that each proposal has independent utility and is not necessary for the other to proceed. As such, the following discussion analyzes the potential impacts of the WHI and WHII projects separately. In addition, each impact statement includes an analysis of the combined effects of the two projects.

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, or be located 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, the impact is *less than significant*.

WHI

The WHI project would include subdivision of the WHI site into 24-single-family lots, along with development of park areas and various associated on- and off-site improvements. 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 WHI site is located, is generally characterized by low seismicity, and is not in an area at risk for severe ground shaking associated with earthquakes.[9] 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 proposed WHI 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 WHI site does not contain any steep, unvegetated 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. As discussed previously, the soils encountered on the WHI site were determined by WKA to possess a low expansion potential.[10] Therefore, the WHI project would not expose people or structures to unstable earth conditions, changes in geologic substructures, or geologic and geomorphological hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards.

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

10 Wallace Kuhl & Associates. *Geotechnical Engineering Report Addendum, Beaver Creek, Douglas Boulevard, Granite Bay, California, WKA No. 10191.02* [pg. 8]. July 29, 2014.

WHII

The WHII project would include subdivision of the WHII site into 55-single-family lots, along with development of park areas and various associated on- and off-site improvements. Similar to the WHI project, the WHII 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 WHII site, the design of all proposed WHII structures would be required to adhere to the provisions of the 2016 CBC. Furthermore, because the WHII site does not contain any steep, unvegetated 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. The soils encountered on the WHII site were determined by WKA to possess a very low to low expansion potential.[11] Therefore, the WHII project would not expose people or structures to unstable earth conditions, changes in geologic substructures, or geologic and geomorphological hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards.

WHI and WHII

In the event that both the WHI and WHII projects are approved and constructed, combined geologic hazard effects would not result, as such effects are site-specific.

Conclusion

Based on the above, impacts related to exposure of people or structures to unstable earth conditions or changes in geologic substructures, or result in exposure of people or property to geologic and geomorphological hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards, or being located on expansive soils, as defined in Chapter 18 of the CBC, creating substantial risks to life or property, would be ***less-than-significant*** for the WHI and WHII projects, both individually and combined.

Mitigation Measure(s)
None required.

[11] Wallace Kuhl & Associates. *Geotechnical Engineering Report, Creekside Oaks, WKA No. 10110.02* [pg. 7]. June 18, 2014.

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.*

WHI

To construct the improvements proposed at the WHI site, disruption of soils on-site would occur, including excavation/compaction for the residential lots and circulation improvements, foundations, and various utilities. Approximately 9.6 acres of the WHI site would be disturbed by grading activities, with a total of 17,820 cubic yards (CY) of cut and the need for 40,100 CY of fill, which would require approximately 22,280 CY of fill to be imported (see Figure 8-1). In addition, the WHI project would include construction of retaining walls. Therefore, the WHI project could result in disruptions, displacements, compaction or overcrowding of the soil, or in substantial change in topography or ground surface relief features.

WHII

To construct the improvements proposed at WHII site, disruption of soils on-site would occur, including excavation/compaction for the residential lots and circulation improvements, foundations, and various utilities. Approximately 18.4 acres of the WHI site would be disturbed by grading activities, with a total of 14,240 CY of cut and the need for 78,000 CY of fill, which would require approximately 63,760 CY of fill to be imported (see Figure 8-2). In addition, the WHII project would include construction of retaining walls. Therefore, the WHII project could result in disruptions, displacements, compaction or overcrowding of the soil, or in substantial change in topography or ground surface relief features.

WHI and WHII

The WHI and WHII projects would include disturbance of a total of approximately 30.22 acres during grading activities and import of approximately 86,040 CY of fill. Thus, the combined development of the WHI and WHII projects could result in significant disruptions, displacements, compaction or overcrowding of on-site soils, and/or substantial change in topography or ground surface relief features.

In addition, for both project sites, WKA anticipates that the majority of the soils and severely to moderately weathered rock should be excavatable with conventional excavation equipment. However, the weathered granitic rock at the sites would present varying excavation conditions due to differential weathering of the rock. Isolated areas of hard, unexcavatable rock could be encountered during earthwork and utility excavation that will likely require large, heavy-duty excavation equipment equipped with pneumatic jack hammers or blasting to excavate. The on-site soils and weathered rock are anticipated to be excavatable with near-vertical sidewalls without significant caving, unless saturated soils are encountered.

Figure 8-1
Preliminary Grading and Drainage Plan: WHI

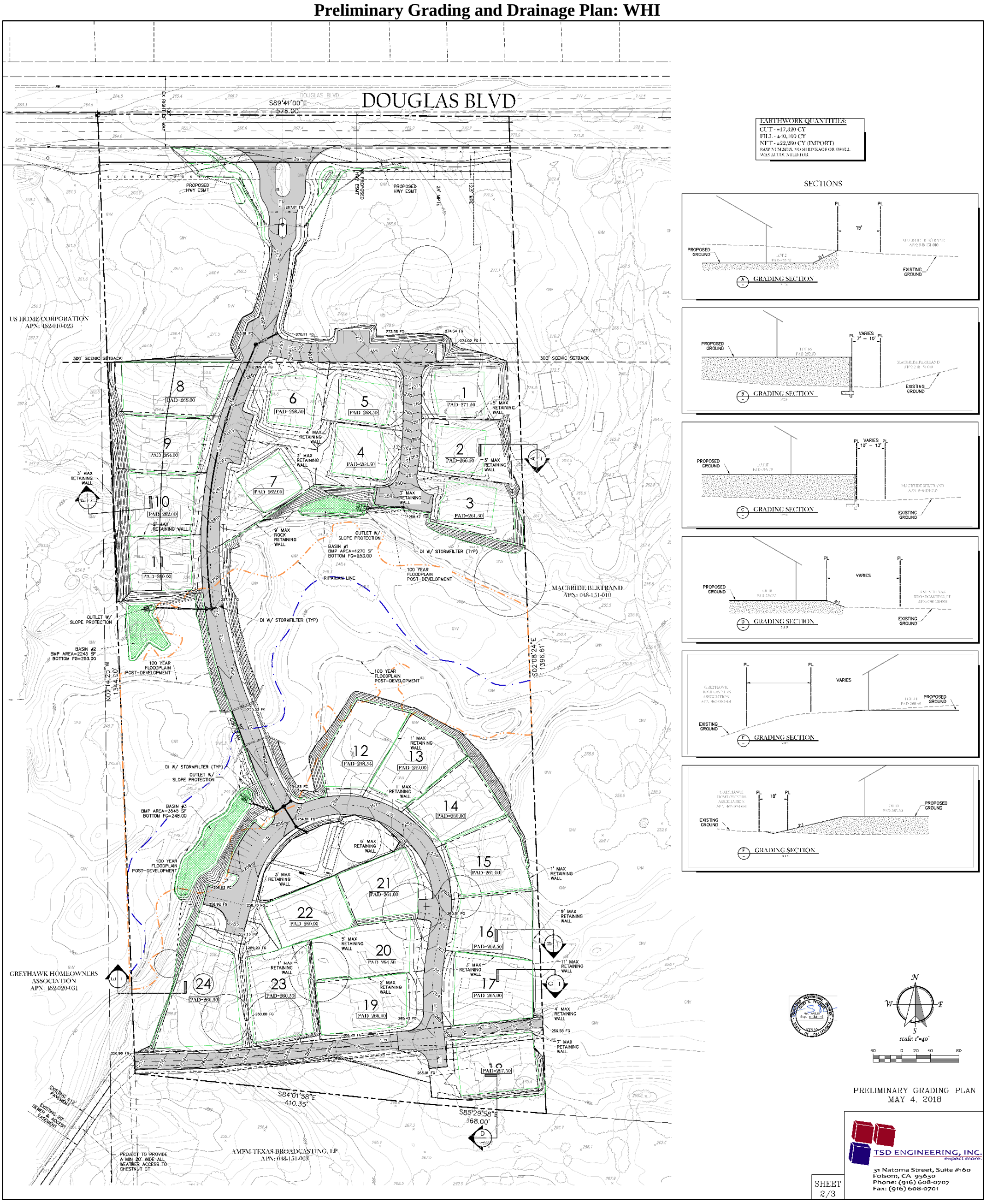
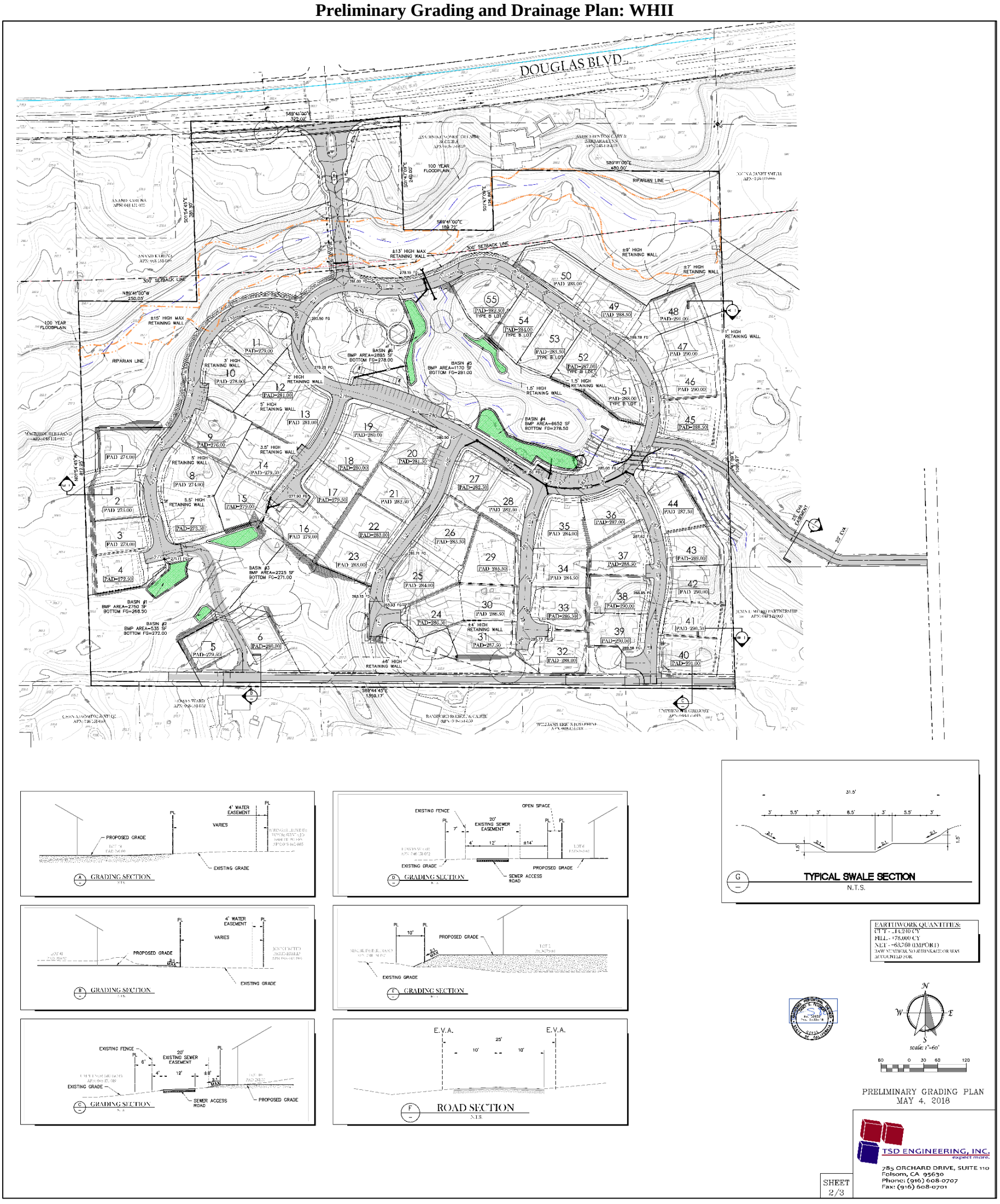


Figure 8-2
Preliminary Grading and Drainage Plan: WHII



Conclusion

Based on the above, the WHI and WHII projects could result in significant disruptions, displacements, compaction or overcrowding of on-site soils, and/or substantial change in topography or ground surface relief features. Thus, 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.

WHI and WHII

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 projects as well as pertinent topographical features both on and off site. All existing and proposed utilities and easements, on site and adjacent to the projects, 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.*

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

The Final Subdivision Map(s) shall not be submitted to the Engineering and Surveying Division (ESD) until the Improvement Plans are submitted for the second review. Final technical review of the Final Subdivision Map(s) shall not conclude until after the Improvement Plans are approved by the ESD.

Prior to the County's final acceptance of the project's improvements, submit to the Engineering and Surveying Division one copy of the Record Drawings in digital format (on compact disc or other acceptable media) along with one blackline hardcopy (black print on bond paper) and one PDF copy. The digital format is to allow integration with Placer County's Geographic Information System (GIS). The final approved blackline hardcopy Record Drawings will be the official document of record. ***(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 Engineering and Surveying Division (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. ***(ESD)***

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. 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 Engineering and Surveying Division (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.

If the geotechnical engineering 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. This shall be so noted on the Improvement Plans, in the Development Notebook (if required), in the Conditions, Covenants and Restrictions (CC&Rs), and on the Informational Sheet filed with the Final Subdivision Map(s). ***(ESD)***

8-2(d) *The Improvement Plan(s) shall identify the stockpiling and/or vehicle staging areas with locations as far as practical from existing dwellings and protected resources in the area.* ***(ESD)***

8-2(e) *Include the following standard note on the Improvement Plans: In the event of blasting, three copies of an approved plan and permit shall be submitted to the County not less than 10 days prior to the scheduled*

blasting. A blasting permit must be obtained from the Placer County Sheriff's Department for all blasting to be done in Placer County. Additionally, the County must be notified and give approval for all blasting done within County right-of-way. If utility companies are in the vicinity where blasting is to occur, the appropriate utility companies must be notified to determine possible damage prevention measures. If blasting is required, the blasting schedule shall be approved by the County and any other utility companies with facilities in the area prior to the commencement of work. ***(ESD)***

8-3 Result in any significant increase in wind or water erosion of soils, either on or off the site features, or result in changes in deposition or erosion or changes in 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*.

WHI and WHII

Development of the WHI and WHII projects would involve ground-disturbing activities such as grading and trenching for utilities. 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 Strap Ravine.

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 projects' National Pollutant Discharge Elimination System (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 sites and treat runoff before being discharged from the sites. The site-specific SWPPPs developed for the WHI and WHII projects 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 sites 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. However, due to the exposure of topsoil on the sites during construction activities, implementation of the projects could result in a significant increase in wind or water erosion of soils, either on or off the sites, and result in changes in deposition,

erosion, or siltation which could modify the channel of downstream water bodies, including Strap Ravine. Thus, 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.

WHI and WHII

8-3(a) *The Improvement Plans shall show water quality treatment facilities/Best Management Practices (BMPs) 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]).*

Storm drainage from on- and off-site impervious surfaces (including roads) shall be collected and routed through specially designed catch basins, vegetated swales, vaults, infiltration basins, water quality basins, filters, etc. for entrapment of sediment, debris and oils/greases or other identified pollutants, as approved by the Engineering and Surveying Division (ESD). BMPs shall be designed in accordance with the West Placer Storm Water Quality Design Manual for sizing of permanent post-construction Best Management Practices for stormwater quality protection. No water quality facility construction shall be permitted within any identified wetlands area, floodplain, or right-of-way, except as authorized by project approvals.

All permanent BMPs shall be maintained as required to ensure effectiveness. The applicant shall provide for the establishment of vegetation, where specified, by means of proper irrigation. Proof of on-going maintenance, such as contractual evidence, shall be provided to ESD upon request. The project owners/permittees shall provide maintenance of these facilities and annually report a certification of completed maintenance to the County DPWF Stormwater Coordinator, unless, and until, a County Service Area is created and said facilities are accepted by the County for maintenance. Prior to Improvement Plan or Final Subdivision Map approval, easements shall be created and offered for dedication to the County for maintenance and access to these facilities in anticipation of possible County maintenance. ***(ESD)***

8-3(b) *Prior to any construction commencing, the applicant shall provide evidence to the Engineering and Surveying Division 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 storm water quality permit. ***(ESD)***

8-4 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. Based on the analysis below and with implementation of mitigation, the impact is *less than significant*.

WHI

Issues associated with unstable geologic units and/or soils, including lateral spreading, subsidence, liquefaction, and collapse 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 slopes on the WHI site are located adjacent to Strap Ravine. However, Strap Ravine and the immediate surrounding area would be protected from development. Furthermore, given that the WHI project is not expected to be subject to severe seismic ground shaking, seismic-related ground failure risks, including lateral spreading, would be relatively minimal.

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 WHI 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

Based on the results of subsurface exploration conducted on both project sites by WKA, as well as known geologic, seismologic, groundwater, and soil conditions on the sites, the potential for liquefaction to occur at the WHI site is very low.[12] As such, the proposed residential structures would not be subject to substantial liquefaction risks.

Collapse

The project site is not located on a geologic unit that is unstable and could result in collapse. While significant cuts are proposed in some areas of the site during grading, these cuts would be supported by engineered retaining walls in accordance with CBC

[12] Wallace Kuhl & Associates. *Geotechnical Engineering Report Addendum, Beaver Creek, Douglas Boulevard, Granite Bay, California, WKA No. 10191.02* [pg.7]. July 29, 2014.

design standards. Given the project's required adherence to the CBC requirements, the WHI project would not be subject to risks associated with collapse.

WHII

Per the Geotechnical Engineering Report prepared for the WHII project, the findings associated with lateral spreading, subsidence, liquefaction, and collapse would be similar to the WHI project. However, as discussed in Chapter 7, Cultural Resources, of this EIR, an historic-era mining pit/shaft and smaller pits are located on the WHII site. The primary open pit or possible collapsed shaft measures 10 feet wide, 17 feet long, and 15 feet deep. A metal water pipe protrudes from the pit/shaft, and modern fragments of steel and milled timber were found adjacent to the feature. The feature is located 150 feet south of Strap Ravine and north of a concentrated area of dredge mining tailings. Additionally, smaller tailings piles and pits are scattered randomly near the recorded area of concentrated tailings. Should development occur on or near a mining pit or shaft within the WHII site, underlying soils may be incapable of supporting the proposed structures in the absence of site-specific design considerations. Therefore, the WHII project could be subject to issues related to unstable soils.

WHI and WHII

Neither the WHI project nor the WHII project would be subject to risks associated with lateral spreading, subsidence, liquefaction, and collapse. While the WHII site includes potentially unstable soils associated with historic mining activities, such features are site-specific and would not combine with WHI development to produce greater effects.

Conclusion

Based on the above, development of the WHI project would not result in any substantial risks related to unstable geologic units or soils, and a less-than-significant impact would occur. However, development of the WHII project could involve potential risks related to potentially unstable soils associated with historic mining activities. Thus, a ***significant*** impact could occur related to being located on a geological unit or soil that is unstable, or that would become unstable as a result of the WHII project.

Mitigation Measure(s)
Implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

WHII

8-4 *Prior to Improvement Plan approval for the WHII site, any open mine shafts, pits or surface openings on the property shall be assessed by a California licensed Professional Engineer or Geologist to determine structural stability. The method by which the opening shall be properly closed under the oversight of the professional engineer or geologist and*

certified safe for future development shall be submitted to the County prior to approval of the Improvement Plans. Once complete, notice shall be provided to the County from the hired professional that the work was completed to industry accepted standards. ***(EH)***

8-5 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*.

WHI and WHII

The presence of mineral resources within Placer County has led to a long history of gold extraction. However, quarries or mining sites are not active in the GBCP area and mineral resources that would be of value are not known to occur on the WHI site or in the site vicinity. The northwest corner of the property is classified as MRZ-3a for placer gold resources. MRZ-3a is an area of undetermined mineral resource significance and known mineral occurrence. The zone encompasses tertiary gravel deposits previously mined or prospected for placer gold, but whose economic significance cannot be evaluated based on available information. The majority of the WHI site is classified at MRZ-1, an area of no mineral resource significance. For sand and gravel, crushed stone, decomposed granite, clay, shale, quartz, and chromite, the WHI site is classified MRZ-4, an area of no known mineral occurrences where geologic information does not rule out either the presence or absence of significant mineral resources.

The WHII project site is classified as MRZ-1, an area of no mineral resource significance, for placer gold. For sand and gravel, crushed stone, decomposed granite, clay, shale, quartz, and chromite, the WHII site is classified MRZ-4, an area of no known mineral occurrences where geologic information does not rule out either the presence or absence of significant mineral resources.

Therefore, implementation of the proposed projects, both individually and combined, 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, and a ***less-than-significant*** impact would occur.

Mitigation Measure(s)
None required.