This section provides an overview of the visual character, scenic resources, views, scenic highways, and sources of light and glare that are encountered on the Project site and the surrounding area. This section concludes with an evaluation of the impacts and recommendations for mitigating impacts. Comments were received during the public review period or scoping meeting for the Notice of Preparation regarding this topic from the following agencies and individuals: City of Shasta Lake (February 22, 2012), Eric Cassano (February 13, 2012), US Department of Agriculture (February 10, 2012), Bill Jeffers and Cliff Jacoby (February 13, 2012), Olenda Findley (February 14, 2012), Erin Jarvis (February 6, 2012), Robert McGill (February 13, 2012), Georgia Haddon (February 1, 2012), Jay Schell (February 14, 2012), Mike Bradford (February 5, 2012), and Rob and Sheryl Sampley (January 25, 2012).

Each of the comments received related to this topic are addressed within this section. Information in this section is derived primarily from the following sources:

- Shasta County General Plan (September, 2004)
- Bureau of Land Management Visual Resource Inventory Manual (January, 1986)
- Bureau of Land Management Visual Resource Contrast Rating Manual (January, 1986)
- Site visits completed by De Novo Planning Group and Maxey Architects (March, 2012)

3.1.1 ENVIRONMENTAL SETTING

CONCEPTS AND TERMINOLOGY

Identifying a Project area's visual resources and conditions involves the three steps listed below.

1. Objective identification of the visual features (visual resources) of the landscape.

2. Assessment of the character and quality of those resources relative to overall regional visual character.

3. Determination of the importance to people, or sensitivity, of views of visual resources in the landscape.

The aesthetic value of an area is a measure of its visual character and quality, combined with the viewer response to the area. Scenic quality can best be described as the overall impression that an individual viewer retains after driving through, walking through, or flying over an area. Viewer response is a combination of viewer exposure and viewer sensitivity. Viewer exposure is a function of the number of viewers, number of views seen, distance of the viewers, and viewing duration. Viewer sensitivity relates to the extent of the public's concern for a particular viewshed. These terms and criteria are described in detail below.

Visual Character

Natural and artificial landscape features contribute to the visual character of an area or view. Visual character is influenced by geologic, hydrologic, botanical, wildlife, recreational, and urban features. Urban features are those associated with landscaped areas and development, such as

roads, utilities, structures, earthworks, and the results of other human activities. The perception of visual character can vary significantly seasonally and even hourly, as weather, light, shadow, and elements that compose the viewshed change. The basic components used to describe visual character for most visual assessments are the elements of form, line, color, and texture of the landscape features. The appearance of the landscape is described in terms of the dominance of each of these components.

Visual Quality

Visual quality is evaluated using the well-established approach to visual analysis adopted by Federal Highway Administration, employing the concepts of vividness, intactness, and unity which are described below.

- Vividness is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns.
- Intactness is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes, as well as in natural settings.
- Unity is the visual coherence and compositional harmony of the landscape considered as a whole; it frequently attests to the careful design of individual components in the landscape.

Visual quality is evaluated on the basis of the relative degree of vividness, intactness, and unity, as modified by its visual sensitivity. High-quality views are highly vivid, are relatively intact, and exhibit a high degree of visual unity. Low-quality views lack vividness, are not visually intact, and possess a low degree of visual unity.

Viewer Exposure and Sensitivity

The measure of the quality of a view is tempered by the overall sensitivity of the viewer. Viewer sensitivity or concern is based on the visibility of resources in the landscape, proximity of viewers to the visual resource, elevation of viewers relative to the visual resource, frequency and duration of views, number of viewers, and type and expectations of individuals and viewer groups.

The importance of a view is related in part to the position of the viewer to the resource; therefore, visibility and visual dominance of landscape elements depend on their placement within the viewshed. A viewshed is defined as all of the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., a roadway or trail). To identify the importance of views of a resource, a viewshed is assigned to three distance zones: foreground, middleground, and background. Generally, the closer a resource is to the viewer, the more dominant it is and the greater its importance to the viewer.

Although distance zones in a viewshed may vary between different geographic regions or types of terrain, the standard foreground zone is 0.25–0.5 mile from the viewer, the middleground zone is

from the foreground zone to three to five miles from the viewer, and the background zone is from the middleground to infinity.

Visual sensitivity depends on the number and type of viewers and the frequency and duration of views. Visual sensitivity is also modified by viewer activity, awareness, and visual expectations in relation to the number of viewers and viewing duration. For example, visual sensitivity is generally higher for views seen by people who are driving for pleasure, people engaging in recreational activities such as hiking, biking, or camping, and homeowners. Sensitivity tends to be lower for views seen by people driving to and from work or as part of their work. Commuters and non-recreational travelers generally have fleeting views and tend to focus on commute traffic, not on surrounding scenery; therefore, they are generally considered to have low visual sensitivity. Residential viewers typically have extended viewing periods and are concerned about changes in the views from their homes; therefore, they are generally considered to have high visual sensitivity. Viewers using recreation trails and areas, scenic highways, and scenic overlooks are usually assessed as having high visual sensitivity.

Judgments of visual quality and viewer response must be based in a regional frame of reference. The same landform or visual resource appearing in different geographic areas could have a different degree of visual quality and sensitivity in each setting. For example, a small hill may be a significant visual element on a flat landscape but have very little significance in mountainous terrain.

Regional Setting

Shasta County comprises approximately 3,850 square miles of diverse landscape, with a population of nearly 182,000 concentrated within the central valley flat lands of the County. The City of Redding, the County seat and largest incorporated City, is located at the northern end of the Central Valley. Two mountain peaks, Mount Shasta at 14,194 feet and Lassen Peak at 10,457 feet, dominate the horizon. Large lakes such as Shasta Lake, north of Redding, and Whiskeytown Lake to the west, provide varied visual character to the surrounding mountain ranges, and provide a range of recreational opportunities for residents and visitors. The Sacramento River, California's largest and longest river, runs through the center of the County as it flows south towards the San Francisco Bay. Vast areas of land, primarily unpopulated forest land, in the County remain under government ownership.

Project Site

The Project site is located on undeveloped open space lands in western Shasta County, immediately north of the City of Shasta Lake, and approximately one mile south of Shasta Lake. The Shasta-Trinity National Forest is located to the north and northwest of the site, and the northwestern portion of the Project site is within the boundary of the Shasta-Trinity National Forest, as shown on Figure 2-2. The Project site is located at the extreme northern end of the Central Valley where it begins its transition from a flat plain at the southeastern and eastern portions of the site into the foothills of the Cascade Range to the east and the Coastal Mountain

Ranges to the west and northwest. The elevation of the site ranges from approximately 800 feet to 2,000 feet above mean sea level (amsl).

The site encompasses approximately 1,850 acres, dominated by Montane Hardwood Conifer and Montane Hardwood vegetative habitats. Figures 2-4A and 2-4B show aerial views of the Project site, and Figure 2-4A includes USGS topographic lines, depicting site elevations and contours. The onsite vegetation provides the greatest visual variation within the site. The Montane Hardwood Conifer and Montane Hardwood habitats provide a dense green backdrop to the site year-round. The non-native grasslands, some riparian habitat, wet meadow habitat, and mixed oak woodland habitat on the site is deciduous, meaning that leaves begin to change color from green to yellow in spring/summer, brown in late summer/fall, and eventually fall from the tree or die in the late fall in winter. The late summer, fall, and winter leaf color variations provide a contrast of colors against the evergreen Montane Hardwood habitats that occupy most areas of the site. Three intermittent streams (Moody Creek, Rancheria Creek, and Salt Creek) traverse the center and eastern portions of the site.

The only major man-made structure on the site is the Union Pacific Railroad line, which traverses the eastern portion of the site. The railroad line is approximately 15 feet wide, including the iron rails, railroad ties, drainage culverts, and ballast rock. Figures 2-5A through 2-5C show photographs depicting existing conditions on the site.

VISUAL ENVIRONMENT SURROUNDING THE PROJECT SITE

The Project site is situated in a rural portion of Shasta County, immediately north of the City of Shasta Lake, and south of Shasta Lake and the Shasta-Trinity National Forest. Views of the Project site from the surrounding areas are generally uninterrupted by buildings, residences, and other structures, but may be hindered by topography and intervening vegetation. The views surrounding the site are generally similar to the visual conditions within the Project site, and are characterized by open grassland with clusters of oak trees to the east, and Montane Conifer and Montane Hardwood habitats to the west, north, and south.

The site is surrounded by open space with a limited number of residential properties to the northeast, south, southeast, and southwest. The closest residential properties to the site are located approximately one-half mile to the southwest of the South Pit, near the southern boundary of the site, and one mile to the southeast of the South Pit, near the southeastern corner of the site, as shown in Figure 2-4. Several other aggregate mines are located in the vicinity of the site, with the closest (Falkenberry Shale Quarry) located approximately 1.5 miles to the northeast, as shown on Figure 2-4.

The City of Shasta Lake, located immediately south of the site, is the closest urbanized area to the Project site. Views within the City of Shasta Lake are characterized by urban and residential development, with distant views beyond the City limits dominated by the Klamath and Cascade Mountain Ranges to the north, east, and west.

The Whiskeytown-Shasta-Trinity National Recreation Area (WST-NRA), which is within the Shasta-Trinity National Forest, is comprised of 246,087 acres divided into three units: Whiskeytown

(42,500 acres), Shasta and Trinity (203,587 acres). Each of these areas encompasses a large man-made lake and its surrounding terrain. This National Recreation Area is used for outdoor activities including camping, fishing, swimming, paddling, boating, backpacking, horseback riding, mountain biking, off-roading and hunting. The Project site is located to the south of the Shasta Unit of the WST-NRA.

Shasta Lake is the largest man-made reservoir in California. When full, the lake has 370 miles of shoreline, which exceeds that of San Francisco bay. Shasta Lake contains 30,000 surface acres and holds 4,550,000 acre-feet of water. Shasta Lake lies behind Shasta Dam, which is the second largest (after Grand Coulee Dam) and second tallest concrete dam (after Hoover Dam) in the United States.

PUBLIC VIEWS AND SENSITIVE RECEPTORS

The Project site is visible from multiple locations in varying degrees from areas surrounding the site, but is most visible from roadways in the Project vicinity and from locations within the City of Shasta Lake.

Roadways

Roadways near the Project site include Interstate 5, Digger Bay Road, and Shasta Dam Boulevard. Interstate 5 is the closest major public roadway, and is located east of the site. Digger Bay road is a winding two-lane road that cuts through the western edge of the property, connecting Digger Bay (on Shasta Lake, northeast of the site) to Shasta Dam Boulevard south of the site. Shasta Dam Boulevard is a two-lane road starting at Interstate 5, and continuing west to Shasta Lake Dam. Each of these roadways is described in greater detail below.

INTERSTATE 5

Interstate 5 is a major north-south freeway running the entire length of Shasta County, and is the closest major roadway to the Project site, located approximately one mile to the east of the site. Partial views of the Project site, particularly the east-facing slope of the proposed North Pit, are visible from Interstate 5. The stretch of Interstate 5 in the vicinity of the Project site has limited commercial and residential development, and provides scenic and unobstructed views of the surrounding natural environment. The speed limit through this stretch of Interstate 5 is 65 miles per hour. This stretch of Interstate 5 is used by commuter traffic and by recreational travelers accessing the Shasta-Trinity National Forest.

DIGGER BAY ROAD

Digger Bay Road is a private/public roadway traveling through the western edge of the Project site. The roadway is a windy two-lane road with varying topography and elevation changes. Digger Bay Road extends from Pickard Street/Shasta Park Drive to the north, ending at Digger Bay Marina and Shasta Lake, approximately 1.5 miles in total length. No large intersections or stop-lights are located along Digger Bay Road. The posted speed limit along Digger Bay Road is 35 miles per hour.

The Project site is visible in varying degrees along stretches of Digger Bay Road where breaks in vegetation or elevations of the roadway allow views of the site. These views are limited to an approximately one-quarter mile stretch when first turning onto Digger Bay Road from Pickard Street/Shasta Park Drive, and approximately one-half mile further north where the road rises in elevation for a very short segment before it descends into Digger Bay Marina and Shasta Lake. There are currently no residences, bike lanes, or other recreational trails that are located along or follow this stretch of Digger Bay Road.

SHASTA DAM BOULEVARD

Shasta Dam Boulevard is a two-lane major collector road primarily oriented east/west from Interstate 5 to the Shasta Dam. The road provides a route through the center of the City of Shasta Lake and major residential and commercial areas of the City. The speed limit along Shasta Dam Road ranges from 30 to 45 miles per hour.

The Project site is partially visible within two one-quarter to one-half mile stretches on the western side of the City of Shasta Lake. The first area of partial site visibility is between where Shasta Dam Road crosses the Union Pacific Rail line and Hardenbrook Avenue. The second area of partial site visibility is between 1st Street and Shasta Park Drive. These views of the site are not direct line of sight views, due to intervening topography, vegetation, and existing commercial and residential buildings. The Project site is located approximately one to 1.5 miles north of these areas on Shasta Dam Road. Therefore, drivers traveling along these portions of Shasta Dam Road would have only brief, partial views of the site, due to driving speeds and the intervening topography, vegetation, and structures.

City of Shasta Lake

The City of Shasta Lake is the closest incorporated City and urbanized area to the Project site. The City includes areas of residential, commercial and industrial developments, with associated infrastructure and services. From most viewpoints within the City, the Project site is completely out of sight due to intervening residential and commercial buildings, natural topography, and vegetation. Areas within the northern portion of the City have partial views of the Project site.

Surrounding Residences

Rural residences are scattered throughout the vicinity of the Project site, primarily to the south, southwest, and southeast. Residences are located in the immediate vicinity of the Project site boundary, one-half to one mile from the areas proposed for disturbance (closest to the South Pit). Most residences in the vicinity of the Project site would have very limited views of the Project site due to the natural topography of the area and the intervening vegetation. Some residences located within the valleys near Digger Bay Road and Black Canyon Road would have partial views of the site, but would not have direct line of site view of the areas proposed for surface disturbance.

Shasta Lake and the Shasta-Trinity National Forest

Shasta Lake is located approximately one mile north and northwest of the Project site boundary. The stretch of Interstate 5, east of the Project site, is located near the southern gateway or entry point into the Shasta-Trinity National Forest for travelers accessing this area from the south. The Shasta Lake Ranger Station and Visitor Information Center is located immediately east of Interstate 5, south of Old Oregon Trail, approximately one mile east of the Project site. Partial views of the Project site, particularly the east-facing slope of the proposed North Pit, are visible from the Shasta Lake Ranger Station and Visitor Information Center.

The Digger Bay Marina is the closest recreational development on Shasta Lake in proximity to the site. Due to the intervening topography, the Project site is not visible from the shoreline areas of Shasta Lake.

Portions of the site may be visible from trails and recreational areas within the Shasta-Trinity National Forest to the north, however, access to the lands immediately north of the site is limited, and the intervening vegetation and topography generally do not provide for clear views of the site from ground level.

VISUAL SIMULATIONS

Visual simulations have been prepared as part of this EIR in order to depict changes to the visual character of the site during periods of peak mining activity (maximum surface disturbance), and the visual character of the site following reclamation activities. As described in greater detail below, the site is most visible to the greatest number of viewers from areas on and adjacent to Interstate 5, located east of the site (including the Shasta Lake Ranger Station and Visitor Information Center), and from areas within the City of Shasta Lake, located south of the site. Figures 3.1-1A and 3.1-1B shows the camera locations for the six sites used in the visual simulations. Camera locations 1, 2, and 3 are from areas along Interstate 5, to the east of the site, and camera locations 4, 5, and 6 are from areas within the City of Shasta Lake.

As described in Chapter 2.0, the proposed mining activities on the site would occur over an approximately 100-year time period. As discussed in the Project Description and **Appendix C**, concurrent reclamation would occur prior to completion of all mining operations in approximately 100 years.

Each of the visual simulations for each camera location shows the existing conditions of the Project site from that location, and depicts the visual conditions of the site during maximum surface disturbance (the 100-year timeframe). Visual simulations have also been prepared to depict the visual conditions of the site from each camera location approximately 30 years after revegetation has occurred. The visual simulations are presented in Figures 3.1-2A through 3.1-2X.

VISUAL CHARACTER, QUALITY, AND SENSITIVITY LEVEL ANALYSIS

Natural and artificial landscape features contribute to the visual character of an area or view. Visual character is influenced by geologic, hydrologic, botanical, wildlife, recreational, and urban features. Visual quality is evaluated on the basis of the relative degree of vividness, intactness, and unity, as modified by its visual sensitivity. High-quality views are highly vivid, are relatively intact, and exhibit a high degree of visual unity. Low-quality views lack vividness, are not visually intact, and possess a low degree of visual unity.

The visual character and quality of the site are considered high. The Project site is currently in a natural open space condition, and the site is characterized by substantial changes in elevation, including hillsides and slopes that are visible from the south and east. The site contains natural vegetation and water features that provide scenic beauty, visual contrast, and contribute to the rugged, rural, natural beauty of the site and the region. Though the visual character and quality is considered high for the before mentioned reasons it should be recognized that similar views are located in abundance throughout the County. Additionally, mining and related surface disturbance is not an uncommon visual occurrence in this area of the County (i.e., two other operations).

Sensitivity levels are a measure of public concern for scenic quality. Lands can be assigned high, medium, or low sensitivity levels by analyzing the various indicators of public concern. When assessing visual sensitivity of a site, factors to consider include:

- Type of Users. Visual sensitivity will vary with the type of users. Recreational sightseers may be highly sensitive to any changes in visual quality, whereas commuters who pass through the area on a regular basis may not be as sensitive to change.
- Amount of Use. Areas seen and used by large numbers of people are potentially more sensitive. Protection of visual values usually becomes more important as the number of viewers increase.
- Public Interest. The visual quality of an area may be of concern to local, State, or National groups. Indicators of this concern are usually expressed in public meetings, letters, newspaper or magazine articles, newsletters, land-use plans, etc. Public controversy created in response to proposed activities that would change the landscape character should also be considered.
- Adjacent Land Uses. The interrelationship with land uses in adjacent lands can affect the visual sensitivity of an area. For example, an area within the view shed of a residential area may be very sensitive, whereas an area surrounded by commercially developed lands may not be visually sensitive.
- Special Areas. Management objectives for special areas such as Natural Areas, Wilderness Areas or Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and Areas of Critical Environmental Concern (ACEC), frequently require special

consideration for the protection of the visual values. This does not necessarily mean that these areas are scenic, but rather that one of the management objectives may be to preserve the natural landscape setting. The management objectives for these areas may be used as a basis for assigning sensitivity levels.

The sensitivity level of the site is also considered high. The site is visible from Interstate 5, which is a heavily travelled highway, used by commuters, regional travelers, and recreational travelers accessing the Shasta-Trinity National Forest. The site is also visible from areas within the City of Shasta Lake, and by rural residences near the Project site, primarily to the south and east. Views of the site from the City of Shasta Lake and the surrounding residences will experience views of the site for long periods of time on a continuous basis, which increases the visual sensitivity of the site from these areas. The site is also visible to recreational users of the Shasta-Trinity National Forest, including hikers, hunters, geolgists, and nature enthusiasts. Additionally, during the public review period for the Notice of Preparation (NOP) prepared for this Project, and during the public scoping meeting held during the NOP comment period, numerous residents of the area, including numerous residents from the City of Shasta Lake, expressed concern over the potential for visual and aesthetic impacts to occur as a result of Project implementation. The high level of public concern over this issue indicates a high level of visual sensitivity of the Project site.

3.1.2 Regulatory Setting

Federal

National Scenic Byways Program

The National Scenic Byways Program is part of the U.S. Department of Transportation, Federal Highway Administration. The program is a grass-roots collaborative effort established to help recognize, preserve and enhance selected roads throughout the United States. Since 1992, the National Scenic Byways Program has funded 3,174 Projects for state and nationally designated byway routes in 50 states, Puerto Rico and the District of Columbia. The U.S. Secretary of Transportation recognizes certain roads as All-American Roads or National Scenic Byways based on one or more archeological, cultural, historic, natural, recreational and scenic qualities. There are no federally designated highways in the Project vicinity.

State

California Scenic Highway Program

The intent of the California Scenic Highway Program is “to protect and enhance California’s natural scenic beauty and to protect the social and economic values provided by the State’s scenic resources.” Caltrans administers the program, which was established in 1963 and is governed by the California Streets and Highways Code (§260 et seq.). The goal of the program is to preserve and protect scenic highway corridors from changes that would diminish the aesthetic value of the adjacent land. Caltrans has compiled a list of state highways that are designated as scenic and county highways that are eligible for designation as scenic.

Scenic highway designation can provide several types of benefits to the region. Scenic areas are protected from encroachment of inappropriate land uses, free of billboards, and are generally required to maintain existing contours and preserve important vegetative features. Only low density development is allowed on steep slopes and along ridgelines on scenic highways, and noise setbacks are required for residential development.

State Route 89 from its intersection with State Route 36, south of Mount Lassen to Interstate -5 south of Mount Shasta, is part of the federal Volcanic Legacy Scenic Byway, but the Project site is not visible from this roadway segment.

LOCAL

Shasta County General Plan

The County's General Plan includes objectives and policies that strive to preserve aesthetic and visual resources in the County.

Figure SH-1 in the Scenic Highways Element of the Shasta County General Plan designates Highway 151 (Shasta Dam Boulevard) from Shasta Dam to Interstate 5 as a State Route Eligible for Official Scenic Highway Designation, Corridor in which the Natural and Man-Made Environment Contrast. Additionally, Figure SH-1 identifies a location on Interstate 5, near the proposed Project access road, as a "Transition Area," which is a location where the visual environment changes dramatically.

The following General Plan Scenic Highways Element objectives and policies are relevant to the proposed Project.

OBJECTIVES

Objective SH-1: Protection of the natural scenery along the official scenic highways of Shasta County from new development which would diminish the aesthetic value of the scenic corridor.

Objective SH-2: New development along scenic corridors of the official scenic highway should be designed to relate to the dominant character of the corridor (natural or natural and man-made contrast) or of a particular segment of the corridor. Relationships shall be achieved in part through regulations concerning building form, site location, and density of new development.

Objective SH-3: Recognition that the management practices of agriculture, timber, and other resource-based industries which may cause some degradation of the visual quality of the scenic corridor are inevitable but their impacts are temporary.

POLICIES

> **Policy SH-a:** To protect the value of the natural and scenic character of the official scenic highway corridors and the County gateways dominated by the natural environment, the following provisions, along with the County development standards, shall govern new development:

- setback requirements
- regulations of building form, material, and color
- landscaping with native vegetation, where possible
- minimizing grading and cut and fill activities
- requiring use of adequate erosion and sediment control programs
- siting of new structures to minimize visual impacts from highway
- regulation of the type, size, and location of advertising signs
- utility lines shall be underground wherever possible; where undergrounding is not practical, lines should be sited in a manner which minimizes their visual intrusion.

Policy SH-b: The type, size, design, and placement of signs within an official corridor shall be compatible with the visual character of the immediate surroundings. The County's sign regulations should be redrafted for the following locations:

- timberlands and forest areas
- croplands and grazing lands
- rural community centers
- urban and town centers
- recreational uses

Shasta County Zoning Ordinance

Section 17.84.050, Lighting, of the County Zoning Ordinance (as amended through July 2003) contains the following aesthetic-related policy that would apply to the proposed Project:

All lighting, exterior and interior, shall be designed and located so as to confine direct lighting to the premises. A light source shall not shine upon or illuminate directly on any surface other than the area required to be lighted. No lighting shall be of the type or in a location such that constitutes a hazard to vehicular traffic, either on private property or on abutting streets.

3.1.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project would have significant impact on aesthetics if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings;
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

IMPACTS AND MITIGATION MEASURES

Impact 3.1-1: Project implementation has the potential to result in substantial adverse effects on scenic vistas or substantially damage scenic resources within a designated State Scenic Highway (Less than Significant)

FEDERALLY DESIGNATED SCENIC HIGHWAYS

There are no federally designated scenic highways in the vicinity of the Project site. In Shasta County, State Route 89 from its intersection with State Route 36 (south of Mount Lassen) to I-5, south of Mount Shasta, is part of the Volcanic Legacy Scenic Byway. The Volcanic Legacy Scenic Byway is designated as an All-American Road under the Federal Highway Administration National Scenic Byways Program. The Project site is not visible from this roadway segment.

STATE DESIGNATED SCENIC HIGHWAYS

According to Caltrans' California Scenic Highway Mapping System, a three-mile portion of Route 151 (Shasta Dam Boulevard) from Shasta Dam to near Lake Boulevard is an "Officially Designated State Scenic Highway." This road segment curves along the slope of a ridge, providing views of the Sacramento River, Shasta Lake and distant hills to the west. While this portion of an Officially Designated State Scenic Highway is located in close proximity to the Project site (approximately 1-2 miles southwest of the site), the Project site is not visible from this stretch of roadway due to the intervening topography. Therefore, the proposed Project would not damage a scenic vista or scenic resources within the viewshed of a designated State Scenic Highway.

Route 151 (Shasta Dam Boulevard) from near Lake Boulevard to Interstate 5 runs east-west approximately one to two miles south of the Project site. This roadway segment is designated by the Caltrans Scenic Highway Mapping System, and by the Shasta County General Plan, as an "Eligible State Scenic Highway, Not Officially Designated." Partial views of the Project site are visible from portions of this roadway segment. The Project site is partially visible within two one-

quarter to one-half mile stretches on the western side of the City of Shasta Lake. The first area of partial site visibility is between where Shasta Dam Road crosses the Union Pacific Rail line and Hardenbrook Avenue. The second area of partial site visibility is between 1st Street and Shasta Park Drive. These views of the site are not direct line of sight views, due to intervening topography, vegetation, and existing commercial and residential buildings. The Project site is located approximately one to 1.5 miles north of these areas on Shasta Dam Boulevard. This roadway segment is labeled as "Eligible State Scenic Highways, Not Officially Designated." As such, the Project would not have a significant impact on an "Officially Designated State Scenic Highway."

Interstate 5, which runs north-south, approximately one-mile east of the Project site, is designated by the Caltrans Scenic Highway Mapping System, and by the Shasta County General Plan, as an "Eligible State Scenic Highway, Not Officially Designated." The Project site is highly visible from this roadway segment, however, this roadway segment is labeled as "Eligible State Scenic Highways, Not Officially Designated." As such, the Project would not have a significant impact on an "Officially Designated State Scenic Highway."

SHASTA COUNTY SCENIC HIGHWAYS ELEMENT

Figure SH-1 in the Scenic Highways Element of the Shasta County General Plan identifies roadway segments in the County that are eligible for protection from visual impacts.

Interstate Highway 5 from the north end of State Route 273 to the Old Oregon Trail interchange is designated as "State Routes Eligible for Official Scenic Highway Designation, Corridor in which Natural and Man-Made Environment Contrast."

The section of Interstate Highway 5 from the Old Oregon Trail interchange to a point approximately 0.75 miles north is designated as a "Transition" zone. As described previously in this section, and as shown on Figures 3.1-2A through 3.1-2L, portions of the Project site would be visible from this stretch of Interstate 5, and from the designated "Transition" Area shown on County General Plan Figure SH-1.

The section of Interstate Highway 5 from the north end of the Transition zone to the north end of the Pit River Bridge is designated as "Scenic Routes Eligible for Official Scenic Highway Designation, corridor in which Natural Environment Is Dominant."

All of State Route 151 (aka Shasta Dam Boulevard) is designated as "State Routes Eligible For Official Scenic Highway Designation, Corridor in Which Natural and Man-Made Environment Contrast."

None of the Shasta County General Plan Scenic Highway Objectives or Policies identified previously in this section apply to the proposed Project because the Project site is not visible from any "Official" scenic highway. As such, this is a less than significant impact.

This EIR acknowledges and discloses that implementation of the proposed Project would substantially alter the existing visual character and scenic quality of an area with high viewer sensitivity and high degrees of visual quality within the viewsheds of two roadway segments designated as Eligible State Scenic Highways (Interstate 5 and Shasta Dam Boulevard). However, as of the time of preparation of this EIR, these roadway segments are not officially designated as State Scenic Highways. Therefore, the Scenic Highway Objectives and Policies contained in the Shasta County General Plan do not apply to this Project, and this is considered a **less than significant** impact.

Impact 3.1-2: Potential to substantially degrade the existing visual character or quality of the site and its surroundings (Significant and Unavoidable)

Implementation of the proposed Project would dramatically alter the existing visual character and quality of the Project site. There are two primary components of the Project that would alter the visual character of the site:

1. The mining areas (North Pit, South Pit, and Overburden Fill Area), and
2. The Primary Processing Plant, Secondary/Ancillary Processing Area, and the Load-Out Area.

These areas are shown on Figure 2-10 in the Project Description.

The Primary Processing Plant, Secondary/Ancillary Processing Area, and the Load-Out Area would not be highly visible from areas surrounding the Project site. These areas of the Project site would be located at an elevation of approximately 1,000 feet amsl. Views of the processing and load-out areas from areas within the City of Shasta Lake would be fully obstructed by the intervening topography in the southern and southeastern portions of the site. Topographic contour lines are shown on Figure 2-4A. There is a hillside with two peaks at elevations of 1,350 feet amsl and 1,275 feet amsl between the processing and load-out areas and the City of Shasta Lake. Those peaks would fully obstruct views of these areas from vantage points within the City of Shasta Lake, and from the residential areas located to the south and southeast of the Project site.

Views of the Primary Processing Plant would also be fully obstructed from Interstate 5 due to the intervening topography. A hilltop with an elevation of approximately 1,150 feet is located directly within the sightline between Interstate 5 and the Primary Processing Plant, which would fully obstruct views of this area of the Project site from Interstate 5.

Travelers along Interstate 5 would have very limited views of the tops of the tallest structures located within the Secondary/Ancillary Processing Area, as shown on Figure 2-10. Views of this portion of the site would largely be obstructed by the stands of mature trees that would remain along the eastern portions of the Project site, and by trees located east of the Project boundary, between the Project site and Interstate 5.

The east-facing slope of the North Pit and the Overburden Fill Area would be the most highly visible aspects of the Project. Mining activities within the North Pit area and Overburden Fill Area would be highly visible from Interstate 5, and the Shasta Lake Ranger Station and Visitor Information Center, as shown on Figures 3.1-2E and 3.1-2F. Portions of this area of the site would also be visible from areas within the City of Shasta Lake, as shown on Figures 3.1-2G through 3.1-2L.

The North Pit would encompass approximately 220 acres. Figure 2-10 shows the location of the North Pit within the context of the Project area. Figure 2-11 shows a cross section of the North Pit, which depicts the topography and ground surface elevations of this area under existing conditions, and shows the final topography of this area after mining has occurred. The western portion of the North Pit is currently a sloped hillside with a maximum existing ground surface elevation of approximately 1,950 feet amsl. The hillside slopes downward to the east, and generally levels out at an elevation between 1,350 and 1,400 feet amsl. Mining activities would generally follow the existing slopes and contours of the North Pit's existing topography, removing approximately 100-250 feet of materials along the contours of the slope and the base of the hillside. The western side of the North Pit would be a "stepped" slope or hillside, with an overall maximum slope of approximately 1.4:1 (1.4 horizontal to 1 vertical), resulting in "steps" that are approximately 50 feet tall and 60 feet wide. The western side of the North Pit would have a peak elevation of approximately 1,950 feet amsl following mining activities, which would step down and to the east until reaching the floor of the North Pit at an elevation of approximately 1,175 feet amsl. The eastern side of the North Pit would have a maximum elevation of approximately 1,325 feet amsl following the completion of mining activities. Viewers from Interstate 5 may see approximately 400-600 feet of exposed rock surface on the sloped face of the North Pit from areas along Interstate 5 near the Oregon Trail Interchange. The visible height of the exposed rock surface on the slope face following full mining disturbance would vary based on the location and orientation of the viewer.

The South Pit would encompass approximately 65 acres, and is most likely the area of the Project site where mining activities would start. Figure 2-10 shows the location of the South Pit within the context of the Project area. Figure 2-11 shows a cross section of the South Pit, which depicts the topography and ground surface elevations of this area under existing conditions, and shows the final topography of this area after mining has occurred. The South Pit is a hill with a peak elevation of approximately 1,380 feet above mean sea level (amsl), and a lower base elevation of approximately 1,050 feet amsl. Mining activities would remove the hilltop, and ultimately create a mining pit with a base elevation of approximately 950 feet amsl at the bottom of the pit. The western side of the South Pit would be a "stepped" hillside with an overall maximum slope of approximately 1.4:1 (1.4 horizontal to 1 vertical), resulting in "steps" that would be approximately 50 feet tall and 60 feet wide. The western side of the South Pit would have a peak elevation of approximately 1,250 feet amsl following the completion of mining activities, which would step down and to the east until reaching the floor of the South Pit at an elevation of approximately 950 feet amsl. The eastern side of the South Pit would have a maximum elevation of approximately 1,050 feet amsl following completion of mining activities.

The overburden fill area would encompass approximately 60 acres, and would be located immediately east of the North Pit, and north of the South Pit. Figure 2-10 shows the location of the overburden fill area. Figure 2-12 shows a cross section of the overburden fill area, which includes the existing ground surface levels and the final ground surface levels following the completion of mining activities and the placement of overburden materials in this area. As shown in Figure 2-12, the overburden fill area is currently a gentle slope decreasing in elevation from west to east, with a small depression located near the center of the 60-acre area. The existing elevation on the western edge of this area is 1,200 feet above mean sea level (amsl) and the elevation on the eastern edge is 1,000 feet amsl. The lowest elevation is approximately 950 feet amsl, near the center of the overburden fill area. Following the placement of overburden materials in the overburden fill area, a mounded hill, approximately 60 acres in size would be created. The maximum elevation would be approximately 1,300 feet amsl, as shown in Figure 2-12. Viewers from Interstate 5 may see approximately 100 feet of exposed rock and soil surface on the overburden fill area from areas along Interstate 5 near the Oregon Trail Interchange. The visible height of the exposed rock and surfaces on the slope face following full mining disturbance would vary based on the location and orientation of the viewer.

The visual character and quality of the site are considered high. The Project site is currently in a natural open space condition, and the site is characterized by substantial changes in elevation, including hillsides and slopes that are visible from the south and east. The site contains natural vegetation and water features that provide scenic beauty, visual contrast, and contribute to the rugged, rural, natural beauty of the site and the region.

The visual sensitivity level of the site is also considered high. The site is visible from Interstate 5, which is a heavily travelled highway, used by commuters, regional travelers, and recreational travelers accessing the Shasta-Trinity National Forest. Motorists traveling on Interstate 5 would be averaging speeds of 65 to 70 miles per hour and would therefore have views of the Project site for less than a minute. In addition, motorists on Interstate 5 are traveling in a north/south direction. The visible surface disturbance of the Project would only be visible from the periphery of their vision and not direct line of sight. The site is also visible from areas within the City of Shasta Lake, and by rural residences near the Project site, primarily to the south and east. Views of the site from the City of Shasta Lake and the surrounding residences would experience views of the site for long periods of time on a continuous basis, which would increase the visual sensitivity of the site from these areas. The majority of these views are partial views screened by existing topography and vegetation that would not be changed as a result of the Project. The site is also visible to recreational users of the Shasta-Trinity National Forest. As described above, recreational viewers are considered highly sensitive to visual changes in the natural environment. Additionally, during the public review period for the Notice of Preparation (NOP) prepared for this Project, and during the public scoping meeting held during the NOP comment period, numerous residents of the area, including numerous residents from the City of Shasta Lake, expressed concern over the potential for visual and aesthetic impacts to occur as a result of Project implementation. The high level of public concern over this issue indicates a high level of visual sensitivity of the Project site.

Mining activities would incrementally remove vegetation and ground cover from the quarry areas as new benches and associated working areas were developed over the 100-year life of the quarry. In addition, the overburden fill area would incrementally be developed as mining operations progressed. The Project does not propose to remove vegetation and ground cover within the proposed mining areas and overburden fill area until necessary for Project operations. The vegetation and ground cover in the primary processing plant, secondary and ancillary processing and loadout area, rail spur/siding and access road would be removed within the first 10 years of operations. As a result, over the 100-year life of the Project the site would be transformed from wooded open space of high scenic and visual quality, to views of mining benches, exposed dirt and rocks, industrial equipment, access and haul roads. Viewers travelling along the Interstate 5 corridor may experience views of a disturbed mine slope face of 400-600 feet high, which would be very visually prominent when compared to the surrounding natural hillsides. The existing visual quality and character of the site would be dramatically changed by the proposed Project. This is considered a **significant impact**.

There is no feasible near-term mitigation solution to alleviate the significant visual impacts of the proposed Project. The processing and load-out areas would be placed in areas of the site that are the least visible from the surrounding roadways and sensitive viewsheds. Trees would be left in place onsite to provide visual screening of the processing and load-out areas to the greatest extent feasible. There is no feasible mitigation available to obstruct or screen views of the mining areas from the surrounding roadways and sensitive view locations.

The Project includes plans for site reclamation and revegetation, including concurrent reclamation, as described in greater detail in the Project Description section of this EIR. As shown on Figure 2-19, the North Pit and Overburden Fill Area would be revegetated with Successional Foothill Pine Woodlands and Successional Oak Woodlands, while the South Pit would be either backfilled and revegetated, or used for open water storage (a lake would be created). Following the start of revegetation activities, it would take decades for the new trees and vegetation to reach maturity and blend with the surrounding natural landscape. Concurrent reclamation would occur on completed quarry benches and construction pads and facilities no longer necessary for Project operations. Specifically, concurrent reclamation of quarry benches would include placement of catchment berms on completed benches using stockpiled overburden and topsoil. The catchment berms would initially be hydroseeded for erosion control. Once lower benches are developed and/or completed, trees and other vegetation consistent with the revegetation plan would be planted on the catchment berms. The Secondary Processing Area would remain as an industrial use indefinitely, and this area of the site is not proposed for reclamation or revegetation.

As described above, Project implementation would dramatically alter and degrade the existing visual character and quality of the Project site, which is currently of high visual quality and high visual sensitivity. Reclamation and revegetation activities would eventually transform most of the Project site back to a naturalized condition. However, this transformation back to a naturalized condition would occur more than a century after initial ground disturbance. Over the life of the quarry, the visual impacts would get progressively more severe and more visible as mining progresses throughout the site, and the area of disturbance increases over the next several

decades. This impact would be **significant and unavoidable** as there is no feasible mitigation available to reduce this impact to a less than significant level. The mitigation measure presented below requires the Project Applicant to fully implement the Reclamation and Revegetation Plans that have been submitted as part of the project application, and described in greater detail in Section 2.0 of this Draft EIR. However, this impact would remain significant and unavoidable following the implementation of this mitigation measure.

MITIGATION MEASURES

***Mitigation Measure 3.1-2**: The Project Applicant shall fully implement the Reclamation Plan and Revegetation Plan, which are components of the applicant's approval package that must be approved by Shasta County prior to the commencement of any mining activities on the Project site. The Reclamation and Revegetation Plans shall be implemented concurrent with mining activities. Once mining in an area of the site has been completed, the applicant shall begin to reclaim and revegetate that portion of the site, consistent with the requirements outlined in the approved Reclamation and Revegetation Plans.*

Impact 3.1-3: Project implementation may result in light and glare impacts (Less than Significant with Mitigation)

Implementation of the proposed Project would introduce new sources of light and glare into the Project area. New sources of glare would occur primarily from the windshields of vehicles travelling to and from the Project site and from vehicles and equipment working within the site. The employee parking areas are located within the interior of the Project site within the processing areas, and are not immediately adjacent to any of the light sensitive land uses in the Project vicinity (the residential areas to the south and southeast, as well as vehicles traveling along Interstate 5). The equipment and structures within the processing areas would not be made of highly reflective materials, and would be screened from view by retained trees and intervening topography. The potential for the Project to result in glare impacts would be considered **less than significant.**

The Project would introduce new sources of nighttime lighting, which could result in increased nighttime lighting in the Project vicinity. Current nighttime lighting in the Project vicinity is primarily limited to lights from vehicles traveling on Interstate 5 and other roadways in the Project vicinity, and from commercial and residential buildings located in the City of Shasta Lake and the areas surrounding the Project site. Existing ambient nighttime lighting conditions in the Project vicinity are currently relatively low.

As described in greater detail in Table 2-2 in the Project Description, quarrying and processing activities would generally occur year round between 6:00 a.m. and 10:00 p.m. on weekdays, and rail loading and materials hauling would occur 24 hours per day, seven days per week. Nighttime operations would require lighting for worker safety. Lights would be positioned in accordance with applicable Occupational Safety and Health Administration and Mine Safety and Health Administration safety standards, set forth in Section 17.84.050, Lighting, of the County Zoning Ordinance. Most of the onsite lighting would be located within the Primary and Secondary

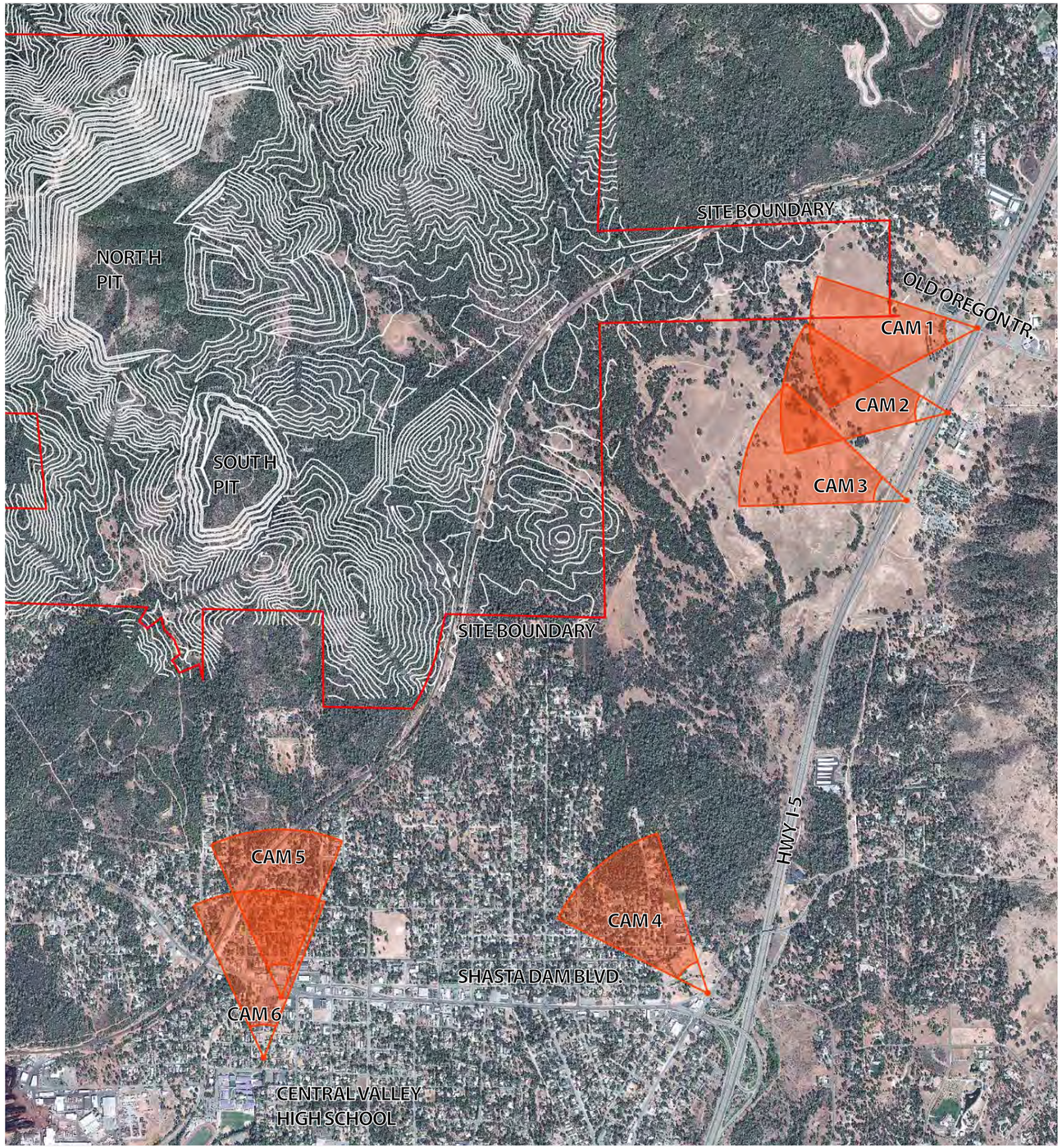
Processing Areas. Nighttime lighting would also occur from excavation equipment and worker vehicles working within the quarry areas after sunset.

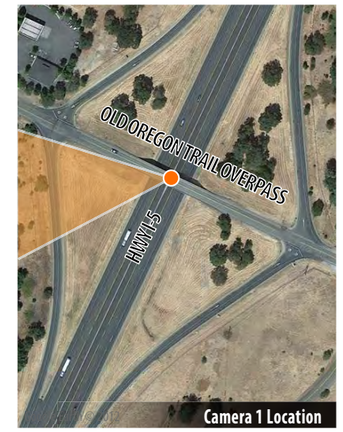
Onsite lighting could increase ambient light during nighttime hours in the Project vicinity, and could reduce the "dark skies" in the Project area. While onsite lighting would be visible from nearby residences and vehicles travelling on Interstate 5, there would be limited potential for onsite lighting to result in "light spillage" or to directly illuminate offsite areas due to the onsite setbacks between the Project property lines and the areas of on-site activity. The introduction of new sources of nighttime lighting to the Project area is considered **potentially significant**. The implementation of Mitigation Measure 3.1-3 would reduce this impact to a **less than significant level**. Mitigation Measure 3.1-3 would ensure that nighttime lighting from the Proposed Project is limited to areas where mining activities and associated materials processing and loading takes place. As such, light spillage onto adjacent properties and undeveloped natural areas of the project site would be avoided. Implementation of the lighting plan would reduce nighttime lighting impacts to sensitive biological areas on and surrounding the project site, and would reduce nighttime lighting impacts to residences in the vicinity of the Project site.

MITIGATION MEASURES

***Mitigation Measure 3.1-3**: In order to reduce potential for nighttime lighting impacts, the Project Applicant shall prepare and submit a lighting standards plan for review and approval by the Shasta County Department of Resource Management. The lighting plan shall include standards to reduce direct and reflected light pollution, and shall comply with the measures set forth in Section 17.84.050, Lighting, of the County Zoning Ordinance. All exterior lighting shall be equipped with shields that concentrate the illumination downward to limit the light that is cast off of the site. The direct source of light (bulbs, lens, filament, tube, etc.) shall be installed as low as possible on poles and/or structures in order to minimize reflected light and light spillage. The candle power of the illumination at ground level shall not exceed what is required by any safety or security regulations or any government agency with regulatory oversight of the mining operations.*

This page left intentionally blank





MOODY FLATS QUARRY EIR

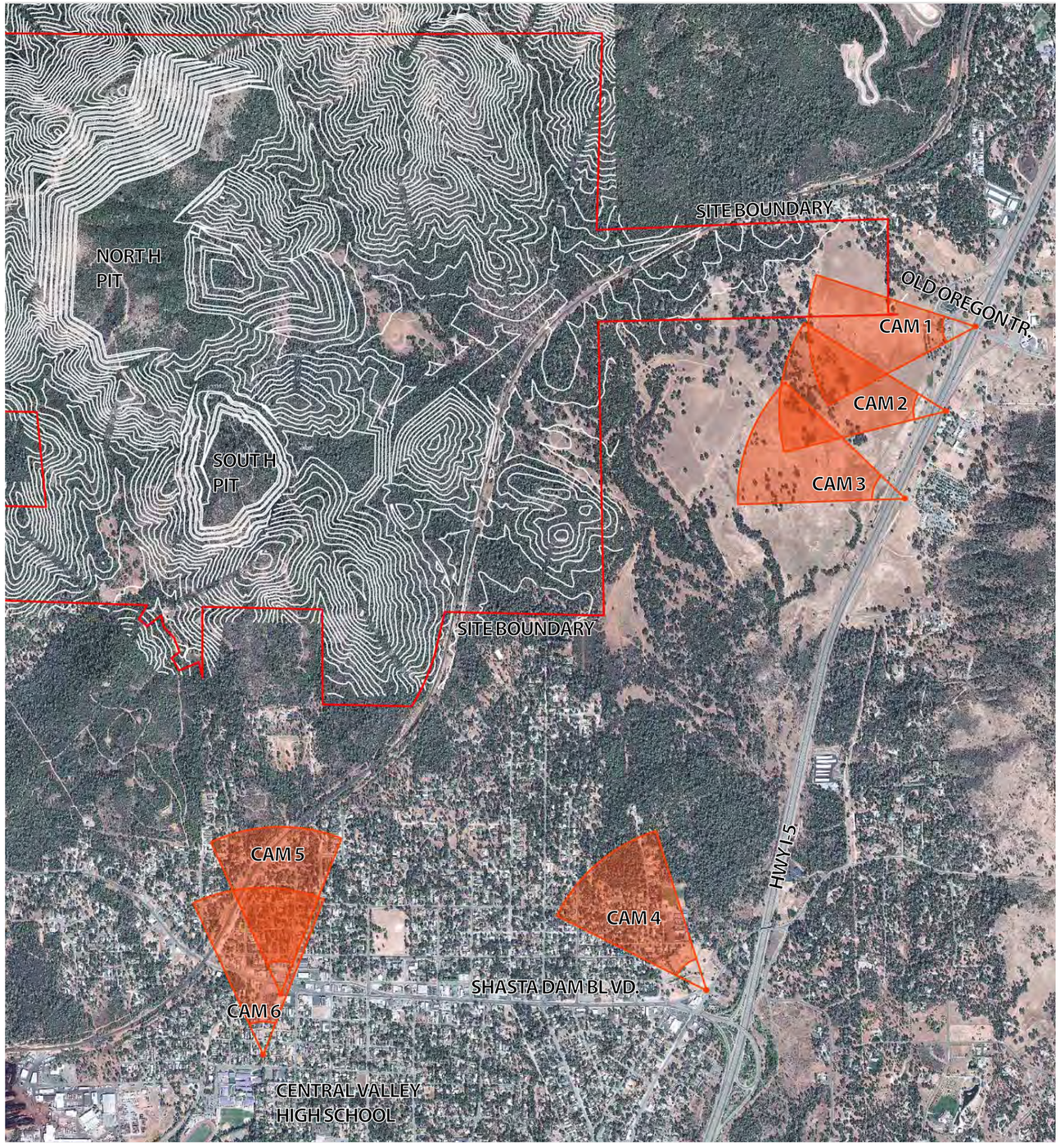
Figure 3.1-1A:
Cameras 1-3 Location Map

N
W E
S

Map date: April 22, 2013

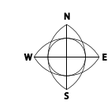
De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



MOODY FLATS QUARRY EIR

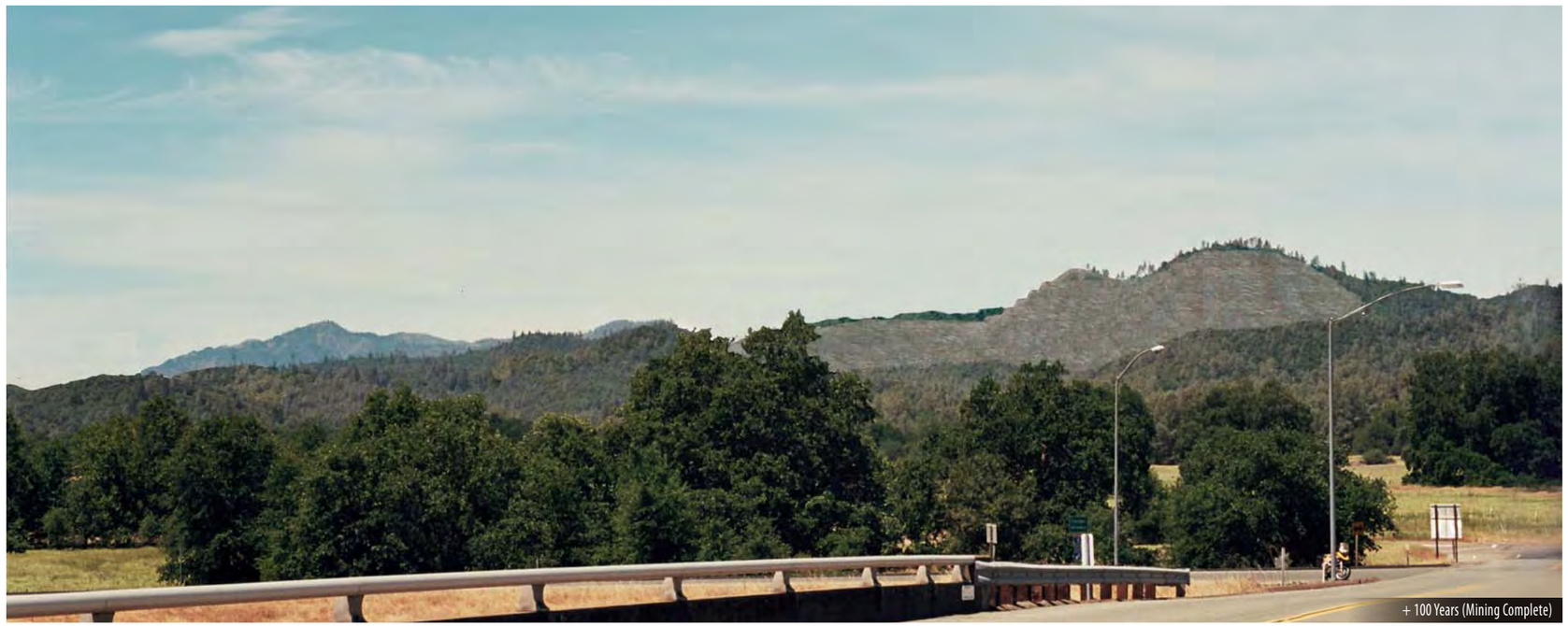
Figure 3.1-1B:
Cameras 4-6 Location Map



Map date: April 22, 2013.

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



MOODY FLATS QUARRY EIR

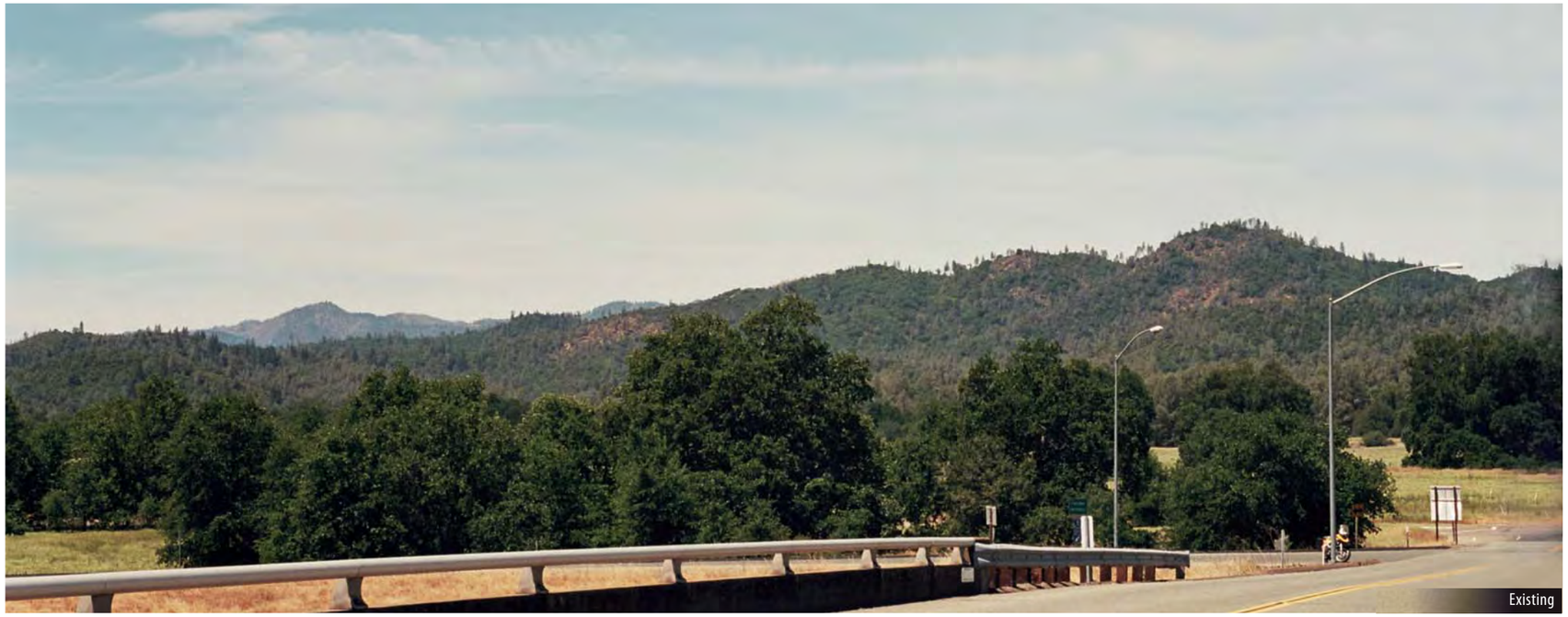
Figure 3.1-2A:
Visual Simulation - View 1

Existing and + 100 years (Mining Complete)
Field of View: 46 degrees

Map date: April 22, 2013

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

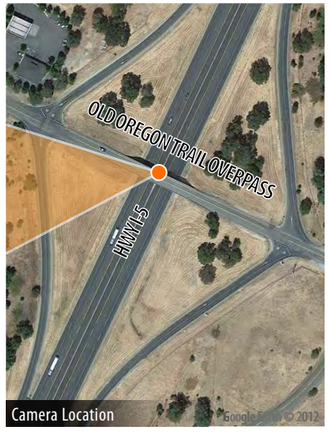
This page left intentionally blank.



MOODY FLATS QUARRY EIR

Figure 3.1-2B:
Visual Simulation - View 1

Existing and +130 years (30 years tree growth)
Field of View: 46 degrees



Map date: April 22, 2013

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

MOODY FLATS QUARRY EIR

Figure 3.1-2C:
Visual Simulation - View 2

Existing and +100 years (Mining Complete)
Field of View: 46 degrees

Map date: April 22, 2013

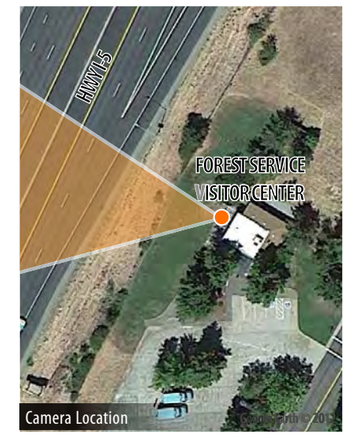
De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

MOODY FLATS QUARRY EIR

Figure 3.1-2D:
Visual Simulation - View 2

Existing and +130 years (30 years tree growth)
Field of View: 46 degrees



Map date: April 22, 2013

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

MOODY FLATS QUARRY EIR

Figure 3.1-2E:
Visual Simulation - View 3

Existing and +100 years (Mining Complete)
Field of View: 46 degrees

Map date: April 22, 2013

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

MOODY FLATS QUARRY EIR

Figure 3.1-2F:
Visual Simulation - View 3

Existing and +130 years (30 years tree growth)
Field of View: 46 degrees

Map date: April 22, 2013

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

MOODY FLATS QUARRY EIR

Figure 3.1-2G:
Visual Simulation - View 4

Existing and + 100 years (Mining Complete)
Field of View: 46 degrees

Map date: April 22, 2013

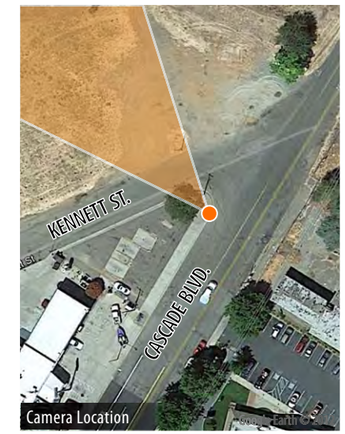
De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

MOODY FLATS QUARRY EIR

Figure 3.1-2H:
Visual Simulation - View 4

Existing and +130 years (30 years tree growth)
Field of View: 46 degrees



Map date: April 22, 2013

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

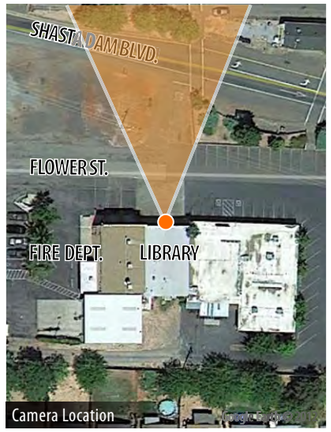
Existing

+ 100 Years (Mining Complete)

MOODY FLATS QUARRY EIR

Figure 3.1-2I:
Visual Simulation - View 5

Existing and +100 years (Mining Complete)
Field of View: 46 degrees



Camera Location

Map date: April 22, 2013

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

Existing

+ 130 Years (30 Years Tree Growth)

MOODY FLATS QUARRY EIR

Figure 3.1-2J:
Visual Simulation - View 5

Existing and +130 years (30 years tree growth)
Field of View: 46 degrees

Camera Location

Map date: April 22, 2013

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

MOODY FLATS QUARRY EIR

Figure 3.1-2K:
Visual Simulation - View 6

Existing and +100 years (Mining Complete)
Field of View: 46 degrees

Map date: April 22, 2013

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

MOODY FLATS QUARRY EIR

Figure 3.1-2L:
Visual Simulation - View 6

Existing and +130 years (30 years tree growth)
Field of View: 46 degrees

Map date: April 22, 2013

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

The Initial Study prepared for this Project, which is included as Appendix A, determined that the proposed Project would have not conflict with existing zoning for agricultural use or a Williamson Act Contract, existing zoning for forest or timberlands, or result in the loss of forest land or the conversion of forest land to non-forest use. Therefore, these topics are not addressed in this Draft EIR.

The purpose of this section is to disclose and analyze the potential for the Project to convert important farmlands to non-agricultural uses, or result in other changes to the environment that could convert farmland to a non-agricultural use. Comments were received during the public review period or scoping meeting for the Notice of Preparation regarding this topic from the Western Shasta Resource Conservation District (January 26, 2012). Each of the comments related to this topic are addressed within this section. Information in this section is derived primarily from the following sources:

- Shasta County General Plan, Chapter/Section 6.1 (September, 2004)
- Soil Survey of Shasta County, California (USDA, 1974)
- California Department of Conservation, Farmland Mapping and Monitoring Program

3.2.1 ENVIRONMENTAL SETTING

EXISTING SITE CONDITIONS

The Project site is located on land that is currently undeveloped, as shown in Figures 2-4A and 2-4B. The elevation of the site ranges from approximately 800 feet to 2,000 feet above mean sea level (amsl). The Project site encompasses approximately 1,850 acres dominated by montane hardwood-conifer and montane hardwood vegetative habitats. Moody Creek, Rancheria Creek, and Salt Creek cross the center and eastern portions of the Project site. A Union Pacific Railroad line runs through the eastern portion of the property and Digger Bay Road crosses the western portion of the property. The northwest corner of the property is within the mapped boundaries of the Shasta-Trinity National Forest but is private land and not subject to regulation by the Forest Service. The Project site sits outside the boundaries of the Shasta Unit of the Shasta-Trinity National Recreation Area.

The Project site is currently designated by the Shasta County General Plan as Mining Resource (MR), Industrial (I), Rural Residential A (RA), Suburban Residential (SR), and Commercial (C) (see Figure 2-6, "Existing General Plan Land Use Designations"). The Shasta County Zone Districts for the Project site are Mineral Resource (MR), Interim Rural Residential (IR), Community Commercial combined with the Design Review District (C-2-DR), and General Industrial (M) (see Figure 2-7, "Existing Zoning Designations"). Thus, none of the Project site is designated or zoned for agricultural or forestry uses. Additionally, none of the surrounding properties in the vicinity of the Project site are designated or zoned for agricultural uses, as shown on Figure 3.2-1.

Notably, there are no agricultural uses occurring on the Project site.

SHASTA COUNTY AGRICULTURE

Agricultural land uses are a major component of Shasta County's resource land base. They are also a major element in defining the quality of life available to the residents of Shasta County. As described in the Shasta County General Plan (2004), the County's total land area in farms was 333,828 acres in 2002. Shasta County ranked 37 out of the 58 California counties in 2011 in the value of total agricultural production, which was $129,441,000. The General Plan describes numerous benefits of agricultural use; these include wildlife, aesthetic, and water quality benefits.

Recent trends in Shasta County show an increase in the number of farms and a decrease in their size, with a loss of agricultural land from 1997 to 2004 amounting to 14,246 acres, or a 4.1 percent decline. Most farms are devoted to pastureland and/or rangeland (Shasta County 2004).

CALIFORNIA AGRICULTURE

The California Department of Conservation identifies through its Farmland Mapping and Monitoring Program lands that have agriculture value and maintains a statewide map of these lands called the Important Farmlands Inventory (IFI). IFI classifies land based upon the productive capabilities of the land, rather than the mere presence of ideal soil conditions.

The suitability of soils for agricultural use is just one factor for determining the productive capabilities of land. Suitability is determined based on many characteristics, including fertility, slope, texture, drainage, depth, and salt content. A variety of classification systems have been devised by the state to categorize soil capabilities. The two most widely used systems are the Capability Classification System and the Storie Index. The Capability Classification System classifies soils from Class I to Class VIII based on their ability to support agriculture with Class I being the highest quality soil. The Storie Index considers other factors such as slope and texture to arrive at a rating. The IFI is in part based upon both of these two classification systems.

Soil Capability Classification System

The Soil Capability Classification System takes into consideration soil limitations, the risk of damage when soils are used, and the way in which soils respond to treatment. Capability classes range from Class I soils, which have few limitations for agriculture, to Class VIII soils that are unsuitable for agriculture. Generally, as the rating of the capability classification increases, yields and profits are more difficult to obtain. A general description of soil classifications, as defined by the Natural Resources Conservation Service (NRCS) is provided in Table 3.2-1 below.

TABLE 3.2-1: SOIL CAPABILITY CLASSIFICATION

CLASS	DEFINITION
I	Soils have slight limitations that restrict their use.
II	Soils have moderate limitations that restrict choice plants or that require moderate conservation practices.
III	Soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.
IV	Soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.
V	Soils are not likely to erode but have other limitations; impractical to remove that limit their use largely to pasture or range, woodland, or wildlife habitat.
VI	Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat.
VII	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife habitat.
VIII	Soils and landforms have limitations that preclude their use for commercial plans and restrict their use to recreation, wildlife habitat, water supply, or aesthetic purposes.

SOURCE: USDA NATURAL RESOURCE CONSERVATION SERVICE, LAND CAPABILITY CLASSIFICATION

SUBCLASSES AND DEFINITIONS

Capability subclass is the second category in the land capability classification system. Class codes e, w, s, and c are used for land capability subclasses.

- **Subclass e** is made up of soils for which the susceptibility to erosion is the dominant problem or hazard affecting their use. Erosion susceptibility and past erosion damage are the major soil factors that affect soils in this subclass.
- **Subclass w** is made up of soils for which excess water is the dominant hazard or limitation affecting their use. Poor soil drainage, wetness, a high water table, and overflow are the factors that affect soils in this subclass.
- **Subclass s** is made up of soils that have soil limitations within the rooting zone, such as shallowness of the rooting zone, stones, low moisture-holding capacity, low fertility that is difficult to correct, and salinity or sodium content.
- **Subclass c** is made up of soils for which the climate (the temperature or lack of moisture) is the major hazard or limitation affecting their use.

Farmland Mapping and Monitoring Program (FMMP)

The FMMP was established in 1982 to continue the Important Farmland mapping efforts begun in 1975 by the USDA Soil Conservation Service (USDA-SCS), now the USDA Natural Resources Conservation Service (NRCS). The intent of the USDA-SCS was to produce agriculture maps based on soil quality and land use across the nation. As part of the nationwide agricultural land use mapping effort, the USDA-SCS developed a series of definitions known as Land Inventory and Monitoring (LIM) criteria. The LIM criteria classified the land's suitability for agricultural production; suitability included both the physical and chemical characteristics of soils and the

actual land use. Important Farmland Maps are derived from the USDA-SCS soil survey maps using the LIM criteria.

Since 1980, the State of California has assisted the NRCS and its predecessor USDA-SCS with completing its mapping in the state. The FMMP was created within the CDC to carry on the mapping activity on a continuing basis, and with a greater level of detail. The CDC applied a greater level of detail by modifying the LIM criteria for use in California. The LIM criteria in California utilize the Soil Capability Classification and Storie Index Rating systems, but also consider physical conditions such as dependable water supply for agricultural production, soil temperature range, depth of the ground water table, flooding potential, rock fragment content, and rooting depth.

The CDC classifies lands into seven agriculture-related categories: Prime Farmland, Farmland of Statewide Importance (Statewide Farmland), Unique Farmland, Farmland of Local Importance (Local Farmland), Grazing Land, Urban and Built-up Land (Urban Land), and Other Land. The first four types listed above are collectively designated by the State as Important Farmlands. Important Farmland maps for California are compiled using the modified LIM criteria (as described above) and current land use information. The minimum mapping unit is 10 acres unless otherwise specified. Units of land smaller than 10 acres are incorporated into surrounding classifications. Each of the seven land types is summarized below.

PRIME FARMLAND

Prime farmland is farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date to attain this classification.

FARMLAND OF STATEWIDE IMPORTANCE

Farmland of statewide importance is farmland with characteristics similar to those of prime farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date to attain this classification.

UNIQUE FARMLAND

Unique farmland is farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date to attain this classification.

FARMLAND OF LOCAL IMPORTANCE

Farmland of local importance is land of importance to the local agricultural economy, as determined by each county's board of supervisors and a local advisory committee.

GRAZING LAND

Grazing land is land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities.

URBAN AND BUILT-UP LAND

Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.

OTHER LAND

Land not included in any other mapping category. Common examples include low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water bodies smaller than forty acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land.

PROJECT SITE SOILS AND FARMLAND CHARACTERISTICS

Soils present on the Project site are shown on Figure 3.2-2 and summarized in Table 3.2-3. The Soil Survey of Shasta County (1974) shows that the Project site contains Capability Class II, III, VI, VII, and VIII soils, as shown in the table below. None of the soils on the Project site are irrigated, therefore, the Soil Capability Classifications presented in Table 3.2-2 below reflect the Project site's soil classifications for non-irrigated soils. Soils present on the Project site are all rated with a subclass of either e or s. Subclass e is made up of soils for which the susceptibility to erosion is the dominant problem or hazard affecting their use. Erosion susceptibility and past erosion damage are the major soil factors that affect soils in this subclass. Subclass s is made up of soils that have soil limitations within the rooting zone, such as shallowness of the rooting zone, stones, low moisture-holding capacity, low fertility that is difficult to correct, and salinity or sodium content.

The majority of the soils on the Project site are class VI and class VII soils, which are soils that have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife habitat.

TABLE 3.2-2: ON-SITE SOIL CAPABILITY CLASSIFICATIONS

SOIL MAP NAME	*SOIL CAPABILITY CLASSIFICATION*	*ACRES OF SOIL TYPE ON THE PROJECT SITE*[1]
Anderson gravelly sandy loam	III-s	0.58
Auburn loam, 0 to 8 percent slopes	IV-e	50.03
Auburn very stony loam, 8 to 30 percent slopes	VI-s	20.96
Auburn clay loam, 8 to 30 percent slopes, eroded	VI-e	129.34
Auburn very stony clay loam, 30 to 50 percent slopes, eroded	VII-s	512.89
Auburn very rocky clay loam, 50 to 70 percent slopes, eroded	VII-s	136.29
Boomer gravelly loam, 0 to 15 percent slopes	III-e	20.82
Boomer gravelly loam, 15 to 30 percent slopes	IV-e	15.49
Boomer gravelly loam, 30 to 50 percent slopes	VI-e	310.08
Boomer very stony loam, 50 to 70 percent slopes	VII-s	59.92
Boomer very stony clay loam, 30 to 50 percent slopes, severely eroded	VI-s	1.00
Churn gravelly loam, 0 to 3 percent slopes	II-s	49.30
Churn gravelly loam, deep, 0 to 3 percent slopes	II-s	58.92
Goulding very stony loam, 10 to 30 percent slopes	VI-s	34.84
Goulding very rocky loam, 50 to 70 percent slopes, eroded	VII-s	4.15
Perkins gravelly loam, 8 to 15 percent slopes	III-e	68.78
Red Bluff loam, 0 to 3 percent slopes	III-s	0.33
Red Bluff loam, 3 to 8 percent slopes	III-e	38.37
Rockland	VIII-s	19.60

NOTE 1: THE PORTION OF THE PROJECT SITE WITHIN THE SHASTA-TRINITY NATIONAL FOREST IS NOT MAPPED.

SOURCE: USDA SOIL CONSERVATION SERVICE, SOIL SURVEY OF SHASTA COUNTY, CALIFORNIA, 1974.

3.2.2 REGULATORY SETTING

FEDERAL

Farmland Protection Program

The Natural Resource Conservation Service (NRCS) administers the Farmland Protection Program (FPP). This is a program that is designed to conserve productive farmland. The NRCS provides funds to agencies for the purchase of conservation easements that meet the specific requirements of the program. Landowners that are interested in participating in the program must agree to conserve their farmland for a minimum period of 30 years.

STATE

Williamson Act

The California Land Conservation Act of 1965, commonly known as the Williamson Act (Gov. Code §§ 51200 et seq.), was established based on numerous state legislative findings regarding the importance of agricultural lands in an urbanizing society. Policies emanating from those findings include those that discourage premature and unnecessary conversion of agricultural land to urban uses and discourage discontinuous urban development patterns, which unnecessarily increase the costs of community services to community residents.

The Williamson Act authorizes each County to establish one or more agricultural preserves. Land that is within the agricultural preserve is eligible to be placed under a contract between the property owner and County that would restrict the use of the land to agriculture in exchange for a tax assessment that is based on the yearly production yield. The contracts have a 10-year term that is automatically renewed each year, unless the property owner requests a non-renewal or the contract is cancelled. If the contract is cancelled the property owner is assessed a fee of up to 12.5 percent of the property value.

The Project site is not under a Williamson Act contract, nor are any of the parcels that are located immediately adjacent to the Project site.

Farmland Security Zones

In 1998 the state legislature established the Farmland Security Zone (FSZ) program. FSZs are similar to Williamson Act contracts, in that the intention is to protect farmland from conversion. The main difference however, is that the FSZ must be designated as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance. The term of a FSZ contract is a minimum of 20 years. The property owners are offered an incentive of greater property tax reductions when compared to the Williamson Act contract tax incentives; the incentives were developed to encourage conservation of prime farmland through FSZs. The non-renewal and cancellation procedures are similar to those for Williamson Act contracts. The Project site and the immediately adjacent parcels are not within the FSZ program.

LOCAL

Shasta County General Plan

The County's General Plan includes objectives and policies that strive to preserve agricultural resources and minimize conflicts between agricultural and urban uses. The following General Plan objectives and policies are relevant to the proposed Project.

AGRICULTURAL ELEMENT

Objective AG-1: Preservation of agricultural lands at a size capable of supporting full-time agricultural operations (designated on the land use maps as A-C or A-G) in order to allow the

continuation of such uses and to provide opportunities for the future expansion and/or establishment of such uses.

Objective AG-2: Preservation of agricultural lands at a size capable of supporting part-time or second income, but not full-time, agricultural operations (designated on the land use maps as A-cg) in order to allow the continuation of such uses and to provide opportunities for the future expansion and/or establishment of such uses.

Objective AG-3: Recognition by Shasta County residents that the preservation of agricultural lands for agricultural uses, both large and small scale, is in the public interest because it preserves local and regional food supplies and is an important contributing industry to the Shasta County economy.

Objective AG-4: Recognition by Shasta County residents that preservation of agricultural lands, both large and small-scale, provides privately maintained open-space, facilitates a rural lifestyle, and requires Countywide understanding of the problems facing ranchers and farmers.

Objective AG-5: Protection of agricultural lands from development pressures and or uses which will adversely impact or hinder existing or future agricultural operations.

Objective AG-6: Protection of water resources and supply systems vital for the continuation of agriculture.

Policy AG-a: Agricultural lands in Shasta County shall be classified according to three general categories based on the following criteria:

Lands designated on the land use maps as A-G capable of supporting grazing by full-time operators, including:

- Existing grazing lands used for this purpose.
- Lands which are not now but could be used for this purpose based on resource characteristics (soils, climate, access to water) and compliance with the applicable parcel size minimums of Table AG-2 (in the Shasta County General Plan).

Land designated on the land use maps as A-C capable of supporting crop production by fulltime operators, including:

- Existing croplands used for this purpose.
- Lands which are not now but could be used for this purpose based on resource characteristics (soils, climate, access to water) and compliance with the applicable parcel size minimums of Table AG-2 (in the Shasta County General Plan).

Land designated on the land use maps as A-cg capable of supporting crop production by part-time or second income operators, with the following characteristics:

- Existing lands used for this purpose.

- Lands which are not now but could be used for this purpose based on resource characteristics (soils, climate, access to water).
- Applicable parcel size minimums of 5, 10 or 20 acres, as best suited to the locale, and applied to part-time agricultural areas found in Table AG-2 (in the Shasta County General Plan).

3.2.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project would have a significant impact on agricultural resources if it would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmlands), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract; **[Impact scoped out.]**
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)); **[Impact scoped out.]**
- Result in the loss of forest land or conversion of forest land to non-forest use; **[Impact scoped out.]**
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.

As noted above, the Initial Study prepared for this Project, which is included as Appendix A, determined that the proposed Project would not conflict with existing zoning for agricultural use or a Williamson Act Contract; would not conflict with existing zoning for forest or timberlands; and would not result in the loss of forest land or the conversion of forest land to non-forest use. Therefore, these topics are not addressed further in this Draft EIR. The analysis presented below focuses on the potential for the Project to convert important farmlands to non-agricultural uses, or result in other changes to the environment that could convert farmland to a non-agricultural use.

IMPACTS AND MITIGATION MEASURES

Impact 3.2-1: Project implementation may result in the conversion of Farmlands, including Prime Farmland, Unique Farmland, and Farmland of Statewide Importance, to non-agricultural uses (No Impact)

As shown on Figure 3.2-1, there are no Prime Farmlands, Unique Farmlands, or Farmlands of Statewide Importance located on, or in the vicinity of the Project site. There are no existing agricultural operations occurring on the Project site.

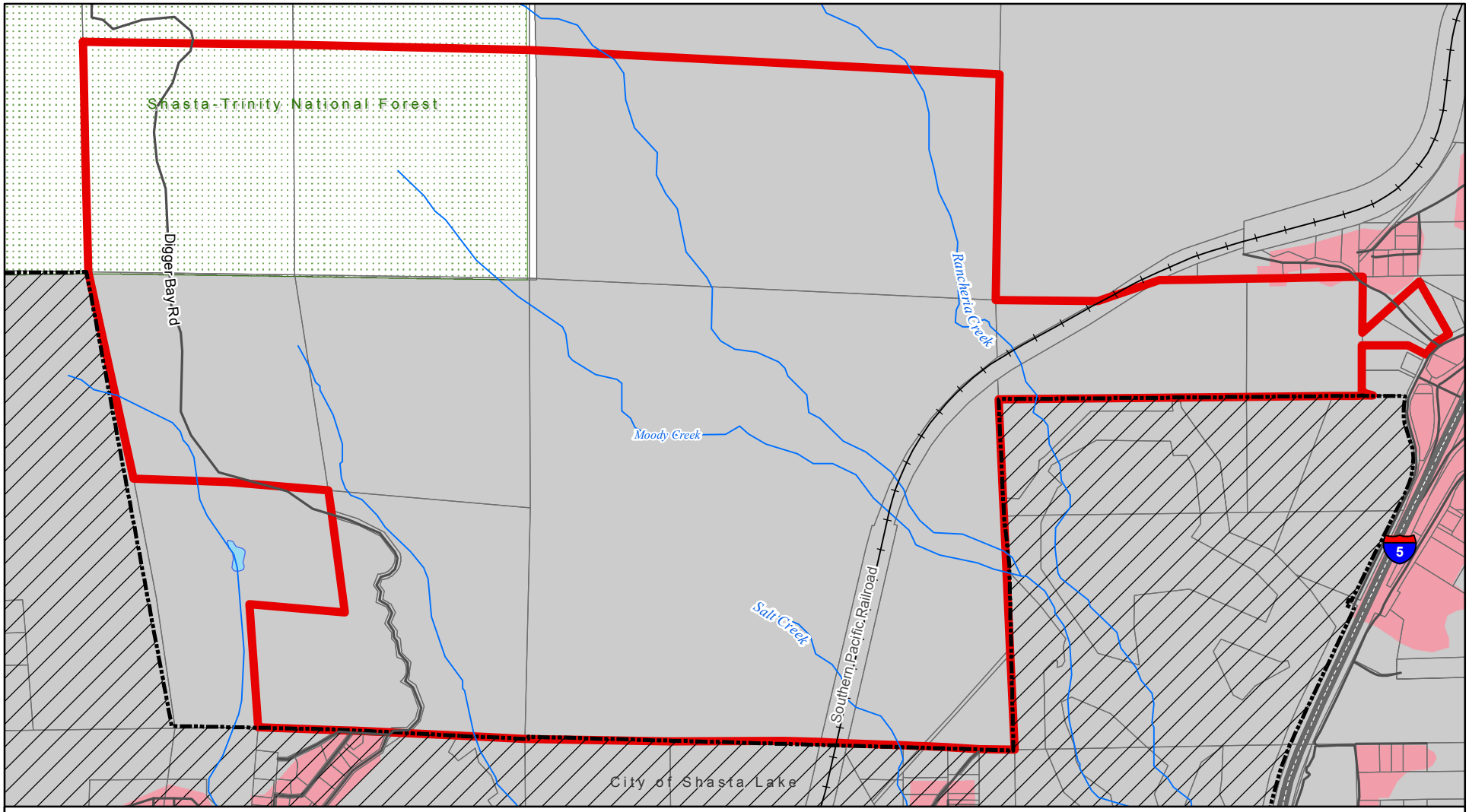
As shown in Table 3.2-2, the majority of the soils on the Project site are class VI and class VII soils, which are soils that have very severe limitations that make them unsuitable for cultivation and that restrict their use largely to pasture or range, woodland, or wildlife habitat.

The Project site is currently designated by the Shasta County General Plan as Mining Resource (MR), Industrial (I), Rural Residential A (RA), and Suburban Residential (SR). The Shasta County Zone Districts for the Project site are Mineral Resource (MR), Interim Rural Residential (IR), Community Commercial combined with the Design Review District (C-2-DR), and General Industrial (M). The County has not designated or zoned any portion of the Project site for agricultural uses.

Implementation of the proposed Project would not result in any adverse impacts to agricultural lands or agricultural operations. There are no designated Prime Farmlands or Important Farmlands on the Project site. As such, the Project would have **no impact** on agricultural lands**,** and no mitigation is required.

Impact 3.2-2: Project implementation may lead to the indirect conversion of County agricultural lands to non-agricultural uses (No Impact)

As described above, the Project site is not designated for agricultural uses, and there are no agricultural uses occurring on the Project site. As such, the Project would not result in the direct conversion of agricultural lands to a non-agricultural use. There are no designated agricultural lands in the immediate vicinity of the Project site, and no agricultural operations are currently occurring in the immediate vicinity of the Project site. Implementation of the proposed Project would not result in any indirect impacts to agricultural operations in other portions of Shasta County. There is **no impact**, and no mitigation is required.



FMMP Designation

- Other Land
- Urban and Built-Up Land
- Out of Survey Area
- Project Site Boundary
- City of Shasta Lake
- Shasta-Trinity National Forest

Data sources: State of California Department of Conservation Farmland Mapping and Monitoring Program, Shasta County, 2010; Shasta County GIS; ESRI StreetMap North America; USFS Adminstrative Forests. Map date: March 4, 2013.

MOODY FLATS EIR

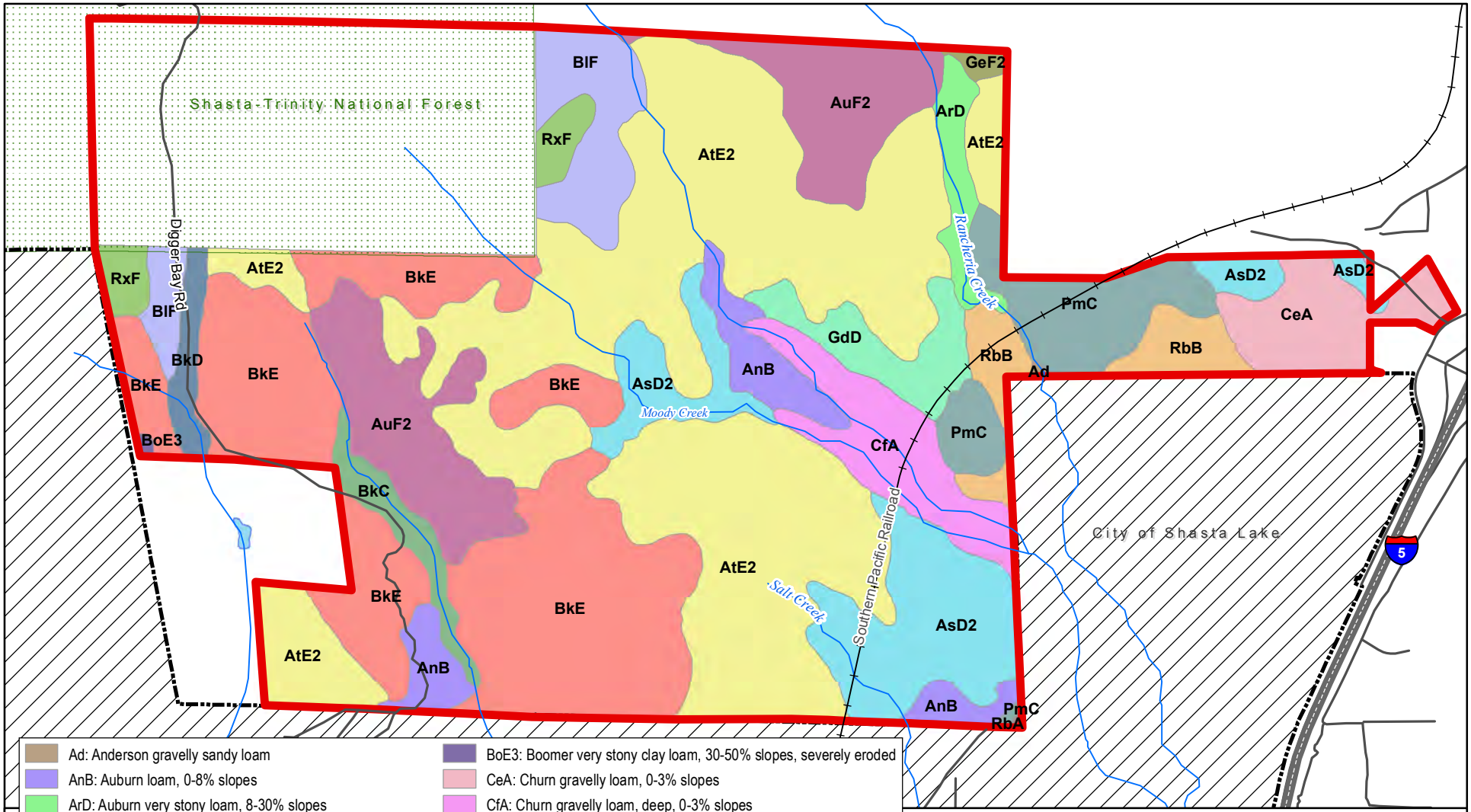
Figure 3.2-1: Important Farmlands

N

0 500 1,000
Feet

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



- Ad: Anderson gravelly sandy loam
- AnB: Auburn loam, 0-8% slopes
- ArD: Auburn very stony loam, 8-30% slopes
- AsD2: Auburn clay loam, 8-30% slopes, eroded
- AtE2: Auburn very stony clay loam, 30-50% slopes, eroded
- AuF2: Auburn very rocky clay loam, 50-70% slopes, eroded
- BkC: Boomer gravelly loam, 0-15% slopes
- BkD: Boomer gravelly loam, 15-30% slopes
- BkE: Boomer gravelly loam, 30-50% slopes
- BlF: Boomer very stony loam, 50-70% slopes
- BoE3: Boomer very stony clay loam, 30-50% slopes, severely eroded
- CeA: Churn gravelly loam, 0-3% slopes
- CfA: Churn gravelly loam, deep, 0-3% slopes
- GdD: Goulding very stony loam, 10-30% slopes
- GeF2: Goulding very rocky loam, 50-70% slopes, eroded
- PmC: Perkins gravelly loam, 8-15% slopes
- RbA: Red Bluff loam, 0-3% slopes
- RbB: Red Bluff loam, 3-8% slopes
- RxF: Rockland

Data sources: USDA NRCS Soil Data Mart; Shasta County GIS; ESRI StreetMap North America; USFS Adminstrative Forests. Map date: March 5, 2013.

MOODY FLATS EIR

Figure 3.2-2: Soils Map

N

0 500 1,000
Feet

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

This section describes the regional air quality, current attainment status of the air basin, local sensitive receptors, emission sources, hazardous air pollutants, and identifies air quality impacts that are likely to result from Project implementation. This section includes mitigation measures for significant and potentially significant air quality impacts. The climate change and GHG analysis is provided in Section 3.7 of this EIR.

There were numerous comments received during the public review period and scoping meeting for the Notice of Preparation regarding this topic. In addition to the oral comments received at the public scoping meeting regarding this topic, written comments regarding this topic were received from the following entities and persons: City of Shasta Lake (February 22, 2012), John Husome (January 25, 2012), Bill Jeffers and Cliff Jacoby (February 13, 2012), Robert Atwood (February 3, 2012), Carolyn Burdick (January 29, 2012), Cinnamon Kern (February 4, 2012), Darria Kosich (January 31, 2012), Rob and Sheryl Sampley (March 8, 2012), Debbie Mynatt (February 10, 2012), Cliff Jacoby (January 21, 2012), Jay Schell (February 14, 2012), Kim Downing (February 8, 2012), Susan Kuykendall (January 27, 2012), Lisa Grill (February 14, 2012), Robert McGill (February 13, 2012), Theresa Mehden (February 1, 2012), Pamelyn Morgan (February 14, 2012), Terry Bradford (January 18, 2012), Eric Cassano (February 13, 2012), Shasta County Air Quality Management District (February 2, 2012), U.S. Department of Agriculture (February 10, 2012), Gary Fodge (January 17, 2012), Carolyn Keogh (January 31, 2012), Heidi Strand (February 8, 2012), and Stephanie Thomas (February 6, 2012).

Each of the comments received related to this topic are addressed within this section.

The information in this section was derived from the following source materials:

- Air Quality Impact Analysis, Moody Flats Quarry Project, Golder Associates, Inc. (August 30, 2012) which is attached as **Appendix D**.

3.3.1 EXISTING SETTING

NORTHERN SACRAMENTO VALLEY AIR BASIN

The study area for this analysis is the Northern Sacramento Valley Air Basin, which is comprised of Butte, Colusa, Glenn, Shasta, Sutter, Tehama, and Yuba Counties. The Shasta County Air Quality Management District (SCAQMD) has jurisdiction over air quality issues throughout Shasta County.

Shasta County encompasses the northernmost portion of the Sacramento Valley and the surrounding mountainous areas, approximately 160 miles northwest of Sacramento. The area has a moderate year-round climate where the average daily temperature remains above freezing. The average annual temperature is approximately 62ºF, and annual precipitation averages about 30 inches.

The Sacramento Valley portion of the air basin forms a bowl, bounded on the west by the Coast Ranges, on the north by the Cascade Range, and on the east by the Sierra Nevada. These mountain ranges reach heights exceeding 6,000 feet above sea level. During summer, the wide, flat expanse

of the Sacramento Valley provides an ideal environment for the formation of photochemical smog. Photochemical smog is a condition that develops when primary pollutants (oxides of nitrogen and volatile organic compounds created from fossil fuel combustion) interact under the influence of sunlight to produce a mixture of hundreds of different and hazardous chemicals known as secondary pollutants. Moreover, the prevailing winds in the Sacramento Valley blow from south to north, driven by the marine air traveling through the Carquinez Strait. These winds can transport pollutants from the broader Sacramento area and from the San Francisco Bay Area to the Northern Sacramento Valley Air Basin. The mountain ranges that surround the Northern Sacramento Valley Air Basin (NSVAB) provide a physical barrier to continued movement of the air mass, significantly hindering the dispersal of pollutants.

Air Movement and Wind

As with all of Central California, climate in the Shasta County area is dominated by the strength and location of a semi-permanent, subtropical high-pressure cell over the northeastern Pacific Ocean. Climate is also affected by the temperature moderating effects of the nearby oceanic heat reservoir. Warm summers, cool winters, rainfall, daytime onshore breezes, and moderate humidity characterize regional climatic conditions. The north wind is the prevailing wind for Shasta County. Historical wind direction data for the Project area is shown in Figure 3.3-2.

In summer, when the high-pressure cell is strongest, temperatures are very warm and humidity is low. The periodic incursion of the sea breeze into the Sacramento Valley, however, creates breezes that moderate the summer heat. In winter, when the high-pressure cell is weakest, conditions are characterized by occasional rain and snow storms interspersed with stagnant conditions and ocassionally heavy fog.

Sunlight

The presence and intensity of sunlight are necessary prerequisites for the formation of photochemical smog. Under the influence of the ultraviolet radiation of sunlight, certain original or “primary” pollutants (mainly reactive hydrocarbons and oxides of nitrogen) react to form “secondary” pollutants (primarily oxidants). Since this process is time dependent, secondary pollutants can be formed many miles downwind from the emission sources. Because of the prevailing daytime winds and time delayed nature of photochemical smog, oxidant concentrations are highest in the inland areas of the NSVAB.

Temperature Inversions

A temperature inversion is a reversal in the normal decrease of temperature as altitude increases. In most parts of the country, air near ground level is warmer than the air above it. Semi-permanent systems of high barometric pressure fronts establish themselves over the basin, deflecting low-pressure systems that might otherwise bring cleansing rain and winds. The height of the base of the inversion is known as the “mixing height” and controls the volume of air available for the mixing and dispersion of air pollutants.

The interrelationship of air pollutants and climatic factors are most critical on days of greatly reduced atmospheric ventilation. On such days, air pollutants accumulate because of the simultaneous occurrence of three factors: low inversions, low maximum mixing heights and low wind speeds. Although these conditions may occur throughout the year, the months of July, August and September generally account for more than 40 percent of these occurrences.

The potential for high contaminant levels varies seasonally for many contaminants. During late spring, summer and early fall, light winds, low mixing heights and sunshine combine to produce conditions favorable for the maximum production of oxidants, mainly ozone. When strong surface inversions are formed on winter nights, especially during the hours before sunrise, and coupled with near-calm wind levels, carbon monoxide from automobile exhausts becomes highly concentrated.

CRITERIA POLLUTANTS

The United States Environmental Protection Agency (EPA) uses six "criteria pollutants" as indicators of air quality, and has established for each of them a maximum concentration above which adverse effects on human health may occur. Fossil fuel combustion is a significant source of pollutant formation. These threshold concentrations are called National Ambient Air Quality Standards (NAAQS). Each criteria pollutant is described below.

Ozone (O_3) is a photochemical oxidant and the major component of smog. While O_3 in the upper atmosphere is beneficial to life by shielding the earth from harmful ultraviolet radiation from the sun, high concentrations of O_3 at ground level are a major health and environmental concern. O_3 is not emitted directly into the air but is formed through complex chemical reactions between precursor emissions of volatile organic compounds (VOC) and oxides of nitrogen (NOx) in the presence of sunlight. These reactions are stimulated by sunlight and temperature so that peak O_3 levels occur typically during the warmer times of the year. Both VOCs and NOx are emitted by transportation and industrial sources. VOCs are emitted from sources as diverse as automobiles, chemical manufacturing operations, dry cleaners, paint shops and other sources using solvents.

The reactivity of O_3 causes health problems by damaging lung tissue, reducing lung function and sensitizing the lungs to other irritants. Scientific evidence indicates that ambient levels of O_3 affect not only people with impaired respiratory systems, such as asthmatics, but healthy adults and children as well. Exposure to O_3 for several hours at relatively low concentrations has been found to significantly reduce lung function and induce respiratory inflammation in normal, healthy people during exercise. This decrease in lung function generally is accompanied by symptoms including chest pain, coughing, sneezing and pulmonary congestion.

Carbon monoxide (CO) is a colorless, odorless and poisonous gas produced by incomplete burning of carbon in fuels. When CO enters the bloodstream, it reduces the delivery of oxygen to the body's organs and tissues. Health threats are most serious for those who suffer from cardiovascular disease, particularly those with angina or peripheral vascular disease. Exposure to elevated CO levels can cause impairment of visual perception, manual dexterity, learning ability and performance of complex tasks.

Nitrogen dioxide (NO_2) is a brownish, highly reactive gas that is present in all urban atmospheres. NO_2 can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. Nitrogen oxides are an important precursor both to ozone (O_3) and acid rain, and may affect both terrestrial and aquatic ecosystems. The major mechanism for the formation of NO_2 in the atmosphere is the oxidation of the primary air pollutant nitric oxide (NO). NO plays a major role, together with VOCs, in the atmospheric reactions that produce O_3. NO_2 forms when fuel is burned at high temperatures. The two major emission sources of NO_2 are transportation and stationary fuel combustion sources such as electric utility and industrial boilers.

Sulfur dioxide (SO_2) affects breathing and may aggravate existing respiratory and cardiovascular disease in high doses. Sensitive populations include asthmatics, individuals with bronchitis or emphysema, children and the elderly. SO_2 is also a primary contributor to acid deposition, or acid rain, which causes acidification of lakes and streams and can damage trees, crops, historic buildings and statues. In addition, sulfur compounds in the air contribute to visibility impairment in many parts of the country. This effect is especially noticeable in national parks. Ambient SO_2 results largely from stationary sources such as coal and oil combustion, steel mills, refineries, pulp and paper mills and from nonferrous smelters.

Particulate matter (PM) includes dust, dirt, soot, smoke and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, construction activity, fires and natural windblown dust. Particles formed in the atmosphere by condensation or the transformation of emitted gases such as SO_2 and VOCs are also classified as particulate matter.

Studies of human populations exposed to high concentrations of particulate matter (sometimes in the presence of SO_2) and laboratory studies of animals and humans, show significant effects which are of concern for human health. These effects include introduction of new respiratory symptoms, aggravation of existing respiratory and cardiovascular disease, alterations in the body's defense systems against foreign materials, damage to lung tissue, carcinogenesis and premature death.

Respirable particulate matter (PM_{10}) consists of small particles, less than 10 microns in diameter, of dust, smoke, or droplets of liquid which penetrate the human respiratory system and cause irritation by themselves or in combination with other gases. Particulate matter in Shasta County is created or released by many sources, including but not limited to, dust from grading and excavation activities, agricultural uses including soil preparation activities, fertilizer and pesticide spraying, weed burning and animal husbandry, road dust, wildfires, residential and motor vehicle fuel combustion, particularly diesel-powered vehicles. Small PM_{10} particles present greater health risk than larger particles since these fine particles can more easily penetrate the defenses of the human respiratory system.

Fine particulate matter ($PM_{2.5}$) consists of small particles, which are less than 2.5 microns in size. Similar to PM_{10}, these particles are primarily the result of combustion in motor vehicles, particularly diesel engines, and industrial sources and residential/agricultural activities such as burning. $PM_{2.5}$ formed through the reaction of other pollutants. As with PM_{10}, $PM_{2.5,}$ particles can increase the chance of respiratory disease, and cause lung damage and cancer. In 1997, the EPA created new federal air quality standards for $PM_{2.5}$.

The major subgroups of the population that appear to be most sensitive to the effects of particulate matter include individuals with chronic obstructive pulmonary or cardiovascular disease or influenza, asthmatics, the elderly and children. Particulate matter also soils and damages materials, and is a major cause of visibility impairment.

Lead (Pb) exposure can occur through multiple pathways, including inhalation of air and ingestion of Pb in food, water, soil or dust. Excessive Pb exposure can cause seizures, mental retardation and/or behavioral disorders. Low doses of Pb can lead to central nervous system damage. Recent studies have also shown that Pb may be a factor in high blood pressure and subsequent heart disease.

ODORS

Typically odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another.

It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air.

When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

TOXIC AIR CONTAMINANTS

TACs are pollutants that may be expected to result in an increase in mortality or serious illness or that may pose a present or potential hazard to human health. Health effects include cancer, birth defects, neurological damage, damage to the body's natural defense system, and diseases that lead to death. Although ambient air quality standards exist for criteria pollutants, no such standards exist for TACs.

Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, the California Air Resources Board (ARB) has consistently found that there are no levels or thresholds below which exposure is free of risk. Individual TACs vary greatly in the risk they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. For certain TACs, a unit risk factor can be developed to evaluate cancer risk. For acute and chronic health risks, a similar factor called a Hazard Index is used to evaluate risk. In the early 1980s, ARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Toxic Air Contaminant Identification and Control Act (Assembly Bill [AB] 1807, Tanner 1983) created California's program to reduce exposure to air toxics. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, Connolly 1987) (Cal. Health & Safety Code § 39666 et seq.) supplements the AB 1807 program by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

SENSITIVE RECEPTORS

Sensitive receptors are people or other organisms who may have significant increased sensitivity or exposure to contaminants by virtue of age, health, status, proximity to contaminants or facilities they use. Examples of sensitive receptors include children, the elderly residences, hospitals and schools. (Figure 3.3-1.) There are a number of existing residences located within a half-mile of the Project site with the closest residences being those located to the southwest of the Project site. The nearest school to the Project site is North Woods Discovery School, which is located at 14732 Bass Road, approximately 0.68 miles to the northeast of the proposed primary access road off of Wonderland Boulevard. While not formally considered to be sensitive receptors, wildlife and vegetation may also be adversely impacted by continuous exposure to pollutant concentrations.

AMBIENT AIR QUALITY

Both the U.S. Environmental Protection Agency (U.S. EPA) and the California Air Resources Board (CARB) have established ambient air quality standards for criteria pollutants. These ambient air quality standards represent safe levels of contaminants that avoid specific adverse health effects associated with each pollutant.

The federal and California state ambient air quality standards are summarized in Table 3.3-1 for important pollutants. The federal and state ambient standards were developed independently, although both processes attempted to avoid health-related effects. As a result, the federal and

state standards differ in some cases. In general, the California state standards are more stringent. This is particularly true for ozone and particulate matter between 2.5 and 10 microns in diameter (PM_{10}).

The U.S. Environmental Protection Agency established new national air quality standards for ground-level ozone and for fine particulate matter in 1997. The 1-hour ozone standard was phased out and replaced by an 8-hour standard of 0.075 PPM. Implementation of the 8-hour standard was delayed by litigation, but was determined to be valid and enforceable by the U.S. Supreme Court in a decision issued in February of 2001.

TABLE 3.3-1: FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

POLLUTANT	*AVERAGING TIME*	*FEDERAL PRIMARY STANDARD*	*STATE STANDARD*
Ozone	1-Hour 8-Hour	-- 0.075 ppm	0.09 ppm 0.070 ppm
Carbon Monoxide	8-Hour 1-Hour	9.0 ppm 35.0 ppm	9.0 ppm 20.0 ppm
Nitrogen Dioxide	Annual 1-Hour	0.053-- 0.10 ppm	0.030 ppm 0.18 ppm
Sulfur Dioxide	Annual 24-Hour 1-Hour	0.03 ppm 0.14 ppm 0.075 ppm	-- 0.04 ppm 0.25 ppm
PM_{10}	Annual 24-Hour	-- 150 ug/m3	20 ug/m3 50 ug/m3
$PM_{2.5}$	Annual 24-Hour	12 ug/m3 35 ug/m3	12 ug/m3 --
Lead	30-Day Avg. 3-Month Avg.	-- 0.15 ug/m3	1.5 ug/m3 --

Notes: ppm = parts per million, ug/m3 = Micrograms per Cubic Meter

SOURCE: CALIFORNIA AIR RESOURCES BOARD, 2012

NOTE: THIS TABLE DOES NOT PROVIDE THE VARIOUS STATISTICAL FORMS OF THESE STANDARDS.

In 1997, new national standards for fine particulate matter diameter 2.5 microns or less ($PM_{2.5}$) were adopted for 24-hour and annual averaging periods. The current PM_{10} standards were to be retained, but the method and form for determining compliance with the standards were revised. The federal $PM_{2.5}$ standard was subsequently revised to lower values in 2006 (24-hour standard) and 2012 (annual standard).

The State of California regularly reviews scientific literature regarding the health effects and exposure to PM and other pollutants. On May 3, 2002, CARB staff recommended lowering the level of the annual standard for PM_{10} and establishing a new annual standard for $PM_{2.5}$. The new standards became effective on July 5, 2003, with another revision on November 29, 2005.

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are another group of pollutants of concern. TACs are injurious in small quantities and are regulated despite the absence of criteria documents. The identification, regulation and monitoring of TACs is relatively recent compared to that for criteria pollutants. Unlike criteria pollutants, TACs are regulated on the basis of risk rather than specification of safe levels of contamination.

Existing air quality concerns within Shasta County and the entire SVAB are related to increases of regional criteria air pollutants (e.g., ozone and particulate matter), exposure to toxic air contaminants, odors, and increases in greenhouse gas emissions contributing to climate change. The primary source of ozone (smog) pollution is motor vehicles which account for 70 percent of the ozone in the region. Particulate matter is caused by dust, primarily dust generated from construction and grading activities, and smoke which is emitted from fireplaces, wood-burning stoves, and agricultural burning.

Attainment Status

In accordance with the California Clean Air Act (CCAA), the CARB is required to designate areas of the state as attainment, nonattainment, or unclassified with respect to applicable standards. An "attainment" designation for an area signifies that pollutant concentrations did not violate the applicable standard in that area. A "nonattainment" designation indicates that a pollutant concentration violated the applicable standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria.

Depending on the frequency and severity of pollutants exceeding applicable standards, the nonattainment designation can be further classified as serious nonattainment, severe nonattainment, or extreme nonattainment, with extreme nonattainment being the most severe of the classifications. An "unclassified" designation signifies that the data do not support either an attainment or nonattainment status. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The U.S. EPA designates areas for ozone (O_3), carbon monoxide (CO), and nitrogen dioxide (NO_2) as "does not meet the primary standards," "cannot be classified," or "better than national standards." For sulfur dioxide (SO_2), areas are designated as "does not meet the primary standards," "does not meet the secondary standards," "cannot be classified," or "better than national standards." However, the CARB terminology of attainment, nonattainment, and unclassified is more frequently used.

The sub-categories for nonattainment status (serious, severe, and extreme) are also used by U.S. EPA. In 1991, new nonattainment designations were assigned to areas that had previously been classified as Group I, II, or III for PM_{10} based on the likelihood that they would violate national PM_{10} standards. All other areas are designated "unclassified."

Federal and state air quality laws require identification of areas not meeting the ambient air quality standards. These areas must develop regional air quality plans to eventually attain the standards.

The U.S. Environmental Protection Agency (EPA) has classified Shasta County as an unclassified/attainment area for the 8-hour ozone, CO, PM_{10}, and $PM_{2.5}$ standards. However, it should be noted that the EPA has proposed lowering the 8-hour ozone standard to a range of values between 0.060 and 0.070, which if approved, would place Shasta County's National Designation as Non-Attainment for this standard.

The CARB has classified Shasta County as a moderate nonattainment area for the 1-hour ozone standard, an unclassified area for the CO and $PM_{2.5}$ standards, and a nonattainment area for the PM_{10} and 8-hour ozone standard. Shasta County's attainment status for each of these pollutants relative to the NAAQS and CAAQS is summarized in Table 3.3-2.

TABLE 3.3-2: FEDERAL AND STATE ATTAINMENT STATUS FOR SHASTA COUNTY

CRITERIA POLLUTANTS	*STATE DESIGNATIONS*	*NATIONAL DESIGNATIONS*
1-Hour Ozone	Moderate Nonattainment	--
8-Hour Ozone	Nonattainment	Unclassified/Attainment
PM_{10}	Nonattainment	Unclassified
$PM_{2.5}$	Attainment	Unclassified/Attainment
Carbon Monoxide	Unclassified	Unclassified/Attainment
Nitrogen Dioxide	Attainment	Unclassified/Attainment
Sulfur Dioxide	Attainment	Unclassified
Sulfates	Attainment	--
Lead	Attainment	Unclassified/Attainment
Hydrogen Sulfide	Unclassified	--
Visibility Reducing Particles	Unclassified	--

SOURCES: CALIFORNIA AIR RESOURCES BOARD (2012).

Air Quality Monitoring

In combination, local air quality management districts and the California Air Resources Board (CARB) monitor ambient air quality at approximately 250 air-monitoring stations across the state. Air quality monitoring stations usually measure pollutant concentrations ten feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. The CARB currently operates monitoring stations in Redding, Anderson and Shasta Lake. The monitoring station located at 13791 Lake Boulevard in the City of Shasta Lake is the closest monitoring station to the Project site, located approximately one-half mile to the south. The other monitoring station in Shasta Lake is located at 4066 La Mesa Avenue, approximately 1.5 miles south of the Project site. Air quality data from 2009-2011 are provided in Table 3.3-3.

TABLE 3.3-3: AMBIENT AIR QUALITY MONITORING DATA (CITY OF SHASTA LAKE)

POLLUTANT	CAL.	FED.	YEAR	MAX CONCENTRATION	DAYS (SAMPLES) STATE/FED STANDARD EXCEEDED
	PRIMARY STANDARD				
Ozone (O_3)[1] (1-hour)	0.09 ppm for 1 hour	NA	2009 2010 2011	0.081 0.089 0.083	0 / * 0 / * 0 / *
Ozone (O_3)[1] (8-hour)	0.070 ppm for 8 hour	0.075 ppm for 8 hour	2009 2010 2011	0.071 0.077 0.077	1 / 0 13 / 2 5/ 1
Particulate Matter (PM_{10})[2]	50 ug/m3 for 24 hours	150 ug/m3 for 24 hours	2009 2010 2011	32.2 28.3 30.7	0 / 0 * / 0 0 / 0
Fine Particulate Matter ($PM_{2.5}$)	No 24 hour State Standard	35 ug/m3 for 24 hours	Not collected at these sites.		

SOURCES: CALIFORNIA AIR RESOURCES BOARD (ADAM) AIR POLLUTION SUMMARIES, 2009-2011, ACCESSED MAY 2, 2013.

Notes:

ppm = parts per million.

Ug/m3 = microns per cubic meter.

* = There was insufficient (or no) data available to determine the value

1: Data from the Shasta Lake Monitoring Station at 13791 Lake Boulevard

2: Data from the Shasta Lake Monitoring Station at 4066 La Mesa Avenue

As shown in the table above, concentrations of ozone and particular matter monitored at the stations in the City of Shasta Lake remained relatively constant from 2009 through 2011.

3.3.2 REGULATORY SETTING

FEDERAL

Clean Air Act

The Federal Clean Air Act (FCAA) was first signed into law in 1970. In 1977, and again in 1990, the law was substantially amended. The FCAA is the foundation for a national air pollution control effort, and it is composed of the following basic elements: National Ambient Air Quality Standards (NAAQS) for criteria air pollutants, hazardous air pollutant standards, state attainment plans, motor vehicle emissions standards, stationary source emissions standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions.

The EPA is responsible for administering the FCAA. The FCAA requires the EPA to set NAAQS for several problem air pollutants based on human health and welfare criteria. Two types of NAAQS were established: primary standards, which protect public health, and secondary standards, which protect the public welfare from non-health-related adverse effects such as visibility reduction.

Prevention of Significant Deterioration

The Prevention of Significant Deterioration, or PSD, permit program was developed by the United States Congress to prevent significant environmental impacts on “attainment areas” or

unclassifiable areas with the NAAQS from large industrial sources of air pollution. The PSD program is implemented by both federal and state regulations. The regulations apply to new or modified air pollution sources that are classified as "major" relative to air pollution emissions potential, and that are proposing construction Projects that may "significantly" increase their air pollutant emissions. Under the PSD program, the new construction or modification must use air pollution control equipment and procedures determined by the Shasta County Air Quality Management District and/or US EPA to be the most effective for the Project (Best Available Control Technology, or BACT). The applicant must also provide a detailed evaluation of the proposed Project's air quality impact on the local and regional environment.

STATE

California Clean Air Act

The California Clean Air Act (CCAA) was first signed into law in 1988. The CCAA provides a comprehensive framework for air quality planning and regulation, and spells out, in statute, the state's air quality goals, planning and regulatory strategies, and performance. California Air Resources Board (CARB) is the agency responsible for administering the CCAA. CARB established ambient air quality standards pursuant to the California Health and Safety Code section 39606(b), which are similar to the federal standards.

Air Quality Standards

NAAQS are determined by the EPA. The standards include both primary and secondary ambient air quality standards. Primary standards are established with a safety margin. Secondary standards are more stringent than primary standards and are intended to protect public health and welfare. States have the ability to set standards that are more stringent than the federal standards. As such, California established more stringent ambient air quality standards.

Federal and state ambient air quality standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulates (PM_{10}) and lead. In addition, California has created standards for pollutants that are not covered by federal standards. The state and federal primary standards for major pollutants are shown in Table 3.3-1.

Like the EPA, CARB also designates areas within California as either attainment or nonattainment for each criteria pollutant based on whether the CAAQS have been achieved. Under the CCAA, areas are designated as nonattainment for a pollutant if air quality data shows that a state standard for the pollutant was violated at least once during the previous three calendar years. Exceedances that are affected by highly irregular or infrequent events are not considered violations of a state standard, and are not used as a basis for designating areas as nonattainment.

CARB Mobile-Source Regulation

The State of California is responsible for controlling emissions from the operation of motor vehicles in the state. Rather than mandating the use of specific technology or the reliance on a specific fuel, the CARB's motor vehicle standards specify the allowable grams of pollution per mile

driven. In other words, the regulations focus on the reductions needed rather than on the manner in which they are achieved. Towards this end, the CARB has adopted regulations which required auto manufacturers to phase in less polluting vehicles.

Tanner Air Toxics Act

California regulates TACs primarily through the Tanner Air Toxics Act (AB 1807) (Cal. Health & Safety Code §3666 et seq.) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588, Connolly 1987). The Tanner Act sets forth a formal procedure for CARB to designate substances as Toxic Air Contaminants (TACs). This includes research, public participation, and scientific peer review before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and has adopted EPA's list of Hazardous Air Pollutants (HAPs) as TACs. Most recently, diesel PM was added to the CARB list of TACs. Once a TAC is identified, CARB then adopts an Airborne Toxics Control Measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate the best available control and treatment (BACT) to minimize emissions.

AB 2588 requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures. Recent milestones include the low-sulfur diesel-fuel requirement, and tighter emission standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide.

Offsets

As required by Sections 40918, 40919, 40920, and 40920.5 of the California Health & Safety Code, areas designated as being in nonattainment for one or more of the criteria pollutants identified in state or federal standards must achieve "no net increase" in emissions (i.e., offsets) of those pollutants and their precursors. Although Shasta County has been designated a nonattainment area with respect to the State ozone and PM_{10} ambient air quality standards, it has further been classified as having "moderate air pollution." Shasta County maintains a bank of Emissions Reduction Credits (ERCs) to be used as mitigation offsets for emissions increases, although as of 1997 the AQMD does not require the use of emissions offsets as part of the stationary source permitting program. This ERC program is described in greater detail below.

SHASTA COUNTY AQMD REGULATIONS

Authority to Construct (ATC) Permits

Shasta County AQMD Rule 2, Part 100 requires new or modified stationary sources to obtain an ATC air quality permit. The ATC permit application must provide a description of the facility, an inventory of pollutant emissions, and proposed control systems for the applicable pollutants. The reviewing agency considers whether BACT has been employed and evaluates predicted ambient concentrations attributable to these emissions to ensure compliance with ambient air quality standards.

District Air Pollution Control Regulations

Regulations addressing emissions of specific air contaminants from a single source are contained in AQMD Rule 3, Part 2. For sources constructed after July 1, 1986, PM emissions are limited to 0.15 grains per dry standard cubic foot (gr/dscf), while PM_{10} is limited to 0.05 gr/dscf, and combustion PM is limited to 0.10 gr/dscf. SO_2 emissions are limited to 200 parts per million (ppm), and NOx emissions are limited to 300 ppm for solid fuels, and 250 ppm for gaseous fuels. Opacity is limited to Ringelmann #2 and/or 40 percent[1].

District Emission Reduction Credit and Banking Rule (Rule 2:2)

The purpose of District Rule 2:2 is to provide a mechanism for permitted and non-permitted emission sources to deposit, transfer, and use emission reduction credits (ERCs) as offsets as allowed by applicable laws and regulations. To ensure that all emission reductions are transferred through the District's emission reduction credit bank pursuant to the Health and Safety Code. All transfers and uses of emission reductions that are required under the District's New Source Review (NSR) Rule shall be processed in accordance with this rule. The ERC program provides a mechanism for intra-basin transfers and use of banked ERCs. The provisions of Rule 2:2 apply to the deposit, transfer, and use of emission reduction credits (ERCs) from stationary sources and open biomass burning sources of air pollution emissions. Any person, entity, landowner, or authorized agent, which owns or operates an emission unit for which an eligible emission reduction has occurred or will occur may apply for an ERC certificate in accordance with the requirements of this Rule. To verify emission reductions claimed in conjunction with an application for an ERC certificate, the District may require source tests by ARB approved methods, continuous monitoring, production records, fuel use records, or any other appropriate means. The District maintains a bank register, which contains a record of all deposits, withdrawals and other transactions with regard to the District's banking system.

Shasta County General Plan

The Shasta County General Plan contains the following policies pertaining to air quality.

POLICIES

Policy AQ-1e: The County shall require new air pollution point sources such as, but not limited to, industrial, manufacturing, and processing facilities to be located an adequate distance from residential areas and other sensitive receptors.

Policy AQ-2b: The County will work to accurately determine and fairly mitigate the local and regional air quality impacts of projects proposed in the unincorporated portions of Shasta County.

[1] The Ringelmann scale was developed to give a repeatable visual reference at the stack exit point of the amount of smoke emitted by boilers.

Policy AQ-2c: Land use decisions, where feasible, should contribute to the improvement of air quality. New projects shall be required to reduce their respective air quality impacts to below levels of significance, or proceed as indicated in Policy AQ-2e.

Policy AQ-2e: Shasta County will cooperate with the AQMD in assuring that new projects with stationary sources of emissions of non-attainment pollutants or precursors that exceed 25 tons per year shall provide appropriate emission offsets. A comparable program which offsets indirect emissions of pollutants exceeding 25 tpy from development projects shall also be utilized to mitigate air pollution impacts. An EIR will be required for all projects that have unmitigated emissions of non-attainment pollutants exceeding 25 tons per year.

Policy AQ-2f: Shasta County shall require appropriate Standard Mitigation Measures and Best Available Mitigation Measures on all discretionary land use applications as recommended by the AQMD in order to mitigate both direct and indirect emissions of non-attainment pollutants.

Policy AQ-2g: Significance thresholds as proposed by the AQMD for emissions shall be utilized when appropriate for: (1) Reactive Organic Gases (ROG) and Oxides of Nitrogen (NOx), both of which are precursors of ozone, and (2) inhalable particulate matter (PM10) in determining mitigation of air quality impacts.

Policy AQ-2j: The County shall work toward measures to reduce particulate emissions from construction, grading, excavation, and demolition to the maximum extent feasible.

Policy AQ-4b: The County's development standards shall require the paving of roads as a part of new development permits to the extent necessary to meet access and air quality objectives. These requirements shall be designed to help mitigate potentially significant adverse air quality impacts created by particulate emissions on both an individual and cumulative basis.

3.3.3 PROJECT SOURCES OF AIR EMISSIONS

The Project would consist of a hard rock aggregate mine designed with the eventual capability of producing up to two million tons of aggregate per year. Aggregate produced could be used for production of ready-mix or asphalt concrete onsite, which would be sold to offsite customers, or it could be sold directly to customers and transported offsite by heavy duty truck or rail.

Potential air quality impacts and environmental effects of the Project would result from Project activities at the site. These activities could be a combination of one or all the following activities described below:

- Mining activities including drilling/blasting, handling of mined materials using off-road diesel-powered mobile equipment, and hauling of mined material using off-road trucks (later to be replaced by electric conveyors);
- Aggregate processing using equipment such as jaw crushers, cone crushers, screens, conveyors, etc;

- Operation of ready-mix cement, asphaltic cement, and recycle plants;
- The loading and unloading of raw materials and finished product using off-road diesel equipment;
- Other vehicles used within the general plant and mining footprint boundary;
- Diesel generator emissions until line power is brought to the site;
- On-road customer truck travel and idling within the general plant footprint area; and
- Locomotive (train) travel over a newly-installed railroad spur connecting to the load-out area.

Based on current information on how the Project would be operated, this assessment provides quantitative air quality impact information for two separate operating scenarios.

1. **Scenario 1**: Initially, the facility would operate such that maximum aggregate production would be one million tons per year (1MM tpy), mined material would be transported to the aggregate processing area by off-road haul trucks, electrical power to the site would be provided by a diesel generator, and the access road to the site would be unpaved.
2. **Scenario 2**: Within approximately five years, the facility would operate such that maximum aggregate production would be two million tons per year (2MM tpy), mined material would be transported to the aggregate processing area by electric-powered conveyors, electrical power lines would be brought to the site, and the access road to the site would be paved.

Quantitative information describing activity levels associated with the two operating scenarios assessed are contained in Tables 1a and 1b in Appendices A (Scenario 1) and B (Scenario 2) of the Moody Flats Air Quality Study, which is attached as Appendix D to this EIR. These tables describe the daily, weekly, and annual operating periods, material throughput amounts, on-road vehicle travel volumes, and off-road equipment activity levels. Activity levels are expressed in terms of maximum daily or annual quantities.

SOURCES OF AIR EMISSIONS

Off-Road Diesel Engines

Mobile off-road equipment associated with mining and aggregate plant activities will include excavators, front-end loaders, mine haul trucks (Scenario 1), drills, a generator (Scenario 1), and other miscellaneous equipment with diesel-fueled engines. These engines would emit criteria pollutants such as CO, NO_x, SO_2, PM_{10}/$PM_{2.5}$, and ROG. The particulate matter emitted from diesel engines is also classified as diesel particulate matter (DPM) (a TAC). Because DPM is comprised of many individual pollutants, speciated emissions of individual TACs from diesel engine exhaust were not quantified.

On-Road Diesel Engines

Mobile on-road vehicles associated with the Project would include customer trucks picking up aggregate, ready-mix concrete and asphalt concrete and vendor trucks bringing raw materials to the site. These engines would emit CO, NO_x, SO_2, PM_{10}/$PM_{2.5}$, and ROG, as well as DPM.

Fugitive Dust from Material Handling

Aggregate processing (crushing, screening) and loading/unloading of both mined material and final aggregate would result in the generation of fugitive dust particulate emissions. These emissions can be significantly reduced by the application of water to the materials being handled, as would be the case for the crushers and screens at the aggregate processing plant.

Fugitive Dust from Mobile Source Movement

The movement of both off-road and on-road vehicles over paved and unpaved surfaces would result in the generation of fugitive dust emissions. These emissions would be higher when the paved/unpaved surface is dry and lower when the surface is wet (either due to the presence of surface water, precipitation, or manual application of water).

Asphalt Plant

An asphalt batch plant would be located on the plant site and is assumed to be typical of industry standards. Plant operations would involve drying and mixing of aggregate material with heated asphalt oil to manufacture asphaltic concrete. The plant would have an estimated throughput of 200 tons per hour. The asphalt plant area would include aggregate stockpiles, asphalt oil storage tanks, conveyors, a natural gas-fired rotary dryer, natural gas storage tanks, a control room, and a bag house dust collection system.

Asphaltic concrete manufactured at the site would be loaded onto trucks for transport offsite. Asphalt oil used in the manufacturing process would be delivered onsite as needed and stored in heated storage tanks. Air emissions would occur primarily from natural gas combustion associated with aggregate drying and asphalt cement heating (CO, NO_x, ROG, SO_2, PM_{10}/$PM_{2.5}$), and dryer dust (PM_{10}/$PM_{2.5}$).

Ready-Mix Plant

A ready-mix plant would also be located on the plant site. Typical ready-mix operations involve mixing of processed rock and sand with cement and water to manufacture ready-mix concrete. The plant would have an estimated throughput of 200 tons of material per hour. The ready-mix plant would include concrete aggregate stockpiles, mixer, cement silos, dust collection systems, a control room, and conveyors.

Manufactured ready-mix concrete would be loaded into concrete-mixer trucks and transported offsite. Cement will be delivered onsite in enclosed container trucks as needed and stored in silos. Air emissions would occur primarily from handling and mixing of dry ready-mix concrete ingredients (PM_{10}/$PM_{2.5}$).

Drilling and Blasting

New material to be mined would be generated in some cases by drilling holes with a diesel-powered drilling, placement of explosives, and detonation. This process would result in emissions of combustion pollutants from the engine powering the drill, of combustion by-products of the blasting explosives, and of fugitive dust generated by the blasting.

Recycling Plant

Recycled asphalt and/or concrete would be processed in a recycling plant crusher and re-used in the asphalt and/or ready-mix plants. Processing (crushing) of recycled material would occur in conjunction with aggregate processing and would generate small quantities of fugitive dust.

Train Locomotive Emissions

The sale of construction aggregate materials is expected to occur within the local Redding market as well as regional markets. The local market would be serviced by aggregate haul trucks while the regional market would be serviced by rail. Rail transportation of finished products would generate criteria pollutants and DPM emissions both onsite and offsite. Emissions from onsite locomotive exhaust are assessed in the following analysis but off-site emissions (from the time the aggregate train leaves the site) are not analyzed as these emissions are assumed to be part of the rail authority's existing locomotive traffic inventory and would occur with or without the Project.

Miscellaneous Sources

Onsite and offsite vehicle travel associated with worker commuting would generate passenger vehicle tailpipe emissions (CO, NO_x, ROG, SO_2, PM_{10}/$PM_{2.5}$). Other minor sources of air pollutant emissions would include onsite fuel delivery and storage, and use of maintenance fluids containing reactive organic gases (ROGs).

3.3.4 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project would have a significant impact on the environment associated with air quality if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Cause a violation of any air quality standard or contribute substantially to an existing or Projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations;
- Create objectionable odors affecting a substantial number of people.

SCAQMD Thresholds

For the purposes of this air quality analysis, actions that violate federal standards for criteria pollutants (i.e., primary standards designed to safeguard the health of people considered to be sensitive receptors while outdoors and secondary standards designed to safeguard human welfare) are considered significant impacts. Additionally, actions that violate state standards developed by the CARB or criteria developed by the SCAQMD, including thresholds for criteria pollutants, are considered significant impacts. As described in SCAQMD Rule 2:1, Part 301, the following thresholds of significance (shown in Table 3.3-4) for criteria pollutants and other regulated pollutants are used to determine significance relative to the application of, and need to apply, Best Available Control Technology (BACT) for stationary sources. SCAQMD Rule 2:1, Part 200 defines Best Available Control Technology as:

For any emissions unit the more stringent of:

a. *The most effective emission control device, emission limit, or technique that has been required or used for the type of equipment comprising such emissions unit unless the applicant demonstrates to the satisfaction of the Air Pollution Control Officer (APCO) that such limitations are not achievable; or*

b. *Any other emission control device or technique, alternative basic equipment, different fuel or process, determined to be technologically feasible and cost-effective by the APCO. The cost-effective analysis shall be performed in accordance with the methodology and criteria specified by the APCO;*

c. *Under no circumstances shall BACT be determined to be less stringent than the emission control required by any applicable provision of District, State, or federal laws or regulations, unless the applicant demonstrates to the satisfaction of the APCO that such limits are not achievable.*

SCAQMD has two levels of daily emission thresholds for indirect emissions[2] of NO_x, ROG and PM_{10} that were developed for CEQA assessments based in part on the Rule 2:1 Part 301, BACT; these are used to determine the appropriate level of required mitigation measures and are also included in Table 3.3-4. The SCAQMD uses an annual emission threshold of 25 tons per year for evaluating the significance of NO_x, ROG, and PM_{10} emissions from direct emission sources.[3]

If Level A thresholds for pollutants listed in Table 3.3-4 are exceeded by a Project, then standard mitigation measures (SMMs) and appropriate best available mitigation measures (BAMMs) are required. The appropriate type and number of BAMM applied to a project shall be based on the

[2] Indirect emission are defined by the SCAQMD as emissions from motor vehicles traveling to and from the facility (e.g., trucks and trains).

[3] Direct emission sources are defined by the SCAQMD in this instance as emissions from stationary sources at the facility, including onsite fugitive dust.

unique characteristics of the project, and selected from a list of measure kept updated by the SCAQMD (Shasta County General Plan Air Quality Element, page 6.5.013). If Level B thresholds are exceeded by a Project, then SMM, BAMM, and special BAMM are required, based on their emission reduction potential to lower project emissions below Level B thresholds. If project emissions cannot be reduced to below Level B thresholds following the application of SMM and BAMM, then emission offsets shall be required.

TABLE 3.3-4: SCAQMD EMISSIONS THRESHOLDS OF SIGNIFICANCE AND BACT THRESHOLDS

POLLUTANT	*THRESHOLD A / BACT THRESHOLDS (LBS/DAY)*	*THRESHOLD B (LBS/DAY)*
NO_x	25.0	137
CO	500.0	NA
SO_2	80.0	NA
Indirect PM/PM_{10}	80.0	137
VOC/ROG	25.0	137
Sulfuric Acid	35.0	NA
Lead	3.2	NA
Asbestos	0.03	NA
Beryllium	0.002	NA
Mercury	0.5	NA
Vinyl Chloride	5.0	NA
Fluorides	15.0	NA
$TRS/H_2S/RS$*	50.0	NA

SOURCE: SCAQMD RULE 2:1, PART 301 (LEVEL A – FOR APPLICATION OF BACT) AND "PROTOCOL FOR REVIEW – LAND USE PERMITTING ACTIVITIES", SCAQMD, NOVEMBER 2003 (LEVEL A AND B).

**TRS= TOTAL REDUCED SULFUR COMPOUNDS, H2S= HYDROGEN SULFIDE, AND RS= REDUCED SULFUR COMPOUNDS.*

Odor Based Thresholds

Projects that would potentially generate objectionable odorous emissions that would be located near existing sensitive receptors or other land uses where people may congregate could constitute a significant air quality impact to existing uses. Also, residential or other sensitive receptor projects built for the intent of attracting people locating near existing odor sources could also cause a significant air quality impact for the proposed uses. The SCAQMD does not have a specific threshold used to measure the significance of odors. The typical odor cited from an aggregate operation is the "rotten egg smell" that results from asphalt plant hydrogen sulfide (H_2S) emissions. The existing California ambient air quality standard for H_2S is 30 ppb, averaged over a period of 1 hour to protect against nuisance odor ("rotten egg smell") for the general public. This standard will be used to assess potential impacts from project odor.

EMISSIONS CALCULATIONS AND METHODOLOGY

The analysis in this section is based on information provided in the Air Quality Study for the Moody Flats Quarry Project (Golder Associates, Inc., August 30, 2012). This Air Quality Study is attached as Appendix D to this EIR. The majority of the tables referenced below are found in Appendix A and Appendix B of the Air Quality Study, which is attached as Appendix D to this EIR.

Tables 3.3-5 and 3.3-6, provided below, include summaries of all air emissions estimates described in this section. Table 3.3-5 provides air emissions estimates for Scenario 1, and Table 3.3-6 provides air emissions estimates for Scenario 2.

Tables 3.3-7 and 3.3-8 provide summaries of toxic air contaminants generated during Scenario 1 and Scenario 2, respectively.

Air emissions were estimated for the following potential sources of air pollutants.

Onsite Off-Road Mobile Source Emissions (Including Mining)

Project activities related to mining and aggregate plant processing would typically employ off-road mobile equipment resulting in criteria pollutant, DPM, and fugitive dust emissions. In addition, eventual use of a railroad spur allowing for loading and shipment of aggregate product via rail would result in onsite emissions of pollutants from locomotives.

The URBEMIS (Urban Emissions) model, Version 9.2.4 was used to estimate onsite emissions from off-road mobile mining and aggregate plant equipment sources. URBEMIS calculates exhaust criteria pollutants and fugitive dust emissions as a result of mobile equipment travel and earthwork material handling. PM_{10} emissions from exhaust represent DPM emissions.

Data used for the URBEMIS model runs are summarized in Table 1a in Appendix A (Scenario 1) and Appendix B (Scenario 2) in the attached Air Quality Impact Analysis (Appendix D to this EIR). The primary differences between the URBEMIS model runs in going from Scenario 1 to Scenario 2 are the removal of the haul trucks (due to replacement by conveyors) and increases in the assumed maximum annual operating levels. The URBEMIS output files for maximum daily and total annual emissions are provided in Appendix C (Scenario 1) and Appendix D (Scenario 2) in the attached Air Quality Impact Analysis (Appendix D to this EIR).

The mobile off-road equipment proposed for this Project are expected to meet Tier 4 emission standards. To account for this, the equipment was assumed to be built in 2014; this does not require that the equipment is actually 2014 model year, but just that it will meet Tier 4 emission standards. Mitigation of fugitive dust was assumed in the model due to watering of travelled surfaces up to three times per day during dry conditions.

The resulting emissions estimates from the URBEMIS modeling for both tailpipe (exhaust) and fugitive dust are summarized below in Tables 3.3-5 (Scenario 1) and 3.3-6 (Scenario 2).

Onsite train locomotive emissions were calculated in accordance with a methodology suggested in EPA, *Emission Factors for Locomotives*, Office of Transportation and Air Quality, EPA-420-F-09-025,

April 2009. These emissions are summarized below in Tables 3.3-5 (Scenario 1) and 3.3-6 (Scenario 2).

Offsite/Onsite On-Road Mobile Source Exhaust Emissions

On-road mobile vehicles (primarily heavy duty diesel trucks picking up aggregate, asphalt concrete, and ready-mix concrete) traveling onsite and offsite would be sources of criteria pollutant and DPM emissions. Tailpipe criteria pollutant emission factors for aggregate haul trucks were determined from the California Air Resources Board's motor vehicle emission inventory program, EMFAC2011[4].

Tailpipe emission factors for onsite vehicle travel were obtained from EMFAC2011 for simulation years 2013 (Scenario 1) and 2018 (Scenario 2) for vehicle speeds of 15 miles per hour. Similarly, emission factors for offsite vehicle travel were obtained from EMFAC2011 for simulation years 2013 (Scenario 1) and 2018 (Scenario 2) for the default distribution of typical vehicle speeds.

To estimate Project emissions, the total vehicle miles traveled (VMT) for each on-road vehicle category were estimated and total emissions were computed using the following equations:

- Trips/day x Round Trip Distance (miles) x Emission Factor (g/mi) ÷ 453.6 g/lb = Pounds/day
- Trips/year x Round Trip Distance (miles) x Emission Factor (g/mi) ÷ 453.6 g/lb = Pounds/year

Offsite on-road vehicle emission estimates are provided below in Tables 3.3-5 (Scenario 1) and 3.3-6 (Scenario 2). Onsite on-road vehicle emission estimates are provided below in Tables 3.3-5 (Scenario 1) and 3.3-6 (Scenario 2).

Onsite idling emissions from on-road vehicles were based on emission factors for idling obtained from the EMFAC2011 model multiplied by five minutes per vehicle per trip consistent with California Code of Regulations Section 2485, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. Onsite on-road vehicle idling emission estimates are provided below in Tables 3.3-5 (Scenario 1) and 3.3-6 (Scenario 2).

Asphalt Plant

Both criteria pollutants and TAC emissions were estimated from the proposed asphalt plant. The maximum production rate of the asphalt plant was estimated to be 200 tons per hour for 16 hours per day, with annual rates dependent on which Scenario was being evaluated. The asphalt plant would require cleaned, sized aggregate from the aggregate plant as a raw material input. It was assumed that for every ton of clean, sized aggregate delivered to the asphalt plant, 1.1 tons of asphalt concrete would be produced.

[4] California Air Resources Board. EMFAC2011 September 19, 2011. Emission rates downloaded at: http://www.arb.ca.gov/jpub/webapp//EMFAC2011WebApp/rateSelectionPage_1.jsp.

ASPHALT PLANT CRITERIA POLLUTANT EMISSIONS

PM_{10}, CO, NO_x, SO_2 and ROG emission estimates were based on data published by Gencor Industries, Inc. (a major manufacturer of asphalt batch plants). It is expected that the asphalt plant installed would have similar technology, and hence it is reasonable to assume that emissions would be similar in magnitude, but not necessarily identical to, the Gencor plant as technology continues to improve. The Gencor emission rates in pounds per ton were used with the assumed production rates (in tons) to calculate production-based emission rates. The Gencor data, as well as the detailed emission calculations (including all assumptions) are presented in Table 7 in Appendix A (Scenario 1) and Appendix B (Scenario 2) in the attached Air Quality Impact Analysis (Appendix D to this EIR).

Emissions of CO_2 from the asphalt plant are based on Chapter 11.1 of the U.S. Environmental Protection Agency (EPA) compilation of emission factors, AP-42.[5] Detailed emission calculations with references, including all assumptions, are presented in the same tables as the other criteria pollutants.

ASPHALT PLANT TOXIC AIR CONTAMINANT EMISSIONS

In addition to criteria pollutants, the asphalt manufacturing process would release toxic air contaminants (TACs). For the purposes of this assessment a spreadsheet model published by the San Joaquin Valley Air Pollution Control District (SJVAPCD)[6] provides emission factors that can be used to estimate TAC emissions from asphalt plants. The data in this spreadsheet contains TAC emission factors based on production (tons of final asphalt). It was assumed that the asphalt plant would use natural gas and a baghouse to capture emissions. TAC emission estimates are presented below in Tables 3.3-7 (Scenario 1) and 3.3-8 (Scenario 2).

Ready-Mix Plant

Emissions of PM_{10}/$PM_{2.5}$ were estimated from the ready-mix concrete plant. The maximum production rate of the concrete plant was estimated to be 200 tons per day. The ready-mix concrete plant would accept cleaned, sized aggregate from the aggregate plant as a raw material input. It was assumed that for every ton of clean, sized aggregate delivered to the ready-mix concrete plant, 1.4 tons of ready-mix concrete would be produced.

READY-MIX PLANT CRITERIA POLLUTANT EMISSIONS

Emissions of PM_{10} and $PM_{2.5}$ from the ready-mix concrete plant are based on Chapter 11.12 of the AP-42 document. Detailed emission calculations for the ready-mix plant with references, including

[5] *AP 42, Volume I, Fifth Edition, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources*, U.S. Environmental Protection Agency, most recent data available at http://www.epa.gov/ttn/chief/ap42/index.html.

[6] Provided by Glenn Reed with the SJVAPCD.

all assumptions, are presented in Table 9 in **Appendix A** (Scenario 1) and **Appendix B** (Scenario 2) in the attached Air Quality Impact Analysis (**Appendix D** to this EIR). Emissions calculations for the ready-mix plant are summarized below in Tables 3.3-5 (Scenario 1) and 3.3-6 (Scenario 2).

READY-MIX PLANT TOXIC AIR CONTAMINANT EMISSIONS

In addition to PM_{10} and $PM_{2.5}$, the ready-mix manufacturing process would release toxic air contaminants (TACs). For the purposes of this assessment a spreadsheet model published by the SJVAPCD[7] provides emission factors that can be used to estimate TAC emissions from ready-mix plants. The data in this spreadsheet contains TAC emission factors based on production (tons of ready-mix concrete). TAC emission estimates are presented below in Tables 3.3-7 (Scenario 1) and 3.3-8 (Scenario 2).

The specific processes within the aggregate processing plant would include main conveyor loading and unloading, screening, material drop in product piles, and the loadout of clean, sized aggregate. In addition, emission from the loading and unloading of the pit run haul trucks, and from delivery and supply trucks traveling over a paved access road, were also estimated.

Drilling and Blasting Emissions

Onsite drilling and blasting activities would emit PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, and TACs.

Fugitive dust emissions from drilling activities were estimated using emission factors available from Chapter 11.9 of the U.S. EPA AP-42 document.

Emissions of PM_{10}, $PM_{2.5}$, CO, NO_x, and SO_2, resulting from blasting using ammonium nitrate/fuel oil (ANFO) explosives were estimated using emission factors available from Chapter 13.3 of the AP-42 document. The emission factors for ANFO are assigned the lowest reliability rating by the EPA and are sufficiently old that they do not reflect the much lower sulfur content in diesel fuels available today; therefore, it can be assumed that these emission factors may overestimate actual emissions from detonation of ANFO and are likely to significantly over-predict SO_2 emissions in particular. Emissions estimates for these criteria pollutants from drilling and blasting activities are presented below in Tables 3.3-5 (Scenario 1) and 3.3-6 (Scenario 2).

Emissions of two TACs, ammonia and hydrogen cyanide, were made using emission factors from a 1974 report by the U.S. Bureau of Mines. These TAC emission estimates are presented below in Tables 3.3-7 (Scenario 1) and 3.3-8 (Scenario 2).

Asphalt/Concrete Recycling Emissions

Waste asphalt concrete and Portland cement concrete would be brought to the Project site for crushing and incorporation into new asphalt and ready-mix concrete for sale. This process would generate fugitive PM_{10} and $PM_{2.5}$ emissions, which would be controlled by water spray application

[7] Provided by Glenn Reed with the SJVAPCD.

as necessary. These emissions were estimated based on available emission factors for stone crushing and are presented below in Tables 3.3-5 (Scenario 1) and 3.3-6 (Scenario 2). TAC emissions from recycling of cured asphalt and concrete are negligible because of the solid nature of the material and relatively cool temperatures of related processing.

Aggregate Plant Process Emissions

The maximum input to the aggregate plant was assumed to be 2,220,000 tons per year and 12,200 tons per day of pit run material. It was assumed that pit run material would contain 10 percent waste (unsaleable material).

Aggregate processing would be carried out using a typical industry standard aggregate plant which consists of a combination of different processing equipment such as jaw crushers, cone crushers, fine and coarse screens, and conveyors, all of which are potential sources of fugitive PM_{10} and $PM_{2.5}$ emissions onsite. For this Project, it was assumed that conveyors would be sufficiently enclosed and materials sufficiently wetted such that fugitive dust emissions from conveyors would be negligible.

PM_{10} and $PM_{2.5}$ emissions from crushing and screening were quantified using emission factors obtained from Chapter 11.19 of the AP-42 document. The process equipment at the quarry would be equipped with wet dust suppression technology to reduce the fugitive dust emissions; therefore, emission factors for controlled sources were used for emission estimation.

Emissions estimates for aggregate material crushing and screening are presented below in Tables 3.3-5 (Scenario 1) and 3.3-6 (Scenario 2).

Loading and Unloading of Aggregate-Containing Materials Emissions

Fugitive dust would be generated during the loading of mine pit haul trucks (Scenario 1), loading of conveyors leading to the main mine stockpile, loading of material onto the conveyor feeding the aggregate processing plant, dropping processed aggregate onto storages piles, and unloading of aggregate into product trucks.

Emissions of PM_{10} and $PM_{2.5}$ from each of these material transfers were estimated using a material "drop" equation from Chapter 13.2.4 of the AP-42 document. Emissions estimates for handling these materials up through the dropping of final aggregate onto storage piles are provided in below in Tables 3.3-5 (Scenario 1) and 3.3-6 (Scenario 2). Emission estimates for final loadout into trucks or railcars are provided below in Tables 3.3-5 (Scenario 1) and 3.3-6 (Scenario 2).

Fugitive Dust Emissions from Mine Pit Haul Truck Travel

The emission factors for fugitive dust generated from off-road mine pit haul trucks traveling on unpaved surfaces at the Project site (applicable to Scenario 1 only) were determined using calculations in Chapter 13.2.2 (Unpaved Roads) of the AP-42 document. This emission estimation methodology relies on estimates of road silt loading (default value used) and local meteorological parameters (based on actual available data). It was assumed that these surfaces would be watered frequently during dry conditions such that an overall 90 percent emission reduction is achieved.

Emissions estimates for fugitive dust from unpaved surfaces traveled by mine pit haul trucks in Scenario 1 are provided in below in Table 3.3-5 (Scenario 1).

Fugitive Dust Emissions from On-Road Vehicle Travel on Site Access Road

Fugitive dust generated by on-road vehicles entering the Project site on the access road were estimated assuming that the road would be unpaved in Scenario 1 and would be paved in Scenario 2.

The emission factors for fugitive dust generated from on-road vehicles traveling on the unpaved access road (applicable to Scenario 1 only) were determined using calculations in Chapter 13.2.2 (Unpaved Roads) of the AP-42 document. As noted above, this emission estimation methodology relies on estimates of road silt loading (default value used) and local meteorological parameters (based on actual available data). It was assumed that these surfaces would be watered frequently during dry conditions such that an overall 90 percent emission reduction is achieved. Emissions estimates for fugitive dust from the unpaved access road surface traveled by on-road vehicles in Scenario 1 are provided below in Table 3.3-5.

The emission factors for fugitive dust generated from on-road haul trucks traveling on the paved access road surface (applicable to Scenario 2) were determined using calculations in Chapter 13.2.1 (Paved Roads) of the AP-42 document. This emission estimation methodology relies on estimates of road silt loading (default value used) and local meteorological parameters (based on actual available data). It was assumed that these surfaces would be swept and/or vacuumed frequently during dry conditions to remove deposited soil such that an overall 90 percent emission reduction is achieved. Emissions estimates for fugitive dust from the paved access road surface traveled by on-road vehicles in Scenario 2 are provided below in Table 3.3-6.

Diesel Generator Emissions

Emissions of criteria pollutants from the diesel generator that would be used to supply electricity to the Project site in Scenario 1 (Scenario 2 assumes that line power would be brought to the site) were based on specifications from a representative, available 455 kilowatt generator. Emissions of PM_{10} were also used to represent DPM emissions. These emissions estimates are provided below in Tables 3.3-5.

EMISSIONS SUMMARY

Maximum estimated Project-wide criteria pollutant emissions are summarized in below in Tables 3.3-5 (Scenario 1) and 3.3-6 (Scenario 2). Similarly, TAC emissions are summarized below in Tables 3.3-7 (Scenario 1) and 3.3-8 (Scenario 2).

Subtotals of Project-wide direct and indirect emissions, as defined in SCAQMD guidance[8], are also shown in the criteria pollutant summary tables (Tables 3.3-5 and 3.3-6), and are compared to emissions-based significance levels provided in the same SCAQMD guidance document.

[8] *Protocol for Review, Land Use Permitting Activities, Procedures for Implementing the California Environmental Quality Act*, Shasta County Air Quality Management District, November 2003.

TABLE 3.3-5: 1 MM TPY SCENARIO CRITERIA POLLUTANT EMISSION ESTIMATES SUMMARY COMPARISON TO THRESHOLDS

SOURCE	ROG		NOX		CO		SO2		PM10		PM2.5		CO2	
	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)
Direct Sources [4]														
Onsite Sources														
Blasting and Drilling	--	--	65.5	1.64	258	6.45	7.70	0.19	40.5	0.61	2.34	0.035	--	--
Mining Activities (URBEMIS)(Dust)	--	--	--	--	--	--	--	--	10.4	0.85	2.16	0.18	--	--
Mine Haul Trucks (Unpaved Road Dust)	--	--	--	--	--	--	--	--	339	8.99	33.9	0.90	--	--
Plant Operation (URBEMIS)(Dust)	--	--	--	--	--	--	--	--	0	0	0	0	--	--
Product and Supply Trucks (Unpaved Road Dust)	--	--	--	--	--	--	--	--	452	8.38	45.2	0.84	--	--
Screens	--	--	--	--	--	--	--	--	3.66	0.12	0.25	0.008	--	--
Crushing	--	--	--	--	--	--	--	--	4.46	0.15	0.83	0.028	--	--
Aggregate Plant Material Handling	--	--	--	--	--	--	--	--	41.3	1.32	6.26	0.20	--	--
Asphalt Plant (AP-42)	13.8	0.21	32.0	0.48	237	3.54	3.52	0.053	22.4	0.33	15.0	0.22	105,600	1,579
Concrete Plant (AP-42)	--	--	--	--	--	--	--	--	31.8	0.60	7.31	0.14	--	--
Recycle Plant	--	--	--	--	--	--	--	--	1.73	0.007	0.32	0.001	--	--
Diesel Generator [1]	1.39	0.138	90	8.9	7.15	0.71	0.0002	0.00002	0.35	0.035	0.35	0.035		
Direct Source Emissions Total	**15**	**0.34**	**187**	**11**	**502**	**11**	**11**	**0.25**	**948**	**21**	**114**	**2.6**	**105,600**	**1,579**
Direct Source Thresholds	--	*25*	--	*25*	--	--	--	--	--	*25*	--	--	--	--

Indirect Sources [3]														
Onsite Sources														
Product and Supply Trucks (Tailpipe/Brake/Tire) [1]	14.1	0.26	69.7	1.28	31.0	0.57	0.093	0.002	3.94	0.072	3.55	0.065	9,108	167
Product and Supply Trucks (Idling) [1]	1.18	0.022	10.9	0.199	4.89	0.09	0.000	0	0.15	0.003	0.15	0.003	650	12
Aggregate Train Locomotive [1]	5.45	0.27	5.45	0.27	1.41	0.070	0.10	0.005	0.20	0.010	0.19	0.010	540	27

SOURCE	ROG		NOX		CO		SO2		PM10		PM2.5		CO2	
	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)
Offsite Sources														
Product and Supply Trucks (Tailpipe/Brake/Tire)	21.5	0.39	315	5.78	91.1	1.65	0.33	0.006	13.3	0.24	11.5	0.21	43,433	795
Indirect Source Emissions Total	**42**	**0.9**	**401**	**7.5**	**128**	**2.4**	**0.5**	**0.013**	**18**	**0.33**	**15**	**0.29**	**53,731**	**1,001**
Level A Significance Thresholds - Criteria Pollutants (2)	*25*	--	*25*	--	--	--	--	--	*80*	--	--	--	--	--
Level B Significance Thresholds - Criteria Pollutants (2)	*137*	--	*137*	--	--	--	--	--	*137*	--	--	--	--	--
Other Sources (5)														
Onsite Sources														
Mining Activities w/o Haul Trucks (URBEMIS)(Exhaust) (1)	1.07	0.060	6.74	0.35	20.5	1.16	0	0	0.17	0.010	0.17	0.010	11,589	661
Mine Haul Trucks (URBEMIS)(Exhaust) (1)	0.85	0.050	4.31	0.26	15.6	0.94	0.00	0.00	0.15	0.010	0.15	0.010	--	--
Plant Operation (URBEMIS)(Exhaust) (1)	1.50	0.15	7.71	0.58	25.2	2.37	0	0	0.14	0.010	0.11	0.010	7,284	507
Other Source Emissions Total	**3.4**	**0.26**	**19**	**1.2**	**61**	**4.5**	**0**	**0**	**0.46**	**0.03**	**0.43**	**0.03**	**18,872**	**1,167**

Grand Total	**60.8**	**1.55**	**607**	**19.7**	**692**	**17.5**	**11.7**	**0.26**	**966**	**21.8**	**130**	**2.91**	**178,203**	**3,747**

Notes:

(1) The majority of PM_{10} emission are DPM emissions.

(2) Significance thresholds obtained from the Shasta County "*Protocol for Review, Land Use Permitting Activities, Procedures for Implementing the California Environmental Quality Act*" document, November 2003.

(3) Indirect sources are the sum of on-road vehicle emissions (including offsite, onsite, and idling emissions) and locomotive emissions. As defined by *Protocol for Review, Land Use Permitting Activities, Procedures for Implementing the California Environmental Quality Act*, Shasta County Air Quality Management District, November 2003, Indirect sources are "induced" by the Project.

(4) Direct sources are the sum of stationary source emissions (blasting, aggregate plant, asphalt plant, concrete plant, recycle plant, diesel generator, and all fugitive dust emissions). As defined by *Protocol for Review, Land Use Permitting Activities, Procedures for Implementing the California Environmental Quality Act*, Shasta County Air Quality Management District, November 2003, Direct sources are stationary sources that are part of the Project.

(5) Other Sources are those sources associated with the project that cannot be categorized as either Indirect or Direct sources as defined in footnotes 3 and 4 (i.e. tailpipe emissions from mobile off-road equipment).

TABLE 3.3-6: 2 MM TPY SCENARIO CRITERIA POLLUTANT EMISSION ESTIMATES SUMMARY COMPARISON TO THRESHOLDS

SOURCE	ROG		NOX		CO		SO2		PM10		PM2.5		CO2	
	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)
Direct Sources [4]														
Onsite Sources														
Blasting and Drilling	--	--	65.5	3.27	258	12.9	7.70	0.39	40.5	1.21	2.34	0.070	--	--
Mining Activities (URBEMIS)(Dust)	--	--	--	--	--	--	--	--	10.8	1.28	2.26	0.27	--	--
Plant Operation (URBEMIS)(Dust)	--	--	--	--	--	--	--	--	0	0	0	0	--	--
Product and Supply Trucks (Paved Road Dust)	--	--	--	--	--	--	--	--	55.0	2.92	13.5	0.72	--	--
Screens	--	--	--	--	--	--	--	--	6.35	0.24	0.43	0.017	--	--
Crushing	--	--	--	--	--	--	--	--	7.72	0.30	1.43	0.055	--	--
Aggregate Plant Material Handling	--	--	--	--	--	--	--	--	42.7	1.72	6.46	0.26	--	--
Asphalt Plant (AP-42)	13.8	0.47	32.0	1.10	237	8.14	3.52	0.12	22.4	0.77	15.0	0.52	105,600	3,630
Concrete Plant (AP-42)	--	--	--	--	--	--	--	--	31.8	1.39	7.3	0.32	--	--
Recycle Plant	--	--	--	--	--	--	--	--	1.73	0.014	0.32	0.003	--	--
Direct Source Emissions Total	**14**	**0.34**	**97**	**11**	**495**	**11**	**11**	**0.25**	**219**	**21**	**49**	**2.6**	**105,600**	**3,630**
Direct Source Thresholds	--	*25*	--	*25*	--	--	--	--	--	*25*	--	--	--	--

Indirect Sources [3]														
Onsite Sources														
Product and Supply Trucks (Tailpipe/Brake/Tire) [1]	8.25	0.35	37.7	1.58	18.0	0.75	0.077	0.003	1.82	0.076	1.54	0.065	9,066	377
Product and Supply Trucks (Idling) [1]	0.95	0.04	11.5	0.481	4.56	0.19	0.000	0	0.092	0.004	0.092	0.004	643	27
Aggregate Train Locomotive [1]	10.9	0.54	10.9	0.54	2.82	0.14	0.20	0.010	0.40	0.020	0.38	0.019	1,080	54
Offsite Sources														
Product and Supply Trucks (Tailpipe/Brake/Tire)	16.1	0.67	203	8.48	69.2	2.84	0.36	0.015	9.31	0.39	7.9	0.33	54,315	2,261

SOURCE	ROG		NOX		CO		SO2		PM10		PM2.5		CO2	
	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)	(LB/DAY)	(TON/YR)
Indirect Source Emissions Total	**36**	**0.9**	**263**	**7.5**	**95**	**2.4**	**0.6**	**0.013**	**12**	**0.33**	**10**	**0.29**	**65,105**	**2,719**
Level A Significance Thresholds - Criteria Pollutants (2)	*25*	--	*25*	--	--	--	--	--	*80*	--	--	--	--	--
Level B Significance Thresholds - Criteria Pollutants (2)	*137*	--	*137*	--	--	--	--	--	*137*	--	--	--	--	--
Other Sources (5)														
Onsite Sources														
Mining Activities w/o Haul Trucks (URBEMIS)(Exhaust) (1)	1.07	0.090	6.74	0.51	20.5	1.67	0	0	0.17	0.010	0.17	0.010	11,589	964
Plant Operation (URBEMIS)(Exhaust) (1)	1.50	0.17	7.71	0.72	25.2	2.72	0	0	0.14	0.010	0.11	0.010	7,284	692
Other Source Emissions Total	**2.6**	**0.26**	**14**	**1.2**	**46**	**4.4**	**0**	**0**	**0.31**	**0.02**	**0.28**	**0.02**	**18,872**	**1,656**
Grand Total	**52.5**	**1.55**	**375**	**19.8**	**635**	**17.5**	**11.9**	**0.26**	**231**	**21.7**	**59**	**2.90**	**189,577**	**8,005**

Notes:

(1) The majority of PM_{10} emission are DPM emissions.

(2) Significance thresholds obtained from the Shasta County "*Protocol for Review, Land Use Permitting Activities, Procedures for Implementing the California Environmental Quality Act*" document, November 2003.

(3) Indirect sources are the sum of on-road vehicle emissions (including offsite, onsite, and idling emissions) and locomotive emissions. As defined by *Protocol for Review, Land Use Permitting Activities, Procedures for Implementing the California Environmental Quality Act*, Shasta County Air Quality Management District, November 2003, Indirect sources are "induced" by the Project.

(4) Direct sources are the sum of stationary source emissions (blasting, aggregate plant, asphalt plant, concrete plant, recycle plant, diesel generator, and all fugitive dust emissions). As defined by *Protocol for Review, Land Use Permitting Activities, Procedures for Implementing the California Environmental Quality Act*, Shasta County Air Quality Management District, November 2003, Direct sources are stationary sources that are part of the Project.

(5) Other Sources are those sources associated with the project that cannot be categorized as either Indirect or Direct sources as defined in footnotes 3 and 4 (i.e. tailpipe emissions from mobile off-road equipment).

TABLE 3.3-7: 1 MM TPY SCENARIO NON-DPM TAC EMISSION ESTIMATES SUMMARY

SUBSTANCE	CAS[2]	ASPHALT PLANT		CONCRETE PLANT		BLASTING		TOTALS	
		(LB/HR)	(TON/YR)	(LB/HR)	(TON/YR)	(LB/HR)	(TON/YR)	(LB/HR)	(TON/YR)
CO[1]	360-08-0	--	--	--	--	--	--	--	--
NO_2[1]	10102-44-0	--	--	--	--	--	--	--	--
SO_2[1]	7446-09-5	--	--	--	--	--	--	--	--
Arsenic	7440-38-2	--	--	1.6E-05	5.6E-06	--	--	1.6E-05	5.6E-06
Ammonia	7664-41-7	--	--	--	--	6.6E+00	1.6E-01	6.6E+00	1.6E-01
Benzene	71-43-2	4.2E-03	1.2E-03	--	--	--	--	4.2E-03	1.2E-03
Beryllium	7440-41-7	--	--	8.8E-07	3.1E-07	--	--	8.8E-07	3.1E-07
Cadmium	7440-43-9	--	--	7.7E-07	2.7E-07	--	--	7.7E-07	2.7E-07
Chromium (VI)	18540-29-9	4.6E-05	1.3E-05	3.6E-06	1.3E-06	--	--	5.0E-05	1.4E-05
Copper	7440-50-8	6.8E-04	1.9E-04	2.2E-05	7.8E-06	--	--	7.0E-04	1.9E-04
Formaldehyde	50-00-0	2.5E+00	6.8E-01	--	--	--	--	2.5E+00	6.8E-01
Hydrogen Cyanide	74-90-8	--	--	--	--	4.2E-01	1.0E-02	4.2E-01	1.0E-02
Lead	7439-92-1	--	--	9.5E-06	3.3E-06	--	--	9.5E-06	3.3E-06
Manganese	7439-96-5	3.0E-03	8.3E-04	2.7E-04	9.4E-05	--	--	3.3E-03	9.2E-04
Mercury	7439-97-6	9.6E-05	2.6E-05	--	--	--	--	9.6E-05	2.6E-05
Nickel	7440-02-0	1.9E-03	5.2E-04	1.8E-05	6.2E-06	--	--	1.9E-03	5.2E-04
PAHS w/o Naptha	1-15-0	1.3E-03	3.5E-04	--	--	--	--	1.3E-03	3.5E-04
Selenium	7782-49-2	--	--	7.7E-07	2.7E-07	--	--	7.7E-07	2.7E-07
Toluene	108-88-3	5.3E+00	1.5E+00	--	--	--	--	5.3E+00	1.5E+00
Xylene	1330-20-7	3.9E+00	1.1E+00	--	--	--	--	3.9E+00	1.1E+00
Zinc	7440-66-6	7.8E-03	2.1E-03	6.3E-05	2.2E-05	--	--	7.9E-03	2.2E-03

SOURCE: MOODY FLATS QUARRY AIR QUALITY STUDY, APPENDIX A, TABLE 22, GOLDER ASSOCIATES, AUGUST 20, 2012.

1) CO, NO_2 (as NO_x), and SO_2 emissions are summarized in the Criteria Pollutant Emission Summary Table.

2) CAS Registry Numbers, also referred to as CASRNs and CAS Numbers, are unique numerical identifiers assigned by the Chemical Abstracts Service to every chemical substance described in open scientific literature.

TABLE 3.3-8: 2 MM TPY SCENARIO NON-DPM TAC EMISSION ESTIMATES SUMMARY

SUBSTANCE	CAS[2]	ASPHALT PLANT		CONCRETE PLANT		BLASTING		TOTALS	
		(LB/HR)	(TON/YR)	(LB/HR)	(TON/YR)	(LB/HR)	(TON/YR)	(LB/HR)	(TON/YR)
CO[1]	360-08-0	--	--	--	--	--	--	--	--
NO_2[1]	10102-44-0	--	--	--	--	--	--	--	--
SO_2[1]	7446-09-5	--	--	--	--	--	--	--	--
Arsenic	7440-38-2	--	--	1.6E-05	1.1E-05	--	--	1.6E-05	1.1E-05
Ammonia	7664-41-7	--	--	--	--	6.6E+00	3.3E-01	6.6E+00	3.3E-01
Benzene	71-43-2	4.2E-03	2.3E-03	--	--	--	--	4.2E-03	2.3E-03
Beryllium	7440-41-7	--	--	8.8E-07	6.2E-07	--	--	8.8E-07	6.2E-07
Cadmium	7440-43-9	--	--	7.7E-07	5.4E-07	--	--	7.7E-07	5.4E-07
Chromium (VI)	18540-29-9	4.6E-05	2.5E-05	3.6E-06	2.5E-06	--	--	5.0E-05	2.8E-05
Copper	7440-50-8	6.8E-04	3.7E-04	2.2E-05	1.6E-05	--	--	7.0E-04	3.9E-04
Formaldehyde	50-00-0	2.5E+00	1.4E+00	--	--	--	--	2.5E+00	1.4E+00
Hydrogen Cyanide	74-90-8	--	--	--	--	4.2E-01	2.1E-02	4.2E-01	2.1E-02
Lead	7439-92-1	--	--	9.5E-06	6.7E-06	--	--	9.5E-06	6.7E-06
Manganese	7439-96-5	3.0E-03	1.7E-03	2.7E-04	1.9E-04	--	--	3.3E-03	1.8E-03
Mercury	7439-97-6	9.6E-05	5.3E-05	--	--	--	--	9.6E-05	5.3E-05
Nickel	7440-02-0	1.9E-03	1.0E-03	1.8E-05	1.2E-05	--	--	1.9E-03	1.0E-03
PAHS w/o Naptha	1-15-0	1.3E-03	6.9E-04	--	--	--	--	1.3E-03	6.9E-04
Selenium	7782-49-2	--	--	7.7E-07	5.4E-07	--	--	7.7E-07	5.4E-07
Toluene	108-88-3	5.3E+00	2.9E+00	--	--	--	--	5.3E+00	2.9E+00
Xylene	1330-20-7	3.9E+00	2.2E+00	--	--	--	--	3.9E+00	2.2E+00
Zinc	7440-66-6	7.8E-03	4.3E-03	6.3E-05	4.4E-05	--	--	7.9E-03	4.3E-03

SOURCE: MOODY FLATS QUARRY AIR QUALITY STUDY, APPENDIX B, TABLE 20, GOLDER ASSOCIATES, AUGUST 20, 2012.

1) CO, NO_2 (as NO_x), and SO_2 emissions are summarized in the Criteria Pollutant Emission Summary Table.

2) CAS Registry Numbers, also referred to as CASRNs and CAS Numbers, are unique numerical identifiers assigned by the Chemical Abstracts Service to every chemical substance described in open scientific literature.

IMPACTS AND MITIGATION MEASURES

Impact 3.3-1: Project operations may conflict with, or obstruct implementation of, any applicable air quality plan (Less than Significant)

As noted above, the Shasta County General Plan has a number of policies specifically related to minimizing air quality impacts from new projects. The Shasta County Planning Division will require that the project be in compliance with all of these policies prior to commencing construction.

The Air Pollution Control Districts and Air Quality Management Districts' (Districts) for the counties located in the northern portion of the Sacramento Valley (including Shasta County, where the Project is located) together compromise the Northern Sacramento Valley Planning Area (NSVPA). The NSVPA Districts have committed to jointly prepare and adopt a uniform air quality attainment plan (the Plan) for the purpose of achieving and maintaining compliance with the California ozone Ambient Air Quality Standards (AAQS). The Plan was last updated in 2012.

Districts within the areas of origin of transported air pollutants require sufficient emission control measures for ozone in order to mitigate the impacts of pollution sources within their jurisdictions on ozone concentrations within the District and in downwind areas. The requirements of the Plan are incorporated into the SCAQMD air quality rules. Since the Project will be required to comply with all applicable SCAQMD rules and obtain an air quality Authority to Construct/Permit to Operate permit from the SCAQMD, it will be in compliance with the requirements of the Plan.

Because the Project will be in compliance with both the Shasta County General Plan and the NSVPA Plan, it will not conflict with, or obstruct implementation of, either of these plans. Therefore, this impact will be **less than significant**.

Impact 3.3-2: Project operations may result in emissions of Criteria Air Pollutants in excess of Shasta County Air Quality Management District Thresholds of Significance (Significant and Unavoidable)

The Project would consist of a hard rock aggregate mine designed with the eventual capability of producing up to two million tons of aggregate per year. Aggregate produced could be used for production of ready-mix or asphalt concrete on-site, which would be sold to off-site customers, or it could be sold directly to customers and transported off-site by heavy duty truck or rail. The following is a summary of the various sources of emissions anticipated to occur as a result of Project operations.

This assessment provides quantitative air quality impact information for the following two operating scenarios:

> **Scenario 1:** Initially, the facility would operate such that maximum aggregate production would be one million tons per year (1MM tpy), mined material would be transported to the aggregate processing area by off-road haul trucks, electrical power to the site would

be provided by a diesel generator, and the access road to the site would remain unpaved. Table 3.3-5 outlines the criteria pollutant emission estimates as compared to applicable thresholds for Scenario 1.

Scenario 2: Within approximately five years, the facility would operate such that maximum aggregate production would be two million tons per year (2MM tpy), mined material would be transported to the aggregate processing area by electric-powered conveyors, electrical power lines would be brought to the site, and the access road to the site would be paved. Table 3.3-6 outlines the criteria pollutant emission estimates as compared to applicable thresholds for Scenario 2.

Off-Road Diesel Engines

Mobile off-road equipment associated with mining and aggregate plant activities would include excavators, front-end loaders, mine haul trucks (Scenario 1), drills, a generator (Scenario 1), and other miscellaneous equipment with diesel-fueled engines. These engines would emit criteria pollutants such as CO, NO_x, SO_2, PM_{10}/$PM_{2.5}$, and ROG. The particulate matter emitted from diesel engines is also classified as diesel particulate matter (a TAC). Because DPM is comprised of many individual pollutants, speciated[9] emissions of individual TACs from diesel engine exhaust were not quantified.

On-Road Diesel Engines

Mobile on-road vehicles associated with the Project would include customer trucks picking up aggregate, ready-mix concrete and asphalt concrete and vendor trucks bringing raw materials to the site. These engines would emit CO, NO_x, SO_2, PM_{10}/$PM_{2.5}$, and ROG, as well as DPM.

Fugitive Dust from Material Handling

Aggregate processing (crushing, screening) and loading/unloading of both mined material and final aggregate would result in the generation of fugitive dust particulate emissions. These emissions could be significantly reduced by the application of water to the materials being handled, as would be the case for the crushers and screens at the aggregate processing plant.

Fugitive Dust from Mobile Source Movement

The movement of both off-road and on-road vehicles over paved and unpaved surfaces would result in the generation of fugitive dust emissions. These emissions would be higher when the paved/unpaved surface is dry and lower when the surface is wet (either due to the presence of surface water, precipitation, or manual application of water).

[9] Speciation is the process of disaggregating inventory pollutants into individual chemical species components or groups of species. The need for speciation is determined by the inventory purpose. Inventory applications that require detailed speciation include photochemical modeling, air toxics inventories, chemical mass balance modeling, and visibility modeling.

Asphalt Plant

An asphalt batch plant would be located on the plant site and would be constructed to regulatory standards (i.e., best available control technology standards). Plant operations would involve drying and mixing of aggregate material with heated asphalt oil to manufacture asphaltic concrete. The plant would have an estimated throughput of 200 tons of asphaltic concrete per hour. The asphalt plant area would include aggregate stockpiles, asphalt oil storage tanks, conveyors, a natural gas-fired rotary dryer, natural gas storage tanks, a control room, and a bag house dust collection system. Asphaltic concrete manufactured at the site would be loaded onto trucks for transport off-site. Asphalt oil used in the manufacturing process would be delivered on-site as needed and stored in heated storage tanks. Air emissions would occur primarily from natural gas combustion associated with aggregate drying and asphalt cement heating (CO, NO_x, SO_2, ROG, and PM_{10}/$PM_{2.5}$), and dryer dust (PM_{10}/$PM_{2.5}$).

Ready-Mix Plant

A ready-mix plant would also be located on the plant site. Typical ready-mix operations involve mixing of processed rock and sand with cement and water to manufacture ready-mix concrete. The plant would have an estimated throughput of 200 tons per hour. The ready-mix plant would include concrete aggregate stockpiles, mixer, cement silos, dust collection systems, a control room, and conveyors. Manufactured ready-mix concrete would be loaded into concrete mixer trucks and transported offsite. Cement would be delivered onsite in enclosed container trucks as needed and stored in silos. Air emissions would occur primarily from handling and mixing of dry ready-mix concrete ingredients (PM_{10}/$PM_{2.5}$).

Recycling Plant

Recycled asphalt and/or concrete would be processed in a recycling plant crusher and reused in the asphalt and/or ready-mix plants. Processing (crushing) of recycled material would occur in conjunction with aggregate processing and would generate small quantities of fugitive dust.

Train Locomotive Emissions

The sale of construction aggregate materials is expected to occur within the local Redding market as well as regional markets. The local market would be serviced by aggregate haul trucks while the regional market would be serviced by rail. Rail transportation of finished products would generate criteria pollutants and DPM emissions both onsite and offsite. Emissions from on-site locomotive exhaust are assessed but off site emissions (from the time the aggregate train leaves the site) are not analyzed as these emissions are assumed to be part of the rail authority's existing locomotive traffic inventory and would occur with or without the Project.

Miscellaneous Sources

Onsite and offsite vehicle travel associated with worker commuting would generate passenger vehicle tailpipe emissions (CO, NO_x, SO_2, ROG, PM_{10} and $PM_{2.5}$). Other minor sources of air pollutant emissions would include on-site fuel delivery and storage, and use of maintenance fluids containing ROG.

Construction Emissions

Construction emissions would occur during initial site preparation and periodic modification and expansion of facilities. Construction-related air pollutant emissions would be associated with ground disturbance, equipment and vehicle emissions. Because construction activities would utilize equipment similar to that already onsite for Project operations, new and/or additional equipment would not be brought onsite to complete construction tasks. Instead, the same equipment would be moved onsite based on the current task, and operating hours would remain similar whether the mobile equipment was used for construction and/or Project operations. Therefore, construction emissions are assumed to coincide with operational emissions, and are not addressed separately in this analysis.

Modeling of air pollutant emissions under both scenarios included the following assumptions pertaining to measures that would be implemented to reduce fugitive dust emissions:

- Traveled, unpaved surfaces would be watered up to three times per day during dry conditions;
- Paved access roads would be swept with sufficient frequency to achieve a fugitive dust control efficiency of 90 percent; and
- Vehicle speeds on unpaved roads would not exceed 15 mph.

These assumptions are to be made a condition of Project approval, and shall be included as requirements on the Project's Use Permit.

Emissions Summary

Maximum estimated Project-wide criteria pollutant emissions which include ROG, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, and CO2, under Scenarios 1 and 2 are presented above in Tables 3.3-5 and 3.3-6, respectively.

As shown in Tables 3.3-5 and 3.3-6, indirect Project emissions under Scenario 1 and 2 are predicted to exceed the Level A thresholds for ROG. In addition, indirect Project emissions are predicted to exceed the Level A and B thresholds for NO_x. This is considered to be a **potentially significant** impact. Other indirect and direct emission sources under Scenarios 1 and 2 would be under the SCAQMD thresholds presented in Table 3.3-4.

Maximum daily indirect PM_{10} emissions from either Scenario of 15 pounds per day would be less than the SCAQMD Level A and B thresholds of 80 and 137 pounds per day respectively. Maximum annual direct PM_{10} emissions from either Scenario of 23 tons per year would be less than the SCAQMD threshold of 25 tons per year. Although no Shasta County CEQA significance thresholds are available for CO and SO_2 emissions, between the relatively low emission rates for these pollutants (compared to their associated ambient air quality standards [see Table 3.3-1]) and the fact that the airshed is in compliance with these standards (see Table 3.3-2), these emissions would be less than significant. In addition, these emissions are less than the SCAQMD thresholds used for the application of BACT shown in Table 3.3-4.

As a result of the predicted ROG emissions in excess of the Level A threshold, the Project would be required to implement SCAQMD standard mitigation measures for reducing ROG emissions. As a result of the predicted NO_x emissions in excess of the Level B threshold, the Project would be required to implement best available mitigation measures for reducing NO_x emissions.

The Project would employ the best current technology for reducing ROG and NO_x emissions for those sources under the operator's control; namely:

- The asphalt plant would utilize a low-NO_x burner design to minimize NO_x emissions and a drum exhaust recirculation system to combust ROG emissions in the burner zone; and

- Off-road mobile equipment would have engines meeting Tier 4 emission standards, the most stringent standards currently available for such equipment. These standards reflect the equipment with the lowest available ROG and NO_x emission rates.

These requirements are outlined in Mitigation Measure 3.3-2, below. Mitigation Measure 3.3-2, would reduce impacts associated with ROG and NO_x, but not to a level below the SCAQMD thresholds of significance. Therefore this impact is considered **significant and unavoidable**.

MITIGATION MEASURES

Mitigation Measure 3.3-2*: Prior to the commencement of surface disturbing activities, the Project Operator shall prepare a ROG and NO_x emissions reduction plan (ERP) that meets the requirements of the SCAQMD. The ERP shall include quantifiable and verifiable metrics that demonstrate the effectiveness of the measures at reducing emissions of ROG and NO_x, including, but not limited to, a list of all off road vehicles proposed for use at the Project site to demonstrate Tier 4 compliance. The emissions reduction plan shall be submitted to the SCAQMD for review and approval prior to commencement of surface disturbing activities. The emissions reduction plan shall include all feasible Reasonably Available Control Measures (RACMs) and Best Available Control Technologies (BACT) for a stationary source recommended in SCAQMD guidance documents applicable to large surface disturbing activities.*

Impact 3.3-3: Project operations may contribute to an exceedance of an established ambient air quality standard (Significant and Unavoidable)

Project-related air pollutant emissions would create a potential for exceeding established federal and state AAQS. Maximum exposure point concentrations in ambient air (i.e. outside of the Project site property boundary) were estimated for PM_{10}, $PM_{2.5}$, and NO_2. These are the criteria pollutants that would be emitted from the Project in the largest estimated quantities relative to their associated AAQS. The AAQS for CO is significantly less stringent than for other criteria pollutants, and SO_2 and ROG emissions estimates are relatively low, so offsite concentrations of SO_2 and ozone (ROG is a precursor for ozone) were not estimated. Exposure point concentrations were assessed for the Project activity emissions discussed in Impact 3.3-2, above. For purposes of this evaluation, the maximum modeled emissions were compared to applicable state or federal AAQS. Existing background concentrations of these pollutants are addressed where necessary to determine whether or not combined modeled and background concentrations would result in a significant impact.

The U.S. EPA AERMOD dispersion model (version 09292) was used to estimate maximum ambient air concentrations of pollutants emitted from Project activities. Model runs for evaluating AAQS included source-specific emission rates appropriate for the AAQS averaging time. Model results were then directly comparable to the AAQS (except for those AAQS with statistical formats, in which case the appropriate statistics were performed on the model results). The criteria pollutant dispersion modeling results for Scenario 1 are presented below in Table 3.3-9. Scenario 2 results are presented in Table 3.3-10.

TABLE 3.3-9: CRITERIA POLLUTANT DISPERSION MODELING RESULTS- SCENARIO 1

POLLUTANT	*AVERAGING TIME*	*MODELED CONCENTRATIONS[(A)] (UG/M3)*		*CALIFORNIA AMBIENT AIR QUALITY STANDARD (UG/M3)*	*NATIONAL AMBIENT AIR QUALITY STANDARD (UG/M3)*
NO_2	1-hr	213.9 (b)		339	
NO_2	1-hr	152.1 (c)			188 (d)
NO_2	Annual	0.721	1988	57 (e)	100 (e)
		0.763	**1989**		
		0.744	1990		
		0.710	1991		
		0.645	1992		
PM_{10}	24-hr	394.3 (f)		50	
		283.7 (g)			150
PM_{10}	Annual	12.58	1988	20 (e)	No Standard
		12.29	1989		
		12.30	1990		
		12.62	**1991**		
		11.50	1992		
$PM_{2.5}$	24-hr	23.5 (h)		No Standard	35
$PM_{2.5}$	Annual	1.28	1988	12 (e)	15 (e)
		1.25	1989		
		1.25	1990		
		1.29	**1991**		
		1.17	1992		

SOURCE: MOODY FLATS QUARRY AIR QUALITY STUDY, TABLE 5-2, GOLDER ASSOCIATES, AUGUST 20, 2012.

(a) The maximum modeled annual concentration for multi-year assessments are bolded. Calendar years shown indicate the meteorological year used in the modeling.
(b) The modeled concentration is equal to the maximum 1-hr modeled concentration for comparison to the CAAQS.
(c) The federal 1-hour standard requires determining the maximum 1-hour NO2 concentration for each day (i.e., 365 values for a typical year with continuous, valid monitoring data), then determining the 98th percentile value. If 365 valid concentrations are available, this would be the eighth highest value in the data set.
(d) The form of the national ambient air quality standard is the 98th percentile of the maximum daily 1-hour concentration
(e) Calculated as the arithmetic average.
(f) The modeled concentration is equal to the maximum 24-hr modeled concentration for comparison to the CAAQS.
(g) The modeled concentration is the 6th highest concentration for comparison to the NAAQS (exceed once per year on average over 5 years modeled).
(h) The maximum concentration is equal to the 98th percentile for comparison to the NAAQS.

TABLE 3.3-10: CRITERIA POLLUTANT DISPERSION MODELING RESULTS- SCENARIO 2

POLLUTANT	*AVERAGING TIME*	*MODELED CONCENTRATIONS[A] (UG/M3)*		*CALIFORNIA AMBIENT AIR QUALITY STANDARD (UG/M3)*	*NATIONAL AMBIENT AIR QUALITY STANDARD (UG/M3)*
NO_2	1-hr	120.8 (b)		339	
NO_2	1-hr	84.8 (c)			188 (d)
NO_2	Annual	1.26	1988	57 (e)	100 (e)
		1.29	**1989**		
		1.26	1990		
		1.19	1991		
		1.07	1992		
PM_{10}	24-hr	75.5 (f)		50	
		34.5 (g)			150
PM_{10}	Annual	3.93	1988	20 (e)	No Standard
		3.84	1989		
		3.84	1990		
		3.94	**1991**		
		3.59	1992		
$PM_{2.5}$	24-hr	18.8 (h)		No Standard	35
$PM_{2.5}$	Annual	0.969	1988	12 (e)	15 (e)
		0.947	1989		
		0.947	1990		
		0.972	**1991**		
		0.886	1992		

SOURCE: MOODY FLATS QUARRY AIR QUALITY STUDY, TABLE 5-3, GOLDER ASSOCIATES, AUGUST 20, 2012.

(a) The maximum modeled annual concentration for multi-year assessments are bolded. Calendar years shown indicate the meteorological year used in the modeling.
(b) The modeled concentration is equal to the maximum 1-hr modeled concentration for comparison to the CAAQS.
(c) The federal 1-hour standard requires determining the maximum 1-hour NO_2 concentration for each day (i.e., 365 values for a typical year with continuous, valid monitoring data), then determining the 98th percentile value. If 365 valid concentrations are available, this would be the eighth highest value in the data set.
(d) The form of the national ambient air quality standard is the 98th percentile of the maximum daily 1-hour concentration
(e) Calculated as the arithmetic average.
(f) The modeled concentration is equal to the maximum 24-hr modeled concentration for comparison to the CAAQS.
(g) The modeled concentration is the 6th highest concentration for comparison to the NAAQS (exceed once per year on average over 5 years modeled).
(h) The maximum concentration is equal to the 98th percentile for comparison to the NAAQS.

NO_2

NO_x emissions from combustion sources are comprised primarily of NO and NO_2. The state and federal standards are for NO_2 only. After release, NO is oxidized to NO_2 fairly rapidly, and there are algorithms within the AERMOD model to account for this conversion; however, since use of these algorithms would require the use of hourly ambient ozone data, the assessment presented in this

EIR conservatively utilizes U.S. EPA guidance for NO_2:NO_x ambient ratios[10]; specifically, this ratio is assumed to be 0.80 for 1-hour NO_2 modeling and 0.75 for annual NO_2 modeling.

As shown in the tables above, maximum modeled one-hour and annual NO_2 concentrations would be less than the associated AAQS. The highest modeled one-hour NO_2 concentrations occurred only within a very small area just south of the entrance to the Project site access road. The majority of these concentrations would be due to on-road vehicle tailpipe emissions for vehicles entering and exiting the access road. Consequently, as shown in the tables above, NO_2 emissions without the addition of background concentrations would be less than significant.

The nearest valid ambient NO_2 monitoring data published by the California Air Resources Board for use as background concentrations are from Chico, California in Butte County. The most recent complete NO_2 data from this site provides a three-year (2009-2011) average of the 98th percentile daily 1-hour concentration of 62.7 ug/m^3. When this background concentration is added to the maximum 98th percentile daily 1-hour modeled concentration of 152.1ug/m^3, the AAQS of 188ug/m3 is exceeded. Therefore, with the addition of background concentrations, maximum total concentrations (maximum modeled plus background) are likely above one or more of the ambient NO_2 standards and predict **a significant impact**.

<u>PM_{10}</u>

As shown in Table 3.3-9 the maximum predicted 24-hour PM_{10} concentration for Scenario 1 was 394.3 µg/m^3, and would exceed the associated California AAQS (50 µg/m^3). The predicted 24-hour PM_{10} concentration, evaluated as the highest-sixth-high value for the purposes of comparing to the federal AAQS, was 283.7 µg/m^3, and would exceed the federal standard. Concentrations above the California AAQS occurred over a fairly broad area to the south of the Project site, with the highest concentrations occurring just south of the entrance to the Project site access road. The majority of the concentrations in this area would be due to estimated fugitive dust emissions from the unpaved access road. Estimated fugitive emissions from the mine haul trucks would also contribute to high predicted concentrations at locations further west along the southern boundary of the site. Scenario 1 PM_{10} concentration exceedences of California AAQS and federal standards occur without the addition of representative background concentrations.

As shown in Table 3.3-10 maximum predicted 24-hour PM_{10} concentrations for Scenario 2 would be 75.5 µg/m^3, significantly lower than Scenario 1 (394.3 µg/m^3), but would still exceed the California AAQS of 50 µg/m3 as a result of impacts from estimated fugitive dust emissions from the paved access road near the entrance to the road. Maximum predicted annual average PM_{10} concentrations under Scenario 2 would be less than the associated federal AAQS. Notably, the 24-hour PM_{10} results would be above California ambient standard without the addition of an appropriate background concentration.

[10] Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard, U.S. EPA Office of Air Quality Planning and Standards, March 1, 2011.

As shown above, maximum predicted 24-hour PM_{10} concentrations would exceed California AAQS (both scenarios) and federal standards (Scenario 1), even before consideration of appropriate background concentrations, and therefore predict a **significant impact**.

$PM_{2.5}$

As shown in Table 3.3-9 maximum predicted 24-hour PM2.5 concentrations for Scenario 1 were 23.5 µg/m3 and 18.8 µg/m3 for Scenario 2. The modeled PM2.5 concentrations would not exceed the associated federal standard (35 µg/m3) under either Scenario 1 or 2 (there is no associated California AAQS). However, although modeled $PM_{2.5}$ concentrations would be less than ambient standards, the addition of a representative background concentration could result in maximum total (maximum modeled plus background) concentration above the 24-hour standard. For example, the most recent three-year average (2010-2012) of the 98th percentile 24-hour $PM_{2.5}$ concentrations measured at the monitoring site nearest the Project site (Redding Health Department site) is 14.3 µg/m^3. Combined with the maximum modeled 98th percentile 24-hour $PM_{2.5}$ concentration of 23.5 µg/m^3, the total concentration would exceed the federal 24-hour standard of 35 µg/m^3. Therefore, with the addition of background concentrations, maximum total $PM_{2.5}$ concentrations (maximum modeled plus background) are likely above the federal standard and predict **a significant impact**.

As a result of the predicted exceedance of the NO_2, PM_{10}, and $PM_{2.5}$ of AAQS, these impacts would be considered **significant**. NO2 exceedences would be due primarily to tailpipe emissions from on-road and off-road mobile sources. The available mitigation measures are provided above in Mitigation Measure 3.3-2. PM_{10} and $PM_{2.5}$ exceedances would be due primarily to fugitive dust emissions. Mitigation Measures 3.3-3(a) and 3.3-3(b) provide a range of fugitive dust emission reduction measures that must be implemented by the Project. While the implementation of Mitigation Measures 3.3-2, 3.3-3(a), and 3.3-3(b) would reduce NO_2, PM_{10}, $PM_{2.5}$ emissions, the resulting ambient concentrations would not be to a level below appropriate AAQS standards and this impact would remain **significant and unavoidable**. There are no additional mitigation measures available that would reduce this impact to a less than significant level.

MITIGATION MEASURES

Mitigation Measure 3.3-3(a):

1. *The Applicant shall implement all adequate dust control measures during all phases of Project development and construction in accordance with SCAQMD standards.*

2. *All material excavated, stockpiled, or graded shall be sufficiently watered to prevent fugitive dust from leaving property boundaries and causing a public nuisance or a violation of an ambient air standard. Watering shall occur at least three times daily with complete site coverage, particularly in the mid−morning and after work is completed each day. Watering need not occur during periods of rain or high humidity, or when exposed materials are sufficiently saturated or wet so as to preclude the transport of airborne dust.*

3. *All areas (including unpaved roads) with vehicle traffic shall be watered periodically or have dust palliatives applied for stabilization of dust emissions. These dust suppression measures shall be carried out by the applicant or the applicant's contractor(s) as frequently as needed in order to reduce visible dust emissions from all unpaved roads. Dust palliatives shall be approved by SCAQMD and the RWQCB.*

4. *All onsite vehicles shall be limited to a speed of 15 miles per hour on unpaved roads.*

5. *The project applicant shall install, maintain, and monitor an anemometer on the project site in a location deemed suitable by the SCAQMD. All land clearing, grading, earth moving, and excavation activities shall be suspended when winds exceed 35 miles per hour, as measured onsite.*

6. *All inactive portions of the site shall be seeded and watered until suitable grass cover is established. This shall apply to portions of the site that will be inactive for a year or more.*

7. *All trucks hauling dirt, sand, soil, or other loose material shall be covered or shall maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and top of the trailer) in accordance with the requirements of California Vehicle Code Section 23114.*

8. *All material transported offsite shall be either sufficiently watered or securely covered to prevent the spillage of such material.*

9. *Paved streets adjacent to the site shall be swept at the end of each day, as needed, to remove excessive accumulations of silt and/or mud that may have accumulated as a result of activities on the site.*

10. *Adjacent paved streets shall be swept (recommend water sweeper with reclaimed water) at the end of each day if visible soil materials have been carried onto adjacent public paved roads from the project site.*

11. *All diesel engines shall be shut off after 5 minutes of non-use to reduce emissions from idling.*

Mitigation Measure 3.3-3(b): *The Applicant shall chip seal the onsite access road concurrent with completion of construction of the access road in order to reduce fugitive dust emissions and PM_{10} emissions. The chip seal shall cover the entire length and width of the access road on the Project Site, as shown on Figure 2-10 (Site Plan).*

POTENTIAL HEALTH EFFECTS OF SIGNIFICANT CRITERIA POLLUTANT IMPACTS

As noted above, the Project is estimated to have some significant and unavoidable impacts due to criteria pollutant emissions.[11] This section examines the criteria and data used to evaluate the potential degree of human health impacts due to the significant criteria pollutant impacts associated with the Moody Flats Quarry Project (Project). Criteria pollutant impacts associated with the project determined to be less than significant based on appropriate California Environmental Quality Act (CEQA) evaluation criteria are not discussed further in this section; i.e. criteria pollutant impacts determined to be less than significant in the context of CEQA are assumed to have less than significant human health impacts.

A summary of the potential adverse human health effects is provided in Section 3.3.1 above.

The potential significance of criteria pollutant emissions from the project has been evaluated based on the SCAQMD emissions-based significance thresholds (evaluated under Impact 3.3-2) and state and federal concentration-based AAQS (evaluated under Impact 3.3-3). In the case of ozone, the potential significance of impacts were evaluated solely based on the emissions-based thresholds for precursor pollutants NO_x and ROG.[12] For all criteria pollutants other than ozone, if a pollutant had estimated emissions greater than an emissions-based threshold, but dispersion modeling demonstrated that offsite ambient concentrations were less than all applicable AAQS, adverse human health effects would not be anticipated.

As discussed in the Impact 3.3-2 section above, estimated emissions of ROG and NO_x were above at least one of the applicable emissions-based significance thresholds, and these emissions after feasible mitigation measures were determined to be significant. Also, as discussed in the Impact 3.3-3 section above, estimated maximum modeled ambient concentrations of NO_2, PM_{10}, and $PM_{2.5}$ were determined (with the inclusion of background concentrations) to exceed at least one of the applicable state and federal AAQS. Based on these results, potential adverse human health effects of the projected significant impacts to ozone, NO_2, PM_{10}, and $PM_{2.5}$ are evaluated further in this section.

Ozone

Using the emissions-based SCAQMD thresholds, Project emissions of the ozone precursors ROG and NO_x are determined to be significant. Ozone is considered a transport pollutant, with peak

[11] The relevant criteria pollutants for the Project are NO_2 (a subset of NO_x), SO_2, CO, PM_{10}, $PM_{2.5}$, and ozone (where the precursors NO_x and ROG lead to atmospheric formation of ozone).

[12] Modeling of ozone formation from precursor pollutants emitted by the Project and subsequent dispersion was not performed; therefore, impacts to the state and federal ozone AAQS were not evaluated using modeling. Such modeling is not typically performed on a project-specific basis, but rather for all sources in an entire airshed since all source emissions (including naturally-occurring, area source, and stationary source emissions) must be accounted for when modeling for ozone formation. Airshed modeling is the purview of the local air District, not individual project applicants.

ambient concentrations typically occurring well away from (downwind of) the source of precursor pollutant emissions. Project emissions of ozone precursors will add to the existing concentrations of precursor pollutants in the local airshed to potentially increase the observed ambient concentrations of ozone. Therefore, ambient ozone concentrations will only increase due to Project precursor emissions to the extent that these emissions increase the existing concentrations of ROG and NO_x.

Since ozone formation depends on the presence of both ROG and NO_x, changes in the rate of ozone formation are most directly related to the pollutant class that is in shortest supply in the atmosphere. Rural areas tend to be "NO_x-limited" (i.e., changes in the rate of ozone formation are most dependent on changes in ambient NO_x concentrations) because of the significant presence of ROG-emitting trees and relative dearth of NO_x emission sources. Urban areas are more likely to be "ROG-limited" (i.e., changes in the rate of ozone formation are most dependent on changes in ambient ROG concentrations) because of the significant presence of NO_x-emitting sources such as motor vehicles and less ROG-emitting vegetation. Due to the rural and suburban nature of the areas surrounding the Project site, ozone formation in the airshed is expected to be NO_x-limited.

The impact of Project emissions on ozone formation within the local airshed can therefore be evaluated by comparing the short-term NO_x emissions from the Project to the short-term NO_x emissions within the airshed. This will be helpful in estimating the potential contribution to ozone health effects within the airshed due to Project emissions. Table 3.3-11 summarizes the short-term NO_x emissions from the Project relative to the total short-term NO_x emissions within the airshed.

TABLE 3.3-11: NOX EMISSION COMPARISON

SHASTA COUNTY NO_x EMISSIONS (1) (LBS/DAY)	*MAXIMUM PROJECT NO_x EMISSIONS (2) (LBS/DAY)*	*PROJECT PERCENT OF EXISTING COUNTY EMISSIONS*
73,400	567	0.77%

(1) Shasta County Air Pollution Control District presentation -2013 Staff Report (http://www.co.shasta.ca.us/docs/Resource_Management/aq-staff-reports/2013/022613-R1.pdf)

(2) Moody Flats Quarry Air Quality Study, Golder Associates, August 30, 2012.

Therefore, using Shasta County as a representation of the airshed, the Project could cause short-term NO_x emissions to increase by up to 0.77 percent. Assuming that ozone formation is roughly proportional to NO_x emissions into the airshed, this implies that the Project could cause ambient ozone concentrations in the airshed to increase by up to 0.77%.[13]

[13] Note that NO_x is also a precursor pollutant for secondary $PM_{10}/PM_{2.5}$ formation, so additional NO_x emissions due to the project may increase regional $PM_{10}/PM_{2.5}$ concentrations by a similar percentage. However, since this increase is

Ambient monitoring data from a monitoring site near Shasta Lake (nearest the Project site and often downwind from Redding during the summer ozone season) indicate maximum 8-hour ozone concentrations of 77, 69, and 72 parts per billion (ppb) for 2011, 2012, and 2013, respectively, compared to the California AAQS of 70 ppb. A 0.77% increase in the maximum measured ozone concentrations at this monitoring site would be equal to increases of 0.59, 0.53, and 0.55 ppb for 2011, 2012, and 2013, respectively, representing less than one percent of the AAQS.

As noted in the 2005 review of the California ozone AAQS by the CARB[14], many studies consider ozone to be a threshold pollutant. Ambient concentrations below the health effects threshold concentration (i.e., the AAQS) are likely to have no adverse effect to even sensitive members of the population (e.g., asthmatics). However, other studies do not suggest such a bright line relationship to health effects and the CARB treated ozone as a no-threshold pollutant in their review, at least down to concentrations of 40 ppb.

Data provided by CARB in Appendix B of the 2005 ozone AAQS review document suggest that the rate of hospital admissions for respiratory diseases (including asthma) could increase by 1.65 percent for a 10 ppb increase in the 1-hour ambient ozone concentration. As noted above, Project emissions are estimated to potentially increase ambient 8-hour ozone concentrations by roughly 0.5 ppb. CARB provides an 8-hour to 1-hour average conversion ratio of 1.33, so this translates to a potential increase in 1-hour ozone concentrations of 0.7 ppb, resulting in an estimated 0.12 percent increase in the rate of hospital admissions for respiratory diseases assuming that all relationships are linear. Such a change in the hospital admission rate for respiratory diseases is unlikely to be statistically significant, especially considering that areas downwind of the Project site during the summer ozone season (i.e. north of the Project site) have relatively low population densities.

NO_2

Short-term (1-hour) NO_2 ambient concentrations resulting from Project NO_x emissions were estimated to be greater than an associated AAQS, resulting in a determination that impacts would be significant.

Maximum modeled 1-hour NO_2 concentrations (when added to a representative background concentration) exceeded the federal AAQS for Scenario 1 emission rates. Note that no other NO_2 AAQS were exceeded for Scenario 1 emission rates and none of the NO_2 AAQS were exceeded for Scenario 2 emission rates.

Based on Scenario 1 NO_x emissions, the maximum predicted offsite 98th percentile 1-hour NO_2 concentration (comparable to the federal AAQS of 188 µg/m^3) is 214.8 µg/m^3 (when background

much less than the increased ambient concentrations resulting from primary PM_{10}/$PM_{2.5}$ emissions described later in this document, the impact to secondary PM_{10}/$PM_{2.5}$ formation is not discussed here.

[14] Review of the California Ambient Air Quality Standard For Ozone, California Air Resources Board, October 27, 2005.

concentrations are added). This result is 14 percent above the federal AAQS. The California 1-hour NO_2 AAQS (339 µg/m^3, which is compared to the maximum 1-hour concentration) was not exceeded for Scenario 1 NO_x emissions.

As indicated by the representative 1-hour NO_2 background concentration of 62.7 µg/m^3 (as noted in the Impact 3.3-3 section above), NO_2 concentrations in the area near the Project are well below (about one-third) the federal AAQS. As shown in Figure 5-2 of the Golder Associates August 30, 2012 air quality study (Appendix D), the area with predicted 1-hour NO2 concentrations exceeding 188 – 62.7 = 125.3 µg/m^3 (i.e. the area containing concentrations from Project emissions predicted to exceed the federal AAQS when background concentrations are accounted for) is limited to an extremely small area (roughly a few hundred square meters) right along the northern boundary of the Project property; a location with no current houses or other structures.

The statistical form of the federal 1-hour NO_2 AAQS (based on the 98th percentile of the daily maximum 1-hour concentrations) would require a member of the public to be exposed to 1-hour NO_2 concentrations above 188 µg/m^3 for at least eight days per year. Therefore, the fact that there are no houses or structures in the area of predicted impacts from Project emissions above the AAQS (and it is unlikely that structures would be built at this location right at the Project property boundary), it is expected that no member of the public would actually be exposed to NO_2 concentrations above the federal 1-hour NO_2 AAQS due to Project emissions.

Therefore, no adverse health effects due to Project NO_x emissions are anticipated.

PM_{10}

Short-term (24-hour) and annual PM_{10} ambient concentrations resulting from Project PM_{10} emissions were estimated to be greater than an associated AAQS, resulting in a determination that impacts would be significant.

Based on Scenario 1 PM_{10} emissions, the maximum predicted offsite 24-hour PM_{10} concentration is 427.3 µg/m^3 (comparable to the California AAQS of 50 µg/m^3) and 316.8 µg/m^3 (based on slightly different statistics, comparable to the federal AAQS of 150 µg/m^3).[15] These results are above both the California and federal AAQS. The predicted annual average PM_{10} concentration of 25.8 µg/m^3 is above the California AAQS of 20 µg/m^3 (there is no federal annual PM_{10} AAQS).[16] Scenario 1 emissions are projected to occur only during the first five years of the Project.

[15] These total concentrations are based on the maximum modeled concentrations shown in Table 3.3-9 plus background concentrations based on the three-year average of data collected in 2011 through 2013 at the Redding Health District monitoring site. The resulting 24-hour PM_{10} background concentrations based on these data is 33.0 ug/m^3.

[16] The total concentration is based on the maximum modeled concentration shown in Table 3.3-9 plus background concentrations based on the three-year average of data collected in 2011 through 2013 at the Redding Health District monitoring site. The resulting annual PM_{10} background concentrations based on these data is 13.2 ug/m^3.

Based on Scenario 2 PM_{10} emissions, the maximum predicted offsite 24-hour PM_{10} concentration is 108.5 µg/m^3 (comparable to the California AAQS of 50 µg/m^3) and 67.6 µg/m^3 (based on slightly different statistics, comparable to the federal AAQS of 150 µg/m^3). This result is above the California AAQS and below the federal AAQS. The predicted annual average PM_{10} concentration of 17.1 µg/m^3 is below the California AAQS of 20 µg/m^3.

As indicated by representative background concentrations of 33.0 µg/m^3 (24-hour) and 13.2 µg/m^3 (annual), existing ambient PM_{10} concentrations are roughly two-thirds of the California 24-hour and annual average AAQS and about 22 percent of the federal 24-hour AAQS.

Based on the data displayed in Figure 5-1 of the Golder Associates August 30, 2012 air quality study (Appendix D), the area with predicted maximum 24-hour PM_{10} concentrations exceeding 50 – 33.0 = 17.0 µg/m^3 (i.e. the area containing concentrations from Project emissions predicted to exceed the California AAQS when background concentrations are accounted for) for Scenario 1 emissions is estimated to be relatively large, encompassing portions of surrounding residential areas.[17] The similar area with 24-hour PM_{10} concentrations exceeding 17.0 µg/m^3 for Scenario 2 emissions is significantly smaller than for Scenario 1.

The adverse human health effects due to exposure to increases in PM_{10} concentrations have been extensively studied and form the basis for the development of both the federal and California PM_{10} AAQS. These health effects are generally separated out into increases in morbidity (rate of illness) and mortality (rate of premature death), and can be evaluated for increases in both 24-hour and annual PM_{10} concentrations.

Increases in 24-Hour PM_{10} Concentrations

The morbidity outcomes historically studied that are associated with exposure to PM_{10} include hospitalization for cardiovascular or respiratory disease, emergency room and urgent care visits, asthma exacerbation, acute and chronic bronchitis, restrictions in activity, work loss, school absenteeism, respiratory symptoms, and decrements in lung function. As such, there are many different endpoints that could be evaluated to quantify the potential health impacts of elevated 24-hour PM_{10} concentrations. A few examples are provided here.

One study[18] that looked at Los Angeles residents age 30 and older concluded that hospital admissions for cardiovascular disease increased by 0.65 percent for every 10 µg/m^3 increase in daily PM_{10} concentration.

In order to quantify a typical increase in the rate of this adverse health effect for Project-related emissions, the annual average PM_{10} concentration estimated by dispersion modeling for the areas

[17] Figure 5-1 does not explicitly show the 17.0 µg/m^3 concentration isopleth, but it is clear that this isopleth would extend beyond the area shown in the figure; this has been confirmed by re-examining the modeling data.

[18] Linn WS, Szlachcic Y, Gong H Jr., Kinney PL, Zweidinger R (2000). Air pollution and daily hospital admissions in metropolitan Los Angeles. Environ Health Perspect 108:427-34.

with existing homes is an appropriate representation of the average increase in 24-hour PM_{10} concentration resulting from the project. A review of the modeling data for Scenario 1 indicates that the maximum average increase in 24-hour PM_{10} concentrations at locations with existing residences surrounding the Project would be less than 8 $\mu g/m^3$. This results in an estimated average potential increase in daily hospital admissions for cardio vascular disease of 0.52 percent (at the worst-case residential location). A similar evaluation for Scenario 2 yields an estimated average potential increase in daily hospital admissions for cardio vascular disease of 0.13 percent (i.e. about 75 percent lower).

The same study by Linn et al noted an increase in hospital admissions for respiratory disease (0.66 percent for every increase in daily PM_{10} concentration of 10 $\mu g/m^3$) nearly identical to that for cardiovascular disease. As a result, the average percentage increases in daily hospital admissions for respiratory disease for Scenario 1 and Scenario 2 emission levels are estimated to be nearly identical to those estimated for cardiovascular disease above.

Twenty-four hour PM_{10} concentrations have been found to be correlated with increases in asthma symptoms as well. Several studies[19] have determined that increases in asthma-related symptoms (e.g. cough, phlegm, shortness of breath) occur at rates of between five and fifteen percent for every 10 $\mu g/m^3$ increase in daily PM_{10} concentration.

Based on a maximum estimated average increase in 24-hour PM_{10} concentrations at residences surrounding the project of 8 $\mu g/m^3$ for Scenario 1, this results in an average potential increase in daily asthma-related symptoms of between 4 and 12 percent (at the worst-case residential location). A similar evaluation for Scenario 2 emissions would be about 75 percent lower, or in a range between one and four percent.

In terms of changes in the rate of premature deaths (mortality), several studies[20] determined that the daily rate of premature deaths due to the health effects of daily exposure to PM_{10} increased by 0.8 percent (with an uncertainty of ± 0.3 percent at the 95% confidence level) for every 10 $\mu g/m^3$ increase in daily PM_{10} concentration.

Based on a maximum estimated average increase in 24-hour PM_{10} concentrations at residences surrounding the project of 8 $\mu g/m^3$ for Scenario 1, this results in an average potential increase in the daily rate of premature deaths of 0.64 percent (at the worst-case residential location). A

[19] For example: Ostro BD, Lipsett MJ, Mann J, Braxton-Owens H, White M (2001). Air pollution and exacerbation of asthma in African-American children in Los Angeles. Epidemiology 12:200-8 and Yu O, Sheppard L, Lumley T, Koenig JQ, Shapiro GG (2000). Effects of ambient air pollution on symptoms of asthma in Seattle-area children enrolled in the CAMP study. Environ Health Perspect 108(12):1209-14.

[20] For example: Schwartz, J., D.W. Dockery and L.M. Neas. 1996. Is Daily Mortality Associated Specifically With Fine Particles. *Journal of the Air & Waste Management Association.* Vol. 46(10): 927-939. and Dockery, D.W., C.A. Pope III, X. Xu, J.D. Spengler, J.H. Ware, M.E. Fay, B.G. Ferris, and F.E. Speizer. 1993. "An Association between Air Pollution and Mortality in Six U.S. Cities." *New England Journal of Medicine* 329(24):1753-1759.

similar evaluation for Scenario 2 yields an estimated average potential increase in the daily rate of premature deaths of 0.16 percent.

Increases in Annual PM_{10} Concentrations

Although the maximum increase in annual PM_{10} concentrations predicted by the dispersion modeling in the Golder Associates August 30, 2012 air quality study (Appendix D) exceeded the associated California AAQS for estimated Scenario 1 emissions, only a few locations that were within 10 meters of the Project property boundary were above the AAQS. These locations did not have any existing residences or structures and are unlikely to have any in the future. Therefore, there were no potential adverse health effects to evaluate for annual PM_{10} concentration impacts.

$PM_{2.5}$

Short-term (24-hour) $PM_{2.5}$ ambient concentrations resulting from Project $PM_{2.5}$ emissions were estimated to be greater than an associated AAQS, resulting in a determination that impacts would be significant.

Based on Scenario 1 $PM_{2.5}$ emissions, the maximum predicted offsite 24-hour $PM_{2.5}$ concentration (when added to a representative background concentration) is 37.8 $\mu g/m^3$ (based on the 98th percentile of the 24-hour concentrations, comparable to the federal AAQS of 35 $\mu g/m^3$). This result is 8 percent above the federal AAQS. California does not have a separate 24-hour $PM_{2.5}$ AAQS. The maximum predicted offsite 24-hour $PM_{2.5}$ concentration for Scenario 2 emissions is below the federal AAQS.

As indicated by the representative 24-hour $PM_{2.5}$ background concentration of 14.3 $\mu g/m^3$ (as noted in the Impact 3.3-3 section above), existing ambient $PM_{2.5}$ concentrations are roughly 41 percent of the federal 24-hour AAQS.

Although not displayed in the Golder Associates August 30, 2012 air quality study, the area with predicted 24-hour $PM_{2.5}$ concentrations exceeding 35 – 14.3 = 20.7 $\mu g/m^3$ (i.e. the area containing concentrations from Project emissions predicted to exceed the federal AAQS when background concentrations are accounted for) for Scenario 1 emissions is estimated by the dispersion model to be very small and only along the property boundary where there are no existing houses or structures, and there are unlikely to be any in the future.

The statistical form of the federal 24-hour $PM_{2.5}$ AAQS (based on the 98th percentile of the daily concentrations) would require a member of the public to be exposed to 24-hour $PM_{2.5}$ concentrations above 35 $\mu g/m^3$ for at least eight days per year. Therefore, the fact that there are no houses or structures in the area of maximum predicted impacts from Project emissions (and it is unlikely that structures would be built at this location right at the Project property boundary), it is expected that no member of the public would actually be exposed to 24-hour $PM_{2.5}$ concentrations above the federal 24-hour $PM_{2.5}$ AAQS due to Project emissions.

Therefore, no adverse health effects due to Project $PM_{2.5}$ emissions are anticipated.

Impact 3.3-4: Project implementation may create objectionable odors affecting a substantial number of people (Less than Significant with Mitigation)

Operation of the proposed Project has the potential to generate odors in excess of the existing baseline environmental conditions. Typically odors are regarded as an annoyance rather than a health hazard. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person may be perfectly acceptable to another. It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult and at some point can no longer be detected by an individual.

Projects that would potentially generate objectionable odorous emissions that would be located near existing sensitive receptors or other land uses where people may congregate could constitute a significant air quality impact to existing uses. Also, residential or other sensitive receptor projects built for the intent of attracting people locating near existing odor sources could also cause a significant air quality impact for the proposed uses. The SCAQMD does not have a specific threshold used to measure the significance of odors. The typical odor cited from an aggregate operation is the "rotten egg smell" that results from asphalt plant hydrogen sulfide (H_2S) emissions. The existing California ambient air quality standard for H_2S is 30 ppb, averaged over a period of 1 hour to protect against nuisance odor ("rotten egg smell") for the general public. This standard will be used to assess potential impacts from project odor.

Project facilities and/or equipment that could create objectionable odors include diesel exhaust from mobile construction equipment and the asphalt batch plant. The nearest sensitive receptors are the five existing residences located slightly less than one mile to the east and south from where the asphalt batch plant and majority of mobile equipment would be operating. There are numerous residences located just beyond the one-mile radius from the asphalt batch plant and majority of mobile equipment. Residences in the vicinity of the Project site, and the distance of these residences from the asphalt batch plant are shown on Figure 3.3-1.

As shown in the wind rose[21] on Figure 3.3-2, winds from the east or west are expected to be rare, so asphalt plant emissions would rarely blow toward residences to the east or west. Winds would

[21] A wind rose is a graphic tool used by meteorologists to give a succinct view of how wind speed and direction are typically distributed at a particular location.

blow with a higher frequency toward residences to the south, two of which are just under one mile from the proposed asphalt plant location.

Relative to many existing asphalt plants, the proposed asphalt plant would employ technologies designed to minimize emissions of odorous compounds. One of the primary ways this would be accomplished is through the recycling of drum mixer exhaust back to the combustion zone of the dryer burner or condensing out the odorous compounds. This process would remove a significant portion of the odorous compounds otherwise emitted.

In order to quantify and calculate the H_2S emission factor for asphalt plants, an emission factor of 0.0050 lb/ton of asphalt produced was taken from a 2001 study conducted by the North Carolina Division of Air Quality and used to model maximum 1-hour H_2S ambient concentrations. The maximum concentration outside of the Project property boundary was determined to be 13.7 $\mu g/m^3$, which is well below the California ambient air quality standard of 42 $\mu g/m^3$ (i.e., 30 parts per billion). Therefore, this impact would be **less than significant.**

SCAQMD has rules specifically prohibiting air pollutant emissions, including odor, which cause a nuisance. As part of the air quality permitting process, and during operations under a permit, the asphalt plant would need to be operated in such a manner that excessive[22] odor nuisance complaints do not result. The asphalt plant would have to obtain an Authority to Construct (ATC) and Permit to Operate (PTO) from the SCAQMD. As part of the permitting process, the Applicant would need to demonstrate to the satisfaction of the SCAQMD permitting staff that the plant would be equipped with BACT for controlling air emissions, including those which may create an objectionable odor at area residences.

Based on the distances involved, and the odor-reducing technology that would be incorporated into the plant design, and the maximum concentration of H_2S outside of the Project property boundary was determined to be 13.7 $\mu g/m^3$, which is well below the California ambient air quality standard of 42 $\mu g/m^3$ it is expected that odor impacts at residences outside of the Project boundary would be minimal. If any odor impacts were to occur during actual operations so as to cause a nuisance, SCAQMD would have the authority to require additional measures to reduce these impacts, as outlined in Mitigation Measure 3.3-3. The implementation of the following mitigation measure would further ensure that this impact remains at a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.3-4*: The Shasta County Air Quality Management District shall monitor, record, and track odor complaints received from residences in the vicinity of the Project site. If more than one confirmed complaint per year averaged over a three-year period, or three unconfirmed complaints per year averaged over a three-year period are received, the SCAQMD shall require the applicant to evaluate changes in operating conditions and parameters at the*

[22] For the purposes of this EIR analysis, "excessive" means one confirmed complaint per year averaged over a three-year period, or three unconfirmed complaints per year averaged over a three-year period.

asphalt plant to the satisfaction of the SCAQMD staff. Such changes might include increasing exhaust release heights and/or additional fugitive emission capture systems.

Impact 3.3-5: Implementation of the proposed Project may expose sensitive receptors to toxic air contaminants (Less than Significant)

Project activities would result in emissions of diesel particulate matter (DPM) and other toxic air contaminants (TACs) that may expose humans to inhalation and associated health risks. DPM emissions generated under Scenario 1 are shown in Table 3.3-5 (primarily as PM_{10} emissions), and DPM emissions generated under Scenario 2 are shown in Table 3.3-6 (Primarily as PM_{10} emissions). TACs generated from Project activities under Scenario 1 are shown in Table 3.3-7, and TACs generated under Scenario 2 are shown in Table 3.3-8.

To determine the exposure and health risk, the AERMOD model was used in conjunction with the Hotspots Analysis and Reporting Program (HARP) and HARP On-Ramp models to estimate maximum predicted cancer and non-cancer health effects to occupational workers not associated with the Project and nearby residents or other sensitive receptors. For the purposes of this analysis, the AERMOD model was executed using unit emission rates for each source representation, in accordance with the HARP On-Ramp software guidance. Then predicted ambient concentrations for each source representation and estimated TAC emissions were input to the HARP model to estimate lifetime excess cancer risk (LECR), chronic hazard, and acute hazard at model receptor locations. The HARP model uses toxicity factors published by the California Office of Environmental Health and Assessment (OEHHA).

LIFETIME EXCESS CANCER RISK

Cancer risks from DPM and TACs concentrations in air would occur primarily through the inhalation pathway. In addition, cancer risk from TACs was also assessed for the home-grown produce (resident/sensitive receptor only), dermal, soil ingestion and mother's milk pathways. The HARP software was used to estimate cancer risk for each TAC for the exposure pathways identified above. Cancer risk values resulting from exposures to different TACs through the various exposure pathways are generally additive.

The "Derived (Adjusted)" exposure assumptions recommended by the OEHHA were used to estimate cancer risk. In addition, although LECR is determined assuming 70 years of exposure and, in particular, DPM emissions from the on-road vehicle fleet would decline over that period (by at least 50 percent in accordance with the EMFAC model[23] which accounts for replacement of older vehicles with newer, cleaner vehicles), these declines in emissions were not explicitly accounted for in the Lifetime Excess Cancer Risk (LECR) estimates; i.e., the DPM emissions assumed for the initial year of operation for each scenario were assumed to occur for 70 years. In addition, although Scenario 1 emissions resulted in slightly higher offsite exposure to TAC emissions relative to Scenario 2, when evaluating the 70 year exposure for determining LECR for Scenario 1, it was

[23] The EMFAC model is the California Air Resource Board's tool for estimating emissions from on-road vehicles.

conservatively assumed that Scenario 1 emissions would occur for the entire 70 year period, which would not be the case if Scenario 2 is implemented within five years as planned. As a result, the estimated LECR values reported in this assessment are considered to be over-estimates of any actual maximum cancer risk that might result from exposure to Project emissions.

Under Scenario 1, the maximum estimated LECR values for off-site occupational workers is 2.9 in one million workers and the maximum estimated LECR values for residents/sensitive receptors is 6.0 in one million residents or sensitive receptors. These levels are both below the CEQA threshold of 10 in one million.

Under Scenario 2, the maximum estimated LECR values for off-site occupational workers is 0.7 in one million and the maximum estimated LECR values for residents/sensitive receptors is 1.6 in one million. These levels are both below the CEQA threshold of 10 in one million.

The most significant contributor to the maximum LECR values in all cases was DPM emissions from on-road vehicles entering the Project site via the access road. According to guidance from the SCAQMD, LECR values less than 10-in-a-million are considered less than significant and the predicted LECR values would be below this threshold under Scenarios 1 and 2.

CHRONIC NON-CANCER HAZARD

Chronic non-cancer health effects from DPM and other TACs in air would also occur through the inhalation pathway. In addition, chronic non-cancer health effects from TACS were also assessed for the home-grown produce (resident/sensitive receptor only), dermal, soil ingestion and mother's milk pathways. Default exposure parameters for residents/sensitive receptors and occupational worker receptors were used.

The HARP software was used to estimate a hazard quotient for each TAC from the exposure pathways described above. Hazard quotients for different TACs affecting the same target organ are then added together, to produce an overall hazard index (HI) for that target organ. The maximum HI for all target organs assessed is then reported.

The maximum estimated chronic HI values for off-site occupational workers and residents/sensitive receptors is 0.01 (off-site workers) for Scenario 1 and 0.01 (for off-site residents/sensitive receptors) for Scenario 2.

The most significant contributor to the maximum HI values in all cases was DPM emissions from on-road vehicles entering the Project site via the access road. According to guidance from the SCAQMD, chronic HI values less than 1.0 are considered less than significant and the predicted chronic HI values would be significantly below this threshold under both Scenario 1 and Scenario 2.

ACUTE NON-CANCER HAZARD

Acute non-cancer health effects from TACs in air would occur through the inhalation pathway. No other acute exposure pathways are evaluated by the HARP model. Because acute exposures are assumed to generally occur over a single hour, there is no distinction between exposure

parameters for occupational workers or residents/sensitive receptors. Default exposure assumptions were assumed for all receptor locations outside of the Project site property boundary.

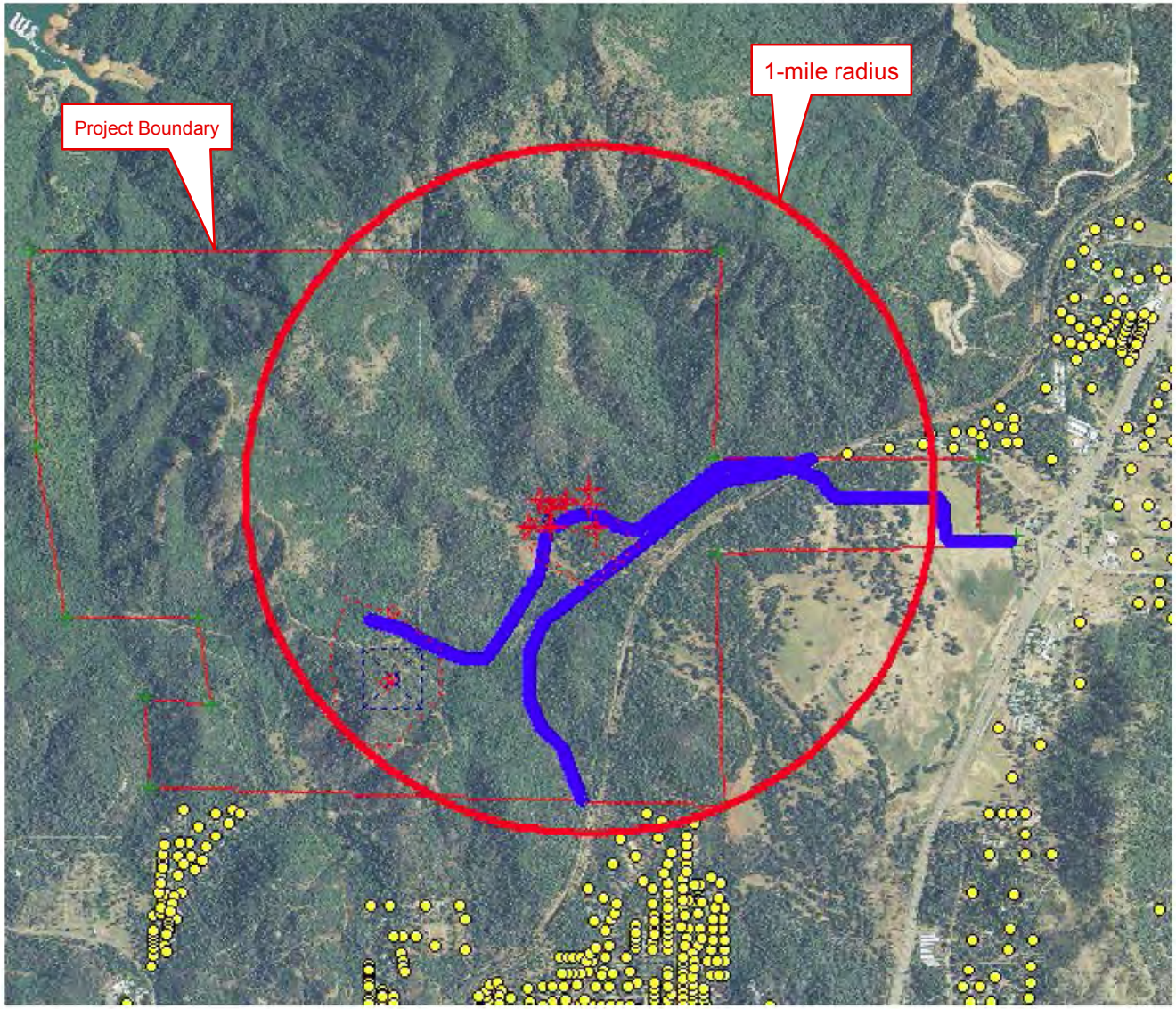
The HARP software was used to estimate a hazard quotient for each TAC from the inhalation exposure pathway. Hazard quotients for different TACs affecting the same target organ are then added together, to produce an overall HI for that target organ.

The maximum HI for all target organs assessed was then reported. The maximum estimated acute HI values for all off-site receptors is 0.7 for Scenario 1 and 0.6 for Scenario 2. The most significant contributor to the maximum HI values in all cases is formaldehyde emissions from the asphalt plant. According to guidance from the SCAQMD, acute HI values less than 1.0 are considered less than significant and the predicted acute HI values would be below this threshold.

SUMMARY

As described above, implementation of the proposed Project would not expose off-site workers, residents or other sensitive receptors to DPM or TACs at levels above the CEQA and SCAQMD thresholds of significance for Lifetime Excess Cancer Risks, Chronic Non-Cancer Hazards, or Acute Non-Cancer Hazards. Thus, this is a **less than significant** impact, and no mitigation is required.

This page left intentionally blank



MOODY FLATS QUARRY EIR

Figure 3.3-1: Residences within 1 mile of the Asphalt Plant

Residence

Asphalt Plant

On-Site Haul Truck and Rail Routes

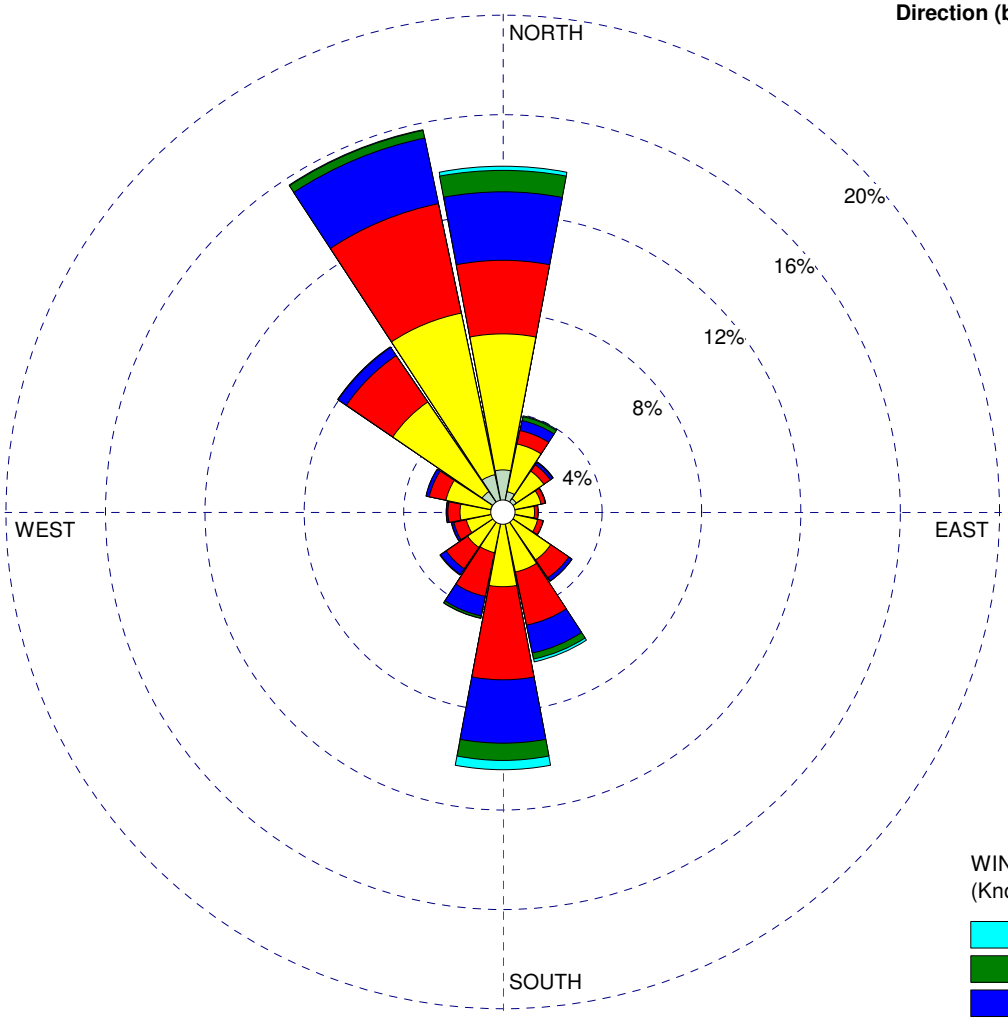
South Pit

N

Source: Golder Associates, Inc, 2012
Map date: May 9, 2013.

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Surface data acquired from www.webmet.com	**1988-1992** **Jan 1 - Dec 31** **00:00 - 23:00**	MODELER:	
	CALM WINDS: **16.26%**	TOTAL COUNT: **43848 hrs.**	
	AVG. WIND SPEED: **6.13 Knots**	DATE: **2/8/2011**	PROJECT NO.: **103-99734**

WRPLOT View - Lakes Environmental Software

MOODY FLATS QUARRY EIR

Figure 3.3-2. Wind Rose for 1988-92 Redding, California

This page left intentionally blank.

This section describes the regulatory setting, regional biological resources, and impacts that are likely to result from Project implementation. Comments were received during the public review period or scoping meeting for the Notice of Preparation regarding this topic from the following entities and individuals: Eric Cassano (February 13, 2012), U.S. Department of Agriculture (February 10, 2012), Western Shasta Resource Conservation District (January 26, 2012), Cinnamon Kern (February 4, 2012), Rose Flame (February 14, 2012), Gary Fodge (January 17, 2012), Jay Schell (February 14, 2012), Lisa Grill (February 14, 2012), Robert McGill (February 13, 2012), and Heidi Strand (February 8, 2012).

This section is based in part on the following technical studies:

- *3M Moody Flats Quarry Shasta County, CA Revegetation Plan* (Biotic Resources Group April 27, 2012) **(Appendix C),**
- *Moody Flats Quarry Project Biological Resources Assessment* (North State Resources August 10, 2012) **(Appendix E),**
- *Moody Flats Quarry Project Botanical Survey Report* (North State Resources August 10, 2012) **(Appendix F)**,
- *Moody Flats Quarry Project Delineation of Waters of the United States* (North State Resources August 10, 2012) **(Appendix G),**
- *Technical Memorandum: Potential for Fish use and Channel Adjustments Associated with the Proposed Moody Flats Quarry* (Stillwater Sciences June 8, 2012) **(Appendix H),**
- *Moody Flats Quarry Stormwater, Erosion Control, and Drainage Plan, Shasta County, California (*3M Facilities Engineering and EMKO Environmental, Inc. May 2010) **(Appendix I),**
- *Addendum to the Stormwater, Erosion Control, and Drainage Plan, Moody Flats Quarry, Shasta County, California (*3M Facilities Engineering and EMKO Environmental, Inc. August 2012) **(Appendix J),**
- *Moody Flats Quarry Shasta Salamander Habitat Assessment and Survey Report (North State Resources August 24, 2012)* **(Appendix K)***,*
- *Hydrology and Water Quality Analysis of the Proposed 3M Moody Flats Quarry Use Permit and Reclamation Plan Shasta County, California* (EMKO Environmental, Inc. June 2005) **(Appendix L),**
- *Update to the Hydrology and Water Quality Analysis of the Proposed 3M Moody Flats Quarry Use Permit and Reclamation Plan Shasta County, California* (EMKO Environmental, Inc. August 2012) **(Appendix M),**
- *Field Investigation Report Hydrology Analysis 3M Redding Hard-Rock Aggregate Quarry, Shasta County, California* (Brown Caldwell June 30, 2009) **(Appendix N)**,

- *Moody Flats Project: Wildlife Movement Corridors Technical Memorandum (*North State Resources February 7, 2014) **(Appendix V), and**
- *Moody Flats Project: 9-Quad CNDDB Search Technical Memorandum (*North State Resources January 7, 2014) **(Appendix W).**

3.4.1 ENVIRONMENTAL SETTING

Shasta County encompasses approximately 3,785 square miles in north central California. The western part of the county is located in the northern Klamath Mountains, the eastern portion is in the Cascade Mountains and Modoc Plateau, and the south-central portion is in the Sacramento Valley. The climate varies by region, but generally the county has cool, wet winters and hot, dry summers. Precipitation is normally in the form of rain, with snow in the higher elevations, and ranges from approximately 20 to 80 inches per year.

REGIONAL SETTING

Geomorphic Provinces

California's geomorphic provinces are naturally defined geologic regions that display a distinct landscape or landform. Earth scientists recognize eleven provinces in California. Each region displays unique, defining features based on geology, faults, topographic relief and climate. These geomorphic provinces are remarkably diverse. They provide spectacular vistas and unique opportunities to learn about earth's geologic processes and history. Shasta County is located in portions of the Cascade Range, Klamath Mountains, Modoc Plateau, and Great Valley geomorphic provinces of California. The Project site is located in an area that transitions from the Great Valley to the Klamath Mountains Geomorphic Province. Each is described below.

KLAMATH MOUNTAINS. The Klamath Mountains have rugged topography with prominent peaks and ridges reaching 6,000-8,000 feet above sea level. In the western Klamath, an irregular drainage is incised into an uplifted plateau called the Klamath peneplain. The uplift has left successive benches with gold-bearing gravels on the sides of the canyons. The Klamath River follows a circuitous course from the Cascade Range through the Klamath Mountains. The province is considered to be a northern extension of the Sierra Nevada.

GREAT VALLEY. The Great Valley is an alluvial plain about 50 miles wide and 400 miles long in the central part of California. Its northern part is the Sacramento Valley, drained by the Sacramento River and its southern part is the San Joaquin Valley drained by the San Joaquin River. The Great Valley is a trough in which sediments have been deposited almost continuously since the Jurassic (about 160 million years ago). Great oil fields have been found in southernmost San Joaquin Valley and along anticlinal uplifts on its southwestern margin. In the Sacramento Valley, the Sutter Buttes, the remnants of an isolated Pliocene volcano, rise above the valley floor.

Bioregions

The county is defined by three different bioregions including the Sacramento Valley, Klamath/North Coast, and Modoc. The Project site is located in an area that transitions from the Sacramento Valley Bioregion to the Klamath/North Coast Bioregion. Both are described below.

KLAMATH/NORTH COAST. The Klamath/North Coast Bioregion in California's northwestern corner extends roughly one-quarter of the way down the 1,100-mile coast and east across the Coastal Range and into the Cascades. Much of this bioregion is covered by forest and is the state's wettest climate, with rainfall distribution varying widely from an average annual 38 to 80 or more inches. The western portion of Shasta County falls within this bioregion, which is considered “Inland” with a climate that is drier with low rainfall in winter and hot, dry summers. Vegetation includes mixed conifer habitat of white fir, Douglas fir, ponderosa pine, Sierra lodgepole pine, incense cedar, sugar pine, red pine, Jeffrey pine, mountain hemlock, knobcone pine, western red cedar, red alder, redwood, tanoak, Pacific madrone, and chaparral. Wildlife in the bioregion includes deer, fox, black bear, mountain lion, California clapper rail, Aleutian Canada geese, Roosevelt elk, osprey, fisher, bank swallow, Coho salmon, king salmon, otis blue butterfly, bald eagle, Point Arena mountain beaver, Swainson's hawk, willow flycatcher, western sandpiper, and Oregon silverspot butterfly.

SACRAMENTO VALLEY BIOREGION. The Sacramento Valley Bioregion is a watershed of the Sierra Nevada that encompasses the northern end of the great Central Valley, stretching from Redding to the southeast corner of Sacramento County. The bioregion is generally flat, and is rich in agriculture. The south-central portion of the County falls within this bioregion, which has a climate that is characterized by hot dry summers and cool wet winters. Oak woodlands, riparian forests, vernal pools, freshwater marshes, and grasslands provide the major natural vegetation of the bioregion. This bioregion is the most prominent wintering area for waterfowl, attracting significant numbers of ducks and geese to its seasonal marshes along the Pacific Flyway. Species include northern pintails, snow geese, tundra swans, sandhill cranes, mallards, grebes, peregrine falcons, heron, egrets, and hawks. Black-tailed deer, coyotes, river otters, muskrats, beavers, ospreys, bald eagles, salmon, steelhead, and swallowtail butterflies are some of the wildlife that are common in this bioregion.

LOCAL SETTING

The 1,850-acre Project site is situated north of the City of Shasta Lake, south of Shasta Lake, and west of Interstate 5. The Project site includes the headwaters of the Moody and Rancheria Creek watersheds, which flow southwesterly to West Fork Stillwater Creek. The watershed of an unnamed tributary in the western portion of the Project site flows southwesterly to Churn Creek. The headwaters of Salt Creek also originate on the Project site. Elevations range between 820 feet and 2,500 feet above mean sea level.

Precipitation primarily occurs as rain and average annual rainfall and is approximately 63 inches. Air temperatures range between an average January high of 52 degrees Fahrenheit (ºF), and an average July high of 95 ºF. The year-round average high is approximately 72 ºF.

The Project site is undeveloped with many two-track roads and off-highway vehicle trails throughout. Fire-lines were built along the ridge tops in the western portion of the Project site due to a wildfire in 2007. Many of these areas are recovering and vegetation is beginning to re-establish.

Natural Communities

Natural communities provide the primary habitat for the biological resources in Shasta County, which is a biologically diverse part of the state. According to the California Wildlife Habitat Relationship System (CWHR) there are 43 wildlife habitat classifications in Shasta County out of 59 found in the state. The following 11 CWHR habitats were mapped on the Project site during the reconnaissance-level surveys including: annual grassland, barren, blue oak-gray pine, blue oak woodland, fresh emergent wetland, mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, valley oak woodland, and valley foothill riparian. Table 3.4-1 provides a summary of CWHR habitats occurring on the Project site and the boundaries of these habitats are presented in Figure 3.4-1. General descriptions for each habitat are provided below.

TABLE 3.4-1: SUMMARY OF CWHR HABITATS

CWHR HABITATS	*APPROXIMATE ACREAGE*
Annual grassland	50
Barren	21
Blue oak-gray pine	196
Blue oak woodland	7
Fresh emergent wetland	0.05
Mixed chaparral	148
Montane hardwood-conifer	905
Montane hardwood	504
Ponderosa pine	87
Valley foothill riparian	4
Valley foothill riparian/Fresh emergent wetland	1
Valley oak woodland	17
Total	**1,940[1]**

[1] *THE 1,940 ACRES INCLUDES THE 1,850-ACRE PROJECT SITE AND ADDITIONAL ACREAGE OWNED BY THE PROJECT APPLICANT THAT IS LOCATED OUTSIDE, BUT ABUTTING THE 1,850 ACRE PROJECT SITE. THE BIOLOGICAL SURVEYS PERFORMED BY NORTH STATE RESOURCES PROVIDED COVERAGE OF THE ENTIRE 1,940 ACRE PROPERTY OWNED BY THE APPLICANT.*

SOURCE: NORTH STATE RESOURCES, INC. (2012)

Annual grassland occurs in the eastern portion of the Project site and in the Moody Flats area west of the railroad tracks. It is generally characterized by a dense herbaceous layer of annual grasses and forbs dominated by yellow star-thistle *(Centaurea solstitialis),* slender wild oat *(Avena barbata),* rose clover *(Trifolium hirtum),* storks bill *(Erodium botrys),* winter vetch *(Vicia villosa),* medusahead *(Taeniatherum caput-medusae),* ripgut brome *(Bromus diandrus),* and soft chess *(B. hordeaceus).* Seasonal wetlands including seep-springs, swales, and intermittent pools occur in the annual grassland habitat. These features are inundated for long duration during the growing season supporting vegetation adapted to living in moist or wet conditions. These wetlands are dominated by a variety of grasses and forbs based on the length of saturation or inundation. Dominant species occurring in these features include Mediterranean barley *(Hordeum marinum*

ssp. *gussoneanum),* Italian ryegrass *(Lolium multiflorum),* iris leaved juncus *(Juncus xiphioides),* dallis grass *(Paspalum dilatatum),* and sweet vernal grass *(Anthoxanthum aristata).*

Barren habitat occurs as primarily non-vegetated areas created by significant roads and fire lines, the railroad corridor, and rock outcrops. Roads and firelines mapped as barren predominantly occur in the western portion of the Project site. The railroad corridor bisects the mid- to eastern portion of the Project site and rock outcrops occur along the ridgelines in the west and northern portions of the Project site. Barren habitat exhibits sparse to no vegetation. Re-colonization of vegetation in firelines is beginning to occur.

Blue oak woodland occurs in the eastern most corner of the Project site. It is characterized by a moderate overstory of blue oak *(Quercus douglasii)* with a dense herbaceous understory dominated by species occurring in the adjacent annual grasslands including slender wild oat, rose clover, storks bill, winter vetch, ripgut brome, and soft chess.

Blue oak-gray pine occurs mainly in the lower, moderately sloped portions of the Project site. It occurs in the western portion of the Project site in valleys generally along stream corridors and over a ridge in the north-central portion of the Project site. A dense to moderately dense overstory with a dense to moderately dense understory characterizes the blue oak-gray pine habitat. Several oak species are present in this habitat type and herbaceous cover varies from dense to sparse depending on the canopy closure. Dominant overstory species include blue oak, California black oak *(Q. kelloggii),* valley oak *(Q. lobata),* interior live oak *(Q. wislizenii),* and gray pine *(Pinus sabiniana).* Oracle oak *(Quercus x morehus),* a hybrid of California black and interior live oak is also common in the overstory. Common shrubs observed in this habitat include white leaf manzanita *(Arctostaphylos viscida),* buck brush *(Ceanothus cuneatus),* poison oak *(Toxicodendron diversilobum),* coffee berry *(Rhamnus californica),* snowdrop bush *(Styrax officinalis),* wild mock orange *(Philadelphus lewisii),* deer brush *(Ceanothus integerrimus),* and California buckeye *(Aesculus californica).* Common grasses and forbs observed in this vegetation habitat include pussy ears *(Calochortus tolmiei),* Pacific hounds tongue *(Cynoglossum grande*), slender wild oat, and soaproot (*Chlorogalum pomeridianum*). Lianas of Dutchman's pipe (*Aristolochia californica*) and chaparral clematis (*Clematis lasiantha*) shroud shrubs and often grow into the tree canopy.

Fresh emergent wetlands are uncommon in the Project site and occur in a pond located in the southern portion of the Project site, and in a small, excavated channel along the railroad tracks in the southeastern portion of the Project site. Small intermittent pools in the annual grassland habitat also contain fresh emergent vegetation. Emergent wetland vegetation dominates these features due to perennial or nearly perennial inundation. Common species include pale spike rush *(Eleocharis macrostachya),* broad-leaf cattail *(Typha latifolia),* and pondweed (*Potamogeton* sp.).

Mixed chaparral occurs on exposed slopes throughout the Project site. This habitat is typically characterized by dense shrub stands. Dominant species include whiteleaf manzanita, buckbrush, toyon *(Heteromeles arbutifolia),* California buckeye, Brewer's oak *(Quercus garryana* var. *breweri),* California bay *(Umbellularia californica),* interior live oak, Lemmon's ceanothus *(Ceanothus lemmonii),* birchleaf mountain mahogany *(Cercocarpus betuloides),* holly-leaf redberry *(Rhamnus ilicifolia),* yerba santa *(Eriodictyon californicum),* and poison oak. Few herbaceous plants occur in

this habitat and include soaproot, goosegrass *(Gallium aparine),* and hedgehog dogtail *(Cynosurus echinatus).*

Montane hardwood occurs on the slopes in the northern and western portions of the Project site and is characterized by a dense overstory of California black oak. The understory is often sparse due to a dense canopy. Associated species include canyon live oak, poison oak, soaproot, California buckeye, and California bay.

Montane hardwood-conifer occurs on the slopes throughout the main portion of the Project site and is characterized by a dense hardwood canopy interspersed with conifers. The dominant hardwood is California black oak with interior and canyon live oak *(Q. chrysolepis)* associates. Individuals or stands of gray pine or ponderosa pine (*Pinus ponderosa*) occur in this habitat type. Understory species are generally dense and include whiteleaf manzanita, buck brush, interior live oak, canyon live oak, California buckeye, western redbud *(Cercis occidentalis),* and California bay. Forbs and grasses occur in a sparse to moderate herbaceous layer dominated by pussy ears, soaproot, hound's tongue, and slender wild oat.

Ponderosa pine occurs primarily in the northwestern portion of the Project site, although there are also small stands occurring toward the southern portion. Ponderosa pine stands are dominated by sparsely to moderately distributed ponderosa pine with California black oak as a common hardwood associate. Dense stands of whiteleaf manzanita, buck brush, and Brewer's oak are also present in the understory. Understory plants are sparse and include soap root, poison oak, and narrow-leaved sword fern *(Polystichum imbricans).*

Valley foothill riparian occurs as thin stringers and large patches along most stream corridors in the Project site. It also occurs around the southern edge of the pond in the southern portion of the Project site. In valley foothill riparian associated with streams, it is characterized as a sparse overstory of Fremont cottonwood *(Populus fremontii),* big leaf maple *(Acer macrophyllum),* or white alder *(Alnus rhombifolia),* and a fairly dense mid-story and herbaceous layer. The mid-story is dominated by willows including arroyo willow *(Salix lasiolepis),* narrow-leafed willow *(S. exigua),* red willow *(S. laevigata)* western choke cherry *(Prunus virginiana),* and spice bush *(Calycanthus occidentalis).* Brambles of Himalayan blackberry *(Rubus discolor)* and California blackberry *(R. ursinus)* often engulf broader, low-gradient riparian areas. Lianas of California grape grow into the canopy. Other species include California buttonwillow *(Cephalanthus occidentalis),* American dogwood *(Cornus sericea),* California ash *(Fraxinus dipetala),* and mugwort *(Artemisia douglasiana).*

Valley oak woodland is located in the level, lower elevation areas in the eastern portion of the Project site. It occurs between Moody and Rancheria Creeks east and west of the railroad tracks. It also occurs along small drainages in the western portion of the Project site. This habitat is characterized by a dense overstory dominated by valley oak, with occasional blue, California black, and interior live oak. Moderate to dense patches of shrubs occur in the understory and include California buckeye, coffee berry, snowdrop bush and western redbud. California grape *(Vitis californica)* is present in these woodlands and grows into the upper canopy. Forbs and herbs occur

in dense patches where openings in the canopy occur. Dominant herbaceous species include hedgehog dogtail, torilis *(Torilis arvense),* and European hairgrass *(Aira caryophyllea).*

Special-Status Species

For the purpose of this evaluation, special-status plant species include plants that are (1) listed as threatened or endangered under the California Endangered Species Act (CESA) or the federal Endangered Species Act (ESA); (2) proposed endangered or threatened by the U.S. Fish and Wildlife Service (USFWS); (3) designated as rare by the California Department of Fish and Wildlife (CDFW); (4) state or federal candidate species for listing as threatened or endangered; and/or (5) have a California Rare Plant Rank (CRPR) of 1B, 2, 3, or 4 (California Department of Fish and Wildlife 2012).

Special-status animal species include species that are (1) listed as threatened or endangered under the CESA or ESA; (2) proposed for federal listing as threatened or endangered; (3) state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as Species of Special Concern or California Fully Protected Species.

The most current lists of special-status plant wildlife species were reviewed to confirm the present status of these species (California Department of Fish and Wildlife 2011, 2012).

Special-status species potentially occurring in the Project area were determined through database searches using California Natural Diversity Database (CNDDB), California Wildlife Habitat Relationships System (CWHR) (California Department of Fish and Wildlife 2008), the USFWS database of federally protected species, and the CNPS Electronic Inventory (California Native Plant Society 2012), reconnaissance field surveys of floral and faunal resources, and review of pertinent environmental documents and technical studies.

Using the CNDDB, a search of recorded accounts of special-status species was conducted for the Project area and Shasta Dam, 7.5-minute USGS topographic quadrangles (California Natural Diversity Database 2013). The CNDDB is a database consisting of historical observations of special-status plant species, wildlife species, and natural plant communities. Because the CNDDB is limited to reported sightings, it is not a comprehensive list of species that may occur in a particular area. However, it is useful in refining the list of special-status species that have the potential to occur in the Project site.

The CWHR system was used to aid in determining wildlife species potentially occurring in the vegetation habitats within the Project area. The CWHR is a predictive database based on scientific information concerning wildlife species and their habitat relationships. Fish and invertebrates are not included in the CWHR system. Applications of CWHR include characterization of wildlife vegetation habitats and special habitat elements occurring within a particular area by using the CWHR vegetation habitat classification system. The CWHR model output is a list of wildlife species that potentially occur in the area, based on wildlife habitats, habitat elements, and geographic location. Mayer and Laudenslayer (1988) describe the various wildlife habitats that constitute the CWHR classification system. The goal of the classification system is to identify and classify

vegetation types important to wildlife, and to recognize and logically categorize major vegetative complexes at a scale sufficient to predict wildlife-habitat relationships.

The following CWHR habitats are present on the Project site: annual grassland, barren, blue oak-gray pine, blue oak woodland, fresh emergent wetland, mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, valley oak woodland, and valley foothill riparian. The criteria used for the CWHR query included all species potentially occurring in Shasta County in these habitats. All habitat stages were included, and no habitat elements were excluded for the purposes of the CWHR query.

The USFWS maintains a database that lists federally protected species for each USGS quadrangle in the jurisdiction of the Sacramento USFWS office. The current USFWS list of endangered and threatened species that may occur, or be affected by projects in the Project area and Shasta Dam 7.5-minute USGS topographic quadrangles and in Shasta County (including the presence/absence of designated critical habitat) were reviewed.

A database search was also performed for the Project site utilizing the CNPS Electronic Inventory, which allows users to query the Inventory of Rare and Endangered Plants of California (California Native Plant Society 2012). This database uses a set of search criteria (e.g., quad name, habitat type). The criteria used for the CNPS query included all CNPS Rare Plant Rank 1A, 1B, 2, 3, and 4 plants occurring in Shasta County in annual grasslands, chaparral, cismontane woodland, lower montane coniferous forest, marshes and swamps, meadows and seeps, valley and foothill grasslands, riparian woodland, and riparian scrub habitats between elevations of approximately 800 and 2,500 feet.

Table 3.4-2 provides a list of special-status plant species documented onsite, their current protective status, general habitat, and potential occurrence rank. Table 3.4-3 provides a list of special-status animal species that are documented, current protective status, general habitat, and potential occurrence rank. Figure 3.4-2 illustrates the location of the special-status species in the vicinity of the Project site.

TABLE 3.4-2. SPECIAL-STATUS PLANT SPECIES KNOWN OR POTENTIALLY OCCURRING IN THE PROJECT AREA

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE/CRPR)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
FEDERAL OR STATE LISTED				
Boggs lake hedge-hyssop *Gratiola heterosepala*	—/E/1B.2	Vernal pools and lake margins; elevation 10-2,375 meters	Potentially occurring in annual grassland and seasonal wetlands occurring in the Project site.	Low
Greene's tuctoria *Tuctoria greenei*	E/R/1B.1	Vernal pools; elevation 30-1,070 meters	Potentially occurring in annual grassland and seasonal wetlands occurring in the Project site.	Low
Slender Orcutt grass *Orcuttia tenuis*	T/E/1B.1	Vernal pools; elevation 35-1,760 meters	Potentially occurring in annual grassland and seasonal wetlands occurring in the Project site.	Low
OTHER SPECIAL-STATUS SPECIES				
Shasta eupatory *Ageratina shastensis*	—/—/1B.2	Chaparral and lower montane coniferous forest, rocky, often carbonate; elevation 400-1,800 meters	Potentially occurring in chaparral, montane hardwood-conifer, and ponderosa pine habitats in the Project site. Known from Shasta Lake.	Medium
Henderson's bent grass *Agrostis hendersonii*	—/—/3.2	Valley and foothill grassland, vernal pools/ vernally mesic; elevation 70-305 meters	Potentially occurring in annual grassland and seasonal wetlands occurring in the Project site. Known from occurrences in the Redding area, and Ingot.	Low

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE/CRPR)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Sanborn's onion *Allium sanbornii* var. *sanbornii*	—/—/4.2	Chaparral, cismontane woodland, and lower coniferous forest (usually serpentinite, gravelly soils); elevation 260-1,510 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, ponderosa pine, blue oak-gray pine, and montane hardwood habitat types with serpentine, gravelly soils occurring in the Project site. Known from Oasis Road.	Medium
Slender silver moss *Anomobryum julaceum*	—/—/2.2	Broadleaved upland forest, lower montane coniferous forest, north coast coniferous forest/damp rock and soil outcrops; elevation 100-1000 meters	Potentially occurring in montane hardwood-conifer, ponderosa pine, and montane hardwood habitats present in the Project site. Known from Whiskeytown environmental camp.	Low
Shasta County arnica *Arnica venosa*	—/—/4.2	Cismontane woodland and lower coniferous forest; elevation 400-1,490 meters	Potentially occurring in montane hardwood-conifer, ponderosa pine, blue oak-gray pine, and montane hardwood habitats occurring in the Project site.	High
Marbled wild-ginger *Asarum marmoratum*	—/—/2.3	Lower montane coniferous forest; elevation 200-1,800 meters	Potentially occurring in montane hardwood-conifer and ponderosa pine habitats occurring in the Project site. Known from the Sacramento River Canyon.	Medium
Depauperate milk-vetch *Astragalus pauperculus*	—/—/4.3	Chaparral, cismontane woodland and valley and foothill grassland; vernally mesic, volcanic elevation 60-1,120 meters	Potentially occurring in mixed chaparral, montane hardwood, montane hardwood-conifer, blue oak-gray pine, and annual grassland habitats with seasonally mesic environments occurring in the Project site. Known from Oasis Road.	Medium

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE/CRPR)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Thread-leaved beakseed *Bulbostylis capillaries*	—/—/4.2	Lower montane coniferous forest, meadows and seeps, upper montane coniferous forest; elevation 395-2,075 meters	Potentially occurring in meadows and seeps occurring in ponderosa pine and montane hardwood-conifer habitats occurring in the Project site.	Low
Callahan's mariposa lily *Calochortus syntrophus*	—/—/1B.1	Cismontane woodland and valley and foothill grassland; vernally mesic; elevation 525-855 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, blue oak-gray pine, blue oak woodland, and annual grassland occurring in the Project site. Known from Whitmore near the Buckhorn CDF station.	Low
Butte County morning-glory *Calystegia atriplicifolia* ssp. *buttensis*	—/—/4.2	Chaparral, lower montane coniferous forest, rocky, roadside; elevation 600-1,524 meters	Potentially occurring in montane hardwood-conifer, ponderosa pine, and mixed chaparral habitats occurring in the Project site. Known from the Roaring Creek area.	Low
Buxbaum's sedge *Carex buxbaumii*	—/—/4.2	Bogs and fens; meadows and seeps; marshes and swamps; elevation 3-3,300 meters	Potentially occurring in perennial and seasonal wetlands occurring in annual grassland, fresh emergent wetlands, and valley foothill riparian habitats occurring in the Project site.	Low
Bristly sedge *Carex comosa*	—/—/2.1	Coastal prairie, marshes and swamps, valley and foothill grasslands; elevation 0-625 meters	Potentially occurring in perennial and seasonal wetlands occurring in annual grassland, fresh emergent wetlands, and valley foothill riparian habitats occurring in the Project site. Known from Big Bend and Fall River Mills.	Low
Brown fox sedge *Carex vulpinoidea*	—/—/2.2	Marshes and swamps (freshwater), riparian woodland; elevation 30-1,200 meters	Potentially occurring in vernal swales and seasonal wetlands in the Project site.	Medium

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE/CRPR)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Pink creamsacs *Castilleja rubicundula* ssp. *rubincundula*	—/—/1B.2	Chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland; elevation 20-900 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, blue oak-gray pine, blue oak woodland, and annual grasslands occurring in the Project site. Known from Gas Point Road in Cottonwood.	Low
Shasta clarkia *Clarkia borealis* ssp. *arida*	—/—/1B.1	Cismontane woodland and lower coniferous forest; elevation 490-595 meters.	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site. Known from Ingot.	High
Northern clarkia *Clarkia borealis* ssp. *borealis*	—/—/1B.3	Chaparral, cismontane woodland, and lower coniferous forest; elevation 400-1,340 meters.	**Present on site.** Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site. Known from Gray Rocks, 2.5 miles northeast of the Project site.	High
Serpentine collomia *Collomia diversifolia*	—/—/4.3	Chaparral, cismontane woodland, serpentinite, rocky or gravelly; elevation 300-600 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site.	Low
Castlegar hawthorn *Crataegus castlegarensis*	—/—/3	Riparian woodland, moist rocky loam; elevation 0-975 meters	Potentially occurring in valley foothill riparian habitat and along streams throughout the Project site. Known from northeastern Shasta County.	Low

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE/CRPR)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Silky cryptantha *Cryptantha crinita*	—/—/1B.2	Cismontane woodland, lower montane coniferous forest, riparian scrub, riparian woodland, valley and foothill grassland/gravelly streambeds; elevation 85-300 meters	Potentially occurring in gravelly streambeds within all habitats in the Project site. Known to occur 2.7 miles southeast of the Project site.	High
California lady's slipper *Cypripedium californicum*	—/—/4.2	Bogs and fens, lower montane coniferous forest, seeps and streambanks, usually serpentinite; elevation 30-2,750 meters	Potentially occurring in valley foothill riparian and seeps and springs occurring throughout the site.	Low
Clustered lady's slipper *Cypripedium fasciculatum*	—/—/4.2	Lower montane coniferous forest and north coast coniferous forest, usually serpentinite seeps and streambanks; elevation 100-2,435 meters	Potentially occurring in valley foothill riparian and seeps and springs occurring throughout the site.	Low
mountain lady's slipper *Cypripedium montanum*	—/—/—4.2	Broadleafed upland forest, cismontane woodland, lower montane coniferous forest, and north coast coniferous forest; elevation 185-2,225 meters	Potentially occurring in montane hardwood-conifer, montane, hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site.	Low
Norris' beard moss *Didymodon norrisii*	—/—/2.2	Cismontane woodland and lower montane coniferous forest; elevation 600-1,973 meters	Potentially occurring in montane hardwood-conifer, montane, hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site.	Low

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE/CRPR)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Tripod buckwheat *Eriogonum tripodum*	—/—/4.2	Chaparral, cismontane woodland, often serpentinite; elevation 200-1,600 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane, hardwood, and ponderosa pine, blue oak-gray pine habitats occurring in the Project site. Known nearby occurrence on Oasis Road, south of Shasta Lake.	Medium
Butte County fritillary *Fritillaria eastwoodiae*	—/—/3.2	Chaparral, cismontane woodland and lower montane coniferous forest, openings, sometimes serpentinite; elevation 50-1,500 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane, hardwood, and ponderosa pine, blue oak-gray pine habitats occurring in the Project site.	Medium
Red Bluff dwarf rush *Juncus leiospermus* var. *leiospermus*	—/—/1B.1	Chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, vernal pools/ vernally mesic; elevation 35-1020 meters	Potentially occurring in seasonal wetlands in annual grassland habitats in the Project site	Medium
Santa Lucia dwarf rush *Juncus luciensis*	—/—/1B.2	Chaparral, great basin scrub, lower montane coniferous forest, meadows and seeps, vernal pools; elevation 300-2,040 meters	Potentially occurring in seasonal wetlands in annual grassland habitat occurring in the Project site. Known from 2 occurrences in southeastern Shasta County.	Low
Legenere *Legenere limosa*	—/—/1B.1	Vernal pools; elevation 1-880 meters	Potentially occurring in seasonal wetlands in annual grassland habitats in the Project site	Low
Dubious pea Lathyrus sulphureus var. argillaceous	—/—/3	Cismontane woodland, lower montane coniferous forest, and upper montane coniferous forest; elevation 150-305 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site.	Medium

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE/CRPR)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Broad-lobed leptosiphon *Leptosiphon latisectus*	—/—/4.3	Broadleaved upland forest and cismontane woodland; elevation 170-1,500 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site.	Low
Cantelow's lewisia *Lewisia cantelovii*	—/—/1B.2	Broadleaved upland forest, chaparral, cismontane woodland, lower montane coniferous forest, mesic, granitic, sometimes serpentinite seeps; elevation 330-1,370 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site. Known from the Sacramento River.	Medium
Howell's lewisia *Lewisia cotyledon* var. *howellii*	—/—/3.2	Broadleaved upland forest, chaparral, cismontane woodland, lower montane coniferous forest; elevation 150-2,010 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site.	Low
Redwood lily *Lilium rubescens*	—/—/4.2	Broadleaved upland forest, chaparral, cismontane woodland, lower montane coniferous forest, north coast coniferous forest, upper montane coniferous forest, sometimes serpentinite, sometimes roadsides; elevation 30-1,715 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site.	Low
Bellinger's meadowfoam *Limnanthes floccosa* ssp. *bellingeriana*	—/—/1B.2	Cismontane woodland, meadows, and seeps, mesic; elevation 290-1,100 meters	Potentially occurring in seasonal wetlands in annual grassland and blue-oak gray pine habitats occurring in the Project site. Known from Ingot area.	Low

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE/CRPR)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Woolly meadowfoam *Limnanthes floccosa* ssp. *floccosa*	—/—/4.2	Chaparral, cismontane woodland, valley and foothill grassland, vernal pools; elevation 60-1,095 meters	Potentially occurring in seasonal wetlands in annual grassland and blue-oak gray pine habitats occurring in the Project site. Known from eastern Shasta County.	Low
Tehama navarretia *Navarretia heterandra*	—/—/4.3	Valley and foothill grassland, vernal pools, mesic; elevation 30-1,010 meters	Potentially occurring in seasonal wetland in annual grassland and blue oak gray pine habitats in the Project site.	Low
Awl-leaved navarretia *Navarretia subuligera*	—/—/4.3	Chaparral, cismontane woodland, lower montane coniferous forest, rocky, mesic; elevation 150-1,100 meters	Potentially occurring in seasonal wetlands and seeps and springs in chaparral, montane hardwood, montane hardwood-conifer, ponderosa pine, and blue-oak gray pine habitats occurring in the Project site.	Low
Shasta snow-wreath *Neviusia cliftonii*	—/—/1B.2	Cismontane woodland, lower coniferous forest, and riparian woodland, often streamsides, sometimes carbonate, volcanic, or metavolcanic; elevation 300-560 meters.	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, blue oak-gray pine, and valley foothill riparian habitats occurring in the Project site. Known to occur 1.7 miles northeast of the Project site.	Medium
Thread-leaved beardtongue *Penstemon filiformis*	—/—/1B.3	Cismontane woodland, lower montane coniferous forest, rocky; elevation 450-1,830 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site. Known from the Sacramento River.	Medium

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE/CRPR)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Narrow-petaled rein orchid *Piperia leptopetala*	—/—/4.3	Cismontane woodland, lower coniferous forest, upper montane coniferous forest; elevation 380-2,225 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site.	Low
Bidwell's knotweed *Polygonum bidwelliae*	—/—/4.3	Chaparral, cismontane woodland, valley and foothill grassland, volcanic; elevation 60-1,200 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, blue oak-gray pine and annual grassland habitats occurring in the Project site.	Low
Nuttall's ribbon-leaved pondweed *Potamogeton epihydrus* ssp. *nuttallii*	—/—/2.2	Marshes and swamps, shallow freshwater; elevation 369-2,172 meters	Potentially occurring in fresh emergent wetlands in the Project site.	Low
Eel-grass pondweed *Potamogeton zosteriformis*	—/—/2.2	Marshes and swamps, freshwater; elevation 0-1,860 meters	Potentially occurring in fresh emergent wetlands in the Project site.	Low
Hoary gooseberry *Ribes roezlii* var. *amictum*	—/—/4.3	Broadleaved upland forest, cismontane woodland, lower montane coniferous forest, upper montane coniferous forest; elevation 120-2,300 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, ponderosa pine, and blue oak-gray pine habitats occurring in the Project site.	Low
Sanford's arrowhead *Sagittaria sanfordii*	—/—/1B.2	Marshes and swamps, shallow freshwater; elevation 0-650 meters	Potentially occurring in fresh emergent wetlands in the Project site.	Low
Marsh skullcap *Scutellaria galericulata*	—/—/2.2	Lower montane coniferous forest, meadows and seeps, marshes and swamps, mesic; elevation 0-2,100 meters	Potentially occurring meadows and seeps in montane hardwood-conifer and ponderosa pine habitats in the Project site.	Medium

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE/CRPR)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Canyon Creek stonecrop *Sedum paradisum*	—/—/1B.3	Broadleaved upland forest, chaparral, lower montane coniferous forest, granitic, rocky; elevation 300-1,900 meters	Potentially occurring in rocky outcroppings in montane hardwood-conifer, montane hardwood, ponderosa pine, and chaparral habitats occurring in the Project site.	Medium
English Peak greenbriar *Smilax jamesii*	—/—/1B.3	Broadleaved upland forest, lower montane coniferous forest, marshes and swamps, north coast coniferous forest, upper montane coniferous forest, streambanks and lake margins; elevation 580-2,500 meters	Potentially occurring in marshes and swamps and along stream margins in montane hardwood-conifer, montane hardwood, valley foothill riparian, and ponderosa pine habitats occurring in the Project site. Known from Iron Canyon east of Shasta Lake.	Low
Obtuse starwort *Stellaria obtusa*	—/—/4.3	Lower montane coniferous forest, riparian woodland, upper montane coniferous forest, mesic, streambanks; elevation; 150-2,135	Potentially occurring along stream margins in valley foothill riparian, and ponderosa pine habitats occurring in the Project site.	Low
Long-fruit jewel flower *Streptanthus longisiliqus*	—/—/4.3	Cismontane woodland and lower montane coniferous forest, openings; elevation 715-1500 meters	Potentially occurring in marshes and swamps and along stream margins in montane hardwood-conifer, montane hardwood, and ponderosa pine habitats occurring in the Project site.	Low
Slender false lupine *Thermopsis gracilis* var. *gracilis*	—/—/4.3	Chaparral, cismontane woodland, lower montane coniferous forest, meadows and seeps, north coast coniferous forest, sometimes roadsides; elevation 100-1,615 meters	Potentially occurring in meadows and seeps in mixed chaparral, montane hardwood-conifer, montane hardwood, and ponderosa pine habitats occurring in the Project site.	Medium

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE/CRPR)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Cylindrical trichodon *Trichodon cylindrica*	—/—/2.2	Broadleaved upland forest, meadows and seeps, upper montane coniferous forest, sandy, exposed soil, road banks; elevation 50-2,002 meters	Potentially occurring on sandy exposed soil in meadows and seeps in montane hardwood-conifer, montane hardwood, and ponderosa pine habitats occurring in the Project site.	Low
Siskiyou false-hellebore *Veratrum insolitum*	—/—/4.3	Chaparral and lower montane coniferous forest, clay; elevation 45-1,635 meters	Potentially occurring in montane hardwood-conifer, montane hardwood, and ponderosa pine habitats occurring in the Project site.	Low
Oval-leaved viburnum *Viburnum ellipticum*	—/—/2.3	Chaparral, cismontane woodland, and lower montane coniferous forest; elevation 215-1400 meters	Potentially occurring in mixed chaparral, montane hardwood-conifer, montane hardwood, and ponderosa pine habitats occurring in the Project site. Known from Jones Valley area.	High

[1]*STATUS CODES: FEDERAL AND STATE: E = ENDANGERED; T = THREATENED.*

CALIFORNIA RARE PLANT RANK:

1B *PLANTS RARE, THREATENED, OR ENDANGERED IN CALIFORNIA AND ELSEWHERE.*

2 *PLANTS RARE, THREATENED, OR ENDANGERED IN CALIFORNIA BUT MORE COMMON ELSEWHERE.*

3 *PLANTS ABOUT WHICH WE NEED MORE INFORMATION, REVIEW LIST.*

4 *PLANTS OF LIMITED DISTRIBUTION, A WATCH LIST.*

Modifiers

.1 Seriously endangered in California.

.2 Fairly endangered in California.

.3 Not very endangered in California.

SOURCE: NORTH STATE RESOURCES 2012, CALIFORNIA NATURAL DIVERSITY DATABASE

TABLE 3.4-3: SPECIAL-STATUS FISH AND WILDLIFE SPECIES KNOWN OR POTENTIALLY OCCURRING IN THE PROJECT AREA.

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
FEDERAL OR STATE LISTED				
Vernal pool fairy shrimp *Branchinecta lynchi*	T/—	Live in vernal pools, swales, and ephemeral freshwater habitats.	Pool features that may provide habitat occur in the Project site.	Low
Vernal pool tadpole shrimp *Lepidurus packardi*	E/—	Live in vernal pools, swales, and ephemeral freshwater habitats.	Pool features that may provide habitat occur in the Project site.	Low
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/—	Elderberry shrubs associated with riparian forests that occur along rivers and streams.	One elderberry shrub was observed along Digger Bay Road. Other shrubs may be present in the Project site.	Low
Central Valley steelhead Distinct Population Segment (DPS) *Oncorhynchus mykiss irideus*	T/—	Spawn and rear in Sacramento River and its tributaries. Require cool, swift, shallow water; clean, loose gravel for spawning; and runs and suitable large pools in which to rear and over-summer.	Within known anadromous fish migration reaches, but above critical habitat. Not observed during 2012 surveys. Limited potential for Moody, Rancheria, and Salt Creeks to support non-natal rearing habitat. Barriers downstream of the Project site prevent upstream movement (Stillwater Sciences, 2012).	Low
Central Valley spring-run ESU Chinook salmon *Oncorhynchus tshawytscha*	T/T	Spawn and rear in main-stem Sacramento River and suitable perennial tributaries. Require cool year-round water temperatures and deep pools for over-summering habitat. Spawn in riffles with gravel and cobble substrate.	Within known anadromous fish migration reaches, but above critical habitat. Not observed during 2012 surveys. Limited potential for Moody, Rancheria, and Salt Creeks to support non-natal rearing habitat. Barriers downstream of the Project site prevent upstream movement (Stillwater Sciences, 2012).	Low

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Sacramento River winter-run ESU Chinook salmon *Oncorhynchus tshawytscha*	E/E	Spawn and rear in main-stem Sacramento River. Require cool year-round water temperatures, since spawning occurs during the summer. Requires deep pools and riffles, and clean gravel and cobble substrate to spawn.	Within known anadromous fish migration reaches, but above critical habitat. Not observed during 2012 surveys. Limited potential for Moody, Rancheria, and Salt Creeks to support non-natal rearing habitat. Barriers downstream of the Project site prevent upstream movement (Stillwater Sciences, 2012).	Low
California red-legged frog *Rana draytonii*	T/SC	Requires aquatic habitat for breeding, also uses a variety of other habitat types including riparian and upland areas. Adults utilize dense, shrubby, or emergent vegetation associated with deep-water pools with fringes of cattails and dense stands of overhanging vegetation.	Potentially occurring at the pond in southern portion of Project site.	Low
Shasta salamander *Hydromantes shastae*	—/T	Moist limestone fissures and caves, in volcanic and other rock outcroppings, and under woody debris in mixed pine-hardwood stands.	**Present on site.** Identified onsite in rock outcrops within proposed North Pit. Potentially occurring in rock outcrops and adjacent slopes in other portions of the Project site.	High
Bald eagle *Haliaeetus leucocephalus*	D/E, FP	Requires large bodies of water, or free-flowing rivers with abundant fish and adjacent snags and large trees for perching and nesting.	Potentially occurring in ponderosa pine habitat in the northern portion of the study. Known to occur 1 mile north of the Project site at Shasta Lake.	Low
Northern spotted owl *Strix occidentalis caurina*	T/SC	In northern California, resides in large stands of old growth, multi-layered mixed conifer, redwood and Douglas-fir habitats	Potentially occurring in ponderosa pine and montane hardwood-conifer habitats in the Project site.	Low

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Willow flycatcher *Empidonax traillii*	—/E	Rare summer resident in wet meadow and montane riparian habitats at 2,000 to 8,000 feet elevation. No longer known to nest in Sacramento Valley but migrates through the north state region in spring and fall.	Potentially occurring in valley foothill riparian along streams in the Project site.	Low
Pacific fisher *Martes pennanti pacifica*	C/CT	Intermediate to large dense stages of coniferous forests and deciduous riparian habitats with greater than 50% canopy closure.	Potentially occurring in ponderosa pine, montane hardwood-conifer, and montane hardwood habitats in the Project site. Known to occur 0.5 mile northwest of the Project site.	High (in NW portion of site)
OTHER SPECIAL-STATUS SPECIES				
Central Valley fall/late fall-run ESU Chinook salmon *Oncorhynchus tshawytscha*	SC/SC	Spawn and rear in main-stem Sacramento River and suitable perennial tributaries. Spawn and rear in main-stem Sacramento River and suitable perennial tributaries. Requires cool water temperatures for spawning, egg-incubation and juvenile rearing. Spawn in riffles with gravel and cobble. Spawn in riffles with gravel and cobble.	Within known anadromous fish migration reaches, but above critical habitat. Not observed during 2012 surveys. Limited potential for Moody, Rancheria, and Salt Creeks to support non-natal rearing habitat. Barriers downstream of the Project site prevent upstream movement (Stillwater Sciences, 2012).	Low
Foothill yellow-legged frog *Rana boylii*	—/SC	Rocky streams in a variety of habitats.	Rocky stream habitat is present within Moody and Rancheria Creeks in the Project site.	Low

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Northwestern pond turtle *Actinemys marmorata*	—/SC	Slow water aquatic habitat with available basking sites. Requires an upland oviposition site near the aquatic site with good sun exposure, gentle slope, and sparse vegetation. Usually on south- or west-facing aspects.	**Present on site**. Identified in the upper reach of Moody Creek. Potentially occurring in pond in southern portion of Project site. Known from adjacent properties.	High
Long-eared owl *Asio otus*	—/SC	Dense riparian and live oak thickets near meadow edges, and nearby woodland and forest habitats; also found in dense conifer stands at higher elevations.	Potentially occurring in riparian and dense oak thickets adjacent to meadow and grassland in the Project site.	Low
Western burrowing owl *Athene cunicularia hypugaea*	—/SC	Grasslands and ruderal habitats.	Potentially occurring in annual grasslands present in the Project site.	Low
Northern harrier *Circus cyaneus*	—/SC	Forages in marshes, grasslands, and ruderal habitats; nests in extensive marshes and wet fields.	Potentially occurring in annual grasslands present in the Project site.	Medium
White-tailed kite *Elanus leucurus*	—/FP	Occurs in low elevation grassland, agricultural, wetland, oak-woodland, or savannah habitats. Riparian habitat adjacent to open areas also used.	**Present on site.** Observed foraging in annual grasslands in the Project site. Breeding habitat is present in oak woodlands adjacent to annual grassland.	High
Vaux's swift *Chaetura vauxi*	—/SC	Prefers redwood and Douglas-fir habitats, nests in hollow trees and snags or, occasionally, in chimneys; forages aerially.	Potentially occurring in ponderosa pine habitat present in the Project site.	Low
Olive-sided flycatcher *Contopus borealis*	—/SC	Montane and northern coniferous forests, at mid-to high elevations. Associated with forest openings	Potentially occurring in ponderosa pine habitat in the Project site.	Low

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Yellow warbler *Dendroica petechia*	—/SC	Breeds in riparian woodlands, particularly those dominated by willows and cottonwoods.	**Present on site.** Observed in valley foothill riparian in the Project site.	High
Yellow-breasted chat *Icteria virens*	—/SC	Breeds in riparian habitats having dense understory vegetation, such as willow and blackberry.	**Present on site.** Observed in valley foothill riparian in the Project site.	High
Townsend's western big-eared bat *Corynorhinus townsendii*	—/SC	Roosts in colonies in caves, mines, bridges, buildings, and hollow trees in a variety of habitats. Habitat must include appropriate roosting, maternity, and hibernacula sites free from disturbance by humans.	Potentially occurring in hollow trees present in the Project site.	Low
Pallid bat *Antrozous pallidus*	—/SC	Forages over many habitats; roosts in buildings, trees, rocky outcrops and rocky crevices in mines and caves.	Potentially occurring in hollow trees and rock outcrops present in the Project site.	Low
Western mastiff bat *Eumops perotis*	—/SC	Many open habitats, including conifer and deciduous woodlands, grassland, and chaparral. Roosts in crevices in cliff faces and high buildings.	Potentially occurring in rock outcrops present in the Project site.	Low
Western red bat *Lasiurus blossevillii*	—/SC	Prefers sites with a mosaic of habitats that includes trees for roosting and open areas for foraging. Strongly associated with riparian habitats.	Potentially occurring in valley foothill riparian and along stream corridors in the Project site.	Low
American badger *Taxidea taxus*	—/SC	Herbaceous, shrub, and open stages of most habitats with dry, friable soils.	Potentially occurring in annual grassland habitat in the Project site.	Low

COMMON NAME SCIENTIFIC NAME	CURRENT STATUS[1] (FED/STATE)	GENERAL HABITAT DESCRIPTION	COMMENTS	POTENTIAL OCCURRENCE RANK
Ring-tailed cat *Bassariscus astutus*	—/FP	Riparian habitats and in brush stands of most forest and shrub habitats. Nests in rock recesses, hollow trees, logs, snags, abandoned burrows or woodrat nests.	Potentially occurring in valley foothill riparian and along stream corridors in the Project site.	High

[1]*STATUS CODES:*
FEDERAL AND STATE CODES: E = ENDANGERED; T = THREATENED; C = CANDIDATE; CT = CANDIDATE FOR THREATENED (STATE); SC = SPECIES OF CONCERN (FEDERAL) AND SPECIES OF SPECIAL CONCERN (STATE); PD = PROPOSED FOR DELISTING; D = DELISTED; FP = CALIFORNIA FULLY PROTECTED SPECIES
SOURCES: NORTH STATE RESOURCES 2012, CALIFORNIA NATURAL DIVERSITY DATABASE

Invasive Plants

Six non-native invasive plants with a Cal-IPC rating of High occur within the Project site: red brome (*Bromus madritensis* ssp. *rubens*), cheatgrass (*Bromus tectorum*), yellow starthistle, medusahead Himalaya blackberry, and French broom (*Genista monspessulana*). All of these invasive plants, except Himalaya blackberry and French broom, occurred within areas mapped as annual grassland habitat and within some of the annual grassland included in other habitat types (e.g. blue oak woodland, valley oak woodland, and mixed chaparral). Yellow starthistle and medusahead were the most abundant of these invasive plants in the annual grassland. Himalaya blackberry was abundant in the western portion of the Project site along the banks of the intermittent stream that runs along the length of the Digger Bay Road and around the pond that is part of this same drainage along the southwestern Project site boundary. French broom was present along the dirt road near the pond near the southwestern Project site boundary. Italian plumeless thistle (*Carduus pycnocephalus*) has a Cal-IPC rating of Moderate and was common in the annual grassland habitat east of the railroad tracks. The Cal-IPC ratings (High, Moderate, and Limited) of all invasive plants observed at the Project site are noted in the botanical report contained in the appendix.

HYDROLOGY/HYDROLOGIC FEATURES

Watersheds for Moody, Rancheria, Salt, and Churn creeks originate in or just outside of the Project site. Smaller intermittent and ephemeral streams contribute to the hydrology of these larger streams. Seep-springs that generally originate at exposed bedrock occurring on the upper slopes and ridges also contribute to flows within the drainages. The drainages flow south and south easterly, and their hydrology is provided by ground water and sheet flow from adjacent slopes. Drainages in the northeastern portion of the Project site convey water to East Fork Stillwater Creek.

The gradient becomes nearly level in the eastern portion of the Project site and intermittent swales that convey water become more predominant. Surface water is provided by precipitation and sheetflow.

Moody, Rancheria, Salt, and Churn creeks are tributaries to the Sacramento River, which is a traditional navigable water (TNW). Rancheria Creek flows to Moody Creek approximately 600 feet downstream of the Project site. Moody Creek flows 3.3 river miles to Stillwater Creek and Stillwater Creek flows 15.75 river miles to the Sacramento River.

IS231[1] (IS 172, IS190, etc.) is a tributary to Salt Creek. This water feature flows approximately 1.8 river miles southeast to Salt Creek. From this point Salt Creek conveys water four river miles to Churn Creek and Churn Creek flows approximately 14.3 river miles to the Sacramento River.

[1] "IS" means intermittent stream. A numbering system is used for intermitted streams that are otherwise unnamed.

From the east side of the Project site, Salt Creek flows south approximately 5.6 river miles to Churn Creek and Churn Creek flows approximately 14.3 river miles to the Sacramento River.

IS181 is also a tributary to Churn Creek. From the Project site, IS181 flows approximately 2.8 river miles to Churn Creek. From this confluence, Churn Creek conveys water to the Sacramento River approximately 17.1 river miles.

Field assessments were performed on the Project site on April 5, 2012 and May 17, 2012. The results of the field assessments are discussed in **Appendix H** Fish Use And Channel Adjustments Technical Memo.

JURISDICTIONAL WATERS/WETLANDS

Any project that proposes to fill or otherwise physically alter creeks, wetlands, or other waters requires a number of federal, state and, in some cases, local permits before it can proceed. It should be recognized that impacts to "waters of the United States" and impacts to "waters of the State" might differ, due to the differing laws and regulations that address these impacts.

Waters of the US

Waters of the U.S. include lakes, rivers, streams, intermittent drainages, mudflats, sandflats, wetlands, sloughs, and wet meadows. Wetlands are defined as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” [33 C.F.R. §328.3(b)]. Waters of the U.S. exhibit a defined bed and bank and ordinary high water mark (OHWM).

Waters of the State

Waters of the State are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. Examples include, but are not limited to, rivers, streams, lakes, bays, marshes, mudflats, unvegetated seasonally ponded areas, drainage swales, sloughs, wet meadows, natural ponds, vernal pools, diked baylands, seasonal wetlands, and riparian woodlands. It should be noted that the U.S. Supreme Court Case (*Solid Waste Agencies of Northern Cook County vs. U.S. Army Corps of Engineers,* now commonly referred to as "SWANCC") ruled that isolated wetlands are not "waters of the United States" and are not subject to section 404 permits or 401 certification, and should be instead regulated under state law. In California, the Porter-Cologne Water Quality Act is the state law that regulates such waters. The Court's ruling has no bearing on the definition of Waters of the State, including isolated wetlands, and the State retains authority to regulate discharges of waste into any Waters of the State, regardless of whether the federal government has concurrent jurisdiction under Section 404/401 of the Clean Water Act.

Wetland Delineation

North State Resources, Inc. (NSR) conducted an on-site routine delineation of waters of the United States on the Project site based on field observations of positive indicators for hydrophytic vegetation, hydrology, and soils for wetlands; and on indicators of an OHWM for other waters of

the United States. This methodology is consistent with the approach outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008), and USACE regulations. Taxonomic nomenclature for plant species is in accordance with *The Jepson Manual* (Hickman 1993). Wetland indicator status for plant species was confirmed using Reed (1988), and the "50/20 Rule" was applied to determine plant dominance (USACE 2008). Presence of primary and secondary wetland hydrology indicators were documented for each wetland feature.

A soil pit was dug in each representative wetland feature. Soil pits were dug to a depth sufficient to document the presence or confirm the absence of hydric soil or hydrology indicators. Soils were examined to assess field indicators of hydric soils. Positive indicators of hydric soils were observed in the field in accordance with the criteria outlined in *Field Indicators of Hydric Soils in the United States* (Hurt and Vasilas 2006). Soil colors were determined using a Munsell® soil-color chart. The hydric status of each soil map unit occurring on the Project site was reviewed using the *Web Soil Survey* (Soil Survey Staff 2010). At least one set of data points was selected to best represent the wetland feature type and the adjacent uplands. Data points were also placed in suspect areas to confirm wetland or upland status.

"Other waters" are traditional navigable waters (TNWs) and their tributaries. Delineation of "other waters" was based on presence of an OHWM as defined in USACE regulations (Title 33 of the Code of Federal Regulations [CFR], Section 328.3 [33 CFR 328.3] and 33 CFR 328.4) and whether the feature qualified as tributary to waters of the United States. Physical characteristics of an OHWM include a natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, presence of litter and debris, leaf litter disturbed or washed away, scour, deposition, presence of bed and bank, and water staining. At least one set of paired data points was then selected to best represent the "other waters" and adjacent upland conditions for each "other waters" type.

Sixty-one data points representing each feature type, the associated upland, and suspect areas were characterized and documented throughout the Project site. Field observations were conducted June 15 through July 20, 2010. Routine wetland determination data forms and representative photographs of features delineated and data point locations are presented in an appendix to the wetland delineation.

Based on the above field observations and associated mapping the wetland delineation identified 10 types of waters of the United States within the site occupying approximately 14.1036 acres. Tables 3.4-4 and 3.4-5 below summarizes the types of waters of United States and acreage identified within the site and limits of surface disturbance.

TABLE 3.4-4: ACREAGE SUMMARY OF WATERS OF THE UNITED STATES

WATERS OF THE UNITED STATES	*TOTAL ACREAGE*	*ACREAGE WITHIN THE LIMITS OF SURFACE DISTURBANCE*
WETLANDS		
Fresh Emergent Wetland	0.0931	0.0500
Fresh Emergent-Riparian Wetland	0.0000	0.0000
Intermittent Pool	0.0007	0.0007
Intermittent Swale	1.5745	1.5584
Riparian Wetland	2.3436	0.4920
Seep-Spring Wetland	0.2449	0.0803
Vegetated Ditch	0.0063	0.0000
OTHER WATERS		
Ephemeral Stream	0.5342 (19,021 LF)	0.2528 (9,382 LF)
Intermittent Stream	9.5480 (114,252 LF)	5.5753 (62,166 LF)
Seep-Spring/Other Waters	0.0032	0
Total Jurisdictional "Waters of the U.S"	**14.1036**	**8.0095**

SOURCE: NORTH STATE RESOURCES, INC. (2012)

TABLE 3.4-5: ACREAGE SUMMARY OF NON-JURISDICTIONAL FEATURES

NON-JURISDICTIONAL FEATURES		
NON-JURISDICTIONAL WETLANDS		
Intermittent Pool	0.074	0.056
Seep-Spring Wetland	0.0094	0
Vegetated Ditch	0.0418	0.0418
NON-JURISDICTIONAL OTHER WATERS		
Ephemeral Stream	0.0020 (86 LF)	0
Non-Vegetated Ditch	0.0827 (1,795 LF)	0.0751 (1,464 LF)
Total Non-Jurisdictional "Waters of the U.S"	**0.2099**	**0.1729**

SOURCE: NORTH STATE RESOURCES, INC. (2012)

CHARACTERIZATION AND JURISDICTIONAL DETERMINATION OF DELINEATED WETLAND FEATURES

(Note: the figure references below are provided in the Wetland Delineation contained in Appendix G to this EIR.)

Fresh emergent wetland (FEW) occurs in the eastern portion (FEW1, 2, and 3 (Figure 3d and 3g) and in one location along the railroad tracks (FEW4, Figure 3e) in the eastern portion of the Project site. Fresh emergent wetlands occur in areas with long-duration inundation creating an environment for perennial, hydrophytic plants. Fresh emergent wetlands occurring in the Project site are generally man-made. FEW1 and 2 are excavated seep-springs in the headwaters of intermittent swales. FEW4 has formed between the railroad and the dirt road where elevated

culverts inhibit flow from the intermittent stream to the west. FEW3, however, is located in a convex position on the slope and hydrology is provided by groundwater.

Dominant plant species occurring in fresh emergent wetlands include twelfth rush (*Juncus uncialis*-OBL), green sheath sedge (*Carex feta*-OBL), and pale spike rush (*Eleocharis macrostachya*-OBL). Inundation was observed during the field visit on June 15, 2010. Additional wetland hydrology criteria include hydrogen sulfide odor, reduced iron, and a thin muck surface. Hydric soil criteria are met through the observation of surface water and saturation. Indicators of long-duration saturation include depleted matrix and a hydrogen sulfide odor. Fresh emergent wetlands contribute to the flow of water in intermittent swales and intermittent streams that convey water to Rancheria Creek, a RPW, and ultimately to the Sacramento River, a TNW. Therefore, these features are subject to federal jurisdiction.

Fresh emergent-riparian wetland (FEW-RW1, Figure 3c) occurs in the in-stream constructed impoundment located in the tributary to Salt Creek in the southwestern portion of the Project site. Wooded riparian areas have developed along the banks of the impoundment whereas, fresh emergent vegetation has established in the shallow perimeter of the impoundment. Dominant plant species along the banks of the impoundment include Goodding's black willow (*Salix gooddingii*-OBL), and narrow-leaved willow (*Salix exigua*-OBL). Fresh emergent species include pennyroyal (*Mentha pulegium*-OBL), pale spike rush, willow dock (*Rumex salicifolius*-OBL), water plantain (*Alisma plantago-aquatica*-OBL), and rabbitsfoot grass (*Polypogon monspeliensis*-FACW). Inundation was observed during the field visit on July 8, 2010. Additional wetland hydrology criteria include a hydrogen sulfide odor and sediment deposits. Hydric soil criteria are met through the observation of surface water and saturation. Indicators of long-duration saturation include a hydrogen sulfide odor. FEW-RW1 is an in-stream constructed impoundment in IS110 (Figure 3c) that conveys water to Salt Creek, a RPW, and ultimately to the Sacramento River, a TNW. Therefore, these features are subject to federal jurisdiction.

Intermittent pools (IP) in the Project site are created by OHV and 4x4 vehicle use. These are depressional features that are inundated for long enough duration to establish hydrophytic vegetation. Soil characteristics are difficult to determine due to repetitive disturbance by vehicles. Depending on the amount of disturbance, plant establishment varied from sparse to moderately dense. Dominant plant species in less disturbed pools include pennyroyal, smooth cat's ears (*Hypochaeris glabra*-UPL), perennial ryegrass (*Lolium perenne*-FAC), and coyote thistle (*Eryngium castrense*-FACW). In more frequently disturbed pools, dominant plant species include nutsedge (*Cyperus eragrostis*-FACW), rabbitsfoot grass, slender rush (*Juncus tenuis*-FACW), toad rush (*Juncus bufonius*-FACW), and hyssop loosestrife (*Lythrum hyssopifolia*-OBL). Water is provided by frequent flooding and long-duration inundation indicated by sediment deposits, soil surface cracks, water-stained leaves, and oxidized rhizospheres. Vehicle disturbance may inhibit or mask hydric soil indicators; however, inundation was observed through June 30, 2010 and development of dominant hydrophytic vegetation and hydrology indicators are evidence of long duration ponding.

IP1 (Figure 3g) is approximately 25 feet from a jurisdictional water feature and may overflow and sheet flow to IS12 (Figure 3g) to its southwest. Because there is a surface connection to a jurisdictional feature, IP1 is also subject to federal jurisdiction.

NJIP1 through NJIP6 (3g, 3e, and 3f) are isolated from waters of the United States. The pools range from 50 to 200 feet away from any jurisdictional features and do not drain or show any physical evidence of a surface connection to waters of the United States. Therefore, the intermittent pools were determined to be isolated and non-jurisdictional.

Intermittent swales (ISW) generally occur in the eastern, gently sloped portion of the Project site. Intermittent swales are vegetated, linear, drainage features that convey water to other jurisdictional features, generally intermittent streams. Depending on soil type and slope gradient, these features alternate with scoured, intermittent streams. Plants dominating these features include perennial ryegrass, coyote thistle, pennyroyal, iris-leaved rush (*Juncus xiphioides*-OBL), seep monkey flower (*Mimulus guttatus*-OBL), Mediterranean barley (*Hordeum marinum* var. *gussoneanum*-FAC), and soft chess. Hydrology is provided by frequent flooding and long-duration inundation indicated by a biotic crust and oxidized rhizospheres. Hydric soil criteria are met through indicators of long duration ponding, including the observation of redox depressions.

Intermittent swales convey water to intermittent streams that flow to Rancheria Creek, a RPW and East Stillwater Creek, which are tributaries to the Sacramento River, a TNW. Therefore, intermittent swales in the Project site are federally jurisdictional waters.

Riparian wetlands (RW) occur adjacent to the larger intermittent streams occurring in the Project site. The dominant hydrophytic plants on the east side of the Project site include Fremont cottonwood, arroyo willow, California button willow, willow dock, meadow rue (*Thalictrum fendleri*-FAC), rabbitsfoot grass, pinnate-leaved lotus (*Lotus pinnatus*-OBL), seep monkey flower, spearmint (*Mentha spicata* var. *spicata*-OBL), Mexican tea (*Chenopodium ambrosioides*-FAC), sticky cinquefoil (*Potentilla glandulosa*-FAC), and California grape. Upland plants also occur at a lesser extent and include poison oak and California coffeeberry. The dominant hydrophytic plants on the west side of the Project site include white alder, spice bush, Indian rhubarb (*Darmera peltata*-OBL), Himalayan blackberry, and California grape.

RW47 (Figure 3e) occurring along IS205 (Figure 3e) is dominated by herbaceous species. Because this riparian area is nearly level, the water table provided by the stream hydrates a broad area. Dominate plants include white-tipped clover (*Trifolium variegatum*-FAC), slender rush, pinnateleaved lotus, nutsedge, checker mallow (*Sidalcea hirsuta*-OBL), perennial ryegrass, and iris-leaved juncus (*Juncus xiphioides*-OBL).

For all riparian wetlands, water is provided by frequent flooding and long-duration inundation indicated by water marks, sediment deposits, and drift deposits. The soils are problematic in that these riparian wetlands occur on a sand/cobble bars within and adjacent to intermittent streams in the Project site. However, the pit dug for RW47 emitted hydrogen sulfide odor supporting both wetland hydrology and hydric soils.

Riparian wetlands occur within and adjacent to intermittent streams that convey water to Moody, Rancheria, Salt, or Churn creeks, each of which are RPWs and tributaries to the Sacramento River, a TNW. Therefore, riparian wetlands in the Project site are federally jurisdictional waters.

Seep-spring wetlands (SSW) occur throughout the Project site but vary in plant composition between the east and west portions of the Project site. A spring is a point where ground water flows out of the ground when an aquifer meets the grounds surface. The eastern seep-spring wetlands occur typically along exposed bedrock outcrops in the headwaters of intermittent streams. Dominate plant species in seep-spring wetlands on the east side of the Project site include seep monkey flower, white brodiaea (*Triteleia hyacinthina*-FAC), and perennial ryegrass. Hydrology indicators of long duration saturation include water marks and sediment deposits. Hydric soil indicators are problematic because in most cases water seeps directly from the bedrock and typical hydric soil characters cannot develop. Where soil overlays the bedrock, the hydrogen sulfide hydric soil indicator has developed.

The western seep-spring wetlands are generally seeps that have been developed by excavation for road-cuts or in one case, the specific development of a spring (SSW28, Figure 3a). These seep-spring wetlands are dominated by arroyo willow, chain fern (*Woodwardia fimbriata*-FACW), spice bush, slender rush, and Himalayan blackberry. Hydrology is provided by frequent flooding and long duration inundation indicated by a biotic crust and a hydrogen sulfide odor. Hydric soil criteria are met through indicators of long duration ponding including the observation of hydrogen sulfide odor, loamy mucky material, loamy gleyed matrix, and depleted matrix.

Seep-spring wetlands are tributary to intermittent streams that flow to Moody, Rancheria, Salt, or Churn creeks, each of which are RPWs and tributaries to the Sacramento River, a TNW. Therefore, seep-spring wetlands in the Project site are federally jurisdictional waters.

NJSSW1 (Figure 3a) was created by the development of a landing. From the cut in the slope, water seeps across the landing towards two arroyo willows at the eastern edge of the landing. The arroyo willows appear to respire the seepage because there is no indication that water seeps beyond the arroyo willows. This feature is approximately 150 feet from waters of the United States, and the topography does not indicate that this feature would flow to a jurisdictional feature during a high precipitation event. Therefore, NJSSW1 was determined to be isolated and non-jurisdictional.

Vegetated ditches occurring in the Project site are ditches that have been excavated to drain adjacent uplands, roads, or railways. Because these features gradients are so slight, pooling and/or saturation occur in each of the ditches allowing hydrophytic vegetation to colonize. Dominant plant species include pale spikerush, Perennial ryegrass, Mediterranean barley, hyssop loosestrife, rabbitsfoot grass, and pennyroyal. Wetland hydrology criteria are met through the observation of surface water on June 17, 2010, and oxidized rhizospheres indicating long-duration inundation. Hydric soil criteria are met through the observation of surface water, biotic crust, and redox depression indicating long duration saturation.

VD1 and 2 intercept (Figure 3c) flow from an intermittent stream north of the feature. Although this feature was excavated to drain a road, it intercepts flow from a water of the United States and conveys the flows to waters of the United States. Therefore, VD 1 and 2 are subject to federal jurisdiction.

NJVD1 and NJVD2 (Figure 3g) are determined to be federally non-jurisdictional based on the Rapanos guidance provided by the EPA and the Corps. In accordance with this guidance, federal agencies will not assert jurisdiction over "ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water" (Grumbles and Woodley 2007). Although hydrophytic vegetation is present, these features have been excavated wholly in uplands and drain the adjacent uplands and roadways during precipitation events. Therefore, NJVD1 and NJVD2 are not subject to federal jurisdiction. A significant nexus evaluation for this feature is included in Appendix D of the Wetland Delineation, which is Appendix G to this EIR.

CHARACTERIZATION AND JURISDICTIONAL DETERMINATION OF DELINEATED "OTHER WATER" FEATURES

Ephemeral streams (ES) occur infrequently in the Project site and are found where seep-spring wetlands do not contribute to the hydrology of the watershed. These features exhibit indicators of scour and deposition, minor drift lines, and sediment deposits, but lack indication of a ground water component. Water is provided by sheet flow during precipitation events. The poorly defined hydrology indicators, close proximity to the headwaters, and the small size of the ephemeral streams indicate short duration flow and the lack of a groundwater component. Jurisdictional boundaries were established at the OHWM.

Most ephemeral streams in the Project site flow into an intermittent stream which conveys water ultimately to the Sacramento River, a TNW. Therefore, these streams are federally jurisdictional.

However, NJES2 and 3 (Figure 3c) have been altered by the construction of a historic building pad. A ditch was built along the perimeter of the pad to intercept water from this drainage, but a breach in the berm has allowed water to flow out and dissipate onto the pad. Due to the short duration of flow and the lack of velocity, water either percolates into the pad or evaporates. The pad is level and approximately 200 feet from a jurisdictional feature. Although the topography generally slopes towards IS111 (Figure 3c), the topography has been historically altered and compacted in this area as there are two roads between IS111 to the south and NJES 2 and 3. Because the feature is ephemeral and has a short duration of flow, the nearest feature is greater than 200 feet away, and the topography is level at the termination of the feature and historically altered downslope, water that percolates would not flow subsurface into the IS111 approximately 200 feet south.

Additionally, NJES1 (Figure 3e) is a small ephemeral stream that has no surface or subsurface connection to a jurisdictional water. Scour and deposition ends approximately 350 feet from the nearest jurisdictional feature. This feature ends at a small two-track road. The road follows the level contour of the rail-road tracks and because the slope is nearly level, water either percolates

or evaporates at this point. Because the feature is ephemeral and has a short duration of flow, the nearest feature is greater than 350 away, and the topography is level at its termination, water that percolates would not flow subsurface into drainages 350 feet away.

Because there is no surface or subsurface connection and they are 200 to 350 feet from a jurisdictional feature, these features are not subject to federal jurisdiction.

Intermittent streams (IS) occur throughout the Project site in both steep and low gradient drainages. Intermittent streams are characterized as bed and bank features that exhibit indicators of scour, deposition, watermarks, and drift lines. Intermittent streams flow seasonally, but are fed by a groundwater component in addition to precipitation and sheet flow from adjacent slopes, extending the duration of flow. Intermittent streams in the Project site are highly variable in size, gradient, substrate, and duration of flow. The size of streams range from 1 to 15 feet and gradients can range from 1 to 30 percent slope. Substrates are generally dominated by gravel and cobble, but in the upper portions of the drainage often transition to bedrock.

Generally, most intermittent streams dry-up in early summer. However, Moody (IS133 etc., Figure 3e), Rancheria (IS60 etc., Figure 3d), Salt (IS218, etc. Figure 3f), and IS81 (Figure 3b) are all moderate- to long-duration intermittent streams with flows extending well into the summer. Extended flows often support adjacent riparian wetlands and in reaches with lower gradients support herbaceous hydrophytic vegetation including seep monkey flower and pinnate-leaved lotus within the OHWM. Jurisdictional boundaries were established at the OHWM. Depending on the drainage, intermittent streams convey water to Moody, Rancheria, Salt, East Fork Stillwater or Churn creeks, each of which are RPWs and tributaries to the Sacramento River, a TNW. Therefore, intermittent streams in the Project site are federally jurisdictional waters.

Non-vegetated ditches (NVD) occur along the roadways and railroad tracks in the Project site (Figure 3g). These features have been excavated solely to drain uplands. Boundaries were established at the OHWM as indicated by sediment and drift deposits.

All non-vegetated ditches were determined to be non- jurisdictional based on the *Rapanos* guidance provided by the EPA and the Corps. In accordance with this guidance, federal agencies will not assert jurisdiction over "ditches (inluding roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water (Grumbles and Woodley 2007)."

These features have been excavated solely as a function of draining the roadway or railroad. Additionally, these features are characterized as having low volume, infrequent and short duration flow. Therefore, these features are not subject to federal jurisdiction.

Seep-spring-other waters (SSOW1, Figure 3d) occur in the Moody Creek drainage. Water originates from one location in the drainage. The gradient is steep and the substrate is bedrock providing for increased water velocity and precluding the establishment of hydrophytic plants. Evidence of hydrology is provided by indicators including watermarks, sediment deposits, and drift

deposits. This feature flows into Moody Creek. Jurisdictional boundaries were established at the OHWM.

Because this feature conveys water to Moody Creek, a RPW, and tributary to the Sacramento River, a TNW, it is federally jurisdictional.

WILDLIFE MOVEMENT CORRIDORS

A wildlife movement corridor is a linear habitat serving to connect two or more significant habitats. Wildlife corridors provide several functions relating to wildlife movement. These functions include providing a location where wide-ranging animals can travel, plants can propagate, genetic exchange can occur, populations can move in response to environmental change and natural disasters, and individuals can recolonize from local extirpations. On a local scale, wildlife movement corridors are established travel routes used by the resident and migratory wildlife species.

The Project site encompasses the headwaters of Moody and Rancheria Creeks, which flow southwesterly underneath Interstate 5 to West Fork Stillwater Creek. An unnamed tributary in the western portion of the property flows southwesterly into the Churn Creek watershed. The headwaters of Salt Creek also originate within the Project site. The Project site is undeveloped except for the north-south trending Union Pacific Railroad corridor near the eastern portion of the property. These hydrologic features provide a potential drainage wildlife corridor.

The property is situated among natural foothill woodlands, other active existing mines, and rural residential development to the north; natural oak woodland and meadow habitats, and Interstate 5 to the east; natural foothill woodlands and the City of Shasta Lake to the south; and natural foothill woodlands and the Shasta Lake National Recreation Area to the west. A prominent feature of the Project site is a north-south trending ridgeline located in the northwestern portion of the property. This ridgeline is characterized by natural foothill woodlands and is adjacent to extensive woodlands and forest habitats located in the Shasta Lake National Recreation Area. This ridgeline amongst the natural foothill woodlands and forest habitats provide a potential ridge or habitat edge wildlife corridor.

Besides localized movement and use by resident species, and periodic use by migratory species, no sign of established resident or migratory wildlife corridors or native wildlife nursery sites have been observed on the Project site. Potential wildlife corridors Project site include the Moody and Rancheria Creek drainages, which generally run southeasterly through the Project site, and small drainages occurring in the southwestern portion of the Project site that flow southerly. These drainages provide natural corridors for species preferring dense woodlands between areas to the east and south of the Project site to woodlands located to the west and north. Ridgelines between these drainages also serve as natural corridors for movement among the uplands or between drainage corridors.

Another likely wildlife corridor is located along the woodlands at the eastern portions of the Project site, which occurs along the edge of a meadow habitat and Interstate 5. This area likely

provides a corridor between locations south and north of the Project site for species preferring a woodland/grassland edge habitat. Appendix V *Moody Flats Project: Wildlife Movement Corridors Technical Memorandum (*North State Resources February 7, 2014) illustrates locations of potential wildlife corridors.

ANADROMOUS FISHERIES

Salmon and steelhead trout are anadromous fish species that are present in the Sacramento River Basin. Anadromous fish are born in freshwater rivers and streams, and then migrate to the Pacific Ocean to grow and mature before returning to their place of origin to spawn. The Sacramento River system produces most of the Chinook salmon (*Oncorhynchus tshawytscha*) and a large percentage of the steelhead trout (*Oncorhynchus mykiss*) in California.

Anadromous fish resources once flourished naturally in the Sacramento River system, but as a result of habitat destruction from water storage/diversion projects, mining, sedimentation, and bank degradation, they are protected species under the Endangered Species Act. The Sacramento River system has historically supported steelhead trout and four distinct spawning runs of Chinook salmon: fall, late fall, winter, and spring. The salmon runs have declined since the late 1800s and are now characterized as episodic. The Central Valley steelhead was federally listed as threatened in 2003. The fall/late fall-run salmon is a federal and state species of concern, and a candidate species for federal listing. The spring-run Chinook salmon population is listed as threatened by both federal and state agencies. Winter-run Chinook salmon population is listed as a federally and state endangered species. Populations of Central Valley Steelhead and Chinook salmon are supported by hatcheries within the Sacramento River Basin.

Water remaining behind the dams by the start of the spawning run in October is often warmed by summer heat. Warm water and low water elevation are harmful to most coldwater anadromous fish species. Riparian vegetation is critical for the maintenance of high quality fish habitat. It provides cover, controls temperature, stabilizes stream banks, provides food, and buffers streams from erosion and impacts of adjacent land uses. Riparian vegetation also affects stream depth, current velocity, and substrate composition. The decline of riparian communities in California is a factor contributing to the loss of high quality fish habitat.

3.4.2 REGULATORY SETTING

There are a number of regulatory agencies whose responsibility includes the oversight of the natural resources of the state and nation including the CDFW, USFWS, USACE, and the National Marine Fisheries Service. These agencies often respond to declines in the quantity of a particular habitat or plant or animal species by developing protective measures for those species or habitat type. Federal and state agencies are increasingly involved with projects at the local level in Shasta County. The following is an overview of the federal, state and local regulations that are applicable to the proposed Project.

FEDERAL

Federal Endangered Species Act

The Federal Endangered Species Act (FESA), passed in 1973, defines an endangered species as any species or subspecies that is in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as any species or subspecies that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Once a species is listed it is fully protected from a "take" unless a take permit is issued by the USFWS. A take is defined as the harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species or any attempt to engage in such conduct, including modification of its habitat (16 USC 1532, 50 CFR 17.3). Proposed endangered or threatened species are those species for which a proposed regulation, but not a final rule, has been published in the Federal Register.

Migratory Bird Treaty Act

To kill, posses, or trade a migratory bird, bird part, nest, or egg is a violation of the Federal Migratory Bird Treaty Act (FMBTA: 16 U.S.C., §703, Supp. I, 1989), unless it is in accordance with the regulations that have been set forth by the Secretary of the Interior.

Clean Water Act – Section 404

Section 404 of the CWA regulates all discharges of dredged or fill material into waters of the U.S. Discharges of fill material includes the placement of fill that is necessary for the construction of any structure, or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, and other uses; causeways or road fills; and fill for intake and outfall pipes and subaqueous utility lines [33 C.F.R. §328.2(f)].

Waters of the U.S. include lakes, rivers, streams, intermittent drainages, mudflats, sandflats, wetlands, sloughs, and wet meadows. Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" [33 C.F.R. §328.3(b)]. Waters of the U.S. exhibit a defined bed and bank and ordinary high water mark (OHWM). The OHWM is defined by the United States Army Corps of Engineers (USACE) as "that line on shore established by the fluctuations of water and indicated by physical character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" [33 C.F.R. §328.3(e)].

The USACE is the agency responsible for administering the permit process for activities that affect waters of the U.S. Executive Order 11990 is a federal implementation policy, which is intended to result in no net loss of wetlands.

Clean Water Act – Section 401

Section 401 of the CWA (33 U.S.C. 1341) requires an applicant who is seeking a 404 permit to first obtain a water quality certification from the applicable Regional Water Quality Control Board. To obtain the water quality certification, the Regional Water Quality Control Board must indicate that the proposed fill would be consistent with the water quality standards set forth by the state.

STATE

Fish and Game Code §2050-2097 - California Endangered Species Act

The California Endangered Species Act (CESA) protects certain plant and animal species when they are of special ecological, educational, historical, recreational, aesthetic, economic, and scientific value to the people of the State. Under CESA, it is State policy to conserve, protect, restore, and enhance endangered species and their habitats.

To be consistent with federal regulations, CESA contains categories of "threatened" and "endangered" species. The term “rare” as used in FESA was changed to “threatened” in CESA for species, but not for plants. Thus, there are three listing categories for plants in California: rare, threatened, and endangered. Under State law, plant and animal species may be formally designated by official listing by the California Fish and Wildlife Commission.

Fish and Game Code §1900-1913 California Native Plant Protection Act

In 1977 the State Legislature passed the Native Plant Protection Act (NPPA) in recognition of rare and endangered plants of the state. The intent of the law was to preserve, protect, and enhance endangered plants. The NPPA gave the California Fish and Game Commission the power to designate native plants as endangered or rare, and to require permits for collecting, transporting, or selling such plants. The NPPA includes provisions that prohibit the taking of plants designated as "rare" from the wild, and a salvage mandate for landowners, which requires notification of the CDFW 10 days in advance of approving a building site.

Fish and Game Code §3503, 3503.5, 3800 - Predatory Birds

Under the California Fish and Game Code, all predatory birds in the order Falconiformes or Strigiformes in California, generally called “raptors,” are protected. The law indicates that it is unlawful to take, posses, or destroy the nest or eggs of any such bird unless it is in accordance with the code. Any activity that would cause a nest to be abandoned or cause a reduction or loss in a reproductive effort is considered a take. This generally includes construction activities.

Fish and Game Code §1601-1603 – Streambed Alteration

Under the California Fish and Game Code, CDFW has jurisdiction over any proposed activities that would divert or obstruct the natural flow or change the bed, channel, or bank of any lake or stream. Private landowners or project applicants must obtain a “Streambed Alteration Agreement” from CDFW prior to any alteration of a lake bed, stream channel, or their banks. Through this agreement, the CDFW may impose conditions to limit and fully mitigate impacts on fish and

wildlife resources. These agreements are usually initiated through the local CDFW warden and will specify timing and construction conditions, including any mitigation necessary to protect fish and wildlife from impacts of the work.

Public Resources Code § 21000 - California Environmental Quality Act

The California Environmental Quality Act (CEQA) identifies that a species that is not listed on the federal or state endangered species list may be considered rare or endangered if the species meets certain criteria. Under CEQA public agencies must determine if a project would adversely affect a species that is not protected by FESA or CESA. Species that are not listed under FESA or CESA, but are otherwise eligible for listing (i.e. candidate, or proposed) may be protected by a local government until the opportunity to list the species arises for the responsible agency.

Species that may be considered for review are included on a list of "Species of Special Concern," developed by the CDFW. Additionally, the California Native Plant Society (CNPS) maintains a list of plant species native to California that have low numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the Inventory of Rare and Endangered Vascular Plants of California. List 1A contains plants that are believed to be extinct. List 1B contains plants that are rare, threatened, or endangered in California and elsewhere. List 2 contains plants that are rare, threatened, or endangered in California, but more numerous elsewhere. List 3 contains plants where additional information is needed. List 4 contains plants with a limited distribution.

Public Resources Code § 21083.4 - Oak woodlands conservation

In 2004, the California legislature enacted SB 1334, which added oak woodland conservation regulations to the Public Resources Code. This new law requires a county to determine whether a project, within its jurisdiction, may result in a conversion of oak woodlands that will have a significant effect on the environment. If a county determines that there may be a significant effect to oak woodlands, the county must require oak woodland mitigation alternatives to mitigate the significant effect of the conversion of oak woodlands. Such mitigation alternatives include: conservation through the use of conservation easements; planting and maintaining an appropriate number of replacement trees; contribution of funds to the Oak Woodlands Conservation Fund for the purpose of purchasing oak woodlands conservation easements; and/or other mitigation measures developed by the county.

California Water Code Section 13260

Section 13260 of the California Water Code states that persons discharging or proposing to discharge waste that could affect the quality of the waters of the State, other than into a community sewer system, shall file a Report of Waste Discharge (ROWD) with the appropriate RWQCB. Following the filing of a ROWD, if applicable, the RWQCB adopts Waste Discharge Requirements (WDR) specifying water quality limitations for the waste discharge reported. Pursuant to California Water Code 13267, a Monitoring and Reporting Program may be required by the RWQCB as a condition of the WDR.

California Wetlands Conservation Policy

In August 1993, the Governor announced the "California Wetlands Conservation Policy." The goals of the policy are to establish a framework and strategy that will:

- Ensure no overall net loss and to achieve a long-term net gain in the quantity, quality, and permanence of wetland acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property.
- Reduce procedural complexity in the administration of State and federal wetland conservation programs.
- Encourage partnerships to make landowner incentive programs and cooperative planning efforts the primary focus of wetland conservation and restoration.

The Governor also signed Executive Order W-59-93, which incorporates the goals and objectives contained in the new policy and directs the Resources Agency to establish an Interagency Task Force to direct and coordinate administration and implementation of the policy.

Trout and Steelhead Conservation and Management Act of 1979

This Act declares that it is a policy of the State to:

1) Establish and maintain wild trout and steelhead stocks in suitable waters of the state.

2) Establish angling regulations designed to maintain wild trout and steelhead through natural production.

Salmon, Steelhead Trout, and Anadromous Fisheries Program Act

This Act was chaptered into the Fish and Game Code in 1988 (Section 6900 et. seq.). Its intent was to implement the recommendations of the California Advisory Committee on Salmon and Steelhead Trout (CACSST) to conserve and restore the anadromous fisheries resources of the State. The CACSST is a citizen's advisory committee created by the state Legislature in 1983 to develop a strategy for the conservation and restoration of salmon and steelhead resources in California. It consists of representatives from commercial and sport fishing organizations, native Americans, aquatic scientists, and public interest groups. The Act established the Salmon and Steelhead Trout Restoration Program within CDFW, whose purpose is to "develop a plan and program that strives to double the current [1988] natural production of salmon and steelhead".

Steelhead Rainbow Trout Policy

This policy of the California Fish and Game Commission (CFGC) recognizes the need to protect genetic integrity and habitat of all stocks and places management emphasis on natural stocks. The policy declares:

- Management of steelhead will be directed towards protection and maintenance of populations and genetic integrity of all identifiable stocks.
- Juvenile steelhead rescued from desiccating streams must be returned to their natal stream. Steelhead rescue will only be allowed when fish can be held until habitat

conditions improve or they can be released immediately in other areas of their natal stream.

- Restoration and acquisition plans will be developed and implemented to safeguard critical habitats such as estuaries, lagoons, and spawning and rearing areas, and to secure necessary instream flows.
- Existing steelhead habitat shall not be diminished further without offsetting mitigation of equal or greater long-term habitat benefits. CDFW will oppose any development or project which will result in irreplaceable losses. Artificial production will not be considered appropriate mitigation for loss of wild fish or their habitat.
- Sport fishing for adult and juvenile steelhead will only be permitted where CDFW has determined that harvest will not harm existing wild populations or impair adequate returns of adults for sport fishing and spawning.
- Resident fish will not be planted in drainages of steelhead waters if CDFW has determined that it will interfere with steelhead populations.

LOCAL

Shasta County General Plan

The Fish and Wildlife Element of the Shasta County General Plan contains objectives and policies that address the need to preserve unique and important aquatic, fish and wildlife habitats, and plant communities for their biological resource and ecological values, as well as for their direct and indirect benefits to the citizens of Shasta County. The policies that are relevant to the proposed Project are presented below.

FW-c: Projects that contain or may impact endangered and/or threatened plant or animal species, as officially designated by the California Fish and Game Commission and/or the U. S. Fish and Wildlife Service, shall be designed or conditioned to avoid any net adverse project impacts on those species.

FW-d: The significant river and creekside corridors of Shasta County shall be designated on the General Plan maps. The primary purpose of this designation is to protect the riparian habitats from development and from adverse impacts from conflicting resources uses. The purpose is also to encourage open space and recreation (policy OSR-e). Mapping of significant waterway corridors in areas designated as resource protection lands is not required since it is assumed that resource land uses will also act to protect such waterway corridors. Riparian habitat protection along the significant river and creekside corridors, as designated on the plan maps shall be achieved, where appropriate, by the following measures:

- regulation of vegetation removal.
- design of grading and road construction to restrict sediment input to all streams.
- establishment of a development set-back.
- the siting of structures, including clustering.
- recreation plans for the Sacramento River, Clear Creek, and other feasible waterway resources.

FW-e: Salmon spawning gravel in the following rivers and creeks shall be protected:

- Sacramento River: Keswick Dam to Shasta-Tehama County line.
- Battle Creek: Mouth to the mouth of South Fork Battle Creek.
- Cow Creek: Mouth to: Powerhouse on South Cow Creek; the mouth of Coal Gulch on Old Cow Creek; the mouth of Dry Clover Creek on Clover Creek; the mouth of Tracy Creek on Oak Run Creek; the mouth of Salt Creek on Little Cow Creek.
- Cottonwood Creek: Mouth to west line of Section 6, T.29N., R.5W., M.D.B.& M.
- Bear Creek: Mouth to the Highway 44 bridge.
- Clear Creek: Mouth to Whiskeytown Dam.
- Churn Creek: Mouth to Redding City limits.
- Stillwater Creek: Mouth to the Highway 299E bridge.
- Olney Creek: Mouth to mouth of Tadpole Creek.
- Anderson Creek: Mouth to Interstate 5.

Regional Conservation Planning

A Habitat Conservation Plan (HCP) is a federal planning document that is prepared pursuant to Section 10 of the Federal Endangered Species Act (FESA). An approved HCP within a defined plan area allows for the incidental take of species and habitat that are otherwise protected under FESA during development activities.

A Natural Community Conservation Plan (NCCP) is a state planning document administered by CDFW. An approved NCCP within a defined plan area allows for the incidental take of species and habitat that are otherwise protected under CESA during growth and development activities.

Shasta County does not have an approved HCP or NCCP that is administered in the region.

3.4.3 IMPACTS AND MITIGATION MEASURES

METHODS

Literature and Database Review

For the purpose of this evaluation, special-status plant species include plants that are (1) listed as threatened or endangered under the California Endangered Species Act (CESA) or the federal Endangered Species Act (ESA); (2) proposed endangered or threatened by the U.S. Fish and Wildlife Service (USFWS); (3) designated as rare by the California Department of Fish and Wildlife (CDFW); (4) state or federal candidate species for listing as threatened or endangered; and/or (5) have a California Rare Plant Rank (CRPR) of 1B, 2, 3, or 4 (California Department of Fish and Wildlife 2012).

Special-status animal species include species that are (1) listed as threatened or endangered under the CESA or ESA; (2) proposed for federal listing as threatened or endangered; (3) state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as Species of Special Concern or California Fully Protected Species.

The most current lists of special-status plant wildlife species were reviewed to confirm the present status of these species (California Department of Fish and Wildlife 2011, 2012).

Special-status species potentially occurring in the Project area were determined through database searches using California Natural Diversity Database (CNDDB), California Wildlife Habitat Relationships System (CWHR) (California Department of Fish and Wildlife 2008), the USFWS database of federally protected species, and the CNPS Electronic Inventory (California Native Plant Society 2012), reconnaissance field surveys of floral and faunal resources, and review of pertinent environmental documents and technical studies.

Using the CNDDB, a "9-quad search" of recorded accounts of special-status species was conducted for the USGS topographic quadrangle in which the Project site is located, and all adjacent USGS quadrangles (California Natural Diversity Database 2014). The CNDDB is a database consisting of historical observations of special-status plant species, wildlife species, and natural plant communities.

Because the CNDDB is limited to reported sightings, it is not a comprehensive list of species that may occur in a particular area. However, it is useful in refining the list of special-status species that have the potential to occur in the Project site.

The CWHR system (version 8.2) was used to aid in determining wildlife species potentially occurring in the vegetation habitats within the Project area. The CWHR is a predictive database based on scientific information concerning wildlife species and their habitat relationships. Fish and invertebrates are not included in the CWHR system. Applications of CWHR include characterization of wildlife vegetation habitats and special habitat elements occurring within a particular area by using the CWHR vegetation habitat classification system. The CWHR model output is a list of wildlife species that potentially occur in the area, based on wildlife habitats, habitat elements, and geographic location. Mayer and Laudenslayer (1988) describe the various wildlife habitats that constitute the CWHR classification system. The goal of the classification system is to identify and classify vegetation types important to wildlife, and to recognize and logically categorize major vegetative complexes at a scale sufficient to predict wildlife-habitat relationships.

Based on the vegetation habitat mapping performed by NSR (described below), annual grassland, barren, blue oak woodland, blue oak-gray pine, fresh emergent wetland, mixed chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, valley oak woodland, and valley-foothill riparian CWHR habitats occur within the Project area. The criteria used for the CWHR query included all species potentially occurring in Shasta County in these habitats. All habitat stages were included, and no habitat elements were excluded for the purposes of the CWHR query.

The USFWS maintains a database that lists federally protected species for each USGS quadrangle in the jurisdiction of the Sacramento USFWS office. The current USFWS list of endangered and threatened species that may occur, or be affected by projects in the *Project City, California,* and *Shasta Dam, California,* 7.5-minute USGS topographic quadrangles and in Shasta County (including the presence/absence of designated critical habitat) were reviewed.

A database search was also performed for the Project site using the CNPS *Electronic Inventory,* which allows users to query the *Inventory of Rare and Endangered Plants of California* (California Native Plant Society 2012) using a set of search criteria (e.g., quad name, habitat type). The criteria used for the CNPS query included all CNPS Rare Plant Rank 1A, 1B, 2, 3, and 4 plants occurring in Shasta County in annual grasslands, chaparral, cismontane woodland, lower montane coniferous forest, marshes and swamps, meadows and seeps, valley and foothill grasslands, riparian woodland, and riparian scrub habitats between elevations of approximately 800 and 2,500 feet.

Biological Surveys

The biological surveys were conducted by North State Resources (NSR). Mr. Len Lindstrand III, NSR Senior Biologist and Terrestrial Biology Program Manager, served as the lead investigator for the biological surveys. Ms. Heather Kelly, NSR staff biologist, provided additional field assistance. The biological surveys were conducted on December 21-22, 2009; January 6, 2010; April 19, 22, 29, 2010; and June 29 2012. Approximately 44 person-hours of field survey time were expended during those dates.

The vegetation habitats on the Project site were classified using the California Wildlife Habitat Relationship system (Mayer and Laudenslayer 1988) (CWHR habitat). CWHR habitats were mapped using 1:2400-scale rectified color aerial photography of the Project site. All vegetation mapping was performed in the field by ground truthing the entire Project site. CWHR habitats were identified and then delineated on aerial photographs. The delineated boundaries were then digitized and generated in ArcGIS software for display and data query purposes.

Protocol-level surveys were conducted for the Shasta salamander during late-winter/early-spring 2010 and spring of 2012, and those results are reported separately. No protocol-level or other focused surveys for special-status wildlife species were conducted as a part of this biological resources assessment. Incidental observations of special-status plant and wildlife species observed during the biological resources surveys were recorded.

Botanical Surveys

The botanical surveys were conducted by North State Resources (NSR) in accordance with the California Department of Fish and Wildlife (CDFW) *Protocols for Surveying and Evaluating Impacts to Special Status Plant Populations and Natural Plant Communities* (California Department of Fish and Wildlife 2009). Mr. Paul Kirk, NSR staff botanist, served as the lead investigator for the botany surveys. Ms. Heather Kelly, NSR staff biologist, provided additional field assistance. The botanical survey was conducted by walking meandering transects that covered all habitat types on the Project site. The survey intensity was increased in microhabitats (e.g., rocky outcrops near ridgelines and riparian corridors) that are known to have a greater potential for the presence of special-status plants. All habitat types were visited twice in order to observe the early- and late-season blooming plants. The botanical surveys were conducted in 2010 on April 19, 22, 23, 28, 29, and June 10, 11, 15, 17, 18, 21, 22, 25, 28, 30. Approximately 98 person-hours of field survey time were expended during those dates. The timing of the botanical surveys coincided with the

blooming period(s) for potentially occurring special status plants on the Project site and provides a comprehensive survey effort for these species.

The botany surveys were conducted using Hickman (1993) as the standard reference for taxonomy and identification; and to confirm designation as a native or non-native species. Additionally, all nonnative plant species were reviewed to determine their status as invasive plants (i.e., noxious weeds) according to the ratings in the *California Invasive Plant Inventory* produced by California Invasive Plant Council (Cal-IPC 2006). Cal-IPC categorizes non-native invasive plants into three categories of overall negative ecological impact in California: High, Moderate, and Limited. The occurrence and distribution of invasive plants found in the Project site with a rating of High is included the Results.

CDFW Field Meeting

Shasta County conducted a field meeting at the Project site with California Department of Fish and Wildlife (CDFW) personnel on December 19, 2013. Those in attendance included: Bill Walker, Senior Planner (Shasta County), Len Lindstrand III, Senior Biologist (North State Resources), Steve McMurtry, Principal Biologist (De Novo Planning Group), Andrew White (Benchmark Resources), John Beck (3M), and several representatives from the CDFW. The purpose of the field meeting was to provide the CDFW personnel with an opportunity to physically inspect and verify the biological conditions present on the Project site. At the field meeting Shasta County requested that the CDFW provide scientific literature and/or adopted CDFW Guidelines related to indirect operational impacts and mitigation measures/strategies associated with dust, noise, vibration, air pollution, lighting, and any other potential indirect impacts that could affect the specific biological resources within the Project site from a mining operation.

Wetland Delineation

North State Resources (NSR) prepared a routine delineation of waters of the United States for the Project site based on field observations of positive indicators for hydrophytic vegetation, hydrology, and soils for wetlands; and on indicators of an ordinary high water mark (OHWM) for other waters of the United States. This methodology is consistent with the approach outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (U.S. Army Corps of Engineers 2008), and Corps regulations. Taxonomic nomenclature for plant species is in accordance with *The Jepson Manual* (Hickman 1993). Wetland indicator status for plant species was confirmed using (Lichvar and Kartesz 2009), and the “50/20 Rule” was applied to determine plant dominance (U.S. Army Corps of Engineers 2008).

A soil pit was dug in each representative wetland feature. Soil pits were dug to a depth sufficient to document the presence or confirm the absence of hydric soil or hydrology indicators. Soils were examined in order to assess field indicators of hydric soils. Positive indicators of hydric soils were observed in the field in accordance with the criteria outlined in *Field Indicators of Hydric Soils in the United States* (Vasilas et al. 2010). Soil colors were determined using a Munsell® soil color chart. The hydric status of each soil map unit occurring in the Project site was reviewed using the *Web*

Soil Survey (Natural Resources Conservation Service 2012a, 2012b). At least one set of data points was selected to best represent the wetland feature type and the adjacent uplands. Data points were also placed in suspect areas to confirm wetland or upland status.

"Other waters" are TNWs and their tributaries. Delineation of "other waters" was based on presence of an OHWM as defined in Corps regulations (33 CFR 328.3 and 33 CFR 328.4) and whether the feature qualified as tributary to waters of the United States. Physical characteristics of an OHWM include, but are not limited to, a natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, presence of litter and debris, leaf litter disturbed or washed away, scour, deposition, presence of bed and bank, and water staining. At least one set of paired data points was then selected to best represent the "other waters" and adjacent upland conditions for each "other waters" type.

Sixty-eight data points representing each feature type, the associated upland, and suspect areas were characterized and documented throughout the Project site. Field observations were conducted June 15 through July 20, 2010 and June 29, 2012. The full delineation including routine wetland determination data forms, representative photographs of features delineated, and data point locations are presented in the Appendix.

The boundaries of delineated features and data points were mapped using a Trimble Pathfinder Pro XH Global Positioning System (GPS) capable of sub-foot accuracy. Where the use of the GPS was not practicable, the features were delineated by hand onto ortho-rectified color aerial photographs.

Fish Use and Channel Adjustment Surveys

Stillwater Sciences conducted a reconnaissance-level field investigation of the reaches of Moody, Rancheria, and Salt creeks on April 5, 2012 to identify potential fish use and potential for channel adjustment from changes in runoff. Stillwater Sciences personnel were accompanied by Frank Borden (Shasta Land Management Consultants) and Andrew White (Benchmark Resources). A second survey of potential fish use was conducted on May 17, 2012.

Surveys of potential fish use were conducted using streambank observation to eliminate potential impacts to individual fish that could occur by using more intensive survey methods such as electrofishing, beach seining, or dipnetting. The size and headwater nature of the creeks are potentially more suitable for steelhead and rainbow trout use than Chinook salmon. Spring surveys are therefore more likely to identify potential steelhead and rainbow trout redds, swim-up fry emergence, and fry occupancy should these fish occur within channel reaches on the Project site. A second survey was conducted to assess fish occurrence in a few pools potentially deep enough to support fish during low to intermittent stream flows. Additional surveys of potential fish use during summer months were limited by lack of perennial streamflow.

The potential for flow-related impacts to alter channel conditions was assessed during the April field visit, when surface runoff and baseflow allowed for qualitative observation of both channel hydraulics and fluvial geomorphology. The proposed Moody Creek diversion alignment was traversed, and observations were made regarding the potential impacts of realignment and

associated changes in surface water hydrology in the affected reaches of Lower Moody Creek and Rancheria Creek. Reaches of Upper Moody Creek, Lower Moody Creek, Rancheria Creek, and Salt Creek within and immediately downstream of the Project site were walked from upstream to downstream, except where dense vegetation prohibited access. Qualitative observations of channel conditions included the following (see Appendix H for additional information):

- channel morphology (e.g., gradient, planform, bankfull width and depth, sediment storage),
- bed surface texture,
- channel hydraulics (e.g., flow depths and velocities),
- base-level controls influencing potential channel adjustment (e.g., bedrock, boulders, large wood, engineered structures), and
- bank stability (e.g., bank height, bank materials, vegetation reinforcement, existing bank erosion).

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project would have a significant impact on biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community, including oak woodland, identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service;
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

IMPACTS AND MITIGATION

Impact 3.4-1: The proposed Project has the potential to impact special-status invertebrate species (Less than Significant with Mitigation)

Special-status invertebrates that are known in the region include: the Vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), California linderiella (*Linderiella occidentalis*), and valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). The vernal pool fairy and vernal pool tadpole shrimp, listed as federal threatened and endangered respectively, and the California linderiella, listed as a California Species of Special Concern, are all dependent on vernal pools and swale areas within grasslands. The valley elderberry longhorn beetle is a federal threatened insect that is only associated with blue elderberry plants, oftentimes in riparian areas and sometimes on land in the vicinity of riparian areas.

Vernal Pool Crustaceans: Vernal pool crustaceans, including vernal pool fairy shrimp, vernal pool tadpole shrimp, and California linderiella are found in ephemeral freshwater habitats, and their life cycles have adapted to the unique habitat conditions of vernal pools. Following the winter rains vernal pool become inundated, and in conjunction with the appropriate environmental cues (temperature, total dissolved solids, alkalinity, pH, etc.), the hatching of vernal pool crustacean eggs is initiated. Vernal pool crustaceans then mature rapidly into adults.

A wetland delineation was performed from June 15 through July 20, 2010 by North State Resources determine the presence of hydrological water features. Based on the field observations and associated mapping, the wetland delineation identified 10 types of hydrologic features within the site occupying approximately 14.1036 acres.

Approximately 8.0095 acres of hydrologic features are located within the Project's limits of surface disturbance, including 2.1814 acres of wetlands and 5.8281 acres of "other waters" (ephemeral and intermittent streams). The "other waters" are not appropriate habitat for vernal pool crustaceans. The 2.1814 acres of wetlands is composed of 0.05 acres of fresh emergent wetland, 0.0007 acres of intermittent pool, 1.5584 acres of intermittent swale, 0.4920 acres of riparian wetland, and 0.0803 acres of seep spring. These wetland classifications are within the appropriate classifications for vernal pool crustaceans. While the *Moody Flats Quarry Project Biological Assessment* (North State Resources 2012) cites that there is a low potential for occurrence of vernal pool crustaceans on the project site due to the small size of the individual wetlands combined with the fact that the closest occurrence of vernal pool crustaceans is approximately 10 miles away, protocol-level surveys were not conducted in the preparation of the Biological Assessment. In addition, the intermittent pool and swale features are located in an area of the site near the proposed access road. The intermittent swale areas are included within the limits of surface disturbance but are unlikely to be disturbed as result of access road construction. Though unlikely, potential fill of these features may occur if the access road is realigned; therefore, this impact is considered **potentially significant**. In accordance with USFWS policy, given the presence

of 2.1814 acres of wetland habitat proposed for disturbance (potential habitat) and the absence of protocol surveys, these species are presumed present on the project site.

Direct Effects: The proposed Project would result in the direct loss of 2.1814 acres of federally listed crustacean habitat, and the death of an unknown number of vernal pool fairy shrimp and vernal pool tadpole shrimp through the direct filling of wetlands within the project site. The California linderiella is listed as a California Species of Special Concern, and the proposed project will result in a direct loss of habitat and death of an unknown number of this species.

Indirect Effects: The proposed Project would result in indirect effects to all vernal pool tadpole shrimp, vernal pool fairy shrimp, and California linderiella, in the form of death, injury, and harm, found in wetlands that are supported by associated upland areas and swales, and all habitat otherwise damaged by loss of watershed, human intrusion, introduced species, and pollution that will be caused by the proposed Project. The proposed Project has the potential to result in indirect effects to 4.1082 acres of federally-listed crustacean habitat.

Conclusion: Authorization for the incidental take of vernal pool tadpole shrimp or vernal pool fairy shrimp is required under federal law. Prior to any vegetation removal and ground disturbing construction activities that would result in disturbance to these habitat, the Project applicant would be required to subject submit an application for a Section 7 Consultation to the USFWS in coordination with the USACE 404 permit. The USFWS will review the status of the vernal pool tadpole shrimp and vernal pool fairy shrimp, the environmental baseline, the effects of the proposed Project and the cumulative effects and provide their biological opinion related to the proposed Project's potential to jeopardize these two listed species. The Project site is not located within proposed or designated critical habitat for the vernal pool fairy shrimp or the vernal pool tadpole shrimp, and, therefore, the proposed Project is not anticipated to jeopardize the long-term viability or cumulative species survivorship of these two listed species.

The incidental take of vernal pool fairy shrimp and vernal pool tadpole shrimp is difficult to detect or quantify due to the cryptic nature of these species and their relatively small body size. Due to the difficulty in quantifying the number of individuals that will be taken as a result of the proposed Project, the USFWS will typically quantify take incidental to the proposed Project as the number of acres of habitat that will become unsuitable for vernal pool crustaceans due to the proposed Project. For purposes of this analysis, it is estimated that 2.1814 acres of vernal pool fairy shrimp and vernal pool tadpole shrimp will be harassed, harmed, injured, or killed, as a result of the proposed project.

While the California linderiella is not federal or state listed and not addressed within a regulatory permit, these special status species occupy the same habitat as is mentioned for the federally listed vernal pool tadpole shrimp and vernal pool fairy shrimp and will have similar impacts. Similar to the above impact discussion, it is estimated that all California linderiella inhabiting 2.1814 acres of wetland habitat will be affected as a result of the proposed Project.

Implementation of the following mitigation measures will ensure that the potential impacts to vernal pool tadpole shrimp, vernal pool fairy shrimp, and California linderiella are reduced to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.4-1(a)*: The Project applicant shall maintain a 250-foot buffer around all mapped intermittent pool and swale features within the Project's limits of surface disturbance. If a 250-foot buffer can be maintained and fill of these features can be avoided throughout the life of the Project, then no further mitigation is required. If surface disturbance within 250 feet of the intermittent swale and pool features cannot be avoided, the Project applicant shall hire a qualified biologist to conduct presence/absence surveys in potential habitat according to the most current protocol published by the USFWS prior to any surface disturbing activities. If required surveys are negative no further mitigation for these species is required. If vernal pool tadpole or vernal pool fairy shrimp are identified during surveys the Project applicant shall obtain authorization for the incidental take of the vernal pool crustaceans (Section 7 consultation) from the USFWS in coordination with the USACE 404 permit. At a minimum, the Project applicant shall provide compensatory mitigation at a ratio of no less than 1:1, or as determined by the USFWS. Compensatory mitigation may include on-site mitigation, off-site mitigation, and/or purchase of mitigation credits from an approved mitigation bank. Compensatory mitigation is subject to the review and approval of the USFWS. If the USFWS issues an authorization of the take of vernal pool crustaceans, the Project applicant shall be subject to all the term and conditions, and conservation measures imposed by the USFWS in association with the permit.*

Valley Elderberry Longhorn Beetle: The valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is a federally threatened insect that the USFWS has placed on a list of species that should be considered for delisting, but remains listed at the time of publication of this EIR. This species is dependent upon the blue elderberry (*Sambucus mexicana*) as a primary host species. Elderberry shrubs are a common component of riparian areas throughout the Sacramento Valley region.

Biological surveys were conducted by North State Resources on December 21-22, 2009, January, 6, 2010, April 19, 22, 29 2010, and June 29, 2012. During these surveys one elderberry shrub was observed within the Project site, but outside the limits of surface disturbance. In addition, the shrub identified did not show any evidence of VELB (i.e. boring holes).

Elderberry shrubs are primarily associated with Valley foothill riparian habitat that occurs along streams within the Project site. Due to the dense vegetation and understory that surrounds many of the streams within the Project site, access is limited and it is possible that transect surveys may have missed additional elderberry shrubs. While presence of VELB is considered unlikely due to the limited amount of valley foothill riparian habitat on the Project site (approximately 4 acres) and the distance to the closest known occurrence of this species (more than 10 miles), vegetation and tree removal activities could result in removal of elderberry shrubs with sufficient stem size to support VELB. This is considered a **potentially significant** impact.

Mitigation measures presented below would require the Project applicant, if VELB is still federally listed under the Endangered Species Act at the time of vegetation removal and ground disturbance, to retain a biologist to perform preconstruction surveys before removing vegetation and trees related to mapped Valley foothill riparian habitat. A 100-foot setback would be established from all identified elderberry shrubs with one or more stems of 1-inch diameter at ground level growing on or adjacent to the property. If take of VELB cannot be avoided, the Project applicant shall consult with USFWS and obtain an incidental take permit before the removal of VELB habitat is authorized. Implementation of the following mitigation measure would ensure that the potential impact to VELB is reduced to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.4-1(b)*: If VELB is listed under the federal Endangered Species Act at the time vegetation removal and ground disturbance to occupied habitat, the following mitigation measures shall be implemented. A maximum of 30 days before removing on-site trees and vegetation related to Valley foothill riparian and other potential habitat, the Project applicant shall retain a qualified biologist to perform preconstruction surveys. A copy of each final preconstruction survey shall be submitted to the County by the Project applicant. If blue elderberry shrubs are found with exit holes indicating occupation by VELB, Project ground-disturbing activities shall be set back a minimum of 100 feet from all occupied elderberry shrubs. If the Project requires removal of potentially occupied blue elderberry (Sambucus mexicana) shrubs, the Project applicant shall retain a qualified biologist to perform determinate elderberry surveys in accordance with the Conservation Guidelines for the Valley elderberry longhorn beetle (USFWS 1999). A copy of each final determinate survey shall be submitted to the County by the Project applicant. The surveys shall document each shrub including the shrub height, number of stems by diameter class, maximum diameter at ground level, presence of exit holes, and presence of riparian habitat. Any blue elderberry (Sambucus mexicana) shrubs to be removed must be transplanted in accordance with the Conservation Guidelines for the Valley elderberry longhorn beetle (USFWS 1999). In addition to these transplanting requirements, the Project applicant shall plant seedlings and cuttings in accordance with the Conservation Guidelines for the Valley elderberry longhorn beetle (USFWS 1999) as presented in Table 3.4-6 below. The planting requirements serve as compensatory mitigation and may be provided on-site, off-site, and/or provided by the purchase of mitigation credits through an authorized mitigation bank. If take of VELB cannot be avoided, the Project applicant shall obtain authorization for the incidental take of VELB (Section 7 Consultation) from the USFWS in coordination with the USACE 404 permit before any take of Valley elderberry longhorn beetle occurs. The Project applicant shall submit a copy of any incidental take permit to the County.*

TABLE 3.4-6: COMPENSATORY MITIGATION RATIOS FOR VELB HABITAT

Location	Stems (maximum diameter at ground level)	Exit Holes on Shrub Y/N (quantify)[1]	Elderberry Seedling Ratio[2]	Associated Native Plant Ratio[3]
non-riparian	stems > = 1 & = < 3" "	No:	1:1	1:1
		Yes:	2:1	2:1
non-riparian	stems > 3 & < 5" "	No:	2:1	1:1
		Yes:	4:1	2:1
non-riparian	stems >= 5 "	No:	3:1	1:1
		Yes:	6:1	2:1
riparian	stems > = 1 & = < 3" "	No:	2:1	1:1
		Yes:	4:1	2:1
riparian	stems > 3 & < 5" "	No:	3:1	1:1
		Yes:	6:1	2:1
riparian	stems > = 5 "	No:	4:1	1:1
		Yes:	8:1	2:1

Source: Table 1 from Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS 1999)

[1] All stems measuring one inch or greater in diameter at ground level on a single shrub are considered occupied when exit holes are present anywhere on the shrub.
[2] Ratios in the Elderberry Seedling Ratio column correspond to the number of cuttings or seedlings to be planted per elderberry stem (one inch or greater in diameter at ground level) affected by a project.
[3] Ratios in the Associated Native Plant Ratio column correspond to the number of associated native species to be planted per elderberry (seedling or cutting) planted.

Impact 3.4-2: The proposed Project has the potential to impact special-status reptile and amphibian species (Less than Significant with Mitigation)

Special-status reptiles and amphibians that potentially occur within the Project site include: northwestern pond turtle (*Actinemys marmorata*), Shasta salamander (*Hydromantes shastae*), California red-legged frog (*Rana draytonii*), and foothill yellow-legged frog (*Rana boylii*). The northwestern pond turtle, California red-legged frog, and foothill yellow-legged frog each require aquatic habitat. The Shasta salamander can be found in moist limestone fissures and caves, in volcanic and other rock outcroppings, and under woody debris in mixed pine-hardwood stands.

Northwestern Pond Turtle: The northwestern pond turtle (*Emys marmorata*) is a California species of special concern and is California's only native freshwater turtle. Its favored habitats include streams, large rivers and canals with slow-moving water, aquatic vegetation, and open basking sites. Although the turtles must live near water, they can tolerate drought by burrowing into the muddy beds of dried drainages. This species feeds mainly on invertebrates such as insects and worms, but will also consume small fish, frogs, mammals and some plants. Western pond turtle predators include raccoons, coyotes, raptors, weasels, large fish, and bullfrogs. This species breeds from mid to late spring and nest in adjacent open grasslands or sandy banks.

During an April 5th, 2012 field surveys by Stillwater Sciences, a pair of northwestern pond turtles were identified in one of the branches of Moody Creek. As such, northwestern pond turtles are

presumed present in Moody, Rancheria, Churn, and Salt Creeks and adjacent habitat on the Project site.

The proposed Project would require direct impacts to approximately 8.01 acres of waters of the United States located within the Project's limits of surface disturbance. This includes 2.18 acres of wetlands and 5.83 acres of ephemeral and intermittent streams. The largest impact to waters of the United States would result from diversion of Moody Creek, resulting in approximately 5.58 acres of intermittent stream diversion. The remaining wetland and ephemeral and intermittent stream impacts would result from development of the secondary and ancillary processing and load-out area and mining area. The Project's impacts to Moody, Rancheria, Churn, and Salt Creeks and adjacent habitat would have the potential to result in direct and indirect impacts to northwestern pond turtle. This is a **potentially significant** impact.

Mitigation measures presented below will require preconstruction surveys 500 feet upstream and downstream from all areas proposed for disturbance no earlier than two days before surface disturbance activities begin. If northwestern pond turtles are located during the survey, the qualified biologist shall capture and relocate the individuals to the nearest suitable habitat upstream or downstream of the areas proposed for disturbance. Additionally, the Project applicant shall be responsible for the installation of barrier fencing along each side of the work area to prevent individual turtles from entering the work area.

Mitigation measures presented below also require the implementation of measures to avoid entrapment of northwestern pond turtle. Avoidance measures include covering all open trenches at the end of each workday and fully surrounded by silt fences or equipped with earthen escape ramps. Trenches shall be inspected daily before construction to ensure that no turtles are trapped and that fences or ramps are intact and working properly.

Mitigation measures are also presented in this EIR that are intended to ensure that the impacts to water quality from the proposed Project are minimized through the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) with Best Management Practices (BMPs). The Project applicant would be required to file a Notice of Intent with the Regional Water Quality Control Board (RWQCB) and obtain a General Construction Permit in compliance with the National Pollution Discharge Elimination System (NPDES) prior to the commencement of vegetation removal and ground disturbance. The RWQCB will review the SWPPP and recommend and/or comment on the BMPs. The Project applicant would be required to install construction fencing along environmentally sensitive areas in the vicinity to ensure that vegetation removal and ground disturbance activities do not unintentionally disturb areas outside the Project site. The Project applicant would also be required to prepare a Water Quality Management Plan for use during the long-term operation of the proposed Project. This plan would require a system design that treats storm water to federal and state standards and to ensure that storm water is treated prior to entering a downstream protected wetland or jurisdictional water.

Implementation of the following mitigation measures would ensure that potentially significant impacts to northwestern pond turtle are reduced to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.4-2(a)*: No earlier than two days prior to the commencement of vegetation removal and ground disturbance within 500 feet of* Moody, Rancheria, Churn, and Salt Creeks*, the Project applicant shall retain a qualified biologist(s) to conduct pre-construction surveys in potential habitat for northwestern pond turtle, including nesting areas. The survey area will include 500 feet upstream and downstream in all potential habitat proposed for disturbance. If individual northwestern pond turtles are located during the survey, the qualified biologist shall capture and relocate the individuals to the nearest suitable habitat upstream or downstream of the areas proposed for disturbance. If the capture and relocation efforts extend beyond two days, vegetation removal and ground disturbance shall be delayed until all capture and relocation efforts are completed. If northwestern pond turtle nest areas are located during the survey, the Project applicant shall avoid direct disturbance to the nests. The Project applicant shall be responsible for the installation of barrier fencing along each side of the work area to prevent individual turtles from entering the work area. The Project applicant shall retain a qualified biologist to inspect the barrier fencing prior to commencing vegetation removal and ground disturbance to ensure that the barrier fencing is appropriately installed, in good repair, and functions as a barrier to northwestern pond turtle. The qualified biologist shall monitor the initial vegetation removal and ground disturbance activities that take place within 165 feet (50 m) of areas where a northwestern pond turtle has been found, and/or within 330 feet (100 m) of a confirmed breeding nest. Additionally, the qualified biologist shall inspect the barrier fencing on a monthly basis throughout the construction and/or ground-disturbing phase to ensure that it is appropriate installed, in good repair, and is still functioning as a barrier to northwestern pond turtle. All inspections and monitoring shall be documented by the qualified biologist and provided to Shasta County.*

Mitigation Measure 3.4-2(b)*: During vegetation removal and ground disturbance within 500 feet of* Moody, Rancheria, Churn, and Salt Creeks*, the Project applicant shall implement measures to avoid entrapment of northwestern pond turtle as a secondary backup measure in the event that barrier fencing does not prevent entry into the disturbance area. Such measures shall include covering all open trenches at the end of each workday, installing barrier fencing around open trenches, and/or equipping open trenches with earthen escape ramps. All construction personnel shall be educated to identify northwestern pond turtles if encountered and to be aware of possible turtle presence on construction sites, including entrapments in trenches. Trenches shall be inspected twice daily (before and after daily construction activities) by construction personnel to ensure that no animals are trapped and that fences or ramps are intact and working properly. If individual northwestern pond turtles are trapped during construction activities, a qualified biologist shall capture and relocate the individuals to the nearest suitable habitat upstream or downstream of the areas proposed for disturbance. If the capture and relocation efforts extend beyond two days, vegetation removal and ground disturbance shall be delayed until all capture and relocation efforts are completed.*

Shasta salamander: The Shasta salamander (*Hydromantes shastae*) is state listed as a threatened species. This salamander is primarily associated with limestone caves and outcrops, although it has also recently been observed in other habitats under rocks and forest litter over 10 miles from

limestone formations. The Shasta salamander range is known only in Shasta County and is primarily active at night during the wet winter and spring months. The closest known location for Shasta salamander listed in the California Natural Diversity Database (CNDDB) is approximately three miles east of the Project site.

Protocol-level surveys were conducted on-site in accordance with guidelines described in Survey Protocol for the Shasta Salamander (Version 3.0, Olson and Lewendal 1999) in March and April 2010 and March 2012. One salamander was found on-site during the March 2012 survey. No further surveys have been conducted because presence is assumed within the Project site.

Approximately 131 acres of Shasta salamander habitat has been identified onsite and approximately 97 acres within the Project's limits of surface disturbance (see **Appendix K**, Figures 2 and 3). The Project's removal of 97 acres of Shasta salamander habitat would be a **potentially significant** impact. The implementation of Mitigation Measure 3.4-2(c) would reduce this impact to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.4-2(c)*: Prior to vegetation removal and ground disturbance of potential Shasta Salamander habitat, the Project applicant shall obtain authorization for the incidental take of the Shasta salamander (Section 2081) from the CDFW. At a minimum, the Project applicant shall provide compensatory mitigation at a ratio of no less than 1:1 (approximately 97 acres). All compensatory mitigation shall require conservation easements or similar permanent protection mechanism to be placed over the compensatory habitat land to ensure the protection in perpetuity. The compensatory mitigation must be approved by the CDFW prior to its establishment. The compensatory mitigation must be appropriate Shasta salamander habitat, and be prioritized as follows: (1) on-site, (2) within Shasta County, and (3) within the known range of the Shasta salamander. Compensatory mitigation shall be of similar quality as identified on-site. Actual sites shall be coordinated with, and approved by, the CDFW prior to vegetation removal and ground disturbance of Shasta salamander habitat. The establishment of compensatory habitat may be phased based on occurrence of disturbance to identified onsite habitat.*

California red-legged frog and Foothill yellow-legged frog: The California red-legged frog (CRLF) is listed as threatened under the federal Endangered Species Act. The CRLF is a large frog with prominent dorsolateral folds, pointed nose and can vary in pattern and coloration. They occur predominantly along California coastal drainages and in isolated populations in the northern Sierra Nevada mountain range. Suitable habitat for the CRLF include springs, semi-permanent to permanent ponds, ponded and back water portions of streams, marshes, lagoons and artificial impoundments such as stock ponds or irrigation ponds. Ideal aquatic habitat has varying levels of water depth, a mixture of herbaceous, hydrophytic vegetation for cover, egg laying, and foraging, and sloping shorelines with little to no vegetation for basking and larvae development. There are three habitat types that are used by CRLFs; breeding habitat, dispersal upland/riparian habitat, and summer habitat. It is thought in order to maintain pond breeding amphibians all three habitat components must be maintained.

The foothill yellow-legged frog (*Rana boylii*) (FYLF) is listed as a species of special concern in California. It is a gray to olive colored frog with occasional mottling or spots, and lacks a dorsolateral fold common in California red-legged frogs (CRLF) or eye stripe common in Northern Pacific tree frogs. The FYLF range includes the coast ranges of Oregon, south to Los Angeles County, in northern California west of the Cascade crest, and along the west side of the Sierra Nevada range as far south as Kern County. The majority of FYLF occurrences include a running perennial water source such as rocky rivers and steep rocky tributaries. They have occasionally also been found in ephemeral streams, intermittent streams and perennial ponds, but it's unclear whether those occurrences represent sustaining populations.

Biological surveys were conducted by North State Resources on December 21-22, 2009, January, 6, 2010, April 19, 22, 29 2010, and June 29, 2012. Stillwater Sciences performed a field investigation of the Project-affected reaches of Moody, Rancheria, and Salt creeks on April 5, 2012 and on May 17, 2012. While the aquatic environments on the Project site present marginal habitat for CRLF and FYLF, these species were not observed during the extensive surveys performed on the Project site. Given the lack of observations during biological surveys, lack of a nearby suitable permanent water source, and the distance (beyond 10 miles) from the closest CNDDB occurrence, there is a low potential for CRLF and/or FYLF to occur within the Project site. Implementation of the proposed Project is not expected to have a direct or indirect effect on to CRLF or FYLF. As such, implementation of the proposed Project would have a **less than significant** impact on these species.

Impact 3.4-3: The proposed Project has the potential to impact special-status fish species or interfere substantially with the movement of any native resident (Less than Significant with Mitigation)

Special-status fish that occur within the region include: the Chinook salmon and steelhead, which are found in the rivers, streams, and tributaries of the Sacramento River Basin. There are three species of Chinook salmon in the region: the Central Valley spring-run ESU Chinook salmon (*Oncorhynchus tshawytscha*), which is federally and state threatened; the Sacramento River winter-run ESU Chinook salmon (*Oncorhynchus tshawytscha*), which is federally and state endangered; and the Central Valley fall/late fall-run ESU Chinook salmon (*Oncorhynchus tshawytscha*), which is a California Species of Special Concern. The Central Valley steelhead Distinct Population Segment (DPS) (*Oncorhynchus mykiss irideus*) is federally threatened.

Stillwater Sciences conducted a reconnaissance-level field investigation of the Project-affected reaches of Moody, Rancheria, and Salt creeks on 5 April 2012 to assess potential for channel adjustment from Project-related changes in runoff and on 5 April 2012 and 17 May 2012 to identify potential fish use. Stillwater Sciences considered the conditions excellent for observing hydraulics, channel condition, aquatic habitat, and fish presence during the field assessments. Assessment of the potential for channel adjustment included identification of channel morphology, bed surface texture, channel hydraulics, base level, and bank stability. Assessment of fish use included streambank observations during early spring and early summer baseflows, baiting

of numerous isolated pools, and identification of potential migration barriers along the railroad right of way and elsewhere on the property.

Based on Stillwater Sciences' (2012) observations made during the field investigation, the stream channels within the Project area do not support native or non-native fish. Stillwater Sciences concluded that the channels are inhabited, however, by amphibians and reptiles, as evidenced by observations of Pacific tree frogs and northwestern pond turtles in Upper Moody Creek.

CDFW personnel present at the Field Meeting on December 19, 2013 did not concur with the observations and conclusions from the Stillwater Sciences (2012) study. Specifically, CDFW personnel believe the stream channels within the Project area could support native or non-native fish as there is no evidence that fish barriers are present either on or offsite. The CDFW personnel indicated that debris lines and high water marks clearly show access to the upper reaches of the creek as being available to fish during certain high flow events, unless it can be confirmed that fish barriers exist downstream. It is not possible at this time to determine if fish barriers are present downstream due to access constraints on private property; therefore, presence of anadromous fish will be assumed in Moody Creek.

Direct Impacts: The proposed Project would result in the removal of approximately 5.5753 acres of Upper Moody Creek. The stream diversion activities are anticipated to involve the construction of an alternate channel or bypass that would be functionally equivalent to the existing Moody Creek stream channel. This alternate channel would receive and discharge the same waters that flow through the existing Moody Creek stream channel, but along a different stream alignment. The construction of the diversion stream would be constructed in the dry season with low or no flows in the intermittent stream. The ultimate connection of the diversion stream would be strategically timed at a period of low or no flow. Instream construction activities would be required at the upstream receiving connection point and downstream discharge connection point. Activities at these two connection points would require some degree of vegetation removal, ground clearing, channel and bank excavation, placement of gravels and instream habitat structures, backfilling, compaction, grading. These activities could result in the following potentially significant impacts to anadromous fish and other fisheries resources:

Direct injury or mortality resulting from equipment use and dewatering activities. During instream construction activities, anadromous fish species may be crushed by earth moving equipment, construction debris, and worker foot traffic. It is therefore necessary to isolate the work area from actively flowing water through the use of coffer dams and dewatering pumps if the intermittent stream has active flows. However, dewatering activities can lead to fish becoming concentrated or stranded in residual wetted areas. Thus, if anadromous fish and other fisheries resources are known to or assumed to occur at these construction points, capture and relocation procedures need to be implemented prior to construction. Capture and relocation efforts, in turn, may also result in injury or mortality to fish if not conducted by a qualified biologist according to established guidelines.

Temporary loss, alteration, or reduction of habitat. In-channel construction activities at the receiving and discharge connection points, the use of construction equipment in stream channels,

workspace dewatering, and clearing of riparian vegetation for work site access may result in temporary impacts to the habitat of anadromous fish and other fisheries resources. Potential adverse impacts that may occur include alterations of the stream substrate composition and channel integrity. Riparian vegetation is an important component of anadromous fish and other fisheries resources habitat, providing channel shading, bank stability and complexity, instream cover in the form of large woody debris (LWD), and an important source of organic matter and food. The temporary loss of riparian vegetation may result in increased soil erosion, elevated water temperatures, and loss of fisheries habitat complexity.

Short-term increases in sedimentation and turbidity. Increased sedimentation rates could result if fine sediment is discharged to streams or mobilized within channels during construction activities. Increased sedimentation may adversely affect water quality and channel substrate composition. Specific rates of sedimentation are dependent upon the duration, volume, and frequency at which sediments are contributed to the surface water flow. Substantial sedimentation rates may smother fish eggs and fish food (i.e., benthic invertebrates), degrade spawning habitat, and fill pools. Furthermore, suspended sediments increase the turbidity of the water. High rates of turbidity can result in direct mortality or deleterious sublethal effects (e.g., gill abrasion, decreased visibility during foraging) to fish.

Accidental spills and use of hazardous materials. Equipment refueling, fluid leakage, and maintenance activities within or near-stream channels pose a risk of accidental water contamination that may result in injury or death to anadromous and other fish species. Many commonly used hydraulic fluids contain organophosphate ester additives that are toxic to anadromous and other fish species. Acute lethal and sublethal effects have been documented in anadromous fish in particular (as opposed to warm water species). Leaks or spills of petroleum hydrocarbon products found in construction equipment have similar adverse effects on fish. Furthermore, when surface water comes into contact with uncured concrete, either through accidental spills of concrete or through storm drainage contact with recently-poured structures, alkaline substances in the concrete may leach into the water, resulting in decreases in the natural hydrogen ion concentration (pH). Rapid changes in the pH of the stream water can have adverse effects on fish, particularly if the hydrogen ion concentration is reduced such that the pH reading increases to high levels (i.e. above nine). The stream diversion activities are not anticipated to require concrete; however, some concrete will be used on the Project site in the development of certain structures. The Project must have a designated equipment refueling and storage area that would capture accidental spills if they occur to prevent them from leaching into the groundwater or draining into streams.

Since presence of special status anadromous fish species is assumed, disturbance and associated equipment operation within Upper Moody Creek during spring and fall runs could result in a **potentially significant** impact. The implementation of Mitigation Measure 3.4-3(a), prohibits construction of the Upper Moody Creek diversion during these times of year and would reduce this impact to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.4-3(a)*: The Project applicant shall limit the season for instream construction activities in Upper Moody Creek to a period with low or no flows (generally July 1 through October 15). This shall specifically apply to instream activities that would connect the diversion channel at the upstream diversion receiving point and downstream discharge point.*

Mitigation Measure 3.4-3(b)*: If the Project applicant cannot avoid disturbance of instream construction activities in Upper Moody Creek consistent with Mitigation Measure 3.4-3(a), the Project applicant shall obtain authorization for the incidental take of the anadromous fish resources, including steelhead and Chinook salmon (Section 2081 from the CDFW and Section 7 consultation from the USFWS in coordination with the USACE 404 permit) prior to any instream construction activities in Upper Moody Creek. If access to downstream reaches of the creek become accessible and it can be verified that fish barriers exist, preventing upstream movement of anadromous fish into the Project site, then authorizations for the incidental take of anadromous fish will not be warranted. Any such evidence of downstream fish barriers shall be made available for inspection by the USFWS and/or CDFW and County personnel for verification.*

Indirect Impacts: While special status fish are not present on the Project site, special status fish, including Chinook salmon and steelhead, are known to occur in downstream waterways within the region. Construction and operational activities have the potential to affect these special status fish through stormwater quality impacts and discharge impacts on waterways located on the Project site.

The Upper Moody Creek channel is bedrock-controlled near the proposed diversion point and has little potential for channel adjustment. Downstream of the diversion point, where the Upper Moody Creek channel would be filled for development of the secondary and ancillary processing and load-out facility, there would be no potential for significant effects resulting from changes in stormwater runoff from the proposed Project because this portion of the creek will be filled and no longer able to receive stormwater flows. At the downstream end of Moody Flats, Upper Moody Creek has a relatively high potential to incise and/or shift laterally if development of the secondary and ancillary processing and load-out facility were to accelerate peak runoff to the reach.

Peak flows through the Moody Flats reach of Lower Moody Creek would increase over existing conditions due to diversion of surface runoff from Upper Moody Creek and Salt Creek. The Lower Moody Creek channel through Moody Flats is formed in unconsolidated alluvium and colluvium with long continuous lengths of channel bank lacking reinforcement by roots of woody riparian vegetation. This reach has a relatively high potential of incising or adjusting laterally by bank erosion in response to increased peak flows during storm runoff. The *Stormwater, Erosion Control, and Drainage Plan* (EMKO, 2010) does not provide information describing proposed changes to the existing channel over this reach, and it is unclear if and how the Lower Moody Creek channel through Moody Flats would be modified (e.g., by rip rap armoring, structural grade control, and/or engineered surface or subsurface channelization) to limit channel adjustment. The concrete box culvert through the Union Pacific Railroad would prohibit downstream propagation of any channel adjustments initiated in upstream reaches of Lower Moody Creek; thus, increased runoff would be

unlikely to result in channel adjustment in the bedrock-controlled reach downstream of the Union Pacific Railroad.

The *Stormwater, Erosion Control, and Drainage Plan* (EMKO 2010) and *Addendum to the Stormwater, Erosion Control and Drainage Plan* (EMKO 2012) describe the approach for collection and management of sheetflow runoff from disturbed areas of the site. Stormwater or creek flows would not be diverted from any channels currently draining to Moody Flats. A detailed summary of the stormwater management approach and the stormwater modeling conducted for the Project are presented in the analysis of Impact 3.9-1 in Section 3.9.3 of this EIR. All runoff from disturbed areas of the site would be collected through a series of sumps, retention basins, settling ponds, and a vegetated sheet drain. Overall, the stormwater management system would reduce the peak flood flows from the site to flow rates that are less than current stormwater flood flows leaving the site. The settling ponds provide twice the retention time recommended by the SWRCB to allow sediment particles to settle out of the stormwater, and the vegetated sheet drain provides an additional measure to remove sediment before the stormwater enters Moody Creek downstream of the Project disturbance area.

The stormwater management system has been designed to prevent any uncontrolled runoff from leaving the Project site during construction or operation, thus preventing any pollutants from entering waterways leading to downstream spawning grounds for Chinook salmon and steelhead. This would prevent effects on water chemistry, nutrient loads, temperatures, and critical food sources. Although the stormwater management system has been designed to prevent pollutants from entering into waterways, there exists the potential for pollutants to enter into waterways if the full range of water quality control measures were not properly implemented. This is a **potentially significant** indirect impact. Mitigation measures have been included in section 3.9, Hydrology, which would reduce this impact to a **less than significant** level.

MITIGATION MEASURES

*See **Mitigation Measures 3.9-1(a) through 3.9-1(c)** requiring finalization and approval of an engineered stormwater, erosion control and drainage plan, compliance with Regional Water Quality Control Board regulations, and preparation and approval of a Stormwater Pollution and Prevention Plan (SWPPP).*

Migratory Impacts: Anadromous fish species, including Chinook salmon and steelhead trout, are present in the Sacramento River Basin. The Sacramento River system has historically supported steelhead trout and four distinct spawning runs of Chinook salmon, including populations that are supported by hatcheries. As discussed above, Stillwater Sciences conducted a reconnaissance-level field investigation of the Project-affected reaches of Moody, Rancheria, and Salt creeks to assess potential for channel adjustment from Project-related changes in runoff and to identify potential fish use. Based on Stillwater Sciences' (2012) observations made during the field investigation, the stream channels within the Project area do not support native or non-native fish. CDFW personnel present at the Field Meeting on December 19, 2013 did not concur with the observations and conclusions from the Stillwater Sciences (2012) study. CDFW personnel specifically did not concur that fish barriers were present on the Project site, although they could not deny or confirm

whether fish barriers are present downstream on adjacent private properties that were not accessible. The CDFW personnel indicated that debris lines and high water marks clearly show access to the upper reaches of the creek as being available to fish during certain high flow events, unless it can be confirmed that fish barriers exist downstream. It is not possible at this time to determine if fish barriers are present downstream due to access constraints on private property; therefore, presence of anadromous fish will be assumed in Moody Creek.

The proposed Project includes direct impacts to intermittent stream habitat including the diversion of Moody Creek as described in Section 2.0 Project Description. The total acreage of directly impacted intermittent stream habitat is 5.5753 acres. While it has not been definitively confirmed whether fish barriers exist downstream, the impacts to intermittent stream habitat, including the diversion of Moody Creek, is considered a **potentially significant** impact on anadromous fish habitat, including steelhead even though no observations of these species have been made on the Project site. It is the policy of the CDFW that existing steelhead habitat not be diminished further without offsetting mitigation of equal or greater long-term habitat benefits. It is the policy of CDFW to oppose any Project which will result in irreplaceable losses without the offset mitigation.

The Applicant's current proposal includes the direct disturbance of 5.5753 acres of intermittent stream habitat. Most of this proposed disturbance is associated with the proposed diversion of Upper and Lower Moody Creek. The proposal would divert Upper Moody Creek, at a point starting near the northwest corner of the proposed Secondary and Ancillary Processing and Load-out Area, southward for over 1,000 feet until it connects to the existing Lower Moody Creek. This diversion of the Upper Moody Creek would provide a site that is sufficiently large and contiguous enough for the operation of the Secondary and Ancillary Processing and Load-out Area. The diversion of Upper Moody Creek would result in the creation of a new channel of over 1,000 feet, and the abandonment/fill of approximately 4,000 feet of existing channel.

The Applicant's current diversion proposal also includes the direct disturbance to Lower Moody Creek from a point starting near the southwest corner of the proposed Secondary and Ancillary Processing and Load-out Area (where the diverted Upper Moody Creek would connect to the existing Lower Moody Creek), southwest approximately to the existing Union Pacific Railroad. Through field discussions with the County staff, the Applicant, and the CDFW staff, it is anticipated that the current proposal can feasibly be redesigned to minimize disturbance to Lower Moody Creek. The minimization design concept would be to limit disturbance only to three locations along Lower Moody Creek: 1) at the new confluence with Upper Moody Creek, 2) at the area proposed for an access ramp to the South Pit, and 3) at the area proposed for the railroad loadout area that would need to cross the Lower Moody Creek. All other proposed disturbances to Lower Moody Creek would be avoided from direct disturbance. In addition to the redesign concept, a 50-foot no disturbance setback would be placed along Lower Moody Creek extending 100 feet from the centerline to either side of the creek. All diversion activities must be performed during times of low or no flow

The Applicant is required to mitigate through compensation for direct impacts that are not avoided. Habitat creation/ replacement and restoration of habitat will be necessary for

compensation of impacts to Moody Creek. The compensation will require the development of new stream habitat to be created that is functionally of equal or greater habitat quality when compared to the reach of Moody Creek that would be removed. There are several key characteristics that must be incorporated into the design and construction of the compensation habitat to ensure that it functions as high quality habitat. These include appropriate channel width, depth, gradient, substrate, and cover. These are critical factors for migration, holding, spawning, and rearing of fish resources. Implementation of Mitigation Measure 3.4-3(c) requiring avoidance to the extent feasible, minimization to the extent feasible, and habitat creation/replacement for direct impacts will reduce this impact to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.4-3(c)*: *Avoidance: *The Project Applicant shall consider avoidance of stream habitat as a priority in the final project design. The current proposal includes the direct disturbance of 5.5753 acres of intermittent stream habitat, including direct disturbance of Upper and Lower Moody Creek. The applicant shall redesign the Moody Creek diversion plan to minimize disturbance to Lower Moody Creek. The minimization design concept shall limit disturbance only to three locations along Lower Moody Creek: 1) at the new confluence with Upper Moody Creek, 2) at the area proposed for an access ramp to the South Pit, and 3) at the area proposed for the railroad loadout area that would need to cross the Lower Moody Creek. All other proposed disturbances to Lower Moody Creek shall be avoided from direct disturbance. In addition to the redesign, a 50-foot no disturbance setback shall be placed along Lower Moody Creek extending 50 feet from the centerline to either side of these creeks. The diversion activities must be limited to times of low or no flow.*

Compensation: *The Project applicant shall provide compensatory mitigation at a ratio of no less than 1:1, or as determined appropriate by the USFWS and CDFW for all direct impacts to intermittent streams. The current Project plans estimate approximately 5.5753 acres of direct disturbance; however, the acreage of direct disturbance is anticipated to be reduced by avoiding impacts to Lower Moody Creek as recommended above. For the impact area that cannot be avoided, compensatory mitigation shall include on-site mitigation in the form of the creation of high quality habitat for anadromous fish that is equal to or greater than the existing habitat quality of Moody Creek. The newly created habitat shall be in the form of a realigned diversion stream that provides for cool water refuge and holding areas, stable spawning gravels with limited fine sediments, and cover and holding areas close to spawning areas. These habitat functions are necessary and can been achieved through a combination of plane beds, pool riffles, step pools, forced pool riffles, and pool riffles of appropriate channel depth, width, gradient, substrate, and cover. The intent is to incorporate design factors that will create appropriate stream and pool depth, water velocity, substrate, and temperatures for fish resources. The appropriateness of these design factors shall be coordinated with the USFWS and CDFW personnel to ensure that these stream design characteristics are appropriate for fish resources in the region. The habitat design shall be embodied in a habitat restoration and management plan (or another form acceptable to the regulatory agencies) that is subject to the review and approval of the County, CDFW, and the USFWS. Additional off-site mitigation, and/or purchase of mitigation credits from an approved*

mitigation bank may be required by the regulatory agency as determined through the permitting process. Compensatory mitigation is subject to the review and approval of the USFWS and CDFW. If the USFWS and CDFW issue an authorization of the take of anadromous fish resources, the Project applicant shall be subject to all the term and conditions, and conservation measures imposed by the USFWS and CDFW in association with the permit. If access to downstream reaches of the creek become accessible and it can be verified that fish barriers exist, preventing upstream movement of anadromous fish into the Project site, then authorizations for the incidental take of anadromous fish would not be warranted. Any such evidence of downstream fish barriers shall be made available for inspection by the USFWS and/or CDFW personnel for verification. Regardless of the need for incidental take authorizations, the Project applicant shall provide compensatory mitigation on-site for impacts to Moody Creek in the form of the creation of high quality stream habitat that is equal to or greater than the existing habitat quality of Moody Creek.

Impact 3.4-4: The proposed Project has the potential to impact special-status bird species (Less than Significant with Mitigation)

Special-status birds occurring within the region in similar habitats include: bald eagle (*Haliaeetus leucocephalus*), northern spotted owl (*Strix occidentalis caurina*), willow flycatcher (*Empidonax traillii*), long-eared owl (*Asio otus*), western burrowing owl (*Athene cunicularia hypugaea*), northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), Vaux's swift (*Chaetura vauxi*), olive-sided flycatcher (*Contopus borealis*), yellow warbler (*Dendroica petechial*), and yellow-breasted chat (*Icteria virens*). Each of these species has the potential to exist on the Project site.

Federal/State Listed

Northern spotted owl (*Strix occidentalis caurina*) is a federally threatened species, a California species of special concern, and fully protected raptor in California that is found in northern California in large stands of old growth, multi-layered mixed conifer, redwood and Douglas-fir habitats. Potential foraging habitat occurs in the ponderosa pine and montane hardwood-conifer habitats located at the very northern-most portion of the Project site. The nearest records of this species are located 12 and 14 miles to the north and east, respectively, of the Project site. The Project site is not within northern spotted owl designated critical habitat. This species is not documented in the CNDDB within a five mile radius of the Project site, or within a nine quadrangle search. There is a low likelihood of this species occurring on the Project site.

Willow flycatcher (*Empidonax traillii*) is a California endangered species that is a rare summer resident in wet meadow and montane riparian habitats at 2,000 to 8,000 feet elevation. This species is no longer known to nest in Sacramento Valley and moves through the north state region in spring and fall where it is sometimes observed in riparian and open chaparral habitats during migration. Potential breeding habitat does not occur in the Project site and the Project site is outside of the current breeding elevation and geographic range. This species was not observed, and has a low potential to occur during migration in the Valley foothill riparian habitat along streams.

Project operational activities, such as nighttime lighting, nighttime loadout operations, noise and/or vibration from blasting, noise and/or vibration from operating stationary and mobile equipment, dust from mining and hauling operations, air pollution from operating stationary and mobile equipment, could disturb birds that live adjacent to the areas where the operations will occur. The indirect impacts described above can affect the survivorship of the young, if construction occurs adjacent to nesting areas during nesting. The impact to the birds is greater the closer the operational activity is to the birds.

Conclusion: The proposed Project will directly impact potential habitat of the northern spotted owl (federal threatened) and willow flycatcher (State endangered). Implementation of the proposed Project would require disturbance to ponderosa pine and montane hardwood-conifer habitats in the Project site, which is potential habitat for the northern spotted owl. Additionally, the proposed Project would require disturbance to valley foothill riparian habitat along the streams in the Project site, which is potential habitat for the willow flycatcher. Under the ESA, only occupied habitat is protected. This is a **potentially significant** impact.

The following mitigation measures require preconstruction surveys of potential habitat to be performed for northern spotted owl and willow flycatcher and in the event that either species is found, a Protected Activity Center (PAC) and Limited Operating Period (LOP) would be established in coordination with the regulatory agencies (USFW and CDFW) to ensure that construction activities and ongoing operational activities do not disturb these listed species directly or indirectly. Additionally, the following mitigation measures may require ongoing surveys for these species throughout the operational life of the Project if they are determined to be present, or until these species are delisted. Implementation of these mitigation measures would ensure the proposed Project would have a **less than significant** impact on these species.

Mitigation Measures

Mitigation Measure 3.4-4(a)*: Prior to each new phase of vegetation removal and horizontal ground disturbance, the Project applicant shall retain a qualified biologist to perform preconstruction protocol surveys of potential habitat for northern spotted owl to determine whether active nest sites are located within 0.25 mile of Project construction and operational activities. If active nest sites are determined to exist within 0.25 mile of Project activities, the Project applicant shall coordinate with the USFWS to establish a Protected Activity Center (PAC) and limited operating periods (LOPs) for construction and operational activities to avoid disturbances to breeding activities and habitat of northern spotted owl. A PAC established the area where Project activities are prohibited within the LOP. The LOP establishes a period during which Project activities are prohibited within the PAC.*

Mitigation Measure 3.4-4(b)*: If northern spotted owl is documented in the ponderosa pine and montane hardwood-conifer habitats in the Project site on an ongoing basis (i.e., throughout each phase of the Project unless this species is delisted), surveys for northern spotted owl shall be performed on a monthly basis from March through August by a qualified biologist. The Project applicant shall provide a monthly monitoring report to the County and USFWS. Ongoing surveys are not warranted if northern spotted owl is not found in the Project site after conducting surveys for a*

requisite construction phase. However, prior to any new horizontal phase of construction, should a preconstruction survey identify the northern spotted owl, the qualified biologist shall recommence the monthly surveys referenced in this mitigation measure.

***Mitigation Measure 3.4-4(c)**: Prior to each new phase of vegetation removal and horizontal ground disturbance occurring between May 1 and August 31 of each year, the Project applicant shall retain a qualified biologist to perform preconstruction surveys within potential habitat for willow flycatcher in accordance with A Willow Flycatcher Survey Protocol for California (2003). If active nest sites are determined to exist on the Project site, the Project applicant shall consult with the CDFW on an appropriate buffer and timeframe for construction and operational activities to avoid disturbances to breeding activities and habitat of willow flycatcher.*

***Mitigation Measure 3.4-4(d)**: If willow flycatcher is documented in the riparian habitats in the Project site on an ongoing basis (i.e., throughout each phase of the Project unless this species is delisted), surveys in accordance with A Willow Flycatcher Survey Protocol for California (2003) shall be performed on a monthly basis from June through August by a qualified biologist. The Project applicant shall provide a monthly monitoring report to the County and CDFW. Ongoing surveys are not warranted if willow flycatcher is not documented in the Project site after conducting surveys for a requisite construction phase. However, prior to any new horizontal phase of construction, should a preconstruction survey identify the willow flycatcher, a qualified biologist shall recommence monthly surveys referenced in this mitigation measure.*

Not Listed but Special Status

Bald eagle (*Haliaeetus leucocephalus*) is a federally delisted species and is a fully protected raptor in California that requires large bodies of water, or free-flowing rivers with abundant fish and adjacent snags and large trees for perching and nesting. This species was not observed and has a low potential to occur within the ponderosa pine habitat in the northern portion of the Project site. This species is documented approximately one mile north of the Project site at Shasta Lake.

Long-eared owl (*Asio otus*) is California species of special concern and fully protected raptor in California that is found in dense riparian and live oak thickets near meadow edges, and nearby woodland and forest habitats. They can also be found in dense conifer stands at higher elevations. This species was not observed, and has a low potential to occur in the riparian and dense oak thickets adjacent to meadow and grassland in the Project site.

Western burrowing owl (*Athene cunicularia hypugaea*) is California species of special concern and fully protected raptor in California that can be found in grasslands and ruderal habitats. This species was not observed and has a low potential to occur in the annual grasslands in the Project site.

Northern harrier (*Circus cyaneus*) is California species of special concern and fully protected raptor in California that forages in marshes, grasslands, and ruderal habitats and nests in extensive marshes and wet fields. This species was not observed, but it is potentially present in the annual grasslands in the Project site.

White-tailed kite (*Elanus leucurus*) is fully protected raptor in California that occurs in low elevation grassland, agricultural, wetland, oak-woodland, or savannah habitats. They are also found in riparian habitat adjacent to open areas. This species was observed foraging in annual grasslands in the Project site. Potential breeding habitat is present in oak woodlands adjacent to annual grassland.

Vaux's swift (*Chaetura vauxi*) is California species of special concern that prefers redwood and Douglas-fir habitats, nests in hollow trees and snags or, occasionally, in chimneys, and they forage aerially. This species was not observed and has a low potential to occur in the Project site.

Olive-sided flycatcher (*Contopus borealis*) is California species of special concern that is found in montane and northern coniferous forests, at mid-to high elevations. They are associated with forest openings. This species was not observed and has a low potential to occur in the ponderosa pine habitat in the Project site.

Yellow warbler (*Dendroica petechia*) is a California species of special concern that breeds in riparian woodlands, particularly those dominated by willows and cottonwoods. This species was observed in the valley foothill riparian habitat in the Project site.

Yellow-breasted chat (Icteria virens) is a California species of special concern that breeds in riparian habitats having dense understory vegetation, such as willow and blackberry. This species was observed in the valley foothill riparian habitat in the Project site.

Raptors and Migratory Birds: The bald eagle (*Haliaeetus leucocephalus*) and white-tailed kite (*Elanus leucurus*) are raptors that are documented within the vicinity of the Project site. The white-tailed kite was observed on the Project site. These birds are protected by a variety of laws that prevent the harassment and willful or incidental take of these species. Specifically, they are protected under the Fish and Game Code §3503.5, which prohibits destruction of active raptor nests

Migratory birds forage and nest in multiple habitats such as annual grasslands, wetlands, riparian, and oak woodlands. The nests of all migratory birds are protected under the MBTA, which makes it illegal to destroy any active migratory bird nest. The Project site contains appropriate foraging and nesting habitat for a wide variety of birds protected under the MBTA. Construction and operational activities that occur during the nesting season (generally March 1-August 31) have the potential to disturb nesting sites for birds protected by the MBTA. Additionally, Project operational activities, such as nighttime lighting, nighttime loadout operations, noise and/or vibration from blasting, noise and/or vibration from operating stationary and mobile equipment, dust from mining and hauling operations, air pollution from operating stationary and mobile equipment, could disturb migratory birds and raptors that live adjacent to the areas where the operations will occur. The indirect impacts described above can affect the survivorship of the young, if construction occurs adjacent to nesting areas during nesting. The impact to the birds is greater the closer the operational activity is to the birds. This is a **potentially significant** impact. Implementation of the following mitigation measures will ensure that the potential impacts to raptors and migratory birds are reduced to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.4-4(e): *If any vegetation removal and ground disturbance are to occur during the nesting season for migratory birds or raptors (approximately March 1-August 31), the Project applicant shall retain a qualified biologist to perform preconstruction surveys of potential habitat. Surveys shall be conducted of proposed disturbance areas and within 250 feet of these areas. At least two surveys shall be conducted as follows. The first survey shall be conducted at least four weeks, but no more than eight weeks, prior to surface disturbance of any phase of horizontal construction. The second survey shall be conducted no more than one week prior to the initiation of vegetation removal and ground disturbance of any new phase of horizontal construction. In the event that nesting raptors or migratory birds are found within a disturbance area, the Project applicant shall:*

a. *Locate and map the location of the nest site. Within five working days of the surveys prepare a report and submit to the County and CDFW;*
b. *Establish a no-disturbance buffer of 250 feet, or as required by the CDFW. The buffer shall visibly flagged or fenced to ensure that the buffer is recognizable to construction personnel;*
c. *Conduct on-going weekly surveys to ensure that the no disturbance buffer (fencing or flagging) is maintained in good repair to ensure that the buffer is recognizable to construction personnel. Vegetation removal and ground disturbance can resume within the 250 foot no-disturbance buffer when a qualified biologist has confirmed that the birds have fledged.*

In the event of destruction of a nest with eggs, or if a juvenile or adult raptor or migratory bird should become stranded from the nest, injured or killed, the qualified biologist shall immediately notify the CDFW and/or the USFWS. The qualified biologist shall coordinate with the CDFW and/or USFWS to have the injured raptor or migratory bird either transferred to an appropriate recovery center or, in the case of mortality, transfer it to the CDFW within 48 hours of notification. If directed/authorized by the CDFW during the notification, the qualified biologist may transfer the injured raptors or migratory bird to an appropriate recovery center.

Impact 3.4-5: The proposed Project has the potential to impact special-status mammal species (Less than Significant with Mitigation)

Special-status mammals that occur within regional vicinity of the Project site include: Townsend's western big-eared bat (*Corynorhinus townsendii*), pallid bat (*Antrozous pallidus*), western mastiff bat (*Eumops perotis*), silver-haired bat (*Lasionycteris noctivagans*), western red bat (*Lasiurus blossevillii*), Yuma myotis (*Myotis yumanensis*), American badger (*Taxidea taxus*), ring-tailed cat (*Bassariscus astutus*), and Pacific fisher (*Martes pennanti pacifica*). The bat species inhabit a variety of habitats, including grasslands, foothill woodlands, coniferous forest, caves, mines, and buildings. The American badger is found in herbaceous, shrub, and open stages of most habitats with dry, friable soils. The ring-tailed cat is found in riparian habitats and in brush stands of most forest and shrub habitats and their nests are found in rock recesses, hollow trees, logs, snags, abandoned burrows or woodrat nests. The Pacific fisher is found in intermediate to large dense

stages of coniferous forests and deciduous riparian habitats with greater than 50 percent canopy closure.

Bat Species: Townsend's western big-eared bat, Pallid bat, western mastiff bat, western red bat, and Yuma myotis are California species of special concern. These bats are found in a variety of habitats, but primarily in hollowed trees and rock outcrops. These species travel locally and seasonally, but are not considered migratory. During the day, bats roost in buildings, crevices, caves, mines, and hollow trees. The breeding period for these bats is during May and June.

Field surveys on the Project site have not revealed the presence of bats, and their potential presence onsite is identified as low because there are few large old trees with cavities or hallows, shedding bark, etc. that may provide roosting areas. In addition, the rock outcrops onsite do not have many deep cavities or caves to provide roosting habitat.

Project operational activities, such as nighttime lighting, nighttime loadout operations, noise and/or vibration from blasting, noise and/or vibration from operating stationary and mobile equipment, dust from mining and hauling operations, air pollution from operating stationary and mobile equipment, could disturb bats that live adjacent to the areas where the operations will occur. The indirect impacts described above can affect the survivorship of the young, if construction occurs adjacent to maternity colonies during spring and summer breeding and the subsequent raising of young. The impact to the bats is greater the closer the operational activity is to the bats.

Project operations would require the removal of some of this habitat when trees and vegetation are removed before mining begins, which could cause a **potentially significant impact** if bats are present at that time. In addition to this potentially significant direct impact, Project operational activities, such as noise from equipment, could cause a potentially significant indirect impact to bats that live adjacent to the areas where the operations would occur. The direct and indirect impacts described above can affect the survivorship of the young, if construction occurs adjacent to maternity colonies during spring and summer breeding and the subsequent raising of young.

The following mitigation measure requires pre-construction bat surveys of potential habitat prior to the commencement of vegetation removal and ground disturbance construction activities that would result in the direct and indirect disturbance to potential diurnal[2] roosting trees and within a 100 foot buffer area around the entire area(s) where diurnal roosting trees are present. If bat roosts are found through the surveys, the Project applicant would need to coordinate with the CDFW for the appropriate approvals to place one-way covers on any bat roost so that the bats can leave the roost, but not return. The mitigation specifically prohibits direct disturbance to bat maternity roosts until all young are weaned. Implementation of the following mitigation measure

[2] "Diurnal" means belonging to or active during the day.

would ensure that the potentially significant impact to bats is reduced to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.4-5(a): *Up to 30 days prior to the commencement of any new phase of vegetation removal or horizontal ground disturbance, the Project applicant shall retain a qualified biologist to conduct preconstruction bat survey(s) of potential habitat involving the removal of potential diurnal roosting trees (e.g., trees 24 inches DBH and greater, snags, hollow trees). During the survey(s) the qualified biologist shall inspect all potential diurnal roosting trees within the area(s) where potential diurnal roosting trees will be removed and within a 100 foot buffer area around the entire area(s) where diurnal roosting trees will be removed using the appropriate and most effective methodology (e.g., camera inspection, exit survey with night optics, acoustic survey) in determining presence or absence of bat species. If roosting (but not breeding) bats are observed, the qualified biologist shall place one-way covers on the bat roost to allow bats to leave the roost, but not return, after receiving all necessary CDFW permits and/or approvals. No bat maternity roosts shall be disturbed until all young are weaned. The biologist shall establish a suitably sized buffer, absent CDFG guidance documents, stating a specific buffer zone around any bat maternity roosts. The biologist shall establish a 100 foot buffer zone around any bat maternity roosts, unless CDFW provides alternative guidance documented in peer-reviewed, published literature stating a specific buffer zone for such maternity roosts. The buffer area shall be delineated with brightly colored construction fencing. No surface disturbing activities, including vegetation removal, earth movement, nighttime lighting, nighttime loadout operations mobile equipment movement, mining, blasting, operation of stationary equipment, or construction, shall occur within this buffer area until a qualified biologist has determined the young have weaned.*

Pacific fisher and Ring-tailed cat: Pacific fisher is a federal and California candidate to be listed under the federal and California ESAs. Ring-tailed cat is a fully protected species. Valley foothill riparian and stream corridors on portions of the Project site provide suitable habitat for both species. In addition, a known Pacific fisher site is located approximately one-half a mile north of the northwestern portion of the Project site. Site development, including the secondary and ancillary processing and load-out area, may result in the removal of these habitats. In addition, surface disturbance of habitat surrounding Moody Creek and other seasonal riparian habitat around intermittent or ephemeral drainages may disturb or remove some of this habitat. Project operational activities, such as nighttime lighting, nighttime loadout operations, noise and/or vibration from blasting, noise and/or vibration from operating stationary and mobile equipment, dust from mining and hauling operations, air pollution from operating stationary and mobile equipment, could disturb these species if they live adjacent to the areas where the operations will occur. The indirect impacts described above can affect the survivorship of the young, if construction occurs adjacent to dens. The impact to these species and their habitat is greater the closer the operational activity is to these species and their habitat.

This impact is **potentially significant.** Implementation of the following mitigation measure would ensure that this impact is reduced to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.4-5(b): *If vegetation removal and ground disturbance to riparian habitat and stream corridors can be conducted outside the breeding season (February 1 through May 1), then no further mitigation is required. If vegetation removal and ground disturbance to riparian habitat or stream corridors shall occur during the breeding season (February 1 through May 1), a qualified biologist shall conduct a preconstruction survey of potential habitat for potential natal or maternity den trees no more than two weeks before construction activities begin. If an active den is found, a qualified biologist, in consultation with CDFW and USFWS, will determine an appropriate construction-free buffer zone, no less than 50 feet, to be established around the den until the mother and young have vacated the den. Mitigation and further consultation is unnecessary if an active den is not identified during surveys. However, prior to any new phase of vegetation removal or horizontal construction, should a preconstruction survey identify the Pacific fisher or ring-tailed cat, the mitigation and consultation outlined above shall be employed.*

Impact 3.4-6: The proposed Project has the potential to impact special-status plant species (Less than Significant)

A complete list of plants observed during the field surveys is included **Appendix F**. One special-status plant species, northern clarkia (*Clarkia borealis* ssp*. borealis*), was observed on the Project site. Two separate occurrences of northern clarkia were observed in the northwest portion of the Project site along rocky slopes within montane hardwood habitat. A nearby reference location of northern clarkia (CNDDB occurrence #4) that was in bloom was also visited to confirm flowering of the two occurrences observed on the Project site. The southern occurrence consisted of approximately 250 individuals spread over approximately 100 feet along both sides of a dirt-bike trail on a northwest facing slope near the top of the ridgeline. Occurrence #2 was comprised on approximately 25 plants. Approximately two-thirds of these northern clarkia plants were in flower on June 25, 2010.

Northern clarkia is an annual herb in the evening-primrose family (*Onagraceae*). This subspecies is a California endemic, restricted to the southern Cascade Range, and occurs in openings in gray pine and black oak woodlands at elevations between 1,300 to 4,400 feet. The large majority of known occurrences are located in Shasta County in the vicinity of Shasta Lake. Outlier populations occur in Trinity County east of Clare Engle Lake, and in Siskiyou County near Dunsmuir. The nearest recorded northern clarkia location occurs approximately 2.5 miles northeast of the Project site near Shasta Lake. Northern clarkia is a CNPS 1B.3 plant. Site information and photos of the northern clarkia are included in the botanical report contained in Appendix F.

Mining operations would directly impact approximately 430 acres of land within the total 1,850-acre Project site. The limits of disturbance include the 430-acre mining area and an additional 372 acres of indirect disturbance. The limits of disturbance cover 802 acres of the 1,850-acre Project site.

Mining operations would include impacts to the following vegetation communities: annual grassland, barren, blue oak-gray pine, blue oak woodland, fresh emergent wetland, mixed

chaparral, montane hardwood-conifer, montane hardwood, ponderosa pine, valley oak woodland, and valley foothill riparian. The mining activities would be phased over approximately 100 years; therefore the full 430 acres would not be affected at the commencement of the mining activities, but rather over time. Ultimately, approximately 365 acres of 430 acres impacted would be reclaimed as open space. Some reclamation activities may occur concurrent with mining activities.

Project operational activities, such as dust from mining and hauling operations, and air pollution from operating stationary and mobile equipment could disturb vegetation communities located adjacent to the areas where the operations would occur. The indirect impacts described above can affect the survivorship of mature and young plants (i.e. pollinator disruption, seed propagation, etc.) from mining activities that occur immediately adjacent to plant colonies. The impact to the vegetation communities is greater the closer the operational activity is to the vegetation communities.

The two occurrences of northern clarkia (*Clarkia borealis* ssp*. borealis*) are located outside of the 430 acres impacted and would not be directly affected by mining operations. The closest occurrence of northern clarkia (*Clarkia borealis* ssp*. borealis*) is located approximately 250 feet outside of the mining operations. At 250 feet beyond the mining area dust is not anticipated to be a significant indirect impact on northern clarkia due to the distance between the plants and the source of the dust, which would not result in significant dust accumulation on the northern clarkia. There are no other special status plants that were observed during the numerous field surveys or otherwise documented on the Project site. Implementation of the proposed Project would have a **less than significant** impact on special status plants.

Impact 3.4-7: The proposed Project has the potential to have a substantial adverse effect on any riparian habitat or other sensitive natural community, including oak woodlands, identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service (Less than Significant with Mitigation)

Riparian Habitat: The Project site contains riparian habitat, and the Project's limits of surface disturbance includes 0.4920 acres of riparian wetland, 0.2528 acres of ephemeral stream, and 5.5753 acres of intermittent streams. Each of these habitat types includes some riparian vegetation/habitat that would be disturbed as a result of the proposed Project.

The largest impact to riparian habitat would result from diversion of Moody Creek, resulting in approximately 5.58 acres of intermittent stream diversion. The remaining impact to riparian habitat is associated with the riparian wetland and ephemeral and intermittent stream impacts that would result from development of the secondary and ancillary processing and load-out area and mining area. The impact to riparian habitat consisting of 0.4920 acres of riparian wetland, 0.2528 acres of ephemeral stream, and 5.5753 acres of intermittent streams would be **potentially significant**.

Mitigation measures presented under Impact 3.4-8 below would require the appropriate permitting through the regulatory agencies (state and federal) with the appropriate authority to

protect these resources. The permit process would require compensatory mitigation at a minimum of 1:1 to ensure that there is no net loss of wetlands, which includes riparian habitat. The regulatory agency may allow a variety of compensatory mitigation options, including, but not limited to, creation, preservation, enhancement, or payment in-lieu (i.e. mitigation credits) of this habitat.

With the implementation of the mitigation measures presented under Impact 3.4-8, the potentially significant impact on riparian habitat would be reduced to a **less than significant** level.

Oak Woodlands: Oak woodlands were evaluated within the Project site boundary in order to determine impacts to oak woodlands from vegetation removal and ground disturbance activities. The Project site contains 659 acres of oak habitat within the 802 acres limits of disturbance. This includes blue oak woodland, blue oak-gray pine, montane hardwood, montane hardwood-conifer, and valley oak woodland.

The blue oak woodland habitat occurs in the eastern most corner of the Project site and is characterized by a moderate overstory of blue oak *(Quercus douglasii)*. The blue oak-gray pine occurs mainly in the lower, moderately sloped portions of the Project site and in the western portion of the Project site in valleys generally along stream corridors and over a ridge in the north-central portion of the Project site. The dominant overstory species in the blue oak-gray pine habitat includes blue oak, California black oak *(Q. kelloggii),* valley oak *(Q. lobata),* interior live oak *(Q. wislizenii),* and gray pine *(Pinus sabiniana).* Oracle oak *(Quercus x morehus),* a hybrid of California black and interior live oak is also common in the overstory. The montane hardwood occurs on the slopes in the northern and western portions of the Project site and is characterized by a dense overstory of California black oak with sparse canyon live oak. The montane hardwood-conifer occurs on the slopes throughout the main portion of the Project site and is characterized by a California black oak with interior and canyon live oak *(Q. chrysolepis)* associates. Interior live oak and canyon live oak occur sparsely in the understory. The valley oak woodland is located in the level, lower elevation areas in the eastern portion of the Project site. It occurs between Moody and Rancheria Creeks east and west of the railroad tracks. It also occurs along small drainages in the western portion of the Project site. This habitat is characterized by a dense overstory dominated by valley oak, with occasional blue, California black, and interior live oak. Table 3.4-7 provides a summary of the oak habitats with the approximately acreage of each within the Project site.

TABLE 3.4-7: SUMMARY OF OAK HABITAT WITHIN PROJECT SITE AND LIMITS OF DISTURBANCE

CWHR HABITATS	PROJECT SITE (AC)	LIMITS OF DISTURBANCE (AC)
Blue oak-gray pine	196	124
Blue oak woodland	7	3
Montane hardwood-conifer	905	304
Montane hardwood	504	213
Valley oak woodland	17	15
Total	**1,629**	**659**

SOURCE: NORTH STATE RESOURCES, INC. (2012)

As part of the vegetation site characterization outlined above, sample transects in each habitat type were performed. These transects included vegetation measurements of percent cover, density, overall plant species richness, and status as a native or non-native plant species. Based on this analysis oak tree canopy and cover density were documented as illustrated in Table 3.4-8, Oak Tree Canopy Cover and Density.

TABLE 3.4-8: OAK TREE CANOPY COVER AND DENSITY

VEGETATIVE HABITAT	*SPECIES*	*CANOPY COVER (%)*	*DENSITY PER PLOT (%)*
Blue Oak-Gray Pine	Blue Oak	19	10
	Interior Live Oak	13	15
Blue Oak Woodland	Blue Oak	50	36
Mixed Chaparral	Interior Live Oak	8	11
Montane Hardwood-Conifer	Interior Live Oak	14	20
	Blue Oak	<1	1
Valley Foothill Riparian	Valley Oak	15	8
	Blue Oak	15	6
	Interior Live Oak	8	6
Valley Oak Woodland	Valley Oak	39	8
	Canyon Live Oak	6	5

SOURCE: NORTH STATE RESOURCES, INC. (2010)

CEQA requires counties to assess oak woodlands conversion impacts associated with new development and mitigate appropriately. Fish and Game Code section 1361 (h) defines "Oak woodlands" to mean “an oak stand with a greater than 10 percent canopy cover or that may have historically supported greater than 10 percent canopy cover.]

All of the vegetative habitats containing oak woodland species, as shown in Table 3.4-8, contain over 10 percent oak woodland canopy. As a result, Project implementation may result in the conversion of approximately 659 acres of oak woodland habitat. This is considered a **potentially significant impact**.

Implementation of the following mitigation measures would reduce the impact to a ***less than significant*** level. Public Resources Code section 21083.4 allows mitigation for oak woodland impacts through onsite or offsite conservation easements, replanting/restoration, contribution to the oak woodlands conservation fund, and/or other measures approved by the County. The Applicant is proposing to partially mitigate the impact to oak woodland habitat by replanting oak trees as part of site reclamation. As outlined in the reclamation plan (see **Appendix C**) upon completion of mining operations in the North Pit revegetation to successional oak woodland would occur. Approximately 132 acres of oak woodland revegetation is anticipated, including planting a mix of blue oak, black oak, interior live oak. Oak tree planting would also occur in other revegetated areas of the site at a lower density and based on test plot success. Public Resources Code section 21083.4 only allows replanting to account for no more than one half the mitigation requirements for the Project. Therefore, the Project applicant would be required to mitigate for the remaining oak tree habitat impacts through one of the other means outlined in Mitigation Measure 3.4-7(a) below.

MITIGATION MEASURES

Mitigation Measure 3.4-7(a)*: Prior to the commencement of vegetation removal and horizontal ground disturbance of blue oak woodland, blue oak-gray pine, montane hardwood, montane hardwood-conifer, and valley oak woodland habitats, the Project applicant shall compensate for the loss of oak woodland to be disturbed at a 1:1 ratio, in accordance with Public Resources Code Section 21083.4. The pace of the compensatory mitigation may vary to generally keep pace with the pace of vegetation removal, but at no point in time shall the Applicant remove more oak woodlands than what has been mitigated for at a 1:1 ratio. The compensation shall include one or more of the following oak woodlands mitigation alternatives to mitigate the significant effect of the conversion of oak woodlands:*

1. ***Offsite Conservation Easements****: The Project applicant shall fulfill the requirement to compensate for the loss of oak woodland habitat at a 1:1 ratio through participation in one or more programs listed below, in order to provide a 1:1 compensation ratio for 50 percent or more of the impacted oak woodland habitat:*
    a. *Purchase offsite conservation easements established through a certified oak woodlands conservation bank, or other comparable entity approved by Shasta County. The offsite conservation easement(s) shall provide for comparable biological diversity and habitat quality as the oak woodland habitat impacted by the Project, as determined by a qualified biologist and verified by Shasta County. The conservation easement(s) shall be established in perpetuity. The purchase of offsite conservation easements totaling at least 330 acres shall be completed prior to the commencement of vegetation removal and horizontal ground disturbance of blue oak woodland, blue oak-gray pine, montane hardwood, montane hardwood-conifer, and valley oak woodland habitats.*
    b. *The Project applicant may either purchase conservation easements directly, or may contribute funds to the Oak Woodlands Conservation Fund, as established under subdivision (a) of Section 1363 of the Fish and Game Code, for the purpose of purchasing oak woodlands conservation easements, as specified under paragraph (1) of subdivision (d) of that section and the guidelines and criteria of the Wildlife Conservation Board. If the Applicant contributes funds to the Oak Woodlands Conservation Fund, the Applicant shall verify to the satisfaction of the County that the funds contributed are sufficient to provide a 1:1 compensation ratio for the habitat impacted by the Project.*
2. *The Project applicant may create up to 329 acres of oak woodland habitat on the Project site, or up to 50 percent of the requisite oak woodland mitigation habitat, that counts toward the requirement to provide a 1:1 ratio of compensatory oak woodland habitat. The oak woodland habitat created on the Project site may be created in phases over the life of the Project, and shall be completed within five years of cessation of mining activities on the site. The Project applicant shall implement the revegetation monitoring and maintenance requirements established in the Moody Flats Quarry Project Reclamation Plan (see*

Appendix C). The onsite oak woodland habitat created by the Project applicant shall be of comparable biological diversity and habitat quality as the oak woodland habitat impacted by the Project. The quality and comparability of the created onsite habitat shall be determined by a qualified biologist, and verified by the County.

3. *In the event that the Applicant cannot mitigate for 50 percent of the impacted oak woodland habitat through the creation of comparable onsite habitat at a 1:1 ratio, the Applicant shall mitigate for the balance of the required habitat through the purchase of offsite conservation easements as described in paragraphs 1(a) and 1(b) above. Within five years of cessation of mining activities at the Project site, the applicant shall demonstrate to the satisfaction of the County that all of the oak woodlands impacted by the Project have been mitigated at a 1:1 acreage ratio of potential comparable biological habitat quality. The Applicant shall further verify that 50 percent or more of the compensatory mitigation occurred as offsite conservation easements.*

Impact 3.4-8: The proposed Project has the potential to have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means (Less than Significant with Mitigation)

As discussed above and summarized in Table 3.4-4 and based on field observations and associated mapping, the wetland delineation identified 10 types of waters of the United States within the site occupying approximately 14.1 acres.

Approximately 8.0095 acres of waters of United States are located within the Project's limits of surface disturbance, including 2.1814 acres of wetlands and 5.8281 acres of "other waters" (ephemeral and intermittent streams). In general, for a site that encompasses approximately 1,900 acres, it has a small amount of US jurisdictional wetlands. Riparian wetlands, the largest wetland type by acreage at 2.3436 acres, will largely be avoided through site design. The largest impact to waters of United States would result from diversion of Moody Creek, resulting in approximately 5.58 acres of intermittent stream diversion. The remaining wetland and ephemeral and intermittent stream impacts would result from development of the secondary and ancillary processing and load-out area and mining area. The impact to 8.01 acres of waters of United States would be **potentially significant**.

Mitigation measures presented below require appropriate permitting through the regulatory agencies (state and federal) with the appropriate authority to protect wetlands and other improvement water resources. The permit process will require compensatory mitigation at a minimum of 1:1 to ensure that there is no net loss of wetlands. The regulatory agency may allow a variety of compensatory mitigation options, including, but not limited to, creation, preservation, enhancement, or payment in-lieu (i.e. mitigation credits).

Mitigation measures presented in the Hydrology and Water Quality section would also ensure that the potential for indirect impacts to wetlands and water resources from the proposed Project are minimized through the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) with Best Management Practices (BMPs).

With the implementation of the following mitigation measures, the potentially significant impact from the direct loss of 8.01 acres of jurisdictional wetlands/waters and other indirect impacts to protected wetlands/waters would be reduced to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.4-8(a)*. Prior to any activities that would result in fill or discharge to a water of the United States, the Project applicant shall obtain a Section 404 permit from USACE and a Section 401 Water Quality Certification from the RWQCB. The Project applicant shall comply with all terms and conditions of the permits/certifications issued by these regulatory agencies, including compensatory mitigation for loss of wetlands and waters of the United States and waters of the state as required by law. Compensatory mitigation may include on-site mitigation, off-site mitigation, and/or purchase of mitigation credits from an approved mitigation bank. Compensatory mitigation is subject to the review and approval of the USACE. The Project applicant shall provide Shasta County with evidence of any compensatory mitigation required by the USACE, which shall be at a minimum of 1:1.*

Mitigation Measure 3.4-8(b)*. Prior to any activities that would result in a substantial diversion or obstruct the natural flow of, or fill or discharge to a lake or streambed over which CDFW has jurisdiction, the Project applicant shall submit a notification of streambed alteration to CDFW and secure a streambed alteration agreement. The Project applicant shall provide Shasta County with evidence of any compensatory mitigation required by CDFW. Compensatory mitigation may include on-site mitigation, off-site mitigation, and/or purchase of mitigation credits from an approved mitigation bank. Compensatory mitigation is subject to the review and approval of the CDFW.*

Mitigation Measure 3.4-8(c)*. The Project applicant shall conduct construction activities that will affect watercourses and other waters of the United States/waters of the State shall be conducted during the dry season (typically May to November) to minimize erosion unless a wet-weather erosion and sediment control plan is reviewed and approved by the County.*

Impact 3.4-9: The proposed Project has the potential to interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites (Less than Significant)

Movement Corridors: The majority of the Project site would consist of the mine and processing areas in the central and eastern portions of the property. The proposed Project would include two quarry pits (the South Pit and North Pit), primary and secondary aggregate processing plants, an overburden storage area, a stockpiling and load-out area (including rail siding/spur for rail car loading), and associated infrastructure. An access road would connect the Project areas to Interstate 5. Areas to the north, south, and west of the proposed Project would remain as open space consisting of natural foothill woodlands.

The proposed Project may create small, localized barriers (i.e., highwalls in the pits, associated mining and mobile equipment activities, barren areas) for some wildlife species; however, the proposed Project would not cause an overall barrier to wildlife movement because wildlife corridors would still occur to the north, east, south, and west of the mine site. Other than the mine development and access road, no other Project features would act as local barriers or hazards to wildlife movement. The areas adjacent to, and surrounding, the mine site would continue to provide habitat for wildlife movement.

The only permanent, localized barrier to overland wildlife movement would be the highwalls in the pits; however, the development of these highwalls would be phased. The 65-acre South Pit would likely be excavated first, and would produce reserves sufficient to last approximately 20 to 30 years before excavations in the 220-acre North Pit either begin or make substantial progress. When quarry activities end in the South Pit, the pit would be reclaimed, reducing the amount of area disturbed at any period of time. The only area that would not be re-vegetated after operations are complete is the secondary and ancillary processing and load-out area; however, this area would include no physical barriers to wildlife. Additionally, the Moody Creek diversion channel, which would border the southwest side of this area, would provide a vegetated habitat around the processing and load-out area. Appendix V *Moody Flats Project: Wildlife Movement Corridors Technical Memorandum (*North State Resources February 7, 2014) illustrates the relationships between likely existing wildlife corridors and mine development areas over time are.

Project operational activities, such as nighttime lighting, nighttime loadout operations, noise and/or vibration from blasting, noise and/or vibration from operating stationary and mobile equipment, dust from mining and hauling operations, air pollution from operating stationary and mobile equipment, could disturb wildlife movement within the 802 acre limits of disturbance, but areas in the remainder of the Project site are not anticipated to be substantially disturbed by these operation activities.

The proposed Project is unlikely to directly or indirectly interfere substantially with resident or migratory wildlife movement or impede the use of native wildlife nursery sites because the

highwalls would be the only physical permanent barrier to overland wildlife movement, and excavation of the North Pit would not begin for 20 to 30 years after Project operations begin (approximately when excavation of the South Pit would end and reclamation of this area would begin). More than half of the 1,850 acre Project site would remain as wildlands, and the Project site is situated within the property such that wildlands would surround the mine development.

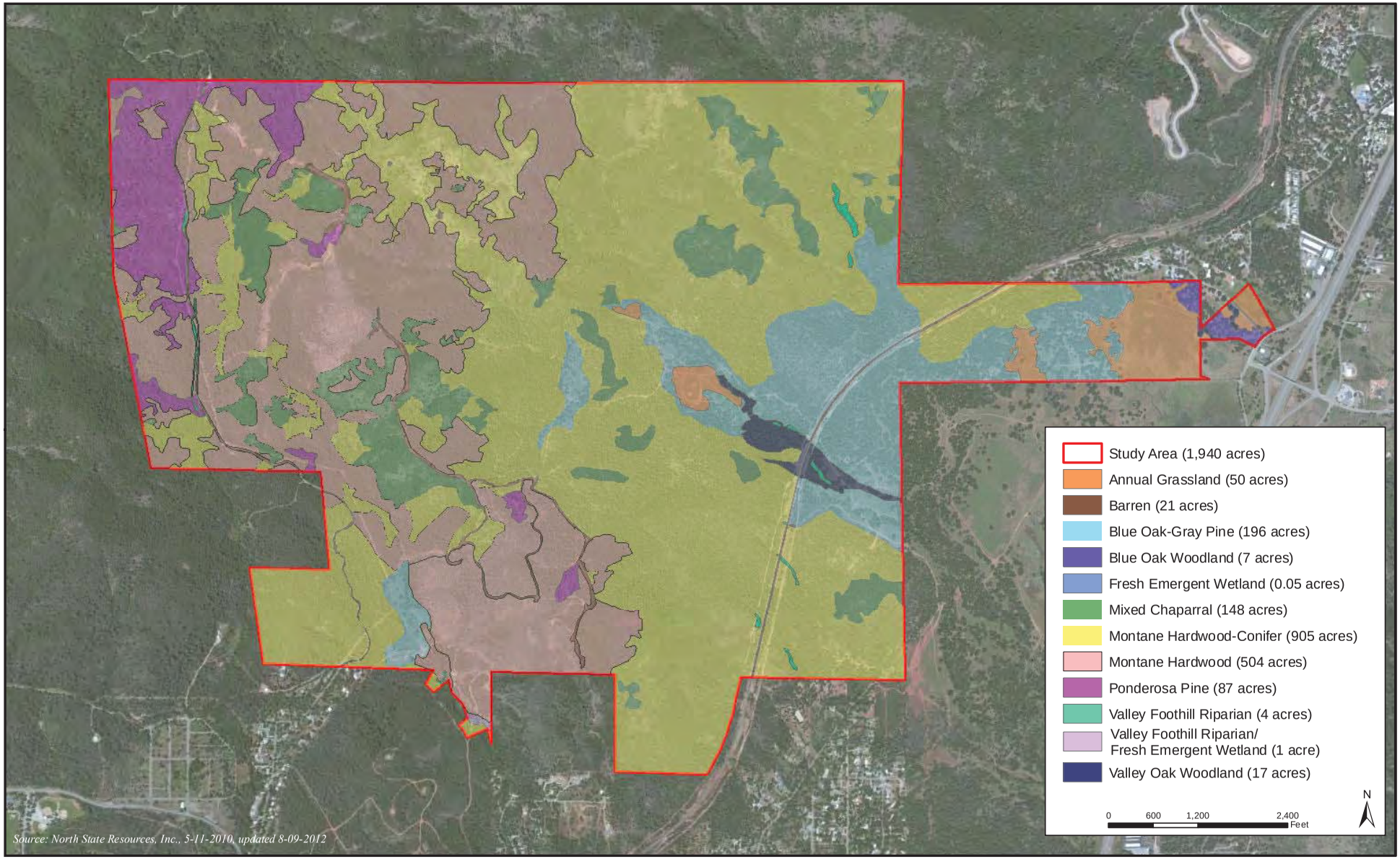
Migratory Deer. There are ten deer winter ranges within Shasta County. The Project site is not considered a critical winter range, fall holding area, or fawning ground for the regional deer populations. The proposed Project will eliminate deer habitat; however, this habitat is not considered sensitive habitat given that it is not critical winter range, fall holding area, or fawning ground. Additionally, the proposed Project would not cause fragmentation of habitat whereby the species can no longer move through the area. Implementation of the proposed Project would have a **less than significant** direct and indirect impact on migratory deer.

Impact 3.4-10: The proposed Project has the potential to conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (Less than Significant)

Shasta County has established three policies in the General Plan that are aimed at addressing the protection of special-status species, the preservation and protection of riparian and aquatic habitat, and the protection of salmon spawning habitat (Policies FW-c, FW-d, and FW-e). These policies are presented within the Fish and Wildlife Habitat section of the Resources Group Chapter in the General Plan, and are identified under the Regulatory Setting heading of this EIR section. The implementation of the mitigation measures identified in this section would ensure that the proposed Project would not conflict with any of these General Plan policies. The County does not have an adopted tree preservation program or oak woodland management plan. This is a **less than significant** impact.

Impact 3.4-11: The proposed Project has the potential to conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan (No Impact)

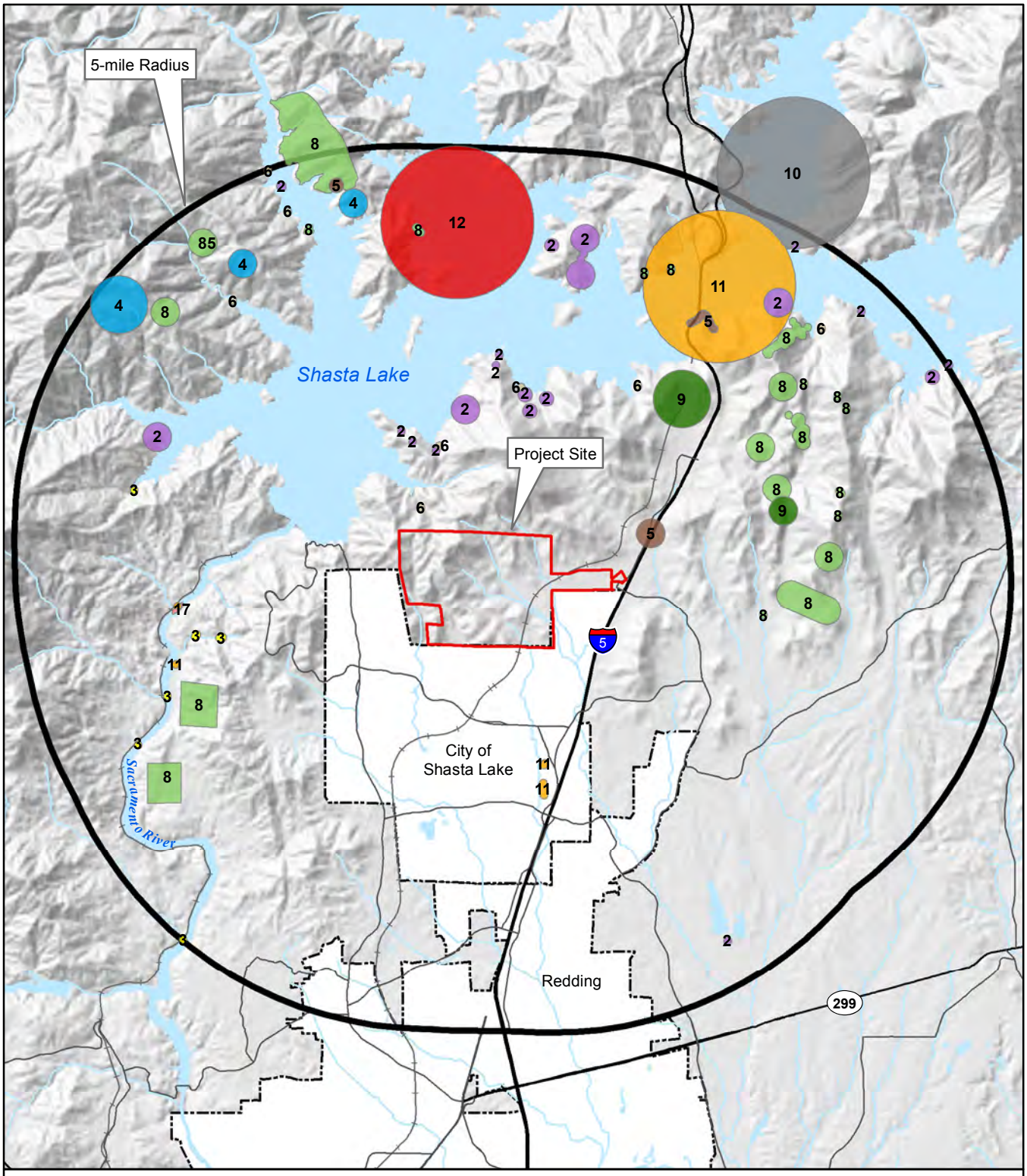
There are no Habitat Conservation Plans, Natural Community Conservation Plans, or other approved local, regional, or state habitat conservation plan in effect in Shasta County. Implementation of the proposed Project would have **no impact** relative to this environmental topic.



MOODY FLATS QUARRY EIR

Figure 3.4-1: CWHR Habitat Types

This page left intentionally blank.



MOODY FLATS EIR

Figure 3.4-2: CNDDB 5-mile Radius
Wildlife

1: Antioch Dunes anthicid beetle
2: bald eagle
3: foothill yellow-legged frog
4: Klamath sideband
5: Oregon shoulderband
6: Pacific fisher
7: Sacramento anthicid beetle
8: Shasta salamander
9: Shasta sideband
10: silver-haired bat
11: western pond turtle
12: Yuma myotis

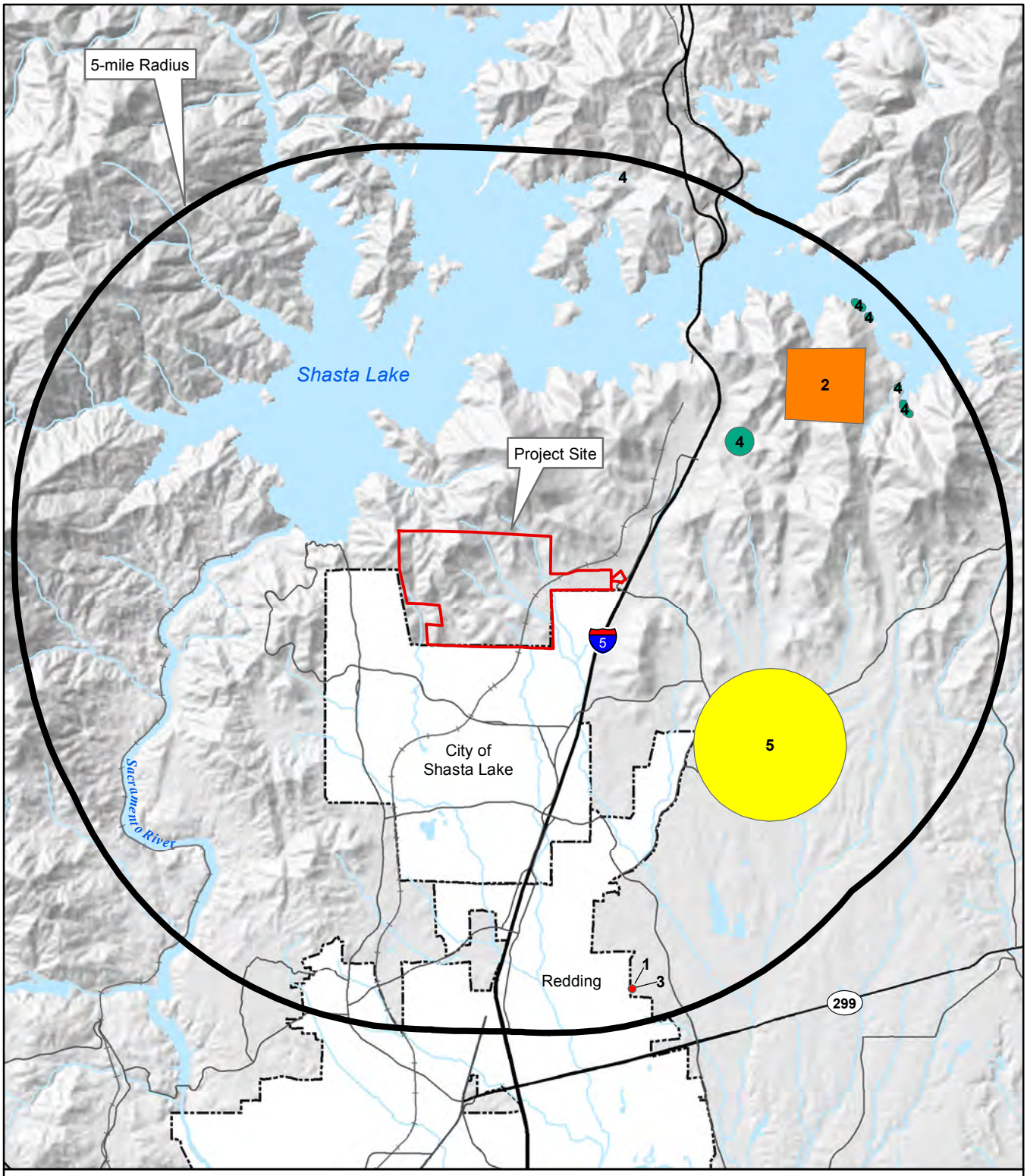
0 0.5 1
Miles

N

Sources: California Natural Diversity Database (2/7/2012). ESRI StreetMap North America. Map Date: May 8, 2013.

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



MOODY FLATS EIR

Figure 3.4-3: CNDDB 5-mile Radius
Plants

1: Henderson's bent grass
2: northern clarkia
3: Red Bluff dwarf rush
4: Shasta snow-wreath
5: silky cryptantha

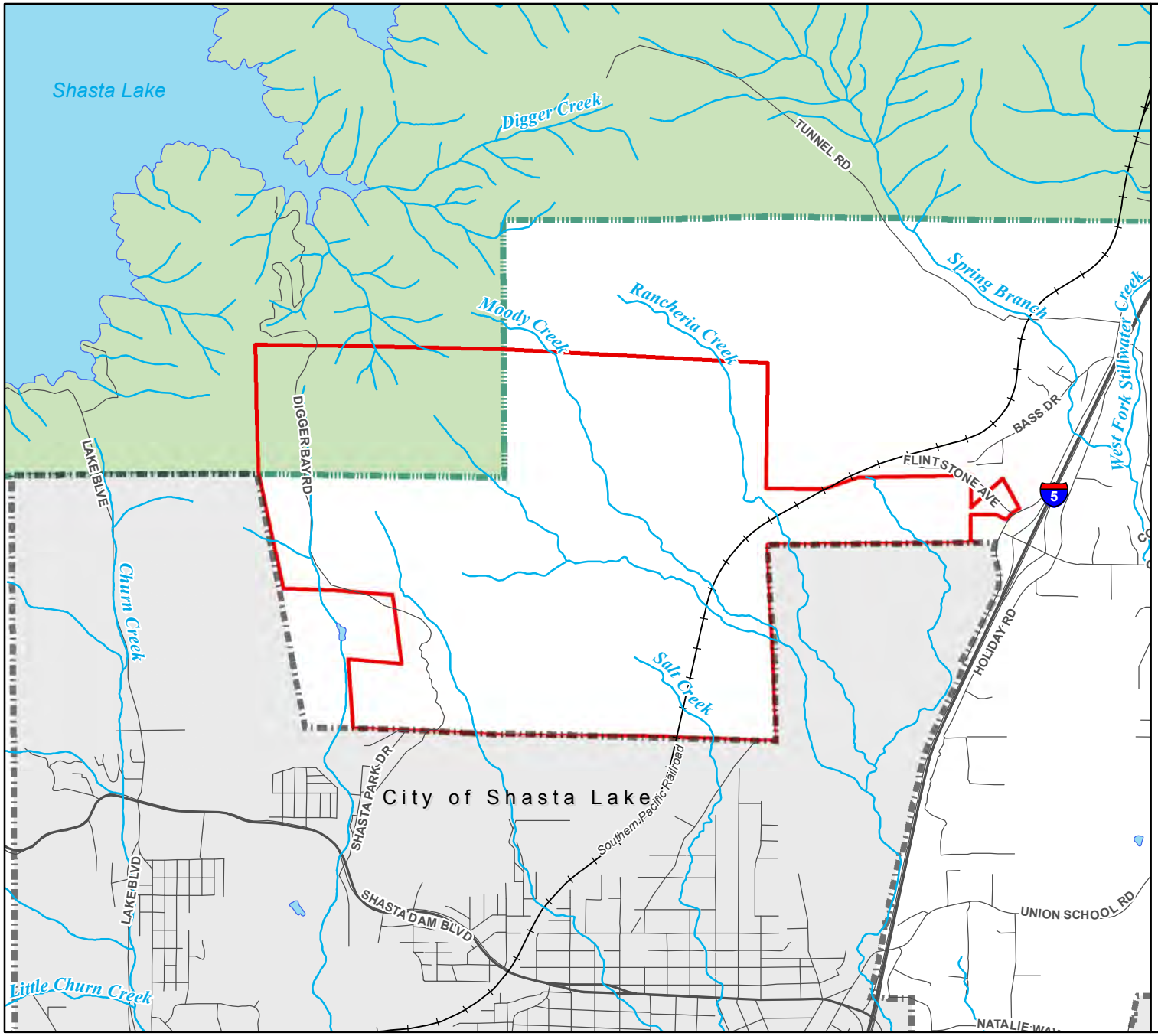
0 0.5 1
Miles

N

Sources: California Natural Diversity Database (2/7/2012). ESRI StreetMap North America. Map Date: May 8, 2013.

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



MOODY FLATS QUARRY EIR

Figure 3.4-4:
Regional Hydrography

- Streams and Rivers
- Water Bodies
- Project Site Boundary
- City of Shasta Lake
- Shasta-Trinity National Forest

N

0 1,000 2,000
Feet

Data sources: USGS National Hydrography Dataset; Shasta County GIS; ESRI StreetMap North America.
Map date: May 9, 2013.

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

This section provides a background discussion of the prehistoric period background, ethnographic background, the historic period background, known cultural resources in the region, the regulatory setting, an impact analysis, and mitigation measures. Comments were received during the public review period and scoping meeting on the Notice of Preparation regarding cultural resources from the following parties: Kelli Hayward, Wintu Tribe of Northern California (January 17, 2012), Robert Atwood (February 3, 2012), Sky Scholfield (February 14, 2012), Jay Schell (February 14, 2012), Robert McGill (February 13, 2012), Pamelyn Morgan (February 14, 2012), and Heidi Strand (February 8, 2012).

Each of the comments received are addressed within this section. Information in this section is derived primarily from the following sources:

- Shasta County General Plan, 2004
- Gold Districts of California (Division of Mines and Geology, Bulletin 193, 1970)
- California Gold Camps (University of California Press, Berkeley, Gudde, Erwin G., 1975)
- Handbook of the Indians of California (Bureau of American Ethnology Bulletin 78. Washington, Kroeber, Alfred L. 1925)
- Archaeological Inventory Survey 3M Development Project, c. 2,500 acres Near Mountain Gate, Shasta County, California, Sean Jensen (Genesis Society, 2006) **(Appendix O)**

The Project-specific Cultural Resources Inventory prepared by Genesis Society is attached to this Draft EIR as **Appendix O**. The Cultural Resources Inventory was professionally peer reviewed by Melinda Peak, Senior Historian/Archaeologist with Peak & Associates. Ms. Peak also provided supplemental information and analysis that was used in the preparation of this EIR section.

3.5.1 ENVIRONMENTAL SETTING

The Project site is located east of the Sacramento River at the northern-most end of the Sacramento Valley. The mountains of the North Coast Range rise to the west, the Klamath Mountains to the north, the volcanic deposits of the Cascade Range are to the east, with the remainder of the Sacramento Valley to the south. Structurally, the Sacramento Valley is a large, elongated, north-south trending, asymmetrical trough. Fringing this trough along its mountain borders are dissected uplands which have been structurally deformed and which are underlain primarily by unconsolidated continental deposits of the Pliocene and Pleistocene age.

Annual precipitation in this area is approximately 35-40 inches, most of which occurs as rainfall during the months of November through April. Warm, dry summer months have an average July maximum of over 100 degrees Fahrenheit (F) and winters exhibit an average January minimum in the mid-30 degrees F (Klaseen and Ellison 1974:53-54, 155). Native valley oaks (Quercus lobata) occur throughout the Project vicinity, particularly where pockets of deep soil have accumulated.

Prior to impacts related to historic mining activity and the airborne pollution from turn-of-the century copper processing facilities on the west side of the Sacramento River and to the south, blue oak (Q. Douglasii), interior live oak (Q. wislizenii), digger pine (Pinus sabiniana), small patches of manzanita (Arctostaphylos viscida), and various annual grasses and forbs were even more abundant than today.

Major streams within the Redding area and in the Project vicinity supported dense riparian associations that were often separated from forest and chaparral zones by stands of live oak, dwarf interior live oak, manzanita, Ceanothus and redbud. These interface zones provided abundant resources and excellent habitat for numerous species of mammals and birds, many of which exploited several of these zones concurrently.

The environment of the Project area has undergone some changes since the end of the Pleistocene. Paleoclimatic reconstructions by West (1983) suggest a shift from a warmer period in which plant zones were 300 meters higher in elevation and temperatures were 1.3-2.1 degrees Celsius warmer than at present, to the relatively cooler and moister conditions prevalent today in which plant zones have shifted downward and southward (West 1983:3.20-3.21). This shift is believed to have occurred around 2,500 to 2,800 years ago.

While the effects of long-term climatic change on environment and habitats are not fully assessed, there is no question that major environmental changes have occurred during very recent times. Biologically extractive practices during the past century-and-a-half have reduced soil nutrients in some areas, timber harvesting and livestock grazing have reduced the available biomass, and the elimination of the Indians' practice of annual burning has undoubtedly affected many of the primary ecological relationships which once existed throughout the Redding area. Combined with past mining, water diversion projects, recent urban expansion to the south, access road grading, and generalized vegetation clearing, there is no question that the environmental structure of this portion of Shasta County generally and portions of the Project area in particular have in fact been significantly altered over the years.

PREHISTORIC PERIOD

As it is necessary to discuss cultural events within a temporal framework, this Draft EIR uses a simple chronology proposed by Farber and Neuenschwander based on results from the Squaw Creek site (see below). This chronology is used, as suggested by the authors, simply as a convenient division of time for this cultural area that does not imply acceptance of any particular theoretical view of regional prehistory. The chronology formulated by Fredrickson for the North Coast Ranges has also been applied to the region (c.f. Peak & Associates 1984). His periods are temporal events, but they are defined by a dominance of certain economies, subsistence practices and general aspects of the ordering of society. The periods are generally similar to those offered earlier by Willey and Phillips and have a wide area of applicability, however, as pointed out by Farber and Neuenschwander, in the latest prehistoric period, the Emergent defined by Fredrickson, implies aspects of cultural development that are not documented ethnographically or archaeologically in much of the Cascades region. The following chronology simply offers a basic temporal framework within which to assess the particular events that were transpiring in northeast California, with particular reference to the southern Cascades, during the periods stated below.

The periods advanced by Farber and Neuenschwander, with approximate dates in years before the present (B.P.) are given below. The present is defined as 1950 on, to conform to radiocarbon dating conventions.

Early Prehistoric Period	7600 B.P.-5000 B.P.
Middle Prehistoric Period	5000 B.P.-1450 B.P.
Late Prehistoric Period	1450 B.P.-100 B.P.

There is some evidence of human presence in the region prior to the Early Period, but it is scanty. There are some flake-based industries from near Redding, but none have been reported along the Pit River and its environs. Fluted points and long-stemmed versions of the Great Basin Stemmed series (such as Lind Coulees and Cougar Mountain points) have been reported from Goose Lake and Fall River Mills Valley. Jensen and Farber have excavated a prehistoric period encampment near McDoel characterized by Great Basin Stemmed series points.

Early Prehistoric Period--Within the immediate Project vicinity, only Component I at Squaw Creek dates to the Early Prehistoric Period. At this time contacts with the North Coast Ranges and Central Valley are evident, with Borax Lake Wide Stems and other wide stem variant points present. Squaw Creek rises in the Klamath Mountains and flows south to the Pit River. Since Squaw Creek demonstrates North Coast and Valley influence, it is reasonable to expect that the influence was also present along the lower reaches of the Pit River. The Lorenzen site (Baumhoff and Olmsted 1963), far up the Pit River drainage, also contained Borax Lake points. The Borax Lake points are believed by Baumhoff and Olmsted to date later than their age at Squaw Creek, but this may be a measure of site disturbance or excavation techniques. Sixteen similar points have been reported from Sacramento Canyon sites (Goldberg and Raven 1983; Basgall and Hildebrandt 1987:170-175). Kowta (1984) sees some relationship between site location for this temporal period and Elk distribution in northern California. He believes that the people who used the wide stem points were highly mobile big game hunters who travelled in small bands.

With only one component at one site providing the bulk of the data, plus inferences from surrounding areas, there is little that can be said about the settlement and subsistence practices of the early period in the Project vicinity beyond what has been mentioned above. The earliest deposits at Squaw Creek appear to reflect occasional visits by a highly mobile band practicing, primarily, big game hunting supplemented with collection and processing of seeds. As time went on their use of the site became more substantial, new forms of dart points became the norm and reliance on plant foods increased (Clewett and Sundahl 1983:83). The shift to different point styles could result from a change in hunting practices (lowered emphasis on big game?), an improved technology for taking large game, or a change in the group using the site to a population with different cultural affiliations.

Middle Prehistoric Period--The long time span assigned to Component II at Squaw Creek defines the Middle Prehistoric Period. This period stretches from the first intensive occupation of most sites in the southern Cascades through the introduction of the bow and arrow and generally features a population with less emphasis on big game hunting and more emphasis on vegetable food collecting and processing. Over time, these groups become increasingly adapted to their environment, in part by responding to long term changes in environmental conditions. This long term period is broken up into more than one major cultural phase in all of the archaeological sequences in the region, including Squaw

Creek after reanalysis of Component II based on results from the Clickapudi Creek sites.

The earliest defined occupation phase from the upper Sacramento Valley is the Pollard Flat phase (Basgall and Hildebrandt 1987). The point forms characteristic of this period were familiar from the Squaw Creek report, but not named (other than the McKee point forms) until Basgall and Hildebrandt defined the Squaw Creek Contracting Stem and Pollard Diamond-shaped types. These points also characterize the early portion (through about 3,000 B.P.) of Component II at Squaw Creek and Component III at Clickapudi (Clewett and Sundahl 1979, 1980, 1981, 1982). All of these components are quite similar in that a wide variety of tool forms are present, including a relatively high frequency of non-utilitarian tools, reflecting a variety of activities at the site. Basgall and Hildebrandt (1987:445) interpret this as reflecting a rather stable version of a forager settlement/subsistence strategy wherein a group moves regularly from one base camp to another located in areas where resources are readily obtained near to the base camp. They note that the number of non-utilitarian objects does not fit well with the standard definition of this system (Binford 1980) and suggest that the sites were occupied for relatively lengthy periods each year because a long-lasting warm-dry interval (West 1987:36-55) had created a favorable ecological situation.

The latter part of the Middle Prehistoric Period in this region is represented by the latter part of Component II at Squaw Creek, all of Component II at Clickapudi and the Vollmers phase in the Sacramento Canyon. This phase is characterized by Clickapudi Notched series projectile points. In all of the above areas this phase sees reduced intensity of occupation at individual sites and more diversity of artifact complement between sites. Basgall and Hidebrandt believe that this represents a shift to a fission-fusion adaptive strategy wherein the population gathered in large residential base camps in the fall and winter, but in the spring divided into small groups that moved regularly to favored collection areas; that is, followed a forager strategy for the rest of the year. The components noted above, therefore, would reflect the smaller, specialized, resource collection camps. Basgall and Hildebrandt (1987: 449-450) believe that the winter base camps related to the Sacramento Canyon sites are located on Clear Creek near Whiskeytown Dam, at sites previously thought to be later in time. These sites include well-developed middens with a diverse artifact assemblage and non-utilitarian artifacts are common.

It is reasonable to suppose that the time period was represented by more elaborate sites than are seen in the Sacramento Canyon in this period. For instance, on the Mendocino Coast during the same period, the obsidian is dominated by Medicine Lake sources (Peak and Noble 1983), indicating an extended exchange system. Oddly, at this same time obsidian at Squaw Creek is predominantly derived from local (Tuscan) sources, even though Medicine Lake sources are favored in the preceding and succeeding periods at the same site. To further complicate matters, a recent study by Hamusek-McGann (1993:164-168) found that obsidian from four sites on lower Squaw Creek showed a fairly even division between local Tuscan sources and Medicine Lake sources while sites on upper Squaw Creek produced a preponderance of obsidian derived from the Medicine Lake area.

It appears that Pollard Flat and Vollmers occupations in the Sacramento Canyon overlap in time, by as much as 1,800 years. This is, to say the least, an unusual situation that may reflect two groups using the area seasonally for different purposes. On the other hand, the Pollard Flat components seem to be

substantial, if seasonal, occupations and it is difficult to see why they would leave the area just as some resource attractive to Vollmers phase people became available. There is some evidence of increasing hostility toward the end of the Pollard Flat phase (Basgall and Hildebrandt 1987:457) and the authors feel that a cultural boundary situation, with the exact location of the boundary shifting over time, is the most likely explanation.

Late Prehistoric Period--The introduction of the bow and arrow marks the beginning of the Late Prehistoric Period. This is considered a prime temporal marker, since the appearance of smaller projectile points begins almost everywhere at this time *circa* 1700 B.P. to 1500 B.P. In some areas, its introduction is accompanied by a simple reduction in size of the projectile point forms currently used in the region. Elsewhere, the introduction of the bow and arrow apparently came as a package, that is, the style of the new, smaller point forms were completely different from the earlier forms.

Perhaps correlated with the results of the introduction of the bow and arrow, but occurring somewhat later in time depending on the region, was a widespread intensification of resource exploitation. For the southeast Great Basin, Bettinger and Baumhoff (1982) see this as a shift to resources requiring comparatively high energy to process but which are common (i.e., grass seeds), in comparison to those requiring less energy to process but are less common or are more widely distributed (i.e., deer). The shift in the Central Valley is clearly towards acorn processing and an anadromous fishing emphasis, seen in the Northern Valley as the Shasta Complex, which appears to coincide with the movement of the Wintu into the area. In the southern Cascades there appears to be a more conservative response, which Clewett and Sundahl (1983) term the Tehama Complex.

The Tehama Complex reflects a seasonal round similar to the ethnographic for the Yana, i.e., villages are seasonally occupied, there are diversified resource exploitation strategies, and seasonal settlements are located both on major rivers and their tributaries. This seasonal scheduling stands in contrast to that of the Shasta Complex is better correlated with the population increase and intensified resource exploitation characteristic of that period. The villages are permanent, located next to the major rivers, and there is heavy reliance upon anadromous fish and acorns. In the Sacramento Canyon the Mosquito Creek phase reflects this period. Like the preceding Vollmers phase, the sites are relatively small with a limited variety of artifacts, representing the specialized spring-summer camps similar to the Shasta Complex. However, Basgall and Hildebrandt (1987:450-451) are not convinced that these sites represent the Shasta Complex as exemplified in the Redding vicinity and they certainly do not reflect the Tehama Pattern. Farber (1985) also does not accept the Shasta/Tehama dichotomy and argues that the Tehama Complex is, basically, the Shasta Complex adapted to the differing environmental constraints of the foothills versus the valley. This conclusion is drawn from excavations of two sites near Redding (Farber and Neuenschwander 1984; Farber, Ritter and Jensen 1985) where mano and metate technology, absent in the Shasta Complex according to Sundahl (1982), appears with otherwise typical Shasta Complex materials.

Another regional issue involves the question of whether these cultural expressions fit comfortably into the taxonomic scheme advanced by Fredrickson based on research in the North Coast Ranges. Clewett and Sundahl (1983:84-85) accept the suggestion by Bennyhoff (1982) that the Shasta Complex should be considered the Shasta Aspect of the Augustine Pattern and they assign the Tehama Complex and the

Mill Creek Complex to this Pattern as well. At a greater time depth, they consider the earliest evidence at Squaw Creek, with wide stem projectile points, etc., to be the Squaw Creek Aspect of the Borax Lake Pattern. As noted above, other researches object to this terminology on the grounds that it implies more about the cultures involved than is supported by currently available data.

Farber's suggestion of essential continuity between the Shasta and Tehama complexes has gained little acceptance, in part because the Shasta Complex is identified with the Wintu, a group speaking a Penutian language that moved into the northern Sacramento Valley from the south in the Late Prehistoric Period. It is assumed that they displaced a population that spoke a language of the Hokan family, since Hokan languages surrounded Wintu territory at the time of Euro-American contact. The similarities seen in the earlier prehistoric periods between the North Coast Ranges and the prehistoric cultures of Shasta and Tehama Counties are then viewed as a reflection of a widespread Hokan occupation of northern California with similar subsistence strategies and technology. If there is not a strong dichotomy between the Shasta Complex and the Tehama Complex (and certainly there are more differences than presence of absence of mano and metate) then the identification of population movements and external relationships becomes a much more difficult archaeological problem.

The Late Prehistoric Period in the above areas is heralded by the appearance of the Gunther series, as well as small corner-notched and side-notched point forms believed to be smaller versions of dart point forms that preceded them in this region (Clewett and Sundahl 1983). The Tehama Complex is the earliest appearance of the period in this region and is replaced by the Shasta Complex *circa* 1200 B.P., both in the lower Pit River and upper Sacramento Valley areas. Gunther series points only comprise part of the projectile point forms in the Tehama Complex, but they become dominant in the Shasta Complex. There is a strong southern Cascade influence demonstrated by the small side- and corner-notched point specimens. The relatively few Desert Side Notched and Cottonwood Triangular points are a measure of the lessened Great Basin influence, which clearly is not a major factor.

ETHNOGRAPHIC BACKGROUND

The Wintu are the northernmost dialectical groups of the Wintun, whose territory roughly incorporates the western side of the Sacramento Valley from the Carquinez Straits north to include most of the upper Sacramento River drainage, the McCloud River, and the lower reaches of the Pit River. The Wintun, a collective name, were subdivided into three sub-groups with the Southern, Central, and the Northern dialects known respectively as Patwin, Nomlaki, and Wintu. The northernmost group was further divided into nine sub-areas, with the Project area being located within the Redding (Keswick) Sub-group's territory (DuBois 1935: Map 1; LaPena 1978).

Wintu subsistence was based on three main staples: deer, acorns and salmon. All three were abundant within the Redding area, although the latter two were available only seasonally. So crucial was salmon as a food resource to the Wintu and other groups of northern California that the availability of this food source has been used as an important variable in assessing prehistoric population levels (Baurnhoff 1963) and is considered a major determinant of site distribution among various other California Indian groups (Chartkoff and Chartkoff 1975; Raven et al. 1984). Deer also constituted a major dietary staple, a food source that was both abundant and available essentially

year-round. Lastly, acorns constituted the third primary staple of the Wintu, seasonally abundant as well as storable.

The available ethnographic information documents a pattern of land use, settlement and subsistence that was quite complex. The salmon runs, the locations of seasonally available big game (especially deer), and the distribution of acorn-yielding oak trees, which together supplied the primary staples, required major forays from the home base since all three were concentrated in different areas. This form of resource exploitation required not only that permanent villages be established, particularly along the Sacramento River and other major drainages, including Moody and Rancheria Creeks within the Project area, but that seasonal use be made of a wide variety of other habitat zones, where less-permanent villages/camps were established and special-purpose activities undertaken. In consideration of this fact, and supported by the results of previous archaeological survey on nearby land, the following prehistoric site types considered potentially present within this area include:

- Surface scatters of lithic artifacts and debitage associated with dark brown to black "midden" deposits resulting from fairly substantial encampments. Within the Project area and elsewhere around Redding, such sites are frequently located adjacent or close to perennial water sources, as along the Project area's Moody and Rancheria Creeks, especially at confluences with smaller, ephemeral tributaries.
- Surface scatters of lithic artifacts and debitage without associated middens, resulting from short-term occupation and/or specialized economic activities.
- Bedrock milling stations, including both mortar holes and metate slicks, located in areas where bedrock is exposed, particularly along stream channels.
- Petroglyphs, especially bedrock outcrops whose surfaces contain numerous "cupules".
- Isolated finds of aboriginal artifacts and flakes. Large, fine-grained basalt cobbles are frequently encountered along stream channels throughout much of the Redding area, and were often "assayed" in place resulting in isolated large cores and tabular flakes.

Based upon extensive archaeological excavations in the Redding area, a fairly long prehistoric sequence has emerged. This long sequence was apparently punctuated, and has in fact been largely defined by several cultural introductions that may have coincided with population movements into the region. Specifically, the earliest occupants of this portion of northern California are believed to have been Hokan-speakers whose material culture closely resembled the Borax Lake and Mendocino Complexes assemblages dating to a similar time period. While population density was probably relatively low during this period (c. 4,500 B.C. to A.D. 200), these people were widely distributed throughout the region and presumably were making use of portions of the Sacramento Valley floor and probably utilizing acorns. Large, wide-stemmed projectile points and manos and metates are frequently encountered artifact types associated with this period.

Sometime between A.D. 200 and A.D. 500, Penutian-speaking immigrants are believed, on the basis of linguistic (Whistler 1977) and other evidence, to have entered the region and initially disrupted but eventually to have displaced Hokan occupants in many areas. The Penutian subsistence pattern and related technology were, it has been hypothesized, more suited to the exploitation of a riverine

environment and to more intensive and extensive use of bulbs and other plants. This was coupled with animal and fishing products more intensively processed with mortars and pestles, corner-notched and small stemmed projectile points more suited for use with bows and arrows, and a variety of other more specialized technological devices. The abundance of fish, clams, bulbs, tules, acorns and other resources, coupled with the Penutian penchant for more intensive and extensive exploitation of these items, are believed to have resulted in a rapid population increase which eventually resulted in the Penutians displacing the Hokan occupants from the Sacramento Valley floor and portions of the adjacent foothills and mountain ranges on both sides of the Sacramento Valley. This process was still underway at the time of Euro-American contact in the mid-19th century.

HISTORIC PERIOD BACKGROUND

As a consequence of geographical isolation, the historic era began comparatively late in the Shasta area. Although Spanish explorers and missionaries settled in California in 1769, they remained on the coast, leaving the northeast corner of the state for later exploration. For more than half a century after the Spanish occupied California, Shasta County remained locked in its geographic isolation, a land unknown to all Euro-Americans.

When Mexico established its independence from Spain in 1821, California became a semi-independent colony of the New Mexican Republic; and the Franciscan rule in California began to give way to a new secular order. The leaders in this new order formed another sort of society, a kind of rural patriarchy based upon wealth in cattle, horses, and land, over which presided a closely linked alliance of family leaders, essentially a class of *hidalgos* that sought to expand their own privileges and powers like a frontier type of medieval lord.

This new class of Californio elite also found itself welcoming more and more foreigners to their once isolated communities. The accumulating wealth of these men made them more eager for trade in the fine goods and manufactured luxuries that could not be supplied by Mexico. British and American shipmasters, attracted to the Pacific Coast first for the sea otter trade, diversified and expanded into other industries by exchanging their manufactured goods for the Californios' cattle hides and rendered tallow--products that had a market in the shoe and candle industry in England and New England. By the 1830s, because of this activity, the Californios opened their country to an expanding system of commerce and trade that made it a lively, active outpost of mercantile capitalism on the Pacific Coast.

Initially, these activities did not immediately affect Shasta County, but they did have a distant, indirect impact. Northward, in the Oregon country, the British Hudson's Bay Company had secured its own commercial monopoly by 1821, establishing its headquarters at Fort Vancouver on the Columbia River. The company governor, Dr. John McLoughlin, directed a sophisticated strategy that led his fur hunters to California. Because of his concern to preempt American competitors and secure the Northwest's premium beaver furs for his company, Dr. McLoughlin sent annual expeditions into the Snake River country--a vast region between the Rocky Mountains and the Great Salt Lake on the east and Oregon's Cascade Range on the west. Led by Peter Skene Ogden, after 1824, these Snake River brigades had orders to trap the beaver to exhaustion in the Snake River drainage and northern Great Basin. Hudson's

Bay company men would make their profit and leave the Snake River country barren of furs; thus, giving the American fur hunters no reason to invade this part of the British company's domain (Cline 1974:62-64).

During his 1826-27 expedition with the Snake River brigade, Peter Skene Ogden became the first fur hunter to reach the Pit River. He named the waterway the Pit River because of the number of animal pit traps that the local Indians had constructed. Ogden's exploration opened the area to other trappers. The Americans entered the territory when Jedediah Smith took a southern route into California and trapped his way up the American River, eventually working his way northeast to Fort Vancouver.

As more trappers explored the area, they established several routes of travel. In 1846, by the onset of the war with Mexico, British and American fur traders and immigrants had carried out a substantial exploration of northern California, including the Upper Pit River country and Shasta County, where neither the Spanish nor the Mexican authorities had ventured. The various expeditions, mostly commercial in their objectives, had made clear the geographical outlines of the region, demonstrating among other points, that it was the only stream south of the Columbia River to pass through the Cascade-Sierra mountain barrier from the interior region. These same expeditions had also demonstrated that no resources of important commercial value could be found in the Upper Pit River country to attract immigrants into the region. No longer an unknown land, by 1846 this area still remained well beyond the periphery of development for the expanding Anglo-American civilization.

Pierson B. Reading came west in 1843 with the Chiles-Walker party. Reading passed through Shasta County before eventually arriving at Sutter's Fort. He worked for Sutter for a year and was able to obtain a land grant of 26,000 acres, Rancho Buena Ventura, the most northerly land grant in California, from the Governor Micheltorena. A house was constructed for Reading's overseer of the rancho, in 1845 and the land was stocked with cattle. He later built an adobe on the west bank of the Sacramento River near its confluence with Cottonwood Creek, seven miles east of the community of Cottonwood.

Although Major Reading first discovered gold in Clear Creek in 1848, the area initially did not attract the hoards of miners that descended on Coloma and its environs. Reading's early discovery had proved the existence of profitable placer deposits in this region, making it certain others would also come crowding to sluice the gravels and pan the dark sands of the local rivers and streams.

Shasta County was established in 1850, one of the 27 original counties in California. At first it included all the territory that later became Modoc and Lassen counties, as well as portions of Plumas, Siskyou and Tehama counties. The original County seat was located at Reading's Ranch.

From 1852 through the rest of the nineteenth century, mining became the first, most basic industry in the region. Mining has remained important to the local economy during the twentieth century as well, though periods of renewed productivity have alternated sharply with periods of decline or even the complete shutdown of mining operations. This pattern of alternating boom and bust, inherent within the precious metals mining industry throughout the American West and worldwide has been exaggerated in the Project region by the geological characteristics of its mineral deposits. Predominantly, the mineral wealth of the Shasta area is in the form of copper in deposits of massive sulfide ore that also contain zinc, lead, silver, and gold, among other minerals. Quartz deposits, which

elsewhere have provided a more stable base for the gold mining economy, are rare within this region (Lydon and O'Brien 1974:17).

The second prominent industry of the Shasta region is lumbering. Like the mining industry, the lumber market was subject to outside influences. Initially, the lumber industry in the area supplied the settlers and miners in the region with wood for constructing houses, wagons, and flumes. The industry grew in spurts in the 1900s. The San Francisco earthquake of 1906 created a surge in the demand for lumber when people were rebuilding, but when San Francisco had been reconstructed, the demand for lumber waned (Lawson 1986:89-92).

The next surge in the lumber industry came with the United State's entry into World War (WW) I. The country needed lumber for the construction of barracks at training bases and California's resources helped supply that need. Once the army had constructed their barracks, however, the need for lumber subsided once again. WWII brought similar demands on the lumber industry but this demand continued after the war when soldiers returning to the United States wanted to purchase homes made affordable by loans available through the GI Bill. These fluctuations continued. Although there was a slight lull in the market in the 1950s, the 1960s and 1970s brought a rebound to the industry as the Baby Boomers--the children born in the late 1940s and 1950s--reached maturity and started their own families, driving up the demand for new housing. Adding to the demand for construction-grade lumber, some mills also manufactured Novoply, a new type of particleboard invented in the 1970s (Lawson 1986:89-92).

In 1871 the Southern Pacific Railroad reached Redding, terminating near Waugh's Ferry on the Sacramento River. Twelve years later, in 1883, the Southern Pacific was extended north of Waugh's Ferry, proceeding along the west side of the Sacramento River and then up into the Sacramento River Canyon. As part of the Shasta Dam construction project of the 1940's, the Southern Pacific Railroad (now the Union Pacific) was re-routed to the east, where it partially followed or paralleled the old Buckeye Road (site CA-SHA-1447-H) described above. This re-routed section of Southern Pacific proceeds through the southeast quadrant of the present Project area.

In addition, portions of the Project area were allotted to Native American individuals who may have lived on the land. Some tracts of land were sold by the Native Americans to their neighbors.

KNOWN CULTURAL RESOURCES IN SHASTA COUNTY

According to the Northeast Information Center of the California Historical Resources Information system, as of August 2008, 4,471 cultural resources identified within Shasta County have been assigned primary identification numbers. This includes cultural resources that are assigned primary numbers only (isolated artifacts, resources that lack complete documentation, State Landmarks) and those resources that are more comprehensive in nature and have been documented to standards established by the Office of Historic Preservation. This second category receives both a permanent and primary number.

Site types present, or expected to exist, within Shasta County include prehistoric period occupation areas (both short and long term), burial areas, ceremonial areas, resource collection and processing sites, lithic scatters, quarries, rock art sites, trails, and isolated examples of prehistoric period artifacts.

Relevant cultural resources may include post-contact Native American occupation and ceremonial areas, trails, roads, railroads, small and large-scale mining features, logging features, occupation areas (short and long term), buildings, structures, water conveyance features (ditches), quarries, Shasta Dam construction-related features, trash dumps, and cemeteries.

In general, prehistoric period cultural resources were situated in the most favored environmental settings—areas adjacent to permanent water sources such as the Sacramento and Pit rivers, with relatively level topography. This is also true of most historic period resources, with the exception of mining related features and settlements where the discovery of a mineral deposit did not always correspond with a favored environmental setting. It is important to note that a lower sensitivity area could still contain resources, and the review of all areas proposed for impact should always be indicated.

KNOWN CULTURAL RESOURCES WITHIN THE PROJECT SITE

The records of the Northeast Information Center (CSU-Chico) were examined for existing recorded prehistoric and historic sites (I.C. File# W06-148). In addition to examining records at the Northeast Information Center at CSU-Chico, the following sources were also consulted while at the Information Center, or separately:

- The National Register of Historic Places (1986, and supplements).
- The California Register of Historical Resources.
- The California Inventory of Historic Resources (State of California 1976).
- The California Historical Landmarks (State of California 1996).
- The California Points of Historical Interest (May 1992 and updates).
- The Historic Property Data File (OHP 8/06).
- GLO Plats and Historic County Maps.

The Project area had been partially surveyed in the past by James Dotta and Peak & Associates. Several surveys had been conducted in the Project vicinity. Three sites have been recorded within the Project area, two of which represent prehistoric sites (CA-SHA-208 and CA-SHA-210), with the remaining site comprised of both prehistoric and historic components (CA-SHA-209). As well, an unrecorded segment of an historic road corridor (elsewhere recorded as CA-SHA-1447-H) is documented as being present within the extreme southeast corner of the Project area, and an unrecorded segment of Southern Pacific Railroad (CA-SHA-3547-H).

Native American Concerns

The Native American Heritage Commission was contacted for a check of Sacred Lands within the Project area. The NAHC responded on September 26, 2006, with no listings, but provided a list of Native American groups and individuals who might have knowledge regarding the Project area. Letters requesting comment on the Project were sent to eleven organizations and individuals, including:

- Carol Bowen.
- Carol Sinclair.
- Colusa Indian Community Council.

- Loretta Root.
- Mathew Root.
- Paskenta Band of Nomlaki.
- Redding Rancheria.
- Winnemem Wintu Tribe.
- Pit River Tribe Environmental Council.
- United Tribe of Northern California.
- Wintu Tribe of Northern California.

One response was received from the Redding Rancheria.

Field Studies

A Cultural Resources Inventory (CRI) was prepared for the proposed Project in December 2006 by the Genesis Society. The Genesis Society completed a survey of the property with the following results:

As noted in the records search, three prehistoric sites had been previously recorded within the subject property, all of which were re-recorded during the present Project analysis:

- *Site CA-SHA-208,* habitation site.
- *Site CA-SHA-209,* habitation site.
- *Site CA-SHA-210,* habitation site.

In addition, four newly identified prehistoric sites were encountered and recorded:

- *Site "3M-I",* habitation site, that also contains a minor historic component.
- *Site "3M-2",* habitation site.
- *Site "3M-3",* habitation site.
- *Site "3M-4",* habitation site.

Lastly, four newly identified historic sites were observed and recorded:

- *Site CA-SHA-1447-H,* unrecorded segment of historic Buckeye Road.
- *Site CA-SHA-3547-H,* unrecorded segment of Southern Pacific Railroad. *Site "3M-5",* small ditch without associated features or artifacts.
- *Site "3M-6",* trash scatter dating to the 1930s-1960s without additional features.

The locations of the sites listed above are known, and have been documented. However, as required by law, a map showing the location of these sites is intentionally omitted from this EIR in order to preserve the integrity of the sites.

Site Descriptions

PREHISTORIC SITES

Site CA-SHA-208: This site was originally recorded by Jim Dotta (no date given) as a prehistoric habitation site located on both the north and south sides of Moody Creek. The site was described as containing a substantial dark, ashy midden[1], with house pit depressions on both the north (four house pits) and south (one house pit) sides of the creek. As well, historic-era features (one residential foundation and a well) were described as being present within the southern portion of the site. Finally, vandalism in the form of "pot hunter" pits was noted by Dotta throughout the site.

During the present field inspection it was determined that prehistoric and historic-era features were more widely distributed that indicated by Dotta, and that Moody Creek divided what appeared to be two separate habitation areas, one north of the creek and one south of the creek. During the cultural research for the present Project, a Primary Record Update was prepared in which the cultural material located on the north side of Moody Creek was redesignated site CA-SHA-208. A new Primary Record was then prepared for the cultural materials located on the south side, for which the temporary site designation 3M-1 has been applied and a permanent Trinomial site number requested from the Northeast Information Center. The new site "3M-1" is described below.

Site CA-SHA-208, based on the revised designation noted above, consists of a prehistoric habitation area that extends approximately 125 meters in length (north-south), with a maximum width of 55 meters. This component is identifiable by a surface lithic scatter and a subsurface component contained in a dark brown-black soil ("midden"). The surface lithic component includes waste flakes, cores, and tools of basalt, with the subsurface component being observed at various locations via rodent holes, traced with trowel probes, and evident in the sidewalls of exposed vandal pits present throughout the site area. Depth of this deposit was not formally determined during the present Project, but likely exceeds 40-50 centimeters (cm).

A total of eight house pits were observed, measuring between two and three meters in diameter with central depressions averaging approximately 50 cm below the surrounding land surface. As noted above, extensive vandalism ("pot hunting", excavation) has occurred throughout the site, including within some of the house pits. Additional disturbance was observed in the form of graded access roads within the northeastern portion of the site, as well as contemporary trash and vehicles abandoned along these roads. No additional features (no bedrock mortars, petroglyphs) were observed on the surface during site recordation.

---

[1] A mound or deposit containing shells, animal bones, and other refuse that indicates the site of a human settlement.

This site may meet National Register of Historic Places (NHRP) eligibility criteria in Section 106(d).

Site CA-SHA-209: This site was originally recorded by Jim Dotta (no date given) as a "midden situated on a point of land formed by a creek and dry gully ... [and as containing a] ...loose ashy midden extending approximately 250 feet in length by 60 feet in width, a dense lithic scatter, trade beads and human remains." Also noted were brick and stone foundation remains associated with several almond and fig trees.

During the present Project the site record was updated. Based on current observations, the site represents a prehistoric habitation area extending approximately 95 meters in length (north-south), with a maximum width of 40 meters. This site is identifiable by a surface lithic scatter and a subsurface component contained in a dark brown-black soil, with the surface component including waste flakes, cores, and tools of basalt and obsidian and an estimated midden depth in excess of 40 cm based on examination of open vandal holes and troweled areas. Sixteen house pit depressions are visible, varying from approximately two to three meters in diameter with the center of the pits averaging 30-50 cm depth below the surrounding ground surface. Extensive disturbance to the site area is present in the form of multiple vandal pits, as noted above, with additional impacts resulted from a foot path or ATV path which trends north-south through the western portion of the site. No additional features (i.e., bedrock mortars, petroglyphs) were observed on the surface during site recordation.

This site may meet NHRP eligibility criteria in Section 106(d).

Site CA-SHA-210: This site was originally recorded by Jim Dotta (no date given) and described as a "midden at bottom of deep, narrow valley ... [and as]...extending approximately 50 feet in length and width, and consisting of loose, ashy midden."

During the present Project the site record was updated. Based on current observations, the site represents a prehistoric habitation area extending approximately 25 meters in length (north-south), with a maximum width of 14 meters. This site is identifiable by a surface lithic scatter and a subsurface component contained in a dark brown-black soil, with the surface lithic component including waste flakes, cores, and tools of basalt and obsidian and an estimated midden depth in excess of 40-50 cm based on examination of open vandal holes and troweled areas. Four house pits are visible, varying from approximately two to three meters in diameter with the center of the pits averaging 30-50 cm depth below the surrounding ground surface. Extensive disturbance to the site is evident in the form of multiple vandal pits and grading of a narrow access road through the site. No additional features (i.e., bedrock mortars, petroglyphs) were observed on the surface during site recordation.

This site may meet NHRP eligibility criteria in Section 106(d).

Site 3M-I: This site was originally identified by Jim Dotta (no date given) who had located prehistoric cultural material on both the north and south sides of Moody Creek. During the present Project it was determined that prehistoric and historic-era features were more widely distributed than originally believed, specifically, that Moody Creek divided what appeared to be two separate

prehistoric habitation areas, one north of the creek and one south of the creek. The present site represents the cultural material located on the south side of Moody Creek, separating it from material on the north side of the creek which retains Dotta's original site designation of CA-SHA-208 (see revised description of site SHA-208, above).

Site 3M-1, based on current observations and re-recording per the above paragraph, consists of a pre-historic habitation area that extends approximately 90 meters in length (northwest- southeast), with a maximum width of 30 meters. This component is identifiable by a surface lithic scatter and a subsurface component contained in a dark brown-black soil. The surface lithic component includes waste flakes, cores, and tools of basalt, and a subsurface component in excess of 40-50 cm depth, based on trowel probes and examination of the extensive vandal pits present throughout the site area. Additional disturbance is evident in the form of a graded access road trending through the central portion of the site.

No bedrock mortars, petroglyphs, or housepit depressions were observed, despite Dotta's earlier comment that depressions throughout the site may represent housepits. The observed depressions appear to be old, abandoned and now partially eroded vandal pits.

In addition to the prehistoric component, an historic component is present that consists of structural foundation remnants, a rock-lined well, and fruit trees. The foundation consists of a rectangular, poured concrete stem wall that extends approximately 12 feet in length (northwest- southeast) by 10 feet in width. No lumber or other superstructure remains were observed. A small rock-lined domestic water well is located a short distance southeast of the concrete foundation. The well measures approximately 3 feet in diameter with an observed depth of approximately 5 feet. No other features or artifacts were observed in association with either the well or the concrete foundation, and, as noted, no superstructure or additional structural remains are present. Finally, seven fig trees were observed in close proximity to the foundation remains. Based on size, these trees appear to exceed 50 years in age.

This site may meet NHRP eligibility criteria in Section 106 (d).

Site 3M-2: This site consists of a prehistoric habitation area that extends approximately 42 meters in length (northwest-southeast), with a maximum width of 17 meters, and is identifiable by a surface lithic scatter, house pit depressions, and a subsurface component contained in a dark brown-black soil. The surface lithic component includes waste flakes, cores, and tools of basalt, with the subsurface component being observed at various locations via rodent holes, further traced with trowel probes and in open vandal pits present throughout the site area. Depth of this deposit has not been formally determined but based on examination of exposed sidewalls in open vandal pits appears to be in excess of 40-50 cm. Eight house pit depressions are visible, varying from approximately two to three meters in diameter with the center of the pits averaging 30-50 cm depth below the surrounding ground surface. As noted above, extensive vandalism ("pot hunting", excavation) has occurred throughout the site and within some of the house pits, with additional disturbance resulting from grading an access road through the central part of the site. No bedrock mortars or petroglyphs were observed.

This site may meet NHRP eligibility criteria in Section 106 (d).

Site 3M-3: This site consists of a prehistoric habitation area that extends approximately 80 meters in length (west-east), with a maximum width of 30 meters, and is identifiable by a surface lithic scatter and a subsurface component contained in a dark brown-black soil. The surface lithic component includes waste flakes, cores, and tools of basalt, with the subsurface component being observed at various locations via open vandal pits and further traced with trowel probes to a depth in excess of 40-50 cm. As noted, vandalism ("pot hunting", excavation) has occurred throughout the site, with additional disturbance resulting from grading an access road through the eastern portion of the site. No additional features (i.e., bedrock mortars, house pit depressions, petroglyphs) were observed.

This site may meet NHRP eligibility criteria in Section 106 (d).

Site 3M-4: This site consists of a prehistoric habitation area that extends approximately 70 meters in length (northwest-southeast) with a maximum width of 48 meters. This site is identifiable by a surface lithic scatter and a subsurface component. The surface lithic component includes waste flakes, cores, and tools of basalt, while the subsurface component as observed within open rodent holes and vandal pits appears to extend to at least 45-50-cm. No additional features such as bedrock mortars, house pit depressions or petroglyphs were observed. As noted above, extensive vandalism ("pot hunting", excavation) has occurred throughout the site, although substantial portions of the original deposit appear to remain intact.

This site may meet NHRP eligibility criteria in Section 106(d).

HISTORIC PERIOD SITES

Site 3M-5, Ditch: This site consists of a ditch that trends north-south along the approximate 950-foot contour for roughly 800 feet through the present Project area. The ditch measures two feet in width at the top, one foot in depth. Since no additional features and no artifacts are present in association with the ditch, dating is difficult. Based on size and the absence of mining-related landscape modifications, the ditch seems likely to have served farming or ranching within the Project area. Impacts have been substantial, resulting from grading of several access roads that cut through the alignment and by siltation and erosion. The ditch is not identified on early County or USGS maps, or historic General Land Office (GLO) plats maintained by BLM.

This site does not meet CRHR eligibility criteria, as noted below in the analysis of Impact 3.5-1.

Site 3M-6, Trash Scatter: This site consists of a refuse dump that extends approximately 10 feet in diameter. Artifacts observed include: 15+/- beer cans (2-11/16" diameter, 4-5/8" length) all opened with "church-keys"; 5+/- bean/soup cans (4" diameter, 4-11/16" length); 4+/- solder seamed milk cans (3" diameter, 4 -1/2" length); 15+/- miscellaneous engine parts from automobile/tractor; 1 metal plate with glazed finish (8" diameter); 20+ miscellaneous metal fragments (fragments of stamped steel implements, unidentified as to type, including bailing wire, etc.); miscellaneous glass and stoneware fragments; 6 pieces of scrap sheet (roofing) metal (from 1 to 5 square feet in size). There are no additional historic features in direct association or located nearby, and date of deposition, based on debris types present, appears to be from the mid-1930's through the early- to mid-1960's.

This site does not meet CRHR eligibility criteria, as noted below in the analysis of Impact 3.5-1.

Site CA-SHA-1447-H, Buckeye Trail: This is the route of the abandoned wagon (toll) road (Sacramento River Road) between Old Shasta and Oregon, which passes through the extreme southeast comer of the present Project area. Within the Project area, what remains of the road is a contemporary-style graded ranch access road, ranging from about 12-20 feet in width. No residual historic features remain, such as two-track ruts, historic trash scatters, etc. In fact, the presently recorded segment has been re-graded on multiple occasions for use in ongoing ranching operations, with recent and non-ranch use of the alignment involving off- road vehicle activity. There are multiple graded alignments at three locations along the recorded segment, where periodic flooding and mud build-up have made impassible portions of earlier graded alignments.

The original Buckeye Trail is the route of the 1850's Sacramento River Road between Old Shasta and Oregon, by way of Waugh's Crossing (of the Sacramento River near Redding). The road was originally constructed in 1853 and was utilized as a toll road, first historically recorded by Magee in his 1862 "Official Map of Shasta County." This trail or roadway was the main road from Shasta north to Oregon and continued to be "the main Pacific Highway north for many years" after the county seat was moved from [Old] Shasta to Redding (Hiatt 1974:18). This roadway was utilized as a postal route until at least 1884, serving post offices north of Redding, including Buckeye and Mountain Gate. Mountain Gate, also variously known and identified on historic maps as Bass Station and Stillwater, is located a short distance northeast of the northeast comer of the present Project area.

In 1883, the Southern Pacific Railroad was extended north of Waugh's Ferry along the west side of the Sacramento River and then up the Sacramento River Canyon. With the construction of Shasta Dam in the 1940's-1950's, the Southern Pacific Railroad had to be re- routed to the east, where it partially followed the old California-Oregon Trail from the community of Mountain Gate northward (Peterson 1965). These two historic roadways – the old California-Oregon Trail (the southern portions of which in the Redding area are known as Old Oregon Trail) and the Sacramento River Trail or Buckeye Road (site CA-SHA-1447-H), merged with one another at Mountain Gate (also referred to in historic documents and on historic maps as either Bass Station or Stillwater). From Mountain Gate northward, the combined trails are referred to as the Oregon Trail.

This site does not meet CRHR eligibility criteria, as noted below in the analysis of Impact 3.5-1.

Site CA-SHA-3547-H, Southern Pacific Railroad: This site is the route of the Southern Pacific Railroad mainline (now owned by Union Pacific) between Roseville/Sacramento and Oregon. In 1871 the Southern Pacific reached Redding, terminating near Waugh's Crossing and Ferry on the Sacramento River. Between 1883 and 1886, the Southern Pacific was extended north of Waugh's Crossing and Ferry, proceeding along the west side of the Sacramento River and then up the Sacramento River Canyon to Dunsmuir and eventually to the Oregon Border. This 1886 line represents Southern Pacific's main line from Roseville, where it intersected with the first Transcontinental Railroad, to the California/Oregon border. Southern Pacific was a major factor in the development of Shasta County and Northern California generally during the period 1871 through 1900, shaping the history of the Sacramento Valley and communities along its route. Rail operation has been continuous since completion of the line through and beyond Redding in 1886, although as part of the Shasta Dam construction Project of the 1940's, a section of the original line between Redding and Lamoine on the Sacramento River had to be re-routed easterly in order to by-pass Shasta Dam and the main body of Lake Shasta. It is a portion of this 1940's re-routed section of the Southern Pacific that comprises

the present recorded segment of site CA-SHA-3547-H, dating not to the original period of railroad construction and the period of significance of the Southern Pacific in California history (1886 through 1900), but rather to the 1940's.

This segment of railroad continues the standard gauge, but includes fully modern and very heavy construction since this segment was constructed in the 1940's and was intended to carry the heaviest modern diesel locomotives – it utilizes heavily graded, imported basalt ballast for the roadbed, and heavy, treated ties, tie plates and rails.

Hilly and mountainous terrain coupled with the presence of dry washes and streams required construction within the Project area of three reinforced poured concrete culverts (one of which provides an overcrossing of Rancheria Creek), and one pedestrian/vehicular under-crossing at Moody Creek.

This site does not meet CRHR eligibility criteria, as noted below in the analysis of Impact 3.5-1.

Peer Review

The Cultural Resources Inventory (CRI) completed by Sean Jensen, Genesis Society, in December 2006 was peer reviewed to evaluate the methods, results, and recommendations of the CRI. The peer review was completed by Melinda Peak of Peak and Associates.

In addition, a field visit to the property was undertaken by Neal Neuenschwander of Peak and Associates. He visited the various recorded sites on the property, and did a spot check survey of some of the remaining acreage in sensitive locations. No new sites were located, and only minor variations in site size and description were noted.

The peer review completed for this Project determined that the survey completed by Sean Jensen, Genesis Society, in December 2006 was valid and met the requirements of CEQA and NHPA.

Native American Concerns

As stated above, a Cultural Resources Inventory (CRI) was prepared for the proposed Project. The CRI analyzed potential impacts to Native American cultural resources and included a Sacred Lands Search Request submitted to the Native American Heritage Commission (NAHC). The NAHC responded that a search of sacred land files failed to indicate the presence of Native American cultural resources in the immediate Project area. Request for comment was sent to persons and organizations listed above. To date, a single response has been received from the Redding Rancheria. Mr. James Hayward, Senior, Cultural Resource Program Manager of the Redding Rancheria, requested direct consultation with the lead agency (i.e., Shasta County) concerning known prehistoric sites within the subject property. Additionally, Mr. Hayward indicated that the Rancheria had been supplied, by the Northeast Information Center, site records and location maps for the three previously recorded sites (CA-SHA-208, -209, and -210) located within the subject property.

3.5.2 REGULATORY SETTING

FEDERAL

National Historic Preservation Act

The National Historic Preservation Act (NHPA) was enacted in 1966 as a means to protect cultural resources that are eligible to be listed on the National Register of Historic Places (NRHP). The NHPA sets forth criterion that is used to evaluate the eligibility of cultural resources. The NRHP is composed of districts, sites, buildings, structures, objects, architecture, archaeology, engineering, and culture that are significant to American History.

Virtually any physical evidence of past human activity can be considered a cultural resource. Although not all such resources are considered to be significant and eligible for listing, they often provide the only means of reconstructing the human history of a given site or region, particularly where there is no written history of that area or that period. Consequently, their significance is judged largely in terms of their historical or archaeological interpretive values. Along with research values, cultural resources can be significant, in part, for their aesthetic, educational, cultural and religious values.

STATE

California Register of Historic Resources

The California Register of Historical Resources (CRHR) was established in 1992 and codified in the Public Resource Code Sections 5020, 5024 and 21085. The law creates several categories of properties that may be eligible for the CRHR. Certain properties are included in the program automatically, including: properties listed in the NRHP; properties eligible for listing in the NRHP; and certain classes of State Historical Landmarks. Determining the CRHR eligibility of historic and prehistoric properties is guided by CCR Section 15064.5(b) and Public Resources Code (PRC) Sections 21083.2 and 21084.1. NRHP eligibility is based on similar criteria outlined in Section 106 of the NHPA (16 U.S.C. 470).

Cultural resources, under CRHR and NRHP guidelines, are defined as buildings, sites, structures, or objects that may have historical, architectural, archaeological, cultural, or scientific importance. A cultural resource may be eligible for listing on the CRHR and/or NRHP if it:

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

If a prehistoric or historic period cultural resource does not meet any of the four CRHR criteria, but does meet the definition of a "unique" site as outlined in PRC Section 21083.2, it may still be treated as a

significant resource if it is an archaeological artifact, object or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- it contains information needed to answer important scientific research questions,
- there is a demonstrable public interest in that information,
- it has a special and particular quality such as being the oldest of its type or the best available example of its type, or
- it is directly associated with a scientifically recognized important prehistoric or historic event.

California Environmental Quality Act

CEQA Guidelines Section 15064.5 provides guidance for determining the significance of impacts to archaeological and historical resources. Demolition or material alteration of a historical resource, including archaeological sites, is generally considered a significant impact. Determining the CRHR eligibility of historic and prehistoric properties is guided by CCR Section 15064.5(b) and Public Resources Code (PRC) Sections 21083.2 and 21084.1. NRHP eligibility is based on similar criteria outlined in Section 106 of the NHPA (16 U.S.C. 470).

CEQA also provides for the protection of Native American human remains (14 Cal. Code Regs § 15064.5[d]). Native American human remains are also protected under the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001 et seq.), which requires federal agencies and certain recipients of federal funds to document Native American human remains and cultural items within their collections, notify Native American groups of their holdings, and provide an opportunity for repatriation of these materials. This act also requires plans for dealing with potential future collections of Native American human remains and associated funerary objects, sacred objects, and objects of cultural patrimony that might be uncovered as a result of development projects overseen or funded by the federal government.

Assembly Bill 978

In 2001, Assembly Bill (AB) 978 expanded the reach of Native American Graves Protection and Repatriation Act of 1990 and established a state commission with statutory powers to assure that federal and state laws regarding the repatriation of Native American human remains and items of patrimony are fully complied with. In addition, AB 978 also included non-federally recognized tribes for repatriation.

LOCAL

Shasta County General Plan

The September 2004 Shasta County General Plan contains a Heritage Resources Element that intends to, "….identify and protect sites and structures of architectural, historical, archaeological, or cultural significance" (Shasta County General Plan 2004:6.10.1). The 2004 General Plan Heritage Resource Element has a sole objective; the protection of significant and historic cultural resources (Shasta County General Plan 2004:6.10.3). To accomplish this objective, Shasta County has adopted Policy HER-a,

"Development projects in areas of known heritage shall be designed to minimize degradation to these resources. Where conflicts are unavoidable, mitigation measures which reduce such impacts shall be implemented. Possible mitigation measures may include clustering, buffer or non-disturbance zones, and building siting requirements" (Shasta County General Plan 2004:6.10.4).

3.5.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project is considered to have a significant impact on cultural resources if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines §15064.5;
- Cause a substantial adverse change in the significance of archaeological resource pursuant to CEQA Guidelines §15064.5;
- Directly or indirectly destroy a unique paleontological resource;
- Disturb any human remains, including those interred outside of formal cemeteries.

METHODS

Records Search

The records of the Northeast Information Center (CSU-Chico) were examined for existing recorded prehistoric and historic sites by Sean Jensen (walk-in records search conducted September 14, 2006, I.C. File# W06-148). Prior to 2006, an archaeological survey had been completed for approximately 10 percent of the Project area, with three previously recorded prehistoric period sites in the Project area.

Field Studies

A Cultural Resources Inventory (CRI) was prepared for the proposed Project in December 2006 by the Genesis Society. The Genesis Society completed a complete survey of the property, re-recording the three previously recorded prehistoric period sites, recorded newly identified prehistoric sites, recorded two segments of linear historic period resources, and discovered and recorded two new historic period sites. The sites were field checked by Neal Neuenschwander, Archaeologist with Peak & Associates, with site forms updated for the resources.

Site Eligibility

At this time, all prehistoric period resources appear to be significant for their ability to provide important information on California's prehistory. Without evidence to the contrary, the resources must be treated as properties eligible for the California Register.

No formal evaluation has been made of the historic period resources. A formal evaluation should be undertaken; at this time, two of the resources will be treated as eligible for the California Register

without evidence to the contrary. The in-use railroad line and paved road representing a former section of the Buckeye Trail require no particular treatment regardless of whether they are an eligible property or not, given their disturbed condition and active and on-going use.

IMPACTS AND MITIGATION MEASURES

Impact 3.5-1: Project implementation could cause a substantial adverse change to a significant historical or archaeological resource, or directly or indirectly destroy or disturb a unique paleontological resource or human remains (Less than Significant with Mitigation)

A records search of the Project area through the Northeast Information Center was performed and qualified professionals (Genesis Society and Peak & Associates) were retained to perform research, field studies, and cultural evaluations of the Project site. The records search revealed three previously recorded prehistoric period sites (CA-SHA-208, -209, and -210), and the field surveys resulted in the recordation of four prehistoric period (Sites 3M-1, 3M-2, 3M-3 and 3M-4) and four additional historic period cultural resources (Sites CA-SHA-1447-H, CA-SHA-3547-H, 3M-5 and 3M-6).

Table 3.5-1, below, outlines the National Register's eligibility criteria for the seven identified prehistoric sites, and analyzes them in comparison to the criteria to ascertain whether they are subject to protection under the NRHB. As noted, only one of the criteria (d) of Section 106 would potentially be met.

Table 3.5-1: Application of National Register of Historic Places Eligibility Criteria to Identified Prehistoric Sites

ELIGIBILITY CRITERIA UNDER SECTION 106	FACTUAL ANALYSIS	ELIGIBILITY CONCLUSION
(a) Associated with events which have made significant contributions to the broad patterns of the history of the United States.	These seven prehistoric sites are not linked with specific events that have made significant contributions to the broad patterns of the history of California or the United States, nor is this site associated with people significant or important in United States or California history. There is no way to determine the individuals responsible for creation of these prehistoric components based on the physical evidence that remains at them.	No
(b) Associated with the lives of people significant in United States history.	These seven prehistoric sites are not linked with specific events that have made significant contributions to the broad patterns of the history of California or the United States, nor is this site associated with people significant or important in United States or California history. There is no way to determine the individuals	No

ELIGIBILITY CRITERIA UNDER SECTION 106	FACTUAL ANALYSIS	ELIGIBILITY CONCLUSION
	responsible for creation of these prehistoric components based on the physical evidence that remains.	
(c) Embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction.	Based on existing inventory data maintained by the NIC at CSU-Chico, there are a large number of records on file for prehistoric habitation locales containing buried cultural material that essentially duplicate the attributes present these seven sites. Such components and the physical remains which comprise these sites are not considered rare or underrepresented in the existing California State inventory for the County in general or the Project vicinity in particular, nor do these sites or their components represent a "...distinctive type..." or "...a distinguishable entity whose components may lack individual distinction."	No
(d) Has yielded, or is likely to yield, information important in prehistory or history.	These seven prehistoric sites likely contain buried cultural deposits and, for example, datable (temporally diagnostic) artifact types, faunal and floral remains, and specialized samples suitable for radiocarbon dating. Depending on age and certain attributes that might be present, such buried cultural material could yield important and valuable information on prehistoric patterns of resource extraction methodology and technology, technical information concerning lithic reduction strategies employed, the size of the population involved, and further characterization of the intensity of resource use during prehistoric time periods in this area of the County.	Potentially

Table 3.5-2, below, outlines the California Register's eligibility criteria for four historic period sites and provides an analysis of each of the sites at issue in this Project.

Table 3.5-2: Application of California Register of Historical Resources Eligibility Criteria to Historic Period Sites

ELIGIBILITY CRITERIA	FACTUAL ANALYSIS	ELIGIBILITY CONCLUSION
SITE CA-SHA-1447-H		
(a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage	While intact segments of this historic roadway are important in local and regional history, integrity of setting, materials, workmanship, feeling and association of the presently recorded segment have all been lost. No evidence (e.g., ruts) of use by wagons and carts remains. Mechanized equipment has regraded the surface, leaving this a modern, graded ranch access road.	No
(b) Is associated with the lives of persons important in our past	While intact segments of this historic roadway are important in local and regional history, integrity of setting, materials, workmanship, feeling and association of the presently recorded segment have all been lost. No evidence (e.g., ruts) of use by wagons and carts remains. Mechanized equipment has regraded the surface, leaving this a modern, graded ranch access road.	No
(c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values	This site does not embody the distinctive characteristics of a type, period, region, or method of construction, nor does it represent the work of a master or possess high artistic values. None of the historically definitive attributes remain and this site type is not rare or underrepresented in the California inventory.	No
(d) Has yielded, or may be likely to yield, information important in prehistory or history	Data recovery work involving this segment of site could not be expected to provide unique or unusual additional information above that existing in the record. None of the defining historic qualities or attributes remain and no other historic features exist on-site.	No

SITE CA-3547-H		
(a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage	This site does not date to, and does not possess integrity of location or other attributes and qualities of construction and original design relevant to the period in which the Southern Pacific achieved significance in northern California and Shasta County, from 1871 to 1900.	No
(b) Is associated with the lives of persons important in our past	This site does not date to, and does not possess integrity of location or other attributes and qualities of construction and original design relevant to the period in which the Southern Pacific achieved significance in northern California and Shasta County, from 1871 to 1900.	No
(c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values	This site does not embody the distinctive characteristics of a type, period, region, or method of construction, nor does it represent the work of a master or possess high artistic values. This site does not date to, and does not possess integrity of location or other attributes and qualities of construction and original design relevant to the period in which the Southern Pacific achieved significance in California history. The site represents a common and shared railroad design.	No
(d) Has yielded, or may be likely to yield, information important in prehistory or history	Data recovery work involving this segment of site could not be expected to provide unique or unusual additional information above that existing in the record. No distinctive historic qualities defining the pre-19th century segments of this railroad exist and no historic features that date to the period of historic significance exist.	No
SITE 3M-5		
(a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage	This ditch is not associated with additional features or artifacts and is not identified on early county or U.S. Geological Survey maps or historic GLO plats, making dating problematic.	No

(b) Is associated with the lives of persons important in our past	There is no way, based on existing information (or lack thereof), to link the site with specific individuals or undertakings within or near the project area, historically important or otherwise.	No
(c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values	This site does not embody the distinctive characteristics of a type, period, region, or method of construction, nor does it represent the work of a master or possess high artistic values. The ditch is in no way distinctive or unusual and is not associated with any other features or trash scatters. A large number of ditch sites in the area have already been well documented that duplicate the qualities and attributes of this feature.	No
(d) Has yielded, or may be likely to yield, information important in prehistory or history	Data recovery work involving this segment of site could not be expected to provide unique or unusual additional information above that existing in the record. No features or trash scatters are associated with this site, which does not appear on historic maps or plats for Shasta County.	No
SITE 3M-6		
(a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage	No historic features are associated with this refuse dump and no such features are known to be located nearby.	No
(b) Is associated with the lives of persons important in our past	Historic Shasta County maps and other plats do not identify any historic structures or other features in the area of the recorded trash scatter; therefore, no reasonable way exists to link the site with specific individuals or undertakings/projects or ranch operations within or near the project area, historically important or otherwise.	No
(c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses	This site does not embody the distinctive characteristics of a type, period, region, or method of construction, nor does it represent the work of a master or possess high artistic values. The scatter is relatively small, whole artifacts are conspicuously absent (suggesting artifact collecting or vandalism), and no additional associations exist. A very large	No

high artistic values	number of small trash scatters duplicate the attributes of this site and this site's suggested time span have been well documented in the county and in adjacent counties; therefore this site is not rare or underrepresented in the California inventory.	
(d) Has yielded, or may be likely to yield, information important in prehistory or history	Data recovery work involving this segment of site could not be expected to provide unique or unusual additional information above that existing in the record. Whole artifacts do not exist on this site and, based on trowel probes, no evidence of subsurface accumulation of earlier artifacts exists.	No

The following sites are within areas proposed for construction and/or development as shown on Figure 2.0-10 and would be directly impacted: 3M-2, 3M-4, 3M-6, and CA-SHA-208. As discussed in Section 3.5.1 above, 3M-6 does not meet eligibility criteria; therefore, impacts to site 3M-6 would be **less than significant**. Disturbance to sites 3M-2, 3M-4, and CA-SHA-208 would be a **potentially significant impact**.

The following sites are within the Project's limits of surface disturbance, but not within an area identified for construction and/or development related disturbance: 3M-1, 3M-3, and a portion of 3M-5. As discussed in section 3.5-1 above, 3M-5 does not meet eligibility criteria; therefore, potential impacts to site 3M-5 would be **less than significant**. Sites 3M-1 and 3M-3 do meet eligibility requirements and may be impacted if Project operations and/or development disturbed these areas; therefore, this impact would be **potentially significant**.

CA-SHA-3547-H, CA-SHA-209, CA-SHA-1447-H, and CA-SHA-210 are outside the Projects limits of surface disturbance and would not be impacted by the Project; therefore, this would be a **less than significant** impact.

Implementation of Mitigation Measures 3.5-1(a) through 3.5-1(d) would ensure that the prehistoric and historic period sites that would be impacted by Project-related site disturbance would be properly documented, protected, or otherwise addressed, as required by state law. Implementation of Mitigation Measure 3.5-1(e) would ensure that if any previously unknown resources are discovered during mining activities, those resources would be reported, analyzed and protected by a qualified archaeologist, as appropriate. Implementation of these measures would ensure that the Project would result in **less than significant** impacts to cultural and historical resources.

MITIGATION MEASURES

Mitigation Measure 3.5-1(a): *For the prehistoric period sites that would be directly affected by the Project (*CA-SHA-210, 3M-2, 3M-3, and 3M-4)*, all reasonable measures to engage in consultation with the local Native American community shall be conducted to help formulate the data recovery program. All site testing and data recovery activities shall be conducted by a qualified professional archaeologist retained by the Project applicant who meets the Secretary of Interior Standards, and shall be completed prior to any ground disturbance within 100 feet of the site. A volumetric sample of the site shall be excavated to preserve the data that may be contained within the site.*

An initial test excavation shall provide more information on the sites' extent and degree of intact deposit, combined with a boundary definition testing. All reasonable measures to engage and consult with relevant Native American groups shall be taken during site testing activities. Based on the results of the test excavations, a complete plan shall be developed for data recovery excavations at each site. The data recovery shall require similar reasonable coordination with the local Native American community. The data recovery plan shall include details on the amount and nature of excavation units, the research questions to be addressed, the protocol for monitoring, the nature of the final report, and the location for permanent curatorial care for the collections derived from the excavations.

For any sites subject to test excavations and potentially to data recovery excavations, the applicant shall provide adequate assurances for the proper care and treatment, including lab work, preparation of reports on the results of these studies, and arrangements for curatorial care be in place.

Mitigation Measure 3.5-1(b): *Prior to disturbance within 250-feet of sites that would or could be directly affected by Project-related surface disturbance (CA-SHA-208, 3M-2, and 3M-4), the following collection and evaluation tasks shall be completed by a qualified professional archeologist:*

a) *Excavation utilizing 1-meter-square exposures and in arbitrarily-defined 10 cm levels, with all recovered material screened through ¼ inch mesh, unless very small objects (e.g., beads, small historic artifacts) are observed, in which case screening would shift to 1/8 inch mesh. A minimum of four test units shall be placed within the midden areas and house pit features (where present) at any tested site.*

b) *Evaluation of recovered cultural material in relation to local and regional typologies for various types of formed artifacts that might be exposed.*

c) *Preparation of a formal report, to proceed in conformity with standard professional practices, detailing the information and research values of recovered cultural material, if any. The report shall include appropriate recommendations for any additional data recovery, if any, justified on the basis of the specific findings of formal testing. The report shall be submitted to the Shasta County, Department of Resource Management (Planning Division) for written concurrence prior to disturbance within 250-feet of these sites.*

For all sites subject to test excavations and potentially to data recovery excavations, the Applicant shall provide adequate financial assurances for the proper care and treatment, including lab work, preparation of reports on the results of these studies, and arrangements for curatorial care to be in place.

Mitigation Measure 3.5-1(c): *For sites within the Project's proposed limits of surface disturbance, but not within an area identified for construction and/or development (i.e., 3M-1 and 3M-3), boundary definition testing should be conducted by a qualified professional archeologist prior to surface disturbance within 250-feet of their approximate locations to determine the maximum extent of the resources. Surface disturbance shall not occur within 100 feet of the boundaries established. Security personnel or an operations manager should be notified of site locations. The archeologist shall prepare a boundary definition testing report and shall provide a copy of the report to the Shasta County, Department of Resource Management (Planning Division) prior to any surface disturbance. Prior to disturbance within boundaries established, if necessary for Project operations, the Applicant shall follow the protocol outlined in Mitigation Measure 3.5-1(b).*

Mitigation Measure 3.5-1(d): *The following measures shall be included on all Project plans and shall be adhered to throughout Project site work during ground disturbing activities throughout the life of the Project.*

a) *If any cultural resources (i.e., human bone or burnt animal bone, midden soils, projectile points, humanly-modified lithics, historic artifacts, etc.) are encountered during any phase of Project construction or operations, all earth-disturbing work shall stop within 100 feet of the find. The Shasta County Planning Division shall be notified and a qualified archaeologist shall make an assessment of the discovery and recommend/implement mitigation measures as necessary. Shasta County shall consider mitigation recommendations presented by a qualified archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology for any unanticipated discoveries. The County and the Project Applicant shall consult and agree upon implementation of a measure or measures that the County and Project applicant deem feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, and/or other appropriate measures. The Project Applicant shall be required to implement any mitigation necessary for the protection of cultural resources.*

b) *If human remains are discovered, all work shall be halted immediately within 50 meters (165 feet) of the discovery and the Shasta County Planning Division and the County Coroner shall be notified, according to Section 5097.98 of the Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner shall notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed.*

c) *Prior to the commencement of Project excavations, vegetation removal or site disturbance, all Project personnel shall read and sign an agreement which outlines each of the mitigation measures MMs 3.5-1(a) – (c), which would protect prehistoric and historic sites, Native American remains and any/all potential, subsurface cultural resources.*

d) *In the event that Project plans change to include areas not surveyed, additional reconnaissance by a qualified archeologist shall be required prior to any earth-disturbing activities to identify any potential cultural or paleontological resources or human remains. If any cultural resources are identified, Shasta County shall consider mitigation recommendations presented by a qualified archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology for any unanticipated discoveries. The County and the Project Applicant shall consult and agree upon implementation of a measure or measures that the County and Project Applicant deem feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. The Project Applicant shall be required to implement any mitigation necessary for the protection of cultural resources.*

Impact 3.5-2: Potential to Disturb Any Human Remains, Including Those Interred Outside of Formal Cemeteries (Less than Significant with Mitigation)

Indications are that humans have occupied Shasta County for over 10,000 years and it is not always possible to predict where human remains may occur outside of formal burials. Therefore, excavation and construction activities, regardless of depth, may yield human remains that may not be interred in marked, formal burials.

Under CEQA, human remains are protected under the definition of archaeological materials as being "any evidence of human activity." Additionally, Public Resources Code section 5097 has specific stop-work and notification procedures to follow in the event that human remains are inadvertently discovered during Project implementation.

Specifically, all work must stop if human remains are found during construction until the County Coroner has been contacted, and, if the human remains are determined to be of Native American origin, the NAHC and the descendant(s) have been notified and consulted.

It is also likely that human remains could be found during the test excavations and subsequent data recovery excavations within the prehistoric site areas.

Implementation of the following mitigation measure would ensure that all construction activities that inadvertently discover human remains implement state required consultation methods to determine the disposition and historical significance of any discovered human remains. These policies and the following mitigation measure would reduce this impact to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.5-2: *If human remains are discovered during the course of construction, work shall be halted at the site and any nearby area reasonably suspected to overlie adjacent human remains until the Shasta County Coroner has been informed and has determined that no investigation of the cause of death is required. If the remains are of Native American origin, either of the following steps shall be taken:*

a) *The coroner shall contact the Native American Heritage Commission in order to ascertain the proper descendants from the deceased individual. The coroner shall make a recommendation to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods, which may include obtaining a qualified archaeologist or team of archaeologists to properly excavate the human remains; OR*

b) *The landowner shall retain a Native American monitor, and an archaeologist, if recommended by the Native American monitor, and rebury the Native American human remains and any associated grave goods, with appropriate dignity, on the property and in a location that is not subject to further subsurface disturbance when any of the following conditions occurs:*

    1. *The Native American Heritage Commission is unable to identify a descendent.*
    2. *The descendant identified fails to make a recommendation.*
    3. *Shasta County or its authorized representative rejects the recommendation of the descendant, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.*

This page left intentionally blank

The purpose of this section is to disclose and analyze the potential impacts associated with the geology of the Project site and general vicinity, and to analyze issues such as the potential exposure of people and property to geologic hazards, landform alteration, and erosion. There were no comments received during the NOP comment period related to this environmental topic.

Information in this section is derived primarily from the following sources:

- Updated Slope Stability Evaluation, 3M Moody Flats Quarry (Petra Geotechnical, August 2012) (**Appendix P**);
- Preliminary Geotechnical Exploration, 3M Plant Site Development (CH2MHill, March 1981) (**Appendix Q);**
- Moody Flats Quarry Stormwater, Erosion Control, and Drainage Plan (EMKO Environmental, May 2010) **(Appendix I);**
- Addendum to the Moody Flats Quarry Stormwater, Erosion Control, and Drainage Plan (EMKO Environmental, August 2012) (**Appendix J);**
- Shasta County General Plan (Shasta County, 2004);
- Literature prepared by the California Division of Mines and Geology;
- Information from the U.S. Natural Resources Conservation Service; and
- Mapping published by the U.S. Geologic Survey.

3.6.1 ENVIRONMENTAL SETTING

REGIONAL GEOLOGY

The Project site is located in the northern Sacramento Valley at the northern margin of the Great Valley Physiographic province. The Great Valley province is bordered to the north by the Klamath and Cascade Physiographic provinces, to the east by the Cascade and Sierra Nevada Physiographic provinces, to the west by the Klamath and Coast Range Physiographic provinces, and to the south by the Transverse Range Physiographic province.

The Sacramento Valley is a late Mesozoic forearc basin that formed contemporaneously with, and between the accretionary trench deposits of the Franciscan Complex to the west, and an eastern magmatic arc complex, the roots of which are exposed in the Sierra Nevada Mountains. The region has experienced orogenic uplift, faulting, and subsequent erosion as the valley was inundated by the ancestral Pacific Ocean.

The exposed granite of the Sierra Nevada mountain range represents the eroded edge of a tilted block of crystalline rocks known as the Sierra Nevada Batholith. The Sierra Nevada Batholith is a series of

granitic plutons that range in age from Jurassic to Cretaceous. The plutons intruded sedimentary and volcanic rocks of Ordovician to Late Jurassic ages.

The Sierra Nevada Mountains are the bedrock upon which the Great Valley sequence rests, in other locations, mudflows and lahars of the Pliocene Tuscan Formation and younger volcanics rocks cover the granitic bedrock, which plunges beneath the Great Valley sequence at the eastern margin of the Central Valley.

The Great Valley sequence is a very thick accumulation of sediments forming an asymmetric structural trough or syncline, with the axis of the trough west of the apparent surface axis of the present valley surface. The trough has been filled with as much as 10 vertical miles of sediment in the Sacramento Valley (the Great Valley Sequence), and these sediments range in age from Jurassic to Holocene. The Great Valley sequence rests on basement rocks consisting of metamorphosed sedimentary and volcanic rocks of Ordovician to Late Jurassic ages.

LOCAL GEOLOGY

The geology of the Project site is dominated by Paleozoic metavolcanic and metasedimentary rock. Limited areas of Quaternary alluvial deposits are also present (Petra 2012). The oldest and dominating rock unit in the Project site area is the Copley Greenstone, of probable middle Devonian age (417 to 354 million years ago). This formation is comprised of volcanic basal flows, pyroclastic flows, tuffs and pillow lavas that have been metamorphosed. The predominant lithology of the Copley Formation is a metavolcanic greenstone that is characterized by its greenish gray color. Based on core logs in the South Pit area, massive greenstone is interbedded with greenstone breccias. Outcrops, especially in the South Pit area, display weathered reddish to orange-brown patina. Based on field observations (Petra, 2012), the weathering is more prominent in the area of the South Pit than the North Pit, where relatively unweathered outcrops are exposed.

The Kennett Formation is exposed on the Project site, east of the Copley Greenstone. The Kennett Formation on the site consists of thin-bedded siliceous mudstone. Hypabyssal intrusions, that are locally formed, were observed in several areas, mainly along steep cuts along the existing railroad track at the eastern part of the site (Petra, 2012).

The Bass Mountain Diabase is exposed in the northeastern and southeastern parts of the Project site. Alluvial deposits are present along the drainages and flatter portions of the eastern part of the Project site. This material generally consists of silty sand with gravel. Rounded greenstone cobbles are common in the prominent drainages on the site.

Figures 3.6-1 and 3.6-2 show the geologic features described above.

FAULTS AND SEISMICITY

Seismicity

The amount of energy available to a fault is determined by considering the slip-rate of the fault, its area (fault length multiplied by down-dip width), maximum magnitude, and the rigidity of the displaced rocks. These factors are combined to calculate the moment (energy) release on a fault. The total seismic energy release for a fault source is sometimes partitioned between two different recurrence models, the characteristic and truncated Gutenberg-Richter (G-R) magnitude-frequency distributions. These models incorporate our knowledge of the range of magnitudes and relative frequency of different magnitudes for a particular fault. The partition of moment and the weights for multiple models are given in the following summary.

Earthquakes are generally expressed in terms of intensity and magnitude. Intensity is based on the observed effects of ground shaking on people, buildings, and natural features. By comparison, magnitude is based on the amplitude of the earthquake waves recorded on instruments, which have a common calibration. The Richter scale, a logarithmic scale ranging from 0.1 to 9.0, with 9.0 being the strongest, measures the magnitude of an earthquake relative to ground shaking. Table 3.6-1 provides a description and a comparison of intensity and magnitude.

TABLE 3.6-1: MODIFIED MERCALLI INTENSITY SCALE FOR EARTHQUAKES

RICHTER MAGNITUDE	MODIFIED MERCALLI SCALE	EFFECTS OF INTENSITY
0.1 – 0.9	I	Earthquake shaking not felt
1.0 – 2.9	II	Shaking felt by those at rest.
3.0 – 3.9	III	Felt by most people indoors, some can estimate duration of shaking.
4.0 – 4.5	IV	Felt by most people indoors. Hanging objects rattle, wooden walls and frames creak.
4.6 – 4.9	V	Felt by everyone indoors, many can estimate duration of shaking. Standing autos rock. Crockery clashes, dishes rattle and glasses clink. Doors open, close and swing.
5.0 – 5.5	VI	Felt by all who estimate duration of shaking. Sleepers awaken, liquids spill, objects are displaced, and weak materials crack.
5.6 – 6.4	VII	People frightened and walls unsteady. Pictures and books thrown, dishes and glass are broken. Weak chimneys break. Plaster, loose bricks and parapets fall.
6.5 – 6.9	VIII	Difficult to stand. Waves on ponds, cohesionless soils slump. Stucco and masonry walls fall. Chimneys, stacks, towers, and elevated tanks twist and fall.
7.0 – 7.4	IX	General fright as people are thrown down, hard to drive. Trees broken, damage to foundations and frames. Reservoirs damaged, underground pipes broken.
7.5 – 7.9	X	General panic. Ground cracks, masonry and frame buildings destroyed. Bridges destroyed, railroads bent slightly. Dams, dikes and embankments damaged.
8.0 – 8.4	XI	Large landslides, water thrown, general destruction of buildings. Pipelines destroyed, railroads bent.
8.5 +	XII	Total nearby damage, rock masses displaced. Lines of sight/level distorted. Objects thrown into air.

Faults

A fault is a fracture in the crust of the earth along which rocks on one side have moved relative to those on the other side. A fault trace is the line on the earth's surface defining the fault. Displacement of the earth's crust along faults releases energy in the form of earthquakes and in some cases in fault creep. Most faults are the result of repeated displacements over a long period of time.

Surface rupture occurs when movement on a fault deep within the earth breaks through to the surface. Surface ruptures have been known to extend up to 50 miles with displacements of an inch to 20 feet. Fault rupture almost always follows preexisting faults, which are zones of weakness. Rupture may occur suddenly during an earthquake or slowly in the form of fault creep. Sudden displacements are more damaging to structures because they are accompanied by shaking.

The State of California designates faults as active, potentially active, and inactive depending on how recent the movement that can be substantiated for a fault. Table 3.6-2 presents the California fault activity rating system.

TABLE 3.6-2: FAULT ACTIVITY RATING

FAULT ACTIVITY RATING	GEOLOGIC PERIOD OF LAST RUPTURE	TIME INTERVAL
Active (A)	Holocene	Within last 11,000 Years
Potentially Active (PA)	Quaternary	11,000-1.6 Million Years
Inactive (I)	Pre-Quaternary	Greater than 1.6 Million Years

The California Geologic Survey (CGS) evaluates the activity rating of a fault in fault evaluation reports (FER). FERs compile available geologic and seismologic data and evaluate if a fault should be zoned as active, potentially active, or inactive. If an FER evaluates a fault as active, then it is typically incorporated into a Special Studies Zone in accordance with the Alquist-Priolo Earthquake Hazard Act (AP). AP Special Study Zones require site-specific evaluation of fault location and require a structure setback if the fault is found traversing a Project site.

No faults are known to traverse the Project site (Petra, 2012). The closest potentially active fault is the Battle Creek fault, located approximately 23 miles to the south. Several potentially active faults are located in the Lassen area, east of the site, the closest being the Hatchet Mountain fault, approximately 32 miles to the east. The most seismically active area to the site is the Mendocino triple junction, where the North American, Pacific, and Gorda tectonic plates meet. This area is located approximately 100 miles west of the site.

Because of the absence of local faults, the site has a low potential for strong seismic ground shaking compared to many places in California. Based on probabilistic analysis from the California Geological Survey website, the peak ground acceleration (g) at the site is estimated to be approximately 0.16g for firm rock conditions, based on a probability of 10 percent in 50 years (Petra, 2012). Table 3.6-3 presents fault location information data collected from the California Geologic Survey database.

TABLE 3.6-3: FAULTS INFLUENTIAL TO PROJECT AREA

FAULT NAME	DISTANCE	SEISMOLOGY PARAMETERS	
	MILES/DIRECTION	MAXIMUM CREDIBLE EARTHQUAKE (RICHTER MAGNITUDE)	MAXIMUM CREDIBLE BEDROCK SITE ACCELERATION (% G)
Battle Creek	25/SE	7.3	<5
Hatchet Mountain	36/NE	5.0[1]	<5
Hat Creek Area (numerous faults)	50/NE	7.0	<5
Mt. Lassen Volcanic Activity	50/SE	6.0[1]	<5
Likely	90/NE	7.5	<5
Honey Lake	100/SE	7.25	<5
Freshwater	84/SW	7.25	<5
San Andreas	102/SW	8.25	<5

1: Indicates that the maximum credible earthquake is not quoted in the literature, but has been estimated based on fault length to magnitude relationships (CH2MHILL, 1981)

SOURCE: CALIFORNIA GEOLOGIC SURVEY DATABASE, AND CH2MHILL (1981)

Alquist-Priolo Special Study Zone

The California legislature passed the Alquist-Priolo Special Studies Zone Act in 1972 to address seismic hazards associated with faults and to establish criteria for developments for areas with identified seismic hazard zones. The California Geologic Survey (CGS) evaluates faults with available geologic and seismologic data and determines if a fault should be zoned as active, potentially active, or inactive. If CGS determines a fault to be active, then it is typically incorporated into a Special Studies Zone in accordance with the Alquist-Priolo Earthquake Hazard Act. Alquist-Priolo Special Study Zones are usually one-quarter mile or less in width and require site-specific evaluation of fault location and require a structure setback if the fault is found traversing a Project site. The Project site is not within an Alquist-Priolo Special Study Zone.

Historic Seismicity

The largest recorded earthquake in the Project vicinity was a magnitude 5.5 event in 1950 near Mt. Lassen. None of the recorded events were large enough or close enough to the Project site to have produced a significant (greater than 5 percent g) site acceleration.

SEISMIC HAZARDS

Seismic Ground Shaking

The potential for seismic ground shaking in California is expected. As a result of the foreseeable seismicity in California, the State requires special design considerations for all structural improvements in accordance with the seismic design provisions in the California Building Code. These seismic design provisions require enhanced structural integrity based on several risk parameters. Seismic ground shaking on the Project site is expected during the life of the Project. All structures must and will be built in accordance with the seismic design standards in California.

Fault Rupture

A fault rupture occurs when the surface of the earth breaks as a result of an earthquake, although this does not happen with all earthquakes. These ruptures generally occur in a weak area of an existing fault. Ruptures can be sudden (i.e. earthquake) or slow (i.e. fault creep). The Alquist-Priolo Fault Zoning Act requires active earthquake fault zones to be mapped and it provides special development considerations within these zones. The Project site does not have surface expression of active faults and fault rupture is not anticipated.

Liquefaction

Liquefaction is a phenomenon in which saturated soils lose strength and cohesion when subjected to dynamic forces, such as shaking during an earthquake. Liquefaction can also occur in unsaturated soils with low cohesion, such as sand. Ground failure resulting from liquefaction can include sand boils, ground settlement, ground cracking, lateral spreading, slope toe failure, and ground warping.

The potential for liquefaction within the Project site is low, due to the lack of unconsolidated sediments and lack of near-surface groundwater. The soils at the Project site are thin, especially toward the ridges to the north and west where mining of the North and South Pit would primarily occur. The material underlining these soils is of granitic nature and not generally subject to saturation or loss of cohesive strength during seismic events. Additionally, during the early phases of the Project, most of the unconsolidated deposits that could potentially increase liquefaction potential would be removed and processing facilities would then be constructed on exposed bedrock.

There are no records of liquefaction occurring on the Project site (CH2MHILL 1981), and the soils on the Project site are not highly susceptible to liquefaction. For these reasons, the potential for liquefaction is considered to be low during seismic shaking.

Subsidence

Soil subsidence can result from both natural and man-made phenomena. Natural phenomena that may induce subsidence include seismically induced settlement (liquefaction); soil consolidation; oxidation or dewatering of organic-rich soils; and collapse of subsurface cavities. Man-made activities such as withdrawing subsurface fluids through groundwater pumping may help induce subsidence by decreasing pore pressure.

Subsidence is particularly common in soils having high silt or clay contents. However, the Project site is located within a large granitic structure. Consequently, the risk of subsidence as a result of natural or man-made phenomena at the Project site is considered low.

Landslides

Landslides, rock falls, and debris flows are all forms of mass wasting, the movement of soils and rock under the influence of gravity. A landslide may occur if source material on a slope is triggered by some mechanism. Source materials include fractured and weathered bedrock and loose soils. Triggering mechanisms include earthquakes, saturation from rainfall, and erosion.

Landslide risk categories can generally be categorized into four categories. Areas of “no risk” are identified as flatlands, valley bottoms, and areas of minimal topographic relief. Areas of “low risk” are generally identified as those along hillside and mountains terrain of competent igneous and metamorphic rocks and sedimentary rocks with favorable bedding and composition. The “moderate risk” category includes dip slopes, complexly folded metamorphic rocks, and zones of fractured rock. The “high risk” locations are those that consist of weak, landslide-prone rocks and existing or historical landslide locations. Therefore, in general, landslide hazards are locations along foothills and mountainous terrain, steep banks along rivers, and passes through valley floors.

The Project site has locations with relatively steep slopes. The elevation change along the western slope near the Project site is approximately 1,000 feet vertical to about 4,000 feet horizontal. This equates to an average slope of 14-degree angle. However, this represent an overall average; some locations have slopes steeper than 14 degrees. If the granitic rocks in the steeper areas are fractured, the area would be more susceptible to landslides. Using the general criteria established above the Project site

represents a low to moderate risk for a landslides event in its current condition. A more detailed analysis of slope stability within the quarry pits and overburden fill area is provided below under the impact analysis.

SOILS AND EROSION

Soils types vary greatly across the Project site, as shown in Figure 3.2-2, in the Agricultural and Forest Resources section, and as shown in Table 3.6-4 below.

TABLE 3.6-4: ON-SITE SOIL CAPABILITY CLASSIFICATIONS

SOIL MAP NAME	SOIL CAPABILITY CLASSIFICATION	ACRES OF SOIL TYPE ON THE PROJECT SITE[1]
Anderson gravelly sandy loam	III-s	0.58
Auburn loam, 0 to 8 percent slopes	IV-e	50.03
Auburn very stony loam, 8 to 30 percent slopes	VI-s	20.96
Auburn clay loam, 8 to 30 percent slopes, eroded	VI-e	129.34
Auburn very stony clay loam, 30 to 50 percent slopes, eroded	VII-s	512.89
Auburn very rocky clay loam, 50 to 70 percent slopes, eroded	VII-s	136.29
Boomer gravelly loam, 0 to 15 percent slopes	III-e	20.82
Boomer gravelly loam, 15 to 30 percent slopes	IV-e	15.49
Boomer gravelly loam, 30 to 50 percent slopes	VI-e	310.08
Boomer very stony loam, 50 to 70 percent slopes	VII-s	59.92
Boomer very stony clay loam, 30 to 50 percent slopes, severely eroded	VI-s	1.00
Churn gravelly loam, 0 to 3 percent slopes	II-s	49.30
Churn gravelly loam, deep, 0 to 3 percent slopes	II-s	58.92
Goulding very stony loam, 10 to 30 percent slopes	VI-s	34.84
Goulding very rocky loam, 50 to 70 percent slopes, eroded	VII-s	4.15
Perkins gravelly loam, 8 to 15 percent slopes	III-e	68.78
Red Bluff loam, 0 to 3 percent slopes	III-s	0.33
Red Bluff loam, 3 to 8 percent slopes	III-e	38.37
Rockland	VIII-s	19.60

Note 1: The portion of the project site within the Shasta-Trinity National Forest is not mapped.

SOURCE: USDA SOIL CONSERVATION SERVICE, SOIL SURVEY OF SHASTA COUNTY, CALIFORNIA, 1974.

Erosion

Erosion is the wearing away and removal of soils and/or rocks by natural forces. The main natural erosion forces are rainfall, wind, percolation of water that slowly dissolves rock (water is known as the universal solvent; because given time, it will eventually dissolve or wear any rock or other surface materials), or landslides.

Erosion of the surface caused by rainwater is known as sheet-wash. Sheet-wash is described as water flowing across land and picking up particles of soil or organic materials and carrying them away. Additionally, rainwater flows can cause rilling, which is when runoff water forms shallow broad channels across an area. Both sheet-wash and rilling leave patches of deposited soil material as a result of decreasing water velocity that result from diminishing land gradient or from slackening rainwater.

Wind erosion picks up small soil particles or bounces or rolls large particles along the land surface. Wind erosion is most serious when the soil is bare and exposed to strong wind.

Although all of these erosion processes are natural, human activity can often multiply the frequency and size of the erosion event. Human activities that can increase erosion include:

- Reducing the rate by which water can enter the soil (e.g., covering the land with impervious surfaces such as houses, roads, and shopping centers), and thereby, promote rapid runoff and greater erosive power of the water;
- Making drainage systems which concentrate runoff without controlling flow;
- Using poor agricultural practices such as overgrazing and cutting furrows down slope rather than with the natural contour of the land; and/or
- Excavating an area, which removes the vegetation and leaves the soil exposed to erosive factors.

The Project site has been historically used, and is currently being used, as undeveloped open space. Some surface soils have been exposed due to development of internal roads and historic surface water flows. In some higher elevation areas, vegetative cover has been reduced as a result of over-steep slopes and a fire that burned a portion of the Project site. The potential for Project activities to result in increased erosion is addressed below under the impact discussion.

3.6.2 REGULATORY SETTING

STATE

The State of California has established a variety of regulations and requirements related to seismic safety and structural integrity, including the California Building Code, the Alquist-Priolo Earthquake Fault Zoning Act and the Seismic Hazards Mapping Act.

California Building Code

The California Building Standards Code (CBSC) is included in Title 24 of the California Code of Regulations (CCR) and is a portion of the California Building Standards Code. Under state law, all building standards must be centralized in Title 24 or they are not enforceable. The CBC incorporates the Uniform Building Code, a widely adopted model building code in the United States. Through the CBSC, the state provides a minimum standard for building design and construction. The CBSC contains specific requirements for seismic safety, excavation, foundations, retaining walls and site demolition. It also regulates grading activities, including drainage and erosion control.

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. The main purpose of the Act is to prevent the construction of buildings used for human occupancy on active faults.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act, passed in 1990, addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically-induced landslides. Under the Act, seismic hazard zones are to be mapped by the State Geologist to assist local governments in land use planning.

As of March 2013, the Shasta County area had not been mapped under the Seismic Hazards Mapping Act, because the state targeted higher risk areas, such as the San Francisco Bay area and areas within Southern California.

Surface Mining and Reclamation Act (SMARA)

The Surface Mining and Reclamation Act of 1975 (SMARA, Public Resources Code, Sections 2710-2796) provides a comprehensive surface mining and reclamation policy with the regulation of surface mining operations to assure that adverse environmental impacts are minimized and mined lands are reclaimed to a usable condition. SMARA also encourages the production, conservation, and protection of the state's mineral resources. Public Resources Code Section 2207 provides annual reporting requirements for all mines in the state, under which the State Mining and Geology Board is also granted authority and obligations.

The Surface Mining and Reclamation Act (SMARA), Chapter 9, Division 2 of the Public Resources Code, requires the State Mining and Geology Board to adopt State policy for the reclamation of mined lands

and the conservation of mineral resources. These policies are prepared in accordance with the Administrative Procedures Act, (Government Code) and are found in California Code of Regulations, Title 14, Division 2, Chapter 8, Subchapter 1.

The Surface Mining and Reclamation Act, and the State Mining and Geology Board Reclamation Regulations are flexible with respect to addressing geotechnical slope stability for both fill slopes and cut slopes. SMARA does not specify a minimum factor or safety for slope stability. However, Title 14, Chapter 8, CCR Section 3502(b)(3) indicates that final reclaimed slopes shall be flatter than the critical gradient, which implies that static factors of safety should be greater than 1.0. This section further states "Wherever final slopes approach the critical gradient for the type of material involved, regulatory agencies shall require an engineering analysis of slope stability. Special emphasis on slope stability and design shall be taken when public safety or adjacent property are affected."

Section 3704(d) states that fill slopes shall be 2H:1V or flatter. Fill slopes steeper than 2H:1V must be supported by site-specific geologic and engineering analyses to indicate that the minimum factor of safety is suitable for the proposed end use.

LOCAL

County of Shasta General Plan

The Health and Safety Element of the Shasta County General Plan includes several objectives and policies to reduce the risks to the community from seismic and other geologic hazards. The following objectives and policies regarding seismic and other geologic hazards are applicable to this Project:

Objective SG-1: Protection of all development from seismic hazards by developing standards for the location of development relative to these hazards; and protection of essential or critical structures, such as schools, public meeting facilities, emergency services, and high-rise and high-density structures, by developing standards appropriate for such protection.

Objective SG-2: Protection of development on unstable slopes by developing standards for the location of development relative to these hazards.

Objective SG-3: Protection of development from other geologic hazards, such as volcanoes, erosion, and expansive soils.

Objective SG-4: Protection of waterways from adverse water quality impacts caused by development on highly erodible soils.

> **Policy SG-b:** In order to minimize development that would be endangered by landslides, geological investigations by a registered geologist or a geological engineer will be required on all subdivision and/or developments where the preliminary staff report indicates the possibility of landslides on or adjacent to the development. A landslide map shall be developed and maintained as these reports are accumulated for reference by the development sponsors.

Policy SG-d: Shasta County shall develop and maintain standards for erosion and sediment control plans for new land use development. Special attention shall be given to erosion prone hillside areas, including those with extremely erodible soils types such as those evolved from decomposed granite.

Policy SG-e: When soil tests reveal the presence of expansive soils, engineering design measures designed to eliminate or mitigate their impacts shall be employed.

Shasta County Grading Ordinance

The Shasta County Grading Ordinance, included in the Shasta County Zoning Plan (Shasta County, 2003) sets forth regulations concerning grading, excavating, and filling. The Shasta County Grading Ordinance, prohibits movement of earth materials in excess of 250 cubic yards or which disturbs 10,000 square feet of surface area without a grading permit from the County. The grading permit must include an approved grading plan provided by the Project applicant, and it must set forth terms and conditions of grading operations that conform to the County's grading standards. The permit also requires the Project applicant to provide a permanent erosion control plan that must be implemented upon completion of the Project. Ongoing maintenance of erosion control measures would be required during the construction and operation of the Project and for three years after completion of the Project, unless the Project is released earlier by the enforcing officer designated by the County Board of Supervisors.

As outlined in Section 12.12.050(A)(3) of the Grading Ordinance, mining and ground disturbing activities are exempt from preparation of a grading plan when a use permit and reclamation plan are granted by the County.

Shasta County Code

CHAPTER 18.04, SURFACE MINING AND RECLAMATION

The purpose of this chapter is to implement the Surface Mining and Reclamation Act. This chapter acknowledges that the extraction of minerals is essential to the continued economic well-being of the county and to the needs of society. This chapter seeks to balance economic and environmental considerations with respect to surface mining, and to ensure that surface mining lands are reclaimed to a usable condition which readily adaptable for alternative land uses.

3.6.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project would have a significant impact on geology and soils if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - Strong seismic ground shaking; or
  - Seismic-related ground failure, including liquefaction;
- 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- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property; or
- 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.

The IS/NOP prepared for this Project concluded that potential impacts associated with rupture of known earthquake faults, and strong seismic shaking, would result in less than significant impacts. Therefore, these topics will not be further addressed in this Draft EIR.

IMPACTS AND MITIGATION MEASURES

Impact 3.6-1: The proposed Project could expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving, unstable soils, or liquefaction (Less than Significant with Mitigation)

An analysis of onsite soil conditions was completed as part of the Preliminary Geotechnical Exploration completed by CH2MHill for the Project site (CH2MHill, 1981). The field exploration consisted of a site reconnaissance, excavation of 46 backhoe test pits, and drilling 16 soil borings. Most of the surface and near-surface soil encountered during the geotechnical exploration is of alluvial or colluvial origin. Alluvial soils are present in the area of the Secondary Processing Plant and Load-Out Area, while residual soils, primarily derived from marine shale and mudstone, are present at locations throughout the Project site.

The majority of the Project site would be mined for aggregate materials. Permanent structures, such as buildings and stationary processing equipment would not be located outside of the Primary Processing Area or the Secondary Processing Area, both of which are described in greater detail in Section 2.0. Structures associated with the aggregate processing facility, ancillary aggregate product facilities (e.g., Portland cement concrete plant, asphalt concrete batch plant, and recycled construction materials plant), and aggregate truck and railcar load-out facility could be subject to risks associated with expansive or unstable soils. The Preliminary Geotechnical Exploration completed by CH2MHill for the Project site focused primarily on potential soil-related impacts within the areas proposed for development of the various aggregate processing and aggregate product production facilities (CH2MHill, 1981).

Soils encountered at the primary and secondary processing areas varied from fine-grained (clay and silt) to coarse-grained (sand, gravel, and cobbles) in texture. The depth to very dense or hard material varied from approximately seven feet to over 45.5 feet, and was generally between 10 and 20 feet. The predominant soil encountered in these locations was a mixture of sand, gravel, and silt which typically extended from the ground surface to depths in excess of 10 feet. This soil was typically loose to medium in consistency near the ground surface and medium to dense below five feet.

Potential problem soils include high-plasticity mixtures of silt and clay which are probably highly weathered residual soils. These soils are likely to be compressible, may be soft at high moisture content, and exhibit a high shrink-swell potential. Additionally, some low resistivity mixtures of silt, clay, and sand were encountered. These soils are likely to be corrosive to buried steel.

The potential for liquefaction within the Project site is considered relatively low, due to the lack of unconsolidated sediments and lack of near-surface groundwater. Additionally, during the early phases of the Project, most of the unconsolidated deposits that could potentially increase liquefaction potential would be removed and processing facilities would then be constructed on exposed bedrock.

The California Building Code requires that geotechnical engineering studies be undertaken for any development in areas where potentially serious geologic risks exist. The Preliminary Geotechnical Investigation performed for the proposed Project indicated a potential risk associated with expansive soils, particularly in the areas where the proposed aggregate processing facilities would be located. This is considered to be a **potentially significant** impact.

The Preliminary Geotechnical Investigation notes that consideration should be given to removal and recompaction of native top soils to improve foundation support. The Preliminary Geotechnical Investigation further recommends that upon identification of structure types, loads, and locations, additional field and laboratory work should be performed for final design of onsite structures, processing facilities, and rail load-out facilities. This work should include subsurface exploration and each major structure and additional tests, primarily to determine engineering parameters.

MITIGATION MEASURES

***Mitigation Measure 3.6-1**: In accordance with the California Building Code (Title 24, Part 2) Section 1803, the Project Applicant shall complete a geotechnical engineering investigation and submit it to the Shasta County Building Division of the Department of Resource Management for review and approval prior to the issuance of building permits for any of the proposed onsite facilities or structures.*

The final engineering plans for all proposed structures, foundations, utility trenches, roadways, and railroad facilities shall be prepared by a qualified engineer, and shall implement the recommendations and measures included in the geotechnical investigation.

The County's Building Division of the Department of Resource Management shall ensure that all the pertinent sections of the California Building Code are adhered to in the construction of buildings and structures on site, and that all appropriate measures are implemented in order to reduce the risk of expansive soils to acceptable levels prior to the issuance of a Building Permit.

SIGNIFICANCE AFTER MITIGATION

Implementation of MM 3.6-1 would reduce this impact to **less than significant** by requiring implementation of measures that would stabilize the soils underlying the proposed development.

Impact 3.6-2: Mining activities could lead to landslides, slope instability, debris flows, and increased risk of erosion due to slope failure (Less than Significant with Mitigation)

Quarrying operations at the Project site would use conventional mining practices common in the industry to expose and gather aggregate materials from the mining areas (the North and South Pits). Quarrying would be initiated by establishing a working bench at the upper quarry limit. As the initial bench was extended laterally along the quarry face, a new bench would be established at the next lower level. Bench areas would be extended until the planned quarry backwall is reached; successive benches would be developed as the quarry progresses downward. Mineral reserves would be removed through a combination of drilling, blasting, and excavation equipment. The quarry would be excavated with an overall (stepped) slope of 1:1 (1 horizontal foot to 1 vertical foot) (see Figure 2-13 in the Project Description). Loaders or similar excavating equipment would remove the aggregate for processing after blasting. Blasted rock would be loaded onto haul trucks and transported to or within the primary processing plant adjacent to the active pit.

Slope instability can impact a development in a number of ways. Pertaining to the proposed Project, the following list represents the most applicable and relevant hazards associated with slope instability:

- Hazards to human occupancy and worker safety;
- Impacts to adjacent properties due to unstable land;
- Encroachment onto adjacent watersheds, stream capture, etc.; and

- Increased erosion and resultant off-site sediment transport.

In addition to the items listed above, the Surface Mining and Reclamation Act (SMARA) was implemented to require reclamation of mining sites following mining activities. In keeping with SMARA requirements, stability analyses are required for proposed slopes to demonstrate a factor of safety against slope failure suitable for the proposed end use (the Reclamation Plan).

A Project-specific Slope Stability Evaluation was prepared for the proposed Moody Flats Quarry by Petra Environmental (August, 2012). The purpose of the Slope Stability Evaluation is to determine the impacts of potential adverse slope stability of the proposed quarry and stockpile slopes identified in the mining plan and Reclamation Plan.

The terrain of the Project site is mountainous, with elevations generally rising to the northwest. Slopes are steeper in the western part of the site with relatively flat gradients at the eastern edge of the site. Site elevations range from approximately 2,035 feet amsl on a peak in the northwest part of the site, to approximately 860 feet amsl, where Moody Creek leaves the eastern boundary of the site. Most of the site is currently covered by dense vegetation. As described in greater detail in the Project Description, two mining pits are proposed: the North Pit and the South Pit, as shown on Figure 2-10 in the Project Description. An Overburden Stockpile Area is proposed to be located east of the pits (Figure 2-10). The North Pit would be the larger of the two pits, and would be approximately 4,050 feet long (north to south) and 3,350 feet wide (east to west). The smaller South Pit would be approximately 2,280 feet long and 1,530 feet wide. The Overburden Fill Area would be approximately 1,480 feet wide (north to south) and 2,300 feet long (west to east).

The proposed elevation of the floor of the North Pit is 1,200 feet amsl. The highest slope would be along the northwestern area of the pit, at a height of approximately 800 feet (see Figure 2-11). The proposed elevation of the floor of the South Pit is 950 feet amsl. The highest slope in the South Pit would be along the southeastern area of the pit, at a height of approximately 360 feet. The general design of the pit slopes would consist of 50-foot high slopes at an approximate inclination of 68 degrees from horizontal (0.4:1 horizontal to vertical), separated by an approximately 50-foot wide horizontal bench. The overall gradient of these slopes would be approximately 35 degrees, a slope ratio of 1.4:1 (h:v) feet.

As shown on Figure 2-10, overburden material would be stockpiled to the immediate east of the North Pit. The stockpiled material is proposed to have individual fill slopes of 50 feet in height, separated by 45- to 50-foot wide horizontal benches for a maximum height of approximately 250 feet (see Figure 2-12). The gradient of the individual 50-foot high fill slopes would be 2:1 (h:v) with an overall slope gradient with the benches of 2.5:1 (h:v).

Limited equilibrium slope stability analyses were performed for proposed quarry slopes of the North and South Pits, as well as the proposed Overburden Stockpile Area. Geologic cross sections were prepared for representation of the various slope conditions, forming the geometric configurations for the individual analyses, as well as providing the spatial limits for the assignment of the various soil/bedrock strength and density parameters. Limited equilibrium stability analyses were run on nine cross-sections,

shown on Figures 3.6-3 through 3.6-7: three representing the north, west, and southwest walls of the North Pit; two sections representing the west, southeast, east, and northeast walls of the South Pit, and one section through the proposed overburden stockpile fill slope. Groundwater levels were located approximately 50 to 200 feet below existing grades. The analyses were performed using the computer program GSTABL7, Version 2.004, prepared by Garry H. Gregory, PE. The analytical method used in the analysis included the Bishop and Spencer's slip circle and Janbu block slide methods.

The various soil and rock unit weight and strength parameters, as well as the seismic coefficient, which were utilized in the slope stability analysis are summarized in Table 3.6-5.

TABLE 3.6-5: SLOPE STABILITY ANALYSIS PARAMETERS

MATERIAL	UNIT WEIGHT (PER CUBIC FOOT)	ANGLE OF INTERNAL FRICTION	COHESION (POUNDS/SQUARE FOOT)	SEISMIC COEFFICIENT
Copley Greenstone- unweathered	165	52	3000*	0.10
Copley Greenstone- weathered	130	32*	400*	0.10
Stockpile materials	125	31*	50*	0.10
Shale bedrock below stockpile	135	35*	400*	0.10
Topsoil overlying shale bedrock	125	15*	300*	0.10

* Based on engineering judgment from experience with similar materials (Petra, 2012)

SOURCE: UPDATED SLOPE STABILITY EVALUATION, MOODY FLATS QUARRY, PETRA 2012

The results of the slope stability analyses, expressed as factors of safety, are summarized in Table 3.6-6.

TABLE 3.6-6: SUMMARY OF STABILITY ANALYSIS RESULTS

CROSS SECTION	DESCRIPTION	FACTORS OF SAFETY	
		STATIC	SEISMIC
Section A-A' North Pit Central Slope	Height= 770' Unweathered bedrock for full height	1.69	1.37
Section B-B' North Pit South-Central Slope	Height= 550' Unweathered bedrock for full height	1.75	1.41
Section C-C' North Pit South Slope	Height= 175' Weathered bedrock in upper 60 feet Unweathered bedrock for full height	2.72	2.21
Section D-D' South Pit West Slope	Height= 295' Weathered bedrock in upper 60 feet Unweathered bedrock below 60 feet	2.20	1.84
Section E-E' South Pit South Slope	Height= 400' Weathered bedrock in upper 60 feet Unweathered bedrock below 60 feet	2.05	1.61
Section F-F' North Pit North Slope	Height= 845' Unweathered bedrock for full height	1.62	1.31
Section G-G' Fill Stockpile South Facing Slope	Height= 250' Fill keyway at toe extending through topsoil and alluvium excavated into bedrock. Bottom width of keyway = 50 feet No Groundwater	1.53	1.17
Section H-H' Fill Stockpile East Facing Slope	Height= 170' Fill keyway at toe extending through topsoil and excavated into bedrock. Bottom width of keyway = 50 feet No Groundwater	1.62	1.27

SOURCE: UPDATED SLOPE STABILITY EVALUATION, MOODY FLATS QUARRY, PETRA 2012

The minimum factor of safety determined for the final configuration of the North Pit was computed at 1.62 for static conditions and 1.31 for pseudo-static (seismic) for Section F-F', the northern slope. In the South Pit the minimum factor of safety was computed at 2.05 for static conditions and 1.61 for seismic in Section E-E', the south slope. The Overburden Fill Area slope produced a minimum factor of safety of 1.53 for static and 1.17 for seismic for Section G-G', the south-facing slope. The seismic analyses were performed on each section using a seismic coefficient of 0.10 to evaluate the stability of the pit slopes during a seismic event. These factors of safety indicate that the overall quarry and stockpile slopes would be generally stable, and they would exceed the minimum values for the proposed reclaimed land uses following mining activities.

Slope Stability Analysis Conclusions

The Project site is currently undeveloped and the areas proposed for mining activities would ultimately be returned to open space uses as part of the reclamation efforts following mining activities. There would be no residences or human occupancy proposed on the Project site during or after mining activities, thus, slope stability would not present a hazard to onsite human occupancy. There could be a

potential for localized small-scale slope failures to occur (i.e., rockfall) on the individual quarry slope faces of both the North and the South Pits during mining operations. These small-scale individual slope failures would not result in off-site impacts to the surrounding areas, but could pose a moderate risk to workers and mining personnel. Rockfall would pose an omnipresent danger to all personnel in the quarry area. This type of risk is inherent to the mining industry, and workers would receive extensive safety training to avoid onsite hazards and to mitigate risks to worker safety and welfare. Public access to the quarry areas would be strictly prohibited, and rockfall risks would be limited to qualified trained personnel on the Project site.

The offset distances between the pit walls (the mining areas) and the nearest adjacent property line, and/or drainage channel indicate the potential for impacts to adjacent properties or drainage channels would be highly unlikely. As described in much greater detail in Section 3.9, Hydrology and Water Quality, the drainage system developed for the Project site would include an enclosed drainage pattern. Therefore, erosion from the quarry pit slopes would be contained/retained within the quarry, eliminating the potential for off-site sediment transport. The discussion and analysis presented above demonstrates that the primary slope stability issue is in compliance with SMARA, but could result in significant impacts to worker safety and public safety.

The Slope Stability Evaluation (Petra, 2012) includes recommendations to further ensure that quarry operations and Reclamation Plan implementation would result in stable slopes that would mitigate potential large-scale slope failures and ensure compliance with applicable SMARA requirements. The implementation of the following mitigation measures would ensure that impacts related to slope stability are **less than significant**.

MITIGATION MEASURES

***Mitigation Measure 3.6-2(a)**: The following requirements and recommendations shall be implemented during mining activities within the North and South Pits:*

1. *During mining operations, the Operator shall hire a California-registered Certified Engineering Geologist to inspect each quarry slope prior to the final trim blast. The geologist shall provide direction as to the final slope face configuration in view of the geologic structures.*

2. *If significant seepage areas are encountered during mining operations, Operator shall install hydraugers (drilled horizontal drains) to provide local dewatering.*

3. *Operator shall direct drainage from the North Pit away from the South Pit upon construction of the stormwater detention system described in Section 3.9 of this Draft EIR.*

4. *Operator shall strictly prohibit public access to the mining areas at all times throughout the operational life of the quarry, and prior to full implementation of the Reclamation Plan. Only trained and qualified personnel shall be granted access to the quarry slopes and mining areas.*

***Mitigation Measure 3.6-2(b)**: The following requirements and recommendations shall be implemented during all material stockpiling activities within the Overburden Fill Area:*

1. *The Operator shall remove all topsoil prior to the placement of stockpile material on the Overburden Fill Area. Topsoil shall be placed on an area with slopes less than 1.5:1 (h:v), and shall be stored until reclamation activities commence.*

2. *The Operator shall uniformly compact the outer 20 feet of the fill slopes to 90 percent or more relative compaction with reference to ASTM D1557, extending to the slope face. The compaction requirement may be waived by a California-registered Certified Engineering Geologist where the individual slopes are constructed no steeper than 2.5:1 (h:v), and it can be demonstrated that slope stability will be maintained.*

3. *The Operator shall strictly prohibit public access to the overburden fill area at all times throughout the operational life of the quarry, and prior to full implementation of the Reclamation Plan. Only trained and qualified personnel shall be granted access to the overburden fill area.*

SIGNIFICANCE AFTER MITIGATION

Implementation of Mitigation Measures 3.6-2(a) and 3.6-2(b) would reduce this impact to a **less than significant** level.

Impact 3.6-3: Project implementation could result in erosion and the loss of topsoil (Less than Significant with Mitigation)

Impacts associated with erosion and the loss of topsoil are addressed in detailed in under Impact 3.9-1 in Section 3.9, Hydrology and Water Quality. As described in Section 3.9 the Project would substantially alter existing drainage patterns at the site. However, the Project is designed to prevent erosion and siltation by complying with federal, state and local grading and drainage requirements. In addition, the stormwater system would reduce stormwater flow rates and volumes from the Project site, thus reducing the potential for erosion and siltation. Furthermore, the stormwater system would include redundant sediment removal capabilities with two Water Quality Ponds and the Vegetated Sheet Drain.

The stormwater modeling results demonstrate that both the rate and amount of surface runoff from the site would be reduced when compared to existing conditions. As discussed in greater detail under Impact 3.9-1, the current peak discharge for a 25-year, 24-hour storm from the site is estimated to be approximately 633 cubic feet per second (cfs). The proposed onsite stormwater system would reduce the peak discharge for the same storm event to about 200 cfs, which is a substantial reduction from existing conditions. As described in greater detail in Section 3.9 of this Draft EIR, and as described in the technical analyses contained in Appendices I, J, L, and M, all runoff from disturbed areas of the project site would be directed to water quality detention ponds, settling basins, and vegetated sheet drains prior to discharge into any navigable waters. Operation of the Project's stormwater detention and

water quality treatment system would reduce the potential for sediment to be discharged into surface waters in the vicinity of the Project site.

Furthermore, by retaining sufficient water to meet the Project's needs, the annual runoff volumes would be reduced initially by 65 acre-feet per year and ultimately by 260 acre-feet per year. Current runoff from the Project site is estimated to be 800 acre-feet per year (SB 610 Water Supply Assessment, September 2011, Appendix S).

As described above, and shown on Exhibit 3.9-1, the proposed stormwater system would have more than adequate capacity to control runoff from the Project site. The system would reduce runoff rates and volumes, thus reducing potential sources of polluted runoff and sediment discharge. In addition, the redundant Water Quality Ponds and the Vegetated Sheet Drain would provide reduction of suspended sediment in the final discharge beyond that recommended by the SWRCB.

Mitigation Measure 3.9-1(b) requires the Project Applicant to submit a Report of Waste Discharge (RoWD) to the Regional Water Quality Control Board to determine whether Waste Discharge Requirements (WDRs) will be required for the Project. The Project Applicant shall implement all required WDRs identified by the RWQCB throughout the life of the Project.

Mitigation Measure 3.9-1(c) requires that prior to any ground disturbing activities, the Project Applicant shall prepare and submit a Stormwater Pollution Prevention Plan (SWPPP) that includes specific types and sources of stormwater pollutants, determines the location and nature of potential impacts, and specifies appropriate control measures to eliminate any potentially significant impacts on receiving water quality from stormwater runoff. The SWPPP shall require treatment Best Management Practices (BMPs) that incorporate, at a minimum, the required hydraulic sizing design criteria for volume and flow to treat projected stormwater runoff. The SWPPP shall comply with the most current standards established by the Central Valley RWQCB. BMPs shall be selected from a menu according to site requirements and shall be subject to review by the Central Valley RWQCB. The Project Applicant shall implement appropriate BMPs as identified in the SWPPP throughout the life of the Project.

Additionally, Mitigation Measure 3.9-1(d) requires annual inspection reports of the Project's stormwater management and water quality system, in order to ensure that all applicable regulatory requirements related to surface water quality and sediment discharge reductions continue to be met throughout the life of the Project.

Based on the discussion above, the Project would have a **less than significant** impact related to erosion and surface water quality impacts. Mitigation Measure 3.6-3 would provide additional measures to reduce the potential for erosion to occur on the Project site. Additionally, the implementation of Mitigation Measures 3.9-1(a) through 3.9-1(d) would further ensure that the proposed Project would not result in significant impacts related to erosion.

MITIGATION MEASURES

***Mitigation Measure 3.6-3**: Vegetation removal and the disturbance of topsoil shall not occur on the Project site until it is necessary for site development and/or mining of a given area of the Project site. No clearance of any area shall be permitted more than one year in advance of development and/or mining of that area. Site clearing and vegetation removal activities should not occur during the wet season (approximately November through March), unless the Project Applicant can demonstrate the necessity of site clearing activities during these months to the satisfaction of the Shasta County Department of Resource Management; and further, that erosion will be prevented with standard erosion BMPs.*

SIGNIFICANCE AFTER MITIGATION

Mitigation Measures 3.6-3 and 3.9-1(a) through 3.9-1(d) would ensure that vegetation is retained on the site as long as feasible prior to site development and mining activities, and would ensure that a comprehensive stormwater quality system is operated on the Project site in order to reduce the potential for erosion and the discharge of sediment into surface waters. The implementation of these mitigation measures would reduce this impact to a **less than significant** level.

Impact 3.6-4: Project implementation may result in the installation and use of septic tanks and/or an onsite wastewater disposal system (Less than Significant with Mitigation)

During the initial early stages (approximately first five years) of the Project, portable chemical toilets would be used on the Project site. These portable chemical toilets would not be drained onsite. Toilet contents would be gathered by a contracted hauler, licensed to dispose of chemical toilet waste, and disposed of in an approved offsite location. Chemical toilet disposal is anticipated to occur once every one-to-two weeks. Portable chemical toilets would be used in various areas of the quarry throughout the operational life of the proposed Project. State law requires a permit for anyone in the business of cleaning septic tanks, cesspools, chemical toilets, holding tanks, etc., and disposing of the waste in the County. All persons who are registered with the County Environmental Health Division to clean septic tanks are required to also file with the Department of Public Works, an Application to Use County's Septage Treatment Facilities, and to comply with the Agreement For Use of County Septage Disposal Facilities. These permit and filing requirements, as well as mandatory compliance with existing County regulations regarding the disposal of chemical toilet and septic waste, would ensure that impacts associated with portable chemical toilets would be **less than significant**.

Upon development of the permanent structures and buildings located within the secondary and ancillary processing and load-out areas, an onsite septic system would be installed to meet the wastewater demands of Project employees. The exact location and design of the future septic system has not been determined at this time.

A permit issued by the Shasta County Environmental Health Division (EHD) is required prior to the installation of a new or replacement septic tank and leach field or the repair of an existing failing system. A permit application must be submitted along with a complete site plan, fees, and soil test data.

Soil tests required include the excavation of a soil profile pit so that the profile can be logged and at least three percolation tests. On occasion other tests may be requested. Tests must be done by, or under the supervision of, a qualified registered civil engineer, registered geologist, registered environmental health specialist, certified engineering geologist, or soil scientist certified by the American Registry of Certified Professionals in Agronomy, Crops and Soils, or by a qualified testing laboratory approved by the Office of the State Architect.

Septic system permits are issued after EHD staff determines a site is suitable for a septic system and are valid for one year. EHD staff must inspect the system prior to backfilling to verify compliance with terms of the permit and sewage disposal standards. The County's Sewage Disposal Standards include numerous requirements related to soil types, restrictions regarding proximity of leach fields to surface waters and groundwater, and other standards to ensure environmental quality and protection. The County's Septic Tank and Leach Line Design, Construction and Installation Guidelines provide regulations regarding tank types, standards, and measures to ensure septic systems meet or exceed all applicable local and state regulations.

The construction of an onsite septic system could have a **potentially significant impact** on geology and soils. However, implementation of Mitigation Measure 3.6-4 would ensure that the future onsite septic system would be located on an area with acceptable soils for percolation, adequate distances from water resources, and would comply with all applicable regulations for onsite sewage disposal systems.

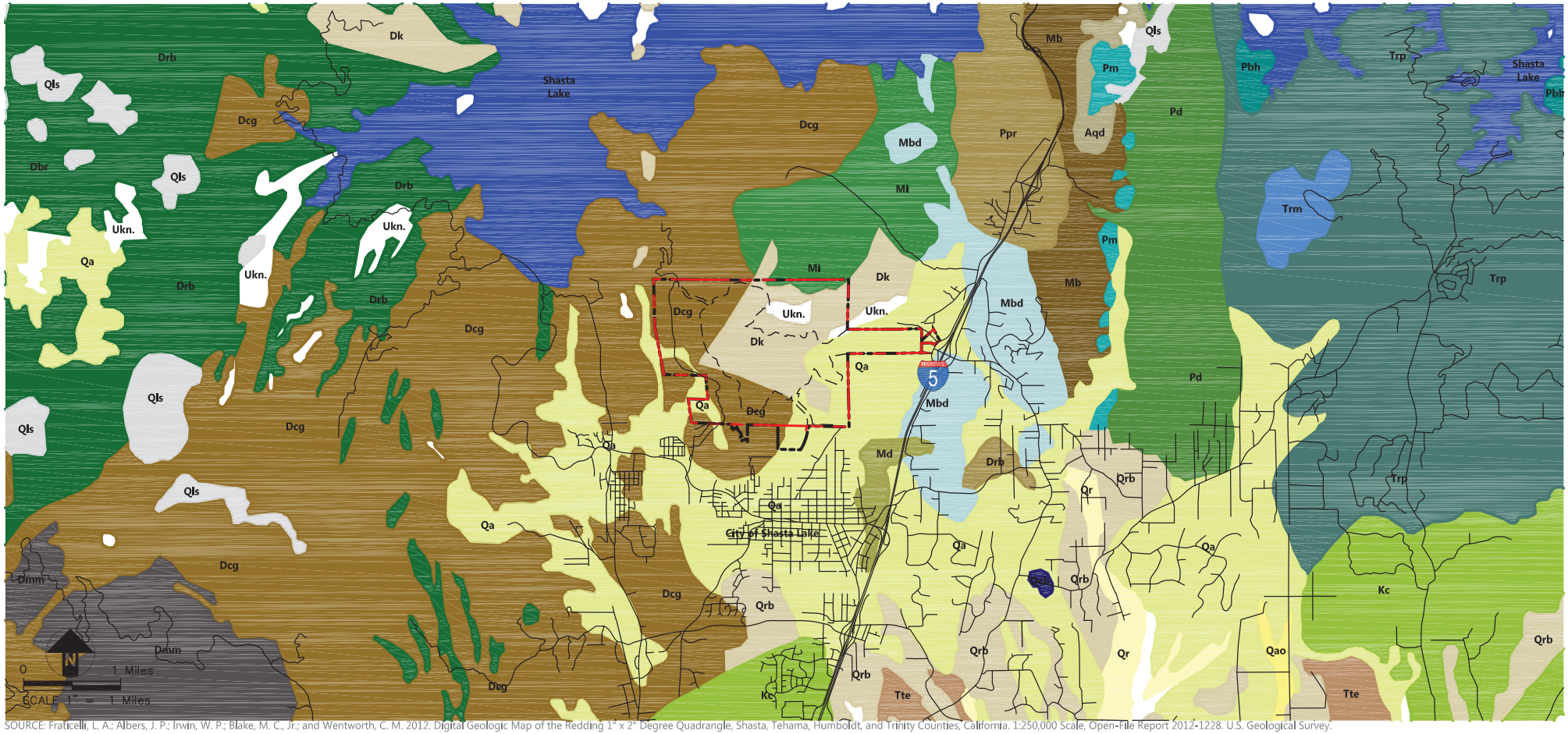
MITIGATION MEASURES

Mitigation Measure 3.6-4*: Prior to the construction, installation and operation of any onsite sewage disposal system, the Project Applicant shall comply with the site testing requirements required by Section 8.40 of the Shasta County Code, and the Shasta County Environmental Health Division's Sewage Disposal Standards. Soil tests, percolation tests, and other tests deemed necessary by the County Environmental Health Division shall be completed by, or under the supervision of, a qualified registered civil engineer, registered geologist, registered environmental health specialist, certified engineering geologist, or soil scientist certified by the American Registry of Certified Professionals in Agronomy, Crops and Soils, or by a qualified testing laboratory approved by the Office of the State Architect. The design, construction, and installation of the onsite sewage disposal system shall meet or exceed the requirements of the County's Septic Tank and Leach Line Design, Construction and Installation Guidelines. All required permits for the installation and operation of the onsite sewage disposal system shall be received from the County prior to the construction or installation of the onsite sewage disposal system.*

SIGNIFICANCE AFTER MITIGATION

Implementation of MM 3.6-4 would reduce this impact to a **less than significant** level.

This page left intentionally blank.



SOURCE: Fraticelli, L. A.; Albers, J. P.; Irwin, W. P.; Blake, M. C., Jr.; and Wentworth, C. M. 2012. Digital Geologic Map of the Redding 1° x 2° Degree Quadrangle, Shasta, Tehama, Humboldt, and Trinity Counties, California. 1:250,000 Scale, Open-File Report 2012-1228. U.S. Geological Survey.

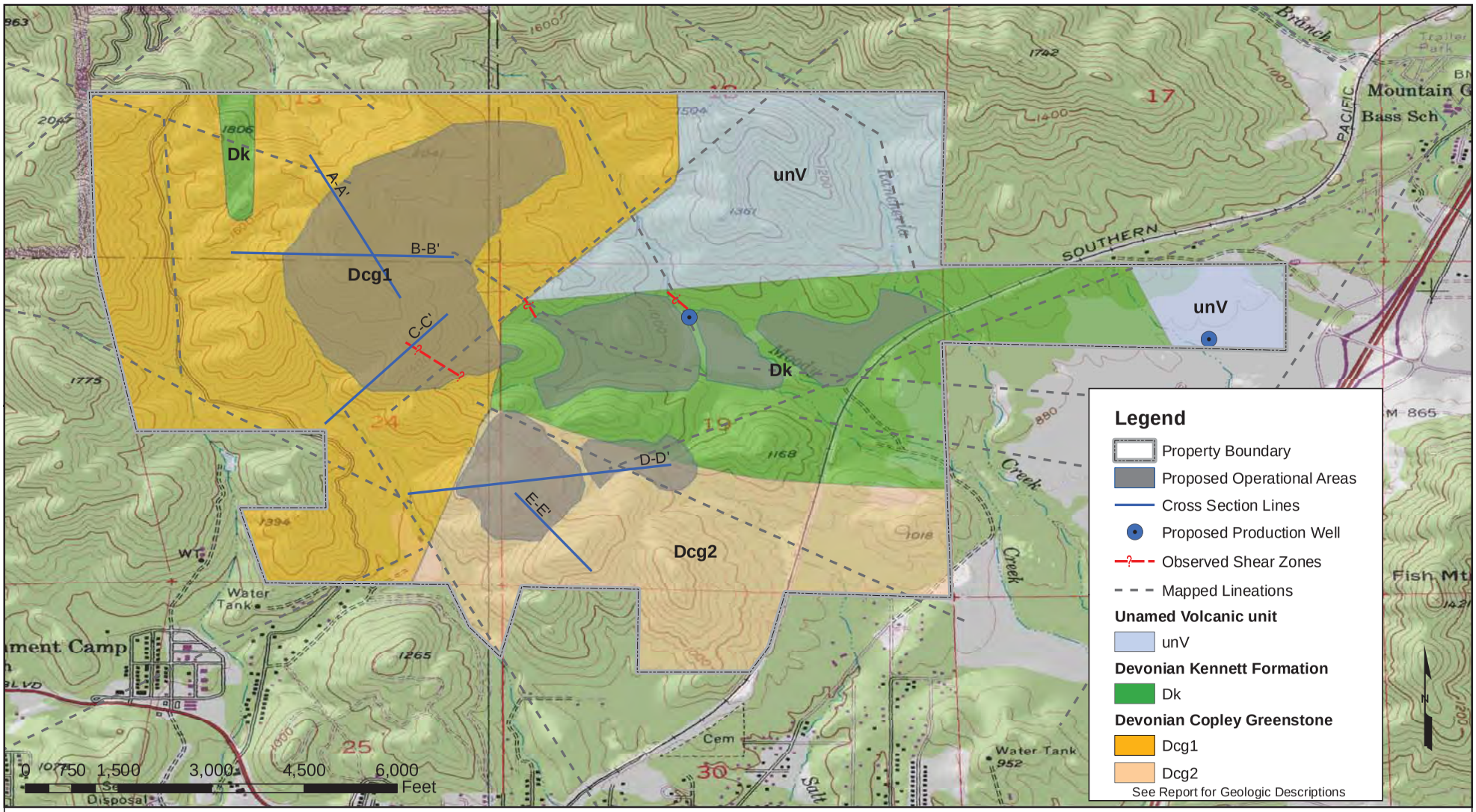
Aqd	Augite-quartz diorite (Permian(?))
Dbr	Balaklala Rhyolite (Denovian(?))
Dcg	Copley Greenstone (Denovian(?))
Dk	Kennett Formation (Denovian)
Dmm	Mule Mountain stock (Denovian)
Kc	Chico Formation (Upper Cretaceous)
Mb	Baird Formation (Mississippian and Pennsylvanian(?))
Mbd	Bragdon Formation (Mississippian)
Md	Mafic rocks (Permian(?))
Mi	Mafic intrusive rocks (Jurassic)
Pbh	Bully Hill Rhyolite (Permian(?)-Middle Triassic(?))
Pd	Dekkas Andesite (Permian)
Pm	McCloud Limestone (Pennsylvanian(?) and Permian)
Ppr	Pit River stock (Permian)
Qa	Alluvium and colluvium (Holocene)
	Shasta Lake
Qao	Alluvial and overbank deposits, undivided (Holocene)
Qcb	Basalt of Coleman Forebay (Pleistocene)
Qls	Landslide deposits (Holocene)
Qr	Riverbank Formation (Pleistocene)
Qrb	Red Bluff formation of Diller(1894)(Pleistocene)
Trm	Modin Formation (Upper Triassic)
Trp	Pit Formation (Permian(?) or Triassic)
Tte	Tehama Formation (Pliocene)
Tva	Andesitic breccia (Pliocene)
Ukn.	Unknown Units (Age Unknown)
	Site Boundary
	Mine and Reclamation Boundary
	Property Ownership

MOODY FLATS QUARRY EIR

Figure 3.6-1: Regional Geology

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



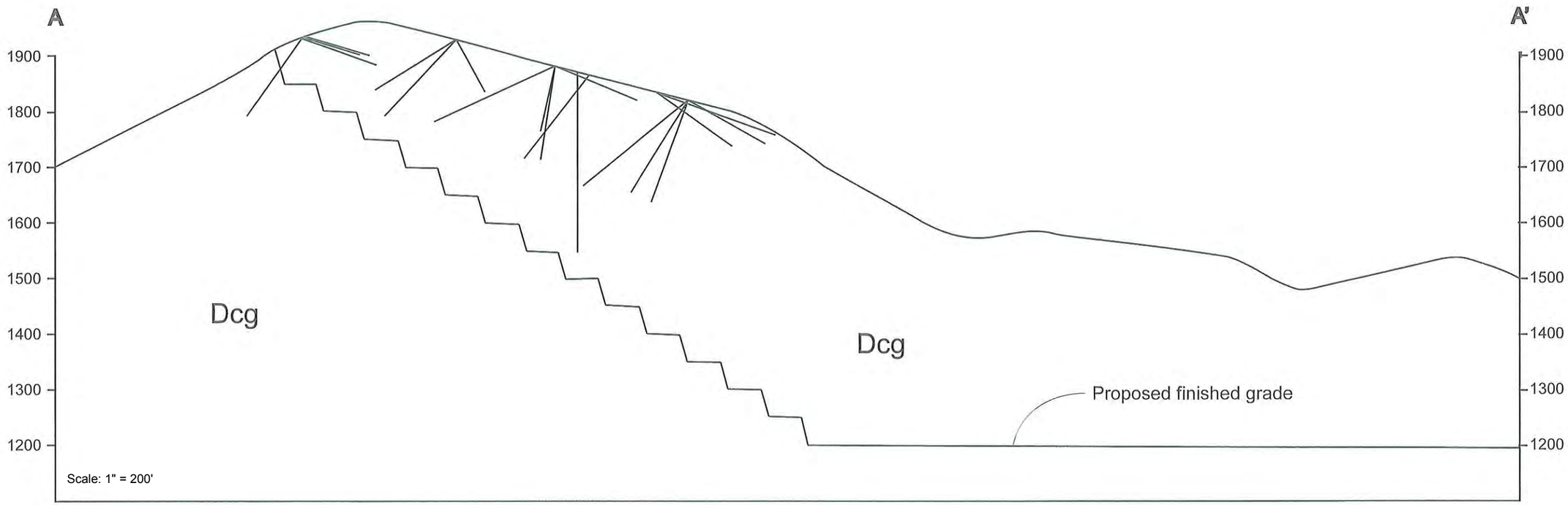
MOODY FLATS QUARRY EIR

Figure 3.6-2: Local Geology

Source: Brown and Caldwell, 1-29-2013.

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



Dcg - Devonian age Copley Greenstone

Apparent dip of joint

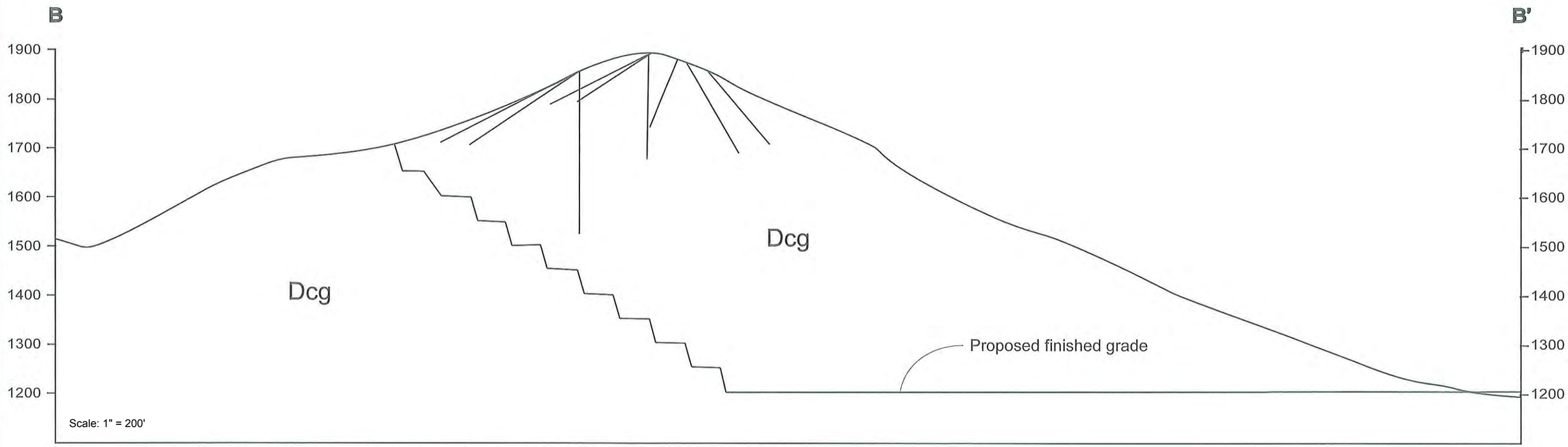
MOODY FLATS QUARRY EIR

Figure 3.6-3: Cross-Section A-A'

Source: Petra Geotechnical, Inc., San Diego, California, December 2009

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



Dcg - Devonian age Copley Greenstone

Apparent dip of joint

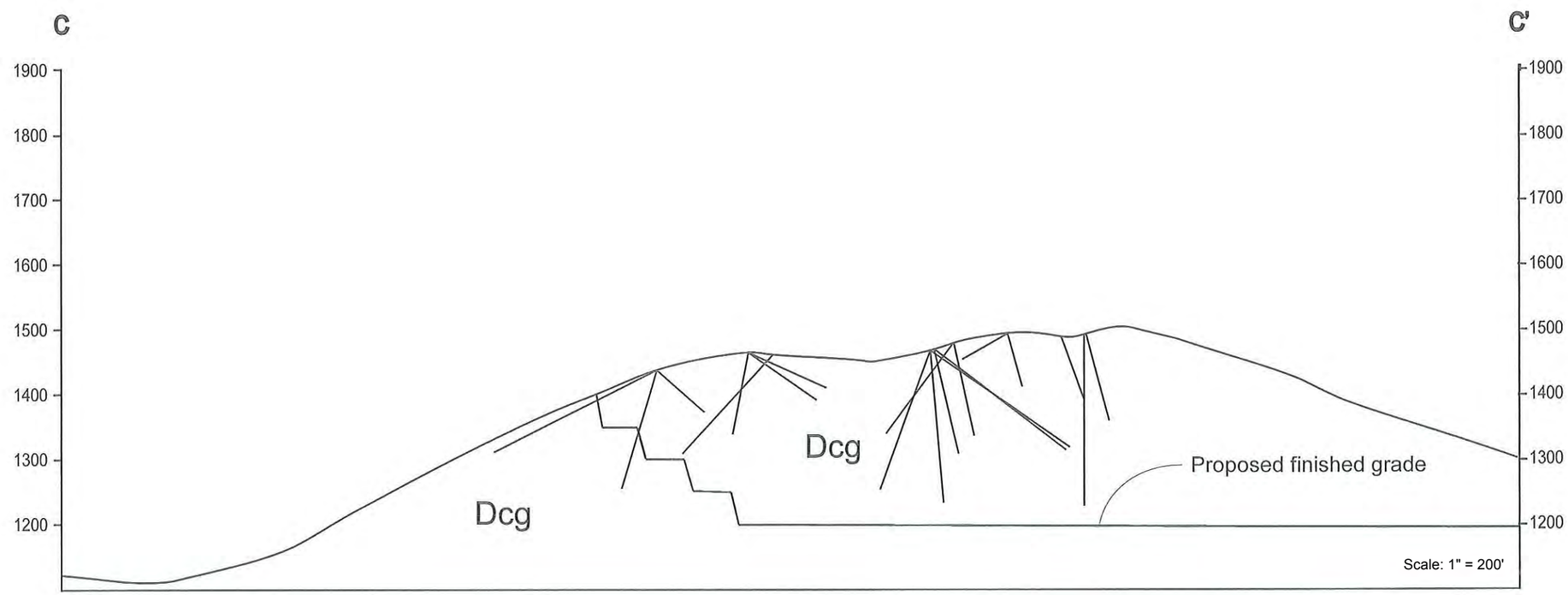
MOODY FLATS QUARRY EIR

Figure 3.6-4: Cross-Section B-B'

Source: Petra Geotechnical, Inc., San Diego, California, December 2009

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



Dcg - Devonian age Copley Greenstone

Apparent dip of joint

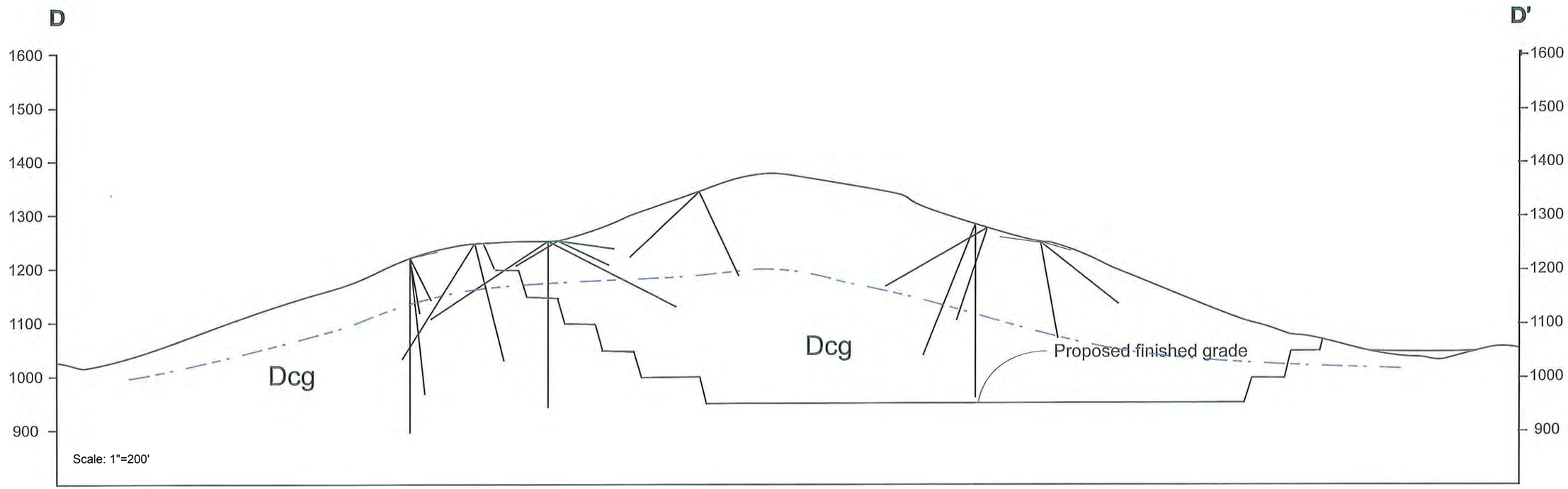
MOODY FLATS QUARRY EIR

Figure 3.6-5: Cross-Section C-C'

Source: Petra Geotechnical, Inc., San Diego, California, December 2009

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



Dcg - Devonian age Copley Greenstone

Apparent dip of joint

Approximated groundwater surface

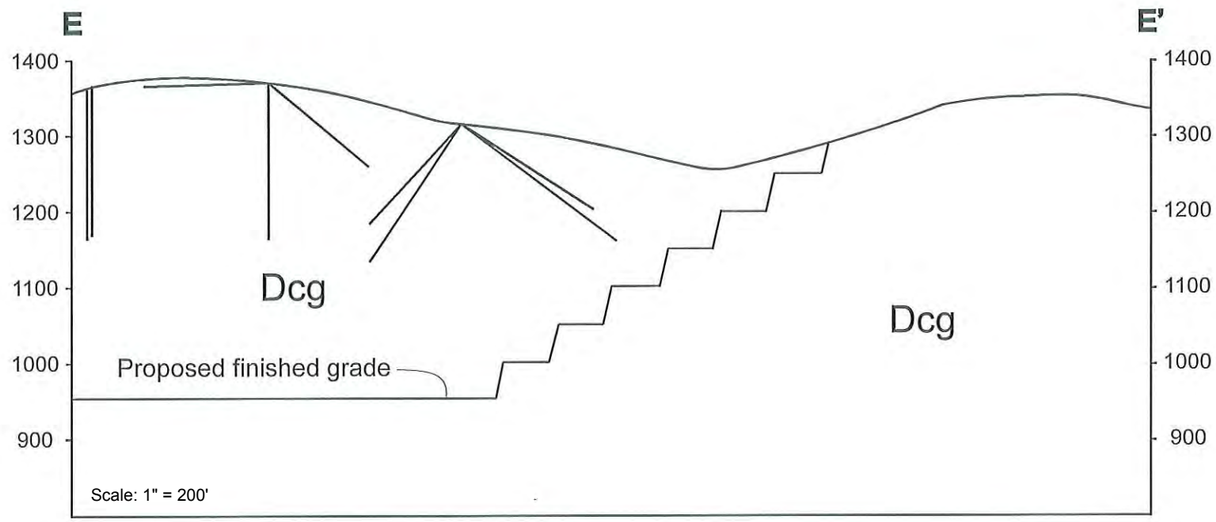
MOODY FLATS QUARRY EIR

Figure 3.6-6: Cross-Section D-D'

Source: Petra Geotechnical, Inc., San Diego, California, December 2009

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank



Dcg - Devonian age Copley Greenstone

Apparent dip of joint

MOODY FLATS QUARRY EIR

Figure 3.6-7: Cross-Section E-E'

Source: Petra Geotechnical, Inc., San Diego, California, December 2009

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank

The purpose of this section is to disclose and analyze the potential impacts related to greenhouse gases (GHGs) and climate change associated with the development and implementation of the proposed project. There were no comments received during the public review period for the Notice of Preparation related to this topic. Prior to release of the Notice of Preparation, the California Department of Fish and Game submitted comments to the County regarding this topic, requesting that this issue be addressed in the EIR. Information in this section is derived primarily from the following sources:

- Air Quality Impact Analysis, Moody Flats Quarry Project. Golder Associates, August 2012. **(Appendix D)**
- Estimated Net CEQA-Based Greenhouse Gas Impact Analysis for the Moody Flats Quarry DEIR. TSS Consultants, May 2012. **(Appendix R)**

3.7.1 INTRODUCTION

The following section provides a summary of greenhouse gases and climate change linkages, discusses the potential global and localized (State of California) effects of climate change, summarizes the applicable regulatory setting related to climate change and greenhouse gases, and discusses the proposed project's potential to result in cumulative climate change impacts.

As described in greater detail below, emissions of greenhouse gases (GHGs) have the potential to adversely affect the environment in a cumulative context. The emissions from a single project would not cause global climate change, however, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change. Therefore, the analysis of GHGs and climate change presented in this section is presented in terms of the proposed project's cumulative contribution and potential to result in cumulatively considerable impacts related to GHGs and climate change.

Cumulative impacts are the collective impacts of one or more past, present, and future projects that, when combined, result in adverse changes to the environment. In determining the significance of a proposed project's contribution to anticipated adverse future conditions, a lead agency should generally undertake a two-step analysis. The first question is whether the *combined* effects from *both* the proposed project *and* other projects would be cumulatively significant. If the agency answers this inquiry in the affirmative, the second question is whether "the proposed project's *incremental* effects are cumulatively considerable" and thus, significant in and of themselves. The cumulative project list for this issue (climate change) comprises anthropogenic (i.e., human-made) GHG emissions sources across the globe, and no project alone would reasonably be expected to contribute to a noticeable incremental change to the global climate. However, legislation and executive orders on the subject of climate change in California have established a statewide context for and a process for developing an enforceable statewide cap on GHG emissions. Given the nature of environmental consequences from GHGs and global climate change, CEQA requires that lead agencies consider evaluating the cumulative impacts of GHGs, even relatively small (on a global basis) additions. Small contributions to this cumulative impact

(from which significant effects are occurring and are expected to worsen over time) may be potentially considerable and, therefore, significant.

3.7.2 ENVIRONMENTAL SETTING

GREENHOUSE GASES AND CLIMATE CHANGE LINKAGES

Various gases in the Earth's atmosphere, classified as atmospheric greenhouse gases (GHGs), play a critical role in determining the Earth's surface temperature. Solar radiation enters Earth's atmosphere from space, and a portion of the radiation is absorbed by the Earth's surface. The Earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation.

Naturally occurring greenhouse gases include water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3). Several classes of halogenated substances that contain fluorine, chlorine, or bromine are also greenhouse gases, but they are, for the most part, solely a product of industrial activities. Although the direct greenhouse gases CO_2, CH_4, and N_2O occur naturally in the atmosphere, human activities have changed their atmospheric concentrations. From the pre-industrial era (i.e., ending about 1750) to 2005, concentrations of these three greenhouse gases have increased globally by 36, 148, and 18 percent, respectively (IPCC 2007)[1].

Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), ozone (O_3), water vapor, nitrous oxide (N_2O), and chlorofluorocarbons (CFCs).

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors (California Energy Commission 2006a) [2]. In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (California Energy Commission 2006a).

---

[1] Intergovernmental Panel on Climate Change. 2007. "Climate Change 2007: The Physical Science Basis, Summary for Policymakers." http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg1_report_the_physical_science_basis.htm

[2] California Energy Commission. 2006a. Inventory of California Greenhouse Gas Emissions and Sinks 1990 to 2004. http://www.arb.ca.gov/cc/inventory/archive/archive.htm

As the name implies, global climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern, respectively. California produced 492 million gross metric tons of carbon dioxide equivalents ($MMTCO_2e$) in 2004 (California Energy Commission 2006a). By 2020, California is projected to produce 507 $MMTCO_2e$ per year.[3]

Carbon dioxide equivalents are a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential of a GHG, is also dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

Consumption of fossil fuels in the transportation sector was the single largest source of California's GHG emissions in 2004, accounting for 40.7 percent of total GHG emissions in the state (California Energy Commission 2006a). This category was followed by the electric power sector (including both in-state and out of-state sources) (22.2%) and the industrial sector (20.5%) (California Energy Commission 2006a).

EFFECTS OF GLOBAL CLIMATE CHANGE

The effects of increasing global temperature are far-reaching and extremely difficult to quantify. The scientific community continues to study the effects of global climate change. In general, increases in the ambient global temperature as a result of increased GHGs are anticipated to result in rising sea levels, which could threaten coastal areas through accelerated coastal erosion, threats to levees and inland water systems and disruption to coastal wetlands and habitat.

If the temperature of the ocean warms, it is anticipated that the winter snow season would be shortened. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state. The snowpack portion of the supply could potentially decline by 70 percent to 90 percent by the end of the 21st century (Cal EPA 2006)[4]. This phenomenon could lead to significant challenges securing an adequate water supply for a growing state population. Further, the increased ocean temperature

[3] California Air Resources Board. 2010. "Functional Equivalent Document prepared for the California Cap on GHG Emissions and Market-Based Compliance Mechanisms."

[4] California Environmental Protection Agency, Climate Action Team. 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature. http://www.climatechange.ca.gov/climate_action_team/reports/

could result in increased moisture flux into the state; however, since this would likely increasingly come in the form of rain rather than snow in the high elevations, increased precipitation could lead to increased potential and severity of flood events, placing more pressure on California's levee/flood control system.

Sea level has risen approximately seven inches during the last century and it is predicted to rise an additional 22 to 35 inches by 2100, depending on the future GHG emissions levels (Cal EPA 2006). If this occurs, resultant effects could include increased coastal flooding, saltwater intrusion and disruption of wetlands (Cal EPA 2006). As the existing climate throughout California changes over time, mass migration of species, or failure of species to migrate in time to adapt to the perturbations in climate, could also result. Under the emissions scenarios of the Climate Scenarios report (Cal EPA 2006), the impacts of global warming in California are anticipated to include, but are not limited to, the following.

PUBLIC HEALTH

Higher temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to ozone formation are projected to increase from 25 percent to 35 percent under the lower warming range and to 75 percent to 85 percent under the medium warming range. In addition, if global background ozone levels increase as predicted in some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can travel long distances depending on wind conditions. The Climate Scenarios report indicates that large wildfires could become up to 55 percent more frequent if GHG emissions are not significantly reduced.

In addition, under the higher warming scenario, there could be up to 100 more days per year with temperatures above 90°F in Los Angeles and 95°F in Sacramento by 2100. This is a large increase over historical patterns and approximately twice the increase projected if temperatures remain within or below the lower warming range. Rising temperatures will increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

WATER RESOURCES

A vast network of man-made reservoirs and aqueducts capture and transport water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada snow pack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snow pack, increasing the risk of summer water shortages.

The state's water supplies are also at risk from rising sea levels. An influx of saltwater would degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality and reliability of water within the southern edge of the Sacramento/San Joaquin River Delta, a major state fresh water supply. Global warming is also projected to seriously affect agricultural areas, with California farmers projected to lose as much as

25 percent of the water supply they need; decrease the potential for hydropower production within the state (although the effects on hydropower are uncertain); and seriously harm winter tourism. Under the lower warming range, the snow dependent winter recreational season at lower elevations could be reduced by as much as one month. If temperatures reach the higher warming range and precipitation declines, there might be many years with insufficient snow for skiing, snowboarding, and other snow dependent recreational activities.

If GHG emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snow pack by as much as 70 percent to 90 percent. Under the lower warming scenario, snow pack losses are expected to be only half as large as those expected if temperatures were to rise to the higher warming range. How much snow pack will be lost depends in part on future precipitation patterns, the projections for which remain uncertain. However, even under the wetter climate projections, the loss of snow pack would pose challenges to water managers, hamper hydropower generation, and nearly eliminate all skiing and other snow-related recreational activities.

AGRICULTURE

Increased GHG emissions are expected to cause widespread changes to the agriculture industry reducing the quantity and quality of agricultural products statewide. Although higher carbon dioxide levels can stimulate plant production and increase plant water-use efficiency, California's farmers will face greater water demand for crops and a less reliable water supply as temperatures rise.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than-optimal development for many crops, so rising temperatures are likely to worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits and nuts, and milk.

Crop growth and development will be affected, as will the intensity and frequency of pest and disease outbreaks. Rising temperatures will likely aggravate ozone pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

In addition, continued global warming will likely shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion is expected in many species while range contractions are less likely in rapidly evolving species with significant populations already established. Should range contractions occur, it is likely that new or different weed species will fill the emerging gaps. Continued global warming is also likely to alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

FORESTS AND LANDSCAPES

Global warming is expected to alter the distribution and character of natural vegetation thereby resulting in a possible increased risk of large of wildfires. If temperatures rise into the medium

warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. For example, if precipitation increases as temperatures rise, wildfires in southern California are expected to increase by approximately 30 percent toward the end of the century. In contrast, precipitation decreases could increase wildfires in northern California by up to 90 percent.

Moreover, continued global warming will alter natural ecosystems and biological diversity within the state. For example, alpine and sub-alpine ecosystems are expected to decline by as much as 60 percent to 80 percent by the end of the century as a result of increasing temperatures. The productivity of the state's forests is also expected to decrease as a result of global warming.

RISING SEA LEVELS

Rising sea levels, more intense coastal storms, and warmer water temperatures will increasingly threaten the state's coastal regions. Under the higher warming scenario, sea level is anticipated to rise 22 to 35 inches by 2100. Elevations of this magnitude would inundate coastal areas with saltwater, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats.

3.7.3 REGULATORY SETTING

FEDERAL

The Environmental Protection Agency (EPA) is the federal agency responsible for implementing the Clean Air Act (CAA). The Supreme Court of the United States ruled on April 2, 2007 that CO2 is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs. In response to the mounting issue of climate change, EPA has taken actions to regulate, monitor, and potentially reduce GHG emissions.

Greenhouse Gas Permitting Requirements on Large Industrial Facilities

On May 13, 2010, EPA issued the Prevention of Significant Deterioration and Title V Greenhouse Gas Tailor Rule. This final rule sets thresholds for greenhouse gas (GHG) emissions that define when permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

The rule establishes a schedule that will initially focus permitting programs on the largest sources and then expands beyond certain permitting programs to cover the largest sources of GHGs that may not have been previously covered by the CAA for other pollutants. During Step 1, from January 2, 2011 to June 30, 2011, only sources subject to the PSD permitting program at that time (i.e., those that are newly-constructed or modified in a way that significantly increases emissions of a pollutant other than GHGs) would be subject to permitting requirements for their GHG emissions under PSD; and, for these projects, only GHG increases of 75,000 tons (68,039 MT) per

year or more, on a CO2e basis, would need to determine the Best Available Control Technology (BACT) for their GHG emissions. Similarly for the operating permit program, only sources subject to the program at that time (i.e., newly constructed or existing major sources for a pollutant other than GHGs) would be subject to Title V requirements for GHG. During this time, no sources would be subject to Clean Air Act permitting requirements due solely to GHG emissions.

Step 2 builds on Step 1. During Step 2, from July 1, 2011 to June 30, 2013, PSD permitting requirements covered for the first time new construction projects that emit GHG emissions of at least 100,000 tons (90,718 MT) per year even if they did not exceed the permitting thresholds for any other pollutant. Modifications at existing facilities that increased GHG emissions by at least 75,000 tons (68,039 MT) per year became subject to permitting requirements, even if they did not significantly increase emissions of any other pollutant. In Step 2, operating permit requirements for the first time, applied to sources based on their GHG emissions even if they did not apply based on emissions of any other pollutant. Facilities that emitted at least 100,000 tons (90,718 MT) per year of CO2e were subject to Title V permitting requirements.

On February 24, 2012, the EPA proposed to keep GHG permitting thresholds at current levels (Step 2 levels). The Step 2 levels identified above are still in effect at the time of writing of this EIR.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement provides EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of CO2 per year. This publicly available data allows the reporters to track their own emissions, compare them to similar facilities, and aids in identifying cost effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial greenhouse gases along with vehicle and engine manufacturers report at the corporate level. An estimated 85 percent of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.

Under the Mandatory Reporting of Greenhouse Gases (GHGs) rule, owners or operators of facilities that contain cement production processes must report emissions from cement production processes and all other source categories located at the facility for which methods are defined in the rule. Owners or operators are required to collect emission data; calculate GHG emissions; and follow the specified procedures for quality assurance, missing data, recordkeeping, and reporting.

Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the U.S. would meet certain fuel economy goals. Through this Act, Congress established the first fuel economy standards for on-road motor vehicles in the United States (U.S.). Pursuant to the Act, the National Highway Traffic and Safety Administration (NHTSA), which is part of the U.S. Department of Transportation (USDOT), is responsible for establishing additional vehicle standards and for revising existing standards.

Since 1990, the fuel economy standard for new passenger cars has been 27.5 mpg. Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 mpg. In August 2011, the EPA and the NHTSA jointly issued the first-ever global warming emissions and fuel efficiency standards for medium-and heavy-duty vehicles (M/HDV) and engines. The standards apply to new medium- and heavy-duty vehicles, from pickup trucks to big-rig tractors, manufactured in model years (MY) 2014 through 2018.

Compliance with federal fuel economy standards is determined on the basis of each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the U.S. The Corporate Average Fuel Economy (CAFE) program, which is administered by the U.S. Environmental Protection Agency (EPA), was created to determine vehicle manufacturers' compliance with the fuel economy standards. The EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, the USDOT is authorized to assess penalties for noncompliance.

Energy Policy Act of 1992 (EPAct)

The Energy Policy Act of 1992 (EPAct) was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain federal, state, and local government and private fleets to purchase a percentage of light duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are included in EPAct. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.

Energy Policy Act of 2005

The Energy Policy Act of 2005 was signed into law on August 8, 2005. Generally, the act provides for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for a clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

STATE

California Strategy to Reduce Petroleum Dependence (AB 2076)

AB 2076 (Chapter 936, Statutes of 2000), codified in Public Resources Code section 25720, et seq., required the CEC and the California Air Resources Board (CARB) to develop and submit to the Legislature a strategy to reduce petroleum dependence in California. The statute required the strategy to include goals for reducing the rate of growth in the demand for petroleum fuels. In addition, the strategy was required to include recommendations to increase transportation energy efficiency as well as the use of non-petroleum fuels and advanced transportation technologies including alternative fuel vehicles, hybrid vehicles, and high-fuel efficiency vehicles.

The strategy, *Reducing California's Petroleum Dependence*, was adopted by the CEC and CARB in 2003. The strategy recommends that California reduce inroad gasoline and diesel fuel demand to 15 percent below 2003 demand levels by 2020 and maintain that level for the foreseeable future; the Governor and Legislature work to establish national fuel economy standards that double the fuel efficiency of new cars, light trucks, and sport utility vehicles (SUVs); and increase the use of non- petroleum fuels to 20 percent of on-road fuel consumption by 2020 and 30 percent by 2030.

Bioenergy Action Plan – Executive Order #S-06-06

Executive Order #S-06-06 established targets for the use and production of biofuels and biopower and directed state agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The executive order established the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels within California by 2010, 40 percent by 2020, and 75 percent by 2050. The executive order also called for the state to meet a target for use of biomass electricity, including biomass cogeneration facilities.

Governor's Low Carbon Fuel Standard (Executive Order #S-01-07)

Executive Order #S-01-07 establishes a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 through establishment of a Low Carbon Fuel Standard. The Low Carbon Fuel Standard shall be incorporated into the State Alternative Fuels Plan required by AB 1007 and is one of the proposed discrete early action GHG reduction measures identified by CARB pursuant to AB 32.

Senate Bill 97 (SB 97)

Senate Bill 97, codified in Public Resources Code section 21097, was signed by the Governor on August 24, 2007.

The bill required the Office of Planning and Research (OPR), by July 1, 2009, to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions, as required by CEQA, including, but not limited to, effects associated with transportation or energy consumption. The Resources Agency was certified and adopted GHG guidelines on December 30, 2009. Section 15064.4 of the Guidelines became effective on March 1, 2010 and instructs agencies how to determine the significance of impacts from GHGs. This section gives agencies the discretion to choose whether the use a model or methodology to quality GHG emissions or to rely on qualitative analysis or performance based standards.

Senate Bill 375

SB 375, signed into law on September 30, 2008, and codified in the Government Code and Public Resources Code sections 21155, et seq, aligns regional transportation planning efforts, regional GHG emission reduction targets, land use, and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's Regional

Transportation Plan (RTP). CARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years, but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG emission reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012. The CARB assigned the Shasta Regional Transportation Agency (SRTA) with a reduction target of 0 percent per capita GHG emissions from 2005 levels.

Assembly Bill 1493

In 2002, then Governor Gray Davis signed AB 1493 into law. AB 1493 required the CARB to develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty truck and other vehicles determined by the CARB to be vehicles whose primary use is noncommercial personal transportation in the state." To meet the requirements of AB 1493, CARB approved amendments to the California Code of Regulations (CCR) adding GHG emission standards to California's existing motor vehicle emission standards in 2004.

Amendments to CCR Title 13 Sections 1900 (CCR 13 1900) and 1961 (CCR 13 1961), and adoption of Section 1961.1 (CCR 13 1961.1) require automobile manufacturers to meet fleet average GHG emission limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes beginning with the 2009 model year. Emission limits are further reduced each model year through 2016. For passenger cars and light-duty trucks 3,750 pounds or less loaded vehicle weight (LVW), the 2016 GHG emission limits are approximately 37 percent lower than the during the first year of the regulations in 2009. For medium-duty passenger vehicles and light-duty trucks 3,751 LVW to 8,500 pounds gross vehicle weight (GVW), GHG emissions are reduced approximately 24 percent between 2009 and 2016.

California Executive Orders S-3-05 and S-20-06, and Assembly Bill 32

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's GHG emissions to: 1) 2000 levels by 2010, 2) 1990 levels by 2020 and 3) 80 percent below the 1990 levels by 2050.

In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006 (Health & Safety Code §38500, et seq). AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases."

Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team (CAT). Each CAT working group will develop a Near-term Implementation Plan (CATNIPs) for the specific climate change mitigation measures and adaptation strategies being addressed by the working group. These will be the

measures and strategies that were completed by the end of 2010. The CATNIP will include a brief description of the measures and strategies, the steps to be taken in implementation, the agency/department responsible, and the timeline for completion. CARB, which is part of Cal-EPA, develops air quality regulations at the state level. The state regulations mirror federal regulations by establishing industry-specific pollution controls for criteria, toxic, and nuisance pollutants. California also requires areas to develop plans and strategies for attaining state ambient air quality standards as set forth in the California Clean Air Act of 1988. In addition to developing regulations, CARB develops motor vehicle emission standards for California vehicles.

Assembly Bill 32- Climate Change Scoping Plan

On December 11, 2008 CARB adopted its *Climate Change Scoping Plan* (Scoping Plan), which functions as a roadmap of CARB's plans to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations. The Scoping Plan contains the main strategies California must implement to reduce CO_2e emissions by 169 million metric tons (MMT), or approximately 30 percent, from the state's projected 2020 emissions level of 596 MMT of CO_2e under a business-as-usual scenario. (This is a reduction of 42 MMT CO_2e, or almost 10 percent, from 2002–2004 average emissions, but requires the reductions in the face of population and economic growth through 2020.) The Scoping Plan also breaks down the amount of GHG emissions reductions CARB recommends for each emissions sector of the state's GHG inventory.

The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- improved emissions standards for light-duty vehicles (estimated reductions of 31.7 MMT CO_2e),
- the Low-Carbon Fuel Standard (15.0 MMT CO_2e),
- energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO_2e), and
- a renewable portfolio standard for electricity production (21.3 MMT CO_2e).

GHG Cap and Trade Program

California's greenhouse gas cap and trade program is a central element of California's Global Warming Solutions Act (AB 32) and covers major sources of GHG emissions in the State such as refineries, power plants, industrial facilities, and transportation fuels. The regulation includes an enforceable GHG cap that will decline over time. The CARB will distribute allowances, which are tradable permits, equal to the emission allowed under the cap. The final cap and trade regulations were adopted on October 20, 2011.

The program sets a statewide limit on sources responsible for 85 percent of California's greenhouse gas emissions and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The program is designed to provide covered entities the flexibility to seek out and implement the lowest-cost options to reduce emissions.

The regulation covers 360 businesses representing 600 facilities and is divided into two phases: the first, beginning in 2013, includes all major industrial sources, including cement producers; the second, starting in 2015, will cover distributors of transportation fuels, natural gas and other fuels.

Companies are not given a specific limit on their greenhouse gas emissions but must supply a sufficient number of allowances (each the equivalent of one ton of carbon dioxide) to cover their annual emissions. As the cap declines each year, the total number of allowances issued in the state drops, requiring companies to find the most cost-effective and efficient approaches to reducing their emissions. The first compliance year when covered sources will have to turn in allowances is 2013.

To ensure a gradual transition, CARB will provide the majority of allowances to all industrial sources during the initial period (2013-2014), using a calculation that rewards the most efficient companies. Those that need additional allowances to cover their emissions can purchase them at regular quarterly auctions CARB will conduct, or buy them on the market. The first auctions of allowances (for 2013 allowances) are slated for August and November 2012.

Electric utilities will also be given allowances to be sold at auction for the benefit of their ratepayers and to help achieve AB 32 goals.

The final regulations for the cap and trade program are codified in Subchapter 10 Climate Change, Article 5, Sections 95800 to 96023, Title 17, California Code of Regulations. Section 95802(a)(13) contains a definition of "asphalt" as defined in the cap and trade regulations. *"Asphalt" means a dark brown-to-black, cement-like material obtained by petroleum processing and containing bitumens as the predominant component. It includes crude asphalt as well as the following finished products: cements, fluxes, the asphalt content of emulsions (exclusive of water), and petroleum distillates blended with asphalt to make cutback asphalts."*

Section 95802(a)(49) contains a definition of "cement" as defined in the cap and trade regulations. *"Cement" means a building material that is produced by heating mixtures of limestone and other minerals or additives at high temperatures in a rotary kiln to form clinker, followed by cooling and grinding with blended additives. Finished cement is a powder used with water, sand, and gravel to make concrete and mortar.*

Section 95811(a)(1) identifies concrete production facilities as being covered by the Cap and Trade Program. Section 95812 identifies a threshold of 25,000 metric tons of CO2e per year for covered facilities.

Also relevant to proposed Project operations is the treatment of emissions associated with combustion of biomass and biomass-based fuels emits greenhouse gases. The carbon stored in the woody biomass of the onsite trees that would be removed within the LSD as part of Project implementation would be released into the atmosphere if these trees were burned in a biomass fired boiler. However, facilities fueled or fired by biomass have been treated as "carbon neutral" by national and international carbon tracking and trading systems, including the systems in use by

the European Union, and the Regional Greenhouse Gas Initiative, which tracks greenhouse gas emissions in the northeastern U.S. CO_2 emissions from these activities are not included in national emissions totals because biomass fuels are of biogenic origin.[5] It is assumed that the carbon released during the consumption of biomass is recycled as U.S. forests and crops regenerate, causing no net addition of CO_2 to the atmosphere.[6]

Biomass fueled electricity facilities are treated as carbon neutral by the California Air Resources Board and the California Energy Commission. Section 95802(a)(31) of the California Code of Regulations contains a definition of "biomass" as defined in the cap and trade regulations. *"Biomass means non-fossilized and biodegradable organic material originating from plants, animals, and microorganisms, including products, by-products, residues, and waste from agriculture, forestry, and related industries as well as the non-fossilized and biodegradable organic fractions of industrial and municipal wastes, including gases and liquids recovered from the decomposition of non-fossilized and biodegradable organic material. For the purpose of this article, biomass includes both California Renewable Portfolio Standard (RPS) eligible and non-eligible biomass as defined by the California Energy Commission."*

Section 95852.2 of the California Code of Regulations identifies emissions without a compliance obligation under the cap and trade program. As stated in Section 95852.2:

> *Emissions from the following source categories and from the combustion of the following fuel types count toward applicable reporting thresholds, as applicable in MRR (Mandatory Reporting Regulation), but do not count toward a covered entity's compliance obligation set forth in this article unless those emissions are reported as non-exempt biomass- derived CO_2 under MRR. Emissions without a compliance obligation include:*
>
> > *(a) CO_2 emissions from combustion of the following biomass-derived fuels:*
> >
> > > *(1) The biogenic fraction of solid waste materials as reported under MRR;*
> > >
> > > *(2) Waste pallets, crates, dunnage, manufacturing and construction wood wastes, tree trimmings, mill residues, and range land maintenance residues;*
> > >
> > > *(3) All agricultural crops or waste;*
> > >
> > > *(4) Wood and wood wastes identified to follow all of the following practices:*

[5] The 2006 IPCC Guidelines, states that CO2 from the combustion or decay of short–lived biogenic material removed from where it is grown, is reported as zero in the energy, Industrial Processes Product Use (IPPU) and waste sectors as classified in section 1.1.

[6] U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2008 (April 15, 2010) at 3-1

> *(A) Harvested pursuant to an approved timber management plan prepared in accordance with the Z'berg-Nejedly Forest Practice Act of 1973 or other locally or nationally approved plan; and*
> *(B) Harvested for the purpose of forest fire fuel reduction or forest stand improvement.*

By exempting biomass fuels from the compliance obligations set forth in the state's newly-adopted cap and trade program, CARB's regulation treats biomass fuels as being carbon neutral, and should be treated as such for the purposes of GHG analyses and mitigation programs.

The conventional rationale for conferring carbon neutrality on biomass is that the carbon in the biomass, known as biogenic carbon, is already part of the global carbon cycle. Growth of biomass removes carbon from the atmosphere, while combustion of biomass returns the carbon to the atmosphere, thus completing the loop.[7]

LOCAL

Draft Shasta County Regional Climate Action Plan

In 2010, the Shasta County Air Quality Management District (District) initiated the regional climate action planning (RCAP) process. The primary objectives of the RCAP process are to contribute to the State's climate protection efforts and to provide California Environmental Quality Act (CEQA) review streamlining benefits for development projects within the region's four jurisdictions: the City of Anderson, the City of Redding, the City of Shasta Lake, and the unincorporated areas of Shasta County. To facilitate these objectives, the District worked with the four jurisdictions to prepare community-specific, independent climate action plans that contain greenhouse gas (GHG) emission inventories and forecasts, emission reduction measures, and implementation and monitoring programs. As of the writing of this EIR, the Draft RCAP was released for public review in September 2012, but the final RCAP had not yet been adopted.

---

[7] See, e.g., U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2008 (April 15, 2010) at 3-1 ("It is assumed that the carbon (C) released during the consumption of biomass is recycled as U.S. forests and crops regenerate, causing no net addition of CO2 to the atmosphere."); U.S. Department of Agriculture, Forest Service Pacific Southwest Research Station, Biomass to Energy: Forest Management for Wildfire Reduction, Energy Production, and Other Benefits, California Energy Commission report no. CEC-500-2009-080 (January 2010); Intergovernmental Panel on Climate Change, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 1, General Guidance and Reporting (treating biomass used for energy production as having zero emissions in the Energy Sector); Western Governors' Association, Clean and Diversified Energy Initiative, Biomass Task Force Report (January 2006).

The Draft RCAP includes a 2008 baseline GHG emissions inventory. The 2008 GHG emissions inventory serves as the foundation of the unincorporated County's CAP. Using data collected from County departments, utilities, and other relevant agencies and locally-specific emissions factors, the inventory provides an accurate assessment of the sources of GHG emissions generated within the County or as a direct result of County operations (even if outside unincorporated county areas) in the baseline year. This data allows the County to establish a baseline inventory and identify appropriate GHG reduction targets and strategies.

To ensure a comprehensive and complete GHG inventory, the County developed a *Total Inventory* that contains emissions from all sectors including building energy (electricity and natural gas), transportation, waste, water, off-road vehicles/recreation, stationary sources (industrial), agriculture, and forestry. Due to a lack of jurisdictional control over the GHG emissions produced by agriculture, forestry, and stationary sources, these sectors are excluded from the *Jurisdictional Inventory*. Examples of permitted stationary sources that are not under the control of the County include cement plants, biomass facilities, and other industrial processes at manufacturing facilities. The Propose Project falls within the RCAP definition of a stationary source. These facilities and equipment are permitted by the Shasta County Air Quality Management District, and their GHG emissions would be controlled under the jurisdiction of the Air Resources Board pursuant to AB 32. The Jurisdictional Inventory is used within the RCAP for the purposes of developing reduction targets and strategies.

In 2008, the community's total baseline emissions included 3,131,054 metric tons of carbon dioxide equivalent emissions (MT CO_2e). As shown in Figure 2.1 and Table 2.1 of the Draft RCAP, stationary sources generated the largest portion of emissions at approximately 2,271,000 MT CO_2e (73% of the total emissions). The transportation sector generated the second highest amount of emissions in the unincorporated County at approximately 243,700 MT CO_2e (8% of the total emissions), followed by energy consumption emissions at approximately 206,300 MT CO_2e (7% of the total emissions). The forestry sector contributed approximately 156,500 MT CO_2e (5% of total emissions), and the agriculture sector generated approximately 132,200 MT CO_2e (4% of total emissions). The off-road vehicle/recreation, solid waste, and water (including water and wastewater) sectors comprise the remaining 4% of the emissions inventory.

With the removal of the agriculture, forestry, and stationary source sector emissions, the community's baseline jurisdictional inventory lowers to 571,255 MT CO_2e in 2008. As shown in Figure 2.2 in the Draft RCAP, transportation generated 43% of total emissions, and energy production and consumption generated 36% of total emissions. The off-road vehicles/recreation sector contributed approximately 14%, and the waste sector contributed approximately 5% of total emissions. The water sector comprised the remaining 2% of total emissions.

Within the RCAP document, the *total* emissions inventory refers to all emissions that result from community (e.g., residential, business, municipal) activities. Certain types of these emissions cannot be controlled by a jurisdiction due to a lack of local authority over the generating activity. The *jurisdictional* inventory refers to only those emissions that a jurisdiction has authority to

influence. Per direction from the Shasta County Air District (District), the RCAP preparers removed the stationary source, forestry, and agriculture sectors from the jurisdictional inventories and they are not considered for emissions forecasts and reduction target setting.

The County and the individual jurisdictions will rely on State mandates to regulate stationary sources (e.g., cement plants, lumber mills, biomass generation facilities). Already a number of state-directed programs are monitoring emissions and reduction strategies for large stationary source emitters. Similarly, emissions related to forestry have been removed from the GHG inventories since forestry activities are regulated directly by the State. Emissions related to agriculture were also removed from the inventory due to the fact that neither the County nor the District regulates agricultural activities.

It should be noted that total emissions (including the agriculture, forestry, and stationary sources sectors) are only discussed in the baseline inventories. The agriculture, forestry, and stationary sources sectors are not carried forward in the emissions projections, nor are they addressed within the target-setting and measure development portions of the RCAP.

The Draft RCAP does not contain any GHG reduction measures directly related to the mining industry or the production of cement or asphalt products. The Draft RCAP does, however, contain a reduction measure for the Unincorporated County related to urban forests. Measure GI-1 includes priorities for urban forest preservation. The urban forest encompasses all of the trees in the County, from street trees and private landscapes to County parks and natural, open spaces. A healthy urban forest can shade buildings and streets, reducing the urban heat island effect and reducing the need for building cooling. Urban trees also improve water and air quality, increase wildlife habitat, and contribute to neighborhood beautification.

3.7.4 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

As described previously, the State Legislature and the global scientific community have found that global climate change poses significant adverse effects to the environment of California and the entire world.

Per Appendix G of the CEQA Guidelines, climate change-related impacts are considered significant if implementation of the proposed Project under consideration would:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Very few public agencies in California have adopted GHG thresholds of significance for CEQA. Neither the Shasta County Air Quality Management District nor Shasta County has formally adopted GHG CEQA thresholds.

In order to determine whether the proposed Project would generate GHG emissions that may have a significant impact on the environment, Shasta County has relied on the Inclusion Thresholds for Covered Entities, as described in Section 95812 of the Cap and Trade regulations adopted by CARB in 2011 (Title 17, California Code of Regulations). As described in Section 95812(c)(1), the applicability threshold for a covered entity (facility) is 25,000 metric tons or more of CO_2e per data year.

It is noted and acknowledged that CARB's 25,000 metric ton/year threshold is a reporting threshold for the cap and trade program, and was not specifically established as a CEQA threshold for GHGs. However, in the report titled: *CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act* (CAPCOA, January 2008), the California Air Pollution Control Officers Association (CAPCOA) identifies the 25,000 metric ton threshold as used by CARB for their reporting threshold, as a potential and appropriate non-zero GHG threshold for use in a CEQA document (see pages 44-45 of the above-referenced 2008 report).

Additionally, as described above, the U.S. EPA regulations for reporting of greenhouse gas emissions set a 25,000 metric ton threshold for large emission sources. Through its rulemaking process, EPA analyzed several potential reporting thresholds, and concluded that this threshold would "appropriately balanc[e] emission coverage and burden."[8] EPA considered but rejected

[8] 74 Fed. Reg. 56272-73 (Oct. 30, 2009).

lower thresholds of 1,000 and 10,000 metric tons, finding that the thresholds would greatly increase the number of covered entities without capturing a significant additional portion of GHG emissions.[9] For similar reasons, the European Union has provided for "small installations" with emissions under 25,000 metric tons to be exempted from its Emissions Trading Scheme.[10]

Given the extensive research and resources that went into the development of the GHG Mandatory Reporting Rule and cap and trade programs adopted by CARB, the U.S. EPA greenhouse gas reporting rule, and the fact that the 25,000 metric ton threshold would capture approximately 94 percent of GHG emissions associated with stationary sources in California (CAPCOA page 44), Shasta County has determined that the use of the 25,000 metric tons/year of CO_2e threshold is the most appropriate quantitative threshold to apply to the proposed Project. This numeric threshold is used in this EIR to determine if the proposed Project would have a significant impact, or result in a cumulatively considerable contribution, to climate change and the generation of GHGs. In other words, if the proposed Project generates 25,000 metric tons of CO_2e or greater in a year, it would be considered to have a significant and cumulatively considerable impact on the environment. If the proposed Project would generate less than 25,000 metric tons of CO_2e per year, it would be considered a less than significant and less than cumulatively considerable impact related to climate change and GHGs.

In order to determine if the proposed Project would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases, the proposed Project is compared to the most applicable and relevant state-level regulations adopted to reduce GHG levels. These include regulations adopted under the AB 32 Scoping Plan.

ANALYSIS APPROACH

At the time of preparation of this Draft EIR, neither CARB nor the Shasta County Air Quality Management District has formally adopted a recommended methodology for evaluating GHG emissions associated with new industrial stationary sources. As described previously in this section, the County's Draft RCAP does not include reduction measures that would be applicable to the proposed Project.

Lead agencies must make a good-faith effort, based on available information, to estimate the quantity of GHG emissions that would be generated by a proposed project, including the emissions associated with construction activities, stationary sources, vehicular traffic, and energy consumption to determine whether the impacts have the potential to result in a significant project or cumulative environmental impact, and, where feasible mitigation is available, to mitigate any

[9] Id. at 56272.

[10] See Article 27, European Parliament Directive 2003/87/EC, as amended by Directive 2009/29/EC.

project or cumulative impact determined to be potentially significant. More recently, OPR prepared amendments to the State CEQA Guidelines, pursuant to SB 97 (Statutes of 2007) for adoption by the California Natural Resources Agency. The amendments added several provisions reinforcing the requirements to assess a project's GHG emissions as a contribution to the cumulative impact of climate change. The amendments went into effect on March 18, 2010.

Specifically, CEQA Guidelines Section 15064.4 states:

(a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:

> *(1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model or methodology it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; and/or*
>
> *(2) Rely on a qualitative analysis or performance based standards.*

(b) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:

> *(1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;*
>
> *(2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.*
>
> *(3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.*

GHG Measurement

Carbon dioxide equivalents (CO_2e) provide a universal standard of measurement against which the impacts of releasing, or avoiding the release of, different GHGs can be evaluated. Every greenhouse gas has a Global Warming Potential (GWP), a measurement of the impact that particular gas has on radiative forcing; that is, the amount of heat/energy that is retained in the Earth's atmosphere through the addition of this gas to the atmosphere. The GWP of a given gas

describes its effect on climate change relative to a similar amount of carbon dioxide (the GWP of CO_2 is 1.0 by definition).

The GWP of a gas depends on two factors, the ability of the gas to absorb infrared energy, and the lifetime of the gas in the atmosphere. GWPs can be expressed on an instantaneous basis, which reflects only the relative ability of the gas to absorb infrared energy, or with an explicit time factor built-in. The residence time of CO_2 in the atmosphere is generally believed to be in excess of 100 years, and some of the other GHGs have even longer residence times. Thus, most analyses use a timeframe in the range of 25 to 100 years in determining the warming potential of GHGs that are emitted into the atmosphere today.

Of the five principal GHGs, CO_2 and methane (CH_4) are the primary GHGs emitted during the combustion of fuels, or via the degradation of biomass. On a per-carbon basis, CH_4 has a GWP that is 25 times greater than the GWP of CO_2 on an instantaneous basis. However, the average residence time of CH_4 in the atmosphere is only about one-tenth as long as the average residence time of CO_2, and its clearance involves conversion to CO_2, so when a time factor is added the relative GWP of CH_4 goes down to values in the range of 7.5 to 12.5 on a per-carbon basis, depending on the length of the timeframe being used in the analysis. GWPs are often reported on a per-weight basis, rather than a per-carbon basis. The instantaneous GWP of methane on a weight basis is 69 relative to the same weight of CO_2, and with a time factor built-in it falls to a range of about 20–35.

Direct greenhouse gas emissions associated with the Project would come primarily from fuel combustion sources. CO_2 would account for the majority of the global warming potential for these greenhouse gas emissions. Although both methane (CH_4) and nitrous oxide (N_2O) are emitted from fuel combustion and have higher global warming potentials, they still do not contribute appreciably to total carbon dioxide equivalent (CO_2e) emissions.[11]

Data provided in the U.S. Environmental Protection Agency (U.S. EPA) mandatory greenhouse gas reporting program published in Title 40 of the Code of Federal Regulations, Section 98, supports the approach used. Emission factors for diesel fuel combustion (the fuel contributing the majority of the greenhouse gas emissions associated with the Project) are as follows:

- CO_2 – 73.96 kg/MMBtu,
- CH_4 – 0.003 kg/MMBtu, and
- N_2O – 0.0006 kg/MMBtu.

[11] *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011*, U.S. EPA, April 12, 2013, at page 3-5.

Although CH_4 has a global warming potential of 25 and N_2O has a global warming potential of 298, including these greenhouse gases to total CO_2e from diesel fuel combustion would only add 0.3 percent to the total, as shown below:

CO_2e from CO_2: 73.96 kg

CO_2e from CH_4: 21 x 0.003 = 0.063 kg

CO_2e from N_2O: 310 x 0.0006 = 0.186 kg

Total CO_2e: 73.96 + 0.063 + 0.186 = 74.209 kg.

Contribution to total CO_2e from CH_4 and N_2O: (0.063 + 0.186) / 74.209 = 0.3%

A similar analysis of the combustion of natural gas (the other major source of direct greenhouse gas emissions associated with the Project) results in an even lower percentage contribution of 0.0006 kg/MMBtu to total CO_2e emissions.

These data support the conclusion that CO_2 emissions associated with the Project account for the majority of the CO_2e emissions. Because methane and nitrous oxide would contribute less than one percent of the GHG emissions from the Project, they were not included in the emission models used and thus, were not considered in the greenhouse gas impact analysis.

Cumulative Project Operations

The Air Quality Report (Appendix D) prepared for this Project addresses two operational scenarios:

- **Scenario 1:** Initially (up to year five), the facility is expected to operate such that maximum aggregate production is one million tons per year (1MM tpy), mined material is transported to the aggregate processing area by off-road haul trucks, electrical power to the site is provided by a diesel generator, and the access road to the site is unpaved.
- **Scenario 2:** Within approximately five years, the facility is expected to operate such that maximum aggregate production is two million tons per year (2MM tpy), mined material is transported to the aggregate processing area by electric-powered conveyors, electrical power lines are brought to the site, and the access road to the site is paved.

The primary differences between the two scenarios affecting GHG emissions, aside from the differences in aggregate production volumes, would be the use of diesel-powered generators and on-site material transport by off-road haul trucks under Scenario 1. Under Scenario 2, electricity would be provided via powerlines to the electrical grid, and material transport would be conducted using electric conveyors. Thus, as described in greater detail in Appendix D, GHG emissions directly attributable to the use of on-site generators and off-road haul trucks would be greater under Scenario 1. However, total GHG emissions from all aspects of Project operations would be greater under Scenario 2. Given the cumulative nature of GHG impacts, as described in greater detail at the beginning of this chapter, and the fact that total GHG emissions would be

higher under Scenario 2, Scenario 2 is used as the basis for this GHG analysis, and represents a worst-case Project scenario for GHG emissions.

ANALYSIS METHODOLOGY

The analysis of GHG impacts associated with project implementation focuses on two aspects of the Project:

1. Direct emissions of GHGs associated with Project operations and Project activities; and
2. Indirect GHG impacts associated with the removal of trees and vegetation from the project site, and the corresponding release of CO_2 stored in the woody biomass, as well as the usage of electricity.

Direct GHG Emissions

GHG emissions were estimated for the following potential sources:

ONSITE OFF-ROAD MOBILE SOURCE EMISSIONS (INCLUDING MINING)

Project activities related to mining and aggregate plant processing would typically employ off-road mobile equipment resulting in GHG emissions. In addition, eventual use of a railroad spur allowing for loading and shipment of aggregate product via rail will result in onsite emissions of GHGs from locomotives.

The URBEMIS (Urban Emissions) model, Version 9.2.4 was used to estimate onsite emissions from off-road mobile mining and aggregate plant equipment sources. URBEMIS calculates exhaust criteria pollutants and CO_2 emissions. The mobile off-road equipment proposed for this Project is expected to meet Tier 4 emission standards. To account for this, the equipment was assumed to be built in 2014; this does not require that the equipment is actually 2014 model year, but just that it will meet Tier 4 emission standards. Onsite train locomotive emissions were calculated in accordance with a methodology suggested in EPA, Emission Factors for Locomotives, Office of Transportation and Air Quality, EPA-420-F-09-025, April 2009. These standards, which are codified at 40 CFR Part 1033, include several sets of emission standards with applicability dependent on the date a locomotive is first manufactured. The first set of standards (Tier 0) applies to most locomotives originally manufactured before 2001. The most stringent set of standards (Tier 4) applies to locomotives originally manufactured in 2015 and later.

OFFSITE/ONSITE ON-ROAD MOBILE SOURCE EXHAUST EMISSIONS

On-road mobile vehicles (primarily heavy duty diesel trucks picking up aggregate, asphalt concrete, and ready-mix concrete) traveling onsite and offsite are sources of GHG emissions. Tailpipe emission factors for aggregate haul trucks were determined from the California Air Resources Board's motor vehicle emission inventory program, EMFAC2011.

To estimate Project emissions (see Appendix D) the total vehicle miles traveled (VMT) for each on-road vehicle category were estimated and total emissions were computed using the following equations:

- Trips/day x Round Trip Distance (miles) x Emission Factor (g/mi) ÷ 453.6 g/lb = Pounds/day
- Trips/year x Round Trip Distance (miles) x Emission Factor (g/mi) ÷ 453.6 g/lb = Pounds/year

Onsite idling emissions from on-road vehicles were based on emission factors for idling obtained from the EMFAC2011 model multiplied by five minutes per vehicle per trip consistent with California Code of Regulations Section 2485, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling.

ASPHALT PLANT

GHG emissions were estimated for the proposed asphalt plant. The maximum production rate of the asphalt plant was estimated to be 200 tons per hour for 16 hours per day, with annual rates dependent on which Scenario was being evaluated. The asphalt plant would require cleaned, sized aggregate from the aggregate plant as a raw material input. It was assumed that for every ton of clean, sized aggregate delivered to the asphalt plant, 1.1 tons of asphalt concrete would be produced. Emissions of CO_2 from the asphalt plant are based on Chapter 11.1 of the U.S. Environmental Protection Agency (EPA) compilation of emission factors, AP-42[12]. Detailed emission calculations with references, including all assumptions, are presented in Appendix D.

PORTLAND CEMENT CONCRETE PLANT (READY-MIX PLANT)

This plant would produce approximately 200 tons of Portland cement concrete per hour and a maximum of approximately 280,000 tons per year. Aggregate material would be fed from the aggregate stockpiles and sent to the batch tower. Aggregate, Portland cement, and water would be separately weighed and blended in a mixer. Dust generated within the plant would be drawn through a baghouse system and returned to the concrete product. The Portland cement concrete mix would be poured into mixer trucks, and then the loads would be ticketed and sent to their destination.

There are no GHG emissions directly associated with the proposed ready-mix plant. While the process of making Portland cement (an ingredient in Portland cement concrete) generates significant volumes of GHGs, Portland cement would not be produced on the Project site. Portland cement produced elsewhere, at existing facilities, would be transported to the Project site, mixed with water and aggregate materials mined at the site, and Portland cement concrete would be produced. This process would generate emissions associated with electricity and natural gas usage. These emissions are accounted for in Table 3.7-2, within the 692 tons per year of CO_2e emissions from Plant Operations.

[12] AP 42, Volume I, Fifth Edition, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, U.S. Environmental Protection Agency, most recent data available at http://www.epa.gov/ttn/chief/ap42/index.html.

AGGREGATE PLANT PROCESS EMISSIONS

The maximum input to the aggregate plant was assumed to be 2,220,000 tons per year and 12,200 tons per day of pit run material[13]. It was assumed that pit run material would contain 10 percent waste (unsaleable material). Aggregate processing would be carried out using a typical industry standard aggregate plant, which would consist of a combination of different processing equipment such as jaw crushers, cone crushers, fine and coarse screens, and conveyors. There are no GHG emissions directly associated with the proposed aggregate plant. GHG emissions associated with the aggregate plant would be related to energy use and consumption associated with plant operations. These emissions are accounted for in Table 3.7-2, within the 692 tons per year of CO_2e emissions from Plant Operations.

Indirect GHG Impacts

The GHG analysis in this EIR also includes an analysis of the carbon that could be released as a result of the removal and destruction of trees and vegetation located on the Project site. In addition, indirect GHG emissions would occur due to the eventual use (approximately five years after start up) of electricity at the Project site.

LOSS OF TREES AND VEGETATION

CO_2 is consumed by growing trees, which release oxygen and store carbon as wood fiber. This carbon capture and retention through photosynthesis is also called carbon sequestration. Trees process CO_2 through photosynthesis, emit oxygen and store carbon in the wood fiber. When a tree is removed from the ground, either naturally (forest fire, death by disease, etc.) or as a result of human activity, the carbon stored within the tree's biomass is eventually released into the atmosphere.

The methodology employed in this analysis estimates the carbon dioxide emissions associated with the removal of all trees during Project development within the Limits of Surface Disturbance (LSD), as compared to a scenario where no project is developed. The analysis did not include any carbon assessment from dead/down material, organic material on the forest floor, soil carbon or emissions associated with the operation of machinery to remove trees. Nor was an assessment conducted for that portion of the ownership outside of the LSD. A conservative approach was employed regarding emission analysis where any uncertainty existed to ensure no underestimation of emissions associated with the development of the Project. By way of example, sample plot determinations were developed.

[13] Pit run material means material excavated directly from an existing bank in a pit and delivered to the site without further processing like crushing, screening, washing and classifying.

A sample plot grid was developed to generate 100 sample plots over the entire LSD. This resulted in a plot grid with sample plots distributed on a 528-foot by 528-foot grid oriented in cardinal bearings. Global Positioning System (GPS) coordinates were provided for the majority of the plots. Sample plots close to LSD or vegetation type boundaries were eliminated to avoid ambiguity in determining appropriate vegetation type by field data collection personnel. Employing the grid described above did not always populate the smaller vegetation types with sufficient plots to provide an adequate sample, and additional plots were added within these types to ensure data quality. GPS coordinates for these plots were not provided, and field data collection personnel were instructed to measure bearing distance from grid associated plots to determine plot location. This resulted in a total of 90 sample plots installed and monumented within the LSD and associated vegetation types.

Each plot was monumented to easily facilitate re-establishment of the plot and to facilitate verification of data quality. Plot monumenting consisted of installation of a wooden stake to identify plot center with GPS coordinates from an on-site reading. Two trees, or the main stem of a shrub if no tree is available, at least 20 degrees apart in a measurement from plot center and no greater than 70 degrees were painted and the bearing and distance from plot center was recorded to assist in relocating plot center, if necessary. The plot number and vegetation type were recorded on the data card for each individual plot. Table 3.7-1 below shows there were 90 plots installed and sampled by vegetative type and acres.

TABLE 3.7-1: SAMPLE PLOTS AND LIMITS OF SURFACE DISTURBANCE ACRES BY VEGETATION TYPE

LSD VEGETATION TYPE	LSD ACRES	PLOTS
Blue Oak-Grey Pine	124	109
Blue Oak Woodland	3	3
Montane Hardwood Conifer	304	45
Montane Hardwood	213	17
Ponderosa Pine	7	3
Valley Oak Woodland	15	3
Totals	**666**	**90**

SOURCE: TSS CONSULTANTS, 2012

The tree sample included both standing live and dead trees. The trees within the LSD were delineated into two categories: overstory or large trees and understory or saplings and seedlings.

The large trees were categorized as those trees, standing live or dead, with a diameter of the stem at breast height (dbh) greater than or equal to 4.5 inches. If live, the tree must have the capacity to attain a height of at least 15 feet; dead trees must be at least eight feet tall for inclusion in the sample. The large trees were sampled using variable plot sampling. Variable plot sampling requires use of an angle gauge or prism (or suitable substitute) to determine sample trees. The probability of any given tree being included in the sample was directly proportional to its diameter measured at breast height (4.5 feet above ground). Field data collection personnel were to select a basal area

factor that would yield an estimated five to eight trees per plot, but were instructed to use no smaller than a 10 basal area factor to determine sample trees. The data to be collected included tree species, dbh, total tree height, deductions for rot/decay, and the ratio of the tree crown to total tree height (crown ratio). Dead trees do not have live crown foliage.

Understory trees were categorized as those trees, standing live or dead, with a dbh of less than 4.5 inches. All trees meeting these criteria within a 1/100th acre circular plot (11.77 foot radius) were sampled. The sample was further delineated into one-inch diameter classes. Recorded data included tree species, the total count of each species by the diameter class, the average height and crown ratio.

The tree species found within the LSD included blue oak, brewer oak, California bay laurel, California black oak, canyon live oak, gray pine, interior live oak, ponderosa pine, oracle oak, and valley oak. All measurements were recorded on the plot data cards. The tree data sampling specifications are included in Appendix R.

The analysis considered sources of carbon dioxide emissions from standing live and dead trees, in both the forest overstory and understory, associated with the development of the quarry and mining Project. The calculation of volume, biomass and conversion to CO_2e for sample data of standing live and dead trees, for tree bole, bark, branches, foliage and roots, was conducted using guidance and equations from the Climate Action Reserve's Forest Project Protocol Resources guidelines.[14]

The initial step required conversion of raw data into cubic foot volume of wood fiber. The data collected was converted into cubic foot volume using equations from "FIA Volume Equation Documentation (Updated March 22, 2010)." This document provides equations for use with various hardwood and conifer species for eastern Washington, western Washington, eastern Oregon, western Oregon and California. A spreadsheet identifies the appropriate equation for conversion by region and species. The output is tree bole and stump volume in cubic feet, which is subsequently converted to biomass by multiplying volume in cubic feet by the particular species wood density.

The biomass for bark and branches/foliage (tree crown material) was determined using equations from "Regional Biomass Equations Used by FIA to Estimate Bole, Bark, and Branches (Updated January 13, 2010)." This document provides specific gravity and wood density by species to facilitate tree bole conversion from cubic foot volume to biomass. In addition, the document provides specific equations by region (as described above) and various hardwood and conifer species, for biomass volumes of bark and live branches or crown foliage. Some hardwood volumes do not have separate calculations for bark and foliage, such as California black oak and interior live

[14] http://www.climateactionreserve.org/how/protocols/forest/resources/#biomass-equations

oak. For some hardwood species, the determination of cubic foot volume as described in the previous paragraph includes output for bark and foliage, but is not available as a separate biomass component.

The biomass volumes were converted to metric tons (2,205 lbs.) and divided by the number of hectares in the LSD (270 hectares) to generate biomass volume in metric tons per hectare. This value was then applied to an allometric regression equation to calculate tree-associated biomass below ground[15] (root material). The below ground biomass estimates in metric tons per hectare were then converted to per acre values. These values were added to above ground biomass volumes and subsequently converted from wood fiber biomass to carbon by applying a factor of 0.5.[16] The volume of carbon from the biomass was then converted to CO_2e by applying a factor of 3.67[17] yielding metric tons per acre of CO_2e for both above ground and below ground woody biomass. The factor of 3.67 represents the conversion of carbon to CO_2e predicated upon the woody biomass material's molecular weight.

LOSS OF CARBON SEQUESTRATION

As described above, CO_2 is consumed by growing trees, which release oxygen and store carbon as wood fiber. This carbon capture and retention through photosynthesis is also called carbon sequestration. Trees process CO_2 through photosynthesis, emit oxygen and store carbon in the wood fiber. Removal of trees and vegetation from the project site will reduce the carbon sequestration potential of the site. In other words, when the trees and vegetation are gone, they will no longer be available to remove CO_2 from the atmosphere.

A very conservative estimate of the loss of carbon sequestration due to the removal of trees and vegetation due to the proposed project can be calculated based on data provided in the offset protocol for "Forestry Carbon Sequestration" by the Chicago Climate Exchange. This protocol estimates that forested areas in Pacific Northwest/West sequester a maximum of 8.33 metric tons CO_2/acre/yr for natural (e.g. older) forest land. This is the highest value for the any of the forest types listed in the protocol at the greatest forest age included (26-30 years old). Forest carbon sequestration rates tend to decline with age past this point.

The Project area will be cleared in phases as excavation progresses and such phasing will be based on economic and other factors. This analysis conservatively assumes that all vegetation on the property will be removed on opening day. Applying this sequestration rate to the total area

---

[15] Cairns, et al. 1997. Root biomass allocation in the world's upland forests. Oecologia 111:1-11.

[16] *"A reassessment of carbon content in wood: variation within and between 41 North American species"*, S. H. Lamlom and R. A. Savidge, Biomass and Bioenergy (2003) Volume: 25, Issue: 4, Pages: 381-388

[17] U.S. Department of Energy's Energy Policy Act, Section 1605(B), Voluntary Reporting Guidelines of Greenhouse Gases, Forestry Appendix.

cleared (666 acres) results in a maximum estimate of 5,548 MT CO_2/yr of loss of carbon sequestration.

ELECTRICITY USAGE

The Project will require electricity to power electric motors associated with conveyors, crushers, screens, and other process equipment, as well as for lighting and building heating. Although this electricity will be generated onsite in operating Scenario 1 by a diesel-powered generator (i.e. from a direct source), it will be provided by line power (i.e. outside generating sources) in operating Scenario 2, resulting in indirect GHG emissions.

Total Project electrical needs are estimated to be 1,087.5 megawatt-hours (MW-hr) per month, or 13,050 MW-hr per year. It is currently assumed that electricity for the project will be provided by the City of Shasta Lake, which estimates that new electricity would be provided about 50 percent from hydroelectric generation and 50 percent from natural gas power plants.

Greenhouse gas emissions from hydroelectric generation is essentially zero. Greenhouse gas emissions from natural gas power plants (primarily CO_2 emissions) can be conservatively estimated based on an assumed heat rate of 9,000 British Thermal Units (Btu) per kilowatt hour (kW-hr) and the U.S. EPA CO_2 emission factor for natural gas combustion (from 40 CFR Part 98 Subpart C) of 53.02 kilograms (kg) of CO_2 per million Btu (MMBtu) of natural gas combusted using the following equation:

(9,000 Btu/kW-hr) x (53.02 kg CO2/MMBtu) / (1E06 Btu/MMBtu) = 0.477 kg CO2/kW-hr

This is equivalent to 0.477 metric tons (MT) of CO_2 per MW-hr. So total estimated indirect CO_2 emissions associated with electrical usage at the Project site can be estimated as:

0.5 x (13,050 MW-hr per year) x (0.477 MT CO2/MW-hr) = ***3,112 MT CO_2 per year***

The factor of 0.5 is used because only 50 percent of the electricity would come from natural gas power plants.

Therefore, GHG emissions resulting from electricity usage by the project at maximum project production rates (after the on-site diesel generator is removed) is estimated to be 3,112 metric tons (MT) of CO_2 per year. Contributions from GHGs other than CO_2, such as CH_4 and N_2O, to CO_2-equivalent (CO_2e) emissions resulting from natural gas combustion are trivial on a percent-contribution basis, even when accounting for global warming potentials, and were not estimated.

IMPACTS AND MITIGATION MEASURES

Impact 3.7-1: Project implementation may directly and/or indirectly generate over 25,000 metric tons of GHG emissions per year, which would result in a significant impact on the environment (Less than Significant and Less than Cumulatively Considerable with Mitigation)

Direct Emissions

Implementation of the proposed Project would result in the generation of 8,005 tons/year total operational (direct) GHG emissions during mining activities, aggregate processing, and vehicle trips throughout the life of the Project. As described previously in this chapter, this analysis is based on full operation of the quarry, which is described as Scenario 2 in the Air Quality Impact Analysis (Appendix D). Within approximately five years, the facility is expected to operate such that maximum aggregate production would be two million tons per year (2MM tpy), mined material would be transported to the aggregate processing area by electric-powered conveyors, electrical power lines are brought to the site, and the access road to the site would be paved. The assumptions used in the analysis of GHG emissions associated with the Project are described above on pages 3.7-20 through 3.7-22.

ANALYSIS RESULTS

Table 3.7-2 displays results of the GHG analysis for the operations of the proposed Moody Flats Quarry. Detailed calculation worksheets associated with this table are provided in Appendix D.

TABLE 3.7-2: DIRECT ON-SITE AND OFF-SITE GHG EMISSIONS GENERATED BY THE PROJECT

SOURCE	DIRECT EMISSIONS CO_2E (TONS/YEAR)
ON-SITE EMISSIONS	
Mining Activities w/o Haul Trucks (exhaust)	964
Plant Operations (exhaust)	692
Product and Supply Trucks (Tailpipe/Brake/Tire)	377
Product and Supply Trucks (Idling)	27
Aggregate Train Locomotive	54
Asphalt Plant	3,630
Subtotal of on-site GHG emissions generated	***5,744***
OFF-SITE EMISSIONS	
Product and Supply Trucks (Tailpipe/Brake/Tire)	2,261
Subtotal of off-site GHG emissions generated	***2,261***
TOTAL OPERATIONAL GHG EMISSIONS	**8,005**

SOURCE: AIR QUALITY IMPACT ANALYSIS, MOODY FLATS QUARRY PROJECT. GOLDER ASSOCIATES, INC., AUGUST 2012.

As shown in the table above, operation of the proposed Moody Flats Quarry would result in approximately 8,005 short tons of direct CO_2e emissions per year. The threshold of significance used in this analysis is 25,000 metric tons of CO_2e per year, while the table above presents CO_2e emissions in "short" tons. The conversion rate between short tons and metric tons is 1:0.907184. Therefore, the proposed Project would generate approximately 7,262 metric tons of direct CO_2e emissions per year.

Indirect Emissions

ENERGY CONSUMPTION

As described above, the Project will require electricity to power electric motors associated with conveyors, crushers, screens, and other process equipment, as well as for lighting and building heating. Although this electricity will be generated onsite in operating Scenario 1 by a diesel-powered generator (i.e. from a direct source), it will be provided by line power (i.e. outside generating sources) in operating Scenario 2, resulting in indirect GHG emissions.

Total Project electrical needs are estimated to be 1,087.5 megawatt-hours (MW-hr) per month, or 13,050 MW-hr per year. It is currently assumed that electricity for the project will be provided by the City of Shasta Lake, which estimates that new electricity would be provided about 50 percent from hydroelectric generation and 50 percent from natural gas power plants.

Greenhouse gas emissions from hydroelectric generation is essentially zero. Greenhouse gas emissions from natural gas power plants (primarily CO_2 emissions) can be conservatively estimated based on an assumed heat rate of 9,000 British Thermal Units (Btu) per kilowatt hour (kW-hr) and the U.S. EPA CO_2 emission factor for natural gas combustion (from 40 CFR Part 98 Subpart C) of 53.02 kilograms (kg) of CO_2 per million Btu (MMBtu) of natural gas combusted using the following equation:

(9,000 Btu/kW-hr) x (53.02 kg CO2/MMBtu) / (1E06 Btu/MMBtu) = 0.477 kg CO2/kW-hr

This is equivalent to 0.477 metric tons (MT) of CO_2 per MW-hr. So total estimated indirect CO_2 emissions associated with electrical usage at the Project site can be estimated as:

0.5 x (13,050 MW-hr per year) x (0.477 MT CO2/MW-hr) = ***3,112 MT CO_2 per year***

The factor of 0.5 is used because only 50 percent of the electricity would come from natural gas power plants.

Therefore, GHG emissions resulting from electricity usage by the project at maximum project production rates (after the on-site diesel generator is removed) is estimated to be 3,112 metric tons (MT) of CO_2 per year. Contributions from GHGs other than CO_2, such as CH_4 and N_2O, to CO_2-equivalent (CO_2e) emissions resulting from natural gas combustion are trivial on a percent-contribution basis, even when accounting for global warming potentials, and were not estimated.

TREE REMOVAL

As described above, project implementation would require the removal of nearly all trees and vegetation within the quarry pits, the overburden fill area, and the processing/load-out areas. These areas are collectively referred to as the limit of surface disturbance (LSD). As shown in Table 3.7-1, the LSD encompasses approximately 666 acres within the Project site.

CO_2 is absorbed by growing trees, which release oxygen and results in storage of the carbon as wood fiber. This carbon capture and retention through photosynthesis is also called carbon sequestration. Trees process CO_2 through photosynthesis, emit oxygen and store carbon in the wood fiber. When a tree is removed from the ground, either naturally (forest fire, death by disease and decay) the carbon stored within the tree's biomass is released into the atmosphere. This release can occur immediately, such as during a forest fire, or over long periods of time if the tree is left to decay slowly. Trees turned into wood-based products (e.g. furniture) continue to sequester carbon for the duration of their usable life. Additionally, vegetation can be used a biomass fuel, which is treated as a "carbon-neutral" (or as having zero emissions) by national and international carbon tracking and trading systems.[18]

The table below provides an estimate of carbon stored in the forest vegetation within the project site's LSD and the emissions associated with the removal of this forest vegetation. The methodology used in this analysis is described above on pages 3.7-22 through 3.7-25.

The table below provides an estimate of carbon emissions associated with the removal of forest vegetation within the project site's LSD. The methodology used in this analysis is described above on pages 3.7-22 through 3.7-25.

The results of the CO_2e per acre of vegetation by vegetation type in the LSD is shown in Table 3.7-3.

[18] The 2006 IPCC Guidelines, states that CO2 from the combustion or decay of short–lived biogenic material removed from where it is grown, is reported as zero in the energy, Industrial Processes Product Use (IPPU) and waste sectors as classified in section 1.1.; See, e.g., U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2008 (April 15, 2010) at 3-1 ("It is assumed that the carbon (C) released during the consumption of biomass is recycled as U.S. forests and crops regenerate, causing no net addition of CO2 to the atmosphere."); U.S. Department of Agriculture, Forest Service Pacific Southwest Research Station, Biomass to Energy: Forest Management for Wildfire Reduction, Energy Production, and Other Benefits, California Energy Commission report no. CEC-500-2009-080 (January 2010); Intergovernmental Panel on Climate Change, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 1, General Guidance and Reporting (treating biomass used for energy production as having zero emissions in the Energy Sector); Western Governors' Association, Clean and Diversified Energy Initiative, Biomass Task Force Report (January 2006).

TABLE 3.7-3: CO_2E (METRIC TONS) BY VEGETATION TYPE

VEGETATION TYPE WITHIN LSD	LSD ACRES	CO_2 EQUIVALENT (METRIC TONS/ACRE) WITHIN LSD	CO_2 EQUIVALENT TOTALS (METRIC TONS) WITHIN LSD
Blue Oak-Grey Pine	124	84.1	10,424
Blue Oak Woodland	3	126.5	379
Montane Hardwood Conifer	304	87.8	26,687
Montane Hardwood	213	79.1	16,838
Ponderosa Pine	7	102.1	715
Valley Oak Woodland	15	176.5	2,647
Totals	**666**		**57,690**

SOURCE: TSS CONSULTANTS, 2012

As shown in Table 3.7-3, the removal of the standing live and dead trees in the Project site's LSD has the potential to result in the release of approximately 57,690 metric tons of CO_2e over the life of the Project. This is considered a **potentially significant and cumulatively considerable** impact.

As described in greater detail in Section 2.0, Project Description, the entire LSD would not be cleared and mined all at once. Rather, the proposed mining activities would occur over a 100-year timeframe, and vegetation removal would be phased to match the pace of mining on the Project site. Mitigation Measure 3.6-3, as described in the Geology and Soils Section of this Draft EIR, mandates that vegetation removal and the disturbance of topsoil shall not occur on the Project site until it is necessary for site development and/or mining of a given area of the Project site. No clearance of any area shall be permitted more than one year in advance of development and/or mining of that area. The implementation of this mitigation measure would ensure that existing trees and vegetation on the Project site would be retained in place for as long as feasible, which would delay the release of carbon stored in the woody biomass material on the site.

Because of the nature of the project, vegetation would be removed one or several acres at a time, over the course of many decades. Based on a per-acre release of emissions, for every acre of forested vegetation removed within the LSD (666 acres) approximately 86.7 metric tons of CO2e on average would be released. As mentioned above, the forest vegetation would not be removed all at once and the amount of vegetation removed per year would vary and depend on many factors, such as the market demand for aggregate products. Some years would result in removing no forest vegetation. In addition, as mining progresses, completed areas would be revegetated. Thus, considering a per-acre release of CO_2e emissions due to removal of vegetation is reasonable. Mitigation Measure 3.7-1 limits the removal of forest vegetation on the site to a maximum of 90 acres in any given year. As such, the potential indirect GHG emissions associated with emissions from tree and vegetation removal would be 7,803 metric tons of CO2e per year.

LOSS OF CARBON SEQUESTRATION

As described above, removal of trees and vegetation from the project site will reduce the carbon sequestration potential of the site. In other words, when the trees and vegetation are gone, they will no longer be available to remove CO_2 from the atmosphere.

A very conservative estimate of the loss of carbon sequestration due to the removal of trees and vegetation due to the proposed project can be calculated based on data provided in the offset protocol for "Forestry Carbon Sequestration" by the Chicago Climate Exchange. This protocol estimates that forested areas in Pacific Northwest/West sequester a maximum of 8.33 metric tons CO_2/acre/yr for natural (e.g. older) forest land.

The Project area will be cleared in phases as excavation progresses and such phasing will be based on economic and other factors. This analysis conservatively assumes that all vegetation on the property will be removed on opening day. Applying this sequestration rate to the total area cleared (666 acres) results in a maximum estimate of 5,548 MT CO_2/yr of loss of carbon sequestration.

Combined Direct and Indirect Emissions

Table 3.7-4 shows the combined direct and indirect GHG emissions that would result from project operations.

TABLE 3.7-4: COMBINED DIRECT AND INDIRECT GHG EMISSIONS

GHG EMISSION SOURCE	CO_2 EQUIVALENT TOTALS (METRIC TONS/YEAR)
Direct: Project Operations	7,262 MT/yr
Indirect: Electricity Use	3,112 MT/yr
Indirect: Tree and Vegetation Removal[1]	7,803 MT/yr
Indirect: Loss of Carbon Sequestration	5,548 MT/yr
Total Combined Direct and Indirect GHG Emissions	**23,725 MT/yr**

NOTE 1: ASSUMES A MAXIMUM OF 90 ACRES OF VEGETATION REMOVAL IN ANY GIVEN YEAR, AS REQUIRED BY MITIGATION MEASURE 3.7-1.

As shown in Table 3.7-4, the combined direct and indirect GHG emissions associated with the proposed Project would be 23,725 metric tons per year, if the project is limited to 90 acres of vegetation removal or less in any given year, as required by Mitigation Measure 3.7-1. If the Project were to remove more than 90 acres per year of vegetation, the Project would exceed the threshold of 25,000 MT/yr of GHG emissions, which would be a **potentially significant and cumulatively considerable** impact.

MITIGATION MEASURES

***Mitigation Measure 3.7-1**: The Project Applicant shall either:*

1. *Limit forest vegetation removal to a maximum of 90 acres in any one year; or*
2. *If forest vegetation removal exceeds 90 acres in any one year, the Application shall procure a contract with a biomass cogeneration facility located in Shasta County that arranges for the disposal of trees and woody vegetation removed from the Project site that is suitable for combustion in a biomass-fired boiler. The requirement to dispose of biomass material at a cogeneration facility shall apply to material removed on all acres that exceed the 90-acre annual allocation. For example, if 100 acres of the site are cleared in a given year, at least 10 acres worth of biomass material shall be sent to a cogeneration facility for disposal. The cogeneration facility used for the disposal of the trees and vegetation removed from the Project site shall be certified under California's Renewable Portfolio Standard (RPS). The agreement for disposal of the onsite woody biomass vegetation shall be executed prior to the commencement of tree removal activities onsite that exceed 90 acres in one year. Any such agreement shall be verified by the Shasta County Department of Resource Management through the life of the Project. Biomass material removed from the Project site that is not suitable for combustion in a biomass-fired boiler (such as shrubs, bushes, and smaller biomass materials) shall be mulched, covered, and stored on the Project site for use as a soil amendment during the site reclamation and revegetation process.*

SIGNIFICANCE AFTER MITIGATION

Implementation of Mitigation Measure 3.7-1 would ensure that the direct and indirect GHG emissions associated with the project would be below the threshold of 25,000 MT/yr. This would be accomplished by either limiting the acreage of vegetation removal to 90 acres of less in any given year, or requiring that trees removed from the LSD are disposed of in a carbon-neutral manner that assists with the generation of a renewable source of electricity in California. Implementation of this mitigation measure would reduce this impact to a **less than significant** and **less than cumulatively considerable** level.

Impact 3.7-2: Project implementation may conflict with plans, policies and programs adopted to reduce the generation of GHGs (Less than Significant)

At the time of preparation of this EIR, Shasta County has not formally adopted any policies, plans or programs aimed at reducing GHG levels, although the County is in the process of preparing a Regional Climate Action Plan (RCAP). It is assumed that the RCAP will contain goals, policies and implementation measures intended to reduce GHG emissions throughout Shasta County. However, the Draft RCAP released for public review and comment does not address emissions associated with aggregate mining activities. Given there are no adopted plans, policies or programs in place at the local level to address GHGs, the analysis of this impact addresses the proposed Project's consistency with State-level efforts to reduce GHGs.

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order was to reduce California's GHG emissions to: 1) 2000 levels by 2010, 2) 1990 levels by the 2020 and 3) 80 percent below the 1990 levels by the year 2050.

In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 set the same overall GHG emissions reduction goals while further mandating that CARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directed state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

The AB 32 Scoping Plan was developed by CARB as the mechanism, or tool, to achieve the target GHG emissions reductions required by AB 32. The AB 32 Scoping Plan, adopted in December 2008, established the business as usual (BAU) 2020 GHG emissions baseline at 596 million metric tons (MMT) of CO_2e. Since 2008, CARB has updated projected BAU emissions based on current economic forecasts (i.e., as influenced by the economic downturn) and reduction measures already in place. Two new reduction measures [Pavley I and the Renewables Portfolio Standard (12% - 20%)] are incorporated into the updated baseline which was not included earlier. These measures are expected to reduce the 2020 statewide emissions projection to 507 $MMTCO_2e$ by 2020.[19] The updated forecast of 507 MMT CO_2e is referred to as the AB 32 2020 baseline.

The AB 32 Scoping Plan established a 2020 GHG emissions target of 427 $MMTCO_2e$, which is 80 $MMTCO_2e$ below the projected 2020 GHG BAU calculations of 507 $MMTCO_2e$. Of the 80 $MMTCO_2e$ reduction needed to meet the 2020 GHG emissions target, 21.3 $MMTCO_2e$ are targeted for reductions achieved through the Renewables Portfolio Standard.

In order to determine whether the proposed Project would generate GHG emissions that may have a significant impact on the environment, Shasta County has relied on the Inclusion Thresholds for Covered Entities, as described in Section 95812 of the Cap and Trade regulations adopted by CARB in 2011 (Title 17, California Code of Regulations). As described in Section 95812(c)(1), the applicability threshold for a covered entity (facility) is 25,000 metric tons or more of CO_2e per data year. The Cap and Trade Program is one of the state's primary tools for reducing GHG emissions and ensuring compliance with AB 32.

Additionally, the U.S. EPA regulations for reporting of greenhouse gas emissions set a 25,000 metric ton threshold for large emission sources. Through its rulemaking process, EPA analyzed several potential reporting thresholds, and concluded that this threshold would "appropriately

[19] California Air Resources Board, Supplement to the AB 32 Scoping Plan Functional Equivalent Document. June 13, 2011. Available at: http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm

balanc[e] emission coverage and burden."[20] EPA considered but rejected lower thresholds of 1,000 and 10,000 metric tons, finding that the thresholds would greatly increase the number of covered entities without capturing a significant additional portion of GHG emissions.[21] For similar reasons, the European Union has provided for "small installations" with emissions under 25,000 metric tons to be exempted from its Emissions Trading Scheme.[22]

Given the extensive research and resources that went into the development of the GHG Mandatory Reporting Rule and cap and trade programs adopted by CARB, the U.S. EPA greenhouse gas reporting rule, and the fact that the 25,000 metric ton threshold would capture approximately 94 percent of GHG emissions associated with stationary sources in California (CAPCOA page 44), Shasta County has determined that the use of the 25,000 metric tons/year of CO_2e threshold is the most appropriate quantitative threshold to apply to the proposed Project. This numeric threshold is used in this EIR to determine if the proposed Project would have a significant impact, or result in a cumulatively considerable contribution, to climate change and the generation of GHGs. In other words, if the proposed Project generates 25,000 metric tons of CO_2e or greater in a year, it would be considered to have a significant and cumulatively considerable impact on the environment and may conflict with state and federal plans and regulations aimed at reducing GHG emissions. If the proposed Project would generate less than 25,000 metric tons of CO_2e per year, it would be considered a less than significant and less than cumulatively considerable impact related to climate change and GHGs, and would not conflict with state and federal plans to reduce GHG emissions.

As described under Impact 3.7-1, the proposed Project would not generate more than 25,000 MT/yr of GHG emissions. As such, the Project would not conflict with any plans, policies, or programs adopted to reduce GHG emissions, and the Project would not conflict with the goals established by AB 32. This is a **less than significant impact**, and no mitigation is required.

[20] 74 Fed. Reg. 56272-73 (Oct. 30, 2009).

[21] Id. at 56272.

[22] See Article 27, European Parliament Directive 2003/87/EC, as amended by Directive 2009/29/EC.

The purpose of this section is to disclose and analyze the potential impacts associated with hazards and hazardous materials related to the Project site and general vicinity, and to analyze the potential for exposure of people to hazards and hazardous materials as the Project would be built and operated in the future. Potential environmental impacts and hazards related to air quality and the release of hazardous emissions are addressed in Section 3.3 of this Draft EIR. The Initial Study and Notice of Preparation determined that the proposed Project site is not included on a list of hazardous materials sites, is not in the vicinity of a public or private airstrip, is not located within one-quarter mile of a school site, and would not impair implementation of an emergency response plan. Therefore, the information and analysis in this section focuses on the potential for the Project to create a significant hazard to the public or the environment through the use, transport, disposal or release of hazardous materials. This section also addresses hazards associated with wildfires.

Comments were received during the public review period or scoping meeting for the Notice of Preparation regarding this topic from the following entities and individuals: City of Shasta Lake (February 22, 2012), Western Shasta Resource Conservation District (January 26, 2012), Robert Atwood (February 3, 2012), Brenda Bell (January 23, 2012), Debra Mynatt (February 10, 2012), Melody Hasher (February 14, 2012), Jay Schell (February 14, 2012), and Heidi Strand (February 8, 2012).

Information in this section is derived primarily from the following sources:

- California Department of Forestry and Fire Protection (CalFire) State Responsibility Areas (November, 2007);
- Shasta County General Plan, 2004; and
- Shasta County and City of Anderson Multi-Jurisdictional Hazard Mitigation Plan, September 2011.

3.8.1 ENVIRONMENTAL SETTING

The Project site is located on land historically utilized as undeveloped open space, as shown in Figure 2-4, Existing Conditions Aerial Photograph in the Project Description chapter of this EIR. The elevation of the site ranges from approximately 800 feet to 2,000 feet above mean sea level (amsl). The site encompasses approximately 1,850 acres dominated by Montane Hardwood-Conifer and Montane Hardwood vegetative habitats. Three creeks, Moody Creek, Salt Creek, and Rancheria Creek, transverse the center and eastern portions of the site. The only man-made structures on the site are the Union Pacific Railroad line through the southeast corner of the site and Digger Bay Road through the southwest and northwest corner of the site.

The site is surrounded by open space with a limited number of rural residential properties to the northeast, south, southeast, and southwest. The closest residential properties to the proposed quarry development are located approximately one-half mile to the southwest and one mile to the

southeast. Several other aggregate mines are located in the vicinity, with the closest approximately 1.5 miles to the northeast.

Wildfire Hazard Severity Zones

California law requires CAL FIRE to identify areas based on the severity of fire hazard that is expected to prevail in the site location. These areas, or "zones," are based on factors such as fuel (material that can burn), slope and fire weather. There are three zones, based on increasing fire hazard…medium, high and very high. Classification of a zone as moderate, high or very high fire hazard is based on a combination of how a fire will behave and the probability of flames and embers threatening buildings. Each area of the Fire Hazard Severity Zones Map gets a score for flame length, embers, and the likelihood of the area burning. Scores are then averaged over the zone areas. Final zone class (moderate, high and very high) is based on the average scores for the zone.

Fire Hazard Severity Zones are found in areas where the state has financial responsibility for fire protection, called State Responsibility Areas. More than 31 million acres are in the Project area. Very high Fire Hazard Severity Zones are found throughout Shasta County and neighboring counties as well. The zones serve several purposes. For instance, they are used to designate areas where exterior wildfire exposure protection building codes apply to new buildings. Local governments must also consider fire hazard severity in the safety element of their general plans.

As shown in Figure 3.8-1, the Project site is located within a State Responsibility Area and nearly all portions of the Project site are located within the Very High Fire Hazard Severity Zone.

The Shasta Lake Fire Protection District provides Automatic Aid and Mutual Threat Zone responses to the entire Project area.

3.8.2 REGULATORY SETTING

A hazardous material is a substance or combination of substances which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either (1) cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating irreversible illness; or (2) pose a substantial present or potential hazard to human health and safety, or the environment when improperly treated, stored, transported, or disposed of. (22 Cal. Code Regs. § 662.60.10.)

Hazardous waste is the subset of hazardous materials that has been abandoned, discarded, or recycled and is not properly contained, including contaminated soil or groundwater with concentrations of chemicals, infectious agents, or toxic elements sufficiently high to increase human mortality or to destroy the ecological environment. If a hazardous material is spilled and cannot be effectively picked up and used as a product, it is considered to be hazardous waste. If a hazardous material site is unused, and it is obvious there is no realistic intent to use the material, it is also considered to be a hazardous waste. Examples of hazardous materials include flammable and combustible materials, corrosives, explosives, oxidizers, poisons, materials that react violently with water, radioactive materials, and chemicals.

Various federal and state agencies exercise regulatory authority over the use, generation, transport, and disposal of hazardous substances. The primary federal agencies that are responsible for overseeing regulations and policies regarding hazardous materials are the Environmental Protection Agency (USEPA), Department of Labor Occupational Safety and Health Administration (OSHA), and the Department of Transportation (DOT).

The primary California state agency with similar authority and responsibility is the California Environmental Protection Agency (Cal-EPA), which may delegate enforcement authority to other local agencies with which it has agreements.

Several laws governing the transport, storage, and use of hazardous materials are governed by these agencies as well as oversight for contaminated sites cleanup. Federal laws and regulations, as well as specific legislation and policies, related to hazards and hazardous materials are summarized below.

FEDERAL

Code of Federal Regulations

Federal regulations applicable to hazardous substances are contained primarily in the Code of Federal Regulations (CFR) Titles 29 (Labor), 40 (Protection of Environment), and 49 (Transportation). The applicable CFR titles include standards and provisions for the protection of workers, the natural and environment, and the general public from the effects associated with the use, storage, and transport of hazardous materials.

Resource Conservation and Recovery Act

The 1976 Federal Resource Conservation and Recovery Act (RCRA) and the 1984 RCRA Amendments regulate the treatment, storage, and disposal of hazardous and non-hazardous wastes. The legislation mandated that hazardous wastes be tracked from the point of generation to their ultimate fate in the environment. This includes detailed tracking of hazardous materials during transport and permitting of hazardous material handling facilities.

The 1984 RCRA amendments provided the framework for a regulatory program designed to prevent releases from underground storage tanks (USTs). The program establishes tank and leak detection standards, including spill and overflow protection devices for new tanks. The tanks must also meet performance standards to ensure that the stored material will not corrode the tanks. Owners and operators of USTs had until December 1998 to meet the new tank standards. As of 2001, an estimated 85 percent of USTs were in compliance with the required standards.

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) introduced active federal involvement to emergency response, site remediation, and spill prevention, most notably the Superfund program. CERCLA was intended to be comprehensive in encompassing both the prevention of, and response to, uncontrolled hazardous substances releases. CERCLA deals with environmental response, providing mechanisms for reacting to

emergencies and to chronic hazardous material releases. In addition to establishing procedures to prevent and remedy problems, it establishes a system for compensating appropriate individuals and assigning appropriate liability. It is designed to plan for and respond to failure in other regulatory programs and to remedy problems resulting from action taken before the era of comprehensive regulatory protection.

Natural Gas Pipeline Safety Act

The Natural Gas Pipeline Safety Act authorizes the U.S. Department of Transportation Office of Pipeline Safety to regulate pipeline transportation of natural (flammable, toxic, or corrosive) gas and other gases as well as the transportation and storage of liquefied natural gas. The Office of Pipeline Safety regulates the design, construction, inspection, testing, operation, and maintenance of pipeline facilities. While the federal government is primarily responsible for developing, issuing, and enforcing pipeline safety regulations, the pipeline safety statutes provide for State assumption of the intrastate regulatory, inspection, and enforcement responsibilities under an annual certification. To qualify for certification, a state must adopt the minimum federal regulations and may adopt additional or more stringent regulations as long as they are not incompatible.

STATE

The primary state agencies that are responsible for overseeing regulations and policies regarding hazardous materials are the California Office of Emergency Services (OES), California Environmental Protection Agency (Cal-EPA), CalRecycle (formerly the California Integrated Waste Management Board (IWMB), Department of Toxic Substances Control (DTSC), California Department of Transportation (Caltrans), California Highway Patrol (CHP), California Regional Water Quality Control Boards (RWQCB), and the California Air Resources Board (CARB). Several laws governing the generation, transport, and disposal of hazardous materials are administered by these agencies. State laws and regulations that are applicable to hazards and hazardous materials are presented below.

Hazardous Materials Management

The California Environmental Protection Agency (Cal-EPA) has established regulations governing the use of hazardous materials in the state. Within Cal-EPA, the Department of Toxic Substance Control (DTSC) has primary hazardous materials regulatory responsibility, but can delegate enforcement responsibilities to local jurisdictions that enter into agreements with DTSC, for the generation, transport, and disposal of hazardous materials under the authority of the Hazardous Waste Control Law (HWCL). State regulations applicable to hazardous materials are contained primarily in Title 22 of the CCR. Title 26 of the CCR is a compilation of those chapters or titles of the CCR that are applicable to hazardous materials management.

Also within the “umbrella” of Cal-EPA, CalRecycle (formerly the California Integrated Waste Management Board (IWMB)) is responsible for protecting the public’s health and safety and the environment through management of the solid waste generated in California. Solid waste regulations are generally enforced through local enforcement agencies (usually county agencies). CalRecycle works in partnership with local government, industry, and the public to reduce waste

disposal and ensure environmentally safe landfills. Solid waste management provisions are outlined in the Public Resources Code (PRC), Division 30.

The California Highway Patrol (CHP) and the California Department of Transportation (CalTrans) are the enforcement agencies for hazardous materials transportation regulations. The California Department of Industrial Relations, Division of Occupational Safety and Health Administration (Cal/OSHA) standards are more stringent than federal OSHA regulations. Cal/OSHA assumes primary responsibility for developing and enforcing workplace safety regulations in Title 8 of the CCR.

The California Office of Emergency Services (Cal/OES) is the state office responsible for establishing emergency response and spill notification plans related to hazardous materials accidents. In addition, Cal/OES regulates businesses by requiring specific businesses to prepare an inventory of hazardous materials, and to prepare risk management plans through the California Accidental Release Prevention Program (Title 19 of the CCR).

The Regional Water Quality Control Boards (RWQCB) regulate surface and groundwater quality according to the provisions of the California Porter-Cologne Water Quality Act, the Toxic Pits Cleanup Act, Underground Tank Law, and federal Clean Water Act. Generally, all petroleum-related sites are handled by the RWQCBs and all underground tank sites are managed by County environmental management agencies. The Project site is located within the jurisdiction of the Central Valley RWQCB (Region 5). The RWQCB can delegate responsibilities, such as underground tank permitting and monitoring, to local jurisdictions, such as Shasta County.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

In January 1996, Cal-EPA adopted regulations implementing a “Unified Hazardous Waste and Hazardous Materials Management Regulatory Program” (Unified Program). The six elements of the Unified Program are as follows: 1) hazardous waste generators and hazardous waste on-site treatment; 2) underground storage tanks; 3) above-ground storage tanks; 4) hazardous material release response plans and inventories 5) risk management and prevention programs; and 6) Unified Fire Code hazardous materials management plans and inventories. The Unified Program is implemented at the local level by a local agency – the Certified Unified Program Agency (CUPA). The CUPA is responsible for consolidating the administration of the six program elements within its jurisdiction. The Shasta County Environmental Health Division (SCEHD) is the designated CUPA in the County.

Emergency Response to Hazardous Materials Incidents

To coordinate emergency services provided by local, state, and federal agencies, California has developed an Emergency Response Plan pursuant to the Emergency Services Act. The Plan is administered by the state Office of Emergency Services. Local agencies are required to develop area plans for an organized response to releases of hazardous materials that are dependent on Business Plans submitted by handlers of hazardous materials and waste within that agency’s area. Pursuant to California Health and Safety Code, Section 25503(a) and CCR Section 2729, any

business handling hazardous material must establish and implement a Hazardous Materials Business Plan. These Business Plans are then submitted to the local administering agency. In the County, the administering agency is SCEHD.

Above-Ground Storage Tanks

In 1989, the California Legislature enacted the Aboveground Petroleum Storage Act (APS) to protect people and natural resources from aboveground petroleum storage tank spills. APS became effective January 1, 1990. APS requires owners or operators of aboveground petroleum storage tanks larger than 660 gallons or with cumulative storage capacity greater than 1,320 gallons to:

- File a storage statement;
- Pay a facility fee; and
- Prepare and implement a Spill Prevention Control and Countermeasure Program (SPCC) to prevent and control potential spills.

California Health and Safety Code

Cal-EPA has established rules governing the use of hazardous materials and the management of hazardous wastes. Many of these regulations are embodied in the California Health and Safety Code. The code includes regulations that govern safe drinking water, substances control, land reuse and revitalization, remediation, restoration, and methamphetamine contaminated cleanups.

California Code of Regulations Title 22 and Title 26

The California Code of Regulations (CCR) Title 22 provides state regulations for hazardous materials, and CCR Title 26 provides regulation of hazardous materials management. In 1996, Cal/EPA established the "Unified Hazardous Waste and Hazardous Materials Management Regulatory Program" (Unified Program) which consolidated the six administrative components of hazardous waste and materials into one program.

LOCAL

Shasta County General Plan

The Public Safety Group, Fire Safety and Sheriff Protection subsection, of the Shasta County General Plan contains policies regarding fire protection and development practices within an identified high risk fire hazard area. These policies are intended to protect persons and structures from fires and ensure that development minimizes the risk of creating fire hazards or defending against those hazards. The following General Plan Objectives and Policies are applicable to the Project:

Section 5.4 Fire Safety and Sheriff Protection

Objective FS-1: Protect development from wildland and non-wildland fires by requiring new development projects to incorporate effective site and building design measures commensurate with level of potential risk presented by such a hazard and by discouraging and/or preventing development from locating in high risk fire hazard areas.

Objective FS-2: Protection of life and property from crime by encouraging new development projects to incorporate effective defensible space design techniques.

> **Policy FS-a:** All new land use projects shall conform to the County Fire Safety Standards.
>
> **Policy FS-b**: Known fire hazard information should be reported as part of every General Plan amendment, zone change, use permit, variance, building site approval, and all other land development applications subject to the requirements of the California Environmental Quality Act (CEQA).
>
> **Policy FS-d:** New development in areas designated Urban Residential and Suburban Residential should be encouraged to incorporate effective site planning and structural design features designed to prevent and deter crime.
>
> **Policy FS-e:** Development in areas requiring expanded levels of police and fire services shall participate in adopted County programs designed to offset the added costs for providing the expanded level of services.

The Public Safety Group, Hazardous Materials subsection, of the County General Plan contains policies regarding contact and release of hazardous materials. These policies are intended protect persons and property from accidental release of hazardous materials. The following General Plan Objectives and Policies are applicable to the Project:

Section 5.6 Hazardous Materials

Objective HM-1: Protection of life and property from contact with hazardous materials through site design and land use regulations and storage and transportation standards.

Objective HM-2: Protection of life and property in the event of the accidental release of hazardous materials through emergency preparedness planning.

> **Policy HM-a:** The County shall make every effort to inform applicants for discretionary and nondiscretionary projects which are located within potential border zone property of known hazardous waste facilities that they must comply with State requirements regarding hazardous waste facilities. A map shall be prepared and maintained which identifies these areas.
>
> **Policy HM-b:** Shasta County shall maintain an emergency preparedness plan for hazardous materials.

Policy HM-c: Shasta County shall adopt policies for hazardous materials use, transportation, storage and disposal as required by State laws.

Policy HM-d: Shasta County shall adopt policies for the protection of life and property from contact with hazardous materials through site design and land use regulations.

Policy HM-e: Any proposal for development of a disposal site for hazardous wastes in Shasta County shall be reviewed closely to ensure that no significant environmental impacts will result from the project. Review of such project may include a determination of what type of hazardous wastes may be disposed of at the site.

Shasta County and City of Anderson Multi-Jurisdictional Hazard Mitigation Plan

The Shasta County Multi-Jurisdictional Hazard Mitigation Plan (SCHMP) includes resources and information to assist in planning for hazards. The plan provides a list of actions that may assist Shasta County and the City of Anderson in reducing risk and preventing loss from future hazard events. The emphasis of the SCHMP is on the assessment and avoidance of identified risks, implementing loss reduction measures for existing exposures, and insuring critical services and facilities survive a disaster. Hazard mitigation strategies and measures avoid losses by limiting new exposures identified in hazard areas, alter the hazard by eliminating or reducing the frequency of occurrence, avert the hazard by redirecting the impact by means of a structure or adapt to the hazard by modifying structures or standards.

3.8.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project would have a significant impact from hazards and hazardous materials if it would:

- 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 one-quarter mile of an existing or proposed school.
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment.
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area.
- For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area.

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

The Initial Study and Notice of Preparation (IS/NOP) prepared by Shasta County in January 2012 determined that the proposed Project site is not included on a list of hazardous materials sites, is not in the vicinity of a public or private airstrip, is not located within one-quarter mile of a school site, and would not impair implementation of an emergency response plan. Therefore, these items are not addressed further in this Draft EIR.

IMPACTS AND MITIGATION MEASURES

Impact 3.8-1: Project implementation may create a hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or the accidental release of hazardous materials. (Less than Significant with Mitigation)

CONSTRUCTION

The use of hazardous materials for construction of the primary processing plant, secondary and ancillary processing plant, and rail spur/siding could pose a potential hazardous-material related impact if a spill or accident occurred. These potential impacts would be associated with transportation, storage, use, and disposal of various hazardous substances during construction of aforementioned facilities. Typical hazardous materials used during construction of these types of facilities include:

- Motor oils
- Automatic transmission fluids
- Canned spray paints
- Gasoline and diesel fuels
- Mastic coatings
- Bottled oxygen and acetylene
- Propane and butane
- Lubricating grease
- Paint thinners
- Antifreeze
- WD-40
- Brake fluids
- Paints (oil based and latex)
- Brazing and solder compounds
- Cleaning solvents
- Disinfectants
- Pressurized gases
- Hydraulic fluids

Except for gasoline and diesel fuel stored on or transported to the Project site, most of the above hazardous materials used at the site would be in small quantities. Therefore, a spill of these materials would be localized and easily cleaned up. While risks associated with the use of hazardous materials during the construction stage of the Project are anticipated to be relatively low, Mitigation Measure 3.8-1(a) requires the preparation of a Hazardous Materials Business Plan/Spill Prevention Control and Countermeasures Plan. Implementation of this mitigation

measure would ensure that potential impacts related to hazards during project construction would be reduced to a **less than significant** level.

Operation

The use of hazardous materials during mining operations could pose a potential health and safety hazard if a spill or accident occurred. The use of hazardous materials during mining operations would include maintenance supplies and operational stores. Hazardous materials used for daily operations or the maintenance of on-site equipment and vehicles would primarily include:

- Fuels (diesel, gasoline, and natural gas)
- Asphalt Oil
- Motor oils
- Automatic transmission fluids
- Paints and thinners
- Hydraulic fluids
- Lubricating grease
- Bottled oxygen and acetylene
- Cleaning solvents
- Lubricating grease
- Brake fluids
- Antifreeze

Most of these hazardous materials would be limited to factory-supplied containers of 55-gallon drums or less. These hazardous materials would be stored within the maintenance shop building in accordance with state and local regulations. However, it would be necessary to transport many of these chemicals to on-site locations for repair or maintenance of equipment and/or vehicles. The use of chemicals at localized areas presents the greatest risk of accidental spills, but such use would be limited to small quantities of five gallons or less and any spill would be easily cleaned up and disposed of in accordance with governmental regulations. Therefore, the transportation of these chemicals to on-site locations for on-site use would be considered to be a **less than significant** impact.

Operation of mobile equipment and certain ancillary processing equipment (e.g. asphalt batch plant) would require on-site storage of large quantities of fuels. On-site storage of fuels would be necessary for refueling of vehicles (e.g., gasoline and diesel). The primary on-site heating chemical would be propane for heating the asphalt in the asphalt batch plant. Fuels would also be transported to service various on-site vehicles, particularly the equipment used for aggregate mining.

Onsite fuel storage would consist of:

- Aboveground diesel fuel storage tanks (two 5,000 gallon tanks or one 10,000 gallon tank)
- Aboveground gasoline tank (one 2,000 gallon tank)
- Aboveground asphaltic oil storage tanks (four 5,000 gallon tanks or two 10,000 gallon tanks)
- Natural gas storage tank (2,500 to 5,000 gallon capacity)

A spill during on-site fueling of a vehicle or a leak from equipment or the storage tanks listed above represents the highest risk of on-site and off-site contamination.

The federal reportable spill quantity for petroleum products, as defined in EPA's guidelines (40 CFR 110) is any oil spill that: (1) violates applicable water quality standards; (2) causes a film or sheen upon or discoloration of the water surface or adjoining shoreline; or (3) causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines. The transport of fuels and other hazardous materials to the Project would be conducted consistent with all applicable State and federal regulations, and would be completed only by licenses personnel certified in the transport and handling of hazardous materials.

The transport, storage, and use of hazardous materials at the Project site are considered a **potentially significant** impact. Implementation of the following mitigation measures would reduce this impact to **a less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.8-1(a)*: Prior to the transport, use, or storage of hazardous materials or explosives at the Project site, the Applicant shall prepare a Hazardous Materials Business Plan (HMBP). The County shall review and approve the HMBP prior to use or storage of hazardous materials on-site. The HMBP shall include the components listed below.*

a. *A completed Business Owner/Operator Identification form and Business Activities form.*

b. *Completed Hazardous Materials (HazMat) Inventory/Chemical Description form(s) for each hazardous material, or mixture containing a hazardous material, stored or handled in reportable quantities.*

c. *Emergency Response Plans and Procedures in the event of a reportable release or threatened release of a hazardous material. The plans and procedures shall include:*

    i. *Immediate notification in the event of a release or threatened release of a hazardous material. A release, or threatened release, which poses a significant present or potential hazard to public health and safety or to the environment shall be reported to the Shasta County Environmental Health Division*

    ii. *Procedures for mitigation of a release or a threatened release to minimize any potential harm or damage to persons, property, or the environment.*

    iii. *Evacuation plans and procedures, including immediate notice, for the Project site. Maps showing evacuation routes and descriptions of evacuation drills shall be included.*

d. *A description of training for all new employees and annual refresher training for all employees in safety procedures in the event of a release or threatened release of a hazardous material, including, but not limited to, familiarity with the Emergency Response Plans and Procedures. These training programs may take into consideration the position of each employee (i.e., the manager or owner may require more or different training then a cashier). Applicant shall maintain written training records for each employee that handles hazardous waste on site.*

e. *A detailed facility map, including evacuation routes, location of hazardous materials stored on site, and location of spill prevention and site cleanup resources located on site.*

Mitigation Measure 3.8-1(b)*: Prior to the transport, use, or storage of hazardous materials at the Project site, the Applicant shall prepare a Spill Prevention Control and Countermeasures (SPCC) Plan to avoid spills and minimize impacts in the event of a spill. The County shall review and approve the SPCC prior to the use or storage of hazardous materials on-site. The SPCC shall include the components listed below.*

a. The SPCC must include a discussion of hazardous materials management, including delineation of hazardous material and hazardous waste storage areas, prevention and response procedures, access and egress routes, and notification procedures.

b. The SPCC shall be provided to all contractors working on the proposed project, and one copy shall be available on site at all times.

c. The Applicant shall store all fuels, lubricants, paint, solvents, and any other hazardous materials in the manner specified by the manufacturer and in accordance with federal regulations and nationally and internationally recognized codes and standards. Small spray cans of carburetor fluid and other hazardous materials shall be stored in an enclosed area in an appropriate fuel storage building. A material safety data sheet shall be stored with each material.

d. All employees shall be properly trained in the use and handling of these materials.

e. Should a spill of hazardous material occur, EHD, DTSC, and RWQCB, which have spill response and cleanup ordinances to govern emergency spill response, shall be notified immediately by the Project operator. A written description of reportable releases shall be submitted to the Central Valley Water Board by the Project operator within two days of the spill. This submittal shall include a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. The releases shall be documented on a spill report form. If a reportable spill has occurred and it is determined that project activities have adversely affected surface or groundwater quality in excess of water quality standards, a detailed analysis shall be performed by a Registered Environmental Assessor to identify the likely cause of contamination. This analysis shall conform to ASTM standards and shall include recommendations for reducing

or eliminating the source or mechanisms of contamination. Based on this analysis, the Project Applicant shall select and implement measures to control contamination, with a performance standard that water quality shall be returned to baseline conditions. These measures shall be subject to approval by EHD, DTSC, and the RWQCB.

Mitigation Measure 3.8-1(c): *The following preventative measures shall be implemented by the Project operator during construction and/or operation of the Project to minimize impacts associated with (a) fueling and maintenance of vehicles; (b) maintenance of equipment; and/or (c) transport, storage, use, and dispose of hazardous materials.*

a. Normal refueling and maintenance operations shall occur in specified areas.

b. Procedures shall be outlined by the Project operator to minimize the chance of a fuel spill during servicing and refueling throughout all stages of Project operations.

c. Gasoline, diesel, and/or propane above ground storage tanks shall be provided with pylons or other restricting access devices to minimize the risk of a vehicle hitting the tanks. Pylons or other restricting access devices shall be installed concurrent with the installation of any onsite storage tanks, and prior to the filling of such tanks with fuels on the Project site.

d. Hazardous material shall be transported in DOT-approved containers and allowed only on approved access roads. Additionally, vehicles and/or storage containers shall be properly marked.

e. Only authorized personnel shall conduct equipment servicing and maintenance.

f. All equipment used for storage or dispensing of gasoline or diesel shall be used in accordance with the National Fire Protection Administration (NFPA) requirements. This equipment shall include, but not be limited to, ASTs, pumps, hoses, and nozzles.

g. Vehicles carrying hazardous materials shall be equipped with appropriate materials to contain a small spill should one occur during transport. Additionally, all service vehicles shall be equipped with Class B fire extinguishers and shall have adequate supplies of spill containment equipment (e.g., granular absorbents, absorbent pigs, and/or catch-basins).

h. Equipment engines shall be turned off during refueling operations to minimize fire risk.

i. Smoking, open flames, or welding shall not be allowed in or near the refueling areas or areas containing or used for storage of flammable materials.

j. All refueling and maintenance operations shall be performed away from drains, culverts, and stormwater runoff collection areas to prevent contamination of local water bodies in the event of an accidental release of hazardous materials.

k. Hazardous wastes, including used oil, used oil filters, used gasoline containers, spent batteries, and other items, shall be collected regularly and stored at the facility's permitted

90-day temporary hazardous material storage area. Additionally, contaminated soil and other materials shall be placed in appropriate containers and transported to the 90-day temporary hazardous material storage area. All hazardous waste shall be disposed of at a regulated treatment, disposal, and storage facility.

l. Hazardous materials shall be stored in proper containers and in designated areas. Cleanup and emergency response materials shall be stored near these areas.

m. Detailed information about the use, storage, and disposal of hazardous materials shall be provided in the construction and operational Hazardous Communication (HAZCOM) Plans. These HAZCOM Plans shall define specific procedures for vehicle refueling and servicing, transportation and storage of hazardous materials, and the disposal of hazardous wastes.

n. All fuel containers shall be inspected periodically for signs of leaking or failure by the Shasta County EHD.

o. All personnel involved in handling hazardous materials shall be trained in accordance with OSHA HAZWOPER regulations.

SIGNIFICANCE AFTER MITIGATION

Implementation of Mitigation Measures 3.8-1(a) through 3.8-1(c) would reduce this impact to a **less than significant** level. A HMBP and a SPCC would be required from the contractor during construction and from the operator during operations. The purpose of these plans is to ensure that adequate containment would be provided to control accidental spills, that adequate spill response equipment and absorbents would be readily available, and that personnel would be properly trained in how to control and clean up any spills. Additionally, best management practices are required, which would reduce potential risks and hazards associated with onsite fueling activities and the handling of hazardous materials onsite.

Impact 3.8-2: Project implementation may expose the public to hazards associated with the transport, use, or storage of explosives. (Less than Significant with Mitigation)

Mineral reserves would be removed through a combination of drilling, blasting, and excavation equipment. In surface mining, holes are drilled through the overburden, loaded with explosives, and discharged, shattering the rock in the overburden. All blasts would occur during daylight hours and only on regular business days (not on weekends or holidays).

The transportation, storage, and handling of materials used for blasting would be performed or supervised by a licensed blasting expert contracted or employed by the Operator. Materials used for blasting, typically ammonium nitrate and fuel oil (ANFO), may be stored on-site. ANFO blasting agents represent the largest industrial explosive manufactured (in terms of quantity) in the United States. This product is used primarily in mining and quarrying operations. The components are generally mixed at or near the point of use for safety reasons. The mixed product is relatively safe and easily handled and can be poured into drill holes in the mass or object to be blasted. ANFO is a free flowing mixture of porous Prilled Ammonium Nitrate and Fuel Oil formulated to be oxygen balanced for use in dry blast holes.

The Applicant would be required to comply with all federal (i.e., U.S. Bureau of Alcohol, Tobacco, Firearms, and Explosives), state (i.e., California Highway Patrol), and local law enforcement (i.e., Shasta County Sheriff's Department) regulations regarding transportation, use, and detonation of blasting materials. The transport of blasting materials to the site is restricted by the California Highway Patrol to pre-approved routes, and all explosive transport vehicles must satisfy all the stringent vehicle standards as required by the federal Department of Transportation. Once explosives enter the site, their transportation and use is regulated by the federal Occupational Safety Administration and by Cal OSHA. All blasting would be conducted in compliance with applicable federal and state blasting regulations. Blasting would be conducted by a qualified blasting expert pursuant to a blasting plan, as required by Mitigation Measure 3.8-2. Potential noise impacts, including groundborne vibration associated with blasting, are further addressed under Impact 3.11-3.

Adherence to all applicable federal and state laws regarding the use, storage and transport of explosive materials, in addition to implementation of the blasting plan required by MM 3.8-2 would reduce hazards associated with the use, transport, and storage of explosive materials to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.8-2*: Prior to conducting the first blast on the Project site, the Applicant shall prepare and submit a detailed blasting plan to the Shasta County Department of Resource Management and the Shasta County Sheriff's Department. The blasting plan shall contain a complete description of clearing and guarding procedures; descriptions of how explosives will be safely transported and used at the site; evacuation, security and fire prevention procedures; blasting equipment list, and procedures for notification of nearby receptors. The blasting plan shall conform to the requirements of 27 CFR Part 55.*

SIGNIFICANCE AFTER MITIGATION

Implementation of Mitigation Measure 3.8-2 would reduce this impact to a **less than significant** level.

Impact 3.8-3: Project implementation may 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 (Less than Significant with Mitigation).

As shown in Figure 3.8-1, nearly all portions of the Project site are located within the Very High Fire Hazard Severity Zone, as defined by the state of California.

The Project site is located within a State Responsibility Area for fire protection. Additionally, at this time, the Shasta Lake Fire Protection District provides Automatic Aid and Mutual Threat Zone responses to the entire Project area.

Property owners within this designated area are subject to the requirements of Public Resources Code (PRC) sections 4125 and 4142. PRC section 4291 establishes six maintenance requirements for "any person that owns, leases, controls, operates, or maintains any buildings or structure in, upon, or adjoining any mountainous or forest-covered lands, brush-covered lands, or grass-covered lands, or any land covered with flammable material." These maintenance requirements include fuels management activities, maintenance of defensible space, and providing adequate emergency access.

As shown in Figure 2-10, the quarry pits and the processing areas would be cleared and graded prior to mining and processing activities. The clearing and grading activities would remove nearly all vegetation and fire fuels from these active areas of the site. However, areas on the Project site outside of the quarry pits and processing areas would continue to be densely vegetated. The areas surrounding the Project site are densely vegetated and contain high wildland fire fuel loads.

There are existing rural residences located to the south and southeast of the Project site, and the City of Shasta Lake is located approximately one mile to the south. In the event of a wildfire at, or near the Project site, the existing residences and structures in the Project vicinity would be at risk. This is considered a **potentially significant** impact.

As described above, Mitigation Measure 3.8-1(c) includes requirements for the proper handling, use, and storage of hazardous and flammable materials. Additionally, fuel trucks are required to have Class B fire extinguishers present at all times. Mitigation Measure 3.8-2 includes requirements for the preparation of a blasting plan, which includes specifications for the safe handling and storage of explosive materials on the Project site. The operational safety measures required by these mitigation measures would help reduce the potential for Project activities to result in the generation of a wildfire.

The Project site also has three access/emergency roads that would provide access to areas throughout the site in the event of a wildfire. Primary access to the Project site would be via a paved private access road that would connect to Wonderland Boulevard via the Interstate 5/Mountain Gate off-ramp (shown in Figure 2-10). Access to the Project site would be controlled by a gate at the entrance to the Project site. The gate would be closed and locked when the Project is not actively operating. Haul roads within the site would be paved or surfaced with gravel or hard-packed dirt.

A second site access point would connect to Digger Bay Road, near the northwest corner of the site. This access point would be limited to access for equipment, material used for blasting (typically ammonium nitrate and fuel oil (ANFO)) delivery and employee traffic when operations necessitate such access, primarily during operation of the North Pit. No material transport would occur on this access road.

Emergency access to and from the site would not only be provided by the access points from Wonderland Boulevard and Digger Bay Road, but also one emergency-only access road. The emergency-access road follows the rail spur/siding to the southeast corner of the site to an existing access road for the UP mainline as shown in Figure 2-10.

The Project's location within a Very High Fire Hazard Severity Zone requires the implementation of mitigation measures to reduce risks associated with wildland fires.

MITIGATION MEASURES

Mitigation Measure 3.8-3*: Prior to use or storage of hazardous materials on-site, the Applicant shall prepare and submit a detailed Fire Prevention and Response Plan to the Shasta County Fire Department for review and approval. The Fire Prevention and Response Plan shall meet all applicable State and local fire prevention and safety requirements, including the requirements of PRC 4291. In addition to all applicable state and local requirements, the Plan shall include the following requirements:*

1. *All buildings on the Project site shall be developed according to the applicable provisions of the California Building Code, Chapter 7A, and other code provisions for construction within "Very High Fire Hazard Severity Zones."*

2. *All major roads within the Project site shall be designed and constructed to support 40,000 pound load capacities, and all driveways and roadways shall meet the requirements of the Shasta County Fire Safe Standards for width, horizontal and vertical curves, turnouts,*

turnarounds, vertical clearance, and all other requirements as set forth by code. An approved turnaround shall be constructed at the end of major roadways as appropriate.

3. *All final site plans shall include details showing any proposed breakaway gates on Project access roads and emergency access roads.*

4. *All final site plans shall show the locations of fire hydrants or other fire flow provisions within 150 feet of all commercial buildings or structures capable of flowing a minimum of 1,500 gallons per minute.*

5. *A Class "A" or higher rated roofing system shall be installed on any structures within the Project site. This rating shall be per the currently adopted Building Code requirements for roofing materials and systems.*

6. *The main electrical disconnect shall be provided on the exterior of the buildings.*

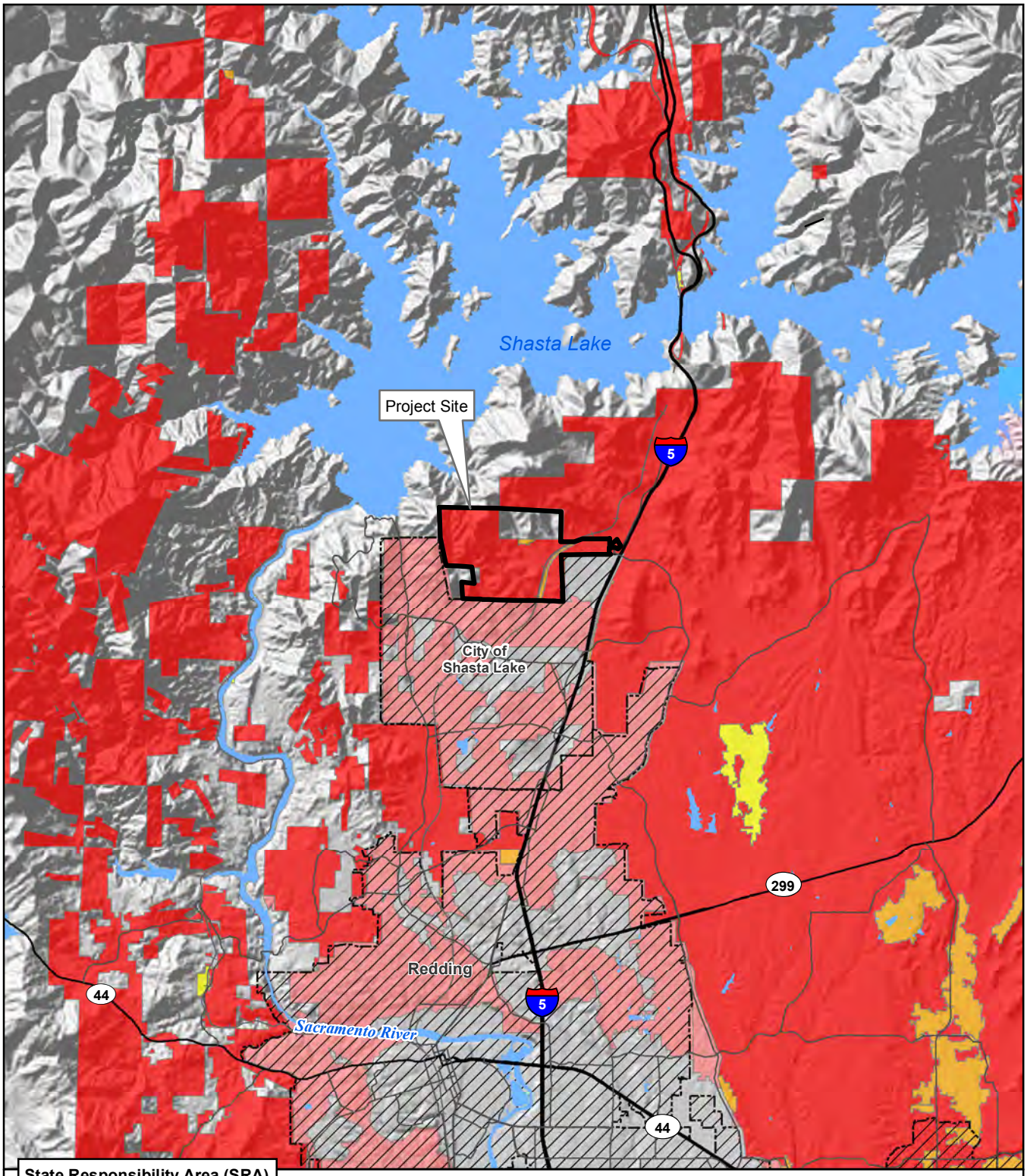
7. *All gates on the Project site shall be set back a minimum of 30 feet from the edge of the roadway serving the property.*

8. *Prior to the issuance of the building permit, all vegetation within 100 feet of any proposed buildings on the property shall be cut, thinned, or otherwise fully in compliance with County Vegetation Maintenance standards.*

9. *The Project Applicant shall participate in the establishment of a shaded fuel break along the western, southern, and eastern property boundaries to reduce wildfire hazard spread to and from the Project property from the City of Shasta Lake and other developed areas.*

SIGNIFICANCE AFTER MITIGATION

Implementation of Mitigation Measure 3.8-3 would reduce this impact to a **less than significant** level.



State Responsibility Area (SRA)

Hazard Class

- Very High
- High
- Moderate

Local Responsibility Area (LRA)

Hazard Class

- Very High

MOODY FLATS EIR

Figure 3.8-1: Fire Hazard Severity Zones

N

0 1 2

Miles

Sources: California Department of Forestry and Fire Protection (CalFire) State Responsibility Areas (11/2007) and Local Responsibility Areas (5/2008); ESRI StreetMap North America; Shasta County GIS. Map date: April 29, 2013.

De Novo Planning Group

A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.