SECTION 4.8
CULTURAL RESOURCES

4.8.1 INTRODUCTION

This section focuses on cultural resources in relation to the project and its action alternatives. It discusses the affected environment and potential environmental impacts as they relate to the project. It offers an analysis of potential impacts for the project, a list of mitigation measures that may be implemented to avoid or offset potential impacts, and an analysis of potential cumulative effects to cultural resources. Information and analysis presented in this section is based on a records and literature review, site survey, and site visits conducted from Fall 2012 through Summer 2015.

Cultural resources may be defined as any building, structure, object or location of past human activity, occupation or use that may be identified through documentary evidence, archaeological inventory, or oral history. Cultural resources may include archaeological sites, traditional properties, and/or structures within the built environment.

In response to the Notice of Preparation of this EIR, comments were received and additional follow-up is continuing with the United Auburn Indian Community (UAIC) of the Auburn Rancheria. The UAIC has expressed interest in preserving archaeological resources at the project site and additional research regarding the identified resources and the potential for other resources to be identified at the project site.

4.8.1.1 Study Area

For cultural resources considerations, the study area includes all lands that will be used to develop the proposed project, including the 210-acre project site and the Crystal Lake Road. The off-site areas under consideration include land along the Crystal Lake access road and surrounding areas that could be visited by guests to the proposed UC Davis alumni camp.

4.8.1.2 Information Sources

Existing conditions within the proposed project site as they relate to known and previously undiscovered cultural resources were determined with the following data collection methods:

- An archival and record search was conducted at the North Central Information Center of the California Historical Resources Information System at California State University, Sacramento;

- A review of archival materials for Placer County on file at the Sierra and Central Valley Division of Pacific Legacy, Inc., located in El Dorado Hills, California was examined;
• A search of the Sacred Lands File maintained by the Native American Heritage Commission was undertaken;

• An intensive, pedestrian archaeological survey of the 210-acre project site was conducted during Summer 2014; and

• Meetings with the United Auburn Indian Community (UAIC) were held during Summer 2015 to consult and gather information regarding UAIC concerns about the project, the presence of Native American cultural resources within the project site, and mitigation measures that could be implemented to reduce potential impacts to less than significant levels per §15064.5 of State CEQA Guidelines.

4.8.2 ENVIRONMENTAL SETTING

A summary discussion of the environmental and cultural setting (the prehistoric and historical cultural background of the proposed project area), is presented in the following sections so that the contexts for known and previously undiscovered cultural resources within the project area may be better understood. These contexts are presented in three sections, beginning with a summary of the natural environment within and surrounding the project site. That is followed by brief review of Native American ethnographic and prehistoric archaeological contexts for the region. Finally, a summary of the historical period occupation and use of the proposed project area and surrounding region is offered.

4.8.2.1 Natural Environmental Setting

The approximately 210-acre Crystal Lake property and the two-mile long access road from Interstate 80 are located on the west slope of the Sierra Nevada approximately 13 miles from the crest of the mountain range at approximately 6,000 feet above sea level. The topography of the property and nearby areas consist of steep mountain peaks with areas of open granite outcroppings. This is a mid-level elevation zone of the Sierra Nevada, between the high country of the Sierra Nevada Batholith (granitic) and the deeply eroded Mehrten formation of the Rubicon River canyon. Precipitation (rain and snow) falls primarily between the months of November and April, which flows into streams, rivers, and lakes. The habitat is Sierran Montane Forest (Kuchler 1997) and corresponding classifications include Sierran Steppe-Mixed Forest-Coniferous Forest Province (USDA Forest Service 1997) and Yellow Pine Belt (Storer and Usinger 1970). The forest canopy is dominated by white fir (*Abies concolor*) and scattered sugar pine (*Pinus lambertiana*), cedar (*Calocedrus decurrens*), ponderosa pine (*Pinus ponderosa*), and Douglas fir (*Pseudotsuga menziesii*). The understory includes Manzanita (*Arctostaphylos sp.*), ceanothus (*Ceanothus velutinus*), and mountain whitethorn (*Ceanothus cordulatus*). Herbaceous plants including sedges (*Carex*
sp.), willow (*Salix* sp.), and annual grasses and forbs are typically found in wet meadow areas (Mayer and Laundenslayer 1988).

The flora of the Sierra Nevada and the composition and distribution of its vegetation associations have changed profoundly during the historic period. Timber harvest, livestock grazing, fire suppression, mining, hydroelectric development, water impoundment, the growth of towns, and expansion of transportation corridors has had pronounced effects on the region’s vegetation. As a result, contemporary vegetation often contains few of the native plant species that characterized the landscape prehistorically.

Mammal species found in the region include: mountain lion, bob cat, black bear, mule deer, coyote, red fox, marten, long-tailed weasel, short-tailed weasel, mink, yellow-bellied marmot, porcupine, western spotted skunk, hare, bushy-tailed woodrat, northern flying squirrel, golden-mantled ground squirrel, chipmunk, mountain pocket gopher, and various voles, shrews, and bats (Zeiner et al. 1990a).

A variety of bird species also inhabit this area, including: golden eagle, northern goshawk, red tailed hawk, great gray owl, spotted owl, blue grouse, common raven, black backed woodpecker, steller jay, and mountain chickadee (Storer and Usinger 1970; Zeiner et al. 1990b).

Fish found in the South Fork American River include rainbow and brown trout, Sacramento sucker, California roach, and speckled dace (USDA Forest Service 1993).

### 4.8.2.2 Cultural Setting

**Ethnographic Background**

The Project lies within the ethnographic territory of two indigenous Native American groups, the Hill Nisenan (Southern Maidu) and Washoe. The crest of the Sierra Nevada served as a dividing line between their territories, with the Nisenan to the west and Washoe to the east. Linguistically distinct groups, their territories overlapped in the Crystal Lake area. Primary sources on Nisenan ethnography include Beals (1933), Gifford (1927), Kroeber (1925), and Littlejohn (1928), and the principal secondary source is Wilson and Towne (1978). Ethnographic sources on Washoe culture include Barrett (1917), d’Azevedo (1963, 1986:466-498), Downs (1966), Freed (1966), Kroeber (1925:569-573), Lowie (1939), Nevers (1976), and Price (1980).

Tribal boundaries were more fluid than rigorously defined, with the Nisenan and Washoe interacting through trade and exchange and marriage partnerships. These groups shared similar traditional lifeways characterized by seasonal movements and residency, subsistence regimes and technology, and social structure. Traditionally, they were hunter-gatherers. Their seasonal strategy of mobility foraging and organized collecting resulted in an assortment of settlement patterns that now are manifest in a variety of
archaeological sites. Because Crystal Lake is nearly 2,000 feet above the snow line, the area may have been used primarily for summer hunting and collecting by the Nisenan and Washoe. The distribution of archaeological sites throughout the regional area suggests that this area was traversed and occupied at least seasonally to procure resources (faunal, vegetal) important in the subsistence of the Nisenan and Washoe. The region also served as a travel corridor linking the Great Basin with California groups in the exchange of various subsistence and wealth items including obsidian, shell beads, acorns, and pine nuts (e.g., Davis 1961). Washoe groups entered deep into Nisenan territory, all the way to the modern cities of Colfax and Grass Valley, during annual acorn gathering and trading expeditions (Nevers 1976).

The material culture of the Nisenan and Washoe is similar to that characterizing other Sierran groups. Flaked stone and groundstone tools included arrow and spear points, arrow straighteners, scrapers, knives, pestles, and mortars. Stone technology used a variety of materials, including local metavolcanics, cherts, and tuff, and obsidian and basalt acquired through trade and exchange with neighboring groups. Bedrock mortars and portable mortars were used along with pestles for grinding plant foods. The acorn from the black oak was particularly prized, but other nuts, seeds, and plant foods (buckeye, pine nuts, berries), as well as mineral and animal products (meat, fish) were also ground in mortars for subsistence, medicinal, and other needs. The technology for processing acorn was similar among the Nisenan and Washoe. Various types of baskets (twined and coiled) were made and used for assorted functions (e.g., storage, cooking, and for show) along with nets, ropes, and snares, all used for capturing small game and fishing (Littlejohn 1928; Wilson and Towne 1978).

Archaeological Background

The prehistory of the project area is regarded in terms of northern Sierra Nevada and Lake Tahoe Basin archaeological chronologies, which postulate more than 8,000 years of occupation throughout the region. An initial cultural chronology for the Sierra Nevada was developed by Heizer and Elsasser (1953) and defined two archaeological complexes, the Martis Complex and Kings Beach Complex, as temporally and spatially distinct. Martis Complex traits were generally recognized by basalt flaked stone, large projectile points, and handstones and millingstones, and appeared to reflect an economic focus on hunting and seed-gathering. In contrast, the later King’s Beach Complex was characterized by obsidian and chert flaked stone, bedrock mortars, and small, light, side-notched projectile points, reflecting an economic emphasis on fish, piñon nuts, seeds, and some hunting. The King’s Beach Complex is usually ascribed to the late prehistoric Washoe, and has suggested beginning dates of ca. 1000 B.P. CA-PLA-9 on the north shore of Lake Tahoe is a type site for the Kings Beach Complex. Elston (1971) and Elston et al. (1994) refined this chronology by subdividing the Martis Complex to provide a cultural continuum between the Martis Complex and the historic Washoe and ultimately recognizing six phases commencing at ca. 10,000-8000 B.P.
A recently proposed cultural chronology for the western Sierra by Jackson and Ballard (1999) was formulated using a large database of Bodie Hills obsidian hydration data derived from 125 site investigations in the American River Watershed. This served as the basis for a new cultural-historical framework which addresses correlations between obsidian hydration patterns, cultural material changes, and paleoclimatic changes. Jackson and Ballard (1999) defined the Sierra Pattern to characterize occupations of the American River Watershed for the time-period spanning the mid- to late Holocene. This cultural-historical taxonomy is summarized below, as it provides the framework for archaeological interpretation at Crystal Lake. Only the most relevant periods of the taxonomy are discussed, as occupations prior to ca. 7000 B.P. are generally not documented in the study region.

**Early Sierran Period.** Beginning ca. 3200 B.P, this period is marked by dart points, millingslabs, and handstones in the western Sierra. Mortar and pestle use is uncommon during this period. Prime locations served as seasonal base camps for Early Sierran land use. Use of these prime locations (abundant freshwater and nearby plant resources at logistically advantageous locations) may have provided small and extended families regular and abundant resources available within a few hours walk of base camps. Jackson and Ballard (1999:246-247) suggest an increased focus and reliance on acorns and deer during the closing centuries of the Early Sierran Period, primarily with milling slabs and handstones. This timing places the beginnings of an acorn based economy at 2000 B.P., generally consistent with other regional findings.

**Middle Sierran Period.** This proposed period witnessed the introduction and widespread adoption of the bow and arrow, a California-based projectile point series (Gunther Series), the first extensive use of mortar and pestle technology in the American River Watershed, and extensive use of the landscape. A sharp decrease in obsidian use may indicate a disruption in the exchange of obsidian from east to west. By the end of the Middle Sierran Period, acorn exploitation is associated with a technological tool assemblage that includes boulder and bedrock mortars, pitted stones, and the use of handstones as pestles, along with their use on millingslabs.

**Late Sierran Period.** The Late Sierran Period is characterized by a widespread, intensive, and specialized use of the western slope of the Sierra. Acorn use was intensive and the black oak was favored. There appears to have been a reduced focus on seeds, exploitation of both large and small fauna (e.g., rabbits, deer), year-round occupation of the western Sierra at sites below 3000-3500 ft. elevation, and habitual use of mid- and high-elevation Sierran sites during summer months. Inception of the Late Sierran Period is proposed at ca. 600 B.P., and it terminated at the middle of the nineteenth century. The Late Sierran Period witnessed the introduction of Desert Series projectile points, of which the Desert Side-notched appears to be most common in the western Sierra. The use of Gunther Series points appears to discontinue abruptly.
**Historical Background**

Contact between Europeans and California Native Americans occurred as early as 1542 with the coastal explorations of Juan Rodriguez Cabrillo (Erlandson and Bartoy 1995). However, the historic period within California did not truly begin until the Spanish expanded their frontier northward into Alta California in the eighteenth century. During the Spanish Period (AD 1542-1821), the project location at Crystal Lake was north and east of Spanish explorations and settlements. Although there were several Spanish expeditions into the northern California interior, including those by Moraga (1808) and Arguello-Ordaz (1823), there were no Spanish expeditions that reached modern Nevada County (Beck and Haase 1974:18).

During the Mexican Period (1821-1848), the frontier expanded north into the Sacramento Valley, but non-native settlement did not extend into the High Sierras. The closest Mexican land grants were in Yuba and Butte counties, southwest of the Crystal Lake project area (Beck and Haase 1974:24). During 1830-1841, Hudson Bay trappers may have passed Crystal Lake (in its original natural form). At that time trappers crossed the High Sierra via Donner Pass while traveling the route of the California Emigrant Trail, which led to Johnson’s Rancho in Yuba County (Hoover et al. 1990:538). John C. Fremont traversed the Sierra Nevada in the winter of 1844, becoming the first Euroamerican to document the Lake Tahoe region. Later that year, the Stephens-Townsend-Murphy emigrant party followed the Truckee River to its outlet into Lake Tahoe. Being the first wagon train to cross the Sierra Nevada during the expansion of the American West, they pioneered the first route at or near what was later named Donner Pass in 1844.

During the 1840s, relations between the Mexican and United States governments became increasingly strained as the U.S. Government continued to expand its territory westward. These political stresses erupted in the Mexican-American War, which lasted from 1846-1848. The war ended with the 1848 signing of the Treaty of Guadalupe Hidalgo, which transferred Mexican lands, including California, to U.S. control.

At the close of the war in 1848, James Marshall discovered gold on the American River and the California Gold Rush began. The discovery of gold brought tens of thousands of gold-seekers from around the world, and those prospectors pushed further into the California interior than the Mexican Period settlers who preceded them. The wealth and expanding population of California spurred its speedy ratification as a state in 1850 (Hoover et al. 1990). Nevada County was settled by non-native immigrants during the Gold Rush period (1840s-1850s) as prospectors discovered gold in rivers and creeks in the region. Several mining towns were established including Grass Valley and Nevada City. Nevada County was formed in 1851 (Hoover et al. 1990:239).
The California Gold Rush and, a decade later, the discovery of the Comstock Lode in Virginia City drew thousands of fortune seekers into the region. This rush of people necessitated new transportation routes over the passes, including stage and freight roads to carry people and goods, and the construction of water flumes and narrow gauge railroads to transport lumber.

Transportation routes through the Sierra Nevada were restricted by topography and specifically by the limited number of navigable passes through the mountains. As a result, transportation corridors established during the early historic period (and during prehistory) still remain in the same locations, evolving over time in response to changes in transportation systems. One such transportation corridor crosses at Donner Pass, through which passed the Truckee Route of the California Emigrant Trail. The California Emigrant Trail stretched from Missouri to California and Oregon. It was one of the primary overland routes for the largest mass migration in human history (NPS 2015). During the 1840s and 1850s, more than 250,000 immigrants traveled the California Emigrant Trail to settle in California. As the trail approached the Nevada desert and Sierra Nevada mountains it split into numerous individual routes. These included the Truckee Route, which followed the Truckee River Valley through Donner Pass and then by the Crystal Lake area, and eventually leading into north-central California where it ended at Johnson’s Ranch near Yuba City. The first immigrant party to use the route was the Murphy-Townsend-Stevens party in 1844-1845. They were soon followed by the disastrous Donner-Reed party in 1846-1847 (Hoover et al. 1990:239-240). Many more immigrant parties followed as the route became established.

During the 1850s and 1860s, the development of settlements, mines, and ranches throughout the region spurred the construction of wagon roads to transport supplies, ores, and people. One such wagon road was the Dutch Flat to Donner Lake Wagon Toll Road, which passed near Crystal Lake (BLM 1867a; Environmental Stewardship and Sustainability 2015:10). This freight wagon road was built in 1864 by railroad interests and others to bring supplies to the mines and railroad construction crews (Central Pacific Railroad Photographic History Museum 2009a:230-234; Rayner 2008:61). The road roughly paralleled the earlier California Emigrant Trail (General Land Office 1867a). During the 1915-1930 time-period, the advent of automobile travel prompted the construction of the Lincoln Highway (now Interstate 80), which approximately followed the alignment of the Dutch Flat wagon road and California Emigrant Trail past Crystal Lake (Environmental Stewardship and Sustainability 2015:10).

In conjunction with the wagon road system, a national railroad system was established during the 1860s which also followed the transportation corridor through Donner Pass. In 1861, Charles Crocker, Leland Stanford, Mark Hopkins Jr., and C.P. Huntington created the Central Pacific Railroad Company. Employing thousands of Irish and Chinese workers, Central Pacific constructed the western segment of the Transcontinental Railroad, which spanned California and Utah. Central Pacific Railroad construction started in 1863 and crossed the Sierras between 1865 and 1868. In 1869, this segment met Union Pacific
Railroad’s eastern segment at Promontory Point in Utah (Hoover et al. 1990; Rayner 2008:103). The Transcontinental Railroad was instrumental in economic and business development on a local, state, and national scale. In 1885, the Southern Pacific leased land from the Central Pacific Railroad, finally merging with it in 1955 (Fickwirth 1992:1440; Union Pacific 2015). As the economy became more established during the 1860s, enterprises became more diversified. The mining and transportation industries that dominated the early boom years made room for agricultural pursuits. Cattle ranching, dairying, grain farming, logging, and a burgeoning recreation industry became important staples in the Lake Tahoe area economy, all of which continue in some form to the present day.

Cattle ranching and dairy farming began in the region in the 1850s, becoming one of the most important industries in the county by the 1870s. To ensure adequate year-round forage for livestock, dairy farmers and ranchers transferred their herds into high mountain pastures for the summer and returned them to lower elevation foothills for winter. This pattern of moving stock was especially well developed for dairy herds, whereby cows were bred to calve in the spring months, resulting in an abundant milk supply for the summer months spent in the high country.

The turn of the century brought changes in the way stock farmers conducted business. After the forest system was created in 1906, grazing limitations were set in public lands. The industry was again impacted by technological improvements in dairying during the 1920s, while changes in transportation were brought by the introduction of the automobile and refrigerated railroad cars (a.k.a. reefers). These later changes resulted in the consolidation of local interests to serve much larger regions and the slow demise of the small local dairy. Some families adapted by diversifying their interests, switching to the less labor-intensive beef cattle industry, or selling off portions of their large land holdings. Families involved in stock raising, however, continue the pattern of transhumance today, albeit via trucks.

The demand for water for gold mining, agriculture, and railroad steam engines led to the development of numerous and increasingly complex water storage and conveyance systems across California. These systems included ditches, canals, flumes, reservoirs and dams, irrigation districts, and major hydroelectric systems. During the Gold Rush and subsequent hydraulic mining era, miners and companies built hundreds of miles of canals and reservoirs. As the state economy shifted to increased agriculture and ranching, canals and ditches were repurposed for irrigation systems. The 1887 Wright Act promoted the creation of irrigation districts in the 1880s and 1890s to settle riparian water right disputes. By the 1920s and 1930s, larger scale irrigation and water projects were being envisioned which resulted in the California Aqueduct and large reservoir projects (JRP and Caltrans 2000).

Throughout the mid- and late twentieth century and into modern times, the project vicinity continued to be used for recreation, transportation (railroad and automobile), and logging. The area remains a major
transportation corridor to the present day. The rail line to the east and north of the property is currently operated by Union Pacific, which merged with Southern Pacific in 1996 (Union Pacific 2015). The archaeological remains of a historic era railroad work camp (P-29-583), which is within the property, may have been occupied between the 1930s and 1950s. Interstate 80, formerly the Lincoln Highway, continues to serve as one of the main roadways through the central Sierras. The property was owned by the railroad until around 1985 when the land was transferred to private ownership and used as a vacation residence. This recreational use has continued to the present day. In the 1990s, a vacation residence known as the “Existing Lake House” was constructed on the northwest shore of the lake. Other facilities including a caretaker house (ca. 1994) pump house (ca. 1994) and a tennis court (ca. 1994) were built around the same time (Environmental Stewardship and Sustainability 2015:9-10). In 2014, UCD purchased the Crystal Lake property to develop the lands for an alumni camp, environmental education center, and conference center.

4.8.3 REGULATORY CONSIDERATIONS

4.8.3.1 State of California

State historic preservation regulations affecting the Project include the statutes and guidelines contained in CEQA (Public Resources Code §20183.2 and §21084.1 and §15064.5 of the State CEQA Guidelines). CEQA requires lead agencies to carefully consider the potential effects of a project on historical resources. An “historical resource” includes, but is not limited to, any object, building, structure, site, area, place, record or manuscript, which is historically or archaeologically significant (Public Resources Code §5020.1).

Advice on procedures to identify such resources, evaluate their importance and estimate potential effects is given in several agency publications such as the series produced by the Governor’s Office of Planning and Research (OPR). The technical advice series produced by OPR strongly recommends that Native American concerns and the concerns of other interested persons and corporate entities, including, but not limited to, museums, historical commissions, associates and societies be solicited as part of the process of cultural resources inventory. In addition, California law protects Native American burials, skeletal remains and associated grave goods regardless of the antiquity and provides for the sensitive treatment and disposition of those remains.

California Register of Historical Resources

In 1992, the California Governor signed Assembly Bill (AB) 2881 into law, establishing the California Register of Historical Resources. The California Register of Historical Resources is an authoritative guide in California used by State and local agencies, private groups, and citizens to identify the State’s historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from
substantial adverse change. The criteria for eligibility for the California Register of Historical Resources are based upon National Register of Historic Places criteria. Certain resources are determined by the statute to be included on the California Register of Historical Resources, including California properties formally determined eligible for, or listed in, the National Register of Historic Places, State Landmarks, and State Points of Interest. Section 15064.5 of the State CEQA Guidelines specifies criteria for evaluating the significance or importance of cultural resources, including:

- The resource is associated with events that have made a contribution to the broad patterns of California history;
- The resource is associated with the lives of important persons from our past;
- The resource embodies the distinctive characteristics of a type, period, region or method of construction, or represents the work of an important individual or possesses high artistic values; or
- The resource has yielded, or may be likely to yield, important information in prehistory or history.

The State Office of Historic Preservation (OHP) has broad authority under Federal and State law for the implementation of historic preservation programs in the State of California. The State Historic Preservation Officer (SHPO) makes determinations of eligibility for listing on the National Register of Historic Places and the California Register of Historical Resources.

The significance of a resource is required to be determined prior to analysis of the level of significance of project activities. The steps required to be implemented to determine significance in order to comply with State CEQA Guidelines are:

- Identify cultural resources;
- Evaluate the significance of the cultural resources based on established thresholds of significance;
- Evaluate the effects of a project on all cultural resources; and
- Develop and implement measures to mitigate the effects of the project on significant cultural resources.

Sections 6253, 6254, and 6254.10 of the California Code authorize state agencies to exclude archaeological site information from public disclosure under the Public Records Act. In addition, the California Public Records Act (CPRA; Government Code §6250 et. seq.) and California’s open meeting laws (The Brown Act, Government Code §54950 et. seq.) protect the confidentiality of Native American cultural place information. The CPRA (as amended, 2005) contains two exemptions that aid in the protection of records relating to Native American cultural places by permitting any state or local agency to deny a CPRA request and withhold from public disclosure:
• "records of Native American graves, cemeteries, and sacred places and records of Native American places, features, and objects described in §5097.9 and §5097.993 of the Public Resources Code maintained by, or in the possession of, the Native American Heritage Commission, another state agency, or a local agency" (GC §6254(r)); and

• "records that relate to archaeological site information and reports maintained by, or in the possession of, the Department of Parks and Recreation, the State Historical Resources Commission, the State Lands Commission, another state agency, or a local agency, including the records that the agency obtains through a consultation process between a California Native American tribe and a state or local agency" (GC §6254.10).

Likewise, the Information Centers of the California Historical Resources Information System maintained by the Office of Historic Preservation prohibit public dissemination of records search and site location information. In compliance with these requirements, and those of the Code of Ethics of the Society for California Archaeology and the Register of Professional Archaeologists, the locations of cultural resources are considered restricted information with highly restricted distribution and are not publicly accessible. Because of these confidentiality concerns, certain resources described in this EIR are not specifically identified with detailed location information or information that could be used to deduce the likely location of certain resources.

Any project site located on non-Federal land in California is also required to comply with State laws pertaining to the inadvertent discovery of Native American human remains.

California Health and Safety Code §7050.5, §7051, and §7054
These sections collectively address the illegality of interference with human burial remains, as well as the disposition of Native American burials in archaeological sites. The law protects such remains from disturbance, vandalism, or inadvertent destruction, and establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project, including the treatment of remains prior to, during, and after evaluation, and reburial procedures.

Paleontological Resources
Paleontological resources include fossil remains, their respective fossil sites, and the fossil-bearing strata and associated specimen data and corresponding geologic and geographic site data. In California, paleontological resources are protected by State CEQA Guidelines Appendix 4.5c, which addresses impacts on fossil sites; California Administrative Code Title 14, §5097.5.

4.8.4 METHODS OF ANALYSIS

4.8.4.1 Records and Literature Search
A cultural resources records search was requested and obtained from the North Central Information Center (NCIC) of the California Historical Resources Information System (CHRIS) at California State
University, Sacramento on November 19, 2012. The CHRIS maintains a wide range of documents and materials relating to historical resources. As used herein, "cultural resources" comprise buildings, structures, objects, historic and archeological sites, landscapes, districts, and all manner of properties associated with past human activities. Cultural resources in the CHRIS inventory include known resources resulting from previous surveys and studies conducted in the past. Known resources include those that have and those that have not undergone formal evaluation by federal, state, or local government agencies with respect to their historical significance. The records search included the following information sources:

- OHP Historic Property Data File (2012);
- Determination of Eligibility (2012);
- NRHP/CRHR listings (2008 & updates);
- California Inventory of Historic Resources (1976);
- California State Historical Landmarks (1996);
- Points of Historic Interest (1992);
- Caltrans Bridge Inventory; and
- Historic Maps (1867 GLO Plat, 1885-87 Colfax Sheet, and 1955 USGS Cisco Grove Quadrangle.

The NCIC record search revealed that nine cultural resources studies have been conducted within a quarter-mile radius of the project area, the earliest in 1949, and that eight archaeological sites are previously recorded sites within the project area. The previously recorded cultural resources within the project area and ¼ mile radius are listed in Table 4.8-1.
4.8 Cultural Resources

Table 4.8-1.
Previously Recorded Cultural Resources within ¼ Mile Radius of the Project Area.

<table>
<thead>
<tr>
<th>Primary</th>
<th>Trinomial</th>
<th>Description (based on original site records)</th>
<th>Relation to Project Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>n/a</td>
<td>CA-PLA-828</td>
<td>6 Bedrock mortars, Petroglyphs, milling feature; basalt flakes, 3 basalt projectile points</td>
<td>Outside</td>
</tr>
<tr>
<td>n/a</td>
<td>CA-PLA-2100</td>
<td>Granitic boulder with 2-3 petroglyph elements</td>
<td>Outside</td>
</tr>
<tr>
<td>P-29-583</td>
<td>CA-NEV-525H</td>
<td>3 historic structure foundations and trash scatter</td>
<td>Within</td>
</tr>
<tr>
<td>P-29-732</td>
<td>CA-NEV-701H</td>
<td>Segment of Donner Emigrant Trail</td>
<td>Within</td>
</tr>
<tr>
<td>P-29-1373</td>
<td>CA-NEV-917</td>
<td>Petroglyph site-2 bedrock milling features.; lithic scatter; 2 basalt projectile points; 1 basalt core</td>
<td>Within</td>
</tr>
<tr>
<td>P-29-2152</td>
<td>CA-NEV-1377/H</td>
<td>Petroglyph site (9) panels-47 elements recorded; basalt projectile point; historic component - trash scatter-rock quarry</td>
<td>Within</td>
</tr>
<tr>
<td>P-29-2153</td>
<td>CA-NEV-1484</td>
<td>Petroglyph site (1)</td>
<td>Within</td>
</tr>
<tr>
<td>P-29-2154</td>
<td>CA-NEV-1485</td>
<td>Petroglyph site (1)</td>
<td>Within</td>
</tr>
<tr>
<td>P-29-2155</td>
<td>CA-NEV-1378</td>
<td>Petroglyph site (2); 7 elements</td>
<td>Outside</td>
</tr>
<tr>
<td>P-29-2514</td>
<td>CA-NEV-1570/H</td>
<td>Lithic scatter, ground stone, basalt projectile point, granitic boulder-2 petroglyph elements</td>
<td>Outside</td>
</tr>
<tr>
<td>P-29-2515</td>
<td>CA-NEV-1571/H</td>
<td>4 granitic boulders – 13 petroglyphs elements; basalt flake</td>
<td>Outside</td>
</tr>
<tr>
<td>P-29-2517</td>
<td>CA-NEV-1573H</td>
<td>Habitation site; hearths, stonewall, artifact scatter – (Possible Chinese association)</td>
<td>Outside</td>
</tr>
<tr>
<td>P-29-2518</td>
<td>CA-NEV-1574H</td>
<td>Smithing area, 2 rock foundations, old road.</td>
<td>Outside</td>
</tr>
<tr>
<td>P-29-2519</td>
<td>CA-NEV-1575H</td>
<td>Trash scatter w/n right-of-way; glass 1880-1916</td>
<td>Outside</td>
</tr>
<tr>
<td>P-29-682</td>
<td>n/a</td>
<td>Basalt chippage scattered on northwest shore of Crystal Lake</td>
<td>Within</td>
</tr>
<tr>
<td>P-29-731</td>
<td>n/a</td>
<td>~50' long concrete dam (1920)</td>
<td>Within</td>
</tr>
<tr>
<td>P-29-2720</td>
<td>n/a</td>
<td>Highway segment (Old US 40)</td>
<td>Outside</td>
</tr>
<tr>
<td>P-29-613</td>
<td>CA-NEV-555-H</td>
<td>First Transcontinental Railroad segment</td>
<td>Outside</td>
</tr>
</tbody>
</table>

In July 2014, the California Native American Heritage Commission (NAHC) was asked to review its Sacred Lands File. The NAHC reported that their review failed to indicate the presence of any Native American cultural resources in the immediate project area.

4.8.4.2 Archaeological Inventory Survey

A pedestrian archaeological survey of the entire Crystal Lake parcel (210 acres) was conducted during the spring of 2014 by two professional archaeologists who meet the Secretary of the Interior’s Professional Qualification Standards. The survey involved traversing the parcel on foot at regularly spaced intervals no larger than 15 meters in order to identify unknown archaeological sites and relocate previously recorded sites. Discovered archaeological sites were recorded on standard California Department of Parks and Recreation (DPR 523) forms, including primary records and archaeological site records, and site mapping using GPS technology. Site record updates were prepared for previously recorded sites to report their current conditions.
4.8.5 EXISTING CONDITIONS

4.8.5.1 Archaeological Inventory Survey Results Within the Proposed Project Site

Table 4.8-2 summarizes the cultural resources identified within the project site, followed by more detailed descriptions of each property.

Table 4.8-2.
Summary of Archaeological Sites Recorded in the Property.

<table>
<thead>
<tr>
<th>Primary</th>
<th>Trinomial</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-29-583</td>
<td>CA-NEV-525H</td>
<td>Historical</td>
<td>Historic era railroad camp with collapsed structures, structural foundations, refuse dump, dirt road segments, water storage features, and artifact scatter. Recorded in 1987 and updated in 1994. Relocated in 2014 field survey. The site record update documents additional features and revised site boundaries based on GPS mapping.</td>
</tr>
<tr>
<td>P-29-682</td>
<td>None</td>
<td>Prehistoric</td>
<td>The reported location of a small lithic scatter. Original site record dated 2000 provides minimal information and did not locate the site in the field. Not relocated during 2014 field survey.</td>
</tr>
<tr>
<td>P-29-731</td>
<td>None</td>
<td>Historical</td>
<td>Historic era concrete dam on Crystal Lake with 1920 date stamp. An actively used dam to retain the water of Crystal Lake. Recorded in 1994. Relocated in 2014 field survey. Updated site record confirms the location based on GPS mapping. Site description and condition are unchanged from 1994 site record.</td>
</tr>
<tr>
<td>P-29-732</td>
<td>CA-NEV-701H</td>
<td>Historical</td>
<td>Historic era linear resource representing the portion of the Donner Emigrant Trail that extends through the property. Six contiguous segments of the trail within the property were recorded in 1994. All segments relocated in 2014 field survey. Updated site record provides GPS mapped locations for each segment and confirms the site description and condition.</td>
</tr>
<tr>
<td>P-29-1373</td>
<td>CA-NEV-917</td>
<td>Prehistoric</td>
<td>Petroglyph site at perennial pond (Duck Pond) with four petroglyphs, 2 bedrock milling features, and basalt lithic scatter. Recorded in 2002. Relocated in 2014 field survey. Updated site record documents new findings including surface lithic tools.</td>
</tr>
<tr>
<td>PL-01</td>
<td>None</td>
<td>Historical</td>
<td>Segment of abandoned historic era utility line through the property. Includes standing wooden power poles, crossbeams with aqua colored insulators, and iron anchors. Newly recorded during 2014 field survey.</td>
</tr>
</tbody>
</table>
4.8 Cultural Resources

**P-29-583 (CA-NEV-525H).** This large historical archaeological site with numerous features and widespread artifact scatter is interpreted as the remains of a historic era railroad camp. The site is located on the northeast project boundary near the Southern Pacific railroad and I-80 corridor. Originally recorded in 1987 and updated in 1994, the site was relocated during the 2014 field survey. The new site record documents 11 features, some updated from previous recordings and others newly identified. The features classify as: structural remains marked by earthen pads, concrete footings and walls, and/or stacked rock walls (F1, F3, F4, F5); a concrete basin for water catchment (F6); a high density refuse deposit/trash scatter with cans, metal, and colored glass (F9); a concrete-lined water storage tank (F11); earthen depressions with milled lumber and corrugated metal (F12); two dirt road segments, one with upright railroad ties as gate posts (F13, F14); and a rock lined earthen depression (possible privy) with assorted artifacts (colored glass, iron, cans), suggesting that a subsurface deposit is present (F15). The site surface contains a wide variety of artifacts including metal pieces and objects, ceramics, colored glass (brown, aqua, blue), and various tin cans including sanitary types and older hole-in-top cans with matchstick and knife cut openings. Also present are graniteware basin pieces, sheet metal, milled wood, barrel hoops and stays, and surface deposits of slag (coal klinker). Sizeable materials include railroad ties, a cast iron stove (incinerator), bedsprings, and abandoned auto parts. A higher density of artifacts (metal, ceramics, and glass) is recorded as Artifact Concentration 1. Temporally diagnostic artifacts include: amethyst glass (ca. 1870s-1930s) (Lockhart 2006); a 1947 auto license plate on a 1940s era car; steel flat-top beer cans (ca. 1935-1960s) (Maxwell 1993:96); floral decal decorated ceramic tableware (twentieth century) (Majewski and O’Brien 1987:146-147); hole-in-top (vent-hole) cans (1900-1990) (Rock 1987:21; Simonis 1990); an Owens-Illinois makers mark (ca. 1932, 1942 or 1952) (Toulouse 1972:403) and twentieth century milk bottle finish. The diagnostic artifacts indicate a date range of 1930s-1960s. An abandoned overhead utility line site extends through the site and is separately recorded as historical archaeological site PL-01 in the cultural resources inventory.

The general condition of the site appears good and not vandalized. Although deteriorating, the features are within their original locations and retain a sense of setting. Minor impacts include a buried fiber optic line and newly excavated earthen ditch along the eastern site boundary. The site is located at the east end of the Crystal Lake access road and is gated at the property boundary near the railroad tracks. The access road goes through a peripheral portion of P-29-583, but site features and artifacts are not readily visible from the road. The site location is nearly 0.25 miles east of the proposed camp development.

The associated railroad is currently known as the Southern Pacific, but it was the Central Pacific until it became part of Southern Pacific in 1899 (Fickwirth 1992:144). In 1861, Charles Crocker, Leland Stanford, Mark Hopkins Jr., and C. P. Huntington created the Central Pacific Railroad Company (Central Pacific). In 1862, the Pacific Railroad Act of 1862 provided federal authorization to build a railroad and telegraph
Cultural Resources

The Central Pacific started construction in Sacramento in 1863 and the route passed by the Crystal Lake project area ca. 1867 (BLM 1867a; Central Pacific Railroad Photographic History Museum 2009a:246). Employing thousands of Irish and Chinese workers, Central Pacific constructed the western segment of the Transcontinental Railroad, which spanned California and Utah. In 1869, this segment met Union Pacific Railroad’s eastern segment at Promontory Point, Utah (Hoover et al. 1990; Rayner 2008:103).

The 1938 Colfax and 1955 Emigrant Gap topographic quadrangles show structures along the railroad alignment near P-29-583. These structures may represent a Crystal Lake railroad station/maintenance facility or community by as early as 1938 (USGS 1938, 1955). No structures are shown on the 1902 Colfax quadrangle (USGS 1902), indicating that a station or work camp was not present at that time. The four largest features are depicted on the 1955 USGS Cisco Grove topographic map, suggesting that they were standing structures 60 years ago.

A Southern Pacific Railroad history prepared by Signor (2003) identifies a train station at Crystal Lake. The book includes a photo of a wood frame building called the "staff office" directly on the railroad tracks. The notation states that the Crystal Lake station was frequently referred to as "Siberia" because of its remote location and that the second story held quarters for the operators. The recorded portion of P-29-583 within the project area is west of the railroad tracks and none of the archaeological features are consistent with such a large two-story building. As such, the staff office from 1905 depicted by Signor (2003) is not located within the recorded boundaries of P-29-583. The site location away from the tracks, nature of the archaeological assemblage, and historical information indicate that the recorded portion of P-29-583 within the property does not date to as early as 1905. Although the Crystal Lake train station on the railroad tracks was established in 1905, available information suggests that the work camp recorded as historic site P-29-583 was not established until the 1930s to mid-twentieth century.

Significance Evaluation. The material assemblage at P-29-583 and close proximity to the nearby railroad tracks is consistent with the site representing the remains of a work camp that housed nearby railroad workers. The proximity of the site to the railroad, archival, and artifact data indicate that the site may be a railroad maintenance camp dating from the early (ca. 1930s) to mid-twentieth century. The Southern Pacific railroad is active with a daily use rate of approximately 20 trains. Being an historic era railroad camp, the site exhibits an association with the railroad that is still present. The surface of P-29-583 contains a wide variety of artifacts, some of which possess diagnostic criteria as to time and function. The relatively dense and large archaeological assemblage implies that the site has data to offer regarding important research themes, such as: camp function, design and conditions; household composition and lifeways; labor organization and management policy; and immigration and ethnicity in a twentieth century work camp (Caltrans 2013:158-168). The recommendation that the site appears to be California
Register eligible for its important research value is provisioned on the assumption that it holds certain characteristics that can be confirmed only through further research. Further research could precisely determine the date of site occupation and associated functions and might involve the following: (1) archival research focused on the lifeways of railroad work camps and specifics about the history of this camp, its organization, and worker identity; (2) comprehensive detailed surface recording of artifact deposits and features; (3) and subsurface excavation to determine the presence or absence of cultural deposits. Accordingly, the site is recommended eligible under California Register Criterion 4.

P-29-682 (No State Trinomial). This prehistoric site is described on the original 2000 site record as a small (30 meter diameter) lithic scatter of basalt flaked stone debitage. The information on the site record was reported as part of a university graduate study, but the site location and description were not field verified at that time. The site record provides a vague location for the site on the north shore of Crystal Lake and states that the site was destroyed during the historic period when a large hotel existed at the lake. The site was not relocated during the 2014 field survey. The site location depicted on the 2000 site record is just north of the lake near the Crystal Lake access road. The 2014 field survey involved an intensive search of the reported site area using narrow transects (1-meter-wide) and close examination of the mineral ground surface, but no artifacts or evidence of the site were found. A site record update from the 2014 fieldwork documents the results. The reported site location is near the south border of the proposed camp development.

Significance Evaluation. No evidence of this reported prehistoric site has been found in the project area. The site was documented on a 2000 site record based on hearsay rather than fieldwork and there is no assurance that the site location or description are accurate. If the site ever existed at the reported location, then it may have been destroyed during the historic era construction of the Crystal Lake Hotel, as stated on the 2000 site record. However, the 2014 field survey found no archaeological materials or potential cultural deposits to indicate the presence of the site at the reported location or surrounding area. As such, this reported site lacks a confirmed location, integrity of place, and archaeological assemblage that may be useful to address important research issues in regional prehistory. Therefore, the site is recommended not eligible for the California Register under any of the criteria.

P-29-731 (No State Trinomial). This historical site is a concrete dam on the northeast side of Crystal Lake with 1920 stamp date. The site was originally recorded in 1994 as an historical archaeological site and was updated during the 2014 field survey. The dam is still in use and holds back the water of Crystal Lake. It is constructed of poured aggregate concrete and measures approximately 295 feet long. The 1920 date stamp is imprinted into the concrete surface at the north end of the dam. The north end leads to the Crystal Lake access road, which in this area coincides with the route of the historic era Donner Emigrant
Trail (P-29-732). On the south side of the dam is a large prehistoric/historical site with petroglyph panels and historic era rock quarry (P-29-2152).

The exposed surface of the dam is decaying and there are areas of missing concrete. Wooden planks have been installed along the top and provide some stability to the dam surface. One could walk across the dam, although a rock lined foot trail is established along the base just to the east (land side). Miscellaneous materials from the dam construction including wire railing and metal poles are broken off and scattered along the east side of the dam. The dam is not visible from the nearby Crystal Lake access road. The location of the dam is about 200 feet southeast of the proposed camp development.

Archival research indicates that Crystal Lake was originally a small, natural lake likely used for livestock, recreation, and steam engines during the nineteenth century. The lake was part of a 1869 federal land grant to Ethan Shipley Foss, who built the Crystal Lake Hotel on the north shore by 1867 (Bean 1867:327; BLM 1867a, 1867b). The hotel acted as a lodging stop for the railroad and wagon road travelers until it burned in the 1890s (Environmental Stewardship and Sustainability 2015:9). An 1867 advertisement for the adjacent hotel described it as a “resort for Pleasure Seekers” and offered rental boats (Bean 1867:327). Little is known about the history of the dams at Crystal Lake. During the late nineteenth century, a dam was built to elevate the lake surface level for increased storage capacity. The original dam may also have been constructed to expand the lake resort business potential, as the advertisement suggests, or it may have been used for watering livestock or railroad functions. In 1920, the current concrete dam replaced the original dam, and further elevated the surface level of the lake (Environmental Stewardship and Sustainability 2015:9-10). The second dam is depicted at the north end of the lake on the 1938 Colfax topographic quadrangle (USGS 1938).

**Significance Evaluation.** The site represents the contemporary use of a historic era resource of the built environment. Archival data indicate that the dam was constructed during the 1920s. However, the site lacks an association because it is not known by whom or for what purpose the dam was constructed. As such, the site does not appear to be associated with events that have made a contribution to broad patterns of California history, or have an association with important historical individuals. It is a small, simple, concrete dam that does not appear to embody distinctive characteristics of a type, period, region, or method of construction. The dam itself, and any construction related artifacts associated with it, are not likely to yield important information about the history of the area. While additional archival research may reveal an association for the dam and details of its construction, based on current available information, the site does not appear to be eligible for the California Register under any of the criteria.

**P-29-732 (CA-NEV-701H).** This historical site represents the route of an historic era trail or road through the property. Six contiguous segments of the route within the property were recorded in 1994.
based on historical research and fieldwork. The route is interpreted as the Donner Emigrant Trail. All six segments were relocated during the 2014 field survey. The trail route enters the property from the east, extends west across the north side of Crystal Lake, turns south along the west side of the lake, and continues south beyond the property boundary. Most portions of the site are characterized by an open linear trail/road averaging about 15 ft wide and forming a visible clearing through the forest. Other portions are incorporated into the actively used Crystal Lake access road that extends through the property. No artifacts have been identified in direct association with the site. The trail segments were identified during the 2014 fieldwork based on the 1994 site record descriptions, historical maps, and determining the most likely corresponding route through the property. Descriptions of each segment are provided below.

Segment A is the portion that enters the property from the east near historical site P-29-583 (railroad work camp). It is a visible linear clearing through the forest. An underground utility line with signage has been established along the route and large boulders have been placed to prevent vehicle access. Segment B is a short connecting section now destroyed by the Crystal Lake access road. Segment C is relatively intact and extends westerly through the woods between the access road and north side of the lake. An overturned automobile with rusted frame is visible at the west end of the segment, near the historical dam on Crystal Lake (P-31-731). Segment D is the section along the north side of the lake. This segment is maintained as an actively used dirt road. The west end terminates within the developed grounds of the Crystal Lake Lodge, at which point the route becomes imperceptible. Segment E is the connecting section along the west side of the lake. This portion of the route crosses large granitic bedrock exposures that characterize the area. As such, Segment E has low archaeological visibility. Segment E is the only portion of the site that was not GPS mapped during the 2014 field survey. The route was instead digitized using historical map data. It conjoins with Segment F, which represents a two-forked split in the trail at the north end of Raccoon Lake in the southwest corner of the property. The split in the road is depicted on the 1891 USGS Colfax topographic map, which shows the primary route heading southwest and continuing a long distance beyond the property boundary, and a short spur road off the primary route that heads south along the west side of Raccoon Lake. The long fork that extends southwest follows the modern-day Crystal Lake access road. Although this is the primary route of the historical trail, no archaeological evidence of the trail was observed during the 2014 field survey (e.g., no artifacts, trail ruts, etc.), likely because the route is now incorporated into the access road. The short spur road (east fork from the split) that heads south was identified during the 2014 field survey. It is a well-defined linear trail/road feature through the forest below (east) of Crystal Lake Road. At the south end are two upright wooden gate posts and a trail identification tag on a nearby tree. This section of the trail is among the best preserved portions of the site within the property. Later in time the spur road became the dirt road that
leads south from the property towards Kelly Lake, as depicted on the 1955 USGS Cisco Grove topographic map.

Segment D is the closest portion of the site to the proposed camp development. Segment D essentially follows the access road just south of the proposed development and extends a short distance into the Crystal Lake Lodge landscape, where it transitions into the archaeologically indiscernible Segment E. Segments D and E retain among the least integrity of all the trail sections. The poor integrity is due to impacts resulting from contemporary use as a vehicular road and because the trail route is no longer verifiable or accurately known.

The California Emigrant Trail, which stretched from Missouri to California and Oregon, was an important transportation route for the largest mass migration in human history (NPS 2015). During the 1840s and 1850s, over 250,000 immigrants traveled this trail to settle in California. As the trail approached the Nevada desert and Sierra Nevada Mountains it split into numerous individual routes. One of these routes was the Truckee Route, or the Truckee Trail of the California Emigrant Trail. This route followed the Truckee River Valley through Donner Pass, past Crystal Lake, and into north-central California, terminating at Johnson’s Ranch. This was an important route for immigrants to California. The first immigrant party to use the route was the Murphy-Townsend-Stevens party in 1844-45, followed by the tragic Donner-Reed party in 1846-1847 (Hoover et al. 1990:239-240). The Truckee Route was the first major transportation route through this corridor and laid the groundwork for wagon roads, the Central Pacific Railroad, and ultimately Interstate 80.

The 1867 GLO plat map for Township 17 North, Range 12 East depicts The “Ole Emigrant Trail” passing along the north side of Crystal Lake in the southwest section of Section 24 (BLM 1867a). The trail intersects with the Dutch Flat-Donner Lake Road approximately two miles west of Crystal Lake. This route was established during the 1890s as an unnamed road, as depicted on the Colfax USGS quadrangle (USGS 1891, 1892, 1894, 1898, 1902) along nearly the same route as the “Old Emigrant Road.” By 1938, the road alignment immediately adjacent and west of Crystal Lake is the same. The road’s east end terminated at structures which appear to be within the railroad work camp recorded as historical archaeological site P-29-583 in the inventory. It appears to have been cut off by the work camp, railroad, and Lincoln Highway. The 1955 map, however, depicts the unnamed route as crossing the railroad and highway (USGS 1955). The historic map data clearly show that, within the Crystal Lake property, the Truckee Route of the California Emigrant Trail has largely remained the same, although it has continued to be used as a road through time.

**Significance Evaluation.** The six recorded segments of P-29-732 (CA-NEV-701H) in the project area are within the designated route of the California National Historic Trail of the National Trails System (NPS
4.8 Cultural Resources

2015a:Map 4; 2015b). The trail segments are more specifically part of the Truckee Route of the California Emigrant Trail. This trail was an important route in the early and mid-nineteenth century westward migration to California and development of transportation. Because the trail segments are associated with this important historical event, the site is recommended eligible for listing on the CRHR under Criterion 1. The Truckee Route has associations with significant individuals, including the Murphy-Townsend Party and Donner-Reed Party; however, the trail segments within the project area do not exhibit a direct association, and as such, may not be contributing to the site eligibility under Criterion 2. All but one of the segments has been altered by ongoing uses or modern activities (e.g., active vehicular use, road maintenance and grading, buried utility lines, boulder barriers, erosion). Only a portion of Segment F (the eastern fork near Raccoon Lake) is in good condition and retains the character of a nineteenth century wagon road. However, even this short section does not exhibit the distinctive characteristics of an historic era wagon road, given the lack of wagon ruts, wear grooves in bedrock, or rust staining. Based on these characteristics, none of the segments of the recorded trail site within the project area appear eligible under Criterion 3. No artifacts dating to the time-period of use as an emigrant trail (1840s-1850s) have been found in association with the recorded trail segments. However, additional field investigation such as metal detection and aerial excavation could reveal artifacts along the trail segments. If present, these artifact scatters may have sufficient data potential for one or more of the segments to be eligible for listing on the California Register under Criterion 4.

P-29-1373 (CA-NEV-917). The site contains four extremely faint petroglyph elements on a level bedrock outcrop. Also present are two bedrock milling features (F1 and F2), a possible toolstone source locality (F3), and a low density surface scatter of basalt flaked stone debitage and tools. The site was recorded in 2002 and relocated during the 2014 field survey. New findings from 2014 include the possible toolstone source (F3) in the northern site area. This represents a small area (3 meter diameter) with quality toolstone, particularly quartzite. The feature may represent a source location of local toolstone for stone tool manufacture. Some of the quartzite rocks have breaks, possibly from intentional flaking and reduction, rather than natural spalls. Five surface stone tools are recorded. These represent two basalt projectile point fragments (neither classifiable) and three cores (two basalt, and one quartzite). Most of the tools and debitage are in the northern site area where there is visible mineral soil, beyond the granite bedrock that otherwise covers the site surface. Debitage density is very low (1 flake: 4 m² maximum).

A single petroglyph panel contains the four elements recorded at the site. The elements include a teardrop shape with appendages, two zigzags, and an extremely faint wavy line. The elements are pecked through the surface patination to a lighter colored base interior and classify as Style 7-High Sierra Abstract/Representational in Payen’s (1966:64-66) classification system. During a site visit on August 3, 2015 members of United Auburn Indian Community suggested that the petroglyph elements reflect
Native American cultural astronomy. The two milling features (F1 and F2) are very shallow milling slicks, each about 20 cm in diameter. Each has smooth polish from wear and lighter patination than the surrounding bedrock surface.

The site condition is good and appears unchanged from the 2002 site record. There are no signs of vandalism. The petroglyph panel has sustained some deterioration from natural weathering and exfoliation and has several surface fractures and small fissures. The petroglyph elements are extremely faint and just barely perceptible. The site location is relatively remote, being situated within forested and rocky terrain in the southeast property. There are no trails or established routes to the site area. The site location is an estimated 0.4 miles southeast of the proposed camp development.

The site stands out among the prehistoric sites identified in the project area by having the greatest variety of cultural constituents, including milling features, petroglyph panel, potential toolstone quarry source, and a flaked stone assemblage that includes functionally diagnostic artifacts (projectile point fragments and cores). Such an assemblage clearly reflects site occupation and habitation, which is not so apparent at the other prehistoric sites in the property given the apparent lack of subsistence-like tools (milling features, flaked stone, etc.). Although temporally diagnostic artifacts are few, the assemblage of unaltered rock features and surface artifact scatter reflects repeated site use and potential for cultural deposits. Chronological data including formed tools (projectile points, obsidian for hydration analysis) and organic materials suitable for radiocarbon dating may be present in subsurface contexts. The site retains integrity in terms of setting within a forested landscape with glaciated bedrock adjacent to a perennial pond.

**Significance Evaluation.** The site P-29-1373 is considered eligible for the California Register under Criteria 3 and 4 because it possesses high artistic and aesthetic values representative of a cultural group and appears to retain the data potential necessary to address research issues important to an understanding of regional prehistory. Although surface artifact density is relatively low, the variety of cultural materials at the site suggests that a subsurface deposit may be present. The greatest possibility for cultural deposits is in the northern site area where there is sufficient soil development and the highest surface artifact density. The site retains good integrity and conveys a strong semblance of prehistoric setting. The material inventory, potential for subsurface deposits, and site integrity indicate that the site contains the data potentials that could be used to address research topics in regional archaeology including cultural chronology, site distribution patterns, rock art, and lithic reduction strategies. Native American consultation has revealed that the site is of important research interest, particularly in terms of ethno-astronomy and cosmology. No information has been offered through Native American consultation to indicate that the site is associated with any particular historic events or person, and this precludes eligibility under the other California Register criteria (1 and 2).
4.8 Cultural Resources

P-29-2152 (CA-NEV-1377/H). This large prehistoric petroglyph site with historical component is distributed over a glaciated rock dome along the eastern shore of Crystal Lake. The site was recorded in 2002 and relocated in 2014 during the field survey of the property. Nine petroglyph panels containing approximately 47 elements are recorded. The historical component consists of a sparse surface scatter of artifacts and a rock quarry. The historical artifacts are mostly in the northern site area near but not within the rock quarry. These include a few ceramic fragments, broken pieces of glass (purple, green, brown, colorless), corrugated metal, and a church-key opened can. The rock quarry is an area roughly measuring 30 ft x 40 ft that has been excavated as a quarry to a depth of about 3 ft. The remaining rock in the quarry consists of cobble-sized angular basalt. The presence of the church-key opened can indicates that some of the refuse was deposited around or after 1935, when the church-key was first patented (United States Patent Office 1935). The rock quarry and historical trash scatter are located in close proximity to the historic period Crystal Lake Dam (P-29-731) although there is no definitive association between them. The dam is located immediately north of the rock quarry and site boundary.

The 2002 site record provides detailed drawings of each petroglyph panel and rock art symbol at the site. The 2014 fieldwork confirmed the accuracy and completeness of the 2002 site record data and provides updated photographs of the petroglyph panels, site overviews, and site boundary mapping using GPS equipment. A wide variety of petroglyph elements is present. Some are complex and distinctive. Examples include concentric circles, wavy lines, ovals, bear tracks, "C" and "D" shapes, and rayed circles. All of the elements are pecked through the surface patination to a lighter colored rock interior. Some elements are more heavily pecked than others and are more distinct. Petroglyph elements and traditions in California and the Great Basin are variously interpreted by researchers (cf. Clelowlow 1978; Coyote Man 1973; Payen 1966; Steward 1929; Whitley 2000). The elements at P-29-2152, like those at the other petroglyph sites in the project area, are characteristic of the Style 7-High Sierra Abstract/Representational in the classification system developed by Payen (1966:64-66). Sites with this rock art style often display complex and dense panels placed on expanses of glacially polished bedrock and occur only in the northern portion of the Sierra Nevada at high elevations. An interpretation offered by members of the United Auburn Indian Community during a site visit on August 3, 2015 is that the petroglyph panels and elements are associated with Native American cultural astronomy. Panel 1 at the north end of the site is the largest and most elaborate panel and contains approximately 30 elements.

The 2014 fieldwork did not identify new features or artifacts at the site and essentially upholds the 2002 site record in terms of site location, condition, and cultural constituents. The only discrepancy regards the presence of a flaked stone scatter consisting of two basalt tools. The 2002 site record provides the location of these artifacts in the general site area (one outside the recorded site boundaries), but neither was relocated during the 2014 fieldwork. These were described as a possible projectile point fragment
4.8 Cultural Resources

( Artifact 1) and a complete contracting stem projectile point (Artifact 2). There are few areas with sufficient soil development for cultural deposits given the location on glacially polished bedrock.

The site condition is good. There are no conspicuous impacts. Modern camp fire rings have been observed within the site boundaries for years, as reported on the 2002 site record and witnessed during a site visit in 2015, but there are no clear signs of vandalism. The 2002 site record suggests that a Forest Service camp ground may have been located along the north shore of Crystal Lake in the site vicinity. The petroglyph panels have sustained some natural deterioration and the elements range in visibility from moderately distinct to extremely faint. The rock quarry is adjacent to Petroglyph Panel 1 and there is a possibility that petroglyphs were destroyed by this activity, as many of the nearby rock surfaces are heavily scratched and scraped. The site is easily accessible and highly visible, owning to the open glaciated dome and prominent location on the lake across (east) of Crystal Lake Lodge. An informal trail goes thru the western site area near Petroglyph Panels 1 and 2. The trail-head is off the Crystal Lake access road, approximately 100 meters north of the site. The site is located an estimated 1,000 ft southeast of the proposed camp development.

The site is located in an area that has been used historically since at least the 1840s. The variety of historic period land uses have included construction and use of transportation routes (California Emigrant Trail, Dutch Flat Donner Lake Wagon Road, Central Pacific Railroad, and Interstate 80), late nineteenth and early twentieth century lake development, and lodging and recreation with the opening of the Crystal Lake House in the late nineteenth century. Much of this activity occurred at or around the north end of the lake or outside the project area. None of the historic GLO plat maps or USGS topographic maps (BLM 1867a; USGS 1891, 1892, 1894, 1898, 1902, 1938, 1955, 1973) reviewed depict a quarry at the site location. Thus, aside from the few diagnostic artifacts, the rock quarry cannot be dated to a particular time-period and cannot be associated with any of the historic period activities.

Significance Evaluation. Evaluation of prehistoric-historical archaeological site P-29-2152 regards the prehistoric and historical components separately. The prehistoric component is considered eligible for the California Register under Criteria 3 and 4 because it possesses high artistic and aesthetic values representative of a cultural group and contains information important to the understanding of prehistory. The historical component does not appear to meet any of the eligibility criteria.

The prehistoric component includes the largest number and variety of petroglyph elements of any petroglyph site in the project area. The other sites each contain between one to four elements. Prehistoric artifacts are few, and are represented only by two previously reported basalt flaked stone tools, neither relocated during the 2014 fieldwork. The depositional setting is primarily glacially polished bedrock with few areas of sufficient soil development that may contain cultural deposits. The data potentials of the site
would be expanded if future research recovers temporally diagnostic materials from intact subsurface cultural deposits to assist in determining the time-period of prehistoric cultural use. Based on available data, it is not possible to accurately determine the chronology of site use. The petroglyph panels are the primary cultural constituent of the prehistoric component. Although similar glyphs in the High Sierra are often ascribed to the late prehistoric period, such as the Martis Archaeological Complex (Foster et al. 1998), an accurate means of dating petroglyphs is still pending and requires considerable scientific study and research (cf. Gilreath 2003:286).

The site P-29-2152 retains a strong sense of prehistoric setting and integrity. It is among several petroglyph sites recorded in the vicinity of Crystal Lake (both within and outside the property) that indicate importance for the area in the past. Native American consultation has identified their interest in the site for ethno-astronomy and cosmology research. The material inventory, potential for subsurface deposits, and site integrity indicate that the site contains the data potentials that could be used to address research topics in regional archaeology including cultural chronology, site distribution patterns, rock art, and lithic reduction strategies. No information has been offered through Native American consultation to indicate that the site is associated with any particular historic events or person, and this precludes eligibility under the other California Register criteria (1 and 2).

The historic period component consists of a rock quarry and sparse surface refuse scatter. Despite its proximity to a number of other historic period sites, neither the quarry or artifact scatter can be definitively associated with an historic event or land use. The historic period scatter that is part of P-29-2152 has few diagnostic materials, although those that are present suggest a ca. 1935 or later date. This date is consistent with the occupation of the railroad work camp (P-29-583), which may indicate an association between the artifact scatter and that camp; however, none of the quarried rock appears to have been used in camp features. The site is located in close proximity to the 1920s Crystal Lake Dam, but there is no evidence that the quarried rock was used in the dam construction. It is possible that it was used to form a rubble core of the dam that is now covered with concrete. Also, it may be that the rock was quarried to use as ballast in transportation routes such as the railroad or other local roads, even though there is no definitive evidence based on available data. The lack of association for the historical component of P-29-2152 as well as the low density and non-diagnostic nature of the artifact scatter indicates that the historical component is not eligible for listing on the California Register under any of the criteria.

P-29-2153 (CA-NEV-1484). This isolated prehistoric petroglyph site is situated at the northern end of a prominent rock ridge overlooking the South Yuba River canyon. The location provides a panoramic view of the canyon and surrounding mountain peaks. A single petroglyph element is the only cultural feature and there are no associated artifacts. The site was recorded in 2002 and relocated during the 2014 field
survey. The 2014 fieldwork reported no new findings. The 2002 site record data are confirmed as accurate and complete. The petroglyph element is very faint, but consists of an oval with an interior crossbar and three appendages at one end, resembling a water bug. The shape is lightly pecked through the surface patination to a lighter colored base interior. The element classifies as Style 7-High Sierra Abstract/Representational in Payen’s (1966:64-66) system; this includes such glyphs at high elevations on glacially polished bedrock in the northern Sierra Nevada. The UAIC has not visited the site, but has conveyed their belief that the site represents a location of Native American cultural astronomy.

The site is in excellent condition and there are no signs of vandalism. The setting is high above the I-80 highway corridor and Southern Pacific Railroad. The audible and visual impacts from these facilities diminish the natural ambiance of the site’s dramatic setting. The petroglyph panel has sustained some minor natural deterioration, but is in comparatively good condition. The bedrock surface is solid without many fractures. The lack of artifacts and depositional setting on exposed glaciated bedrock without soil development indicates low potential for cultural deposits. The temporal range of site use cannot be determined given the absence of diagnostic artifacts, organic materials suitable for radiometric analysis, or even recent materials. It is not possible to accurately date the petroglyph based on current scientific methods (cf. Gilreath 2007). The assemblage is composed of an isolated petroglyph element which may be the result of a single event or visit at the site. There is no information to indicate that the site was repeatedly used. The site is located in a remote portion of the southeast property and is not easily reached due to rugged terrain. The site is not detectable to the untrained eye because of the lack of surface artifacts and features and the extremely faint appearance of the petroglyph element. The site location is at least 0.5 miles southeast of the proposed camp development.

**Significance Evaluation.** The site P-29-2153 is considered eligible for the California Register under Criteria 3 and 4 because it possesses high artistic and aesthetic values representative of a cultural group and contains information important to the understanding of prehistory. The site is one of several petroglyph sites that have been discovered and recorded in the Crystal Lake vicinity, both within the project area and surrounding region. This concentration of sites suggests a high level of significance for the area in the past. Native American consultation has revealed that the site is of important research interest to the community, particularly in terms of ethno-astronomy and cosmology. Although there is low potential for cultural deposits, future research may elucidate the temporal range of site use. This data potential may be sufficient for the site to contribute important information to regional archaeological research in terms of prehistoric, ethno-historic, or even historic era cultural processes. The site does not appear to be eligible under the other criteria. No information has been acquired from Native American consultation to indicate that the site is associated with any particular historic events or persons, and as such, the site is recommended not eligible under Criteria 1 and 2.
4.8 Cultural Resources

P-29-2154 (CA-NEV-1485). This small prehistoric petroglyph site is situated on the northwest slope of a small rocky knoll west of Crystal Lake. A single isolated petroglyph element is the only feature of the site and there are no associated artifacts. The site was recorded in 2002 and relocated in 2014 during the field survey of the property. The 2014 fieldwork confirmed the 2002 site record data in terms of accuracy and detail. The petroglyph element is a short (23 cm) zigzag line. The element classifies as Style 7-High Sierra Abstract/Representational in Payen’s (1966:64-66) classification system. Members of United Auburn Indian Community visited the site on August 3, 2015. A suggested interpretation was that the element represents a mountain ridge. It was noticed that the element is similar to the ridge line that is visible from the site, across Crystal Lake to the east and towards the large petroglyph site P-29-2152. The UACI has included this petroglyph site, like all the other petroglyph sites in the property, as reflecting Native American cultural astronomy.

The site is in moderately good condition and there are no changes from the 2002 site record description. The site has sustained some impacts which affect the semblance of prehistoric setting, but not the petroglyph panel. A utility line formerly crossed over the site as evidenced by two abandoned poles on the ground and broken glass insulators in the area. A nearby tree has been cut down. The gravel driveway to the Crystal Lake Lodge is about 50 meters north of the site, although direct view is obscured by thick forest trees. The bedrock outcrop containing the petroglyph element is fractured and there are limited areas of smooth surface suitable for rock art. The petroglyph element is faded but readily visible. The site is not conspicuous to the untrained observer. The lack of surface artifacts and features and presence of one small petroglyph element suggest that visitors passing through the area would not notice the site. The site location is approximately 0.2 miles south of the proposed camp development.

The site reflects a potential single cultural use event, in which the petroglyph element was created. There are no materials to indicate repeated use or multiple site visits, which may be evidenced by additional features or artifact scatters. The outcrop with the petroglyph element is surrounded by soil consisting of light brown loam with high gravel and sand content. Close inspection of the soil found no evidence of buried artifacts that may be associated with the site. Given the lack of diagnostic materials, it is not possible to determine the temporal range of site use. The site is attributed to the prehistoric period based on context and the petroglyph element.

Significance Evaluation. The site P-29-2154 is considered eligible for the California Register under Criteria 3 and 4 because it possesses high artistic and aesthetic values representative of a cultural group and contains information important to the understanding of prehistory. The site location is within a regional concentration of petroglyph sites (recorded within the property and surrounding area) that conveys a high level of significance for the area in the past. Native American consultation has identified important interest in the site for ethno-astronomy and cosmology research. Undetected cultural deposits
may be present in soils along the periphery of the outcrop with the petroglyph panel. If temporally diagnostic materials are recovered from subsurface contexts, then the chronology of site use can be established, and this strengthens the site’s potential to contribute information important to an understanding of prehistory or history. Although site integrity is compromised by modern impacts including a utility line and tree cutting, and the semblance of prehistoric setting is affected by visual and auditory impacts due to the close proximity of the Crystal Lake Lodge and driveway, the site appears to retain the data potentials necessary for eligibility under Criterion 4. The site does not appear to be eligible under the other criteria. No information has been acquired from Native American consultation to indicate that the site is associated with any particular historic events or persons, and this precludes eligibility under Criteria 1 and 2.

**PL-01 (temporary designation).** This newly identified historical site represents a section of abandoned overhead utility line that extends through the project area, paralleling the northeast property boundary near the Southern Pacific Railroad and I-80 highway corridor. The recorded segment within the property measures about 0.4 miles long. The utility line continues north and south beyond the property boundary. The southern portion goes through historical site P-29-583 (railroad work camp). The line was constructed across rugged mountainous terrain that characterizes the area high above the I-80 highway corridor. The line is not in use, but the wooden poles are still standing. The cross beams have wooden pegs and glass insulators in place (aqua and colorless). Artifacts and debris are scattered on the ground below the line in certain places. The materials primarily include broken glass insulators, milled wood cross beams and poles, iron hardware, and guy wires. Iron anchors are embedded into the granite bedrock at strategic points along the line. The site location is remote and nearly 0.3 miles from the proposed camp development.

In 1862, the Pacific Railroad Act of 1862 provided federal authorization to build a railroad line and telegraph line from Missouri to the Pacific Ocean (Central Pacific Railroad Photographic History Museum 2009b). The resulting 1869 Transcontinental Railroad was paralleled by the first transcontinental telegraph line. The PL-01 utility line is located in the vicinity of the railroad line and it may follow the original early alignment. As such, the PL-01 utility line could be associated with a major achievement in long distance communication systems. Alternatively, it may be one of several later identified utility lines that either cross or are associated with the historic railroad camp (P-29-583). A manufacturing mark on some of the wooden poles, “F. B. Marska Cedar Co./1953/30-2/WC-C/Sandpoint Idaho,” indicates that the poles were likely replaced in the 1950s; however, the alignment may approximate a more historic era line. The Bureau of Land Management’s historical land document index items indicates that in 1927 and 1939, part of the northeast quarter of Section 24 (Township 17 North, Range 12 East) was withdrawn for a possible power-related project, plausibly a transmission line; in addition, a right-of-way for a telephone
and/or telegraph line was authorized in June 1942 through Sections 24, 27, and 28 (BLM 2015:3). Both of these utility-related authorizations are located near PL-01, but neither of these mid-twentieth century utility lines appears to be part of a significant transmission line.

**Significance Evaluation.** The portion of historic period utility line (PL-01) within the property parallels the Southern Pacific railroad. The original construction date of the utility line is unknown, but archival research indicates that it could date to the late 1920s. The twentieth century alignment may have replaced an earlier nineteenth century telegraph line that was installed as part of the Transcontinental Railroad. The standing wooden poles date to the 1950s, and as such, indicate that the utility line was modified during the 1950s. Since then, the line was abandoned after an unknown period of use. If further research identifies that PL-01 is associated with the nineteenth century telegraph line, then the site may be eligible under Criterion 1 for contributing to our understanding of the development of transportation and communication. Because none of the original line is present within the property, the site is not eligible under any of the other CRHP criteria. The significance of later period utilities is less certain and additional research may be required to determine associations and significance.

4.8.5.2 Consultation: United Auburn Indian Community

On June 12, 2015, UC Davis notified the United Auburn Indian Community of the Auburn Rancheria (UAIC), the Washoe Tribe of Nevada and California, and the Shingle Springs Band of Miwok Indians, about the proposed project, provided background information and invited them to consult with the campus on the proposed project.

The UAIC requested further consultation on the proposed project, a records search at the UAIC offices, and a site visit have since occurred. On August 21, the UAIC provided a letter signed by Chairman Gene Whitehouse, dated August 18th and included in Appendix 1.0, requesting certain actions in relation to the proposed project. UC Davis has met with UAIC, reviewed the contents of the letter, and proposed mitigations detailed below in response to the request.

4.8.6 IMPACTS AND MITIGATION MEASURES

4.8.6.1 Criteria of Adverse Effect

Cultural resources consist of buildings, structures, objects, or archeological sites. Each of these entities may have historic, architectural, archaeological, cultural, or scientific importance. Section 15064.5(b) of State CEQA Guidelines defines a “substantial adverse change” as physical demolition, destruction, relocation or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. The significance of an historical resource is considered to be materially impaired if a project:
• demolishes or materially alters in an adverse manner those physical characteristics of a cultural resource (historic or archaeological) that convey its historical significance and that justify its inclusion in, or eligibility for, the California Register of Historical Resources; or

• demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to §5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of §5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

• demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion on the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.

• Directly or indirectly destroy a unique paleontological resource or site or unique geological feature (no such features were found during sites visits and no impacts would occur); or

• Disturb any human remains, including those interred outside of formal cemeteries.

4.8.6.2 Project Impacts and Mitigation Measures
Potential project impacts may result from implementation of the proposed project. This section identifies potential cultural resource impacts in two general categories, Construction Related Impacts (CRI) that may result from development of the proposed project, and Operations-Related Impacts (ORI). The potential impacts related to these two categories and mitigation measures to reduce those potential impacts to a less than significant level per §15064.5 of State CEQA Guidelines are discussed in the following pages. Table 4.8-3 offers site-specific summaries of impacts, followed by more detailed impact assessments and mitigation measures.
<table>
<thead>
<tr>
<th>Site No. P-29-</th>
<th>Description</th>
<th>CA Register Eligible Criterion</th>
<th>Nature of Impact</th>
<th>Impact Potential</th>
<th>Mitigation Measure</th>
<th>Significant Impact?</th>
</tr>
</thead>
<tbody>
<tr>
<td>583</td>
<td>Historic era railroad camp</td>
<td>Yes Crit. 4</td>
<td>1. Road grading</td>
<td>1. Direct</td>
<td>1. ESA fencing during construction. 2. Annual monitoring as specified in CRMP.</td>
<td>1. Less than significant 2. Less than significant</td>
</tr>
<tr>
<td>731</td>
<td>1920 concrete dam on Crystal Lake</td>
<td>No</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>No</td>
</tr>
<tr>
<td>732</td>
<td>Historical Trail Route Donner Emigrant Trail</td>
<td>Yes Crit. 1, 4</td>
<td>Road grading</td>
<td>Direct</td>
<td>ESA fencing of intact Segment C during construction.</td>
<td>Less than significant</td>
</tr>
<tr>
<td>1373</td>
<td>Prehistoric petroglyph site at pond with 4 petroglyphs, 2 bedrock milling features, toolstone source &amp; basalt lithic scatter.</td>
<td>Yes Crit 3, 4</td>
<td>Low potential for unauthorized artifact collection &amp; vandalism.</td>
<td>Low potential, Indirect</td>
<td>Monitoring, protection, interpretation &amp; management specified in CRMP.</td>
<td>Less than significant</td>
</tr>
<tr>
<td>2152</td>
<td>Large prehistoric petroglyph site on east shore of Crystal Lake. Includes 9 petroglyph panels with 47 elements, historical rock quarry and artifact scatter.</td>
<td>Yes Crit. 3, 4</td>
<td>High potential for public visitation, abrasion of petroglyphs, unauthorized artifact collection</td>
<td>High potential, Indirect</td>
<td>1. Train construction personnel to avoid. 2. Exclusion barrier for visitors. 3. Monitoring, protection, interpretation &amp; management specified in CRMP</td>
<td>Less than significant</td>
</tr>
<tr>
<td>2153</td>
<td>A single prehistoric petroglyph on prominent ridge line.</td>
<td>Yes Crit. 3, 4</td>
<td>Low potential for public visitation and vandalism of petroglyphs</td>
<td>Low potential, Indirect</td>
<td>Annual monitoring, protection, interpretation &amp; management specified in CRMP</td>
<td>Less than significant</td>
</tr>
<tr>
<td>2154</td>
<td>A single prehistoric petroglyph on low granitic outcrop.</td>
<td>Yes Crit. 3, 4</td>
<td>Low potential for public visitation and vandalism of petroglyphs</td>
<td>Low potential, Indirect</td>
<td>Annual monitoring, protection, interpretation &amp; management specified in CRMP</td>
<td>Less than significant</td>
</tr>
<tr>
<td>PL-01</td>
<td>Segment of abandoned historic era utility line</td>
<td>No</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>No</td>
</tr>
</tbody>
</table>
Following are potential impacts grouped by type, as they apply to one or more historical resources within the project site, followed by mitigation measures that will be applied to reduce impacts to less than significant levels.

**Construction-Related Impacts**

*Camp and Lodge Area*

**Impact CUL-1:** Impacts from construction activities on identified or previously unidentified cultural resources (Significant; Less than Significant with Mitigation)

As planned, construction of the proposed project will not directly impact any identified significant cultural resources (i.e., California Register eligible sites). Potential impacts may result from construction impacts to previously unidentified resources that were obscured and undiscovered during prior archaeological surveys particularly within the camp and lodge areas, where most ground-disturbing activities are planned. In addition, impacts may result from construction contractors straying outside the construction areas and prehistoric archaeological resources may also be exposed to unauthorized artifact collection during the construction phase of the project. The potential impact would be significant.

**Mitigation Measure CUL-1a:** Initial Archaeological Monitoring. Qualified professional archaeologists will monitor initial ground clearing and construction trenching for utilities in search of significant cultural resources. Native American monitors will be included at their discretion and by scheduled appointment during archaeological monitoring activities.

**Mitigation Measure CUL-1b:** Prehistoric Cultural Resource Evaluation and Data Recovery. If previously unidentified cultural resources are identified during construction monitoring, construction at and within 30 meters of the find will be suspended. UC Davis will retain a qualified archaeologist to evaluate the new discovery according to State CEQA Guidelines for their significance and potential eligibility to be listed on the California Register of Historical Resources. In the case of a prehistoric archaeological site, evaluation may be completed by examining existing records and reports, detailed recording, and/or through excavation to determine the data potential and California Register eligibility of the site. Native American monitors will be included at their discretion and by scheduled appointment during archaeological evaluation fieldwork activities. Resources determined not eligible for the California Register of Historical Resources by UC Davis require no further management.
If the discovered resource is found to be eligible for the CRHR, avoidance is the preferred mitigation measure. If avoidance is not possible, however, alternative mitigation measures for a prehistoric archaeological site that is California Register eligible under Criterion 4 for its scientific research value may include detailed recording, excavation, detailed analysis, and/or further research depending on the nature and type of the resource to recover the important scientific value residing in the site. Native American monitors will be included at their discretion and by scheduled appointment during archaeological data recovery fieldwork activities. Excavated materials would be curated at an appropriate facility, to be identified by the lead agency. Data recovery would be implemented to reduce impacts to less than significant levels per §15064.5 of State CEQA Guidelines.

Mitigation Measure CUL-1c: **Extended Archaeological Monitoring.** Archaeological monitoring of construction beyond the initial monitoring of utility trenching in the Camp and Lodge Area will occur if and only if previously unidentified cultural resources are discovered during the initial monitoring. If additional cultural resources are discovered, those resources will be subject to the same procedures of evaluation and data recovery mitigation if they are found to be CRHR eligible. These procedures will reduce impacts to less than significant levels per §15064.5 of State CEQA Guidelines.

Mitigation Measure CUL-1d: **Discovery of Human Remains.** In the unlikely event that human remains are encountered during ground disturbing activities, all work within a 30 meter vicinity of the find will be halted immediately, and UC Davis and the Nevada County Coroner will be notified. If the remains are determined to be Native American, the Native American Heritage Commission will be notified within 24 hours as required by Public Resources Code §5097.94 and §5097.98. The Native American Heritage Commission will notify the designated Most Likely Descendant(s), who will in turn provide recommendations for the treatment of the remains within 48 hours of being granted access to the find.

Mitigation Measure CUL-1e: **Construction Personnel Training.** Construction supervisory personnel will be notified of the general existence of cultural resources within the Crystal Lake property and construction personnel will be required to keep equipment and activities within specified construction areas only. Prior to construction activities, a qualified archeologist will conduct an awareness and identification training for construction personnel to stress the importance of preserving and avoiding impacts to
4.8 Cultural Resources

prehistoric archaeological resources, and train those personnel on the identification of archaeological materials so that they may recognize previously unidentified archaeological materials if they are unearthed during construction and notify UC Davis and its designated professional archaeologist.

Significance after Mitigation: The impact from CUL-1 would be reduced to a less-than-significant level.

Impact CUL-2: Impacts from construction activities at identified historic period sites have the potential to impact historic period archaeological resources (Significant; Less than Significant with Mitigation)

Construction activities could indirectly impact historic period archaeological resources. Sites at risk include Segments C and D of P-29-732 (CA-NEV-701H), the Donner Emigrant Trail, if the area outside the camp and lodge area construction zone is breached by heavy equipment, and P-29-583 (CA-NEV-525H), a historic era railroad camp, from heavy equipment impacts and unauthorized artifact collection. The potential impact would be significant.

Mitigation Measure CUL-2a: Exclusion Barrier. An exclusion barrier (e.g., temporary, four-foot tall, orange plastic mesh barrier fencing) will be installed in a north-south direction from the south edge of Crystal Lake Road near the dam to the north to the Crystal Lake property boundary. This exclusion barrier will clearly alert and exclude all construction personnel from areas east of the Camp and Lodge Area, prohibiting access by both equipment and personnel. This exclusion barrier will be inspected by archaeologists to ensure that all cultural materials are avoided and excluded from construction areas. The exclusion barrier will include signs that identify all areas outside the barrier as prohibited from access, except for emergency access/evacuation.

Mitigation Measure CUL-2b: Mapping of Construction Exclusion Areas. All exclusion zones for cultural resources within the project site will be shown on construction maps that alert construction personnel that these areas are exclusion zones that may not be breached or accessed except during emergencies. Vegetation management can occur if an on-site archaeologist monitoring the proposed activity determines that the activities would occur outside of the cultural resources site.

Significance after Mitigation: The impact from CUL-2 would be reduced to a less-than-significant level.
4.8 Cultural Resources

Petroglyph and Other Non-Construction Areas

Impact CUL-3: Impacts from construction activities have the potential to impact CRHR eligible Native American petroglyph sites (Significant; Less than Significant with Mitigation)

Construction activities from the proposed project have the potential to impact CRHR eligible Native American petroglyph sites by heavy equipment and unauthorized foot traffic damage on petroglyph elements and artifact collection by construction personnel at Sites P-29-1373 and P-2152, and foot traffic damage at Sites P-29-2153 and P-29-2154. The potential impact would be significant.

Mitigation Measure CUL-3a: Exclusion During Construction. An extension of the exclusion barrier shall be installed along the south edge of Crystal Lake Road as it traverses the north side of Crystal Lake. This extension will join the exclusion barrier as it crosses the road at the east edge of the Camp and Lodge Area (see Mitigation Measure CUL-2a). The barrier will be installed to clearly alert and exclude construction personnel from all petroglyph/archaeological site areas. The exclusion barrier along the south edge of Crystal Lake Road will extend west to the southern turn in the road and thence be installed along the east edge of Crystal Lake Road to the southern property boundary. This barrier will exclude construction equipment and personnel from all petroglyph and prehistoric archaeological sites, as well as CRHR eligible historic era archaeological sites within the Crystal Lake property for the duration of construction. The exclusion barrier in total will extend approximately 1000 meters. This exclusion barrier will be inspected by archaeologists to ensure that all cultural materials are avoided and excluded from construction areas. The exclusion barrier will include signs that identify all areas outside the barrier as prohibited from access. Vegetation management can occur if an on-site archaeologist monitoring the proposed activity determines that the activities would occur outside of the cultural resources site.

Significance after Mitigation: The impact from CUL-3 would be reduced to a less-than-significant level.

Submerged Area within Crystal Lake

Impact CUL-4: Impacts of construction within Crystal Lake on previously unidentified cultural resources (Significant; Less than Significant with Mitigation)

The project could result in potential impacts from construction within Crystal Lake on previously unidentified cultural resources. The construction of a recreational beach along the north shore or
expansion of the existing beach adjacent to the Crystal Lake Lodge with heavy equipment has the potential to impact previously unknown prehistoric archaeological resources near the current lakeshore of Crystal Lake that may have been inundated and submerged when the dam was constructed in 1920. The potential impact would be significant.

**Mitigation Measure CUL-4a: Cultural Resource Survey.** When Crystal Lake is drawn down for the construction of a recreational beach, UC Davis will retain the services of a qualified professional archaeologist to conduct an intensive pedestrian survey of the exposed lake bottom in search of previously unknown prehistoric archaeological resources. Native American monitors will be included at their discretion and by scheduled appointment during cultural resource survey fieldwork activities.

**Mitigation Measure CUL-4b: Prehistoric Cultural Resource Evaluation and Data Recovery.** If previously unknown prehistoric archaeological resources are discovered during the cultural resources survey of the exposed lake bottom, UC Davis will retain the services of a qualified professional archaeologist to determine if the resource(s) qualify as CRHR eligible in a manner consistent with Mitigation Measure CUL-1a. Native American monitors will be included at their discretion and by scheduled appointment during archaeological evaluation fieldwork activities.

If the discovered resource is found to be eligible for the CRHR, avoidance is the preferred mitigation measure. If avoidance is not possible, alternative mitigation measures for a prehistoric archaeological site that is California Register eligible under Criterion 4 for its scientific research value may include detailed recording, excavation, and detailed analysis and/or further research, depending on the nature and type of the resource to recover the important scientific value residing in the site. Native American monitors will be included at their discretion and by scheduled appointment during archaeological data recovery fieldwork activities. Excavated materials would be curated at an appropriate facility, to be identified by the lead agency. Data recovery would be implemented to reduce impacts to less than significant levels per §15064.5 of State CEQA Guidelines.

**Mitigation Measure CUL-4c: Protection of CRHR Eligible Sites.** Any and all portions of prehistoric archaeological sites and features found in the draw down portion of Crystal Lake for which avoidance is possible will be protected by exclusion barriers, signing, and informing construction supervisory personnel of the need for protection during construction of the recreational beach. This exclusion barrier will be installed by
archaeologists to ensure that all cultural materials are avoided and excluded from construction areas. Protection measures will reduce impacts to less than significant levels per §15064.5 of State CEQA Guidelines.

**Mitigation Measure CUL-4d: Modify Exclusion Barrier.** A segment of the continuous exclusion barrier that prohibits access to all property south and east of Crystal Lake Road, as described in Mitigation Measures CUL-3a, will be modified to allow access by construction personnel and equipment for the limited areas subject to the development of a recreational beach. The exclusion barrier will be modified so that exclusion remains for areas west and east of Crystal Lake that are not subject to beach development.

**Significance after Mitigation:** The impact from CUL-4 would be reduced to a less-than-significant level.

**Operation-Related Impacts**

Impacts and mitigation measures related to potential impacts resulting from the operation of the Crystal Lake Alumni Camp and event are described below.

*Petroglyph and Other Native American Archaeological Sites*

**Impact CUL-5:** Impacts from increased visitation during camp operation on petroglyph sites (Significant; Less than Significant with Mitigation)

Visitation and use of the area after the proposed project is developed will increase substantially to a peak period total of approximately 470 people. Without protective measures, visitors are likely to walk on bedrock petroglyphs, particularly those at large and easily accessible P-29-2152, resulting in abrasion and gradual damage/wear that will diminish the visibility of the petroglyphs degrading the integrity of the petroglyphs and obscuring the possible relationships and meanings of the petroglyphs to the environment.

**Mitigation Measure CUL-5a Cultural Resources Management Plan.** UC Davis will develop and implement a Cultural Resources Management Plan (CRMP) to ensure the long-term monitoring and protection of Native American petroglyph elements and other Native American archaeological deposits. The CRMP will provide specific detail to a variety of monitoring and protective measures that will include the following key elements.

i. Public exclusion from all petroglyph and other archaeological sites until the CRMP is completed and implemented. Temporary exclusion barriers (e.g., temporary, four-foot tall, orange plastic mesh barrier fencing)
installed for exclusion of construction personnel and equipment will remain in place until the CRMP is developed and executed.

ii. A key element of the CRMP will be a plan for prohibiting direct contact with petroglyphs at easily accessible and visible petroglyph site P-29-2152. Access will be controlled by the development and installation of permanent barriers that allow viewing of the petroglyphs without direct contact (further described in the educational program provision, below).

iii. Restricted access to petroglyph site P-29-2152 by swimmers, canoers, and kayakers on Crystal Lake.

iv. Collection of initial baseline documentation on the present condition of petroglyphs and Native American archaeological deposits. Baseline documentation, including high-resolution photography, will allow repeat photographs (on an annual basis) to gauge the condition and threats to these resources.

v. Surface collection of artifacts at Native American sites P-29-2152 and P-29-1373. The CRMP will describe a program of systematic surface collection to record and collect artifacts visible on the surface of these two sites to prevent unauthorized artifact collection by visitors. The CRMP will describe the appropriate disposition of surface collected artifacts.

vi. The CRMP will include a plan for incorporating Native American archaeological sites into the educational program for visitors. Educational information and media will be enhanced by the collection of additional data on traditional Native American use of the Crystal Lake property and general region. UC Davis will acquire these data by sponsoring the following:

- Native American Survey. UC Davis will sponsor a visit to the Crystal Lake property by knowledgeable Native Americans from tribal organizations whose members are ancestral to the project area (Maidu, Konkow, Miwok, Washoe). A Native American Survey may identify locations and resource areas used by ancestral groups that may not have an archaeological manifestation.
4.8 Cultural Resources

- Oral History and Ethnographic Research. Additional information on Native American use of the area will be obtained by UC Davis sponsorship of ethnographic research, including (if possible) oral histories from knowledgeable individuals with ties to the project area.

- Permanent physical barriers will be installed to protect the petroglyphs at Site P-29-2152. The barriers will be designed to be compatible with the environment and nature of Native American use of the area. These barriers will prevent visitors from walking on accessible petroglyphs while maintaining the ability for visitors to view and appreciate the petroglyphs, consistent with the educational objectives of the camp and environmental education center.

- Interpretive Media. Information obtained from existing regional archaeological studies, ethnographic research, oral history, and Native American Survey will be used to develop interpretive information for visitors to the UC Davis Crystal Lake Alumni Camp. The CRMP will describe the nature of interpretive media, which may include some combination of the following: signage at petroglyph site P-29-2152; brochures; photographs displayed at the Lodge; archaeological materials collected from the surfaces of P-29-2152 and P-29-1373 securely displayed at the lodge and/or used in interpretive lectures; and lectures and guided tours by docents.

vii. Long-Term Monitoring. The CRMP will describe a program of monitoring the condition of Native American archaeological sites to determine whether visitor impacts occur. If impacts resulting from operation of the facility are documented, additional protective and/or treatment measures will be implemented. The monitoring program will include the following elements:

- Annual photo-monitoring to provide comparative data on the condition of the petroglyph elements and other Native American archaeological deposits. The CRMP will identify specific photo-monitoring stations, aspects, time of year, lighting conditions, and any special filters or treatment of digital images to enhance petroglyph images.
Annual visual inspection of archaeological site features and surfaces for signs of vandalism and unauthorized digging or collection of artifacts.

A description of further treatment options should operation-related impacts be observed. Such options may include additional exclusion barriers to petroglyph sites, electronic monitoring devices (e.g., trail cameras), mapping and additional surface collection of artifacts threatened by unauthorized collection, archaeological excavation, and placement of ground cover that obscures surface archaeological evidence.

**Significance after Mitigation:** The impact from CUL-5 would be reduced to a less-than-significant level.

**Impact CUL-6:** Impacts from increased visitation during camp operation on historic era railroad work camp (Significant; Less than Significant with Mitigation)

The proposed project will greatly increase public visitation that may result in damage to historic era Site P-29-523, a railroad work camp. The influx of visitors may also result in vandalism and unauthorized artifact collecting. The impact would be significant.

**Mitigation Measure CUL-6a.** Annual Monitoring. Protocols for the annual monitoring of Site P-29-523 will be included and coordinated with the CRMP for Native American archaeological resources. Qualified Professional Archaeologists will monitor the site for evidence of unauthorized artifact collection and vandalism.

**Mitigation Measure CUL-6b.** Data Recovery. If unauthorized artifact collecting and/or vandalism is documented by systematic annual monitoring, UC Davis will sponsor a program of data recovery at the site by professional historical archaeologists. Archaeological materials will be mapped and systematically collected for study and reporting. A discard policy will be developed for common historical materials after they are inventoried. Historical materials that are unique, have ongoing research value, or public interpretive value will be curated at an appropriate facility identified by UC Davis. Data recovery would be implemented to reduce impacts to less than significant levels per §15064.5 of State CEQA Guidelines.


**Significance after Mitigation:** The impact from CUL-6 would be reduced to a less-than-significant level.

**Impact CUL-7:** The proposed project will create new sources of light and glare that has the potential to reduce visibility of the night sky for the study of possible ethno-astronomical relationships.

**Mitigation Measure CUL-7.** Lighting Control. **Section 4.3** of this EIR addresses visual impacts of the project, including night-time lighting. Mitigation measures (AES-4a-c) described in **Section 4.3** include: building materials that are textured, non-reflective exterior surfaces, dark colors, and non-reflective (non-mirrored) glass; installation of outdoor directional lighting with shielded and cut-off type light fixtures to minimize glare and prohibit upward directed lighting; extinguishing outdoor lights when not in use; and use of motion sensors and bi-level lighting fixtures to minimize light use. These measures will reduce impacts to less than significant levels per §15064.5 of State CEQA Guidelines.

**Significance after Mitigation:** The impact from CUL-7 would be reduced to a less-than-significant level.

**4.8.6.3 Cumulative Impacts and Mitigation Measures**

**Cumulative Impact CUL-1:** Development of the proposed project would make a cumulatively considerable contribution to cumulative damage to and loss of the resource base of unique archaeological and historical resources (including archaeological sites and historic buildings and structures) in Nevada and Placer Counties (*Significant; Significant and Unavoidable*)

Any disturbance of to a project site soils carries the potential to result in impacts to archaeological resources. Development of the proposed project and other development in Placer and Nevada counties over time would be anticipated to result in some impacts to historical resources and unique archaeological resources. These impacts may be significant if a significant resource is disturbed or destroyed. Project cultural resources protocols, as stipulated in the mitigation measures above, will minimize the impact of development under the proposed project on unique archaeological resources and historical resources because the campus will carry out a continuing program of archaeological investigation, which will in most cases enable the campus to avoid or preserve unique archaeological resources and historical resources, and will appropriately recover data from and document resources that cannot be preserved in place. While data recovery is acknowledged to be destructive of the physical
resource, investigations to date have been successful in preserving at least part of each discovered site, in reducing physical impacts through project modification, and in recovering substantial new archaeological and cultural information. Because the proposed mitigation program is expected to prevent or mitigate damage to unique archaeological resources and historical resources, the mitigation program is considered to have reduced the impacts to less-than-significant levels.

While the University has policies and programs in place that are expected to be effective in protecting the significant resource base, the University has no authority over the programs and actions of other agencies, and cannot ensure that the actions of other agencies will not result in unmitigated impacts to unique archaeological resources and historical resources. Over time, despite preservation policies in place, some unique archaeological resources and historical resources in Placer and Nevada counties could be damaged or destroyed. There may be instances elsewhere in the region, as also may occur on the campus, in which there would be impacts to an exceptionally significant historical resource that cannot fully be mitigated by data recovery or documentation. While the proposed project would make only a minimal contribution to these impacts, any such impact would contribute to a cumulative regional impact, and the impact would be cumulatively significant. Because there are no measures that can fully mitigate this impact, and because the University cannot guarantee implementation by other agencies of measures to protect historical resources and unique archaeological resources, the impact is considered significant and unavoidable.

**Significance after Mitigation:** The impact from Cumulative Impact CUL-1 would be significant and unavoidable.

### 4.8.7 REFERENCES


4.8 Cultural Resources


4.8 Cultural Resources


SECTION 4.9

GEOLOGY, SOILS, AND SEISMICITY

4.9.1 INTRODUCTION

This section identifies existing conditions; describes the regulatory setting for geology, soils, and seismicity in the study area; and analyzes the potential for the proposed project to affect these resources and for the proposed project to be impacted by these resources. Information presented in the discussion and used for the subsequent analysis was drawn primarily from the following sources.

- Regional geologic maps and fault maps prepared by the California Department of Conservation’s California Geological Survey (formerly the Division of Mines and Geology) and the U.S. Geological Survey (USGS).

- Soils information made available by the California Soil Resource Laboratory at the University of California, Davis, based on soil mapping by the Natural Resources Conservation Service (NRCS).

- Volume II, “Background Data and Analysis” of the Nevada County General Plan.

Comments received in response to the Notice of Preparation (NOP) are provided in Appendix 1.0. Public and agency comments related to geology, soils, and seismicity received in response to the NOP are summarized below.

- Concern regarding septic system capacity and adequacy of soils.

- Potential safety to humans and water quality impacts of septic systems.

4.9.2 ENVIRONMENTAL SETTING

4.9.2.1 Study Area

The approximate 210-acre study area is located on the west slope of the Sierra Nevada, near the Sierra Nevada crest, within the South Yuba River watershed in the southeastern portion of Nevada County. It is located to the south of Interstate 80 and is accessed from the Yuba Gap exit (Figures 3-1 and 3-2). The study area is within projected Section 24, Township 17 North and Range 12 East, MDB&M, and is on the Cisco Grove 7.5-minute USGS topographic quadrangle. Crystal Lake is located at an elevation of 5,877 feet above mean sea level (msl).
4.9 Geology, Soils, and Seismicity

4.9.2.2 Geology

Regional Geologic Framework

The study area is in the Sierra Nevada geomorphic province, which is a linear, tilted fault block almost 400 miles long that extends from northern Butte County to the Mohave Desert. In stark contrast to its steep eastern slope, its western slope is gentle. This western slope is deeply incised by rivers and bedrock disappears beneath the sediments of the Central Valley. The upper elevation Sierra Nevada is comprised of massive granites shaped by glaciation, such as is seen in Yosemite. Lower in the Sierra Nevada is the northwest-trending Mother Lode, which is made up of metamorphic rock containing gold-bearing veins. The Sierra Nevada disappears to the north beneath the Cenozoic volcanic rock of the Cascade Ranges (California Geological Survey 2002:2).

Study Area Geology

The study area has been mapped at a regional scale by a number of geologists (Jennings 1977; Stanford Geological Survey 1955; Saucedo and Wagner 1992). According to these maps, there are four main geologic units in the study area: granitic and granodioritic rocks, diorite, Miocene-Pliocene intrusive rocks, and ultramafic rocks. Granitic and granodioritic rocks underlie most of the study area, including all areas to the north of Crystal Lake. South of the lake, the study area is underlain by diorite, while the remaining western and eastern edges of the study area are underlain by Miocene-Pliocene intrusive rocks and ultramafic bedrock, respectively.

The description of these units below is from Saucedo and Wagner (1992). The locations of these units are shown in Figure 4.9-1.

- Granite and Granodiorite Rocks (KJgr): Mesozoic age; granodiorite, diorite, monzonite, quartz porphyrite, schistose granodiorite, granulite, alaskite, and undifferentiated plutonic rocks.
- Diorite (Jdi): Mesozoic age; diorite.
- Miocene-Pliocene Intrusive Rocks (MPv): Cenozoic age; intrusive andesite and basalt.
- Ultramafic Rocks (Jum): Mesozoic age; largely serpentinized, including minor talc schist, amphibole schist, chlorite schist, and soapstone.

Although not mapped, small amounts of Quaternary alluvium (alluvial or stream deposits of Quaternary age (either Pleistocene age [i.e., greater than 11,000 years old] or Holocene age [i.e., younger than 11,000
Figure 4.9-1a
Geologic Map of Study Area and Surrounding Area
Figure 4.9-1b
Geologic Map of Study Area and Surrounding Area
years old]) occur along the various drainageways in the study area, based on ICF International field observations.

**Study Area Topography**

Within the 210-acre study area, the topography is highly variable with gently sloping areas near the north side of Crystal Lake and steeper slopes near the granite outcroppings on the southeast side of the study area. The study area is generally bowl shaped with the approximate 13-acre Crystal Lake near the middle, receiving runoff from large portions of the study area that drain toward the lake. The peripheral portions of the property generally slope away from the central part of the study area, with surface drainage flowing onto adjacent properties. The outfall of Crystal Lake is located at the northeast corner of the lake, with the natural streambed blocked by a concrete dam constructed in the 1920s.

**4.9.2.3 Soils**

**Surface Soils**

The soils in the study area have been mapped by the U.S. Department of Agriculture, Soil Conservation Service (now the NRCS). The soil survey data are available through the California Soil Resource Laboratory at UC Davis (California Soil Resource Laboratory 2015). The soil map units in the study area are shown on Figure 4.9-2.

According to the soil survey, there are ten soil map units that occupy the study area.

- **Meiss-Waca complex**, 2 to 30 percent slopes (MKE), which covers a small area of the southwestern portion and less than 1 percent of the study area.

- **Rock outcrop, metamorphic-Tinker-Cryumbrepts**, wet complex, 2 to 30 percent slopes (MMRE), which covers a majority of the areas around Crystal Lake and roughly 24 percent of the study area.

- **Rock outcrop, metamorphic-Tinker-Cryumbrepts**, wet complex, 30 to 75 percent slopes (MMRG), which covers a large area in the southern portion and roughly 13 percent of the study area.

- **Rock outcrop, granitic-Tinker complex**, 30 to 75 percent slopes (RRG), which covers the northwestern portion and roughly 7 percent of the study area.
Figure 4.9-2
Soil Map Units in the Study Area

MKE: Meiss-Waca complex, 2 to 30 percent slopes
MMRE: Rock outcrop, metamorphic-Tinker-Cryumbrepts, wet complex, 2 to 30 percent slopes
MMRG: Rock outcrop, metamorphic-Tinker-Cryumbrepts, wet complex, 30 to 75 percent slopes
TAE: Tallac very gravelly sandy loam, 2 to 30 percent slopes
TBE: Tallac-Cryumbrepts, wet complex, 2 to 30 percent slopes
WDE: Waca-Meiss complex, 2 to 30 percent slopes
WDF: Waca-Meiss complex, 30 to 50 percent slopes
RRG: Rock outcrop, granitic-Tinker complex, 30 to 75 percent slopes
W: Waca-Meiss complex, 30 to 75 percent slopes
W: open water

Sources: Soil Map Units, California Soil Resource Laboratory 2015
Aerial, ESRI 2014
4.9 Geology, Soils, and Seismicity

- Rock outcrop, granitic-Tinker-Cryumbrepts, wet complex, 30 to 75 percent slopes (RSG), which covers the northeastern portion and roughly 3 percent of the study area.

- Tallac very gravelly sandy loam, 2 to 30 percent slopes (TAE), which covers a small area of the southwestern portion and less than 1 percent of the study area.

- Tallac-Cryumbrepts, wet complex, 2 to 30 percent slopes (TBE), which covers a majority of the area north of Crystal Lake and roughly 35 percent of the study area.

- Waca-Meiss complex, 2 to 30 percent slopes (WDE), which covers a small area of the southwestern portion and roughly 4 percent of the study area.

- Waca-Meiss complex, 30 to 50 percent slopes (WDF), which covers a sizeable area of the western portion and roughly 6 percent of the study area.

- Water, which covers roughly 9 percent of the study area.

The Meiss soils in the Meiss-Waca complex, 2 to 30 percent slopes soil map unit are moderately shallow (19–23 inches to lithic bedrock) and somewhat excessively drained. Parent material is residual materials weathered from andesite. Typically, the surface layer is sandy loam about 9 inches thick. The subsoil between 9 and 19 inches is gravelly sandy loam. Unweathered bedrock occurs at a depth below 19 inches. The erosion hazard is moderate. The wind erodibility group1 is 5. The Waca soils are moderately deep (32–36 inches to lithic bedrock) and well drained. Parent material is residuum weathered from acidic tuff and mudflow deposits derived from andesite. Typically, the surface layer is gravelly sandy loam about 12 inches thick. The subsoil between 12 and 32 inches is very gravelly sandy loam. Weathered bedrock occurs at a depth below 32 inches. The erosion hazard is moderate. The wind erodibility group is 6.

The Rock outcrop, metamorphic soils in the Rock outcrop, metamorphic-Tinker-Cryumbrepts, wet complex, 2 to 30 percent slopes soil map unit are very shallow (0–4 inches to lithic bedrock) and excessively drained. Typically, the surface layer is unweathered bedrock 0–10 inches thick, overlying lithic bedrock. The erosion hazard is not rated, but presumably moderate. No applicable wind erodibility group applies, but the Rock outcrop soils are presumably not readily susceptible to wind erosion.

1 Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. (California Soil Resource Laboratory 2015.)
Tinker soils are deep (33 to 45 inches to a duripan) and well drained. Parent material is glaciofluvial deposits. Typically, the surface layer is cobbly loam about 21 inches thick. The subsoil between 21 and 33 inches is very cobbly sandy loam. Cemented, very cobbly coarse sandy loam and very cobbly coarse sandy loam occurs at a depth below 33 inches. The erosion hazard is moderate. The wind erodibility group is 6. The Cryumbrepts, wet soils are very deep (more than 80 inches) and poorly drained. Parent material is alluvium. (California Soil Resource Laboratory 2015.)

The soils in the Rock outcrop, metamorphic-Tinker-Cryumbrepts, wet complex, 30 to 75 percent slopes soil map unit are similar to the soils in the Rock outcrop, metamorphic soils in the Rock outcrop, metamorphic-Tinker-Cryumbrepts, wet complex, 2 to 30 percent slopes soil map unit. However, for the Tinker soils, the erosion hazard is very severe. (California Soil Resource Laboratory 2015.)

The Rock outcrop, granitic soils in the Rock outcrop, granitic-Tinker complex, 30 to 75 percent slopes soil map unit are very shallow (0–4 inches to lithic bedrock) and excessively drained. Typically, the surface layer is unweathered bedrock 0–10 inches thick, overlying lithic bedrock. The erosion hazard is not rated, but presumably moderate. No applicable wind erodibility group applies, but the Rock outcrop soils are presumably not readily susceptible to wind erosion. The Tinker soils are deep (33 to 45 inches to duripan) and well drained. Parent material is glaciofluvial deposits. Typically, the surface layer is cobbly loam about 21 inches thick. The subsoil between 21 and 33 inches is very cobbly sandy loam. Cemented, very cobbly coarse sandy loam and very cobbly coarse sandy loam occurs at a depth below 33 inches. The erosion hazard is very severe. The wind erodibility group is 6. (California Soil Resource Laboratory 2015.)

The soils of the Rock outcrop, granitic-Tinker-Cryumbrepts, wet complex, 30 to 75 percent slopes soil map unit are similar to the soils of the Rock outcrop, granitic-Tinker complex, 30 to 75 percent slopes soil map unit. However, they include Cryumbrepts, wet soils which are described above. (California Soil Resource Laboratory 2015.)

The Tallac very gravelly sandy loam, 2 to 30 percent slopes soil map unit is deep (41 to 60 inches to duripan) and moderately well drained. Parent material is glaciofluvial deposits. Typically, the surface layer is very gravelly sandy loam about 26 inches thick. The subsoil between 16 and 22 inches is very cobbly coarse sandy loam. Extremely gravelly coarse sandy loam and cemented soils occur at depths below 22 inches. The erosion hazard is moderate. The wind erodibility group is 6. (California Soil Resource Laboratory 2015.)

The soils of the Tallac-Cryumbrepts, wet complex, 2 to 30 percent slopes soil map unit are similar to the soils of the Tallac very gravelly sandy loam, 2 to 30 percent slopes soil map. However, they include Cryumbrepts, wet soils which are described above. (California Soil Resource Laboratory 2015.)
4.9 Geology, Soils, and Seismicity

The Waca and Meiss soils of the Waca-Meiss complex, 2 to 30 percent slopes soil map unit are similar to those described above for the Meiss-Waca complex, 2 to 30 percent slopes soil map unit—only the percent composition differs.

The Waca and Meiss soils of the Waca-Meiss complex, 30 to 50 percent slopes soil map unit are similar to those described above for the Waca-Meiss complex, 2 to 30 percent slopes soil map unit. However, their erosion hazard is severe.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. The linear extensibility percentage for all soils is less than 3 percent, thus indicating a low shrink-swell potential for the soils in the study area.

In summary, excluding Water, portions of four of the nine soil map units have a severe or very severe erosion hazard; however, these soil map units occur outside the projected limits of project disturbance. Shrink-swell potential is low, based on linear extensibility values.

**Subsurface Conditions**

No subsurface exploration program has yet been conducted within the study area.

**Soil Corrosion Potential**

No corrosivity testing, which typically consists of soil pH, resistivity, sulfate, and chloride content tests, has yet been conducted within the study area.

4.9.2.4 Seismicity and Faults

**Primary Seismic Hazards**

Surface Rupture and Faulting

The purpose of the Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (see Section 4.9.3.2) is to regulate development near active faults to mitigate the hazard of surface rupture. Faults in an Alquist-Priolo Earthquake Fault Zone are typically active faults. As defined under the Alquist-Priolo Act, an
**active fault**\(^2\) is one that has had surface displacement within the Holocene epoch (the last 11,000 years); a **late Quaternary fault** is a fault that has undergone displacement during the past 700,000 years; a **Quaternary fault (age undifferentiated)** is one that has had surface displacement at some point during Quaternary time (the last 1.6 million years); and a **pre-Quaternary fault** is one that has had surface displacement before the Quaternary period.

The study area is not identified as being located in an Alquist-Priolo Earthquake Fault Zone (Bryant and Hart 2007). There is no evidence of recent (i.e., Holocene) faulting within the study area and no active faults are mapped at or near the study area (California Geological Survey 2010; USGS 2015). Furthermore, review of aerial photographs does not indicate the presence of lineaments or other features that would suggest the presence of recent faulting on or trending toward the study area. The nearest mapped active and late Quaternary faults pertinent to the study area are shown in Figure 4.9-3.

Numerous faults and/or fault zones were identified as potential seismic sources within a 50-mile radius of the study area. Those expected to have the greatest impact due to their proximity to the study area are the Mohawk Valley fault\(^3\), the Polaris fault, and the North and West Tahoe faults (active faults/fault zones exhibiting Holocene fault displacement); and the lineaments associated with the Dog Valley fault (active faults along which historic displacement has occurred). It is located approximately 25 miles to the north, a distance unlikely to affect the study area with respect to surface fault rupture. Consequently, the study area is not likely to be affected by surface fault rupture.

**Ground-Shaking Hazard**

The intensity of ground shaking that occurs as a result of an earthquake is partly related to the size of the earthquake, its distance from the subject location, and the response of the geologic materials in the area. As a rule, the greater the energy released from the fault rupture (the earthquake **magnitude**) and the closer the fault rupture (**epicenter**) to the site, the greater the intensity of ground shaking. Geologic and soil units comprising unconsolidated, clay-free sands and silts can reach unstable conditions during ground...

\(^2\) Two types of active faults are recognized—active faults along which historic (last 200 years) displacement has occurred, and active faults exhibiting Holocene fault displacement (during past 11,700 years) without historic record.

\(^3\) A recent study (Kreemer and Hammond unpublished) uses the term Mohawk Valley fault zone (MVFZ) for the entire ~100 km long fault zone between roughly the town of Truckee and 40°N (south of Lake Almanor), where many faults and lineaments have been recognized. The USGS Quaternary Fault and Fold database (USGS 2015) only recognizes a small portion of it as the MVFZ and has it divided into the Mohawk Valley section (fault #25a) and the Sierra Valley section (fault #25b). The many late Quaternary faults and lineaments between Lake Tahoe and the southern tip of USGS fault #25b have been recognized and named as the Sierra Nevada fault zone (Olig et al. 2005b as cited in Kreemer and Hammond unpublished) and renamed as the Truckee fault zone (Olig et al. 2005a as cited in Kreemer and Hammond unpublished). These naming conventions are not currently shown on the California Geological Survey 2010 or USGS 2015 maps.
Legends

Faults

- Active fault (fault along which historic [last 200 years] displacement has occurred)
- Active fault (Holocene fault displacement [during past 11,700 years] without historic record)
- Late Quaternary fault (fault displacement during last 700,000 years)
- Quaternary fault (age undifferentiated)

Source: FAM (preliminary) DOC, 2010; NBMG/USGS, 2014

Figure 4.9-3
Faults in the Study Area Region
shaking, which can result in extensive damage to structures built on such soils (see Liquefaction and Associated Hazards). When various earthquake scenarios are considered, ground-shaking intensities will reflect both the effects of strong ground accelerations and the consequences of ground failure.

Earthquake magnitude is generally expressed in the Richter Magnitude Scale or as moment magnitude. The scale used in the Richter Magnitude Scale is logarithmic so that each successively higher Richter magnitude reflects an increase in the energy of an earthquake of about 31.5 times. Moment magnitude is the estimation of an earthquake magnitude by using seismic moment, which is a measure of an earthquake size, utilizing the factors of rock rigidity, amount of slip, and area of rupture. Earthquake energy is most intense at the fault epicenter; the farther an area from an earthquake epicenter, the less likely that ground shaking will occur there.

Ground shaking is described using two methods: ground acceleration as a fraction of the acceleration of gravity, expressed in units of “g,” and the Modified Mercalli scale, which is a more descriptive method involving 12 levels of intensity denoted by Roman numerals. Earthquake intensity is typically expressed using the Modified Mercalli Intensity (MMI) scale, with values ranging from I to XII (Table 4.9-1). According to Volume II, “Background Data and Analysis” of the Nevada County General Plan (Nevada County 1995), the study area is located in a region of low seismic activity that corresponds to a probable maximum intensity between VI and VII on the MMI scale.

<table>
<thead>
<tr>
<th>Modified Mercalli Intensity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Not felt except by a very few under especially favorable conditions.</td>
</tr>
<tr>
<td>II</td>
<td>Felt only by a few persons at rest, especially on upper floors of buildings.</td>
</tr>
<tr>
<td>III</td>
<td>Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.</td>
</tr>
<tr>
<td>IV</td>
<td>Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.</td>
</tr>
<tr>
<td>V</td>
<td>Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.</td>
</tr>
<tr>
<td>VI</td>
<td>Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.</td>
</tr>
<tr>
<td>VII</td>
<td>Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.</td>
</tr>
</tbody>
</table>
4.9 Geology, Soils, and Seismicity

<table>
<thead>
<tr>
<th>Modified Mercalli Intensity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIII</td>
<td>Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.</td>
</tr>
<tr>
<td>IX</td>
<td>Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.</td>
</tr>
<tr>
<td>X</td>
<td>Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.</td>
</tr>
<tr>
<td>XI</td>
<td>Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.</td>
</tr>
<tr>
<td>XII</td>
<td>Damage total. Lines of sight and level are distorted. Objects thrown into the air.</td>
</tr>
</tbody>
</table>


The study area is in a region of California characterized by low historical seismic activity and low ground-shaking hazard. Based on a probabilistic seismic hazard map depicting the peak horizontal ground acceleration values exceeded at a 2 percent probability in 50 years (U.S Geological Survey 2014), the probable peak horizontal ground acceleration values in the study area range from 0.3 to 0.4g, where one g equals the force of gravity, thus indicating that the ground-shaking hazard in the project site is low to moderate. Farther to the east, the ground-shaking hazard increases, coinciding with the increase in abundance of associated faults and fault complexes. Based on the proximity of nearby faults, the most severe ground motion would most likely be expected to occur if there were to be significant activity along the southern extension of the Mohawk Valley fault or the faults in the vicinity of Truckee.

Secondary Seismic Hazards

Liquefaction and Associated Hazards

Liquefaction is a phenomenon in which the strength and stiffness of unconsolidated sediments are reduced by earthquake shaking or other rapid loading. Poorly consolidated, water-saturated fine sands and silts having low plasticity and, when located within 40 feet of the ground surface, are typically considered to be the most susceptible to liquefaction. Soils and sediments that are not water-saturated and that consist of coarser or finer materials are generally less susceptible to liquefaction. Geologic age also influences the potential for liquefaction. Sediments deposited within the most recent millennia are generally more susceptible to liquefaction than older Holocene sediments; Pleistocene sediments are even more resistant; and pre-Pleistocene sediments are generally immune to liquefaction (California Geological Survey 2008).
Based on the shallow soils, geologic age of the earth materials, the average relative density of the surface and subsurface bedrock, the presumed absence of a permanently elevated groundwater table, and low anticipated ground-shaking hazard for the study area, the potential for liquefaction, dynamic compaction, or seismically induced settlement or bearing loss is considered low. However, liquefaction hazard has not been comprehensively evaluated study area-wide, and no site specific-information is available.

**Seismically Induced and Static Slope Failures**

As described above, the topography of the study area is highly variable, with gently sloping areas near the north side of Crystal Lake and steeper slopes near the granite outcroppings on the southeast side of the study area. The slopes on the study area were observed to have adequate vegetation on the slope faces, appropriate drainage away from the slope faces (no significant areas of ponding), and no apparent tension cracks or slump blocks in the slope faces or at the head of the slopes. No indications of slope instability, such as seeps or springs, were observed. Additionally, due to the presumed absence of a permanently elevated groundwater table, the relatively low seismicity of the area, and the relative density of the bedrock, the potential for seismically induced slope instability is considered negligible.

Static slope failure hazard is deemed low due to the same reasons as described above.

However, these hazards have not been comprehensively evaluated study area-wide, and no site specific-information is available.

**4.9.2.5 Other Hazards**

Several other geologic and seismic hazards (land subsidence, volcanic activity, tsunami, and mudflow) that could be experienced in the larger region are unlikely to affect the study area. These hazards are not likely to affect the proposed project and, therefore, are not discussed in this EIR. Seiche hazard is address in Section 4.12, *Hydrology and Water Quality*.

**4.9.3 REGULATORY CONSIDERATIONS**

**4.9.3.1 Federal**

*Clean Water Act 402/National Pollutant Discharge Elimination System*

The Clean Water Act (CWA) is discussed in detail in Section 4.12, *Hydrology and Water Quality*. However, because CWA Section 402 is directly relevant to excavation, additional information is provided below.
4.9 Geology, Soils, and Seismicity

Section 402 mandates that certain types of construction activity comply with the requirements of the U.S. Environmental Protection Agency’s (EPA’s) National Pollutant Discharge Elimination System (NPDES) program. EPA has delegated to the State Water Resources Control Board (State Water Board) the authority for the NPDES program in California, where it is implemented by the state’s nine Regional Water Quality Control Boards (Regional Water Boards). Construction activities disturbing 1 acre or more must obtain coverage under the state’s General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Construction Permit) (see Construction Activities Storm Water Construction General Permit, below). General Construction Permit applicants are required to prepare a notice of intent (NOI) and a stormwater pollution prevention plan (SWPPP) and implement and maintain best management practices (BMPs) to avoid adverse effects on receiving water quality as a result of construction activities, including earthwork.

Because the proposed project would result in the disturbance of an area of 1 acre or more, the project applicant would need to obtain coverage under the General Construction Permit.

**U.S. Geological Survey National Landslide Hazard Program**

To fulfill the requirements of Public Law 106-113, USGS created the National Landslide Hazards Program to reduce long-term losses from landslide hazards by improving understanding of the causes of ground failure and suggesting mitigation strategies. The Federal Emergency Management Agency (FEMA) is the responsible agency for the long-term management of natural hazards.

**4.9.3.2 State**

**Alquist-Priolo Earthquake Fault Zoning Act**

California’s Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (Public Resources Code [PRC] 2621 et seq.), originally enacted in 1972 as the Alquist-Priolo Special Studies Zones Act and renamed in 1994, is intended to reduce the risk to life and property from surface fault rupture during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy across the traces of active faults and strictly regulates construction in the corridors along active faults (earthquake fault zones). It also defines criteria for identifying active faults, giving legal weight to terms such as active, and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones.

Under the Alquist-Priolo Act, faults are zoned and construction along or across them is strictly regulated if they are sufficiently active and well-defined. A fault is considered sufficiently active if one or more of its segments or strands show evidence of surface displacement during the Holocene time (defined for
purposes of the Alquist-Priolo Act as referring to approximately the last 11,000 years). A fault is considered well-defined if its trace can be clearly identified by a trained geologist at the ground surface or in the shallow subsurface, using standard professional techniques, criteria, and judgment (Bryant and Hart 2007).

**Seismic Hazards Mapping Act**

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (PRC 2690–2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act: the state is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards, and cities and counties are required to regulate development within mapped seismic hazard zones.

Under the Seismic Hazards Mapping Act, permit review is the primary mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for sites in Seismic Hazard Zones until appropriate site-specific geologic or geotechnical investigations have been carried out, and measures to reduce potential damage have been incorporated into the development plans. Geotechnical investigations conducted within Seismic Hazard Zones must incorporate standards specified by California Geological Survey Special Publication 117a, *Guidelines for Evaluating and Mitigating Seismic Hazards* (California Geological Survey 2008).

**Construction Activities Storm Water Construction General Permit (Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-006-DWQ)**

Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the General Construction Permit. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

Coverage under the General Construction Permit is obtained by submitting permit registration documents to the State Water Board that include a risk level assessment and a site-specific SWPPP identifying an effective combination of erosion control, sediment control, and non-stormwater BMPs. Post-construction stormwater detention measures may also be required. The General Construction Permit requires that the SWPPP define a program of regular inspections of the BMPs and, in some cases,
sampling of water quality parameters. The Central Valley Water Board administers the NPDES stormwater permit program in western Nevada County.

2013 California Building Standards Code

The state’s minimum standards for structural design and construction are given in the California Building Standards Code (CBSC) (24 California Code of Regulations). The CBSC is based on the 2012 International Building Code (IBC), which is used widely throughout United States (generally adopted on a state-by-state or district-by-district basis) and has been modified for California conditions with numerous, more detailed or more stringent regulations. The CBSC requires that “classification of the soil at each building site will be determined when required by the building official” and that “the classification will be based on observation and any necessary test of the materials disclosed by borings or excavations.” In addition, the CBSC states that “the soil classification and design-bearing capacity will be shown on the (building) plans, unless the foundation conforms to specified requirements.” The CBSC provides standards for various aspects of construction, including excavation, grading, and earthwork construction; fills and embankments; expansive soils; foundation investigations; and liquefaction potential and soil strength loss. In accordance with California law, certain aspects of the project would be required to comply with all provisions of the CBSC.

4.9.3.3 Local

University of California Seismic Safety Policy

Issues related to geologic hazards and soils conditions—ranging from seismic safety to the stability of cuts and fills and the potential for foundation damage as a result of expansive soils—are addressed through the building codes, which are adopted at the local jurisdiction (city or county) level and enforced through the building permit review process. The University of California is exempt from the requirement for local jurisdiction building permits but has adopted and self-enforces the California Building Standards Code (24 California Code of Regulations) for all new construction. The University of California also has a Seismic Safety Policy (UC Davis 2014) that specifically addresses the design and rehabilitation of structures and facilities.

Design and construction of University of California projects follows the current (2013) CBSC, which is based on the 2012 IBC but among other modifications includes more stringent provisions for seismic design of structures. Like its predecessor the Uniform Building Code, the IBC was developed to provide a uniform, widely applicable set of minimum standards to ensure building safety.
The CBSC includes a number of provisions relevant to geologic hazards and practice, including stipulation of projects for which a site-specific geotechnical investigation must be conducted. Key sections of the code include those listed below.

- **Chapter 18, Soils and Foundations.** Chapter 18 contains minimum requirements for design, construction, and water- or damp-proofing of foundations, including geotechnical and structural to ensure adequate support for the loads transferred from the structure above, and requirements for soils investigation and site preparation prior to foundation installation.

- **Chapter 16, Structural Design.** Chapter 16 prescribes minimum structural loading requirements for buildings and structural components, including minimum design loads and allowable design approaches. Because structural design must address site-specific conditions, Chapter 16 provides regionally based criteria for seismic loads, as well as rainfall, snow, and wind loads, all of which can vary greatly depending on location. The seismic design standards in Chapter 16 are not intended to avoid all earthquake damage, but instead focus on ensuring that the design earthquake is a survivable event, by preventing major structural damage under design earthquake conditions.

- **Appendix J, Grading.** Appendix J provides standards for grading (excavation and fill placement) to ensure the short- and long-term stability of cut and fill slopes. Appendix J is based on codes originally developed in the 1960s and tested and improved through decades of implementation in jurisdictions throughout the western United States.

The guiding principle (Policy) of the UC Seismic Safety Policy is as follows.

*The University shall lease, license, acquire, build, maintain, repair and rehabilitate buildings and other facilities to provide an acceptable level of earthquake safety for students, employees, and the public who occupy those buildings and other facilities, to the maximum extent feasible by present earthquake engineering practice and University resources, at all locations where University operations and activities occur within the United States. Feasibility shall be determined by weighing practicality and the cost of protective measures against severity and probability of injury resulting from seismic occurrences.*

The University of California Seismic Safety Policy requires that the

*design and construction of buildings on University premises shall comply, at a minimum, with the current seismic provisions of CBC for new or existing buildings as appropriate. All aspects of the structural design for each individual building of a UC project shall be under the responsible charge of one licensed, registered Professional Engineer or Structural Engineer that serves as the EOR for the structural design of the project through completion of construction.*
The Seismic Safety Policy states that any geotechnical investigation conducted for a project is to include consideration of the seismically induced site failure hazards, including liquefaction, differential settlement, lateral spreading, land sliding, and surface faulting.

The Seismic Safety Policy also establishes a system-wide program for the abatement of seismic hazards in existing buildings and facilities. Abatement is to include:

\textit{identification, temporary and permanent correction of potential earthquake falling, sliding, or rupturing hazards such as, but not limited to, interior and exterior building elements, utilities, equipment, fixtures, furnishings, and other contents that could be dislodged, fall, overturn, slide, or rupture during a seismic disturbance.}

\textbf{Grading, Erosion, and Sediment Control Ordinances}

Although not applicable to the proposed project, the following Nevada County development regulations relating to hydrology and water quality provide context for comparing the development standards that would be required on nearby properties and for understanding the water quality protection goals of Nevada County. Article 19, “Grading,” Chapter V, “Buildings,” of Title 3, “Land Use and Development Code” of the Nevada County Code (Nevada County 2015) describes the required permits, required setbacks, drainage considerations, and erosion control procedures for buildings. Storm drainage and design standards not otherwise specified in Article 19 shall comply with Article 5, “Storm Drainage,” Chapter XVII “Road Standards,” of Title 3, “Land Use and Development Code” of the Nevada County Code.

As described in Chapter 4.12, \textit{Hydrology and Water Quality}, under the requirements of the Central Valley Water Board, the project would be required to comply with design, construction, and maintenance requirements of the Central Valley Water Board (i.e., Construction General Permit, waste discharge requirements for dewatering) for surface water quality and stormwater pollution prevention.

\textbf{Nevada County Design Standards}

The County’s Comprehensive Site Development Standards identify the basic requirements for site development in the County, including standards to mitigate the impact of development on the following environmentally sensitive resources related to geology, soils, and seismicity.

- Earthquake faults.
- Avalanche hazards.
- Steep slopes (30+ percent).
• Areas with high erosion potential.


**Nevada County General Plan**

The proposed project is located on a University of California property that is owned or controlled by The Regents of the University of California. As a state entity, the University is exempted by the state constitution from compliance with local land use regulations, including general plans and zoning. However, the University seeks to develop its property in a manner that minimizes potential land use conflicts with the policies and plans of local jurisdictions to the extent feasible. Although not applicable to the proposed project, the following Nevada County General Plan (Nevada County 2015b) policies related to geology, soils, and seismicity provide context for comparing the development standards that would be required on nearby properties and for understanding the land development goals of Nevada County.

**Open Space Element**

**GOAL 6.1**

Encourage that land use patterns and site development reflect open space values.

**Objective 6.2**

Implement development standards that incorporate open space values.

**Policy 6.9**

Development standards for project design, grading, construction and use, established through the Comprehensive Site Development Standards, shall be used in project review of all discretionary project permits to determine open space requirements for each project.

These standards shall provide for consideration of non-disturbance of, and open space setbacks from identified sensitive environmental, biological, or cultural resources, e.g. 100-year floodplains, wetlands, slopes in excess of 30% (excepting access across slopes up to 30%), lakes, ponds, significant historic or archaeological sites/resources, critical wildlife areas, minimization of land disturbance, consistency with the landforms and
aesthetic context of the site, temporary and permanent erosion and sedimentation controls, and vegetation retention, replacement and enhancement.

Safety Element

**GOAL GH-10.2**

Minimize injury and property damage due to geologic and seismic hazards.

**Policy GH-10.2.1**

Ensure that new construction meets current structural and safety standards.

**Policy GH-10.2.2**

Continue to cooperate with the State Department of Conservation – California Geological Survey, the State Office of Emergency Services and other appropriate federal, state and local agencies and incorporate the most current data concerning the following as the basis for the County’s Site Development Standards, and project site plan review:

a. geologic hazards; and

b. seismic hazard data for sensitive land uses such as schools, medical facilities, high-density residential uses, and intensive commercial uses.

The project review shall consider the need to mitigate development in such areas in accordance with federal, state and local standards.

As part of the project site review process, require sufficient soils and geologic investigations to identify and evaluate the various geologic and seismic hazards that may exist for all proposed development, including subdivisions. Such investigations shall be required within an area determined to be seismically active by the State Department of Conservation – California Geological Survey, or within an area having potential geologic hazards, including slope instability and excessive erosion.

**Policy GH-10.2.1.3**

Carry out the requirements of the California Building Code, particularly with regard to seismic design.
Policy GH-10.2.1.4

Require that underground utility lines, particularly water and natural gas mains, be designed to withstand seismic forces.

Soils Element

GOAL 12.1

Minimize adverse impacts of grading activities, loss of soils and soil productivity.

Objective 12.1

Minimize earth movement and disturbance.

Policy 12.1

Enforce Grading Ordinance provisions for erosion control on all new development projects by adopting provisions for ongoing monitoring of project grading. Project site inspection shall be required prior to initial site disturbance and grading to ensure all necessary control measures, including proper staking and tree protection measures, are in place. The installation, maintenance, and performance of erosion and sedimentation control measures shall be monitored by County or District staff (or their designee) and completely funded by a project applicant. All County projects shall comply with this policy.

Objective 12.2

Minimize erosion due to road construction and maintenance.

Policy 12.4

Require erosion control measures as an element of all County contracts, discretionary projects, and ministerial projects.
4.9.4 IMPACTS AND MITIGATION MEASURES

4.9.4.1 Significance Criteria

The significance criteria listed below are derived from Appendix G of the State CEQA Guidelines. For the purpose of this EIR, geology, soils, and seismicity impacts would be significant if implementation of the proposed project would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area, or based on other substantial evidence of a known fault (refer to CGS Special Publication 42).
  - Strong seismic ground shaking.
  - Seismic-related ground failure, including liquefaction.
  - Landslides.

- Result in substantial soil erosion or the loss of topsoil.

- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.

- Be located on expansive soil, as defined in the California Building Code, creating substantial risks to life or property.

- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

4.9.4.3 Methodology

Impacts related to geology, soils, and seismicity were assessed based on available data (maps, soil surveys), and professional judgment. This analysis focuses on the proposed project’s potential to result in the risk of personal injury, loss of life, and damage to property as a result of existing geologic conditions within the study area.
The geology, soils, and seismicity impact analysis assumes that the project applicant would conform to the latest NPDES requirements, University of California Seismic Safety Policy, and other relevant standards and ordinances. The analysis also assumes that, per a requirement of the CBSC, geotechnical analyses would be performed in the study area. Site-specific, design-level geotechnical investigations would be performed to evaluate the potential for the presence of soft and/or loose soils, unstable slopes, surface fault rupture, ground shaking, liquefaction hazard, slope stability, and expansive soils. Site-specific analyses will occur prior to final design.

4.9.4.4 Project Impacts and Mitigation Measures

Proposed Project

Impact GEO-1: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (No Impact)

The study area is not identified as being within an Alquist-Priolo Fault Zone (Bryant and Hart 2007). There is no evidence of recent (i.e., Holocene) faulting within the study area and no active faults are mapped to cut at or near the study area (California Geological Survey 2010; USGS 2015). Furthermore, review of aerial photographs does not indicate the presence of lineaments or other features that would suggest the presence of recent faulting on or trending toward the study area. Accordingly, the study area is not subject to surface rupture hazard. There would be no impact.

Mitigation Measure(s): No mitigation measures are required.

Impact GEO-2: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking; seismic-related ground failure, including liquefaction; and landslides (Significant; Less than Significant with Mitigation)

The ground-shaking hazard in the study area is low. In addition to the low hazard of ground shaking and related hazards, potential impacts associated with ground shaking would be minimized because UC Davis would be required to implement CBSC and University of California Seismic Safety Policy standards into the project design for applicable features to minimize the potential fault rupture and ground-shaking hazards on associated project features. Structures must be designed to meet the regulations and standards associated with the CBSC and University of California Seismic Safety Policy
standards. The geotechnical study, a requirement of the CBSC as discussed below, would be developed prior to construction activities and the seismic design parameters will be based on the building codes in effect at that time.

Nonetheless, while liquefaction and related hazards (including seismically-induced landslides) are considered low, a large earthquake on a nearby fault could cause minor ground shaking in the vicinity of the study area, potentially resulting in an increased risk of structural loss, injury, or death. In addition, liquefaction hazard has not been comprehensively evaluated in the study area, no site specific-information is available for the study area, and the depth to the water table at the study area is unknown. Thus there may be some potential for liquefaction at the site, and structural damage and the associated life and safety hazard could rise to the level of a significant impact. Implementation of Mitigation Measure GEO-2 would reduce impacts consistent with the prevailing geotechnical engineering standard of care; residual impacts, if any, would be less than significant.

Mitigation Measure GEO-2:  Incorporate findings and recommendations from the site-specific geotechnical investigation to mitigate any effects caused by strong seismic ground shaking, seismic-related ground failure, and expansive soils

A site-specific, design-level geotechnical investigation will be conducted during the design phase for the project. This investigation will be conducted by a licensed geotechnical engineer and include a seismic evaluation of ground acceleration under the design event, as well as relevant soil conditions at the site (including the potential for soil expansion). Engineered fill material and placement, as well as slope configuration, grading recommendations, and erosion control procedures will be included in the investigation. Geotechnical recommendations will subsequently be incorporated into the foundation and building design.

Significance after Mitigation: With implementation of Mitigation Measure GEO-2, which would require implementation of the recommendations of a geotechnical investigation, impacts related to strong seismic ground shaking and seismic-related ground failure would be reduced to a less-than-significant level.

Impact GEO-3:  Result in substantial soil erosion or the loss of topsoil (Less than Significant)

Grading, excavation, and removal of vegetation cover associated with construction could temporarily increase erosion, runoff, and sedimentation. Construction activities also could result in soil compaction and wind erosion effects that could adversely affect soils and reduce the revegetation potential at the construction and staging areas.
However, as required by General Construction Permit, a SWPPP would be developed by a Qualified SWPPP Developer (QSD) and implemented before and during construction. The SWPPP would be kept onsite during construction activity and made available upon request to representatives of the Central Valley Water Board. The SWPPP would identify pollutant sources that may affect the quality of stormwater associated with construction activity and specify BMPs to reduce pollutants in stormwater discharges during and after construction. Therefore, the SWPPP would include a description of potential pollutants, the management of dredged sediments, and hazardous materials present on the site during construction (including vehicle and equipment fuels). The SWPPP also would include details of how the erosion and sediment control practices (i.e., BMPs) would be implemented. Implementation of the SWPPP would comply with state and federal water quality regulations.

This impact would be less than significant.

Please also see Impact WQ-1, Impact WQ-4, and Impact WQ-7 in Section 4.12, Hydrology and Water Quality, for the effects of project-related soil erosion on water quality, both short- and long-term.

**Mitigation Measure(s):** No mitigation measures are required.

**Impact GEO-4:** Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse (Significant; Less than Significant with Mitigation)

The slopes on the study area were observed to have adequate vegetation on the slope face, appropriate drainage away from the slope face, and no apparent tension cracks or slump blocks in the slope face or at the head of the slope. No other indications of slope instability such as seeps or springs were observed. However, while the geologic units appear to be stable, hazards associated with geological instability have not been comprehensively evaluated in the study area, and no site specific-information is available. Thus there may be some potential for geological instability at the site, and potential structural damage and the associated life and safety hazard could rise to the level of a significant impact. As noted in Impact GEO-2, a geotechnical investigation would be prepared for the project. Recommendations and measures from this investigation, as described in Mitigation Measure GEO-2, would ensure that impacts related to unstable geologic units and associated hazards would be reduced to a less-than-significant level.

**Mitigation Measure GEO-2:** Incorporate findings and recommendations from the site-specific geotechnical investigation to mitigate potential effects caused by strong seismic ground shaking, seismic-related ground failure, and expansive soils
Significance after Mitigation: With implementation of Mitigation Measure GEO-2, which would require implementation of the recommendations of a geotechnical investigation, impacts related to unstable geologic units and associated hazards would be reduced to a less-than-significant level.

Impact GEO-5: Be located on expansive soil, as defined in Section 1803.5.3 of the 2013 CBSC, creating substantial risks to life or property (Less than Significant)

Expansive soils have the potential to compromise the structural integrity of project features, which would be a significant impact. However, the linear extensibility percentage for all soils is less than 3 percent, thus indicating a low shrink-swell potential for the soils in the study area. In addition, the CBSC includes detailed provisions to ensure that foundation design is appropriate to site conditions. It also limits the characteristics of materials that are acceptable for use as fill, ensuring against reuse of inappropriate site soils as fill. With adherence to the CBSC, as required by the University of California for all new construction, expansive soils would be addressed consistent with the current engineering standard of care.

This impact would be less than significant.

Mitigation Measure(s): No mitigation measures are required.

Impact GEO-6: Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater (Less than Significant)

This impact is discussed under Impact WQ-7 in Section 4.12, Hydrology and Water Quality.

Mitigation Measure(s): No mitigation measures are required.

4.9.4.5 Cumulative Impacts and Mitigation Measures

Cumulative Impact GEO-1: Contribute to a cumulative impact on local geologic, soils, and seismic conditions in the study area (Less than Significant)

The cumulative impact context for evaluation of potential geology, soils, and seismicity impacts includes the development proposed under the proposed project only. There is no anticipated development in the areas adjacent to the study area that has the potential to impact the local geologic, soils, and seismic conditions or act in combination with the proposed project. The proposed project would comply with CBSC and University of California Seismic Safety Policy standards, as well as state and federal water quality regulations and therefore the proposed project’s contribution to any cumulative effect on local
geologic, soils, and seismic conditions. All long-term project impacts would be reduced to a less-than-significant level through adherence to permit requirements, Low Impact Development, and BMP installation. Compliance with these existing permit requirements has been determined to adequately address cumulative impacts by the regulating agencies. Cumulative impacts on local geologic, soils, and seismic conditions from the proposed project are considered less than significant.

4.9.5 REFERENCES


SECTION 4.10
GREENHOUSE GAS EMISSIONS

4.10.1 INTRODUCTION

This section discusses the existing global, national, and statewide conditions related to greenhouse gases (GHG) and global climate change and evaluates the potential impacts on global climate from the implementation of the proposed project. The section also provides discussion of the applicable federal, state, regional, and local agencies that regulate, monitor, and control GHG emissions. Copies of the modeling runs to estimate GHG emissions associated with the proposed project and supporting technical data are found in Appendix 4.2 of this EIR.

No comments related to GHG emissions were received in response to the Notice of Preparation (NOP) issued for this EIR. Scoping comments submitted in response to the NOP are provided in Appendix 1.

4.10.2 ENVIRONMENTAL SETTING

4.10.2.1 Study Area

The project site is rural area of forested land in Nevada County at an elevation of approximately 6,000 feet. Emissions sources at the project site currently consist of water and building heating associated with the two residential units on the property.

4.10.2.2 Background

Global climate change refers to any significant change in climate measurements, such as temperature, precipitation, or wind, lasting for an extended period (i.e., decades or longer) (US EPA 2008a). Climate change may result from:

- natural factors, such as changes in the sun’s intensity or slow changes in the Earth’s orbit around the sun;
- natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of GHG and other gases to the atmosphere from volcanic eruptions); and
- human activities that change the atmosphere’s composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification).

The primary effect of global climate change has been a rise in the average global tropospheric temperature of 0.2 degree Celsius per decade, determined from meteorological measurements worldwide.
between 1990 and 2005. Climate change modeling using 2000 emission rates shows that further warming is likely to occur, which would induce further changes in the global climate system during the current century (IPCC 2007). Changes to the global climate system and ecosystems, and to California, could include:

- declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere’s ability to hold more water vapor at higher temperatures (IPCC 2007);

- rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets (model-based projections of global average sea level rise at the end of the 21st century (2090–2099) range from 0.18 meter to 0.59 meter or 0.59 foot to 1.94 feet) (IPCC 2007);

- changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones (IPCC 2007);

- declining Sierra snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years (Cal EPA 2006);

- increasing the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas located in the Southern California area and the San Joaquin Valley by the end of the 21st century (Cal EPA 2006);

- increasing the potential for erosion of California’s coastlines and sea water intrusion into the Sacramento and San Joaquin Delta and associated levee systems due to the rise in sea level (California EPA 2006);

- increasing pest infestation, making California more susceptible to forest fires (Cal EPA 2006);

- increasing the demand for electricity by 1 to 3 percent by 2020 due to rising temperatures resulting in hundreds of millions of dollars in extra expenditures (Cal EPA 2006); and

- summer warming projections in the first 30 years of the 21st century ranging from about 0.5 to 2 degrees Celsius (°C) (0.9 to 3.6 °F) and by the last 30 years of the 21st century, from about 1.5 to 5.8 °C (2.7 to 10.5 °F) (Cal EPA 2006).

The natural process through which heat is retained in the troposphere1 is called the “greenhouse effect.” The greenhouse effect traps heat in the troposphere through a threefold process as follows: (1) short-wave radiation in the form of visible light emitted by the Sun is absorbed by the Earth as heat; (2) long-wave radiation re-emitted by the Earth; and (3) GHGs in the upper atmosphere absorbing or trapping the

---

1 The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth’s surface to 10 to 12 kilometers).
long-wave radiation and re-emitting it back towards the Earth and into space. This third process is the focus of current climate change actions.

While water vapor and carbon dioxide (CO$_2$) are the most abundant GHGs, other trace GHGs have a greater ability to absorb and re-radiate long-wave radiation. To gauge the potency of GHGs, scientists have established a Global Warming Potential (GWP) for each GHG based on its ability to absorb and re-emit long-wave radiation over a specific time period. The GWP of a gas is determined using CO$_2$ as the reference gas, which has a GWP of 1 over 100 years (IPCC 1996). For example, a gas with a GWP of 10 is 10 times more potent than CO$_2$ over 100 years. The use of GWP allows GHG emissions to be reported using CO$_2$ as a baseline. The sum of each GHG multiplied by its associated GWP is referred to as “carbon dioxide equivalents” (CO$_2$e). This essentially means that 1 metric ton of a GHG with a GWP of 10 has the same climate change impacts as 10 metric tons of CO$_2$.

### 4.10.2.3 Greenhouse Gases

State law defines GHGs to include the following compounds:

- **Carbon Dioxide (CO$_2$).** Carbon dioxide primarily is generated by fossil fuel combustion from stationary and mobile sources. Due to the emergence of industrial facilities and mobile sources over the past 250 years, the concentration of carbon dioxide in the atmosphere has increased 35 percent (US EPA 2008b). Carbon dioxide is the most widely emitted GHG and is the reference gas (GWP of 1) for determining the GWP of other GHGs. In 2004, 82.8 percent of California’s GHG emissions were carbon dioxide (California Energy Commission 2007).

- **Methane (CH$_4$).** Methane is emitted from biogenic sources (i.e., resulting from the activity of living organisms), incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. In the United States, the top three sources of methane are landfills, natural gas systems, and enteric fermentation (US EPA n.d.[a]). Methane is the primary component of natural gas, which is used for space and water heating, steam production, and power generation. The GWP of methane is 21.

- **Nitrous Oxide (N$_2$O).** Nitrous oxide is produced by natural and human-related sources. Primary human-related sources include agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. The GWP of nitrous oxide is 310.

- **Hydrofluorocarbons (HFCs).** HFCs typically are used as refrigerants in both stationary refrigeration and mobile air conditioning. The use of HFCs for cooling and foam-blowing is growing particularly as the continued phase-out of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) gains momentum. The GWP of HFCs ranges from 140 for HFC-152a to 6,300 for HFC-236fa.

---

2 All Global Warming Potentials are given as 100-year values.
• **Perfluorocarbons (PFCs).** Perfluorocarbons are compounds consisting of carbon and fluorine. They are primarily created as a byproduct of aluminum production and semiconductor manufacturing. Perfluorocarbons are potent GHGs with a GWP several thousand times that of carbon dioxide, depending on the specific PFC. Another area of concern regarding PFCs is their long atmospheric lifetime (up to 50,000 years) (Energy Information Administration 2007). The GWPs of PFCs range from 5,700 to 11,900.

• **Sulfur Hexafluoride (SF₆).** Sulfur hexafluoride is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used as an electrical insulator in high voltage equipment that transmits and distributes electricity. Sulfur hexafluoride is the most potent GHG that has been evaluated by the Intergovernmental Panel on Climate Change with a GWP of 23,900. However, its global warming contribution is not as high as the GWP would indicate due to its low mixing ratio, as compared to carbon dioxide (4 parts per trillion [ppt] in 1990 versus 365 parts per million [ppm] of CO₂) (US EPA n.d.[b]).

### 4.10.2.4 Contributions to Greenhouse Gas Emissions

**Global**

Worldwide anthropogenic (man-made) GHG emissions are tracked for industrialized nations (referred to as Annex I) and developing nations (referred to as Non-Annex I). Man-made GHG emissions for Annex I nations are available through 2007. Man-made GHG emissions for Non-Annex I nations are available through 2005. The sum of these emissions totaled approximately 42,133 million metric tons of CO₂ equivalents (MMTCO₂E).³ It should be noted that global emissions inventory data are not all from the same year and may vary depending on the source of the emissions inventory data.⁴ The top five countries and the European Union accounted for approximately 55 percent of the total global GHG emissions according to the most recently available data (See Table 4.10-1, Top Five GHG Producer Countries and the European Union [Annual]). The GHG emissions in more recent years may differ from the inventories presented in Table 4.10-1; however, the data is representative of currently available global inventory data.

---

³ The CO₂ equivalent emissions commonly are expressed as “million metric tons of carbon dioxide equivalent (MMTCO₂E).” The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP, such that MMTCO₂E = (million metric tons of a GHG) x (GWP of the GHG). For example, the GWP for methane is 21. This means that the emission of one million metric tons of methane is equivalent to the emission of 21 million metric tons of CO₂.

### Table 4.10-1
Top Five GHG Producer Countries and the European Union (Annual)

<table>
<thead>
<tr>
<th>Emitting Countries</th>
<th>GHG Emissions (MMTCO\textsubscript{2}e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>7,250</td>
</tr>
<tr>
<td>United States</td>
<td>7,217</td>
</tr>
<tr>
<td>European Union (EU), 27 Member States</td>
<td>5,402</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>2,202</td>
</tr>
<tr>
<td>India</td>
<td>1,863</td>
</tr>
<tr>
<td>Japan</td>
<td>1,412</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25,346</strong></td>
</tr>
</tbody>
</table>

*Source: World Resources Institute, “Climate Analysis Indicators Tool (CAIT),” http://cait.wri.org/. 2010. Excludes emissions and removals from land use, land-use change and forestry (LULUCF). Note: Emissions for Annex I nations are based on 2007 data. Emissions for Non-Annex I nations (e.g., China, India) are based on 2005 data.*

### United States

As noted in Table 4.10-1, the United States was the number two producer of global GHG emissions as of 2005. The primary GHG emitted by human activities in the United States was CO\textsubscript{2}, representing approximately 84 percent of total GHG emissions (US EPA 2008a). Carbon dioxide from fossil fuel combustion, the largest source of GHG emissions, accounted for approximately 80 percent of U.S. GHG emissions.\(^5\)

### State of California

The California Air Resources Board compiles GHG inventories for the State of California. Based upon the 2006 GHG inventory data (i.e., the latest year for which data are available) for the 2000–2006 GHG emissions inventory, California emitted 484 MMTCO\textsubscript{2}e *including* emissions resulting from imported electrical power in 2006 (CARB 2009). Based on the CARB inventory data and GHG inventories compiled by the World Resources Institute, California’s total statewide GHG emissions rank second in the United States (Texas is number one) with emissions of 434 MMTCO\textsubscript{2}e *excluding* emissions related to imported power (CARB 2009).

A California Energy Commission (CEC) emissions inventory report placed CO\textsubscript{2} produced by fossil fuel combustion in California as the largest source of California’s GHG emissions in 2004, accounting for 80 percent of the total GHG emissions (California Energy Commission 2006a). Emissions of CO\textsubscript{2} from other

---

\(^5\) *Supra* no. 4.
sources contributed 3.1 percent of the total GHG emissions; methane emissions 6.4 percent; nitrous oxide emissions 7.6 percent; and the remaining 3.2 percent was composed of emissions of high-GWP gases (California Energy Commission 2006a). These high GWP gases are largely composed of refrigerants, with small contributions of SFs used in connection with insulating materials for electricity transmission and distribution.

4.10.3 REGULATORY CONSIDERATIONS

4.10.3.1 Intergovernmental Panel on Climate Change

The World Meteorological Organization (WMO) and United Nations Environmental Program (UNEP) established the IPCC in 1988. The goal of the IPCC is to evaluate the risk of climate change caused by human activities. Rather than performing research or monitoring climate, the IPCC relies on peer-reviewed and published scientific literature to make its assessment. While not a regulatory body, the IPCC assesses information (i.e., scientific literature) regarding human-induced climate change and the impacts of human-induced climate change, and recommends options to policy makers for the adaptation and mitigation of climate change. The IPCC reports its evaluations in special reports called “assessment reports.” The Fifth Assessment Report was published in 2014. The Fifth Assessment Report upgrades the likelihood of climate change being attributable to human activities to “extremely likely.”

4.10.3.2 Federal Laws and Regulations

In Massachusetts vs. EPA, the Supreme Court held that United States Environmental Protection Agency (US EPA) has the statutory authority under Section 202 of the Clean Air Act (CAA) to regulate GHGs from new motor vehicles. The court did not hold that the US EPA was required to regulate GHG emissions; however, it indicated that the agency must decide whether GHGs from motor vehicles cause or contribute to air pollution that is reasonably anticipated to endanger public health or welfare. Upon the final decision, the President signed Executive Order 13432 on May 14, 2007, directing the US EPA, along with the Departments of Transportation, Energy, and Agriculture, to initiate a regulatory process that responds to the Supreme Court’s decision.

In December 2007, the President signed the Energy Independence and Security Act of 2007, which sets a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022 and sets a national fuel economy standard of 35 miles per gallon by 2020. The act also contains provisions for energy efficiency in lighting and appliances and for the implementation of green building technologies in federal buildings. On July 11, 2008, the US EPA issued an Advanced Notice of
4.10 Greenhouse Gas Emissions

Proposed Rulemaking (ANPRM) on regulating GHGs under the CAA. The ANPRM reviews the various CAA provisions that may be applicable to the regulation of GHGs and presents potential regulatory approaches and technologies for reducing GHG emissions. On April 10, 2009, the US EPA published the Proposed Mandatory Greenhouse Gas Reporting Rule in the Federal Register (US EPA 2009). The rule was adopted on September 22, 2009 and covers approximately 10,000 facilities nationwide, accounting for 85 percent of US GHG emissions.

On September 15, 2009, the US EPA and the Department of Transportation’s (DOT) National Highway Traffic Safety Administration (NHTSA) issued a joint proposal to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. The proposed standards would be phased in and would require passenger cars and light-duty trucks to comply with a declining emissions standard. In 2012, passenger cars and light-duty trucks would have to meet an average standard of 295 grams of CO\textsubscript{2} per mile and 30.1 miles per gallon. By 2016, the vehicles would have to meet an average standard of 250 grams of CO\textsubscript{2} per mile and 35.5 miles per gallon.\textsuperscript{6} These standards were formally adopted by the US EPA and DOT on April 1, 2010.

On December 7, 2009, the US EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the CAA:

- **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) in the atmosphere threaten the public health and welfare of current and future generations.

- **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

While these findings do not impose additional requirements on industry or other entities, this action was a prerequisite to finalizing the US EPA’s proposed GHG emissions standards for light-duty vehicles, which were jointly proposed by the US EPA and DOT. On April 1, 2010, the US EPA and NHTSA issued final rules requiring that by the 2016 model-year, manufacturers must achieve a combined average vehicle emission level of 250 grams of CO\textsubscript{2} per mile, which is equivalent to 35.5 miles per gallon as measured by US EPA standards. These agencies are currently in the process of developing similar regulations for the 2017 through 2025 model years.

\textsuperscript{6} The CO\textsubscript{2} emission standards and fuel economy standards stated are based on US EPA formulas.
4.10.3.3 State Laws and Regulations

Title 24 Building Standards Code

The California Energy Commission first adopted Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6) in 1978 in response to a legislative mandate to reduce energy consumption in the state. Although not originally intended to reduce GHG emissions, increased energy efficiency, and reduced consumption of electricity, natural gas, and other fuels would result in fewer GHG emissions from residential and nonresidential buildings subject to the standard. The standards are updated periodically to allow for the consideration and inclusion of new energy efficiency technologies and methods. The latest revisions were adopted in 2013 and became effective on July 1, 2014.

Part 11 of the Title 24 Building Standards Code is referred to as the California Green Building Standards Code (CALGreen Code). The purpose of the CALGreen Code is to “improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: (1) Planning and design; (2) Energy efficiency; (3) Water efficiency and conservation; (4) Material conservation and resource efficiency; and (5) Environmental air quality (California Building Standards Commission 2009). The CALGreen Code is not intended to substitute or be identified as meeting the certification requirements of any green building program that is not established and adopted by the California Building Standards Commission (CBSC). The CBSC has released a 2013 California Green Building Standards Code on its website (California Building Standards Commission 2013). The update to Part 11 of the Title 24 Building Standards Code became effective on January 1, 2014. Unless otherwise noted in the regulation, all newly constructed buildings in California are subject of the requirements of the CALGreen Code.

Executive Order S-3-05 and the Climate Action Team

In June 2005, Governor Schwarzenegger established California’s GHG emissions reduction targets in Executive Order S-3-05. The Executive Order established the following goals: GHG emissions should be reduced to 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050. The Secretary of Cal EPA is required to coordinate efforts of various agencies in order to collectively and efficiently reduce GHGs. Some of the agency representatives involved in the GHG reduction plan include the Secretary of the Business, Transportation and Housing Agency, the Secretary of the Department of Food and Agriculture, the Secretary of the Resources Agency, the Chairperson of CARB, the Chairperson of the CEC, and the President of the Public Utilities Commission.
Representatives from each of the aforementioned agencies comprise the Climate Action Team. The Cal EPA secretary is required to submit a biannual progress report from the Climate Action Team to the governor and state legislature disclosing the progress made toward GHG emission reduction targets. In addition, another biannual report must be submitted illustrating the impacts of global warming on California’s water supply, public health, agriculture, coastline, and forests, and reporting possible mitigation and adaptation plans to combat these impacts. Some strategies currently being implemented by state agencies include CARB introducing vehicle climate change standards and diesel anti-idling measures, the Energy Commission implementing building and appliance efficiency standards, and the Cal EPA implementing their green building initiative. The Climate Action Team also recommends future emission reduction strategies, such as using only low-GWP refrigerants in new vehicles, developing ethanol as an alternative fuel, reforestation, solar power initiatives for homes and businesses, and investor-owned utility energy efficiency programs. According to the report, implementation of current and future emission reduction strategies have the potential to achieve the goals set forth in Executive Order S-3-05.

**Assembly Bill 32**

In furtherance of the goals established in Executive Order S-3-05, the legislature enacted Assembly Bill 32 (AB 32, Nuñez and Pavley), the California Global Warming Solutions Act of 2006, which Governor Schwarzenegger signed on September 27, 2006. AB 32 represents the first enforceable statewide program to limit GHG emissions from all major industries with penalties for noncompliance. AB 32 requires the state to undertake several actions. The major requirements are discussed below.

**CARB Early Action Measures**

CARB is responsible for carrying out and developing the programs and requirements necessary to achieve the goal of AB 32—the reduction of California’s GHG emissions to 1990 levels by 2020. The first action under AB 32 resulted in CARB’s adoption of a report listing three specific early-action greenhouse gas emission reduction measures on June 21, 2007. On October 25, 2007, CARB approved six additional early-action GHG reduction measures under AB 32. CARB has adopted regulations for all early action measures. The early-action measures are divided into three categories:

- Group 1 – GHG rules for immediate adoption and implementation
- Group 2 – Several additional GHG measures under development
- Group 3 – Air pollution controls with potential climate co-benefits
The original three adopted early-action regulations meeting the narrow legal definition of “discrete early-action GHG reduction measures” include:

- a low-carbon fuel standard to reduce the “carbon intensity” of California fuels;
- reduction of refrigerant losses from motor vehicle air conditioning system maintenance to restrict the sale of “do-it-yourself” automotive refrigerants; and
- increased methane capture from landfills to require broader use of state-of-the-art methane capture technologies.

The six additional early-action regulations adopted on October 25, 2007, also meeting the narrow legal definition of “discrete early-action GHG reduction measures,” include:

- reduction of aerodynamic drag, and thereby fuel consumption, from existing trucks and trailers through retrofit technology;
- reduction of auxiliary engine emissions of docked ships by requiring port electrification;
- reduction of perfluorocarbons from the semiconductor industry;
- reduction of propellants in consumer products (e.g., aerosols, tire inflators, and dust removal products);
- the requirement that all tune-up, smog check and oil change mechanics ensure proper tire inflation as part of overall service in order to maintain fuel efficiency; and
- restriction on the use of sulfur hexafluoride (SF₆) from non-electricity sectors if viable alternatives are available.

**State of California Greenhouse Gas Inventory and 2020 Limit**

As required under AB 32, on December 6, 2007, CARB approved the 1990 GHG inventory, thereby establishing the emissions limit for 2020. The 2020 emissions limit was set at 427 MMTCO₂e. CARB also projected the state’s 2020 GHG emissions under “business as usual” (BAU) conditions—that is, emissions that would occur without any plans, policies, or regulations to reduce GHG emissions. CARB used an average of the state’s GHG emissions from 2002 through 2004 and projected the 2020 levels based on population and economic forecasts. The projected net emissions totaled approximately 596 MMTCO₂e, though this was updated in 2010 to 507 MMTCO₂e. Therefore, the state must reduce its 2020 BAU emissions by approximately 16 percent in order to meet the 1990 target.

The inventory revealed that in 1990, transportation, with 35 percent of the state’s total emissions, was the largest single sector, followed by industrial emissions, 24 percent; imported electricity, 14 percent; in-state
electricity generation, 11 percent; residential use, 7 percent; agriculture, 5 percent; and commercial uses, 3 percent. AB 32 does not require individual sectors to meet their individual 1990 GHG emissions inventory; the total statewide emissions are required to meet the 1990 threshold by 2020.

**CARB Mandatory Reporting Requirements**

In addition to the 1990 emissions inventory, CARB also adopted regulations requiring the mandatory reporting of GHG emissions for large facilities on December 6, 2007. The mandatory reporting regulations require annual reporting from the largest facilities in the state, which account for approximately 94 percent of point source greenhouse gas emissions from industrial and commercial stationary sources in California. About 800 separate sources fall under the new reporting rules and include electricity-generating facilities, electricity retail providers and power marketers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and industrial sources that emit over 25,000 tons of carbon dioxide each year from on-site stationary combustion sources. Transportation sources, which account for 38 percent of California’s total GHG emissions, are not covered by these regulations but will continue to be tracked through existing means.

**AB 32 Climate Change Scoping Plan**

As indicated above, AB 32 requires CARB to adopt a scoping plan indicating how reductions in significant GHG sources will be achieved through regulations, market mechanisms, and other actions. After receiving public input on their discussion draft of the scoping plan, the CARB Governing Board approved the *Climate Change Scoping Plan* on December 11, 2008. Key elements of the Scoping Plan include the following recommendations:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewable energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing state laws and policies, including California’s clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
• Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state’s long-term commitment to AB 32 implementation.

Under the Scoping Plan, approximately 85 percent of the state’s emissions are subject to a cap-and-trade program where covered sectors are placed under a declining emissions cap. The emissions cap incorporates a margin of safety whereas the 2020 emissions limit will still be achieved even in the event that uncapped sectors do not fully meet their anticipated emission reductions. Emissions reductions will be achieved through regulatory requirements and the option to reduce emissions further or purchase allowances to cover compliance obligations. It is expected that emission reduction from this cap-and-trade program will account for a large portion of the reductions required by AB 32.

Table 4.10-2, AB 32 Scoping Plan Measures (SPMs), lists CARB’s preliminary recommendations for achieving GHG emissions reductions under AB 32 along with a brief description of the requirements and applicability.

<table>
<thead>
<tr>
<th>Scoping Plan Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPM-1: California Cap-and-Trade Program linked to Western Climate Initiative</td>
<td>Implement a broad-based cap-and-trade program that links with other Western Climate Initiative Partner programs to create a regional market system. Ensure California’s program meets all applicable AB 32 requirements for market-based mechanisms. Capped sectors include transportation, electricity, natural gas, and industry. Projected 2020 business-as-usual emissions are estimated at 512 metric tons of CO₂ equivalents (MTCO₂e); preliminary 2020 emissions limit under cap-and-trade program are estimated at 365 MTCO₂e (29 percent reduction).</td>
</tr>
<tr>
<td>SPM-2: California Light-Duty Vehicle GHG Standards</td>
<td>Implement adopted Pavley standards and planned second phase of the program. AB 32 states that if the Pavley standards (AB 1493) do not remain in effect, CARB shall implement equivalent or greater alternative regulations to control mobile sources.</td>
</tr>
<tr>
<td>SPM-3: Energy Efficiency</td>
<td>Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts. The Scoping Plan considers green building standards as a framework to achieve reductions in other sectors, such as electricity.</td>
</tr>
<tr>
<td>SPM-4: Renewables Portfolio Standard</td>
<td>Achieve 33 percent Renewables Portfolio Standard by both investor-owned and publicly owned utilities.</td>
</tr>
<tr>
<td>SPM-5: Low Carbon Fuel Standard</td>
<td>CARB identified the Low Carbon Fuel Standard as a Discrete Early Action item and the final regulation was adopted on April 23, 2009. In January 2007, Governor Schwarzenegger issued Executive Order S-1-07, which called for the reduction of the carbon intensity of California’s transportation fuels by at least 10 percent by 2020.</td>
</tr>
<tr>
<td>SPM-6: Regional Transportation-Related Greenhouse Gas Targets</td>
<td>Develop regional greenhouse gas emissions reduction targets for passenger vehicles. SB 375 requires CARB to develop, in consultation with metropolitan planning organizations (MPOs), passenger vehicle greenhouse gas emissions reduction targets for 2020 and 2035 by September 30, 2010. SB 375 requires MPOs to prepare a sustainable communities strategy to reach the regional target provided by CARB.</td>
</tr>
</tbody>
</table>
### Scoping Plan Measure and Description

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPM-7: Vehicle Efficiency Measures</td>
<td>Implement light-duty vehicle efficiency measures. CARB is pursuing fuel-efficient tire standards and measures to ensure properly inflated tires during vehicle servicing.</td>
</tr>
<tr>
<td>SPM-8: Goods Movement</td>
<td>Implement adopted regulations for port drayage trucks and the use of shore power for ships at berth. Improve efficiency in goods movement operations.</td>
</tr>
<tr>
<td>SPM-9: Million Solar Roofs Program</td>
<td>Install 3,000 MW of solar-electric capacity under California's existing solar programs.</td>
</tr>
<tr>
<td>SPM-10: Heavy/Medium-Duty Vehicles</td>
<td>Adopt heavy- and medium-duty vehicle and engine measures targeting aerodynamic efficiency, vehicle hybridization, and engine efficiency.</td>
</tr>
<tr>
<td>SPM-11: Industrial Emissions</td>
<td>Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce greenhouse gas emissions and provide other pollution reduction co-benefits. Reduce greenhouse gas emissions from fugitive emissions from oil and gas extraction and gas transmission. Adopt and implement regulations to control fugitive methane emissions and reduce flaring at refineries.</td>
</tr>
<tr>
<td>SPM-12: High Speed Rail</td>
<td>Support implementation of a high-speed rail (HSR) system. This measure supports implementation of plans to construct and operate a HSR system between Northern and Southern California serving major metropolitan centers.</td>
</tr>
<tr>
<td>SPM-13: Green Building Strategy</td>
<td>Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.</td>
</tr>
<tr>
<td>SPM-14: High GWP Gases</td>
<td>Adopt measures to reduce high global warming potential gases. The Scoping Plan contains 6 measures to reduce high-GWP gases from mobile sources, consumer products, stationary sources, and semiconductor manufacturing.</td>
</tr>
<tr>
<td>SPM-16: Sustainable Forests</td>
<td>Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation. The federal government and California's Board of Forestry and Fire Protection have the regulatory authority to implement the Forest Practice Act to provide for sustainable management practices. This measure is expected to play a greater role in the 2050 goals.</td>
</tr>
<tr>
<td>SPM-17: Water</td>
<td>Continue efficiency programs and use cleaner energy sources to move water. California will also establish a public goods charge for funding investments in water efficiency that will lead to as yet undetermined reductions in greenhouse gases.</td>
</tr>
<tr>
<td>SPM-18: Agriculture</td>
<td>In the near-term, encourage investment in manure digesters and at the five-year Scoping Plan update determine if the program should be made mandatory by 2020. Increase efficiency and encourage use of agricultural biomass for sustainable energy production. CARB has begun research on nitrogen fertilizers and will explore opportunities for emission reductions.</td>
</tr>
</tbody>
</table>


The Scoping Plan must be updated every five years, and accordingly CARB approved the First Update to the Scoping Plan in May 2014. The First Update includes new strategies and recommendations, describes progress towards climate change goals in California, identifies CARB’s climate change priorities for the next five years, and sets the groundwork for longer term goals such as those included in Executive Order S-3-05. The First Update also states that California is expected to obtain its GHG emissions targets in 2020, primarily due to the ability to impose a ‘hard cap’ on emissions through the Cap and Trade program.
Senate Bill 97 (CEQA Guidelines)

In August 2007, the legislature enacted SB 97 (Dutton), which directed the Governor’s Office of Planning and Research (OPR) to develop guidelines under the California Environmental Quality Act (CEQA) for the mitigation of GHG emissions. A number of actions have taken place under SB 97, which are discussed below. In its work to formulate CEQA Guideline Amendments for GHG emissions, OPR submitted the Proposed Draft CEQA Guideline Amendments for Greenhouse Gas Emissions to the Secretary for Natural Resources on April 13, 2009. The Natural Resources Agency conducted formal rulemaking procedures in 2009 and adopted the CEQA Guideline Amendments on December 30, 2009. They became effective in March 2010.

Senate Bill 375

The California legislature passed SB 375 (Steinberg) on September 1, 2008. SB 375 requires CARB to set regional GHG reduction targets after consultation with local governments. The target must then be incorporated within that region’s regional transportation plan (RTP), which is used for long-term transportation planning, in a Sustainable Communities Strategy. SB 375 also requires each region’s regional housing needs assessment (RHNA) to be adjusted based on the Sustainable Communities Strategy in its RTP. Additionally, SB 375 reforms the environmental review process to create incentives to implement the strategy, especially transit priority projects. The governor signed SB 375 into law on September 30, 2008.

On January 23, 2009, CARB appointed a Regional Targets Advisory Committee (RTAC) to provide recommendations and methodologies to be used in the target setting process. The RTAC provided its recommendations in a report to CARB on September 29, 2009. On August 9, 2010, CARB staff issued the Proposed Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375. CARB staff proposed draft reduction targets for the four largest MPOs (Bay Area, Sacramento, Southern California, and San Diego) of 7 to 8 percent for 2020 and reduction targets between 13 to 16 percent for 2035. For the Bay Area, CARB established a draft target of 7 percent for 2020 and 15 percent for 2035. These targets were recommended to CARB by the Metropolitan Transportation Commission, which adopted the thresholds for its planning purposes on July 28, 2010. Of note, the proposed reduction targets explicitly exclude emission reductions expected from the AB 1493 and low carbon fuel standard regulations. CARB adopted the final targets on September 23, 2010.
4.10.3.4 Applicable Local Plans and Policies

University of California Policy on Sustainable Practices

The University of California Policy on Sustainable Practices was adopted by The Regents in 2006 and revised periodically through June 2015. The policy was developed to standardize campus practices and is a system-wide commitment to minimize the University of California’s impact on the environment and reduce the University’s dependence on non-renewable energy sources. The University of California Policy on Sustainable Practices promotes the principles of energy efficiency and sustainability in the following areas:

- Green Building Design
- Clean Energy Standard
- Climate Protection Practices
- Sustainable Transportation Practices
- Sustainable Operations
- Recycling and Waste Management
- Environmentally Preferable Purchasing Practices
- Food

The policy guidelines that address these topics recommend that University operations:

- Incorporate the principles of energy efficiency and sustainability in all capital projects, operations and maintenance within budgetary constraints and programmatic requirements.
- Minimize the use of non-renewable energy sources on behalf of UC’s built environment by creating a portfolio approach to energy use, including use of local renewable energy and purchase of green power from the grid as well as conservation measures that reduce energy consumption.
- Incorporate alternative means of transportation to/from and within the campus to improve the quality of life on campus and in the surrounding community. The campuses will continue their strong commitment to provide affordable on-campus housing, in order to reduce the volume of commutes to and from campus. These housing goals are detailed in the campuses’ LRDPs.
  - Track, report and minimize GHG emissions on behalf of UC operations.
  - Minimize the amount of University-generated waste sent to landfill.
  - Utilize the University’s purchasing power to meet its sustainability objectives.
The University of California has signed the American College and University Presidents Climate Commitment. Each signatory commits to completing an inventory of GHG emissions within one year, and to developing, within two years, an institutional plan to achieve climate neutrality as soon as possible. The commitment also includes specific interim actions, including requiring that new campus construction will be built to at least the US Green Building Council’s LEED Silver standard or equivalent; purchasing Energy Star appliances; offsetting greenhouse gas emissions generated by institutional air travel; encouraging and providing access to public transportation; purchasing or producing at least 15 percent of the institution’s electricity consumption from renewable sources; supporting climate and sustainability shareholder proposals at companies where the institution’s endowment is invested; and adopting measures to reduce waste.

4.10.4 IMPACTS AND MITIGATION MEASURES

4.10.4.1 Significance Criteria

The impacts related to GHG emissions resulting from the implementation of the proposed project would be considered significant if they would exceed either of the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment;
  - **Construction:** On an annualized basis, the project would have a significant impact if the construction GHG emissions equaled or exceeded 1,100 metric tons/year (expressed as CO2e).
  - **Operation:** On an annualized basis, the project would have a significant impact if the operational phase GHG emissions equaled or exceeded 1,100 metric tons/year (expressed as CO2e).

- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The University of California does not have an adopted CEQA threshold of significance for GHG emission and typically relies on the local air district with jurisdiction in the project area for guidance in setting an appropriate threshold for GHG emission. However, the Northern Sierra Air Quality Management District has not adopted a GHG emissions threshold. The nearby Sacramento Metropolitan Air Quality Management District (SMAQMD) has adopted thresholds after review of overall GHG control efforts and consideration of public input. The University will utilize the SMAQMD thresholds for the proposed project. Details of the SMAQMD thresholds are available at the SMAQMD CEQA guide website.
4.10 Greenhouse Gas Emissions

4.10.4.2 Methodology

The NSAQMD does not provide GHG emission methodology guidance in the adopted district guidelines for assessing air quality impacts. This section follows the SMAQMD CEQA guide using the CalEEMod emissions estimating model to estimate project-related GHG emissions. Site-specific or project-specific data were used in the CalEEMod model where available. Where information was not available for the proposed project, model default values were used. Emission calculations conducted for the proposed project are contained in Appendix 4.2.

4.10.4.4 Project Impacts and Mitigation Measures

Impact GHG-1: The proposed project would not generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. (Less than Significant)

The project GHG emissions were calculated using the CalEEMod emissions model. CalEEMod provides output for construction related emissions and for operational emissions. The following impact analysis first addresses construction GHG emissions and then operational GHG emissions.

Construction Emissions

For construction emissions, project-specific data regarding construction timing, expected construction equipment, vegetation management, and trip information for construction workers, hauling, and deliveries were used as inputs for the CalEEMod modelling. Where project-specific information was not available, the CalEEMod default values were utilized.

The proposed project consists of four main construction phases: vegetation management, rough grading, utility installation, building, construction, and paving with nearly all construction expected to occur in a single year. The model outputs for construction activities are provided in Appendix 4.2. The total emissions the first year of construction were estimated to be 525 MTCO2e and 7.3 MTCO2e during the second year. GHG emissions during none of the construction years would exceed the threshold of 1,100 MTCO2e per year. The potential GHG emission impact from construction activities would be less than significant.
Operational Emissions

The CalEEMod emission estimator does not include a land use input for educational camps, campgrounds, or event center. To evaluate the proposed project’s operational impacts, GHG emissions were estimated using basic CalEEMod default land uses (city park, mobile home park, swimming pool, single-family residences, and motel units) as approximations of the actual land uses proposed for the project.

Table 4.3-5, Annual GHG Emissions for Operational Activities, summarizes the output of operational GHG emissions that would result from the proposed project. The proposed project is projected to result in new operational GHG emissions of 336 MTCO2e per year. The projected increased is less than the threshold of 1,100 MTCO2e per year. The potential impact would be less than significant.

### Table 4.3-5
Annual GHG Emissions for Operational Activities

<table>
<thead>
<tr>
<th>Scope</th>
<th>Source</th>
<th>GHG Emissions (Metric Tons CO₂e/year)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td>Campfires, consumer product, equipment usage</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>Purchased Electricity and Gas Combustion</td>
<td>167.1</td>
</tr>
<tr>
<td>Energy</td>
<td>Waste</td>
<td>25.0</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>34.6</td>
</tr>
<tr>
<td>Other</td>
<td>Vehicle trips (on and off-road)</td>
<td>108.6</td>
</tr>
<tr>
<td>Mobile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Annual GHG Emissions</td>
<td></td>
<td>336</td>
</tr>
</tbody>
</table>

Source: CalEEMod Model Results. Emission details are provided in Appendix 4.2. Note: Totals in table may not appear to add exactly due to rounding.

Mitigation Measures: No project-level mitigation measures are required.

Impact GHG-2: The proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. (Less than Significant)

The Northern Sierra AQMD has not adopted a plan, policy, or regulation for reducing GHG emissions. Applicable policies from the University of California regarding goals for reduced GHG emissions relate to the proposed project and the overall efforts of the University to minimize GHG emissions will extend
to the design and operational details of the proposed project. While the proposed project represents a net increase in GHG emission at the project site, the proposed vacation activity at the project site by alumni and other affiliates of the University are already producing GHG emissions in terms of travel, combustion, and resource use resulting in GHG emissions. These factors make the overall contribution of the proposed project difficult to assess and precisely quantify. With the identified minor contribution of total emission quantified above in impact GHG-1, the proposed project contains no elements that would conflict with UC Davis’s GHG reduction efforts, including the Campus’s Climate Action Plan and the overall efforts of the University of California. The potential impact would be less than significant.

Mitigation Measures: No project-level mitigation measures are required.

4.10.4.3 Cumulative Impacts and Mitigation Measures

As the impact from a project’s GHG emissions is essentially a cumulative impact and program-level emission reductions are necessary to consider the overall efforts to reduce GHG emissions. For this reason, project-level impacts are considered one and the same as cumulative impacts. This approach is consistent with the guidance provided by the SMAQMD and the analysis presented in this section provides an adequate analysis of the proposed project’s cumulative impact related to GHG emissions. The potential impact would be less than significant.

4.10.5 REFERENCES


California Environmental Protection Agency (Cal EPA), Climate Action Team. 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature.


SECTION 4.11

HAZARDS AND HAZARDOUS MATERIALS

4.11.1 INTRODUCTION

This section discusses existing conditions with respect to the routine transport, use, or disposal of hazardous materials for the proposed project and analyzes the potential for the proposed project to increase the exposure to hazards or increase the risk associated with the use and disposal of hazardous materials. This section also addresses hazards related to emergency response planning and hazards related to wildland fires.

Public and agency comments related to Hazards and Hazardous Materials received in response to the Notice of Preparation are summarized below.

- Emergency evacuation use and adequacy of Crystal Lake Road.
- Environmental concerns related to site contamination such as contamination of existing structures, school site related sensitivity, and potential for naturally occurring asbestos.
- Potential impacts to campers from transport of hazardous materials on adjacent railroad.

4.11.2 ENVIRONMENTAL SETTING

4.11.2.1 Study Area

The study area includes the project site and the property along the Crystal Lake road that is proposed as road access for the Crystal Lake property.

4.11.2.2 Hazardous Materials

The term “hazardous material” is defined in Section 25501 of the California Health and Safety Code as any material that, because of quantity, concentration, or physical or chemical characteristics poses a significant present or potential hazard to human health and safety or to the environment. Hazardous materials are grouped into the following four categories, based on their properties: toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), and reactive (causes explosions or generates toxic gases).

Hazardous materials are used in facility operations and building, grounds and vehicle maintenance. Hazardous material use in turn generates hazardous wastes. The University has numerous policies and
procedures in place that govern how chemicals are used, stored, and disposed. This ensures compliance with applicable federal, state, and local laws and regulations pertaining to hazardous materials.

4.11.2.3 Soil and Groundwater Contamination

A government records report was obtained for the project site and the area within 0.5 mile of the site. This report searches federal and state databases, including the California Government Code 65962.5 (Cortese) list, for potential sources of hazardous substances or petroleum that might affect soil and/or groundwater quality at the project site and its vicinity. No sites with potential contamination are on the project site and the site history evaluation found no signs of site contamination (University of California 2014).

4.11.3 REGULATORY CONSIDERATIONS

University facilities are subject to environmental, health, and safety regulations applicable to the transportation, use, management, and disposal of hazardous materials and wastes. This section provides an overview of the regulatory setting and describes current health and safety policies and procedures.

The primary federal agencies with responsibility for hazardous materials management include the United States Environmental Protection Agency (US EPA), and the US Department of Transportation (DOT). The applicable federal laws, regulations, and responsible agencies are discussed in detail in this section. In many cases, California state law mirrors or is more restrictive than federal law, and enforcement of these laws has been delegated to the state or a local agency. In January 1996, the California Environmental Protection Agency adopted regulations implementing a Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program). The program has six elements: (1) hazardous waste generators and hazardous waste on-site treatment, (2) underground storage tanks, (3) aboveground storage tanks, (4) hazardous materials release response plans and inventories, (5) risk management and prevention programs, and (6) Unified Fire Code hazardous materials management plans and inventories. The local agency responsible for implementation of the Unified Program is called the Certified Unified Program Agency (CUPA). As the project site is located within Nevada County, the Environmental Health Department of Nevada County is the designated CUPA for the property.

4.11.3.1 Hazardous Materials Management

Federal and state laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and in the event that such materials are accidentally released, to prevent or to mitigate injury to health or the environment. These laws require hazardous materials users
to prepare written plans, such as Hazardous Materials Business Plans. Nevada County, through its CUPA program, requires any business that handles hazardous materials above certain thresholds to prepare a Hazardous Materials Business Plan, which must include the following:

- Details of the facility and business conducted at the site
- An inventory of hazardous materials that are handled or stored on site
- An emergency response plan and contact information
- A site map

### 4.11.3.2 Hazardous Waste Handling

The federal Resource Conservation and Recovery Act of 1976 (RCRA) created a federal hazardous waste “cradle-to-grave” regulatory program administered by US EPA. Under RCRA, US EPA regulates the management, treatment, and disposal of hazardous waste, and the investigation and remediation of hazardous waste sites. Individual states may apply to US EPA to authorize them to implement their own hazardous waste programs in lieu of RCRA, as long as the state program is at least as stringent as federal RCRA requirements. California has been authorized by US EPA to implement its own hazardous waste program, with certain exceptions. In California, the DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste, and the investigation and remediation of hazardous waste sites. The California DTSC program incorporates provisions of both federal and state hazardous waste laws. As noted above, DTSC has delegated several components of the hazardous waste program to the local CUPA.

### 4.11.3.3 Hazardous Materials Transportation

The DOT regulates the transportation of hazardous materials between states and foreign countries. DOT regulations govern all means of transportation, except for packages sent by mail, which are governed by US Postal Service regulations. The State of California has adopted DOT regulations for the intrastate movement of hazardous materials. In addition, the State of California regulates the transportation of hazardous waste originating in the state and passing out of the state.

The two state agencies that have primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies are the California Highway Patrol (CHP) and the California Department of Transportation (Caltrans). The CHP enforces hazardous material and hazardous waste labeling and packing regulations to prevent leakage and spills of material in transit and to provide detailed information to cleanup crews in the event of an accident. The CHP conducts regular inspections of licensed transporters to assure regulatory compliance.
Every hazardous materials package type used by a hazardous materials shipper must undergo tests that imitate some of the possible rigors of travel. While not every package must be put through every test, representative packages for any package design must be able to be dropped, fully loaded, onto a concrete floor with no significant leakage; survive a compression test in a stacked configuration with no significant damage or distortion; demonstrate that they are leak proof when subjected to internal air and/or liquid pressure; and not have package closure mechanisms adversely affected by vibration.

4.11.3.4 Occupational Safety

Occupational safety standards exist in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the workplace. The State of California Division of Occupational Safety and Health Administration (Cal/OSHA) is responsible for developing and enforcing worker safety in the workplace in California.

Cal/OSHA regulations contain requirements concerning the use of hazardous materials in the workplace and during construction that mandate employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, emergency action and fire prevention plan preparation, and a hazard communication program. The hazard communication program regulations contain training and information requirements, including procedures for identifying and labeling hazardous substances, and communicating hazard information relating to hazardous substances and their handling. The hazard communication program also requires that Material Safety Data Sheets or equivalent safety information be available to employees, and that employee information and training programs be documented. These regulations require preparation of emergency action plans (escape and evacuation procedures, rescue and medical duties, alarm systems, and training in emergency evacuation).

Cal/OSHA regulations include special provisions for hazard communication to employees in research laboratories, including training in chemical work practices. Specific, more detailed training and monitoring is required for the use of carcinogens, ethylene oxide, lead, asbestos, and certain other chemicals. Emergency equipment and supplies, such as fire extinguishers, safety showers, and eye washes, must also be provided and maintained in accessible places as the need dictates. The University compliance process with these state requirements minimizes risks to employees.

4.11.3.5 Emergency Response and Building Code

Fire science research indicates the area around a home or other buildings requires at least 100 to 200 feet of reduced and modified vegetation to minimize structure ignition from radiation and convection heat, and/or firebrands landing and accumulating directly on the home. Fire science also indicates that structure fires can produce sufficient amounts of heat and firebrand to ignite wildland vegetation.
Nevada County Land Use and Development Code Chapter XVI requires new projects and construction meet fire safety standards described in PRC 4290, and establishes requirements for fuel modification and emergency water supply, as well as minimum fire safe driveway and road standards. New structures built in Nevada County must also comply with fire safety building regulations. These building codes require the use of ignition-resistant building materials and establish design standards to improve the ability of a building to survive a wildfire.

State-mandated PRC 4291 requires the management of flammable vegetation around buildings or structures as a firebreak within 30 feet or to the property line from a structure, and as a fuelbreak, within 30 to 100 feet or to the property line from the structure. This regulation applies to all buildings or structures in a mountainous area; forest-covered, brush-covered, or grass-covered lands; or any land that is covered with flammable material in the SRA (Nevada County 1996).

### 4.11.4 IMPACTS AND MITIGATION MEASURES

#### 4.11.4.1 Significance Criteria

The impacts related to hazards and hazardous materials from the implementation of the proposed project would be considered significant if they would exceed the following Standards of Significance, in accordance with Appendix G of the State CEQA Guidelines and the UC CEQA Handbook:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school;

- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;

- For a project located within an airport land use plan or, where such plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area;

- For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area;
**4.11 Hazards and Hazardous Materials**

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or

- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

### 4.11.4.2 Methodology

The potential for the release of hazardous materials during implementation of the proposed project was evaluated by identifying the types of hazardous materials and wastes expected to be present on the project property as well as ways in which the handling and disposal of such materials could result in accidental releases to the environment.

Hazardous materials could be released to the environment during their delivery to or removal from the project site. Once hazardous materials are delivered to the project site, accidents or spills in outdoor areas, and air emissions from evaporation, and engine exhausts would be the only potential release sources for hazardous materials to the immediate outside environment.

### 4.11.4.3 Project Impacts and Mitigation Measures

**Impact HAZ-1:** Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials (Less than Significant)

During construction and operation, the project would use typical fuels, solvents, paints, and cleaning supplies in accordance with the policies of the University of California, Nevada County, and federal and state laws. The materials would be used in relatively low amounts with the highest expected amounts expected to consist of diesel fuel during construction and propane during project operations. Construction contracts will specify the use and disposal requirements of diesel fuel and fuel for the construction operation would be delivered by a licensed company using fuel delivery trucks in accordance with federal Department of Transportation regulations. Propane for the camp operation will also be delivered by commercial vehicles from approved propane commercial delivery companies. The propane will be delivered to storage tanks constructed on the project site and approved by Nevada County in accordance with Nevada County and state requirements. The types of hazardous materials associated with the project are commonly used throughout Nevada County and the substantive
regulatory requirements for the transport, use, or disposal of these materials match or are exceed by the policies of the University of California. The potential impact would be less than significant.

**Mitigation Measure(s):** No mitigation measures are required.

**Impact HAZ-2:** Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (Less than Significant)

As described above in Impact HAZ-2, the proposed project is expected to utilize common hazardous materials during project construction and operation. The delivery and storage of these materials would take place on roads and storage facilities constructed to adequate design and safety standards for commercial vehicles on public roads. The project site and surrounding area contain no unusual conditions that would present unusual safety risks leading to the release of hazardous materials into the environment. Roadway accidents involving fuel delivery could occur in the project area and such events could occur in association with the deliveries for the proposed project. However, the fuel types and regulatory requirements currently in place are expected to minimize this risk.

Railroad uses adjacent to the property could include upset or accident conditions involving hazardous materials. Solid or liquid materials would be downhill of the project site and their release would have no impact on safety at the project site. Releases of gas or smoke from railroad accidents could impact the project site. The federal railroad transport regulatory environment controls the equipment, safety procedures, labelling, and response requirements for rail use involving hazardous materials. The regulations are designed to allow rail transport adjacent to sensitive uses such as schools, parks, hospitals, and residential areas. The proposed project risk from railroad accidents would be the same as the risk to uses along the entire rail corridor. The developed portion of the camp would be buffered by a separation area of 800 feet from the railroad tracks and would be elevated approximately 100 feet above the railroad tracks. The existing regulatory environment, lack of unique project-specific hazard conditions, and the buffer separation area would minimize potential risk from railroad accident conditions. The impact would be less than significant.

**Mitigation Measure(s):** No mitigation measures are required.

**Impact HAZ-3:** Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school (No Impact)

The project is not located within 0.25 miles of an existing or proposed school. No impact would occur.
Mitigation Measure(s): No mitigation measures are required.

Impact HAZ-4: Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment (No Impact)

The proposed project includes no contaminated areas and is not located on a list of hazardous materials sites. Database lists maintained by the State of California were reviewed in 2014 and in August 2015 to confirm that the Crystal Lake property and the Crystal Lake road are not on a list compiled pursuant to Government Code Section 65962.5. No impact would occur.

Mitigation Measure(s): No mitigation measures are required.

Impact HAZ-5: For a project located within an airport land use plan or, where such plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area (No Impact)

The nearest public use airport to the project site is the airport and Blue Canyon, which lies approximately seven miles from the site. There are no other public or public use airport facilities in the vicinity of the project site. Development of the project would not result in an airport-related safety hazard for people residing or working at the site. No impact would occur.

Mitigation Measure(s): No mitigation measures are required.

Impact HAZ-6: For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area (No Impact)

There is no private airport facility in the vicinity of the project. No impact would occur.

Mitigation Measure(s): No mitigation measures are required.

Impact HAZ-7: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan (Significant; Less than Significant with Mitigation)

The existing camp areas along Crystal Lake Road including the existing uses on the project property utilize Crystal Lake Road for emergency evacuation and emergency access from first responders. The primary route for emergency purposes is from Interstate 80 to Lake Valley Road and then Crystal Lake
Road. If a rapid evacuation is needed or if the westward segment of Crystal Lake Road is unavailable, the eastward segment of Crystal Lake Road is available as a secondary emergency only route. The eastward emergency route utilizes Crystal Lake Road, through the project property, across the railroad tracks and then to the Eagle Lakes freeway exit on Interstate 80. During summer months, the Union Pacific Railroad installs concrete ramps across the railroad tracks to make the emergency route accessible for typical on-road vehicles and for emergency response vehicles.

The current westward and eastward segments of Crystal Lake Road would be physically unchanged by the proposed project in terms of allowed usage and on-going access for use of the eastward segment is expected to continue. The westward segment of the unpaved section of Crystal Lake Road would be improved with widening and road bed/surface improvements to meet Nevada County and CalFire standards.

The proposed project would introduce a new population to the project site who could need to use the westward or eastward during an emergency evacuation. To analyze the capacity of the existing routes, the following projection assumes a need to evacuate up to 300 vehicles for the existing 250 campsites served by Crystal Lake Road. Using this projection and assuming that six vehicles per minute could cross the railroad tracks (one every 10 seconds), the current population would need approximately 40 minutes to cross the railroad tracks toward Eagle Lake Road. Adding the guest and employee population of the proposed project would increase the total vehicles to roughly 400 vehicles requiring approximately 67 minutes to evacuate the total population. The resulting increase from approximately 40 minutes to approximately 67 minutes would increase the total evacuation time by approximately 30 minutes.

The projection assumes that all groups would receive an evacuation notice at the same time and that all drivers would need an equivalent amount of time to account for family members, collect basic belonging, access their vehicle, and follow guidance on the appropriate evacuation direction. The increased time to evacuate the project area would physically impair the existing emergency evacuation plan. While the project would impair the existing emergency evacuation plan, the upcoming review process by CalFire as the responding fire agency will determine whether the existing evacuation time of 67 minutes is acceptable or whether projected evacuation time is acceptable. The site specific conditions related to fuel load, topography, existing site fire break and regional fire breaks, safety zones within the project site, and additional measures to improve emergency conditions would be considered as part of the CalFire review and approval process. The potential impact would be significant.

**Mitigation Measure HAZ-7:** The emergency evacuation plan for the proposed project will be reviewed and approved through consultation with CalFire and will, at a minimum,
include a rapid emergency notification process, safety zones within the project site, and fuel reduction efforts to ensure that the resulting emergency plan is adequate.

**Significance after Mitigation:** The impact from HAZ-7 would be reduced to a less-than-significant level.

**Impact HAZ-8:** Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands (Significant; Less than Significant with Mitigation)

Wildland fires are a common occurrence in the conditions surrounding the project site. Recent fire activity has been within two miles of the project site and recent fires at similar elevations in the Sierra have shown that wildland fires can spread quickly in out of control conditions. As described above for Impact HAZ-7, the proposed project would include an adequate emergency evacuation plan to assist with minimizing risks to people during wildland fires. In addition, the project would comply with the applicable building codes (CA Code Section 4290) matching the fire hazard rating of the project property (high or very high) to minimize wildland fire hazards to structures. The camp would be operated with strict rules regarding prohibitions on open flames except for attended fires within designated campfire rings (State of California 2010; CalFire 2006). Cleared area requirements near the campfire rings and available water supply near the campfire rings would also be included. The project property is currently densely overgrown with vegetation and the proposed project would include fuel reduction efforts to decrease fuel density near roads and the developed area, reduce light fuels at ground level, and reduce ladder fuels between the ground and higher portions of the remaining trees. With these proposed items, the impact to people or structures involving wildland fires would be minimized. The impact would be less than significant.

**Mitigation Measure(s):** No mitigation measures are required.

**4.11.4.4 Cumulative Impacts and Mitigation Measures**

**Cumulative Impact HAZ-1:** Cumulative effect of proposed project in relation to hazards and wildland fires (Less than Significant)

The proposed project would be developed within Nevada County and would meet the applicable building code and CalFire safety standards. Hazardous materials would be regulated in accordance with applicable local, state and federal requirements. The project would incrementally add to the hazards and
wildland interface conditions in Nevada County. These conditions are part of the anticipated growth in Nevada County and within the service levels expected for Nevada County. The impact would be less than significant.

4.11.5 REFERENCES


Nevada County. 1996. Nevada County General Plan, Safety Element.


State of California 2010. Title 14, Division 1.5, Chapter 7, Subchapter 2, Fire Safe Regulations, Articles 1 through 5. SRA Fire Safe Regulations.
SECTION 4.12

HYDROLOGY AND WATER QUALITY

4.12.1 INTRODUCTION

This section identifies existing conditions; describes the regulatory setting for hydrology, water quality, and groundwater resources in the study area; and analyzes the potential for the proposed project to affect these resources. Information presented in the discussion and used for the subsequent analysis was drawn primarily from the following sources.

- UC Davis Crystal Lake Property, Botanical Surveys (ICF 2015).
- UC Davis Crystal Lake Property, Aquatic Habitat Inventory Surveys (ICF 2014).
- Nevada County General Plan (Nevada County 2015a).
- Cooperative Climatological Data Summaries, NOAA Cooperative Stations—Temperature and Precipitation (WRCC 2015).
- Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region (Fourth Edition) (Central Valley Water Board 2011).

Comments submitted in response to the Notice of Preparation (NOP) are included in Appendix 1. Public and agency comments related to hydrology and water quality received in response to the NOP are summarized below.

- Potential federal and state stormwater and Clean Water Act permit requirements.
- Regulatory requirements for commercially irrigated agriculture,
- Potential increases in peak flow runoff.
- Capacity of stormwater facilities.
- Alteration of 100-year floodplain boundaries.
- Septic system impacts on water quality.
- Water quality and changes to peak flows from runoff resulting from new parking, roads, and other facilities.
- Aquifer capacity and impacts on groundwater levels.
4.12.2 ENVIRONMENTAL SETTING

4.12.2.1 Study Area

The approximate 210-acre study area is located on the west slope of the Sierra Nevada, near the Sierra Nevada crest, within the South Yuba River watershed in the southeastern portion of Nevada County. It is located south of Interstate 80 and is accessed from the Yuba Gap exit (Figures 3-1 and 3-2). The study area is within projected Section 24, Township 17 North and Range 12 East, MDB&M, and is on the Cisco Grove 7.5-minute USGS topographic quadrangle. Crystal Lake is located at an elevation of 5,877 feet above mean sea level (msl).

4.12.2.2 Climate and Topography

The study area has a typical Mediterranean climate with warm, dry summers and cool, wet winters. Average high temperatures during the summer range from 66 to 77 degrees Fahrenheit. During winter, average low temperatures range from 16 to 20 degrees Fahrenheit (WRCC 2015). Crystal Lake is located in an area where abundant snowfall can occur, depending on the temperatures at the time of a storm event. Precipitation usually takes place from October through May, although thunderstorms frequently occur in the summer. The average annual precipitation in the vicinity of the study area is 65 inches; average annual snowfall is approximately 471 inches (WRCC 2015).

Within the 210-acre study area, the topography is highly variable with gently sloping areas near the north side of Crystal Lake and steeper slopes near the granite outcroppings on the southeast side of the study area. The study area is generally bowl shaped with the approximate 13-acre Crystal Lake near the middle, receiving runoff from large portions of the study area that drain toward the lake. The peripheral portions of the property generally slope away from the central part of the study area, with surface drainage flowing onto adjacent properties. The outfall of Crystal Lake is located at the northeast corner of the lake, with the natural streambed blocked by a concrete dam constructed in the 1920s.

---

1 Climate data was obtained from Station SODA SPRINGS 1 E, CALIFORNIA (#048320), a few miles from the study area.
4.12.2.3 Surface Water

Hydrology

Regional

The proposed project is within the Sacramento River Hydrologic Region. The Sacramento River Hydrologic Region encompasses an area of approximately 17.4 million acres (27,200 square miles) and contains all or large portions of Modoc, Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Butte, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Solano, Lake, and Napa Counties (DWR 2003). Most of northern California is located in the Sacramento River Hydrologic Region, which encompasses several watersheds of various sizes.

According to the U.S. Geological Survey, the study area is located on the top of mountain pass with the one side draining to the Upper Yuba watershed (USGS Hydrologic Unit Code [HUC] #18020125) and the other draining to the North Fork American (HUC #18020128) watershed (USGS 1978). Runoff from the site and surrounding areas is predominantly within the Upper Yuba watershed, with a small portion along the southwest side of the property draining to the North Fork American watershed.

Local

All channels were classified according to the California Forest Practice Rules (CalFire 2015) classification system. Stream habitat inventory surveys based on the methods described in the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 2010) were completed for the entirety of the Outlet Channel and for select areas of Inlet Channel 1 and Inlet Channel 2 (see channel descriptions below) (ICF 2014).

Numerous small drainage features are located within the study area, including Crystal Lake, its inlet channels, and its outlet channel network (Figure 4.12-1). For purposes of classification, the inlet channels are referred to on Figure 4.12-1 and in this section as Inlet Channel 1 and Inlet Channel 2. There is a side tributary on the northeast (right bank, facing downstream) side of Inlet Channel 1—it is labeled as Small Tributary to Inlet Channel 1. Inlet Channel 2 has a side tributary, referred to as Side Gully to Inlet Channel 2, which has its confluence with Inlet Channel 2 along the gravel access road that leads directly to the main house on the UC Davis property. Both Inlet Channel 2 and the Side Gully to Inlet Channel 2 have split channel systems (i.e., braided morphology) and various smaller tributaries that generally terminate

---

2 A Class I stream is where fish are always or seasonally present, either currently or historically; or habitat to sustain fish exists. A Class II stream is where seasonal or year-round habitat exists for aquatic non-fish vertebrates and/or aquatic benthic macro-invertebrates (BMIs). A Class III stream is an intermittent or ephemeral watercourse that has a defined channel with a defined bank (slope break) that shows evidence of periodic scour and sediment transport.
Figure 4.12-1
Hydrologic Features
Crystal Lake Property, University of California Davis

Inlet Features
- Inlet Channel 1
- Small Tributary to Inlet Channel 1
- Inlet Channel 2
- Side Gully to Inlet Channel 2
- Tributary to Side Gully to Inlet 2

Outlet Features
- Outlet Channel
- Side Channel Complex
- Overflow Channel
- Emigrant Trail Tributary
- Culvert

Service Layer Credits: Image courtesy of USGS Earthstar Geographics SIO © 2015
quickly in the upstream direction, the largest one of them referred to as “Tributary to Side Gully to Inlet Channel 2.”

The outlet channel associated with Crystal Lake is labeled as the Outlet Channel. Between the lake and the access road to its north (Crystal Lake Road, Figure 4.12-1), the Outlet Channel is a complex drainage with a side tributary on its left bank (referred to as the Emigrant Trail Tributary), a high flow channel on the right bank floodplain (referred to as the Overflow Channel), and an overflow channel (upstream of the Outlet Channel’s confluence with both the Emigrant Trail Tributary and the Overflow Channel) that has its inception at the outlet of the lake (referred to as the Side Channel Complex).

In brief, nearly all channels within the study area are Class II intermittent channels. Exceptions to the Class II designations include the eastern and western channels (both Class III channels), as well as upper portions of Inlet Channel 2 (a borderline Class III channel that eventually becomes ephemeral) and the Tributary to Side Gully to Inlet Channel 2 (a borderline Class III channel). From a biogeomorphic perspective, all channels are relatively stable and are efficient at storing sediment in the lower gradient reaches and transporting sediment in the steeper gradient reaches. Habitat units are typical of mountain environments, with Inlet Channel 1 dominated by step runs, mid-channel pools, and runs; Inlet Channel 2 dominated by step runs and runs; and the Outlet Channel dominated by step pools, step runs, and cascades.

Streamflow in all channels except the Outlet Channel is controlled primarily by snowmelt and runoff during heavy precipitation events. Most channels are dry during the summer months. Streamflow in the Outlet Channel is a function of the water level in Crystal Lake. When the lake is overtopping the spillway, flows are released, and the channel becomes actively flowing. Flows in the Outlet Channel move in a northeasterly direction into the South Fork of the Yuba River, which flows westerly into Lake Spaulding, a reservoir approximately three miles downstream of the study area. As the lake level drops, streamflow becomes a trickle and is only sustained by a few seeps and springs, which eventually become dry towards the end of the summer months. During stream surveys in the late spring of 2015, streamflows in the Outlet Channel were on the order of a few cubic feet per second or less. Streamflows presumably increase to approximately 1 cfs or slightly greater during periods of high runoff or snowmelt, based on the observed channel dimensions and characteristics.
Wetlands and Waters of the United States

Crystal Lake is a small (13.3-acre), oligotrophic\(^3\) lake located at an elevation of approximately 5,900 feet above msl. The shoreline of Crystal Lake is composed of granite outcrops, conifer forest, decomposed granite, and grassy banks. The lake is fed by precipitation, groundwater inflow, and snowmelt. The mean and maximum depths of Crystal Lake are unknown; however, maximum depth exceeds 25 feet. The shoreline length surrounding the lake is approximately 3,800 feet.

Wetland reconnaissance surveys prepared by ICF International (ICF 2015) identified a total of 3.51 acres of additional other waters of the United States in the study area that appear to meet the criteria for federal or state jurisdiction (Figure 4.6-1).

Refer to Section 4.6, Aquatic Resources, for a full description of each water body in the study area.

Drainage and Stormwater Runoff

There are currently no existing developed runoff facilities for stormwater drainage within the study area (UC Davis 2015). The majority of surface runoff from the study area drains into Crystal Lake within the Yuba River watershed from gentle sloping areas near the north side of the lake and steeper slopes near the granite outcroppings on the southeast side of the study area. The peripheral portions of the study area generally slope away from the lake with surface drainage flowing onto adjacent properties (UC Davis 2015). Runoff from a small portion along the southwest side of the project vicinity drain to the American River watershed.

The majority of the study area is pervious. Existing impervious area within the study area is associated with 2 homes, a pump house, roads, and tennis courts. The surrounding areas are federally owned national forest land with private ownership consisting of small lots for scattered residential uses, larger parcels for recreation (camping), water impoundment on ponds and lakes for water storage and electricity production, and some privately owned areas for timber production.

Water Quality

Existing Water Quality

Limited spatial and temporal water quality information specific to surface flows in the study area is available. Instantaneous water quality sampling occurred in three locations within the Outlet Channel in

\(^3\) Oligotrophic refers to a lake that is relatively low in plant nutrients and containing abundant oxygen in the deeper parts.
the spring of 2015 as part of the baseline bioassessment surveys by ICF International. Measured water quality parameters are summarized below in Table 4.12-1. The overall water quality conditions in the Outlet Channel are considered good for small channels at similar elevations. Water temperatures are considered normal, water clarity values were relatively high, and dissolved oxygen readings indicate healthy water quality conditions for aquatic organisms at each location.

**Table 4.12-1.**
**Measured Water Quality Parameters for UC Davis, Crystal Lake Property Bioassessment (Spring 2015)**

<table>
<thead>
<tr>
<th></th>
<th>Sampling Reach 1</th>
<th>Sampling Reach 2</th>
<th>Sampling Reach 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>5/26/15</td>
<td>5/27/15</td>
<td>5/28/15</td>
</tr>
<tr>
<td>Time</td>
<td>10:23</td>
<td>10:00</td>
<td>10:00</td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>7.47</td>
<td>7.24</td>
<td>10.15</td>
</tr>
<tr>
<td>pH</td>
<td>8.3</td>
<td>7.1</td>
<td>6.8</td>
</tr>
<tr>
<td>Dissolved Oxygen (mg/L)</td>
<td>11.22</td>
<td>9.81</td>
<td>6.67</td>
</tr>
<tr>
<td>Specific Conductivity (µS/cm)</td>
<td>41</td>
<td>34</td>
<td>29</td>
</tr>
<tr>
<td>Salinity (ppt)</td>
<td>0.02</td>
<td>0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Turbidity (NTU)</td>
<td>-0.8</td>
<td>-0.8</td>
<td>-1.2</td>
</tr>
<tr>
<td>% Dissolved Oxygen</td>
<td>93.6</td>
<td>81.2</td>
<td>60.4</td>
</tr>
<tr>
<td>Flow (cfs)</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
</tr>
</tbody>
</table>

*C = degrees Celsius
mg/L = milligrams per liter
µS/cm = microsiemens per centimeter
ppt = parts per thousand
NTU = nephelometric turbidity unit
cfs = cubic feet per second

Elsewhere (i.e., in other channels throughout the study area where no sampling was conducted), the water draining to and from the study area is likely to be of fairly high quality due to the remote and undisturbed condition of the landscape.

In addition, select water quality parameters were measured at Crystal Lake in the fall of 2014 and are presented in Table 4.12-2. The overall water quality conditions at Crystal Lake are considered very good for alpine ponds and lakes at similar elevations. Water temperature at the surface (and below) is considered normal, with slight decreases with corresponding depth below the surface. In addition, water clarity values were moderately high during each sampling period⁴, and dissolved oxygen readings

---

⁴ In addition, on October 6, 2014, water clarity was measured to be 12.7 feet, based on Secchi disk reading of 12.3 and 13.1 feet.
signaled very healthy water quality conditions for aquatic organisms during each sampling period. Finally, water quality readings between the two sampling periods were similar, signifying a stable lacustrine environment with no temporally significant water quality condition fluctuations.

### Table 4.12-2.
**Measured Water Quality Parameters, Crystal Lake (Fall 2014)**

<table>
<thead>
<tr>
<th>Water Quality Parameter</th>
<th>2.5 feet</th>
<th>5 feet</th>
<th>10 feet</th>
<th>15 feet</th>
<th>20 feet</th>
<th>25 feet*&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°C)</td>
<td>14.79 / 12.85</td>
<td>14.38 / 11.50</td>
<td>14.22 / 11.22</td>
<td>14.16 / 11.13</td>
<td>13.98 / 10.93</td>
<td>14.02 / 10.69</td>
</tr>
<tr>
<td>Total Dissolved Solids (mg/L)</td>
<td>0.017 / 0.016</td>
<td>0.017 / 0.016</td>
<td>0.017 / 0.016</td>
<td>0.017 / 0.016</td>
<td>0.016 / 0.016</td>
<td>0.017 / 0.017</td>
</tr>
<tr>
<td>Salinity (PSU)</td>
<td>0.01 / 0.01</td>
<td>0.01 / 0.01</td>
<td>0.01 / 0.01</td>
<td>0.01 / 0.01</td>
<td>0.01 / 0.01</td>
<td>0.01 / 0.01</td>
</tr>
<tr>
<td>pH</td>
<td>8.60 / 6.65</td>
<td>8.18 / 6.58</td>
<td>7.66 / 6.46</td>
<td>7.59 / 6.47</td>
<td>7.48 / 6.47</td>
<td>7.08 / 6.41</td>
</tr>
<tr>
<td>Turbidity (NTU)</td>
<td>-0.8 / -0.7</td>
<td>-0.8 / -0.6</td>
<td>-0.8 / -0.6</td>
<td>-0.7 / -0.5</td>
<td>0.4 / -0.3</td>
<td>6.6 / -0.2</td>
</tr>
<tr>
<td>Chlorophyll a (µg/L)</td>
<td>0.7 / 1.7</td>
<td>0.9 / 1.7</td>
<td>1.0 / 2.8</td>
<td>1.1 / 2.4</td>
<td>1.8 / 2.9</td>
<td>-0.6 / 1.0</td>
</tr>
<tr>
<td>% Dissolved Oxygen</td>
<td>92.6 / 92.1</td>
<td>90.8 / 89.2</td>
<td>90.9 / 88.1</td>
<td>89.8 / 87.0</td>
<td>82.3 / 80.1</td>
<td>8.5 / 72.1</td>
</tr>
<tr>
<td>Dissolved Oxygen (mg/L)</td>
<td>9.38 / 9.73</td>
<td>9.28 / 9.70</td>
<td>9.32 / 9.67</td>
<td>9.23 / 9.57</td>
<td>7.01 / 8.84</td>
<td>0.88 / 8.01</td>
</tr>
</tbody>
</table>

Note: The first values represent the readings taken on September 23, 2014; the second values represent the readings taken on October 6, 2014.

* On September 23, 2014, the readings taken at 25 feet below the water surface were taken on the very bottom of the lake bed and, as such, should be disregarded. The readings from October 6, 2014 are valid.

* C = degrees Celsius
mg/L = milligrams per liter
PSU = practical salinity unit
NTU = nephelometric turbidity unit
µg/L = micrograms per liter

### Beneficial Uses and Impaired Waterways

The ultimate receiving water from the study area and its associated project elements is the upper reaches of the South Fork Yuba River. The Basin Plan for the Sacramento River–San Joaquin River Basins describes beneficial uses for waters within the project vicinity, as shown in Table 4.12-3.
Table 4.12-3.
Designated Beneficial Uses for Surface Water Bodies within the Project Vicinity

<table>
<thead>
<tr>
<th>Water Body</th>
<th>Designated Beneficial Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yuba River (source to Englebright Reservoir)</td>
<td>Municipal and Domestic Supply; irrigation; stock water; hydropower; water contact recreation; noncontact water recreation; cold freshwater habitat; cold fish migration; cold fish spawning; wildlife habitat.</td>
</tr>
<tr>
<td>American River, North Fork (source to Folsom Lake)</td>
<td>Municipal and Domestic Supply; irrigation; water contact recreation; noncontact water recreation; warm(^a) and cold freshwater habitat; cold fish spawning; wildlife habitat.</td>
</tr>
</tbody>
</table>

Source: Central Valley Water Board 2011.
\(^a\) Potential beneficial use.

No impairments for the South Fork Yuba River upstream of Spaulding Reservoir or the North Fork American River (upstream of the North Fork Dam on Lake Clementine) were listed on the State Water Resources Control Board’s Clean Water Act Section 303(d) List / 305(b) Report (State Water Board 2011).

4.12.2.4 Groundwater

**Regional Hydrogeology and Water Quality**

The study area is located within the Sacramento River Hydrologic Region (Basin 5-1). No subbasins are mapped or described within the vicinity of the study area. Groundwater provides about 31 percent of the water supply for urban and agricultural uses in the region, and has been developed in both the alluvial basins and the hard rock uplands and mountains. There are 88 basins/subbasins delineated in the region. These basins underlie 5.053 million acres (7,900 square miles), about 29 percent of the entire region. (DWR 2003.)

The Sacramento Valley is recognized as one of the foremost groundwater basins in the State, and wells developed in the sediments of the valley provide excellent supply to irrigation, municipal, and domestic uses. Many of the mountain valleys of the region also provide significant groundwater supplies to multiple uses. (DWR 2003.)

The reliability of the groundwater supply varies greatly. In the rural mountain areas of the region, domestic supplies come almost entirely from groundwater. Although a few mountain communities are supplied in part by surface water, most rely on groundwater. These groundwater supplies are generally quite reliable in areas that have sufficient aquifer storage or where surface water replenishes supply...
throughout the year. In areas that depend on sustained runoff, water levels can be significantly depleted in drought years and many old, shallow wells can be dewatered. (DWR 2003.)

Groundwater quality in the Sacramento River Hydrologic Region is generally excellent, although no regional studies are available for the Sierra Nevada crest area. The closest study that addresses groundwater quality in the project vicinity is in the Martis Valley to the east of the study area (Fram and Belitz 2012). This study is not entirely relevant to the study area as the hydrogeology characteristics of the Martis Valley (which is composed of relatively deep basin [alluvial] deposits) differ from those in the study area (bedrock with a relatively thin soil mantle).

**Study Area Hydrogeology and Water Quality**

Conditions of the existing well on the property were not documented by the prior owners. According to UC Davis, the well has historically produced 8 to 12 gallons per minute (gpm) since it was installed with no sediment, odor, discoloration, or other issues (Dulcich pers. comm.). Recent laboratory testing performed in the spring of 2015 indicates that the water is safe for human consumption—no coliform bacteria were detected in the sample, and the existing water quality meets the generally accepted definition of bacteriological potability ("bacteriological potability" is the absence of coliform bacteria in drinking water and this is what is generally referred to when calling water "potable") (Cranmer Engineering 2015).

The preliminary investigation for the proposed new well location indicated that good water quality exists at depths of 400 to 1,000 below ground surface (bgs) in the immediate areas outside the study area. These wells typically produce 5 to 12 gpm, with some artesian wells producing upward of 80 gpm. Based on this review, the well company identified areas within the northeast quadrant of the study area as the most likely candidates for a new well (because of closer proximity to the Yuba River). (Dulcich pers. comm.)

**Groundwater Recharge**

Groundwater basin recharge primarily occurs due to infiltration of precipitation, applied water, snowmelt, and streamflow connectivity. This process typically takes place along stream channels, where sand and gravel deposits occur to sufficient depth that adequate quantities of surface water can infiltrate into the underlying aquifer. Groundwater tends to occur as seeps through natural discharge. The amount of groundwater recharge per year is unknown due to the lack of data concerning the subsurface conditions, although preliminary observations and published soil survey data suggest that the study area is primarily underlain by bedrock. Groundwater recharge potential is most likely moderate in the vicinity
of the small drainages and Crystal Lake, but lower elsewhere in the study area where solid bedrock exists.

4.12.2.5 Flooding

Flood Insurance Rate Maps (FIRMs) prepared by the Federal Emergency Management Agency (FEMA) were reviewed to identify the locations of 100-year floodplains in the project vicinity. (A FIRM is the official map of a community prepared by FEMA to delineate both the special flood hazard areas and the flood risk premium zones applicable to the community.) None of the study area is located on FEMA-designated 100-year floodplains (i.e., areas with a 1 percent chance of flooding in any given year). None of the areas immediately downstream of the study area on the Outlet Channel is within a FEMA-designated flood zone.

Upstream dam failure and/or levee failure and ensuing inundation does not pose a risk to the study area because there are no major water bodies upstream of the study area. All larger impoundments in Nevada County are west of the study area, associated with the South Fork Yuba River, the North Fork American River, and their tributaries.

4.12.3 REGULATORY CONSIDERATIONS

4.12.3.1 Federal

Clean Water Act

The federal Clean Water Act (CWA) of 1972 provides for the restoration and maintenance of the chemical, physical, and biological integrity of the nation’s waters. The CWA emphasizes technology-based (end-of-pipe) control strategies and requires discharge permits to allow use of public resources for waste discharge. The CWA also limits the amount of pollutants that may be discharged and requires wastewater to be treated with the best treatment technology economically achievable regardless of receiving water conditions. The control of pollutant discharges is established through National Pollutant Discharge Elimination System (NPDES) permits that contain effluent limitations and standards. The U.S. Environmental Protection Agency (EPA) has delegated responsibility for implementation of portions of the CWA, such as Sections 303, 401, and 402 (discussed below), to the State Water Resources Control Board (State Water Board) and the associated nine Regional Water Quality Control Boards (Regional Water Boards). The proposed study area is located within the jurisdiction of the Central Valley Regional Water Quality Control Board (Central Valley Water Board).
Section 303(d) and Total Maximum Daily Loads

The State of California adopts water quality standards to protect beneficial uses of waters of the state as required by Section 303(d) of the CWA and the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act [see Section 4.12.4.2 below]). Section 303(d) of the CWA established the total maximum daily load (TMDL) process to guide the application of state water quality standards (see the discussion of state water quality standards below). To identify candidate water bodies for TMDL analysis, a list of water quality-impaired segments is generated by the State Water Board. These stream or river segments are impaired by the presence of pollutants, such as sediment, and are more sensitive to disturbance because of this impairment.

In addition to the impaired water body list required by CWA Section 303(d), CWA section 305(b) requires states to develop a report assessing statewide surface water quality. Both CWA requirements are being addressed through the development of a 303(d)/305(b) integrated report, which will address both an update to the 303(d) list and a 305(b) assessment of statewide water quality. The State Water Board developed California’s statewide 2010 Integrated Report based on the integrated reports from each of the nine Regional Water Boards. The 2010 Integrated Report was approved by the State Water Board on August 4, 2010, and approved by EPA on November 12, 2010, and the 2012 Integrated Report with 303(d) listings is currently under development.

No impaired water bodies are within or near the study area or would be affected by the proposed project.

Section 401 – Water Quality Certification

Section 401 of the CWA requires that an applicant pursuing a federal permit to conduct an activity that may result in a discharge of a pollutant obtain a Water Quality Certification (or waiver). A Water Quality Certification requires the evaluation of water quality considerations associated with dredging or placement of fill materials into waters of the United States. Water Quality Certifications are issued by one of the nine Regional Water Boards. Under the CWA, the Regional Water Board must issue or waive a Section 401 Water Quality Certification for a project to be permitted under Section 404.

As described in Section 1.5, the project applicant would be required to obtain a Water Quality Certification for proposed project construction activities that would affect waterways.

Section 402 — National Pollutant Discharge Elimination System

The 1972 amendments to the Federal Water Pollution Control Act established the NPDES permit program to control discharges of pollutants from point sources (CWA Section 402). The 1987 amendments to the
CWA created a new section devoted to stormwater permitting (Section 402[p]). EPA has granted the State of California (the State Water Board and Regional Water Boards) primacy in administering and enforcing the provisions of CWA and NPDES in California. NPDES is the primary federal program that regulates point-source and nonpoint-source discharges to waters of the United States.

NPDES General Permit for Construction Activities

The General NPDES Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, as amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ) (Construction General Permit) regulates stormwater discharges for construction activities (CWA Section 402). Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the Construction General Permit. The Construction General Permit requires the development and implementation of a stormwater pollution prevention plan (SWPPP).

The permit program is risk-based, wherein a project’s risk is based on the project’s potential to cause sedimentation and the risk of such sedimentation on the receiving waters. A project’s risk determines its water quality control requirements, ranging from Risk Level 1, which consists of only narrative effluent standards, implementation of best management practices (BMPs), and visual monitoring, to Risk Level 3, which consists of numeric effluent limitations, additional sediment control measures, and receiving water monitoring. Additional requirements include compliance with postconstruction standards focusing on low impact development (LID), preparation of rain event action plans, increased reporting requirements, and specific certification requirements for certain project personnel.

As described in Section 1.5, the project applicant would be required to obtain a Construction General Permit for the proposed project because total land disturbance would be greater than 1 acre.

BMPs included in the SWPPP may include measures such as the following.

a. Providing permeable surfaces where feasible.

b. Retaining and treating stormwater onsite using catch basins and filtering wet basins.

c. Minimizing the contact of construction materials, equipment, and maintenance supplies with stormwater.

d. Reducing erosion through soil stabilization, watering for dust control, installing perimeter silt fences, placing rice straw bales, and installing sediment basins. In order to
minimize potential impacts on wildlife, no monofilament plastic mesh or line will be used for erosion control.

e. Maintaining water quality by using infiltration systems, detention systems, retention systems, constructed wetland systems, filtration systems, biofiltration/bioretention systems, grass buffer strips, ponding areas, organic mulch layers, planting soil beds, sand beds, and vegetated systems such as swales and grass filter strips that are designed to convey and treat either fallow flow (swales) or sheetflow (filter strips) runoff.

In addition, a procedure for spill prevention and control is typically developed to minimize the potential for, and effects from, spills of hazardous, toxic, or petroleum substances during all construction activities. If a spill should occur during construction that causes a release of a hazardous material, including oil and radioactive materials, the proper agencies are typically notified and an Emergency Release Follow-Up Notice Reporting Form is submitted no more than 30 days following the release.

**Waste Discharge Requirements for Dewatering and Other Low Threat Discharges to Surface Waters**

CWA Section 402 also includes WDRs for dewatering activities. While small amounts of construction-related dewatering are covered under the Construction General Permit, the Central Valley Water Board has regulations specific to dewatering activities that typically involve reporting and monitoring requirements.

If dewatering is required as part of the proposed project\(^5\), then the project applicant will need to comply with the Central Valley Water Board dewatering requirements. Coverage under the Construction General Permit typically covers uncontaminated dewatering activities, which are considered in the permit to be authorized non–stormwater discharges. As part of the Construction General Permit, all dewatering discharges are required to be filtered or treated, using appropriate technology, from sedimentation basins. Authorized non–stormwater dewatering discharges may require a permit because some Regional Water Boards have adopted General Permits for dewatering discharges. The Central Valley Water Board has adopted a NPDES Low Threat Discharge and Dewatering General Permit. Therefore, the project applicant or the project applicant’s contractor would also need to obtain coverage under the NPDES Low Threat Discharge and Dewatering General Permit, which will require the dewatering discharge to be treated prior to discharge to any local waterway.

---

\(^5\) As described in Section 4.12.2, *Environmental Setting*, the drainages on the property are typically dry during the summer, which is presumably when most construction activities would occur. The Waste Discharge Requirements described herein are more likely to be necessary for beach or shoreline improvements, not work conducted in the main impact area on the property, where there are no perennial creeks.
If dewatering activities lead to discharges to the storm drain system or other water bodies, water treatment measures may be designed and implemented as necessary so that water quality objectives are met prior to discharge to waters of the state. As a performance standard, these measures will be selected to achieve the maximum removal contaminant found in the groundwater and will represent the best available technology (BAT) that is economically feasible. Implemented measures may include using infiltration areas and retaining dewatering effluent until particulate matter has settled before the water is discharged. The contractor should perform routine inspections of the construction area to verify that the water quality control measures are properly implemented and maintained; the contractor will also conduct observations of the water (e.g., check for odors, discoloration, or an oily sheen on groundwater). Other pre-discharge sampling and reporting activities required by the Central Valley Water Board is typically conducted, if necessary. The final selection of water quality control measures would be subject to review by the Central Valley Water Board, if necessary. If the groundwater is found to not meet water quality standards, and treatment measures are not effective, the water may need to be hauled offsite for treatment and disposal at an appropriate waste treatment facility.

Section 404—Dredge/Fill Permitting

The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Title IV (Permits and Licenses) of the CWA and specifically under Section 404 (Discharges of Dredge or Fill Material) of the CWA. Section 404 of the CWA regulates placement of fill materials into the waters of the United States. Section 404 permits are administered by U.S. Army Corps of Engineers (USACE).

As described in Section 1.5, the project applicant would be required to obtain a Section 404 permit for proposed project construction activities that would affect waterways.

National Flood Insurance Program

In response to increasing costs of disaster relief, Congress passed the National Flood Insurance Act (NFIP) of 1968 and the Flood Disaster Protection Act of 1973. The purpose of these acts was to reduce the need for large, publicly funded flood control structures and disaster relief by restricting development on floodplains. FEMA administers the NFIP to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA issues FIRMs for communities participating in the NFIP.
4.12.3.2 State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act authorizes the state to implement the provisions of the CWA and establishes a regulatory program to protect the water quality of the state and the beneficial uses of state waters.

The act requires projects that are discharging, or proposing to discharge, wastes that could affect the quality of the state’s waters to file a report of waste discharge (RWD) with the appropriate Regional Water Board. The Porter-Cologne Act also requires that State Water Board or a Regional Water Board adopt basin plans for the protection of water quality. Basin plans are updated and reviewed every 3 years and provide the technical basis for determining WDRs, taking enforcement actions, and evaluating clean water grant proposals. A basin plan must include the following sections (Central Valley Water Board 2011).

- A statement of beneficial water uses that the Regional Water Board will protect.
- Water quality objectives needed to protect the designated beneficial water uses.
- Strategies and time schedules for achieving the water quality objectives.

As noted above, the proposed project lies within the jurisdiction of the Central Valley Water Board. The Central Valley Water Board is responsible for the protection of beneficial uses of water resources in the Central Valley Region. The Basin Plan was last updated in 2011 (Central Valley Water Board 2011).

Regional Water Boards designate beneficial uses for all water body segments in their jurisdictions and then set criteria necessary to protect these uses. Consequently, the specific water quality objectives developed for particular water segments are based on the designated use. The Basin Plan specifies region-wide and water body–specific beneficial uses and has set numeric and narrative water quality objectives for several substances and parameters for numerous surface waters in its region. Specific objectives for concentrations of chemical constituents are applied to bodies of water based on their designated beneficial uses (Central Valley Water Board 2011). In addition, the State Water Board identifies waters failing to meet standards for specific pollutants, which are then state-listed in accordance with CWA Section 303(d). If it is determined that waters of the state are impaired for one or more constituents and the standards cannot be met through point source or nonpoint source controls (NPDES permits or WDRs), the CWA requires the establishment of TMDLs.
California Fish and Game Code Section 1602—Streambed Alteration Agreement

Under Chapter 6 of the California Fish and Game Code, California Department of Fish and Wildlife (CDFW) is responsible for the protection and conservation of the state’s fish and wildlife resources. Section 1602 et seq. of the code defines the responsibilities of CDFW and requires that public and private applicants obtain an agreement to “divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by the CDFW in which there is at any time an existing fish or wildlife resource or from which those resources derive benefit, or will use material from the streambeds designated by the department.” A streambed alteration agreement is required under Section 1602 of the California Fish and Game Code for all activities that involve temporary or permanent activities within state jurisdictional waters.

As described in Section 1.5, the project applicant would be required to obtain a Streambed Alteration Agreement for proposed project construction activities that would affect waterways.

Sustainable Groundwater Management Act

On September 16, 2014, Governor Edmund G. Brown, Jr. signed historic legislation to strengthen local management and monitoring of groundwater basins most critical to the state’s water needs. The three bills—SB 1168 (Pavley), SB 1319 (Pavley), and AB 1739 (Dickinson)—together make up the Sustainable Groundwater Management Act. The bills establish phased requirements for high- and medium-priority basins to adopt groundwater sustainability plans, depending on whether a basin is in critical overdraft. The act requires adoption of groundwater sustainability plans by January 31, 2020, for all high or medium-priority basins in overdraft condition and by January 31, 2022, for all other high- and medium-priority basins unless legally adjudicated or otherwise managed sustainably. These bills do not apply to the proposed project because western Nevada County has no groundwater basins.

California Forest Practice Rules

The University will comply will all applicable State of California forestry regulations. Certain vegetation management activities may require review, permitting, and approval by the State of California. Specific items such as a timber harvest plan or a timber conversion plan may be filed by a registered professional forester in accordance with the requirements of CalFire.

Article 6, “Watercourse and Lake Protection,” of the 2015 California Forest Practice Rules (CalFire 2015) describes the standard practices and measures to ensure that timber operations do not potentially cause significant adverse site-specific and cumulative impacts on the beneficial uses of water, native aquatic and riparian-associated species, and the beneficial functions of riparian zones; result in an unauthorized
take of listed aquatic species; or threaten to cause violation of any applicable legal requirements. This article also provides protection measures for application in watersheds with listed anadromous salmonids and watersheds listed as water quality limited under Section 303(d) of the federal Clean Water Act.

4.12.3.3 Local

Nevada County does not currently have a design and improvement standards manual, a drainage manual, a stormwater management plan, or a stormwater quality ordinance. All relevant local regulations and procedures described below are derived from the Nevada County Code, the Nevada County Department of Environmental Health, or the Nevada County General Plan.

**Grading, Erosion, and Sediment Control Ordinances**

Although not applicable to the proposed project, the following Nevada County development regulations relating to hydrology and water quality provide context for comparing the development standards that would be required on nearby properties and for understanding the water quality protection goals of Nevada County. Article 19, “Grading,” Chapter V, “Buildings,” of Title 3, “Land Use and Development Code” of the Nevada County Code (Nevada County 2015) describes the required permits, required setbacks, drainage considerations, and erosion control procedures for buildings. Storm drainage and design standards not otherwise specified in Article 19 shall comply with Article 5, “Storm Drainage,” Chapter XVII, “Road Standards,” of Title 3, “Land Use and Development Code” of the Nevada County Code.

As described above, under the requirements of the Central Valley Water Board, the project would be required to comply with design, construction, and maintenance requirements of the Central Valley Water Board (i.e., Construction General Permit, WDRs for dewatering) for surface water quality and stormwater pollution prevention.

**Nevada County Design Standards**

Nevada County’s Comprehensive Site Development Standards identify the basic requirements for site development in the county, including standards to mitigate the impact of development on the following environmentally sensitive resources related to hydrology and water quality.

- Wetlands.
- Riparian corridors within 100 feet of intermittent or perennial water courses.
- Floodplains precluding development and land disturbance within floodways and restricting development within the floodway fringe, through the establishment of floodplain setbacks and associated development regulations.

- Steep slopes (30+ percent).

- Areas with high erosion potential.


**Nevada County Department of Environmental Health**

All septic system design and well development would be subject to the Land Use and Development Division of the Nevada County Department of Environmental Health permit and inspections process. Septic system permitting and installation policies, and well installation procedures, are available at the Nevada County website: [http://www.mynevadacounty.com/nc/cda/eh/Pages/Land-Use-and-Development-Division.aspx](http://www.mynevadacounty.com/nc/cda/eh/Pages/Land-Use-and-Development-Division.aspx).

**Septic Systems**

For septic systems, the Nevada County requirements include provisions to protect groundwater quality and public health, ensure acceptable long-term operation, evaluate site specific conditions, and utilize proven septic system design standards.

According to Section L-VI 3.7, “Centralized Wastewater Disposal Permit Application Process,” Article 3, “Centralized Wastewater Collection, Treatment And Disposal System,” Chapter VI “Sewage Disposal,” of Title 3, “Land Use and Development Code” of the Nevada County Code (Nevada County 2015b), the property owner or its designated representative must apply for a centralized wastewater disposal permit on a form provided by the Nevada County Department of Environmental Health. A design package is to be submitted to the Nevada County Department of Environmental Health at the time of application and contain the following information and/or documents.

A. Past and present conditions including, but not limited to, all prior soil mantles, soils work, percolation tests, previous proposals, existing wastewater treatment, collection and disposal systems, etc.
B. Preliminary basis of design including, but not limited to, proposed dwelling structures, flow projections, topography, hydraulic design factors, materials, manholes, inspection chambers and well pumps and pressure pipes, objectives and standards, the design basis for the sewage treatment and final disposal, and the predicted quality and quantity of the final effluent.

C. Proposed location of the treatment system and final disposal area plus locations of any repair or expansion areas (100 percent repair area for any subsequent subsurface soil absorption system).

D. Location of all wells, water service connections, water distribution systems, or other water source.

E. All required setback distances.

F. Distances from wells on all parcels included in the proposed system.

G. Location of ponds, creeks, springs, cut banks, rock out-croppings, etc.

H. Direction and percent of slope in the wastewater disposal areas.

I. Location and description of all proposed or existing structures, driveways, roads, etc.

J. Two (2) copies of scaled maps showing all structures, electrical cables, telephone lines, and the collection system.

K. Two (2) copies of detailed, scaled treatment and disposal site plans showing the locations of any structures, the sewage treatment and disposal system and repair area.

L. Two (2) copies of scaled two (2) view drawing of all components of the system conforming to American Standard drawings and drafting room practice. Three (3) view drawings may be required if necessary to clarify component design.

M. Two (2) copies of the calculations made to determine the quantity and quality of the final effluent.

N. A statement of justification, alternative analysis and certification of the proposed system by the designer.

O. A contingency plan, which outlines the immediate actions to be taken should a failure occur and an action plan for repairs, expansion or replacement of the system as is appropriate.
P. Operation, maintenance, and monitoring instructions, which provide brief and simple guidance regarding the operation, maintenance, and monitoring of the system.

Q. Grant easement for access by Health Department and Regional Board personnel and agents for periodic inspection as necessary.

A minimum of six percolation test holds and two soil mantles are required in any proposed absorption field and the same in the proposed repair expansion area for the initial design review. Additional soils testing may be required to demonstrate soil consistency throughout the disposal area. Percolation tests shall be performed in a manner as prescribed by the Health Officer. Any alternative percolation test procedure may be utilized only with the written approval of the Health Officer. All mantle excavations must be adequately protected under applicable regulations and backfilled following logging of the soil profile by a registered civil engineer, registered engineering geologist, or registered sanitarian.

**Inspections and Performance Monitoring**

According to Section L-VI 315, “Inspections and Performance Monitoring,” Article 3, “Centralized Wastewater Collection, Treatment And Disposal System,” Chapter VI, “Sewage Disposal,” of Title 3, “Land Use and Development Code” of the Nevada County Code (Nevada County 2015b), the following inspections and performance monitoring criteria are applicable to septic systems.

A. Pre-issue inspections shall be made prior to the issuance of a centralized sewage disposal permit to ascertain the suitability of the site. A permit application will be denied when the Health Officer determines the centralized disposal system could not be expected to function in a manner that will protect the public health and safety.

B. Trenches or beds shall be inspected prior to placement of any filter media.

C. Final inspection of each installation shall be made by the Sanitarian before any subsurface system is backfilled or covered.

D. A monitoring program will be established individually for each centralized system at the time of permit issuance. Said monitoring shall be performed to ensure that the centralized wastewater collection, treatment, and disposal system is functioning satisfactorily to protect the public health and safety. The specific requirements will be based primarily upon recommendations of the design engineer and the Health Department. Monitoring requirements will normally be expected to include:

1. Water usage or waste flow metering shall be recorded in a log book.
2. Effluent level measurements in the disposal system.

3. Water quality sampling (bacterial) at least quarterly in monitoring wells or drainages.

E. The owner(s) or administrative authority or their agent will be responsible for (1) and (2) of D above.

F. Nevada County Health Department and/or its designated representatives will be responsible for (3) of D above. Additionally, periodic inspections will be made of the condition of the disposal field, water levels in monitoring wells and equipment operation.

G. All centralized sewage disposal systems shall possess a valid annual certificate of operation issued by the Health Department. Said certificate permit may be revoked for due cause. The permit fee will cover monitoring and routine inspections costs.

Wells

According to Section L-X 2.2, “Permit Application,” Article 2, “Water Wells,” Chapter X, “Water Supply and Resources,” of Title 3, “Land Use and Development Code” of the Nevada County Code (Nevada County 2015b), no person shall dig, bore, drill, deepen, modify, reconstruct, repair, or destroy a water well, cathodic protection well, observation well or monitoring well without first obtaining a permit as provided in Chapter X, “Water Supply and Resources,” of Title 3, “Land Use and Development Code,” of the Nevada County Code (Nevada County 2015b). An application is complete only when the form (on its face) is completed in full, is signed by the licensed well driller, and is accompanied by all required exhibits and fees. The exhibits shall include all of the following:

1. A vicinity map and clear directions to the property and well site.

2. Plans and specifications for the proposed work, including method of sealing the annular space.

3. Two (2) copies of an accurate site plan drawn to scale showing the proposed well location and all features of potential contamination (e.g., on-site sewage systems, sewer lines, animal feed lots, etc.) and property lines within 150 feet of the proposed well site. A scaled assessor’s plot map may be used for this purpose.

4. Copy of assessor’s plot.

5. Location of any restrictions such as easements on the property.
6. Any other information the enforcement agency finds is necessary to complete the permit application.

7. Submission of appropriate permit filing fee.

All construction, reconstruction, or destruction work on wells shall be performed by a person who possesses a valid C-57 contractor’s license in accordance with the provisions of the California Business and Professions Code, or his or her designated employees. Renewal of a permit may be granted to the original permittee if an application for permit renewal is filed prior to the original permit expiration date. Application for permit renewal shall conform to the requirements of Section L-X 2.3, “Permit Application Procedure,” Article 2, “Water Wells,” Chapter X, “Water Supply and Resources,” of Title 3, “Land Use and Development Code” of the Nevada County Code (Nevada County 2015b). The permit shall be renewed or denied consistent with Chapter X “Water Supply and Resources,” of Title 3, “Land Use and Development Code” of the Nevada County Code (Nevada County 2015b).

Well Locations

All wells shall be located as prescribed in Table 1 of Section L-X 2.10, “Well Location,” Article 2 “Water Wells,” Chapter X “Water Supply and Resources,” of Title 3 “Land Use and Development Code” of the Nevada County Code (Nevada County 2015b). These include locating the well at a minimum of 50 feet from the property line, 5 feet from easements, and 100 feet from septic tanks.

Well Protection

As described in of Section L-X 2.11 “Protection,” Article 2, “Water Wells,” Chapter X, “Water Supply and Resources,” of Title 3 “Land Use and Development Code” of the Nevada County Code (Nevada County 2015b), at all times during construction, the well shall be protected in such a manner as to prevent tampering with the well, accidents to persons, the entrance of foreign matter into the well or the entrance of drilling mud into streams, etc. Water and drilling mud used in drilling shall be free from contamination.

Well Inspections

As described in of Section L-X 2.18 “Inspections,” Article 2 “Water Wells,” Chapter X, “Water Supply and Resources,” of Title 3 “Land Use and Development Code” of the Nevada County Code (Nevada County 2015b), the enforcement agency shall make an inspection of the annular seal construction work. It may make an initial inspection of each proposed drilling site prior to the issuance of a well permit, an inspection at the completion of the work, and inspections at such other times as it deems appropriate.
Well Completion

As described in of Section L-X 2.20 “Completion,” Article 2, “Water Wells,” Chapter X, “Water Supply and Resources,” of Title 3 “Land Use and Development Code” of the Nevada County Code (Nevada County 2015b), upon completion of a well, the driller shall be responsible for the sanitary well seal or a well cover. The driller shall also submit a completed water well driller’s report or photocopy of same, completed in detail on the State Department of Water Resources reporting form, to the Health Department. Said photocopy shall contain the assessor’s parcel number of the subject property and permit number.

Nevada County General Plan

The proposed project is located on a University of California property that is owned or controlled by The Regents of the University of California. As a State entity, the University is exempted by the state constitution from compliance with local land use regulations, including general plans and zoning. However, the University seeks to develop its property in a manner that minimizes potential land use conflicts with the policies and plans of local jurisdictions to the extent feasible. Furthermore, the (potential) receiving water body for hydrology and water quality impacts is the South Fork Yuba River, which is outside the limits of the study area, but could be affected by project activities. Although not applicable to the proposed project, the following Nevada County General Plan (Nevada County 2015a) policies related to hydrology and water quality provide context for comparing the development standards that would be required on nearby properties and for understanding the land development goals of Nevada County.

Open Space Element

Goal 6.1

Encourage that land use patterns and site development reflect open space values.

Objective 6.2

Implement development standards that incorporate open space values.

Policy 6.9

Development standards for project design, grading, construction and use, established through the Comprehensive Site Development Standards, shall be used in project review
of all discretionary project permits to determine open space requirements for each project.

These standards shall provide for consideration of non-disturbance of, and open space setbacks from identified sensitive environmental, biological, or cultural resources, e.g. 100-year floodplains, wetlands, slopes in excess of 30 percent (excepting access across slopes up to 30 percent), lakes, ponds, significant historic or archaeological sites/resources, critical wildlife areas, minimization of land disturbance, consistency with the landforms and aesthetic context of the site, temporary and permanent erosion and sedimentation controls, and vegetation retention, replacement and enhancement.

Safety Element

GOAL FH-10.3

Reduce the potential for injury, property damage, and environmental damage from flooding.

Policy FH-10.3.1

Implement development standards to ensure new construction does not result in increased peak run-off or flood potential.

Policy FH-10.3.2

Avoid potential increases in downstream flooding potential by protecting natural drainage and vegetative patterns through project site plan review, application of Comprehensive Site Development Standards, use of clustered development and project subdivision design. The Comprehensive Site Development Standards shall include measures applicable to all discretionary and ministerial projects to avoid downstream flooding resulting from new development. Such measures, shall include, but not be limited to:

a. Avoidance of stream channel modifications;

b. Avoidance of excessive areas of impervious surfaces; and

c. Use of on-site retention or detention of storm water.
Water Element

Goal 11.1

Identify, protect and manage for sustainable water resources and riparian habitats.

Objective 11.1

Promote and provide for conservation of domestic and agricultural water.

Policy 11.1

Adopt water conservation standards, consistent with State guidelines, for multi-family, commercial and industrial development encouraging installation and use of low-flow plumbing fixtures, drip irrigation systems, and drought-tolerant landscape plantings.

Policy 11.2

Encourage the protection of resources which produce water for domestic and agricultural consumption.

Objective 11.2

Preserve surface and sub-surface water quality and, where feasible, improve such quality.

Policy 11.4

Cooperate with State and local agencies in efforts to identify and reduce to acceptable levels all sources of existing and potential point- and non-point-source pollution to ground and surface waters, including leaking fuel tanks, discharges from storm drains, auto dismantling and dump sites, sanitary waste systems, parking lots, roadways, logging and mining operations.

Policy 11.6

The County shall continue to enforce its regulations concerning the installation and operation of private sanitary waste disposal systems in order to protect the quality of surface and ground water.

The location of septic tanks and leachfields and their appropriate setbacks from water courses shall be in accordance with the guidelines of the Lahontan Regional Water
Quality Control Board (eastern County) and the Central Valley Regional Water Quality Control Board (western County).

**Policy 11.6A**

New development shall minimize the discharge of pollutants into surface water drainages by providing the following improvements or similar methods which provide equal or greater runoff control: (a) include curbs and gutters on arterials, collectors, and local roads consistent with adopted urban street designs; and (b) oil, grease, and silt traps for subdivisions creating 5 or more parcels and commercial and industrial development of 1 acre or greater size. Maintenance of such facilities shall be assured through a legally-enforceable mechanism.

**Objective 11.3**

Preserve and, where economically feasible, restore the density and diversity of water-dependent species and continuous riparian habitats based on sound ecological principles.

**Policy 11.7**

Through the development and application of Comprehensive Site Development Standards, and project environmental review, establish and enforce minimum building setback lines from perennial streams and significant wetlands that are adequate to protect stream and wetland resource values.

**Policy 11.8**

Utilize voluntary clustering of development to preserve stream corridors, riparian habitat, wetlands, and floodplains.

**Soils Element**

**Goal 12.1**

Minimize adverse impacts of grading activities, loss of soils and soil productivity.

**Objective 12.1**

Minimize earth movement and disturbance.
Policy 12.1

Enforce Grading Ordinance provisions for erosion control on all new development projects by adopting provisions for ongoing monitoring of project grading. Project site inspection shall be required prior to initial site disturbance and grading to ensure all necessary control measures, including proper staking and tree protection measures, are in place. The installation, maintenance, and performance of erosion and sedimentation control measures shall be monitored by County or District staff (or their designee) and completely funded by a project applicant. All County projects shall comply with this policy.

Objective 12.2

Minimize erosion due to road construction and maintenance.

Policy 12.4

Require erosion control measures as an element of all County contracts, discretionary projects, and ministerial projects.

4.12.4 IMPACTS AND MITIGATION MEASURES

4.12.4.1 Significance Criteria

The significance criteria listed below are derived from Appendix G of the State CEQA Guidelines. For the purpose of this EIR, hydrology and water quality impacts would be significant if implementation of the proposed project would:

- Violate any water quality standards or WDRs.

- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted).

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite.
4.12 Hydrology and Water Quality

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite.

- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

- Otherwise substantially degrade water quality.

- Place housing within a 100-year flood hazard area, as mapped on a federal flood hazard boundary map, FIRM, or other flood hazard delineation map.

- Place within a 100-year flood hazard area structures that would impede or redirect floodflows.

- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

- Contribute to inundation by seiche, tsunami, or mudflow.

4.12.4.3 Methodology

Impacts related to hydrology, water quality, and water resources were assessed based on technical reports prepared for the proposed project, other available data (e.g., maps, soil surveys), and professional judgment. Potential impacts resulting from implementing the proposed project were analyzed by comparing existing conditions, as described in Section 4.12.2, Environmental Setting, to conditions during construction and/or operation of the project. The analysis assesses the direct, indirect, short-term, and long-term impacts related to surface hydrology, flood hazards, groundwater recharge, and surface and groundwater quality as described below.

- Surface Water Hydrology: The surface water hydrology impact analysis considered potential changes in the physical characteristics of water bodies, impervious surfaces, and drainage patterns throughout the study area as a result of project implementation. Conclusions and recommendations from a site-specific drainage analysis have not been incorporated into the analysis of changes in peak flow runoff as this analysis has not yet been completed. The purpose of this study will be to estimate 100-year peak flows for existing and developed conditions; determine the limits of 100-year flooding along the channels associated with the project; provide a floodway analysis along portions of the channels where development would encroach onto the flood-prone areas; determine storage requirements for the study area to attenuate 100-year flows.
to approximate existing-conditions flows; and present water quality treatment options for the development.

- Flood Hazards: The impact analysis for flood risk considered FEMA NFIP maps to determine whether the study area overlaps with existing designated 100-year floodplains.

- Groundwater Recharge: Impacts on groundwater recharge were assessed qualitatively by comparing existing sources of recharge versus recharge capabilities following project implementation. Conclusions and recommendations from a site-specific aquifer study have not been incorporated into the impacts associated with the underlying aquifer as this analysis has not yet been completed. The purpose of this study will be to estimate the water-bearing capacity of the underlying aquifer; to estimate the groundwater recharge rates in the study area and local vicinity (immediate Crystal Lake drainage basin and other subbasins where development activities are proposed); and present well installation recommendations for the proposed project.

- Surface and Groundwater Quality: Impacts of the proposed project on surface water and groundwater quality were qualitatively analyzed using existing information on existing water quality conditions (i.e., 303[d] listed water bodies). These conditions were then compared to conditions under the proposed project for potential project-related sources of water contaminants generated or inadvertently released during project construction (e.g., sediments, fuel, oil, concrete) and project operation (postconstruction runoff and septic tank operation). The potential for water quality objectives to be exceeded and beneficial uses to be compromised as a result of the proposed project was also considered.

4.12.4.4 Project Impacts and Mitigation Measures

Proposed Project

Impact WQ-1: Violate any water quality standards or waste discharge requirements during construction (Less than Significant)

Construction-related earth-disturbing activities for new roads, compacted dirt areas, construction of new buildings, water crossings, and other project elements would introduce the potential for increased erosion, runoff, and sedimentation, with subsequent effects on water quality and storm drain capacity. During site grading, trenching, and other construction activities, areas of bare soil are exposed to erosive forces during rainfall events. Bare soils are much more likely to erode than vegetated areas because of the
lack of dispersion, infiltration, and retention properties created by covering vegetation. The extent of the impacts is dependent on soil erosion potential, type of construction practice, extent of disturbed area, timing of precipitation events, and topography and proximity to drainage channels. In addition, construction equipment and activities would have the potential to leak hazardous materials, such as oil and gasoline, and potentially affect surface water or groundwater quality. Improper use or accidental spills of fuels, oils, and other construction-related hazardous materials such as pipe sealant, solvents, and paints could also pose a threat to the water quality of local water bodies. These potential leaks or spills, if not contained, would be considered a significant impact on groundwater and surface water quality. If precautions are not taken to contain or capture sediments and/or accidental hazardous spills, construction activities could produce substantial pollutants in stormwater runoff could adversely affect existing surface water quality.

Construction of bridge crossings (including culvert upgrades) near and within water bodies may result in discharges of metals and other contaminants in sediment. In-water construction activities would directly disturb sediment along the river bed and result in a temporary increase in turbidity in the immediate area and potentially downstream. Concrete, vehicle, and other fluids may be easily released into the creek during construction as well. These discharges may have adverse impacts on beneficial uses.

However, because the project would disturb more than 1 acre of land, a SWPPP with an associated predetermined risk level would be required as part of compliance with the NPDES Construction General Permit. The purpose of a SWPPP is to reduce the amount of construction-related pollutants that are transported by stormwater runoff to surface waters. The SWPPP would identify specific construction BMPs, which include temporary erosion control measures to reduce sedimentation and turbidity of surface runoff from disturbed areas within the study area, and leak and spill protection for heavy equipment and hazardous materials use, among others.

In addition to the SWPPP, the proposed project would also be required to comply with other water quality requirements (i.e., NPDES Low Threat Discharge and Dewatering permit). County Comprehensive Site Development Standards would also be reviewed and incorporated, where necessary.

Construction dewatering in areas of shallow groundwater may be required during excavation. In the event groundwater is encountered during construction, dewatering would be conducted locally, and according to methods described in Section 4.12.3, Regulatory Considerations. In areas where groundwater is
shallow or perched and there is potential to affect riparian habitat, features would be installed using the vibration method\(^6\), which minimizes subsurface disruption.

UC Davis will comply with all applicable State of California forestry regulations. If a timber harvest plan or timber conversion plan is produced, UC Davis activities will include compliance with the California Forest Practice Rules Article 6 standard practices and measures.

Therefore, potential water quality impacts, such as violations of water quality objectives or WDRs from construction activities, would be less than significant.

**Mitigation Measure(s):** No mitigation measures are required.

**Impact WQ-2:** Substantially deplete groundwater supplies, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (Significant; Less than Significant with Mitigation)

The proposed project involves installation of a new well that will be used for project water supply. The preliminary investigation for the proposed new well location indicated that nearby wells typically produce 5 to 12 gpm, with some artesian wells producing upward of 80 gpm. Based on this review, the well company identified areas within the northeast quadrant of the study area as the most likely candidates for a new well (because of closer proximity to the Yuba River). The proposed project would have a temporally moderate demand on local groundwater resources, with peak demand occurring in the summer when the camp has the greatest number of visitors. In addition, the current demand for groundwater in this remote area is relatively low as the occupancy rate on the neighboring parcels is relatively low, and the project’s location within a few miles of Sierra Nevada crest suggests an ample supply of groundwater would be available for the life of the project.

Preliminary evaluation suggests that 50 gallons per day per person will be required to accommodate the needs of the proposed project. While the existing demand and preliminary investigation suggest the availability of water will be adequate to serve the needs of the proposed project, the long-term aquifer yield is not currently known. This constitutes a potentially significant impact. Incorporation of Mitigation Measure WQ-2 would reduce this impact to a less-than-significant level.

**Mitigation Measure WQ-2:** Incorporate findings and recommendations from the site-specific aquifer study to determine if adequate groundwater supplies are available for the long-term needs of the project

\(^6\) Different than standard pumping techniques and cut-off wall installation, the vibration method uses a stainless steel vibrating device and a vibrating screen to remove water from the soil through vibration and gravity.
A site-specific aquifer study will be completed by a registered hydrogeologist prior to well installation on the property. The purpose of this study will be to estimate the water-bearing capacity of the underlying aquifer; to estimate the groundwater recharge rates in the study area and local vicinity (immediate Crystal Lake drainage basin and other subbasins where development activities are proposed; and present groundwater extraction recommendations for the proposed project. To the extent possible, the study will determine the total volume of storage available within the underlying aquifer and take other local neighboring drawdowns into account to create a groundwater budget. Conclusions and recommendations from the site-specific aquifer study will be incorporated into the final project plans for groundwater extraction.

**Significance after Mitigation:** The impact from substantially depleting groundwater supplies, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level would be reduced to a less-than-significant level.

**Impact WQ-3:** Interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (Less than Significant)

The proposed project site is predominantly undeveloped, and partially covering undeveloped areas with impervious surfaces, as proposed by the project, could reduce infiltration of rainfall and runoff, which in turn could reduce the ability for aquifer recharge and ultimately result in decreased groundwater supplies. However, the proposed project would not substantially interfere with groundwater recharge because the study area is underlain by bedrock and does not overlie a regionally significant groundwater aquifer. In addition, although the proposed disturbance footprint encompasses an area of approximately 18 acres, and approximately 192 acres would remain as open space or landscaped areas, including the lawn and play area associated with the Main House, thereby protecting valuable natural resources (forest, intermittent drainages, wetlands, and steep hillsides) through which infiltration would continue to occur and that contribute to groundwater recharge.

Lastly, the development of the project site would not interfere with groundwater recharge via water infiltration through creeks because no major modification or realignments of the Outlet Channel or any of the other existing site drainages are proposed. This potential impact on groundwater recharge would, therefore, be less than significant.

**Mitigation Measure(s):** No mitigation measures are required.

**Impact WQ-4:** Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that
would result in substantial erosion or siltation onsite or offsite (Significant; Less than Significant with Mitigation)

The proposed project may directly affect the various drainages within the property, most notably the Inlet Channel as shown on Figure 4.12-1. This could affect local drainage patterns. Site preparation activities, such as grading and excavation to construct building pads and improve roadways, would slightly alter the overall existing overland flow drainage patterns in the study area. Alterations in the natural landscape and drainages (hydromodification) could increase the potential for changes in water flow in onsite and offsite drainages, creeks, and streams that could, in turn, affect erosion and/or the amount of sediment in the watercourse. Construction activities also contribute this potential effect because they would leave areas of exposed soil that could be subject to wind or water erosion, and stormwater runoff could potentially transport sediment-laden runoff to local drainages. Increased sediment loads have the potential to degrade water quality and/or reduce the capacity of drainages to convey water. This potential is increased when earth-moving activities and development footprints are close to riparian areas and drainages. Nevada County requires standards for open space setbacks from identified sensitive environmental, biological, or cultural resources such as riparian areas. Actual setbacks for the study area would be determined during the Section 404 permitting process in consultation with USACE.

Project components such as the dining hall, lodge, and sleeping pods would create new impervious surfaces. This would alter drainage patterns on the site compared to existing conditions, but it would also reduce the amount of soil that could be exposed to erosion. This constitutes a potentially significant impact. Incorporation of Mitigation Measure WQ-4 would reduce this impact to a less-than-significant level.

**Mitigation Measure WQ-4:** Incorporate findings and recommendations from the site-specific drainage study to mitigate effects on drainage alteration and/or erosion

A hydrologic and hydraulic analysis will be submitted for all proposed drainage facilities. The analysis must include an introduction/background, location map/description, catchment description/delineation, hydrologic analysis, hydraulic and structural analysis, risk assessment/impacts discussion, unusual or special conditions, conclusions, and technical appendices. The analysis will address the following topics.

- A calculation of predevelopment runoff conditions and post-development runoff scenarios using appropriate engineering methods. This analysis will evaluate potential changes to runoff through specific design criteria, and account for increased surface runoff.
4.12 Hydrology and Water Quality

- An assessment of existing drainage facilities within the study area, and an inventory of necessary upgrades, replacements, redesigns, and/or rehabilitation, including the sizing of onsite stormwater detention features and pump stations.

- A description of the proposed maintenance program for the onsite drainage system.

- Standards for drainage systems to be installed on a project/parcel-specific basis.

- Proposed design measures to ensure structures are not located within intermittent creek areas.

- Water quality treatment, infiltration, and erosion control options for the development.

Drainage systems will be designed on a site-specific basis in accordance with the findings of the analysis. As a performance standard, measures to be implemented will provide for no net increase in peak stormwater discharge relative to current conditions to ensure that 100-year flooding and its potential impacts are maintained at or below current levels and that people and structures are not exposed to additional flood risk. Water quality treatment options, such as vegetated swales, for the development will be fully evaluated and clearly described. These measures will be incorporated to ensure the proposed project’s effect on drainage patterns would not cause or exacerbate the rate of sedimentation or siltation in a manner that would adversely affect the function of natural onsite or offsite drainages, streams, or creeks.

County Comprehensive Site Development Standards will also be reviewed and incorporated, where necessary.

**Significance after Mitigation:** The impact from substantially altering the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite would be reduced to a less-than-significant level.

**Impact WQ-5:** Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite (Significant; Less than Significant with Mitigation)

Project components such as the dining hall, lodge, and sleeping pods would alter surface drainage patterns as a result of adding impermeable surfaces and directly altering flow patterns which could yield increased amounts of stormwater runoff. This constitutes a potentially significant impact. Proposed project activities that convert permeable surfaces or install permanent structures would require stormwater drainage management measures as described above under Impact WQ-4 to avoid onsite or
offsite flooding impacts. In addition, the proposed project would include road crossings of minor seasonal streams. However, the proposed crossings would not alter the course of the stream or river and would be designed to accommodate for potential flooding impacts. Incorporation of Mitigation Measure WQ-4 described above would reduce this impact to a less-than-significant level.

Mitigation Measure WQ-4: Incorporate findings and recommendations from the site-specific drainage study to mitigate effects on drainage alteration and/or erosion

Significance after Mitigation: The impact from substantially altering the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite would be reduced to a less-than-significant level.

Impact WQ-6: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems (Significant; Less than Significant with Mitigation)

Project components such as enhanced roadways, buildings, and hardscaping would result in an increase in stormwater runoff as a result of new impervious surfaces. These surfaces could create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. As noted in Impact WQ-4, a hydrologic and hydraulic analysis will be submitted for all proposed drainage facilities. Recommendations and measures from this analysis as described in Mitigation Measure WQ-4 would ensure the capacity of existing stormwater drainage systems would not be exceeded.

Mitigation Measure WQ-4: Incorporate findings and recommendations from the site-specific drainage study to mitigate effects on drainage alteration and/or erosion

Significance after Mitigation: The impact from creating or contributing runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff would be reduced to a less-than-significant level.
Impact WQ-7: Create or contribute runoff water that would provide substantial additional sources of polluted runoff or create conditions that would pose a hazard to existing groundwater resources (Less than Significant)

Surface Water

Upon completion of the project, components such as enhanced roadways, buildings, and hardscaping would create new impervious surfaces. This condition would result in an incremental reduction in the amount of natural soil surfaces available for infiltration of rainfall and runoff, potentially generating additional runoff during storm events. In addition, the increase in impervious surfaces and increase in surface water runoff could increase the nonpoint-source discharge of pollutants. Anticipated runoff contaminants include sediment, pesticides, oil and grease, nutrients, metals, bacteria, sanding/de-icing agents on roads or walkways, and trash. Contributions of these contaminants to stormwater and non-stormwater runoff could degrade the quality of receiving waters. During the dry season, vehicles and other urban activities release contaminants onto the impervious surfaces, where they can accumulate until the first storm event. During this initial storm event, or first flush, the concentrated pollutants would be transported in runoff to stormwater drainage systems. Contaminated runoff waters could flow into the nearby channels that discharge into the Outlet Channel and South Fork Yuba River, ultimately degrading the water quality of the channel or the river.

As noted in Impact WQ-4, a hydrologic and hydraulic analysis will be submitted for all proposed drainage facilities. Recommendations and measures from this analysis, as described in Mitigation Measure WQ-4, would help to ensure the postconstruction stormwater runoff water quality would not be degraded. To accomplish this, the proposed project’s drainage system would be designed so the postdevelopment runoff would not detrimentally exceed predevelopment runoff rates, durations, and volumes from the study area through proper design and the use of BMPs. Additional requirements of the NDPES Construction General Permit include compliance with postconstruction standards focusing on LID.

Source control BMPs could include conserving natural areas, protecting slopes and channels, and minimizing impervious areas. Treatment control BMPs may include use of vegetated swales and buffers, detention basins, wet ponds, or constructed wetlands, infiltration basins, and other measures. LID technology incorporates site design and stormwater management to maintain the site’s predevelopment runoff rates and volumes. Examples of LID measures include sidewalk storage, vegetated swales, buffers and strips, tree preservation, permeable pavers, and impervious surface reduction and disconnection. Selection and implementation of these measures would occur on a project-by-project basis and would be placed throughout the study area. The specific LID measures would depend on project element size and
stormwater treatment needs. Success criteria and performance standards would be developed and provided to the Central Valley Water Board as part of the Construction General Permit process. UC Davis will be responsible for ensuring the proposed source and treatment control BMPs conform to the requirements.

Implementation of the Construction General Permit post-construction requirements focusing on LID would ensure compliance with the Basin Plan, which specifies water quality objectives and beneficial use requirements. Water quality impacts during project occupancy would be less than significant.

**Groundwater**

The addition of a new septic system could comprise groundwater quality and, ultimately, surface water quality if the septic system was improperly placed, was to leak, or become otherwise compromised. As described under Section 4.12.3, *Regulatory Considerations*, septic system permitting and installation policies enforced by Nevada County Department of Environmental Health would include permit and inspections processes that would include provisions to protect groundwater quality and public health, ensure acceptable long-term operation, evaluate site specific conditions, and utilize proven septic system design standards. These include a thorough investigation of past and present conditions including, but not limited to, all prior soil mantles, soils work, percolation tests, previous proposals, existing wastewater treatment, collection and disposal systems, etc.; all required setback distances; distances from wells on all parcels included in the proposed system; the location of ponds, creeks, springs, cut banks, rock outcroppings, etc.; a contingency plan, which outlines the immediate actions to be taken should a failure occur and an action plan for repairs, expansion or replacement of the system as is appropriate; and operation, maintenance, and monitoring procedures.

A minimum of six percolation test holds and two soil mantles are required in any proposed absorption field and the same in the proposed repair expansion area for the initial design review. Additional soils testing may be required to demonstrate soil consistency throughout the disposal area. Percolation tests shall be performed in a manner as prescribed by the Nevada County Department of Environmental Health Officer. Any alternative percolation test procedure may be utilized only with the written approval of the Nevada County Department of Environmental Health Officer. All mantle excavations must be adequately protected under applicable regulations and backfilled following logging of the soil profile by a registered civil engineer, registered engineering geologist, or registered sanitarian.

A monitoring program will be established individually for each centralized system at the time of permit issuance. The monitoring will be performed to ensure that the centralized wastewater collection, treatment, and disposal system is functioning satisfactorily to protect the public health and safety. The
specific requirements will be based primarily upon recommendations of the design engineer and the Nevada County Department of Environmental Health.

Groundwater quality impacts during project occupancy would be less than significant.

**Mitigation Measure(s):** No mitigation measures are required.

**Impact WQ-8:** Otherwise substantially degrade water quality (Less than Significant)

In addition to urban runoff, one other potential impact on water quality is the discharge of dredged or fill material into waters of the United States that may result from construction of the proposed lake recreation beach and dock area. In addition, the proposed project would include road crossings of minor seasonal streams. These impacts could affect beneficial uses of the wetlands, such as riparian and wildlife habitat. As described under Impact BIO-7 in Section 4.7, *Terrestrial Biological Resources*, the project could result in a maximum amount of wetland fill or alteration of about 0.2 acre. Wetland loss and/or removal without avoidance, minimization, or compensation would constitute a significant impact.

Implementation of Mitigation Measures BIO-6 and BIO-7 would require UC Davis to compensate for loss of wetlands and other waters at a minimum 1:1 ratio, resulting in equal wetlands than currently exist within the study area and benefiting wildlife in the vicinity of the study area. Implementation of Mitigation Measures BIO-6 and BIO-7 would reduce potential water quality impacts on wetlands and other waters to a less-than-significant level.

**Mitigation Measure BIO-6:** Avoid, minimize, and/or compensate for project impacts on riparian habitat

Mitigation Measure BIO-6 is described in Section 4.7, *Terrestrial Biological Resources*.

**Mitigation Measure BIO-7:** Avoid, minimize, and/or compensate for loss of waters and wetlands

Mitigation Measure BIO-6 is described in Section 4.7, *Terrestrial Biological Resources*.

**Significance after Mitigation:** The impact from otherwise substantially degrading water quality would be reduced to a less-than-significant level.
Impact WQ-9: Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map (No Impact)

FIRMs prepared by FEMA were reviewed to identify the locations of 100-year floodplains. The study area does not include FEMA-designated 100-year floodplains. The required drainage study for the project will identify flood prone areas within the study area, and no structures would be located within those areas. Accordingly, there would be no impact.

Mitigation Measure(s): No mitigation measures are required.

Impact WQ-10: Place within a 100-year flood hazard area structures that would impede or redirect floodflows (No Impact)

FIRMs prepared by FEMA were reviewed to identify the locations of 100-year floodplains. The study area does not include FEMA-designated 100-year floodplains. The required drainage study for the proposed project will identify flood prone areas within the study area, and no structures would be located within those areas. Accordingly, there would be no impact.

Mitigation Measure(s): No mitigation measures are required.

Impact WQ-11: Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam (No Impact)

Upstream dam failure and/or levee failure and ensuing inundation does not pose a risk to the study area, because there are no major water bodies upstream of the study area. All larger impoundments in Nevada County are west of the study area, associated with the South Fork Yuba River, the North Fork American River, and their tributaries. Accordingly, there would be no impact.

Mitigation Measure(s): No mitigation measures are required.

Impact WQ-12: Contribute to inundation by seiche, tsunami, or mudflow (Less than Significant)

Seiches are seismically induced waves in bodies of water that can be particularly hazardous where lakes and reservoirs are bordered by campgrounds or other facilities on flat banks. Because of the large number of recreational lakes in Nevada County, seismically induced seiches could prove very damaging. However, most recorded seiches have not been of significant magnitude, and considering the overall low
seismic risk in Nevada County, seiche risk should be considered only a moderate hazard. This impact is considered less than significant.

Mitigation Measure(s): No mitigation measures are required.

4.12.4.5 Cumulative Impacts and Mitigation Measures

Cumulative Impact WQ-1: Contribute to a cumulative effect on surface and groundwater quality and hydrology as a result of the proposed project (Less than Significant)

The cumulative context for evaluation of hydrology and water quality impacts includes the development proposed under the proposed project only. There is no anticipated development in the areas adjacent to the proposed project that has the potential to impact the watershed or the underlying groundwater aquifers. The proposed project would comply with state and federal water quality regulations; therefore, the proposed project’s contribution to any cumulative effect on surface and groundwater quality would not be cumulatively considerable. All long-term project impacts would be reduced to a less-than-significant level through adherence to permit requirements, LID, and BMP installation. Compliance with these existing permit requirements has been determined to adequately address cumulative impacts by the regulating agencies. Cumulative impacts on water quality and hydrology from the proposed project are considered less than significant.

4.12.5 REFERENCES


PERSONAL COMMUNICATIONS

Dulcich, Matt, AICP. Assistant Director of Environmental Planning, Environmental Stewardship and Sustainability. UC Davis. Davis, CA. August 11, 2014—Email exchange with Sara Martin and Jeff Peters of ICF International about water quality characteristics of existing well at the Crystal Lake property and potential area for new proposed well.
SECTION 4.13

LAND USE

4.13.1 INTRODUCTION

This section presents an overview of the land use conditions and policies for the project. Within the impact assessment, the proposed land uses and activities for the project site and along the Crystal Lake Road are assessed for potential conflicts with existing land uses at the project property and adjacent off-site areas. UC Davis is not required to be consistent with the land development policies in the Nevada County General Plan the University of California is constitutionally exempt under Article IX, Section 9 of the California Constitution from local land use regulation including general plans and zoning. The University seeks to cooperate with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible. Accordingly, relevant Nevada County policies are described below.

Information sources used to prepare this section included the University of California CEQA Handbook, the Nevada County General Plan, site visits conducted in 2014 and 2015, and detailed review of scoping comments submitted by the adjacent Snowflower, Inc. Raccoon camp members.

Public and agency comments related to Land Use received in response to the Notice of Preparation are summarized below.

- Concerns that the proposed project would disrupt the use and quality of the Snowflower, Inc. Raccoon camp. Of primary concern were stated concerns regarding noise, dust, traffic, and safety along the Crystal Lake access road.

- Comment letters inquired whether the proposed project would be consistent with Nevada County zoning for the property.

- Comment letters indicated that the proposed increased use of Crystal Lake Road would divide the existing Snowflower, Inc. Raccoon camp active camp activities taking place on the south side of the road from the hiking and open areas north of the road. The concern indicated that the areas north of the road are integral land areas for the land use activities that take place on the south side of the road.

- Comment letters asked that the Draft EIR address all land uses and activities including support activities such as parking areas that would be needed for the proposed project.
4.13.2 ENVIRONMENTAL SETTING

4.13.2.1 Existing Land Uses

The approximately 210-acre Crystal Lake property is located in Nevada County in the Sierra Nevada at an elevation of approximately 6,000 feet above sea level. The property is used for residential uses with the existing lake house available as a short-term vacation rental. The property is approximately 70 miles east of Sacramento and 20 miles west of Truckee and is within 500 feet of the Interstate 80 freeway (Figures 3-1 and 3-2). The mountainous geography of the property and nearby areas consist of steep mountain peaks, heavily forested vegetation, areas of open granite outcroppings, and streams, rivers, and lakes serving to drain and impound water from snow and rainfall. The property is on the west slope of the Sierra Nevada approximately 13 miles from the crest of the mountain range.

Within the 210-acre property, the topography is highly variable with gently sloping areas near the north side of Crystal Lake and steeper slopes near the granite outcroppings on the southeast side of the property. The property is generally bowl shaped with the approximate 12-acre Crystal Lake near the middle of the property receiving runoff from large portions of the property that drain toward the lake. The peripheral portions of the property generally slope away from the property with surface drainage flowing onto adjacent properties. The outfall of Crystal Lake is located at the northeast corner of the lake with the natural streambed blocked by a concrete dam constructed in the 1920’s.

Within the property are two utility corridors for an underground petroleum fuel pipe and a fiber-optic communications line that cross the Sierra Nevada. The fuel pipeline corridor is approximately 20 feet in width and extends east to west across the property approximately 100 feet north of Crystal Lake. The fuel pipeline corridor is carefully managed with extensive signage indicating the presence of an underground pipeline. In addition, the pipeline operator conducts regular inspections and removes vegetation from within the 20 foot corridor. The fiber-optic communications line is a 10-foot wide corridor approximately 50 feet north of the fuel pipeline and is managed similarly to the fuel pipeline.

In addition to the dam and utility corridors, existing development on the project property includes the following:

- **Main House.** The main house was constructed in approximately 1993 as a family vacation home along the northwest shore of Crystal Lake. The house includes approximately 5,500 square feet of interior space, a three car garage, patio area, a small dock extending approximately 35 feet into Crystal Lake, and a lawn and play area of approximately 7,000 square feet.
4.13 Land Use and Planning

- **Caretaker House.** The caretaker house, constructed in approximately 1994, is located north of the main house and includes approximately 1,200 square feet of interior space, a garage, and small service yard for equipment repair and storage.

- **Pump House.** The pump house, constructed in approximately 1993, is located between the main house and the caretaker house. The pump house sits next to the underground well and is approximately 180 square feet with interior space for the water well equipment and an emergency generator. The existing well is approximately 950 feet deep and provides approximately 8-12 gallons per minute. Propane tanks adjacent to the pump house provide approximately 4,000 gallons of storage for propane to serve the main house and the caretaker house and the emergency generator.

- **Roads.** The Crystal Lake property has a primary gravel road that extends from the west side of the property toward the caretaker house and then follows the north shore of Crystal Lake toward the Crystal Lake dam. The road then extends to the east boundary of the property and ends at the right-of-way for the Union Pacific Railroad. Along the north shore of the property and extending further north are additional dirt roads that range in condition from well graded roadways to minimally constructed logging roads that served prior logging efforts on the property.

- **Tennis Court.** In approximately 1994, a concrete tennis court was constructed north of Crystal Lake. This recreational facility is approximately 6,500 square feet with metal fencing surrounding the court.

Prior logging in the northern portions of the property at Crystal Lake last took place in approximately 1994 with selective removal of higher value timber and very little effort to remove lower value trees or the waste branches and smaller trees that were felled during the logging operation. Many parts of the property currently have a high amount of dense vegetation growth that resulted from saplings and younger trees being able to survive the prior logging effort. Portions of the property are densely vegetated with no evidence of recent fires that would have reduced understory vegetation density.

4.13.2.2 Surrounding Land Uses

The land uses surrounding the property include United States Forest Service (USFS) land to the west and north. East of the property is the railroad corridor operated by the Union Pacific Railroad and further east of the rail corridor is privately owned land with no structures and infrequent use between the railroad and Interstate 80. The south boundary of the property includes ownership by the USFS and ownership by a private corporation using the land for recreational camping activities. The surrounding
USFS lands (to west, north, and south) are heavily forested and contain no structures. The USFS land south of the property includes a dirt road that leads to Kelly Lake. A privately-owned campground to the south of the property (Snowflower, Inc. Raccoon camp) contains access roads to the camping facilities, structures for restrooms, and improved camp site amenities (picnic tables, electricity, and water supply).

Within the general vicinity of the property, the Interstate 80 and the Union Pacific Railroad represent the most intense nearby human activity with Interstate 80 providing a four-lane (two lanes in each direction), high-speed crossing of the Sierra Nevada providing both regional transportation between the Lake Tahoe area and the western portion of California and as an interstate connection between California and destinations to the east. Similarly, the railroad serves as a primary rail line for east-west rail traffic between California and destinations to the east for cargo and passenger trains with approximately 22 trains per day. While the freeway and railroad serve as intensively used transportation corridors in close proximity to the proposed project, these corridors do not include substantial stops, commercial services, or visitor amenities near the project area. From the railroad and the freeway, the elevated gradient and existing vegetation mostly obscure views of the project property. The areas proposed for new facilities within the project property are not visible from the railroad or freeway.

In terms of land uses and activities the land surrounding the project property is predominantly characterized as rural forested areas with large parcels of forest land interspersed by land used for camping, institutional lodge and camp areas, and occasional rural residential areas with single residences on large parcels or small clusters of single dwellings on small parcels. Many residences in these areas are used as vacation homes. Topography in the surrounding area is very rugged with steep mountain peaks, deep canyons, and areas of exposed granite outcroppings.

### 4.13.2.2 Proposed Land Uses

The UC Davis Cal Aggie Alumni Association proposes to construct and operate an alumni family camp/environmental education center and conference center on the 210-acre Crystal Lake property south of Interstate 80 southwest of the Eagle Lakes freeway exit (Figures 3-2 and 3-3). The camp and education center would serve a population of up to 350 campers with 70 staff (Figure 3-4 and 3-5). These figures and the project description provided in Section 3.0 provide the development plan and anticipated land use of the proposed project and are the subject of the impact analysis provided below. The conference center would serve as an event venue for professional social gatherings for up to 50 people for a total population of approximately 470 people during a peak period. The camp area would consist of
approximately 25 acres along the north shore of Crystal Lake. The event center would consist of approximately 4 acres near the existing lake house at the northwest shore of Crystal Lake. The remainder of the property would remain undeveloped with access available for the guests of the alumni camp or the event center.

4.13.3 REGULATORY CONSIDERATIONS

4.13.3.1 University of California

The University of California owns the property and has land use control over the property. The University acquired the property in 2014 and has not previously adopted a land management or land development plan for the property. This CEQA environmental review considers the land development and operations proposed for the property. If approved, the development described in this CEQA review would be the allowed use of the property with revisions to the allowed uses subject to future CEQA review and consideration.

4.13.3.2 Nevada County

The University is not subject to municipal policies such as the Nevada County General Plan or zoning requirements. Nevertheless, such policies are of interest or concern to the University. The University has a tradition of working cooperatively with the local community, and it is University practice to seek consistency with local plans and policies, where feasible and understandable the planning context for nearby properties. Therefore, it is appropriate to present a summary of these policies in this EIR. The following information was obtained from the Nevada County General Plan which was adopted in 1996 and has been updated through 2014. In the Nevada County General Plan, the four central themes articulated for developing Nevada County are:

1. Fostering a rural quality of life;
2. Sustaining a quality environment;
3. Development of a strong diversified, sustainable local economy; and
4. Planned land use patterns will determine the level of public services appropriate to the character, economy and environment of each region.

The Nevada County General Plan land use designation for the property is Forest 160. The Forest 160 general plan land use designation is intended “to provide for production and management (including timber harvesting and related operations) of timber resources, and compatible recreational and low density residential uses. Within the Forest designation, the minimum parcel size should be 40+ acres, in
4.13 Land Use and Planning

order to provide for preservation of the timber resource and protection of resource management needs and opportunities” (Nevada County 1996).

Within the Forest element of the Nevada County General Plan, Objective 15.2 states the general plan objective for Forest lands is to:

**Promote and Provide for the continued diversity and sustainability of the forest resources including timber, watersheds, wildlife habitat, aesthetics, and recreation** (Nevada County General Plan, page 15-2).

To assist with implementation of Objective 15.2, General Plan Policy 15.6 states that the action policy is to

**Recognize the need and importance in the Forest land use designation of managing forest products, and of managing natural resources to enhance outdoor recreation. Recognize the importance for providing for an efficient and cost effective means of harvesting and using forest lands. Recognize that the forested areas have a need for certain commercial support uses which should be allowed in a manner which is consistent with the forest use and outdoor recreation areas. Uses which are consistent in the Forest land use designation may include: a. the processing of forest products and natural resources; b. campgrounds; and c. outdoor recreation activities.**

(Nevada County General Plan, page 15-3).

The Nevada County zoning for the property is **Forest-160.** Allowed uses in the **Forest** zoning district include residential, employee housing, home businesses, agricultural uses, crop and tree farming, wineries, and recreational trails. With submittal, review, and approval of a Nevada County Use Permit, additional uses that can be permitted by Nevada County in the Forest zoning district include, among other uses, recreational camp and camping facilities such as the development proposed for the Crystal Lake project site. The Nevada County Zoning rural district site development standards in addition to the specific zoning provisions for “Camp, Low Intensity” and “Campgrounds, Low Intensity” that would be considered as part of a proposed Use Permit review process. Details for the basic requirements of “Camp, Low Intensity” and “Campgrounds, Low Intensity” are provided below in **Table 4.13-1.**

Although University property is not subject to Nevada County zoning, the process of a Nevada County Use permit and CEQA review would be similar to the land development process undertaken by the University to consider the appropriateness of a camp facility at the Crystal Lake property. For a Nevada County Use Permit, a landowner would need to submit a site-specific development plan with expected population and facilities needed to support the development. Upon review of the proposed plan and the environmental impacts of the proposed plan, Nevada County could consider approving the proposal or approving the proposal with adopted mitigation measures. Similarly, for the proposed project, the
University process is evaluating a site-specific development plan and completing CEQA review of the proposed project. Both processes include public and agency review and input and the University can consider approving the plan with adopted mitigation measures to reduce identified impacts of the proposed project. As with a Use Permit, the development activities at the property would be subject to the terms and conditions identified in the approved project.
4.13 Land Use and Planning

Table 4.13-1
Nevada County Land Use Details for Campgrounds and Camps, Low-Intensity

A. **Purpose.** To allow for recreational campgrounds and camps of a less intensive nature within rural and forested areas of the County. In general, such uses will provide for more open space, have less need for infrastructure, generate less traffic, and have less on-site development than uses allowed within the REC or CH Districts.

B. **Definitions.**

1. **Campgrounds, Low-Intensity** - Facilities to accommodate tent camping parties that do not exceed an overall density of 4 tent sites per acre, and excluding recreational vehicles, for a period of less than 30 days.

2. **Camps, Low-Intensity** - Facilities providing for a sustained experience through various social, recreational, educational, and/or religious opportunities in a group setting that do not exceed an overall density of 4 campers per acre, for a period of less than 30 consecutive days. They normally include trained leadership, organized programs, and the resources of the natural surroundings to provide for this experience. Individual facilities may include cabins, tent sites, sleeping platforms, group eating and meeting facilities, lodges, various indoor and outdoor recreational facilities, and similar facilities, but shall exclude recreational vehicles.

C. **Standards.** Such facilities are allowed subject to approval of a Use Permit based on the following standards:

1. Ensure consistency with the purpose of the base and combining districts in which they are located.

2. Ensure compatibility with the existing and future surrounding rural and forest uses.

3. Ensure compatibility between such facilities and surrounding property owners and the neighborhood by providing for not less than a 100-foot non-disturbance buffer around the entire parcel, excluding access and fuel modification to ensure wild land fire safety. Said buffer shall remain in its natural state or a low-intensity open space or recreation use (i.e., pasture, tree farm, hiking trails, etc.). This standard may be revised where the Planning Agency determines that the same practical effect is met through the use of vegetation, fences, walls, or other provisions to ensure minimizing impacts to surrounding property owners and the neighborhood.

4. Require the approval of a safe and rapid evacuation plan as a condition of approval of the Use Permit.

5. Ensure that the proposed density will not adversely affect the quality and quantity of the water supply for the neighboring properties.

6. Parking shall be provided for low-intensity campgrounds at a ratio of one parking space per each 4 people per camp.

7. The project shall provide direct access to a publicly-maintained road. If the property does not have direct access to a publicly-maintained road, the applicant shall be required to form a new or join an existing road maintenance district (i.e., permanent road division, county service area, community service district).

If the Planning Agency determines that use of a road maintenance district is not feasible, the applicant shall join, form, or demonstrate that he/she is part of a road maintenance agreement. If a homeowner’s association maintains the private roads, participation in a road maintenance association must be included as part of the use permit application and a letter of acknowledgement from the association must accompany the application.

Source: Nevada County Land Use and Development Code, Section L-II, 3.6
4.13.4 IMPACTS AND MITIGATION MEASURES

4.13.4.1 Significance Criteria

The impacts from the implementation of the proposed project related to land use and planning would be considered significant if they would exceed the following Standards of Significance, in accordance with Appendix G of the State CEQA Guidelines and the UC CEQA Handbook:

- Physically divide an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating and environmental effect.
- Conflict with existing and future adjacent land uses.
- Conflict with any applicable habitat conservation program or natural community conservation plan.

4.13.4.3 Methodology

The analysis in this section focuses on the compatibility of the proposed project with existing and planned land uses within and near the site. The project area consists of the lands comprising the Crystal Lake project site and the surrounding land uses. In addition, the project area includes the Crystal Lake road and land adjacent to the road. In addition to site visits conducted in 2014 and 2015 to determine existing conditions and existing adjacencies, the project description (Section 3.0), scoping comments, and land use planning documents were reviewed to prepare this section.

4.13.4.4 Project Impacts and Mitigation Measures

Impact LU-1: Physically divide an established community (Significant; Significant and Unavoidable)

The on-site proposed development of new facilities and camp operations would take place within the Crystal Lake property and these development activities would not divide an existing community. The off-site road improvements to Crystal Lake Road and resulting increased traffic along Crystal Lake Road would change the operational character of the road through the introduction of increased traffic volumes near the Snowflower, Inc. Raccon camp located south of Crystal Lake Road. The Snowflower, Inc. Raccon camp members currently use the land north of Crystal Lake Road for recreational activities such
as walking and for children playing in this unused land area. The maximum increased traffic from the proposed project is expected on summer Saturday and Sunday afternoons coinciding with on-going peak occupancy and activities at the Snowflower, Inc. Raccoon camp. The increased road traffic could discourage Snowflower, Inc. Raccoon members from the crossing the road, effectively dividing the existing camp area south of the road from the open area north of the road.

The severity of this impact is difficult to quantify and assess in terms of impact significance. In the scoping comment letters received from Snowflower, Inc. Raccoon camp members, detailed information was provided indicating that the north areas used by camp members are considered integral to the activity and enjoyment of the actual campsites located south of the road. The south camp area includes a high density of camp sites with few open areas available for walking, hiking or other recreation. The existing condition of the road with very low traffic volumes provides opportunities for families to allow minimally supervised children to play throughout the south camp areas and on the open areas to the north of Crystal Lake Road. Accordingly, a reasonable conclusion can be made that the north area is important for the established community of campers to the integrity of the existing land use, particularly for children staying at the Snowflower, Inc. Raccoon camp. The increased traffic proposed for the Crystal Lake access road would, for certain users, divide the north area from the south area. While the proposed project includes construction of a four-way stop sign and crosswalk at the intersection of Crystal Lake Road and the Snowflower, Inc. Raccoon driveway, the impact would still occur because the new traffic volumes would disrupt the nearly integrated use of the south and north areas for camp enjoyment. This impact can be considered as a land use impact that would divide an established community. The impact would be significant.

**Mitigation Measure LU-1:** With approval of the landowner, UC Davis or the Cal Aggie Alumni Association would purchase the approximately 10-acre Snowflower, Inc. Raccoon Camp. The Snowflower, Inc. organization could then move from the site to use existing sites at other camp areas or could develop new camp sites. None of the potential relocation sites would be within 300 feet of the Crystal Lake Road.

**Significance after Mitigation:** If implemented, the impact from LU-1 would be reduced to a less-than-significant level because the north and south areas used by Snowflower, Inc. Raccoon members would no longer be utilized. If not implemented, the impact from LU-1 would be significant and unavoidable because the Snowflower, Inc. Raccoon south camp sites would be divided from the open area north of Crystal Lake Road.

**Impact LU-2:** Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general
plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating and environmental effect. (Significant; Less than Significant)

The University of California is the applicable land use authority for the property in terms of local land development approval. The Nevada County planning and zoning requirements are not applicable to the property. However, these items are discussed above in Section 4.13.3.2 to provide background information regarding Nevada County planning.

For the proposed project, the University will comply with all applicable State of California forestry requirements. Certain vegetation management activities may require review, permitting, and approval by the State of California to comply with the California Forestry Practices Act. The project proposes to develop land on an area zoned for Forest uses and the proposed development would convert land from timber production uses. Additional details regarding impacts to forestry and consistency with the California Forestry Practices Act are provided in Section 4.4 Agricultural and Forestry Resources. Specific items such as a timber harvest plan, timber conversion plan may be filed by a registered professional forester in accordance with the requirements of CalFire. The proposed conversion of timber land would conflict with the state definition of timberland. The impact would be significant.

Mitigation Measure LU-2: Prior to proceeding with the project, implement mitigation AG-1 (Comply with timber harvest and timber conversion requirements of CalFire to eliminate the conflict with an adopted regulation).

Significance after Mitigation: The impact from LU-2 would be reduced to a less-than-significant level.

Impact LU-3: Conflict with existing and future adjacent land uses (Significant; Significant and Unavoidable)

The existing and future land uses adjacent to the project include the railroad, US Forest Service land, and the Snowflower, Inc. Raccoon camp. The proposed project would largely include recreational activities on the project site and would not conflict with the on-going railroad operations and would not conflict with on-going management of the US Forest Service land uses.

The proposed development and activities at the Crystal Lake property would be a camp and campground recreational use. The adjacent Snowflower, Inc. Raccoon camp is also a recreational camp use. All of the development for the proposed for the project would take place at a distance from the property line exceeding the 100 foot non-disturbance buffer used as the Nevada County standard for maintaining land use compatibility (as shown in item 3,C of Table 4.13-1). The University of California
4.13 Land Use and Planning

does not have an adopted setback or buffer area between a property line and camp facilities. In the absence of an adopted standard, the project-specific site plan and topographical conditions at the project site were reviewed to consider potential impacts to adjacent land. For most areas, the proposed project would include a 600 to 800 foot non-disturbance buffer between the property line and the development proposed within the camp area. This distance far exceeds the distance needed to provide a reasonable separation between the proposed uses and potential adjacent land uses. No impacts are expected to result from the uses proposed within the Crystal Lake property.

The proposed project would change the utilization of the Crystal Lake road from that of a privately used road with very little traffic to a more heavily used public road. Details related to impacts of road noise and road dust are provided in **Sections 4.5 (Air Quality)** and **4.15 (Noise)**. With regard to land use compatibility between the existing Snowflower, Inc. Raccoon camp and the Crystal Lake road, the proposed project would create a land use conflict. The existing Snowflower, Inc. Raccoon camp does not include a substantial non-disturbance buffer between the road and the existing camp sites. Land use planning efforts would typically apply a sufficient setback distance between a sensitive land use such as camping area and a public road. Within Nevada County, this standard is 100 feet. In addition to the potential noise and air quality impacts, the use of the road could be considered a new land use that would conflict with the existing camp use located immediately south (within 25 feet) of the Crystal Lake road. For these reasons, the proposed use of the road could conflict with the existing Snowflower, Inc. Raccoon camp use. This impact would be significant.

**Mitigation Measure LU-3:** Implement mitigation LU-1 (Purchase adjacent property to eliminate land use impacts on nearby campers.)

**Significance after Mitigation:** If mitigation LU-1 is implemented, the impact from impact LU-3 would be reduced to a less-than-significant level. If mitigation LU-1 is not implemented, the impact from impact LU-3 would be significant and unavoidable.

**Impact LU-4:** Conflict with any applicable habitat conservation program or natural community conservation plan (No impact)

No habitation conservation program or natural community conservation plan is applicable to the project property. No impact would occur.

**Mitigation Measure(s):** No mitigation measures are required.
4.13.4.5 Cumulative Impacts and Mitigation Measures

Cumulative Impact LAN-1: The proposed project, together with other regional growth and planning efforts, would not result in development that would conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project. *(Less than Significant)*

It is anticipated that development of future off-site projects in the vicinity of the project site would be reviewed for consistency with land use plans and policies in the Nevada County General Plan or the USFS Tahoe Forest Plan. Therefore, it is reasonable to assume that future development would be consistent with applicable plans or polices, which would result in a less than significant cumulative land use impact.

**Mitigation Measure(s):** No mitigation measures are required.

4.13.5 REFERENCES


SECTION 4.14

MINERAL RESOURCES

4.14.1 INTRODUCTION

This section presents existing mineral resources at the project site and analyzes the potential for implementation of the proposed project to affect those resources. Information and analysis presented in this section is based on site visits and the geology description provided in Section 4.14 of this EIR.

No public and agency comments related to mineral resources were received in response to the Notice of Preparation.

4.14.2 ENVIRONMENTAL SETTING

4.14.2.1 Study Area

The study area includes the proposed project site. The Crystal Lake property consists of areas of exposed granite with little vegetation, one major lake, and a large forested area generally north of Crystal Lake. Through the site investigations for this EIR conducted in 2014 and 2015, the biological surveys (Section 4.7), cultural resources surveys (Section 4.8), and aesthetic conditions property evaluations (Section 4.3), observed no signs of prior mining or mineral resource recovery were observed. The property includes no signs of prior mining activities and no indications of aggregate recovering or crushing operations.

4.14.2.2 Mineral Land Classification

The Mineral Land Classification of Nevada County, California prepared by the California Department of Conservation, Division of Mines and Geology (CDMG) in 1990 to identify potential mineral resources in Nevada County and presents those findings for metallic and industrial resources, aggregate resources, and life expectancy/sustainability of aggregate resources (CDOC 1990). Updated information regarding aggregate resources was presented in 2012 on the summary map Aggregate Sustainability in California published by the California Geological Survey (CDOC 2012). The 2012 update summarized that Nevada County has an identified 11-20 year supply of aggregate materials available for construction projects.
4.14.3 REGULATORY CONSIDERATIONS

4.14.3.1 State of California

The primary State law concerning conservation and development of mineral resources is the California Surface Mining and Reclamation Act (SMARA) of 1975, as amended. The SMARA is found in the California Public Resources Code (PRC), Division 2, Chapter 9, Section 2710, et. seq. The SMARA was enacted in 1975 to limit new development in areas with significant mineral deposits and to prevent or minimize the negative impacts of surface mining to public health, property, and the environment. In addition, the SMARA calls for the State Geologist to classify the lands within California based on mineral resource availability. Headings and corresponding text will vary with environmental topic. Present federal, state, and local laws and regulations in that order.

4.14.3.1 University of California

The University of California has no regulations related to land management of mineral resources and no local regulations regarding mineral resources apply to the proposed project. The University considers local planning efforts in relation to land management and development activities. For purposes of evaluating the project site and proposed development activities, the Nevada County General Plan was reviewed to understand the local context for issues related to mineral resources. The Nevada County General Plan includes a Mineral Resources element and identifies that certain areas of Nevada County have previously included substantial gold and silver mining with additional areas serving as sand and gravel mine locations. The Nevada County General Plan does not identify the project site as having mineral resources or as having a locally important mineral resource recovery site.

4.14.4 IMPACTS AND MITIGATION MEASURES

4.14.4.1 Significance Criteria

The significance criteria listed below are derived from Appendix G of the State CEQA Guidelines. For the purpose of this EIR, Mineral Resources impacts would be significant if implementation of the proposed project would:

- 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

- Result in 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.
4.14.4.3 Methodology

The analysis in this section uses information obtained from the sources listed in the introduction of this chapter and compares the existing mineral resources and the effects of the proposed project on the resources. Conclusions are drawn using the significance criteria listed above and, if applicable, mitigation measures are prescribed.

4.14.4.4 Project Impacts and Mitigation Measures

Impact MIN-1: 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 (Less than Significant)

The proposed project does not include known mineral resources that would be of value to the region or to the residents of the State. Marginal areas of sand, gravel, or cobble recovery may exist on the project site but the quantities potentially available but previously undocumented and the amount that could be potentially lost through the land development actions covering approximately 25 acres of the proposed project site would not represent a quantity that could be of regional value. The impact would be less than significant.

Mitigation Measure(s): No mitigation measures are required.

Impact MIN-2: Result in 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. (Less than Significant)

The Nevada County General Plan does not identify the project site as having mineral resources or as having a locally important mineral resource recovery site. The project would not result in the loss of a locally important mineral resource recovery site. No impact would occur.

Mitigation Measure(s): No mitigation measures are required.
4.14.4.5 Cumulative Impacts and Mitigation Measures

Cumulative Impact MIN-1  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 (Level of Significance)

The proposed project is not expected to result in a significant loss of availability of a known mineral resource. No other development projects are proposed in the region that are expected to result in a loss of known mineral resources. The impact would be less than significant.

Mitigation Measure(s): No mitigation measures are required.

4.14.5 REFERENCES


Nevada County General Plan. 1996.
SECTION 4.15

NOISE

4.15.1 INTRODUCTION

This section describes the environmental and regulatory setting for noise in the study area. It also describes the noise impacts, if any, that would result from implementation of the proposed project. Where significant impacts are identified, mitigation measures are identified if feasible.

Issues identified in response to the Notice of Preparation (NOP) (Appendix 1.0) were considered in preparing this analysis. The NOP comments pertaining to noise include construction and operational noise from the proposed project. These comments are summarized below.

- Concern over traffic noise from increased visitors, vendors, and construction traffic.
- Concern regarding noise from recreational activities, such as amplified music at the proposed amphitheater.
- Construction equipment noise concerns in relation to enjoyment of existing camp areas near the south side of the project property.

The key sources of data and information used in the preparation of this section are listed below.

- Nevada County Code, Land Use and Development Code, Title 17, Section L-II 4.1.7, Noise (2012)
- Nevada County General Plan Noise Element (July 2014).

4.15.2 FUNDAMENTALS OF ENVIRONMENTAL NOISE AND VIBRATION

Overview of Noise and Sound

Noise is commonly defined as unwanted sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise is an environmental pollutant that can interfere with human activities, an evaluation of noise is necessary when considering the environmental impacts of a proposed project.

Sound is mechanical energy (vibration) transmitted by pressure waves over a medium such as air or water. Sound is characterized by various parameters, including the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor for characterizing the loudness of an ambient (existing) sound level. Although the decibel (dB) scale, a logarithmic scale, is used to quantify sound
intensity, it does not accurately describe how sound intensity is perceived by human hearing. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called *A-weighting*, written as dBA and referred to as *A-weighted decibels*. **Table 4.15-1** defines sound measurements and other terminology used in this chapter, and **Table 4.15-2** summarizes typical A-weighted sound levels for different noise sources.

In general, human sound perception is such that a change in sound level of 1 dB cannot typically be perceived by the human ear, a change of 3 dB is barely noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level as it increases or decreases, respectively.

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level (L_{eq}), the minimum and maximum sound levels (L_{min} and L_{max}), percentile-exceeded sound levels (such as L_{10}, L_{20}), the day-night sound level (L_{dn}), and the community noise equivalent level (CNEL). L_{dn} and CNEL values differ by less than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such. These measurements are defined in **Table 4.15-1**.

For a point source, such as a stationary compressor or a piece of construction equipment, sound attenuates (lessens in intensity), based on geometry, at a rate of 6 dB per doubling of distance. For a line source, such as free flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance (Caltrans 2013a). Atmospheric conditions, including wind, temperature gradients, and humidity, can change how sound propagates over distance and can affect the level of sound received at a given location.
### Table 4.15-1
#### Definition of Sound Measurements

<table>
<thead>
<tr>
<th>Sound Measurements</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decibel (dB)</td>
<td>A unitless measure of sound on a logarithmic scale that indicates the squared ratio of sound pressure amplitude with respect to a reference sound pressure amplitude. The reference pressure is 20 micropascals.</td>
</tr>
<tr>
<td>A-Weighted Decibel (dBA)</td>
<td>An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.</td>
</tr>
<tr>
<td>C-Weighted Decibel (dBC)</td>
<td>The sound pressure level in decibels as measured using the C-weighting filter network. The C-weighting is very close to an unweighted or flat response. C-weighting is used only in special cases (i.e., when low-frequency noise is of particular importance). A comparison of measured A- and C-weighted level gives an indication of low-frequency content.</td>
</tr>
<tr>
<td>Maximum Sound Level ($L_{\text{max}}$)</td>
<td>The maximum sound level measured during the measurement period.</td>
</tr>
<tr>
<td>Minimum Sound Level ($L_{\text{min}}$)</td>
<td>The minimum sound level measured during the measurement period.</td>
</tr>
<tr>
<td>Equivalent Sound Level ($L_{\text{eq}}$)</td>
<td>The equivalent steady-state sound level that in a stated period of time would contain the same acoustical energy.</td>
</tr>
<tr>
<td>Percentile-Exceeded Sound Level ($L_{\text{xx}}$)</td>
<td>The sound level exceeded xx% of a specific time period. $L_{10}$ is the sound level exceeded 10% of the time, and $L_{90}$ is the sound level exceeded 90% of the time. $L_{90}$ is often considered to be representative of the background noise level in a given area.</td>
</tr>
<tr>
<td>Day-Night Level ($L_{\text{dn}}$)</td>
<td>The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10 p.m. to 7 a.m.</td>
</tr>
<tr>
<td>Community Noise Equivalent Level (CNEL)</td>
<td>The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added to the A-weighted sound levels occurring during the period from 7 p.m. to 10 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10 p.m. to 7 a.m.</td>
</tr>
<tr>
<td>Vibration Velocity Level (or Vibration Decibel Level, VdB)</td>
<td>The root-mean-square velocity amplitude for measured ground motion expressed in dB.</td>
</tr>
<tr>
<td>Peak Particle Velocity (Peak Velocity or PPV)</td>
<td>A measurement of ground vibration, defined as the maximum speed (measured in inches per second) at which a particle in the ground is moving relative to its inactive state. PPV is usually expressed in inches/second.</td>
</tr>
<tr>
<td>Frequency: Hertz (Hz)</td>
<td>The number of complete pressure fluctuations per second above and below atmospheric pressure.</td>
</tr>
</tbody>
</table>
Table 4.15-2.
Typical A-Weighted Sound Levels

<table>
<thead>
<tr>
<th>Common Outdoor Activities</th>
<th>Noise Level (dBA)</th>
<th>Common Indoor Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jet flyover at 1,000 feet</td>
<td>−110</td>
<td>Rock band</td>
</tr>
<tr>
<td>Gas lawnmower at 3 feet</td>
<td>−100</td>
<td></td>
</tr>
<tr>
<td>Diesel truck at 50 feet at 50 mph</td>
<td>−90</td>
<td></td>
</tr>
<tr>
<td>Noisy urban area, daytime</td>
<td>−80</td>
<td></td>
</tr>
<tr>
<td>Gas lawnmower at 100 feet</td>
<td>−70</td>
<td></td>
</tr>
<tr>
<td>Commercial area</td>
<td>−60</td>
<td></td>
</tr>
<tr>
<td>Heavy traffic at 300 feet</td>
<td>−50</td>
<td></td>
</tr>
<tr>
<td>Quiet urban nighttime</td>
<td>−40</td>
<td></td>
</tr>
<tr>
<td>Quiet suburban nighttime</td>
<td>−30</td>
<td></td>
</tr>
<tr>
<td>Quiet rural nighttime</td>
<td>−20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>−10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>−0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Caltrans 2013a.

The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface such as grass attenuates at a greater rate than sound that travels over a hard surface such as pavement. The increased attenuation is typically in the range of 1 to 2 dB per doubling of distance. Barriers such as buildings or topographic features that block the line of sight between a source and receiver also increase the attenuation of sound over distance.

Community noise environments are generally perceived as quiet when the 24-hour average noise level is below 45 dBA, moderate when in the 45 to 60 dBA range, and loud when above 60 dBA. Very noisy urban residential areas are usually around 70 dBA CNEL. Along major thoroughfares, roadside noise levels are
typically between 65 and 75 dBA CNEL. Incremental changes of 3 to 5 dB in the existing 1-hour Leq, or the CNEL, are commonly used as thresholds for an adverse community reaction to a noise increase. However, there is evidence that incremental thresholds in this range may not be sufficiently protective in areas where noise-sensitive uses are located and CNEL is already high (i.e., above 60 dBA). In these areas, limiting noise increases to 3 dB or less is recommended (FTA 2006). Noise intrusions that cause short-term interior noise levels to rise above 45 dBA at night can disrupt sleep. Exposure to noise levels greater than 85 dBA for 8 hours or longer can cause permanent hearing damage.

**Overview of Groundborne Vibration**

Operation of heavy construction equipment, particularly pile-driving equipment and other impact devices (e.g., pavement breakers), create seismic waves that radiate along the surface of and downward into the ground. These surface waves can be felt as ground vibration. Vibration from the operation of this type of equipment can result in effects that range from annoyance for people to damage for structures. Variations in geology and distance result in different vibration levels, including different frequencies and displacements. In all cases, vibration amplitudes decrease with increased distance.

Perceptible groundborne vibration is generally limited to areas within a few hundred feet of construction activities. As seismic waves travel outward from a vibration source, they cause rock and soil particles to oscillate. The actual distance that these particles move is usually only a few ten-thousandths to a few thousandths of an inch. The rate or velocity (in inches per second) at which these particles move is the commonly accepted descriptor of vibration amplitude, referred to as peak particle velocity (PPV).

Vibration amplitude attenuates over distance. This is a complex function of how energy is imparted into the ground and the soil or rock conditions through which the vibration is traveling. The following equation is used to estimate the vibration level at a given distance for typical soil conditions (FTA 2006). PPV_{ref} is the reference PPV at 25 feet (Table 4.15-3).

\[
PPV = PPV_{ref} \times (25/\text{Distance})^{1.5}
\]

**Table 4.15-3** summarizes typical vibration levels generated by construction equipment (FTA 2006) at the reference distance of 25 feet and other distances, as determined with use of the attenuation equation above.
Table 4.15-3.
Vibration Source Levels for Construction Equipment

<table>
<thead>
<tr>
<th>Equipment</th>
<th>PPV at 25 Feet</th>
<th>PPV at 50 Feet</th>
<th>PPV at 75 Feet</th>
<th>PPV at 100 Feet</th>
<th>PPV at 175 Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pile driver (sonic/vibratory)</td>
<td>0.734</td>
<td>0.2595</td>
<td>0.1413</td>
<td>0.0918</td>
<td>0.0396</td>
</tr>
<tr>
<td>Hoe ram</td>
<td>0.089</td>
<td>0.0315</td>
<td>0.0171</td>
<td>0.0111</td>
<td>0.0048</td>
</tr>
<tr>
<td>Large bulldozer</td>
<td>0.089</td>
<td>0.0315</td>
<td>0.0171</td>
<td>0.0111</td>
<td>0.0048</td>
</tr>
<tr>
<td>Loaded trucks</td>
<td>0.076</td>
<td>0.0269</td>
<td>0.0146</td>
<td>0.0095</td>
<td>0.0041</td>
</tr>
<tr>
<td>Jackhammer</td>
<td>0.035</td>
<td>0.0124</td>
<td>0.0067</td>
<td>0.0044</td>
<td>0.0019</td>
</tr>
<tr>
<td>Small bulldozer</td>
<td>0.003</td>
<td>0.0011</td>
<td>0.0006</td>
<td>0.0004</td>
<td>0.0002</td>
</tr>
</tbody>
</table>

Source: FTA 2006.
PPV = peak particle velocity

Tables 4.15-4 and 4.15-5 summarize the guidelines developed by the California Department of Transportation (Caltrans) for damage and annoyance potential from the transient and continuous vibration that is usually associated with construction activity. The activities that are typical of continuous vibration include the use of excavation equipment, static compaction equipment, tracked vehicles, vehicles on a highway, vibratory pile drivers, pile-extraction equipment, and vibratory compaction equipment. The activities that are typical of single-impact (transient) or low-rate, repeated impact vibration include drop balls, blasting, and the use of impact pile drivers, “pogo stick” compactors, and crack-and-seat equipment (Caltrans 2004).

Table 4.15-4.
Vibration Damage Potential Threshold Criteria Guidelines

<table>
<thead>
<tr>
<th>Structure and Condition</th>
<th>Maximum PPV (in/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Transient Sources</td>
</tr>
<tr>
<td>Extremely fragile historic buildings, ruins, ancient monuments</td>
<td>0.12</td>
</tr>
<tr>
<td>Fragile buildings</td>
<td>0.2</td>
</tr>
<tr>
<td>Historic and some old buildings</td>
<td>0.5</td>
</tr>
<tr>
<td>Older residential structures</td>
<td>0.5</td>
</tr>
<tr>
<td>New residential structures</td>
<td>1.0</td>
</tr>
<tr>
<td>Modern industrial/commercial buildings</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Source: Caltrans 2004.
Note: Transient sources create a single, isolated vibration event (e.g., blasting or drop balls). Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. PPV = peak particle velocity
Table 4.15-5.
Vibration Annoyance Potential Criteria Guidelines

<table>
<thead>
<tr>
<th>Structure and Condition</th>
<th>Maximum PPV (in/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Transient Sources</td>
</tr>
<tr>
<td>Barely perceptible</td>
<td>0.04</td>
</tr>
<tr>
<td>Distinctly perceptible</td>
<td>0.25</td>
</tr>
<tr>
<td>Strongly perceptible</td>
<td>0.9</td>
</tr>
<tr>
<td>Severe</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Source: Caltrans 2013b.

Note: Transient sources create a single, isolated vibration event (e.g., blasting or drop balls). Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. PPV = peak particle velocity.

Groundborne vibration can also be quantified by the root-mean-square (RMS) velocity amplitudes, which is useful for assessing human annoyance as a result of noise. The RMS amplitude is expressed in terms of the velocity level in decibel units (VdB). The background vibration velocity level in residential areas is usually around 50 VdB or lower. The vibration velocity level threshold of perception for humans is approximately 65 VdB. Most perceptible indoor vibration is caused by sources within buildings, such as the operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are heavy construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration from traffic is rarely perceptible.

Table 4.15-6 summarizes the typical groundborne vibration velocity levels and average human response to vibration that may be anticipated when a person is at rest in quiet surroundings. If the person is engaged in any type of physical activity, vibration tolerance increases considerably. The duration of the event has an effect on human response, as does its daily frequency of occurrence. Generally, as the duration and frequency of occurrences increase, the potential for adverse human response increases.
Table 4.15-6.
Typical Levels of Groundborne Vibration

<table>
<thead>
<tr>
<th>Human or Structural Response</th>
<th>Vibration Velocity Level (VdB)</th>
<th>Typical Sources (50 feet from source)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold for minor cosmetic damage to fragile buildings</td>
<td>100</td>
<td>Blasting from construction project</td>
</tr>
<tr>
<td>Difficulty in reading computer screen</td>
<td>90</td>
<td>Bulldozer or heavy-tracked construction equipment</td>
</tr>
<tr>
<td>Threshold for residential annoyance for occasional events (e.g., commuter rail)</td>
<td>80</td>
<td>Upper range of commuter rail</td>
</tr>
<tr>
<td>Threshold for residential annoyance for frequent events (e.g., rapid transit)</td>
<td>70</td>
<td>Upper range of rapid transit</td>
</tr>
<tr>
<td>Approximate threshold for human perception of vibration; limit for vibration-sensitive equipment</td>
<td>60</td>
<td>Typical commuter rail</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>Bus or truck over bump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Typical rapid transit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Typical bus or truck on public road</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Typical background vibration</td>
</tr>
</tbody>
</table>

Source: FTA 2006.

4.15.3 ENVIRONMENTAL SETTING

4.15.3.1 Study Area

Project Site

The approximate 210-acre study area is located on the west slope of the Sierra Nevada, within the South Yuba River watershed in the southeastern portion of Nevada County. It is located to the south of Interstate 80 (I-80) and is accessed from the Yuba Gap exit. The Project area is within projected Section 24, Township 17 North and Range 12 East, MDB&M, and is on the Cisco Grove 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle. Crystal Lake is located at an elevation of 5,877 feet above mean sea level (msl).

Surrounding Land Uses

The development areas for the Project are located approximately 1,500 feet or more from I-80 and 1,200 feet or more from the nearby freight railroad, both located to the north of the study area. Snowflower Inc. Campground has many loops and campsites located to the south and west of the study area. The closest
loop of Snowflower Raccoon Campground is located approximately 150 feet south of the study area, and about 1,300 feet south of the proposed project development areas. Topography blocks the line of sight from the Snowflower Inc. Campground to the proposed development areas in the study area. Lakes in the area, such as Raccoon Lake, are used by those staying at the Snowflower Inc. Campground for recreational activities (kayaking, fishing). Snowflower Inc. Campground has a set of rules for all Snowflower Inc. facilities located on the premises, which include not starting motors between the hours of 11:00 p.m. to 8:00 a.m. Additionally, quiet hours at the Snowflower, Inc. Campground are from between 10:00 p.m. and 7:00 a.m.

**Existing Noise Levels**

**Short-Term Noise Monitoring**

Short-term measurements of 15 minutes in duration were conducted in the Project vicinity to characterize the existing noise environment. Measurements were conducted on August 13, 2015.

ICF International selected the noise monitoring sites to characterize existing ambient noise levels at representative locations in the study area. Table 4.15-7 summarizes the results of the short-term monitoring study. Figure 3.6-1 shows the locations of the short-term noise monitoring sites for this analysis.

<table>
<thead>
<tr>
<th>Site #</th>
<th>Location</th>
<th>Start Time</th>
<th>Leq</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST-1</td>
<td>Near proposed amphitheater location towards the northern edge of the study area.</td>
<td>12:00 p.m.</td>
<td>40.2</td>
</tr>
<tr>
<td>ST-2</td>
<td>West of the current caretaker home, up the hill from Crystal Lake Road.</td>
<td>1:20 p.m.</td>
<td>37.5</td>
</tr>
<tr>
<td>ST-3</td>
<td>Near the southern entrance to the Project site, approx. 600 ft. from the Raccoon Loop site of the Snowflower Inc. Campground.</td>
<td>2:17 p.m.</td>
<td>41.5</td>
</tr>
<tr>
<td>ST-4</td>
<td>East of tennis court located near proposed dining hall.</td>
<td>12:31 p.m.</td>
<td>39.5</td>
</tr>
</tbody>
</table>

*Leq = equivalent sound level*

**Long-Term Noise Monitoring**

Continuous ambient noise measurements were also conducted between August 13, 2015 and August 18, 2015, at locations throughout the study area. Three long-term measurements were conducted. Table 4.15-8 summarizes the results of all long-term noise measurements conducted in the study area. **Figure 4.15-1** shows the locations of the long-term noise monitoring sites for this analysis.
Figure 4.15-1
Noise Measurement Locations

Legend
- Study Area
- Noise Measurement Locations
  - ST-# Short-term Measurement Locations
  - LT-# Long-term Measurement Locations

Source: 00433.14 UCD Crystal Lake (08-19-2015) SS
Table 4.15-8.
Summary of Long-Term Sound Level Measurements

<table>
<thead>
<tr>
<th>Site #</th>
<th>Date</th>
<th>Location</th>
<th>L&lt;sub&gt;dn&lt;/sub&gt;</th>
<th>Lowest 1-hr L&lt;sub&gt;eq&lt;/sub&gt;</th>
<th>Highest 1-hr L&lt;sub&gt;eq&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT-1</td>
<td>Friday 8/14/2015</td>
<td>Near proposed Amphitheater location towards the northern edge of the Project site.</td>
<td>48</td>
<td>37</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>Saturday 8/15/2015</td>
<td>50</td>
<td>37</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sunday 8/16/2015</td>
<td>47</td>
<td>36</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monday 8/17/2015</td>
<td>46</td>
<td>36</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Friday 8/14/2015</td>
<td>52</td>
<td>39</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>LT-2</td>
<td>Saturday 8/15/2015</td>
<td>Located west of the current caretaker home, up the hill from Crystal Lake Road.</td>
<td>52</td>
<td>38</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Sunday 8/16/2015</td>
<td>51</td>
<td>36</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monday 8/17/2015</td>
<td>52</td>
<td>37</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Friday 8/14/2015</td>
<td>54</td>
<td>39</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>LT-3</td>
<td>Saturday 8/15/2015</td>
<td>Near the southern entrance to the Project site, approx. 600 ft. from the Raccoon Loop site of the Snowflower Inc. Campground.</td>
<td>54</td>
<td>38</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>Sunday 8/16/2015</td>
<td>53</td>
<td>37</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monday 8/17/2015</td>
<td>53</td>
<td>38</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

*<sup>L</sup><sub>dn</sub> = day-night sound level  
*<sup>L</sup><sub>eq</sub> = equivalent sound level

Note that the L<sub>dn</sub> (weighted 24-hour average with 10 dB added to noise levels during the hours of 10:00 p.m. to 7:00 a.m.) in the vicinity of the study area is generally very quiet, ranging from 46 to 54 L<sub>dn</sub>. The lowest 1-hour L<sub>eq</sub> noise level recorded was 36 dBA L<sub>eq</sub> and the highest was 59 dBA L<sub>eq</sub>. To provide a conservative assessment, the lowest 1-hour L<sub>eq</sub> noise level of 36 dBA was utilized as the ambient noise level in the entire Project vicinity and at the adjacent Snowflower Inc. Campground.

4.15.3 REGULATORY CONSIDERATIONS

Federal, state, and local agencies regulate different aspects of environmental noise. Generally, the federal government sets noise standards for transportation-related noise sources that are closely linked to interstate commerce. These sources include aircraft, locomotives, and trucks. No federal noise standards are directly applicable to the Project. The state government sets noise standards for transportation noise sources such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies. Local general plans identify general principles that are intended to guide and influence development plans. UC Davis, as a state entity, is not subject to Nevada County noise standards. However, to match local policies, UC Davis has applied Nevada County noise standards in this assessment.

The state and local noise policies and regulations that are applicable to the Project are described below.
4.15 Noise

4.15.3.1 State

California Code

Title 24 of the California Code of Regulations, Part 2, California Noise Insulation Standards, establishes minimum noise insulation standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings other than single-family residences. Under this regulation, interior noise levels that are attributable to exterior noise sources cannot exceed the 45 day-night level ($L_{dn}$) in any habitable room. Where such residences are located in an environment in which exterior noise is 60 $L_{dn}$ or greater, an acoustical analysis is required to ensure that interior levels do not exceed the 45 $L_{dn}$ interior standard.

4.15.3.2 Local

Nevada County General Plan

The Noise Element of the Nevada County General Plan (Nevada County 2014) establishes maximum allowable exterior noise levels for various land use categories in terms of the average-hourly ($L_{eq}$) and maximum intermittent ($L_{max}$) noise descriptors. Maximum allowable noise standards are identified for daytime (7:00 a.m. to 7:00 p.m.), evening (7:00 p.m. to 10:00 p.m.), and nighttime (10:00 p.m. to 7:00 a.m.) periods. The County’s noise standards, which are described as performance standards and land use compatibility standards in the General Plan, are summarized in Table 4.15-9.

In addition to the identification of noise standards, the County’s general plan also identifies goals, objectives, and policies to reduce noise-related impacts and land use compatibility conflicts; these goals and policies are intended to guide future development, and future assessment of noise impacts, and to ensure adequate protection of the public from noise effects, and can be found on Page 9-2 of the Nevada County Noise Element. The general plan also identifies land use compatibility standards for new development adjacent to the Nevada County Airport. Although not directly applicable to the proposed project, the standards provide guidance as to noise levels that the County considers to be appropriate for residential uses. The “normally acceptable” noise compatibility standard for new residential development is 60 $L_{dn}$.

Nevada County Land Use Development Code

The allowable exterior noise standards described above are also identified in the Nevada County Land Use Development Code, Chapter II, Zoning Regulations (Section L-II, 4.1.7, Noise). Construction activities are exempt from the County’s noise standards.
Table 4.15-9  
County of Nevada Exterior Noise Limits

<table>
<thead>
<tr>
<th>Use Category</th>
<th>Zoning District</th>
<th>Time Period</th>
<th>Noise Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$L_{eq}$</td>
</tr>
<tr>
<td>Rural</td>
<td>AG, TPZ, AE, OS, FR, IDR</td>
<td>7 a.m.–7 p.m.</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 p.m.–10 p.m.</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 p.m.–7 a.m.</td>
<td>40</td>
</tr>
<tr>
<td>Residential and Public</td>
<td>RA, R1, R2, R3, P</td>
<td>7 a.m.–7 p.m.</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 p.m.–10 p.m.</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 p.m.–7 a.m.</td>
<td>45</td>
</tr>
<tr>
<td>Commercial and Recreation</td>
<td>C1, C2, C3, CH, CS, OP, REC</td>
<td>7 a.m.–7 p.m.</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 p.m.–7 a.m.</td>
<td>65</td>
</tr>
<tr>
<td>Business Park</td>
<td>BP</td>
<td>7 a.m.–7 p.m.</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 p.m.–7 a.m.</td>
<td>60</td>
</tr>
<tr>
<td>Industrial</td>
<td>M1, M2</td>
<td>Any time</td>
<td>80</td>
</tr>
</tbody>
</table>

Source: Nevada County 2010.

Notes:
- Compliance with the above standards shall be determined by measuring the noise level based on the mean average of not less than three (3) 20-minute measurements for any given time period. Additional noise measurements may be necessary to ensure that the ambient noise level is adequately determined.
- Where two different zoning districts abut, the standard applicable to the lower or more restrictive district plus 5 dBA shall apply.
- The above standards shall be measured only on property containing a noise-sensitive land use as defined in General Plan Policy 9.8 and may be measured anywhere on the property containing said land use.
- If the measured ambient level exceeds that permitted, the allowable noise exposure standard shall be set at 5 dBA above the ambient.
- Because of the unique nature of sound, the County reserves the right to provide for a more restrictive standard than shown in the Exterior Noise Limits table contained in this policy. The maximum adjustment shall be limited to be not less than the current ambient noise levels and shall not exceed the standards of this policy or as they may be further adjusted by General Plan Policy 9.1b. Imposition of a noise level adjustment shall only be considered if one or more of the following conditions are found to exist:
  a. Unique characteristics of the noise source:
     - The noise contains a very high or low frequency, is of a pure tone (a steady, audible tone such as a whine, screech, or hum), or contains a wide divergence in frequency spectra between the noise source and ambient level.
     - The noise is impulsive in nature (such as hammering, riveting, or explosions), or contains music or speech.
     - The noise source is of a long duration.
  b. Unique characteristics of the noise receptor when the ambient noise level is determined to be 5 dBA or more below the Policy 9.1 standard for those projects requiring a General Plan amendment, rezoning, and/or conditional use permit. In such instances, the new standard shall not exceed 10 dBA above the ambient or General Plan Policy 9.1 standard, whichever is more restrictive.
- The above standards shall not apply to those activities associated with the actual construction of a project or to those projects associated with the provision of emergency services or functions.

\[ L_{eq} = \text{equivalent sound level} \]
\[ L_{max} = \text{maximum sound level} \]

4.15.4 IMPACTS AND MITIGATION MEASURES

4.15.4.1 Significance Criteria

The significance criteria listed below are derived from Appendix G of the State CEQA Guidelines. For the purpose of this EIR, noise impacts would be significant if implementation of the proposed project would:
4.15 Noise

- Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies.

- Expose persons to or generate excessive ground-borne vibration or ground-borne noise levels.

- Result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project.

- Result in a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project.

- Be located within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport and expose people residing or working in the Project area to excessive noise levels.

- Be located in the vicinity of a private airstrip and expose people residing or working in the Project area to excessive noise levels.

4.15.4.3 Methodology

Operational Noise Assessment Methodology

Stationary Source Noise

Primary stationary noise sources associated with the Project, including activities at the beach area, amphitheater, swimming pool, and the dining hall fan equipment, were analyzed. Reference noise levels for each noise source at a distance of 50 feet were determined, as was the distance between each source and the receiver (Snowflower Inc. Campground). Standard geometric attenuation factors, ground absorption factors, and shielding factors based on distances between receivers and area topography were used to estimate the noise generated by each analyzed source at the receiver location. Noise levels from sources that would be generating noise simultaneously were added logarithmically to determine worst-case loudest noise levels at the nearby noise sensitive land uses for with-project conditions.

Transportation Noise

Transportation noise was evaluated based on information from the Project description stating that the busiest period of camp (on Saturday/Sunday) could have approximately 125 vehicles departing after a week of camp (generally on Saturday) or arriving for the start of camp (generally on Sunday) between 10:00 a.m. and 4:00 p.m. Additionally, the conference center could add up to 40 inbound and 40 outbound vehicle trips over a period of 10:00 a.m. to 8:00 p.m. To provide a conservative analysis, this assessment assumes that all of the 125 vehicles arriving for or departing from camp would arrive or depart during a single peak-hour. These trips would not overlap with the 40 inbound or outbound trips for the event center. Modeling traffic noise levels for 125 vehicle trips would be representative of the loudest traffic condition in the project vicinity. Traffic noise was modeling using the Federal Highway Administration Traffic Noise Model (TNM; Version 2.5)


**Construction Noise Assessment Methodology**

Noise levels associated with Project-related construction activities were evaluated by summing the noise levels of the three loudest pieces of equipment that would likely operate on the project site for a given construction activity or phase. FHWA reference noise levels from the Road Construction Noise Model (RCNM) User’s Guide were used.

The three loudest pieces of equipment for the grading, roadway and underground infrastructure development would be a grader, tractor, and excavator. For the foundation and building construction phase, the three loudest pieces of equipment would be the concrete mixer truck, concrete pump truck, and tractor. Additionally, tree removal work would take place during a 4-week period; the three loudest pieces of equipment utilized for tree removal work would be a chainsaw, a loader, and a chipper or masticator (tree chewing hydraulic head mounted on a backhoe). Note that for all construction activities, trucks hauling materials to the site or debris (e.g., during tree removal) could be driving to and from the construction site. A worst-case assumption of 4 truck trips taking place during a given hour was assumed, and the noise generated from these trucks was added to the construction noise from each activity. The sum of the equipment noise for the worst-case loudest construction phase is then compared to the applicable noise standards to determine if there would be a potential noise impact.

**4.15.4.4 Project Impacts and Mitigation Measures**

**Impact NOI-1:** Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies (Significant; Less than Significant with Mitigation or Significant and Unavoidable)

While the proposed project will involve the development of a campground, the users of which could be sensitive to noise, the proposed project would not be exposed to noise levels in excess of the County’s noise compatibility standard. Noise measurements conducted onsite demonstrated that the proposed project area is very quiet, with $L_{dn}$ values in the range of 46 to 54 dBA, despite its relatively close proximity to I-80 and an active train track. This is below the County’s compatibility standard for residential uses of 60 $L_{dn}$, so there would be no noise compatibility issues associated with the development of a campground in this area.

However, the proposed project may generate noise that could affect nearby noise sensitive land uses. The potential for the proposed Project to affect nearby noise sensitive land uses (via stationary noise sources, transportation noise, and construction noise) is discussed below.
Operational Noise

Stationary Source Operational Noise

Various operational activities associated with the proposed project would generate noise. As described in Section 4.15.3, Environmental Setting, the nearest noise-sensitive land use is the Snowflower Inc. Campground, which is located over 1,300 feet from the proposed project development areas.

Areas that would likely generate the most noise at the proposed alumni camp are the swimming pool, tennis court, beach area, event center, amphitheater, and dining hall. The swimming pool, tennis court, and beach area would all generate noise during the daytime, and the amphitheater would mostly generate noise during the evening hours. The dining hall would likely generate noise (from exhaust fans and HVAC) throughout the day and evening.

The use of the amphitheater would likely generate the most noise of any of the proposed project activities, as it would be a place where campers and counselors may join together in the evening for skits, singing, campfires, or other similar group activities. To provide a worst-case analysis for this proposed use, it is assumed that 420 persons (350 campers and 70 staff) would be present at the amphitheater at the same time. It is also assumed that all 420 persons would be shouting (for example, cheering loudly at the end of a skit). Note that amplification would not used for musical performances, only unamplified acoustic instruments would be used, and a single amplified voice (for a skit, etc.) would be much quieter than 420 persons shouting at the facility. Assuming 420 persons shouting provides a very conservative analysis, as it is unlikely that this many people would be at the amphitheater at a given time, and it is even more unlikely that all 420 persons would be shouting. If 420 persons were shouting at the amphitheater at a given time, this would generate a noise level of 85 dBA at a reference distance of 50 feet from the amphitheater (Harris 1979). Including standard attenuation factors for geometric attenuation, shielding, and ground absorption that would occur between the source (the amphitheater) and the receiver (the Snowflower Inc. Campground), the amphitheater is predicted to generate a noise level of 36 dBA at the edge of the Snowflower Inc. Campground.

According to noise measurements conducted at the Project site, ambient noise levels in the vicinity of the Snowflower Inc. Campground are as low as approximately 36 dBA $L_{eq}$. The noise levels may increase during times of heavy traffic (when people are arriving or departing from Snowflower Inc. Campground), but the lowest measured noise level of 36 dBA $L_{eq}$ was utilized as the ambient baseline in order to ensure that the existing conditions are correctly characterized as very quiet. The 36 dBA noise level from the amphitheater would combine with the existing ambient levels (added logarithmically) to equal a sound level of just under 39 dBA at the edge of the Snowflower Inc. Campground. Therefore,
activities at the amphitheater could increase noise levels from existing conditions (36 dBA) by approximately 3 dB.

The event center, which would include gatherings of up to 50 people for events such as weddings would also generate noise. No amplification equipment would be used at the event center. If all 50 people attending an event at the event center were shouting, this land use would generate a noise level of about 25 dBA $L_{eq}$ at the edge of the Snowflower Inc. Campground. Additionally, the fans and HVAC equipment associated with the dining hall may be operating simultaneously. This equipment would generate noise levels of approximately 67 dBA at a reference distance of 50 feet, but would be reduced to about 8 dBA at the edge of the nearby Snowflower Inc. Campground. Combining the potential worst-case noise from the amphitheater, event center and dining hall with the ambient noise levels (~36 dBA $L_{eq}$) in the vicinity would result in a total evening noise level of 39 dBA $L_{eq}$ at the edge of the Snowflower Inc. Campground; this is similar to the noise increase of the amphitheater alone, as that would contribute the most noise of the three aforementioned noise sources. The noise thresholds for Nevada County state that noise levels may be up to 55 dBA $L_{eq}$ during the daytime hours of 7:00 a.m. to 7:00 p.m., 50 dBA $L_{eq}$ during the evening hours of 7:00 p.m. to 10:00 p.m., and 40 dBA $L_{eq}$ for rural land uses during the nighttime hours of 10:00 p.m. to 7:00 a.m. A 3 dB increase in noise may be perceptible at the Snowflower Inc. Campground; however, the modeled noise level of 39 dBA $L_{eq}$ would not exceed even the most stringent nighttime threshold for Nevada County. Therefore, evening and nighttime noise levels at the edge of the Snowflower Camp are not expected to exceed County noise standards.

Daytime noise levels in the area would be most greatly influenced by the swimming pool, beach area, tennis court, dining hall, and the event center. As previously mentioned, the dining hall would generate minor noise, and is not expected to be perceptible at the edge of the Snowflower Inc. Campground. The tennis court would generate even less noise. Noise levels at a reference distance of 50 feet from the tennis court would be in the range of 50 to 60 dBA (Placer County 2011); at the edge of the Snowflower Inc. Campground, this noise level is predicted to drop to about 8 dBA. Assuming up to 100 people were using the swimming pool at a given time and all were shouting, the swimming pool would generate a noise level of 78 dBA at a reference distance of 50 feet. Although other noise may be generated at the pool (such as the noise associated with a diving board), assuming 100 people are shouting while at the facility is a conservative analysis. The noise generated by the pool is predicted to drop to about 25 dBA at the edge of the Snowflower Inc. Campground. Similarly, if 100 people were utilizing the beach area at a given time and all were also shouting, noise levels would be 75 dBA $L_{eq}$ at a 50-foot reference distance, and 25 dBA at the edge of the adjacent Snowflower Inc. Campground. Finally, and as mentioned above, the event center could generate noise levels of about 25 dBA at the edge of the campground.
All of these noise levels would add to total a 29.0 dBA noise level at the edge of the Snowflower Inc. Campground, which would combine with the ambient noise level of 36 dBA $L_{eq}$ to total a with-project day-time noise level of approximately 37 dBA $L_{eq}$; the increase in noise would be less than 1 dB. This modeling provides a conservative analysis, because it is unlikely that all of the individuals utilizing the pool and the beach would be shouting at the same time. The small predicted increase of less than 1 dB above ambient noise levels may be perceptible to people located nearby based on the tonal characteristics of the sound, but the overall noise level is not predicted to exceed the daytime (7:00 a.m. to 7:00 p.m.) threshold of 55 dBA $L_{eq}$ or evening (7:00 p.m. to 10:00 p.m.) threshold of 50 dBA $L_{eq}$ for rural land uses at the nearby Snowflower Inc. Campground.

Operational noise levels are not predicted to exceed County noise standards. Therefore, this impact is less than significant.

**Transportation Operational Noise**

According to the Project description, it is possible that up to 125 vehicles could be arriving or departing between the hours of 10:00 a.m. and 4:00 p.m. on a Saturday or Sunday. In order to model a reasonable worst-case peak hour traffic noise condition, it was conservatively assumed that all of these vehicles would be arriving or departing during a single peak-hour.

Traffic noise modeling was conducted using the Federal Highway Administration’s Traffic Noise Model (TNM). Posted speed limits along Crystal Lake Road indicate a maximum speed of 5 miles per hour (mph); the speed limit would remain 5 mph with project implementation. The roadway improvements proposed with the project would include roadway paving and widening along this street. Because of this, traffic noise modeling for future with-project conditions conservatively assumed that cars would be traveling at speeds of 15 (even though posted speeds would be 5 mph). Note that TNM does not accurately assess traffic noise levels at very low speeds, such as 5 mph, so no attempt was made to model traffic noise using the 5 mph speed.

Modeling results indicated that Project traffic could generate noise of approximately 50 dBA $L_{eq}$ at a distance of 20 feet from the roadway centerline, which is the approximate distance to the nearby campsites at the Snowflower Inc. Campground. This would combine with ambient noise levels of 36 dBA $L_{eq}$ to equal a total noise level of just over 50 dBA $L_{eq}$ at the nearest campsite. This noise level would be a 14 dB increase from ambient levels. At the portion of the Snowflower Inc. Campground furthest from the roadway (approximately 450 feet to the southeast), project traffic could generate noise levels of up to 27 dBA. This would add with the ambient noise level of 36 dBA $L_{eq}$ to equal a total noise level of approximately 37 dBA $L_{eq}$, which is an approximately 1 dB increase from ambient levels. Note that traffic
noise modeling was also conducted to determine if buses used in lieu of individual vehicle trips to transport campers to the site would reduce traffic noise. Results indicate that 6 buses traveling at speeds of 15 mph would generate noise levels of approximately 53 dBA at a distance of 20 feet from the roadway centerline. These 6 buses would generate noise 3 dB more of noise in 1 hour than 125 cars traveling down the same road. Therefore, buses were not further assessed as an option to reduce traffic noise for the proposed project.

Because ambient noise levels in the project vicinity are so low, increases in traffic noise from cars would result in increases in noise levels by up to 14 dB. Although the predicted traffic noise level of 53 dBA does not exceed the daytime threshold of 55 dBA, the analysis indicates potential for project traffic noise to exceed the evening and nighttime standards (50 dBA and 40 dBA respectively). Therefore, this impact would be significant. Implementation of Mitigation Measures NOI-1 and LU-1 would reduce this impact to a less-than-significant level. However, if Mitigation Measure LU-1 cannot be implemented, this impact would be significant and unavoidable.

Construction Noise

Construction noise is exempt from the Nevada County noise regulations per Section II 4.1.6, Noise, of the Nevada County Code. The analysis of construction noise associated with the proposed project is included in the discussion of temporary noise increases assessed under Impact NOI-3.

Mitigation Measure NOI-1: Restrict vehicle speeds along Crystal Lake Road to 5 mph by posting of speed limit signs and implementing other traffic control features such as speed bumps and limits on when facility users can access the alumni camp

UC Davis will post signs limiting speeds to 5 mph, install speed bumps, and prohibit users of the facility from accessing the project site between the hours of 10:00 p.m. and 7:30 a.m.

Mitigation Measure LU-1: Purchase Snowflower Raccoon Camp

This mitigation measure is described in Section 4.13, Land Use and Planning.

Significance after Mitigation: Implementation of Mitigation Measure NOI-1 would reduce operational noise from vehicle traffic entering the project site and would prohibit nighttime access to the project site by facility users. Implementation of Mitigation Measure LU-1, as described in Section 4.13, Land Use and Planning, would reduce operational noise from vehicle traffic by moving the noise sensitive land use (Snowflower Inc. Campground) about 300 feet further away from the roadway.

Implementation of both Mitigation Measures NOI-1 and LU-1 would reduce this impact to a less-than-significant level. If Mitigation Measure LU-1 cannot be implemented, and only Mitigation Measure NOI-1
can be implemented, this impact would be significant and unavoidable because operational project traffic would remain in close proximity to the campground and could potentially exceed the 50 dBA evening noise standard.

**Impact NOI-2:** Expose persons to or generate excessive groundborne vibration or groundborne noise levels (Less than Significant)

**Operational Vibration Impacts**

None of the operational activities associated with the proposed project would generate perceptible vibration; therefore, there would be no operational vibration impacts.

**Construction Vibration Impacts**

The operation of heavy construction equipment may generate localized groundborne vibration in areas adjacent to the construction site, especially during the operation of high-impact equipment, such as pile drivers. Vibration from non-impact construction activity and truck traffic is typically below the threshold of perception when the activity is more than approximately 50 feet from the noise-sensitive land uses (Federal Transit Administration 2006). Consequently, for construction activities that do not involve the use of high-impact equipment and construction sites that are more than 50 feet from noise-sensitive land uses, groundborne vibration impacts are expected to be less than significant. For the proposed project, there may be campsites at the Snowflower Inc. Campground located less than 50 feet away from where some of the roadway construction is proposed for the project; vibration could be perceptible at these locations, depending on the amount of and specific types of equipment being utilized. However, the duration of time that equipment would be within 50 feet of a specific campsite would be short; additionally, none of the covered activities necessary for Project implementation would involve high-impact equipment, such as pile drivers. Therefore, potential impacts related to the exposure of persons to excessive groundborne vibration would be less than significant.

**Mitigation Measures:** No mitigation measures are required.

**Impact NOI-3:** Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the proposed project (Significant and Unavoidable)

**Stationary Source Operation Noise**

As described for Impact NOI-1, noise levels in the project vicinity would increase with implementation of the proposed project. Operational noise from stationary sources associated with the campsite are
predicted to increase levels from the ambient conditions by less than 1 dB $L_{eq}$ during daytime hours, but by up to 3 dB during evening and nighttime hours. Although the predicted nighttime noise level of 39 dBA $L_{eq}$ is below the nighttime threshold of 40 dBA $L_{eq}$, an evening/nighttime increase from approximately 36 dBA $L_{eq}$ to 39 dBA $L_{eq}$ would likely be perceptible at the edge of the nearby campground since current ambient conditions in the Project vicinity are very quiet; additionally, note that even minor increases in noise can be perceptible depending upon the tonal characteristics of the noise source. A 3 dB or more increase in noise is the threshold level for most people to notice a change in the noise environment. As the increase in noise due to the propose project could be 3 dB, a substantial permanent increase in ambient noise levels above levels existing without the proposed project would be expected. This impact would be significant, and mitigation to reduce this effect would be required, but even with implementation of Mitigation Measure NOI-3, the impact would remain significant and unavoidable.

Transportation Operation Noise

As described for Impact NOI-1, traffic noise levels in the project vicinity would increase with implementation of the proposed project, as additional vehicles would be entering and exiting the Project site along Crystal Lake Road. Increases in traffic noise from vehicles would result in increases in noise levels by up to 14 dB. An increase of 3 dB or more is generally accepted as a threshold of perceptibility for the average healthy human ear. As the current conditions in the area are extremely quiet, and as the increases associated with project traffic could be as great as 14 dB, a substantial permanent increase in ambient noise levels would result from increased vehicle traffic. This impact would be significant, and mitigation to reduce this effect would be required, but even with implementation of Mitigation Measures NOI-1 and LU-1, the impact would remain significant and unavoidable.

Mitigation Measure NOI-1: Restrict vehicle speeds along Crystal Lake Road to 5 mph by posting of speed limit signs and implementing other traffic control features such as speed bumps and limits on when facility users can access the alumni camp

This mitigation measure is described under Impact NOI-1.

Mitigation Measure NOI-3: Prohibit usage of the project amphitheater and event center between the hours of 10:00 p.m. and 7:00 a.m.

UC Davis will prohibit use of the amphitheater and event center between the hours of 10:00 p.m. and 7:00 a.m.

Mitigation Measure LU-1: Purchase Snowflower Raccoon Camp
This mitigation measure is described in Section 4.13, *Land Use and Planning*.

**Significance after Mitigation:** As described previously for Impact NOI-1, implementation of Mitigation Measures NOI-1 and LU-1 would reduce operational noise from vehicle traffic entering the Project site, and reduce the level of effect for Impact NOI-3; however, noise levels would still increase from the current ambient conditions by more than 3 dB, resulting in a substantial permanent increase in noise. Impacts from traffic noise would remain significant.

Implementation of Mitigation Measure NOI-3 would ensure that noise levels after 10:00 p.m. would be reduced to the extent practicable; by prohibiting the use of the event center and the amphitheater (two of the loudest noise sources associated with project development) during these times, noise levels in the project vicinity would be in agreement with the quiet hours of the nearby Snowflower Inc. Campground. This measure would also likely reduce project noise to less-than-perceptible levels during these hours. However, even with this restriction, noise levels during the hours of 7:00 a.m. to 10:00 p.m. would increase from current ambient conditions, resulting in a substantial permanent increase in noise. Operational noise impacts from project stationary noise sources would remain significant.

As Mitigation Measures NOI-1, NOI-3, and LU-1 would not reduce operational noise impacts to less-than-significant levels, and a substantial permanent increase in noise would still result, noise impacts from operation of the proposed project would be significant and unavoidable.

**Impact NOI-4:**

> Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (Significant and Unavoidable)

As described in the Methodology section above, the noise levels of the three loudest pieces of equipment for the grading, roadway and underground infrastructure development were summed to assess construction noise impacts. Additionally, the noise levels for the equipment used for foundation and building construction and for the tree removal activities were separately summed. The construction equipment associated with the tree removal activities, which were determined to result in more noise than the equipment associated with the other two analyzed construction activities, is predicted to generate a noise level of 87 dBA $L_{eq}$ at a reference distance of 50 feet. The $L_{\text{max}}$ for this activity is predicted to be 94 dBA. Although tree removal activities are only anticipated to take place over a 4-week period, noise associated with the other construction activities would be similarly loud. Table 4.15-10 shows the predicted construction noise levels for the three analyzed construction activities, where the loudest three pieces of equipment are operating simultaneously for each activity, at a standard reference distance of 50 feet. Note that these noise levels are conservative because modeling assumes that the three loudest equipment pieces would be operating in the same location simultaneously, which would be an unlikely event.
Table 4.15-10.
Calculated Construction Noise Emission Levels

<table>
<thead>
<tr>
<th>Source Data</th>
<th>Maximum Sound Level (dBA)</th>
<th>Utilization or Acoustical Use Factor</th>
<th>$L_{eq}$ Sound Level (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Activity 1: Grading, Road and Underground Infrastructure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source 1: Excavator - Sound level (dBA) at 50 feet =</td>
<td>81</td>
<td>0.4</td>
<td>77</td>
</tr>
<tr>
<td>Source 2: Tractor - Sound level (dBA) at 50 feet =</td>
<td>84</td>
<td>0.4</td>
<td>80</td>
</tr>
<tr>
<td>Source 3: Grader - Sound level (dBA) at 50 feet =</td>
<td>85</td>
<td>0.4</td>
<td>81</td>
</tr>
<tr>
<td>Calculated Data:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Sources Combined - $L_{max}$ (dBA) at 50 feet =</td>
<td></td>
<td></td>
<td>88</td>
</tr>
<tr>
<td>All Sources Combined - $L_{eq}$ (dBA) at 50 feet =</td>
<td></td>
<td></td>
<td>84</td>
</tr>
<tr>
<td><strong>Construction Activity 2: Foundation and Building Construction</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source 1: Concrete Mixer Truck - Sound level (dBA) at 50 feet =</td>
<td>79</td>
<td>0.2</td>
<td>72</td>
</tr>
<tr>
<td>Source 2: Concrete Pump Truck - Sound level (dBA) at 50 feet =</td>
<td>81</td>
<td>0.4</td>
<td>77</td>
</tr>
<tr>
<td>Source 3: Tractor - Sound level (dBA) at 50 feet =</td>
<td>84</td>
<td>0.4</td>
<td>80</td>
</tr>
<tr>
<td>Calculated Data:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Sources Combined - $L_{max}$ (dBA) at 50 feet =</td>
<td></td>
<td></td>
<td>87</td>
</tr>
<tr>
<td>All Sources Combined - $L_{eq}$ (dBA) at 50 feet =</td>
<td></td>
<td></td>
<td>82</td>
</tr>
<tr>
<td><strong>Construction Activity 3: Tree Removal Activities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source 1: Chainsaw - Sound level (dBA) at 50 feet =</td>
<td>84</td>
<td>0.2</td>
<td>77</td>
</tr>
<tr>
<td>Source 2: Loader - Sound level (dBA) at 50 feet =</td>
<td>78</td>
<td>0.4</td>
<td>74</td>
</tr>
<tr>
<td>Source 3: Chipper - Sound level (dBA) at 50 feet =</td>
<td>93</td>
<td>0.2</td>
<td>86</td>
</tr>
<tr>
<td>Calculated Data:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Sources Combined - $L_{max}$ (dBA) at 50 feet =</td>
<td></td>
<td></td>
<td>94</td>
</tr>
<tr>
<td>All Sources Combined - $L_{eq}$ (dBA) at 50 feet =</td>
<td></td>
<td></td>
<td>87</td>
</tr>
</tbody>
</table>

$dB_A$ = $A$-weighted decibel  
$L_{max}$ = maximum sound level  
$L_{eq}$ = equivalent sound level

Construction Activities 1 and 3 from Table 4.15-10 could take place along the access road and could therefore take place in close proximity to the Snowflower Inc. Campground (i.e., as close as about 20 feet from the campground). Additional noise would be generated from haul trucks importing building materials or exporting tree debris. As described in Section 4.15.4.3, Methodology, it was assumed that up to four truck trips would take place during a given hour. According to the TNM results, four truck trips in a single hour would result in a noise level of 53 dBA $L_{eq}$ at a distance of 50 feet. Peak passby noise levels,
4.15 Noise

however, could exceed 76 dBA at 50 feet or about 84 dBA at 20 feet (FHA 2006). Construction Activity 2 from Table 4.15-10 would take place on the project site and noise from this activity is expected to drop to less than 40 dBA at the Snowflower Inc. Campground as a result of distance and shielding attenuation.

Although Construction noise would not be constant, noise levels could reach levels of up to 87 dBA $L_{eq}$ at a reference distance of 50 feet away from the construction activity, which is the approximate distance to the Snowflower Inc. Campground campsites from locations where Activity 1 and Activity 3 construction could take place. Construction noise levels of approximately 87 dBA $L_{eq}$ would result in an exceedance of the current ambient noise level (36 dBA $L_{eq}$) by approximately 50 dB. Therefore, a substantial temporary increase in ambient noise levels above levels existing without the proposed project would result due to project construction. This impact would be significant, and mitigation (Mitigation Measures NOI-4 and NOI-4b) to reduce this effect would be required, but the impact would remain significant and unavoidable.

Mitigation Measure NOI-4a: The construction contractor will employ noise-reducing construction practices to reduce construction noise

UC Davis will require the construction contractor to employ noise-reducing construction practices. Measures that can be used to limit noise include, but are not limited to, those listed below.

- Locating equipment as far as feasible from noise sensitive uses.
- Requiring that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation.
- Not idling inactive construction equipment for prolonged periods (i.e., more than 2 minutes).
- Prohibiting gasoline or diesel engines from having unmuffled exhaust.
- Scheduling construction activities and material hauling that may affect traffic flow to off-peak hours and using routes that would affect the fewest number of people.
- Using noise-reducing enclosures around noise-generating equipment.
- Constructing temporary barriers between noise sources and noise-sensitive land uses or taking advantage of existing barrier features (terrain, structures) to block sound transmission.

Mitigation Measure NOI-4b: Restrict noise-generating construction work to only take place between the hours of 8:00 p.m. and 5:00 p.m. on weekdays and non-holidays
UC Davis will require the construction contractor to limit noise-generating construction to the hours between 8:00 p.m. and 5:00 p.m. on weekdays and non-holidays. No noise-generating construction activity will be allowed on weekends and holidays between Memorial Day and Labor Day.

**Significance after Mitigation:**

Implementation of Mitigation Measure NOI-4a would reduce construction noise by ensuring that all feasible measures to reduce excessive construction noise are implemented; even with implementation of many noise-reducing construction practices, construction noise will result in a substantial temporary increase in noise near noise-sensitive land uses. This impact would remain significant and unavoidable.

Implementation of Mitigation Measure NOI-4b would reduce the period of time on a given day that excessive construction noise levels would be generated. This mitigation measure would apply to any noise-generating construction work, such as work utilizing heavy equipment or power tools. Although noise generated during the construction of a project is technically exempt in Nevada County, this measure would help reduce the negative effects of construction noise to those located in close proximity the project site. By restricting construction noise to the hours of 8:00 a.m. to 5:00 p.m., there would be more hours in a given day when those staying at the nearby Snowflower Inc. Campground would not be exposed to excessive noise levels. Additionally, by prohibiting noise-generating construction work on the weekends and on holidays, this measure would ensure that the noise levels at the nearby Snowflower Inc. Campground would be similar to existing conditions on those days.

Although Mitigation Measures NOI-4a and NOI-4b would reduce the negative effects of construction noise to nearby noise sensitive land uses, a substantial temporary increase in ambient noise levels would still result. Therefore, this impact would be significant and unavoidable.

**Impact NOI-5:**

Be located within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels (Less than Significant)

AND

**Impact NOI-6:**

Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels (Less than Significant)

The nearest airport or private airstrip is the Blue Canyon-Nyack Airport, which is located approximately 7.4 miles to the southwest of the proposed project.; other airports, such as the Milhous Ranch Airport, the
Sierraville Dearwater Airport, and the Alta Sierra Airport, are all located substantially further away (20 to 30 miles away).

Since the proposed project is not located in an area for which an Airport Land Use Plan has been prepared, and no public or private airfields are located within 2 miles of the project, individuals utilizing the proposed alumni camp would not be exposed to adverse levels of noise due to aircraft overflight; no impact would result, and no mitigation would be necessary.

**Mitigation Measures:** No mitigation measures are required.

### 4.15.4.5 Cumulative Impacts and Mitigation Measures

In general, the implementation of cumulative development projects has the potential to increase ambient noise by increasing traffic and human activity throughout a given area. The geographic context for the analysis of cumulative construction noise impacts and stationary-source operational noise impacts is generally very small (a few hundred feet) because noise diminishes rapidly with distance (6 dBA per doubling of distance for point and stationary sources). Because of this, and because the proposed project is isolated from other development, the proposed project would not contribute to any significant cumulative noise impacts.
4.15.5 References


SECTION 4.16

POPULATION AND HOUSING

4.16.1 INTRODUCTION

This section reviews the existing population and housing conditions for the proposed project. This section describes the increase in site population directly related to implementation of the project and the anticipated changes in regional population and housing that could result from the implementation of the project.

Changes in population, employment, and housing demand are social and economic effects, not environmental effects. According to the California Environmental Quality Act (CEQA), these effects should be considered in an EIR only to the extent that they create adverse impacts on the physical environment. According to Section 15382 of the State CEQA Guidelines, “An economic or social change by itself shall not be considered a significant effect on the environment.”

No public and agency comments related to population and housing were received in response to the Notice of Preparation (NOP). However, one comment letter included a heading titled “Population and Housing” but provided road comments instead of population or housing comments.

4.16.2 ENVIRONMENTAL SETTING

4.16.2.1 Study Area

The project site currently includes a single resident providing caretaker services for the property. The property currently has two housing units as described in the project description (Section 3.0).

4.16.2.2 Surrounding Area

The surrounding area for this section is generally the area of land south of Interstate 80 from the Yuba Gap exit. This definition captures the entire population and housing for the approximately five-square mile area that is served by the Yuba Gap freeway exit and represents a geographic area common to project site in terms of services received and overall impacts. This surrounding area contains a few year-round residents with most dwellings utilized as vacation homes. In addition, two commercial campground facilities, a church camp, and a campground operated by Pacific, Gas and Electric contribute to the summer population within this area.
4.16.4 IMPACTS AND MITIGATION MEASURES

4.16.4.1 Significance Criteria

The impacts related to population and housing from the implementation of the proposed project would be considered significant if they would exceed the following Standards of Significance, in accordance with Appendix G of the State CEQA Guidelines and the UC CEQA Handbook:

- Induce substantial population growth in the area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure).
- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

4.16.4.2 Methodology

The effects of population growth are evaluated below by comparing the context of the expected regional population growth to the population growth that would be induced through implementation of the proposed project.

4.16.4.3 Project Impacts and Mitigation Measures

Impact POP-1: Induce substantial population growth in the area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure) (Less than Significant)

The proposed project would not induce substantial population growth directly or indirectly. Development and operation of the proposed project would include development on the project site with new buildings and access roads. The project would include on-site housing for the employees expected to run the camp facilities. Most of these employees would be seasonal employees to operate the camp during the peak summer periods. These facilities are not anticipated to produce secondary effects whereby other properties would be developed with new homes or businesses. The potential impact would be less than significant.

Mitigation Measure(s): No mitigation measures are required.
Impact POP-1: Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere (No impact)

The proposed project would displace no existing housing and no construction of housing elsewhere would be required. No impact would occur.

Mitigation Measure(s): No mitigation measures are required.

Impact POP-1: Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere (No impact)

The proposed project would displace no existing people and no construction of housing elsewhere would be required. No impact would occur.

Mitigation Measure(s): No mitigation measures are required.

4.16.4.4 Cumulative Impacts and Mitigation Measures

Cumulative Impact POP-1: Induce substantial population growth in the area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure) (Less than Significant)

The proposed project is not anticipated to induce population growth and no other factors are present in the surrounding area or nearby areas that would induce substantial population growth. All proposed development projects in the area would follow either Nevada County or Placer County zoning and general plan requirements. These planning efforts have produced requirements for large lots that mostly serve to minimize the rate of land development in the area surrounding and near the proposed project. The potential impact would be less than significant.

4.16.5 REFERENCES


4.17.1 INTRODUCTION

This section describes the police, fire, schools, and parks that are provided in the project area and analyzes the potential impacts of the proposed project on public services as well as the potential cumulative effects of the proposed project in combination with other regional growth. The objective of this environmental analysis is to determine whether the implementation of the project would result in the need for new or improved public service and recreational facilities, the construction of which could produce significant environmental effects.

Public and agency comments related to Public Services and Recreation received in response to the Notice of Preparation are summarized below.

- Comments indicated a concern related to increased crime from new UC Davis camp participants.
- Comments indicated that the on-going use of existing recreation (camping) on nearby properties could be impacted. This issue is a land use issue and is addressed in Section 4.13, Land Use and Planning.

4.17.2 ENVIRONMENTAL SETTING

The environmental setting for the project site consists of the project property and nearby areas that receive similar services such as the non-federal lands (private land and utility owned lands) accessed from the Yuba Gap freeway exit at Interstate 80. As a proposed recreational use for families and groups seeking an all-inclusive vacation experience, the character of the proposed project is not a typical land use and is a land use that does not typically create demand for public services or recreational facilities. This environmental setting section focuses on fire service as the primary public service that will be necessary to serve the project site. Guests at the proposed camp will have be experiencing a focused recreational live-in vacation experience and would not utilize typical public services or recreational amenities off of the project site.

CalFire provides service currently to the project site and provides rural fire service to many parts of Nevada County, particularly at higher elevations on non-federal land. CalFire would continue to provide fire service for the project and UC Davis, in consultation with CalFire, will coordinate for the review, inspections, permitting, and fire response details needed for the proposed project. CalFire has been
initially contacted with details of the proposed project and has indicated that service to the project site can be provided without creating a need for new facilities.

4.17.3 REGULATORY CONSIDERATIONS

Regulatory considerations for public services and recreation relate mainly to the services provided by Nevada County with detailed information regarding preferred policies provided in the Nevada County General Plan. Additional recreational facilities provided on federal US Forest Service land in the area are governed by the planning and recreation use policies of the US Forest Service. These policies range from minimally managed public land that is open for recreational pursuits to highly managed ski resorts operating on US Forest Service land.

4.17.4 IMPACTS AND MITIGATION MEASURES

4.17.4.1 Significance Criteria

The impact on public services and recreation of the proposed project would be considered significant if it would exceed the following Standards of Significance, in accordance with Appendix G of the State CEQA Guidelines and the UC CEQA Handbook:

- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: fire, police, schools, parks, or other public facilities.

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

- Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment.

4.17.4.3 Methodology

This analysis evaluates the potential for adverse physical impacts to occur as a result of the provision of new or altered public service and recreation facilities related to the proposed project, including facilities or facility expansions needed to accommodate increases in demand for services and service personnel, or to enable service providers to maintain level of service standards. Increased demand for public services that would result from implementation of the project is determined by comparing projected population with the potential need for services to serve that population. An unmet need for services could indicate
that new facilities would be needed or that additional staff would be needed, which could result in a need for new or expanded facilities.

4.17.4.4 Project Impacts and Mitigation Measures

Impact PS-1: Adverse physical impacts associated with the provision of new or physically altered governmental facilities for any governmental facilities, the construction of which could cause significant environmental impacts (Less than Significant)

The proposed project is not expected to increase demand for or utilization of fire, police, schools, parks, or other public facilities. Fire service for the project site would be provided CalFire with response times that are typical of a rural area and mountainous geography. CalFire has indicated that it can serve the proposed project from existing fire stations and would not need to construct a new fire station for the proposed project. Police services are not expected to increase as a result of the proposed project. The proposed camp activity would primarily include family and groups associated with UC Davis and accessing the site for vacation or educational purposes. The additional population and the property are not expected to create a demand for police services that would require construction of nearby police building to serve the project. Schools are not expected to experience an increase in demand for school services or a need for physical space as a result of the proposed project. The project would have minimal full-time, year-round employees (1 to 3 are expected) with most employees hired for the summer camp period. Parks and other public facilities such as libraries or municipal buildings are not expected to experience increased demand because the temporary population of guests at the proposed facility will be on vacation and conducting recreation activities within the proposed project site.

Based on these factors, the proposed project is not expected to result in adverse physical impacts associated with the provision of new or physically altered governmental facilities, the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives. No impact would occur.

Mitigation Measure(s): No mitigation measures are required.
Impact PS-2: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated (No Impact)

As described above for Impact PS-1, the proposed project is not expected to result in any increased use of any neighborhood or regional parks or other recreational facilities. No impact would occur.

Mitigation Measure(s): No mitigation measures are required.

Impact PS-3: Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment (No Impact)

The proposed project is a recreational facility and the potential environmental impacts of the proposed project are the subject of this EIR. Section 3.0 explains the details of the proposed project and Section 2.0 contains a summary of the potential environmental impacts of the proposed project with Section 4.0 providing the detailed project impact analysis related to the construction and operation of the proposed alumni camp, environmental education center, and event center. The project would not have a secondary effect such that additional construction or expansion of recreational facilities would be required. No impact would occur.

Mitigation Measure(s): No mitigation measures are required.

4.17.4.5 Cumulative Impacts and Mitigation Measures

As described above, the project would have no contribution to impacts related to Public Services or Recreation. Accordingly, the project would have no contribution to regional cumulative impacts related to Public Services or Recreation. No impact would occur and no mitigation is necessary.

4.17.5 REFERENCES


SECTION 4.18
TRANSPORTATION/TRAFFIC

4.18.1 INTRODUCTION

This section describes impacts to the transportation system that would result from the implementation of the proposed project. The section includes a brief description of the physical transportation setting for the project area, analysis methodology, and the regulatory context for the evaluation of traffic operating conditions. In addition, the section describes transportation conditions under existing and cumulative scenarios. The impact analysis examines the roadway components of the overall transportation system.

Public and agency comments related to transportation and traffic received in response to the Notice of Preparation are summarized below.

- Traffic impacts on Snowflower, Inc. Racoon camp.
- The safety impact to people, children, elderly, pets, and wildlife from increased traffic on Crystal Lake Road.
- Traffic speed on Crystal Lake Road.
- Traffic impacts to State Route 89 and State Route 28.
- Interstate 80 emergency response times during congested periods.
- Traffic congestion from special events in the region.
- Traffic effects within the context of development within North Tahoe, Truckee, and Squaw Valley.
- Parking capacity at proposed camp.
- Use of railroad crossing for primary access to project property. This issue is evaluated in Section 5.4, Alternatives Considered but Rejected as Infeasible.
- Width of Crystal Lake Road.
- Use of mitigation fees for traffic, road maintenance, speed control, safety, security, traffic enforcement, property damage, winter usage.
- Timing of road improvements and whether improvements would occur before or after construction.
- Ramp capacity on I-80 freeway exits.
- Traffic from service and delivery trips to serve the proposed project.
- Safety of walking on Crystal Lake Road with proposed improvements and anticipated traffic volumes.
- Width of Crystal Lake Road and adequacy for a car to legally pass a bicyclist.
• Greater usage of Kelly Lake Road to access Kelly Lake from more people in the area.
• Emergency services responding to Snowflower, Inc. Racoon camp.
• Emergency evacuation should consider the total number of people/cars who might need to evacuate. This issue is evaluated in Section 4.11, Hazards.

4.18.2 ENVIRONMENTAL SETTING

4.18.2.1 Study Area

The study area includes the project site, Crystal Lake Road from the project site to Lake Valley Road, Lake Valley Road from Crystal Lake Road to the I-80/Yuba Gap overpass, and Interstate 80 in Nevada County. The proposed project is a unique land use with travel attributes that are very dissimilar from other land uses. The proposed alumni camp and environmental education center and event center would operate at peak capacity only during the summer months with an approximate season of 10 weeks from approximately early June to late August. In fall, winter, and spring, the center would operate with reduced guests and possibly with school groups arriving by bus.

During the peak summer season, guests would be allowed to arrive during a specified afternoon period on Sunday afternoons and expected to leave by midday on Saturday’s. From Sunday to Saturday, most guests would remain on the property to participate in formal and informal recreation activities and enjoy site amenities. Guests would typically arrive as a family or group and the remote location of the camp is expected to result in high vehicle occupancy (3 to 4 people per vehicle). The anticipated traffic volumes during a peak afternoon arrival or departure period are expected to consist of approximately 125 vehicles arriving (on a Sunday) or departing (on a Saturday) between 10am and 4pm. Although exact travel times will not be prescribed, the guests are anticipated to arrive evenly distributed throughout the arrival window period of 10am to 4pm. Based on these characteristics and applying a peak hour factor to ensure that impacts are not underestimated, the peak arrival period from 1pm to 2pm on a Sunday afternoon is expected to result in approximately 50 vehicles in the peak hour period for the proposed camp.

For a Saturday or Sunday conference center event, traffic for an afternoon wedding would arrive between 10am and 2pm and would be expected to depart from 4pm to 8pm. This total is expected to include 40 vehicles. The 10am to 2pm arrival period would overlap with arriving campers. Assuming that 20 of the wedding vehicles could arrive between 1pm and 2pm would result a total of 145 vehicles for the proposed project (alumni camp and event center) in this one-hour time period. A peak-hour with 145 vehicles would equate to approximately 2.5 vehicles per minute.
**Figure 3-2 in Section 3.0** shows the project area. Crystal Lake Road is shown as the black line extending from the project property. During the scoping period, one commenter noted that Crystal Lake Road and Kelly Lake Road are sometimes labeled differently on different maps. A review was conducted of printed maps and on-line electronic maps. The review indicates an inconsistency in certain mapping efforts. Most maps identify the road that extends from Crystal Lake as Crystal Lake Road and those maps match the route shown on **Figure 3-2**. Some maps differ and show a portion of the same road as Kelly Lake Road, effectively interchanged with the Crystal Lake Road shown on **Figure 3-2**. Throughout this EIR, Crystal Lake Road is considered to be the road alignment shown in a black line and labeled as Crystal Lake Road. This EIR makes no further effort to reconcile the conflicting map labeling of Crystal Lake Road.

### 4.18.2.2 Roadway System

The roads that would be affected by the proposed project include Crystal Lake Road from the project boundary westward to the connection with Lake Valley Road, Lake Valley Road westward to the connection with the Yuba Gap/Interstate 80 overcrossing, and Interstate 80. These roads are subject to the Nevada County standards except for the Interstate 80 facilities which are subject to Caltrans standards. The relevant components of the circulation system in the project area include intersections, streets, and freeways. No pedestrian or bicyclist paths are located in the study area.

From 2014 Caltrans traffic data, eastbound volumes of Interstate 80 at Yuba Gap are slightly higher than westbound volumes with peak hour traffic measure at 3,300 vehicles per hour and Annual Average Daily Traffic of 24,900 vehicles per day. The highest monthly ADT in 2014 was 33,000. At the Yuba Gap freeway ramps, traffic volumes from 2007 indicated that for the eastbound off-ramp to Yuba Gap Road, traffic levels were 150 vehicles per day and the eastbound on ramp traffic was 120 vehicles per day. Westbound off ramp volumes were 110 vehicles per day and the westbound on ramp was 110 vehicles per day. These data are consistent with field observations in 2014 and 2015 indicating low to moderate volumes of traffic on the Interstate 80 facilities at Yuba Gap and very low, negligible traffic exiting or using the Yuba Gap on ramps. Using the peak hour data of 3,300 vehicles on the I-80 mainline as representing approximately 15% of the daily volumes, an similar peak hour factor approximation of ramp volumes indicates that the eastbound peak volumes for traffic exiting from Interstate 80 to the Yuba Gap exit would be approximately 23 vehicles per hour (approximately 1 vehicle every three minutes during the peak hour). The ramp length of the eastbound Yuba Gap off-ramp is approximately 1,000 feet.
4.18.3 REGULATORY CONSIDERATIONS

4.18.3.1 University of California

Headings and corresponding text will vary with environmental topic. Present federal, state, and local laws and regulations in that order.

4.18.3.1 California Department of Transportation

The California Department of Transportation (Caltrans) provides for the mobility of people, goods, services, and information. Its mission is to work in partnership with others to provide the people of California with a safe, efficient, and effective intermodal transportation system by planning, developing, maintaining, and managing the interregional transportation system and assisting and guiding delivery of local and regional transportation services. Caltrans provides administrative support for transportation programming decisions made by the California Transportation Commission and Caltrans for state funding programs. The State Transportation Improvement Program (STIP) is a multi-year capital improvement program that sets priorities and funds transportation projects envisioned in long-range transportation plans. Caltrans oversees the state highway system, including Interstate 80 near the project site.

4.18.3.1 Nevada County

The Nevada County General Plan contains the following policy related to emergency access for a project site:

Policy MV 4.2-10: Discretionary development served by a dead end road and located beyond the dead end road limit shall be required, at a minimum, to construct secondary access roads in accordance with Chapters XVI and XVII of the Nevada County Land Use Code. Secondary access roads shall meet Nevada County Fire Standard Access Road standards unless a Petition for Exception is approved granting lesser standards.

In Nevada County, the classification of roads not classified as Minor Collector and above by the General Plan Circulation Map is Local Road. These roads function primarily to provide access to individual properties. The standard to which these roads are to be constructed is determined by the type and intensity of the adjacent land uses. The class of local road will be determined by the estimated future Average Daily Traffic (ADT). The future ADT shall be computed using the sum of existing traffic, plus any additional traffic generated from land uses allowed under the County’s current General Plan and
Chapter II of this Code. For the purpose of implementing the General Plan, local roads can be broken into the following subcategories:

- **Minor Collector Equivalent** (Local Class 3) Road: Serves a buildout volume in excess of 2,000 Daily Trips (A.D.T.) and is constructed to the same standard as those roads classified as Minor Collector on the General Plan Circulation Plan.

- **Local Class 2**: Serves a buildout volume of 401 to 2,000 Average Daily Trips (A.D.T.); Design criteria specify a 50 foot right-of-way width; travel lane widths of 10 feet, shoulder width of 4 feet, fuel zone modification of 10 feet; and design speed of 25 miles per hour.

- **Local Class 1**: Serves a buildout volume of 101 to 400 A.D.T.; Design criteria specify a 40 foot right-of-way width; travel lane widths of 9 feet, shoulder width of 2 feet, fuel zone modification of 10 feet; and design speed of 20 miles per hour.

- **Fire Standard Access Road**: Is the minimum standard for access to a driveway for new construction and serves a maximum of 100 A.D.T.

### 4.18.4 IMPACTS AND MITIGATION MEASURES

#### 4.18.4.1 Significance Criteria

The impacts from the implementation of the proposed project related to transportation and traffic would be considered significant if they would exceed the following Standards of Significance, in accordance with Appendix G of the *State CEQA Guidelines* and the UC CEQA Handbook:

- Conflict with an applicable plan, ordinance or policy establishing the measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.

- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.

- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)
4.18 Transportation/Traffic

- Result in inadequate emergency access
- Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)

4.18.4.3 Methodology

Explain methodology is largely qualitative based on the characteristics of the study area, the character of the proposed project, and the low volumes of existing and proposed traffic on the largely rural roads that would be affected by the proposed project.

4.18.4.4 Project Impacts and Mitigation Measures

Impact TRA-1: Conflict with an applicable plan, ordinance or policy establishing the measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit (Less than Significant)

The University does not have an applicable plan, policy or ordinance related to roads in the project vicinity. The roads that would be affected by the proposed project include Crystal Lake Road from the project boundary westward to the connection with Lake Valley Road, Lake Valley Road westward to the connection with the Yuba Gap/Interstate 80 overcrossing, and Interstate 80. These roads are subject to the Nevada County standards except for the Interstate 80 facilities which are subject to Caltrans standards. The relevant components of the circulation system in the project area include intersections, streets, and freeways. No pedestrian or bicyclist paths are located in the study area.

For Crystal Lake Road and Lake Valley Road, the proposed project would include road upgrades where necessary to meet the Nevada County Local Class 1 standard which would include lane widths of 9 feet, shoulders of 2 feet, and a design speed of 20 miles per hour. This standard would accommodate traffic up to 400 average vehicles per day. The expected future volumes include the existing volumes estimated at 150 weekend average daily traffic plus the project volumes of up to 125 vehicles on a peak arrival or departure day which would be below the 400 average daily traffic capacity for a Local Class 1 road. The Nevada County road standard functions as a measure of effectiveness for local roads and would provide adequate performance for the proposed and future volumes of these roads. The intersection at Crystal Lake Road and the Snowflower, Inc. driveway is proposed to include a four-way stop sign to reduce vehicle speeds near the adjacent camp area.
For Interstate 80, the existing low usage and extended length of the Yuba Gap on- and off-ramps would provide adequate performance for the proposed project. The existing ramps during a peak period experience approximately one car every three minutes and the proposed project is projected to result in a peak-hour arrival rate of 2.5 cars per minute. Based on these approximations, the peak ramp usage period would result in approximately three cars per minute during a peak arrival period. The rate of traffic flow from the eastbound off-ramp is governed by the existing northbound stop sign at the ramp terminal. Based on field observation and conservative analysis, one car can progress through the stop sign every 10 seconds which equates to a capacity of 6 cars per minute which is below the anticipated peak of 3 cars per minute. Accordingly, the expected arrivals would not result in problematic queuing on the freeway off-ramps because the arriving traffic could proceed through the ramp terminal stop sign at a faster rate than the rate of arrival traffic that would be using the freeway off-ramp. For traffic flow on the Interstate 80 segments east and west of Yuba Gap, the proposed traffic would occur during non-peak periods. On Saturday’s, traffic from the camp would be departing and generally headed westbound out of the mountains. Peak weekend traffic in the westbound direction occurs on Sunday’s when more vacationers are departing the mountains and headed toward the Sacramento and San Francisco metropolitan areas. On Sunday’s, traffic would be arriving to the camp in the midday during a period when eastbound traffic is relatively light. The proposed project would primarily involve automobile traffic and the rural, secluded location of the proposed project tends to have very few non-motorized or mass transit modes. The project would accommodate non-motorized or mass transit modes in terms of proposed capacity and design adequacy, if needed.

Based on these characterizations, the proposed project would not conflict with performance measures of the affected circulation system. The potential impact would be less than significant.

**Mitigation Measure(s):** No mitigation measures are required.

**Impact TRA-2:** Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways (No Impact)

There is no applicable congestion management program for the project area. Therefore, the project would not conflict with an applicable congestion management program. No impact would occur.

**Mitigation Measure(s):** No mitigation measures are required.
Impact TRA-3:  Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks (Level of Significance)

The project would result in no changes to air traffic patterns. The nearest airport is approximately 7 miles from the project site and the proposed project would have no relation to air traffic levels or location. No impact would occur.

Mitigation Measure(s): No mitigation measures are required.

Impact TRA-4:  Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) (Less than Significant)

As described in Impact TRA-1, the proposed design features for road improvements would meet the Nevada County design standards that are appropriate for the expected traffic volumes. These standards would be wide enough for a car to pass a bicyclist on Crystal Lake Road. For each road segment, specific items such as visibility, sharp curves, intersection design details, and other items will be included in the final design effort. The intersection at Crystal Lake Road and the Snowflower, Inc. driveway is proposed to include a four-way stop sign to reduce vehicle speeds near the adjacent camp area. This design feature is expected to reduce potential hazards associated with vehicle speed. The project includes no incompatible road uses or road users. During most of the year (the period outside of the summer camp peak periods) the road would experience very low levels of traffic. Section 4.13, Impact LU-1 and LU-3 address the issue of compatibility between the proposed road use and the existing Snowflower, Inc. Raccoon camp area.

Mitigation Measure(s): No mitigation measures are required.

Impact TRA-5:  Result in inadequate emergency access (Less than Significant)

The existing route for emergency access to the project property is Crystal Lake Road and the proposed project would be served by the same route. Emergency responders can also utilize the emergency crossing of the railroad tracks near the east boundary of the project property if needed. The proposed project does not include alterations to the existing emergency access routes for the project site except for road surface and width improvements as described in Impact TRA-1 (above). Calfire has indicated that Crystal Lake Road can provide adequate emergency access to serve the proposed facility during operation. The potential impact would be less than significant.
Mitigation Measure(s): No mitigation measures are required.

Impact TRA-6: Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks) (Less than Significant)

The proposed project is a unique land use with minimal opportunities to support alternative transportation because of the remote site and steep terrain. Where possible, shared rides for off-site excursions will be provided for camp guests. The proposed project is not expected to conflict with Nevada County or Caltrans efforts to support alternative transportation. The potential impact would be less than significant.

Mitigation Measure(s): No mitigation measures are required.

4.18.4.5 Cumulative Impacts and Mitigation Measures

Cumulative Impact TRA-1: Contribute to cumulatively considerable transportation/traffic effects (Less than Significant)

The proposed land use at the Crystal Lake alumni camp is a unique land use in terms of traffic impacts. The proposed project would serve vacationing and education groups with anticipated stays of one week extending from a Sunday arrival to a Saturday departure. As such, the project is expected to have very little impact on daily traffic volumes or roadway capacity. While event-related traffic conditions are a concern in the Interstate 80 corridor around Donner summit and Truckee, the proposed project is expected to produce peak period traffic during times that are opposite the traditional peak event and weekend traffic. Accordingly, the proposed project is not expected to contribute to a cumulatively considerable traffic impact. The potential impact would be less than significant.

4.18.5 REFERENCES

Nevada County. 2010. Chapter XVII Road Standards of Nevada County.


SECTION 4.19

UTILITIES AND SERVICE SYSTEMS

4.19.1 INTRODUCTION

This section describes the existing utilities and service systems that serve the project site and describes the utilities needed to serve the proposed project. As a rural property, the site is not served by public water, wastewater or stormwater services.

Public and agency comments related to Utilities and Service Systems received in response to the Notice of Preparation are summarized below.

- Solid waste disposal adequacy for waste generated by the proposed project.
- Septic system adequacy to serve the proposed project and address environmental impacts.
- Water supply adequacy to serve the project and address potential impacts to the aquifer.

4.19.2 ENVIRONMENTAL SETTING

4.19.2.1 Study Area

The study area includes the project site and the immediate surrounding area. Existing utilities at the project site include the existing water well, septic system, fire supply water, emergency generator, and propane tank. The pump house, constructed in approximately 1993, is located between the main house and the caretaker house. The pump house sits next to the underground well and is approximately 180 square feet with interior space for the water well equipment and an emergency generator. The existing well is approximately 950 feet deep and provides approximately 8-12 gallons per minute. Propane tanks adjacent to the pump house provide approximately 4,000 gallons of storage for propane to serve the main house and the caretaker house and the emergency generator. The septic system and leach field are located northwest of the existing lake and provide leach sewer service to the existing lake house and the caretaker house.

Utilities needed to serve the project include the following:

**Domestic Water:** Domestic water for the property is currently provided by a single well that is approximately 1,000 feet deep and provides approximately 8-10 gallons per minute. To serve the proposed camp, an additional well is expected to be needed. A preliminary investigation has identified the eastern portion of the north side of the property as a likely location to drill a second well. To serve the
camp and conference center uses, a total demand of approximately 15,000 to 20,000 gallons per day is expected. Water storage on the site is would take place in underground tanks. Domestic water supply lines would be routed underground.

**Septic System Capacity:** Sanitary sewer service for the existing property is provided by a single septic tank and leach field uphill of the existing main house. The property is not served by a wastewater treatment plant. To serve the proposed camp and the conference center, additional septic system capacity would be needed. In portions of the area proposed for development, a preliminary soil investigation found adequate soil and slope conditions to allow new leach fields that would support a septic system. Through the process of engineering new systems and health and safety permitting by Nevada County, the design for expanded septic service would identify the necessary capacities, treatment details, inspection needs, and backup land area to provide a new system that would operate correctly. Septic system lines would be routed underground.

**Storm Drainage and Runoff:** The project would include detailed engineering and construction measures to reduce erosion and adequately control runoff.

**Electricity:** Electricity for the project site is provided by an overhead electrical line that supplies power from a Pacific Gas and Electric point of connection at the east side of the property along the Union Pacific Railroad tracks. Electricity of the expanded operations would be provided by the existing supply line or from an expanded service line that would be routed on the existing power poles. Electrical lines within the camp area would be placed underground. The existing backup generator would continue in use to provide limited emergency power during storms or other outages.

**Propane:** Propane for heating of large buildings and for cooking would be provided to the project by delivery trucks. Propane storage tanks would be designed into the layout and placed near buildings.

**Telecommunications:** Most telecommunications would take place wirelessly through the use of nearby cellular towers operated by commercial carriers. Some additional telecommunications capacity would be provided by a new telephone service line that would be extended from the east side of the property and then routed underground to facilities within the camp.
4.19.3 REGULATORY CONSIDERATIONS

Public health regulations for septic systems, well water, swimming pool safety, and food service are overseen by the Nevada County Department of Environmental Health. The Department of Environmental Health uses State of California Health and Safety Codes as guidance, as well as Nevada County codes when conducting plan review, inspections, and educational programs. The requirements of Nevada County for these items would be followed during design, permitting, and operation of the proposed project.

4.19.4 IMPACTS AND MITIGATION MEASURES

4.19.4.1 Significance Criteria

The significance criteria listed below are derived from Appendix G and Appendix F of the State CEQA Guidelines and the UC CEQA Handbook. For the purpose of this EIR, utilities, service systems, and energy impacts would be significant if implementation of the proposed project would:

- Exceed the Regional Water Quality Control Board’s wastewater treatment requirements;
- Require or result in the construction or expansion of water or wastewater treatment facilities, which would cause significant environmental effects;
- Require or result in the construction or expansion of storm water drainage facilities, which could cause significant environmental effects;
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed;
- Exceed available wastewater treatment capacity;
- Be served by a landfill with insufficient permitted capacity to accommodate the project’s solid waste disposal needs;
- Comply with applicable federal, state, and local statutes and regulations related to solid waste.
- Require or result in the construction or expansion of electrical or natural gas facilities which would cause significant environmental impacts;
- Result in wasteful, inefficient, and unnecessary use of energy; or
- Place a significant demand on regional energy supply or require provision of substantial additional capacity.
4.19.4.3 Methodology

Project impacts to utilities, service systems and energy are based on a qualitative comparison of the existing and projected demand for utilities, the proposed construction of new utilities to serve the proposed project, and the resulting need, if any, for new, expanded, or modified facilities to meet the increased demand. Many issues related to construction of new utilities are relevant to other resource discussions and environmental impact discussions contained throughout Section 4 of this EIR.

4.19.4.4 Project Impacts and Mitigation Measures

Impact UTIL-1: Exceed the Regional Water Quality Control Board’s wastewater treatment requirements (No Impact)

The proposed project would not utilize a wastewater treatment plant for wastewater. Accordingly, the project would not exceed wastewater treatment requirements of the Central Valley Regional Water Quality Control Board. No impact would occur.

Mitigation Measures: No project-level mitigation measures are required.

Impact UTIL-2: Require or result in the construction or expansion of water or wastewater treatment facilities, which would cause significant environmental effects (Less than Significant)

The project would include construction of septic systems and leach fields for wastewater disposal. This EIR evaluates the construction impacts of the proposed facilities and the Nevada County Environmental Health Department would provide the design standards and oversee the permitting and inspections of the new facilities. The impact would be less than significant.

Mitigation Measures: No project-level mitigation measures are required.

Impact UTIL-3: Require or result in the construction or expansion of storm water drainage facilities, which could cause significant environmental effects (Less than Significant)

The proposed project would construct new roads and buildings resulting in increased impervious surface on the project property and could increase storm water flow on the project site. As discussed in Section 4.12 (Hydrology and Water Quality), the project design include a site specific drainage study to minimize
effects on drainage alteration study (Mitigation Measure WQ-4) will minimize impacts to storm water with the site design incorporating necessary treatment measures within the project site. The environmental impacts of project construction, including the construction of storm water control items are considered throughout Section 4.0 of this EIR. The impact would be less than significant.

**Mitigation Measures:** No project-level mitigation measures are required.

**Impact UTIL-4:** Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed (Less than Significant)

The proposed project would design and construct a new water supply well to meet the expected demand for the proposed project. As discussed in Sections 4.9 (Geology and Soils) and 4.12 (Hydrology and Water Quality), the well design would include an aquifer study to confirm available capacity of the local aquifer to serve the project. The new well would be reviewed, permitted, and inspected by Nevada County to ensure that the water quality and safety is adequate for the proposed use at the project site. The impact would be less than significant.

**Mitigation Measures:** No project-level mitigation measures are required.

**Impact UTIL-5:** Exceed available wastewater treatment capacity (Less than Significant)

The proposed project would construct septic tanks and leach fields to accommodate the projected demand for wastewater disposal. The system would be designed to match the needed capacity and to provide redundancy in the amount of land surface area for potential future relocation/replacement of the leach field area. The impact would be less than significant.

**Mitigation Measures:** No project-level mitigation measures are required.

**Impact UTIL-6:** Be served by a landfill with sufficient permitted capacity to accommodate the project’s solid waste disposal needs (Less than Significant)

Recology Ostrom Road landfill in Yuba County provides solid waste disposal for areas within Nevada County. The landfill is open to commercial waste haulers and can accept up to 3,000 tons of municipal solid waste per day. The site has an expected closure date of 2084 with a total design capacity of over 41 million cubic yards. The proposed project has a limited peak season and would generate a limited amount of solid waste. The proposed project would not exceed the permitted capacity of the Ostrom Road landfill. The impact would be less than significant.
Mitigation Measures: No project-level mitigation measures are required.

Impact UTIL-7: Comply with applicable federal, state, and local statutes and regulations related to solid waste (Less than Significant)

The proposed project would be consistent with the University of California requirements for solid waste disposal. The University of California requirements are designed to comply with all federal and state requirements. The impact would be less than significant.

Mitigation Measures: No project-level mitigation measures are required.

Impact UTIL-8: Require or result in the construction or expansion of electrical or natural gas facilities which would cause significant environmental impacts (Less than Significant)

The proposed project would be served by existing electrical service at the property boundary and would not require expansion of electrical facilities. The project would be served by propane gas for heating and cooking purposes with the propane delivered by commercial truck services. With several propane delivery services available in the region, no expansion of propane services is expected to adequately serve the proposed project. The impact would be less than significant.

Mitigation Measures: No project-level mitigation measures are required.

Impact UTIL-9: Result in wasteful, inefficient, and unnecessary use of energy (Less than Significant)

The proposed buildings would be constructed to minimize energy use with lighting, lighting controls, heating, building insulation, and appliances selected to minimize energy use. The proposed project would not result in wasteful, inefficient, or unnecessary use of energy. The impact would be less than significant.

Mitigation Measures: No project-level mitigation measures are required.

Impact UTIL-10: Place a significant demand on regional energy supply or require provision of substantial additional capacity (Less than Significant)

The proposed project is a relatively small land use with typical energy demands. The proposed project does not include major industrial processes or other similar uses that would not require substantial capacity. The impact would be less than significant.
Mitigation Measures: No project-level mitigation measures are required.

4.8.4.5 Cumulative Impacts and Mitigation Measures

Cumulative Impact UTIL-11: Cumulative contribution to water, wastewater, stormwater, or solid waste disposal capacity (Less than Significant)

The proposed project is a relatively small land use on approximately 25 acres and would be served by primarily by on-site utilities. The project would not contribute to cumulative impacts related to stormwater capacity, wastewater treatment, water supply, or solid waste disposal capacity. The impact would be less than significant.

Mitigation Measures: No project-level mitigation measures are required.

4.8.5 REFERENCES
