This EIR section describes the existing noise environment in the Project vicinity and identifies potential noise impacts associated with the proposed Project. This analysis assesses noise generated by on-site mining activities (excavation and blasting), processing (primary aggregate plant and permanent processing plant), ancillary facilities (concrete ready-mix, asphaltic concrete, and recycling) and load-out of aggregate materials by rail as well as offsite truck traffic.

Project impacts are evaluated relative to applicable noise level criteria and to the existing ambient noise environment. Mitigation measures have been identified for significant noise-related impacts.

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 agencies and individuals: 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), Brenda Bell (January 23, 2012), Phyllis Beyer (January 18, 2012), Carolyn Burdick (January 29, 2012), Cinnamon Kern (February 4, 2012), Ed Coleman (January 26, 2012), Darria Kosich (January 31, 2012), Norma Tahash (January 24, 2012), Rob and Sheryl Sampley (March 8, 2012), Theresa Sota (February 6, 2012), Debbie Mynatt (February 10, 2012), Diane Allen (February 5, 2012), Gordon Gienapp (January 27, 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), Richard Molinar (January 21, 2012), Pamelyn Morgan (February 14, 2012), Terry Bradford (January 18, 2012), Stephanie Thomas (February 6, 2012), Toshadeva Guhan (February 14, 2012), and Richard and Georgia Tull (February 5, 2012).

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

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

- Environmental Noise Assessment [for] Moody Flats Quarry (Bollard Acoustical Consultants, Inc., August 30, 2012), which is attached as **Appendix T**.

3.11.1 ACOUSTIC FUNDAMENTALS

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound is mechanical energy transmitted in the form of a wave because of a disturbance or vibration. Sound levels are described in terms of both amplitude and frequency.

Amplitude

Amplitude is defined as the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound

amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a three dB change in amplitude as the minimum audible difference perceptible to the average person.

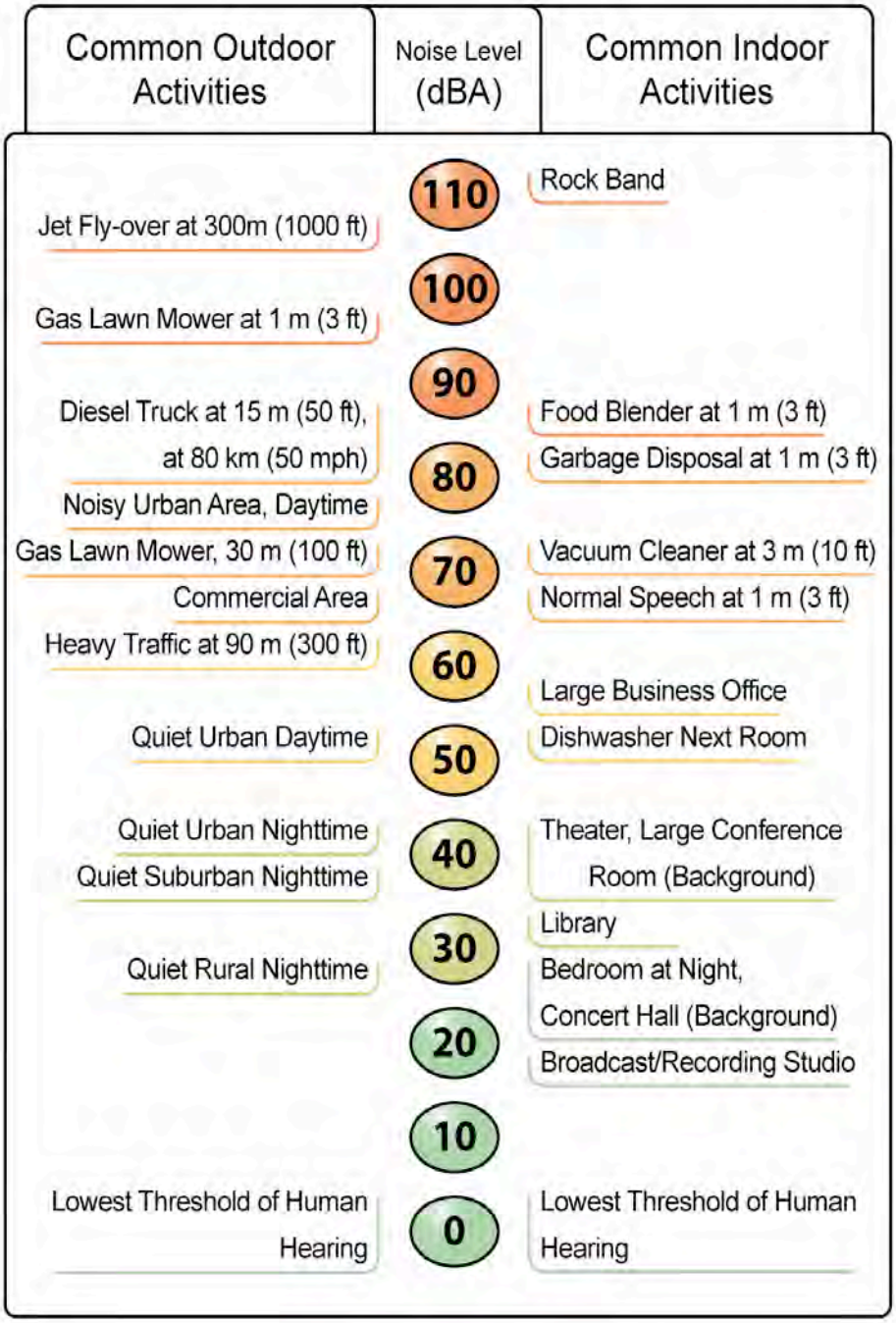
Frequency

The frequency of a sound is defined as the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. For instance, the human ear is more sensitive to sound in the higher portion of this range than in the lower and sound waves below 16 Hz or above 20,000 Hz cannot be heard at all. To approximate the sensitivity of the human ear to changes in frequency, environmental sound is usually measured in what is referred to as "A-weighted decibels" (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA. Common community noise sources and associated noise levels, in dBA, are depicted in Exhibit 3.11-1.

Addition of Decibels

Because decibels are logarithmic units, sound levels cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces a sound level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together would produce an increase of five dB.

Exhibit 3.11- 1 Common Noise Levels



SOURCE: CALTRANS 2009

Sound Propagation & Attenuation

GEOMETRIC SPREADING

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level decreases (attenuates) at a rate of approximately six decibels for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately three decibels for each doubling of distance from a line source, depending on ground surface characteristics. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between a line source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation for soft surfaces results in an overall attenuation rate of 4.5 decibels per doubling of distance from a line source.

ATMOSPHERIC EFFECTS

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

SHIELDING BY NATURAL OR HUMAN-MADE FEATURES

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in minimum five dB of noise reduction. Taller barriers provide increased noise reduction.

Noise Descriptors

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the sound-pressure level in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies, which is referred to as the "A-weighted" sound level (expressed in units of dBA). The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-weighted noise scale. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with environmental noise.

The intensity of environmental noise fluctuates over time, and several descriptors of time-averaged noise levels are typically used. For the evaluation of environmental noise, the most commonly used descriptors are L_{eq}, L_{dn}, CNEL and SEL. The energy-equivalent noise level, L_{eq}, is a measure of the average energy content (intensity) of noise over any given period. Many communities use 24-hour descriptors of noise levels to regulate noise. The day-night average noise level, L_{dn}, is the 24-hour average of the noise intensity, with a 10-dBA "penalty" added for nighttime noise (10 p.m. to 7 a.m.) to account for the greater sensitivity to noise during this period. CNEL, the community equivalent noise level, is similar to L_{dn} but adds an additional five-dBA penalty for evening noise (7 p.m. to 10 p.m.) Another descriptor that is commonly discussed is the single-event noise exposure level, also referred to as the sound-exposure level, expressed as SEL. The SEL describes a receiver's cumulative noise exposure from a single noise event, which is defined as an acoustical event of short duration (0.5 second), such as a backup beeper, the sound of an airplane traveling overhead, or a train whistle. Common noise level descriptors are summarized in Table 3.11-1.

TABLE 3.11-1: COMMON ACOUSTICAL DESCRIPTORS

DESCRIPTOR	DEFINITION
Energy Equivalent Noise Level (L_{eq})	The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.
Minimum Noise Level (L_{min})	The minimum instantaneous noise level during a specific period of time.
Maximum Noise Level (L_{max})	The maximum instantaneous noise level during a specific period of time.
Day-Night Average Noise Level (DNL or L_{dn})	The DNL was first recommended by the U.S. EPA in 1974 as a "simple, uniform and appropriate way" of measuring long term environmental noise. DNL takes into account both the frequency of occurrence and duration of all noise events during a 24-hour period with a 10 dBA "penalty" for noise events that occur between the more noise-sensitive hours of 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours to account for increases sensitivity to noise during these hours.
Community Noise Equivalent Level (CNEL)	The CNEL is similar to the Ldn described above, but with an additional 5 dBA "penalty" added to noise events that occur between the hours of 7:00 p.m. to 10:00 p.m. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated L_{dn}.
Single Event Level (SEL)	The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels.

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called "ambient" environment. In general, the more a new noise exceeds the

previously existing ambient noise level, the less acceptable the new noise will be judged. Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of one dB cannot be perceived by humans;
- Outside of the laboratory, a three-dB change is considered a just-perceivable difference;
- A change in level of at least five dB is required before any noticeable change in community response would be expected. An increase of five dB is typically considered substantial;
- A 10-dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

VIBRATION

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, while vibration is usually associated with transmission through a structure. As with noise, vibration consists of an amplitude and frequency. A person's response to vibration will depend on their individual sensitivity as well as the amplitude and frequency of the source.

Vibration can be described in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities (inches/second). Standards pertaining to perception as well as damage to structures have been developed for vibration in terms of peak particle velocity.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events.

3.11.2 EXISTING SETTING

NOISE-SENSITIVE LAND USES

Noise-sensitive land uses generally include those uses where exposure to noise would result in adverse effects, as well as, uses where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other noise-sensitive land uses include hospitals, convalescent facilities, parks, hotels, places of worship, libraries, and other uses where low interior noise levels are essential.

The Environmental Noise and Vibration Analysis conducted for the proposed Project utilized aerial imagery, NOP comments, and site inspections to identify the potentially-affected sensitive

receptors to the general Project area. It is important to note that it is not necessary to model noise levels at every residence or sensitive receptor in the Project vicinity. Rather, sensitive receptors with similar noise exposure are typically grouped, with one or more representative receptor(s) selected to be applicable to the larger group.

Since sound decreases with distance, it is also normally unnecessary to model receptors at considerable distances from the Project area, particularly if there are closer receptors in the same general direction which are to be analyzed. For example, Shasta Lake is located in close proximity to the Project site, so a receptor representing the lake was included in the analysis. However, because Whiskytown Lake (and visitor center) is located over nine miles from the Project site and dramatically shielded by intervening topography, it was not necessary to include this location as a sensitive receptor. Plus, if no noise impacts are identified at closer receptors, it can normally be concluded that a similar finding would occur at the more distant receptors. Conversely, if impacts are identified at closer receptors, often times mitigation implemented for those closer receptors would benefit the more distant receptors as well.

Exceptions to this general rule occur when there are considerable differences in topographic screening between the closer and more distant receptors. In such cases, a closer receptor which is topographically shielded could have a lower Project noise exposure than a more distant unshielded receptor. Another exception would occur if the mitigation was receptor specific, rather than Project specific.

For this Project, a total of 14 receptor locations were selected to represent existing and proposed future noise-sensitive uses in the immediate and general Project vicinity, including proposed but unbuilt residential developments such as Mountain Gate and Shasta Wine Village. The receptors analyzed in this study are depicted graphically on Figure 3.11-1. A description of each representative receptor location is provided in Table 3.11-2.

TABLE 3.11-2: DESCRIPTION OF REPRESENTATIVE RECEPTORS ANALYZED IN THIS SECTION

RECEPTOR	DESCRIPTION
1	Redding Lakeside Mobile Estates on Bass Road – 1,500 feet northeast of site.
2	Multiple residences on Flintstone Road adjacent to site boundary.
3	Westernmost residence on Flintstone Road adjacent to site boundary.
4	Future Shasta Wine Village on Old Oregon Trail – 2,000 feet east of site.
5	Future residences within Mountain Gate Community closest to site – 400 feet east.
6	Future residences within the Mountain Gate Community – 1,300 feet east of site.
7	Northernmost residence on Black Canyon Road – 515 feet from site boundary
8	Residences on Black Canyon Road – 1100 feet from project boundary, 800 feet from RR tracks.
9	Residences on Walker Lane – 1500 feet from project boundary, 400 feet from RR tracks.
10	Residences on Oliver Street – 1,500 feet south of project boundary.
11	Residences near intersection of Shasta Park Drive and Pickard Street, adjacent to site boundary.
12	Residences on Shasta Park Drive north of White Way – 600 feet south of site boundary
13	Mobile home community on Red Bud Lane – 3500 feet west of site boundary.
14	Digger Bay Marina – 3000+ feet north of site boundary

SOURCE: BOLLARD ACOUSTICAL CONSULTANTS, INC., AUGUST 2012.

BASELINE AMBIENT NOISE ENVIRONMENT

The existing ambient noise environment in the immediate Project vicinity is defined by local railroad activity, distant traffic, and natural sounds (wind, birds, insects, etc.). To quantify the existing ambient noise environment in the Project area at representative residential receivers near the Project site, continuous ambient noise level measurements were conducted at five locations shown on Figure 3.11-2 on October 28-29, 2009. To supplement that data, short-term ambient noise monitoring was also conducted at two additional locations on April 25, 2012. The relationship of the ambient noise measurement locations to the modeled representative receptors are provided in Table 3.11-3.

TABLE 3.11-3: DESCRIPTION OF AMBIENT NOISE MEASUREMENT LOCATIONS

MEASUREMENT SITE	REPRESENTED RECEIVER(S)	LOCATION (GPS)		MEASUREMENT DATES
		LATITUDE	LONGITUDE	
1	R3, R5	40˚ 42’ 33.40” N	122˚ 21’ 2.90” W	October 28-29, 2009
2	R6-R9	40˚ 41’ 44.63” N	122˚ 21’ 26.85” W	October 28-29, 2009
3	R10	40˚ 41’ 31.54” N	122˚ 22’ 2.59” W	October 28-29, 2009
4	R11	40˚ 41’ 45.61” N	122˚ 22’ 56.37” W	October 28-29, 2009
5	R14	40˚ 42’ 59.68” N	122˚ 23’ 15.70” W	October 28-29, 2009
A	R1, R2, R4	40˚ 42’ 41.96” N	122˚ 20’ 21.30” W	April 25, 2012
B	R12, R13	40˚ 41’ 16.61” N	122˚ 23’ 12.97” W	April 25, 2012

SOURCE: BOLLARD ACOUSTICAL CONSULTANTS, INC., AUGUST 2012.

Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used to complete the ambient noise level measurement surveys. The meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 (Precision) sound measurement equipment (ANSI S1.4).

Numerical summaries of the ambient noise level measurements are provided in Table 3.11-4. The Table 3.11-4 data include average noise levels recorded for both daytime and nighttime hours (L_{max}, L_{eq}, L50, L90). Appendices B & C of the Environmental Noise and Vibration Analysis (attached as Appendix T) show complete tabular and graphical representations of the results, respectively.

TABLE 3.11-4: SUMMARY OF AMBIENT NOISE MEASUREMENTS

MEASUREMENT SITE	L_{DN}	AVERAGE MEASURED NOISE LEVEL, DB (RANGE)			
		L_{MAX} (RANGE)	L_{EQ} (RANGE)	L_{50} (RANGE)	L_{90} (RANGE)
Daytime (7 a.m. to 10 p.m.)					
1	64	72 (48-91)	63 (37-70)	40 (33-46)	37 (31-43)
2	47	58 (50-65)	42 (37-46)	39 (35-42)	36 (33-40)
3	44	57 (42-80)	43 (31-52)	31 (28-37)	28 (25-30)
4	41	59 (53-74)	41 (31-50)	32 (27-38)	28 (24-35)
5	64	68 (41-83)	55 (26-61)	37 (23-58)	29 (21-53)
A	N/A	80	59	52	40
B	N/A	73	51	47	45
Nighttime (10 p.m. to 7 a.m.)					
1	64	60 (50-86)	55 (39-63)	39 (38-43)	35 (34-38)
2	47	52 (45-63)	40 (36-46)	37 (35-38)	33 (31-36)
3	44	42 (33-62)	35 (24-43)	25 (23-31)	23 (21-27)
4	41	49 (38-53)	31 (26-33)	29 (25-33)	26 (23-31)
5	64	64 (40-81)	58 (25-64)	40 (24-59)	28 (22-53)

Notes:

1. See Figure 3.11-2 for ambient noise measurement locations.
2. L_{dn} Values shown represent 24-hour weighted averages, so the levels shown for both daytime and nighttime periods are similar but not intended to imply that L_{dn} is computed separately for daytime and nighttime periods.
3. Short-Term monitoring Sites A & B were monitored for a single daytime-period only. As a result, the computation of L_{dn} cannot be made for those locations.

SOURCE: BOLLARD ACOUSTICAL CONSULTANTS, INC., AUGUST 2012.

The Table 3.11-4 data indicate that baseline ambient noise levels present during the ambient noise measurement period were fairly low at Sites 2, 3 and 4, and elevated at Sites 1 and 5. At Site 1, the

elevated average (L_{eq}) and maximum (L_{max}) noise readings were due to the passage of several trains near the monitoring station. At Site 5, the elevated measured average (L_{eq}) and maximum (L_{max}) noise levels are believed to have been affected both by nearby traffic on Digger Bay Road and unidentified sources near the microphone (inspection of Appendix C-5 indicates unusual noise activity between the hours of 1 am and 8 am at Site 5). At Sites 2, 3 and 4, the remote location of the monitors at positions somewhat removed from significant sources of noise led to the lower ambient conditions. At the more remote locations which are removed from major local noise sources, it is reasonable to assume that the ambient noise environment would be comparable to Site 4, which is also removed from major noise sources. After removal of the anomalous data collected at Site 5, and inspection of the Appendix C data, daytime average ambient noise levels can generally be characterized as ranging from 40 to 50 dB L_{eq} in the absence of railroad noise, and nighttime average ambient noise levels can generally be characterized as ranging from 30-40 dB L_{eq} in the absence of railroad noise. These ranges are approximate, but provide a reasonable representation of existing ambient conditions in the immediate vicinity of the Project site.

Existing Traffic Noise Environment

To describe existing noise levels due to traffic, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The Model is based on the Calveno reference noise factors for automobiles, medium trucks, and heavy trucks – with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the area. The Model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. The day/night distribution of traffic is factored into the Model calculations to assess noise exposure in terms of L_{dn}.

Traffic volumes and percentages of truck usage for existing conditions were obtained from Caltrans traffic volumes and truck traffic. Table 3.11-5 shows the predicted existing traffic noise levels in terms of L_{dn} at a reference distance of 100 feet from the centerlines of the primary Project-area roadways. This is considered to be the baseline condition. A listing of the FHWA Model input data for existing conditions is provided in Appendix D of the Environmental Noise and Vibration Analysis.

TABLE 3.11-5: SUMMARY OF EXISTING (2007) TRAFFIC NOISE EXPOSURE FOR LOCAL AREA ROADWAYS

ROADWAY	SEGMENT	L_{DN}, dB @100 FEET	60 dB L_{DN} CONTOUR, FEET
Interstate 5	North of Old Oregon Trail	76	1,103
Interstate 5	Old Oregon Trail to State Route 151	76	1,131
Interstate 5	State Route 151 to State Route 273	75	1,061
Interstate 5	State Route 273 to State Route 299	77	1,261
Interstate 5	State Route 299 to State Route 44	77	1,360
Interstate 5	South of State Route 44	79	1,720
State Route 151	West of Interstate 5	66	271
State Route 273	South of Interstate 5	66	265
State Route 279	East of Interstate 5	70	472
State Route 44	East of Interstate 5	74	814

SOURCES: CALTRANS TRAFFIC VOLUMES (AADT) AND BOLLARD ACOUSTICAL CONSULTANTS, INC.

The extent to which the existing ambient noise environment at existing noise-sensitive land uses located in the general Project area are affected by existing traffic noise depends primarily on their proximity to the roadways shown in Table 3.11-5 and the degree of roadway shielding provided by intervening topography. As such, the Table 3.11-5 data is not intended to represent the actual noise exposure of each resident located near the Table 3.11-5 roadways. Rather, it is provided to establish general baseline noise levels at unshielded locations normalized to a distance of 100 feet from the roadway centerline for subsequent comparison of similar traffic noise levels for Project conditions.

Existing Railroad Noise Environment

To assess the existing and projected future railroad noise environment at the Project site, a combination of noise level measurements, existing railroad noise level data for this area, and accepted railroad noise-prediction algorithms were utilized. Based on a combination of historical data and normalized reference noise level data collected at noise measurement Sites 1 and 3 (See Figure 3.11-1), the mean Sound Exposure Level (SEL) for trains passing the Project area was assessed to be approximately 100 dB SEL at a distance of 100 feet from the railroad tracks, with a maximum noise level of approximately 95 dB L_{max} at that 100-foot reference distance. Where railroad grade crossings occur, such as within the City of Shasta Lake, SEL values are typically on the order of five dB higher due to the usage of warning horns. Based upon previous discussions with the UPRR officials and Bollard Acoustical Consultants, Inc. file data, operations on this line consist of approximately 15 trains per day, randomly distributed throughout the day and nighttime hours.

To relate railroad noise level and operational information to Day/Night Average noise levels (L_{dn}), the following formula is used:

$$_{Ldn} = SEL + 10 \log N_{eq} - 49.4, \text{ dB, where:}$$

SEL is the mean SEL of the event, N_{eq} is the sum of the number of daytime events (7 a.m. - 10 p.m.) per day plus 10 times the number of nighttime events (10 p.m. - 7 a.m.) per day, and 49.4 is 10 times the logarithm of the number of seconds per day. The results of this analysis indicate that existing L_{dn} value at an unshielded location 100 feet from the tracks computes to 69 dB L_{dn}. At locations in proximity to grade crossings, L_{dn} values on the order of 74 dB L_{dn} at 100 feet would be expected. As noted previously, the computed L_{max} at that 100-foot distance would be approximately 95 dB during the loudest portion of the train passage.

Railroad noise exposure at existing residences in the Project vicinity depends on the proximity of those residences to the railroad tracks and the degree of natural shielding provided by intervening topography between the residence and railroad tracks. It should be noted that, although the ambient noise environment in the immediate vicinity of the railroad tracks increases substantially approximately 15 times per day for a period of one to two minutes during each train passage (depending on train length and speed), the remainder of the time ambient conditions near the railroad tracks were measured to be considerably lower.

BASELINE VIBRATION ENVIRONMENT

The existing ambient vibration environment in the immediate Project vicinity is extremely low, as would be expected in a rural area with no appreciable sources of local vibration other than very near the railroad tracks during brief train passages. To quantify the existing ambient vibration environment in the immediate Project vicinity, short-term vibration measurements were conducted at the five locations shown on Figure 3.11-2 using a Larson Davis Laboratories Model HVM vibration meter and a PCB Piezotronics Model 356B08 vibration transducer. Because there were no identified sources of existing vibration present during the vibration monitoring, measured vibration levels were well below the threshold of perception as expected. Specifically, peak particle velocities representing the sum of all peak vibration levels along the x, y and z axes, were measured to range from 0.005 to 0.013 inches per second.

3.11.3 REGULATORY SETTING AND SIGNIFICANCE CRITERIA

STATE OF CALIFORNIA REGULATIONS

California General Plan Guidelines

The State of California regulates vehicular and freeway noise affecting classrooms, sets standards for sound transmission and occupational noise control, and identifies noise insulation standards and airport noise/land-use compatibility criteria. The *State of California General Plan Guidelines* (State of California 2003), published by the Governor's Office of Planning and Research (OPR), also provides guidance for the acceptability of projects within specific CNEL contours. The guidelines also present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

SHASTA COUNTY REGULATIONS

Shasta County General Plan

In California, cities and counties are required to adopt a noise element as part of their general plan. (Govt. Code § 65302.) Cities and counties can also adopt noise control requirements within their zoning ordinances or as a separate noise ordinance. The Project site is located in Shasta County, which has a Noise Element. Applicable noise-level criteria for Shasta County are discussed below.

The objectives of the Shasta County General Plan Noise Element are:

N-1 To protect County residents from the harmful and annoying effects of exposure to excessive noise.

N-2 To protect the economic base of the County by preventing incompatible land uses from encroaching upon existing or programmed land uses likely to create significant noise impacts.

N-3 To encourage the application of state of the art land use planning methodologies in areas of managing and minimizing potential noise conflicts.

The following noise policies, some of which are excerpted or summarized, of the Shasta County General Plan are relevant to the proposed Project:

N-b Noise likely to be created by a proposed non-transportation land use shall be mitigated so as not to exceed the noise level standards of Table N-IV [of the Shasta County General Plan] as measured immediately within the property line of adjacent lands designated as noise-sensitive. . . .

Note: For the purposes of the Noise Element, transportation noise sources are defined as traffic on public roadways, railroad line operations and aircraft in flight. Control of noise from these sources is preempted by Federal and State regulations. Other noise sources are presumed to be subject to local regulations, such as a noise control ordinance. Non-transportation noise sources may include industrial operations, outdoor recreation facilities, HVAC units, loading docks, etc.

N-c Where proposed non-residential land uses are likely to produce noise levels exceeding the performance standards of Table N-IV [of the Shasta County General Plan] upon existing or planned noise-sensitive land uses, an acoustical analysis shall be required as part of the environmental review process so that appropriate noise mitigation may be included in the project design. . . .

N-d The feasibility of proposed projects with respect to existing and future transportation noise levels shall be evaluated by comparison to (General Plan) Figure N-1 and (General Plan) Table N–VI.

N-f Noise created by new transportation sources shall be mitigated to satisfy the levels specified in Table N-VI [of the Shasta County General Plan] at outdoor activity areas and/or interior spaces of existing noise-sensitive land uses. . . .

N-i Where noise mitigation measures are required to achieve the standards of Tables N-IV and N-VI [of the Shasta County General Plan], the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered a means of achieving compliance with the noise standards only after all other practical design-related noise mitigation measures have been integrated into the project.

For residential uses affected by transportation noise sources (i.e., off-site traffic), the County's Noise Element identifies 60 dB as an acceptable noise exposure limit for the Day-Night Average Noise Level (L_{dn}). This is consistent with the State of California standard recommended for transportation noise sources.

For residential uses affected by non-transportation (stationary or operational) noise sources (i.e., on-site aggregate extraction and processing), the Shasta County General Plan establishes performance standards as presented in Table 3.11-6. For this Project, the evaluation period was those hours during which on-site equipment would be operating, including maximum truck traffic operations. According to the Shasta County General Plan Noise Element each of the noise level standards specified in Table 3.11-6 shall be reduced by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. The County can impose noise level standards which are more restrictive than the Table 3.11-6 standards based upon determination of existing low ambient noise levels. In addition, in rural areas where large lots exist, the exterior noise level standard shall be applied at a point 100 feet away from any residence.

TABLE 3.11-6: (TABLE N-IV OF THE SHASTA COUNTY GENERAL PLAN) NOISE LEVEL PERFORMANCE STANDARDS FOR NEW PROJECTS AFFECTED BY OR INCLUDING NON-TRANSPORTATION SOURCES

NOISE LEVEL DESCRIPTOR	DAYTIME (7 A.M. TO 10 P.M.)	NIGHTTIME (10 P.M. TO 7 A.M.)
Hourly L_{eq}, dB	55	50

SIGNIFICANCE CRITERIA

Noise Criteria

CEQA guidelines require assessment of a Project's noise impacts relative to both established local noise standards and existing noise conditions without the Project. The local noise standards of Shasta County were described in the previous section. This section pertains to criteria for assessing the significance of Project-related increases in existing ambient noise conditions.

While CEQA requires that noise impacts be assessed relative to ambient noise levels which are present without the Project, it should be noted that audibility is not a test of significance according to CEQA. If this were the case, any Project which added any audible amount of noise to the environment would be considered unacceptable according to CEQA. Because every physical process creates noise, whether by the addition of a single vehicle on a roadway, or an additional tractor in an agricultural field, the use of audibility alone as a significance criterion would be unworkable. CEQA therefore requires a substantial increase in noise levels before identification of noise impacts, not simply an audible change.

While the CEQA guidelines do not provide numerical thresholds for use in determining the significance of Project-related noise level increases, it is generally recognized that an increase of at least three dB for similar noise sources is usually required before most people will perceive a change in noise levels, and an increase of six dB is required before the change will be clearly noticeable (*Egan, Architectural Acoustics, McGraw Hill*). Where the new source of noise differs from existing noise levels, a perceptible change may be observed with lower increases in ambient noise levels due to the new source having different frequency characteristics than existing ambient conditions.

The Federal Interagency Commission on Noise (FICON) has developed a graduated scale for guidance in the identification of the significance of Project-related noise level increases. Table 3.11-7 was developed by FICON as a means of developing thresholds for impact identification for Project-related noise level increases. The rationale for the graduated scale is that test subjects' reactions to increases in noise levels varied depending on the starting level of the noise. Specifically, with lower ambient noise environments, such as those below 60 dB L_{dn}, a larger increase in noise levels was required to achieve a negative reaction than was necessary in more elevated noise environments.

TABLE 3.11-7: SIGNIFICANCE OF CHANGES IN NOISE EXPOSURE

AMBIENT NOISE LEVEL WITHOUT PROJECT, DB L_{DN}	INCREASE REQUIRED FOR SIGNIFICANT IMPACT, DB
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

SOURCE: FEDERAL INTERAGENCY COMMITTEE ON NOISE (FICON)

Based on the FICON research, a five dB increase in noise levels due to a Project is required for a finding of significant noise impact where ambient noise levels without the Project are less than 60 dB L_{dn}. Where pre-Project ambient conditions are between 60 and 65 dB L_{dn}, a 3 dB increase is applied as the standard of significance. Finally, in areas already exposed to higher noise levels – specifically pre-Project noise levels in excess of 65 dB L_{dn} – a 1.5 dB increase is considered by FICON as the threshold of significance.

For this EIR analysis, it is assumed that a Project-related noise impact would occur if noise level increases from on-site Project-related activities would exceed the Shasta County Noise criteria presented in Table 3.11-6, or if Project-generated noise levels would generally cause noise level increases in excess of the FICON thresholds shown above in Table 3.11-7.

Groundborne Vibration Criteria

There are no federal, state, or local regulatory standards for ground-borne vibration. However, various criteria have been established to assist in the evaluation of vibration impacts. For instance, the California Department of Transportation (Caltrans) has developed vibration criteria based on potential structural damage risks and human annoyance. Caltrans-recommended criteria for the evaluation of groundborne vibration levels, with regard to structural damage and human annoyance, are summarized in Table 3.11-8 and Table 3.11-9, respectively. The criteria differentiate between transient and continuous/frequent sources. Transient sources of ground-borne vibration include intermittent events, such as blasting; whereas, continuous and frequent events would include the operations of equipment, including construction equipment, and vehicle traffic on roadways (Caltrans 2002, 2004).

The ground-borne vibration criteria recommended by Caltrans for evaluation of potential structural damage is based on building classifications, which take into account the age and condition of the building. For residential structures and newer buildings, Caltrans considers a minimum peak-particle velocity (ppv) threshold of 0.25 inches per second (in/sec) for transient sources and 0.04 in/sec for continuous/frequent sources to be sufficient to protect against building damage. Continuous ground-borne vibration levels below approximately 0.02 in/sec ppv are unlikely to cause damage to any structure. In terms of human annoyance, continuous vibrations in excess of 0.04 in/sec ppv and transient sources in excess of 0.25 in/sec ppv are identified by Caltrans as the minimum perceptible level for ground vibration. Short periods of ground vibration in excess of 2.0 in/sec ppv can be expected to result in severe annoyance to people. Short periods

of ground vibration in excess of 0.1 in/sec ppv (0.2 in/sec ppv within buildings) can be expected to result in increased levels of annoyance (Caltrans 2002, 2004).

TABLE 3.11-8: DAMAGE POTENTIAL TO BUILDINGS AT VARIOUS GROUNDBORNE VIBRATION LEVELS

STRUCTURE AND CONDITION	VIBRATION LEVEL (IN/SEC PPV)	
	TRANSIENT SOURCES	CONTINUOUS/FREQUENT INTERMITTENT SOURCES
Extremely Fragile Historic Buildings, Ruins, Ancient Monuments	0.12	0.08
Fragile Buildings	0.2	0.1
Historic and Some Old Buildings	0.5	0.25
Older Residential Structures	0.5	0.3
New Residential Structures	1.0	0.5
Modern Industrial/Commercial Buildings	2.0	0.5
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. *Source: Caltrans 2002, 2004*		

TABLE 3.11-9: ANNOYANCE POTENTIAL TO PEOPLE AT VARIOUS GROUNDBORNE VIBRATION LEVELS

HUMAN RESPONSE	VIBRATION LEVEL (IN/SEC PPV)	
	TRANSIENT SOURCES	CONTINUOUS/FREQUENT INTERMITTENT SOURCES
Barely Perceptible	0.04	0.01
Distinctly Perceptible	0.25	0.04
Strongly Perceptible	0.9	0.10
Severe	2.0	0.4
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. *Source: Caltrans 2002, 2004*		

In addition to the criteria described above, U.S. Bureau of Mines Report of Investigations 8507 (1980) "Structure Response and Damage Produced by Ground Vibrations from Surface Mine Blasting"), recommend that the peak particle velocity generated from any blast shall not exceed 0.5 inches per second for vibration frequencies below 40 hertz, and 2.0 inches per second for vibration frequencies of 40 hertz or more, measured directly between the nearest residence and the blast site. In addition, that publication recommends that maximum air over-pressure ("air blast") generated from this blast shall not exceed 0.014 pounds per square inch (psi), measured directly between the nearest residence and the blast site (Source: U.S. Bureau of Mines Report of Investigations 8485 (1980) "Structure Response and Damage Produced by Airblast from Surface Mining)."

3.11.4 NOISE GENERATION OF THE PROPOSED PROJECT

PROJECT-RELATED NOISE SOURCES

The most significant noise-producing components of the proposed Project consist of the following sources and/or activities:

- Asphalt batch plant and related equipment operation.
- Concrete ready-mix plant and related equipment operation.
- Aggregate pre-processing area equipment (primary [jaw] crushing for subsequent transfer of aggregate materials via conveyor to main aggregate processing plant)
- Main aggregate processing plant (secondary and tertiary crushing, screening, washing) and related equipment operation.
- Recycle plant and related equipment.
- Aggregate material excavation (drilling, blasting and digging) and related equipment operation.
- Truck and rail load-out facilities and related equipment operation.

Locations of Major On-Site Project Noise Sources

Figure 2-10 in the Project Description chapter of this EIR shows the overall site plan and locations of various noise-producing components of the Project. As noted by this figure, Project noise generation would not be concentrated in any single area of the Project site, as excavation, pre-processing, processing, and load-out (both by truck and rail), would all occur at different locations on the site. As a result, the subsequent analysis of Project noise generation and the effects of that noise on the nearest noise-sensitive receptors accounted for the distinct noise generation within each area.

Proposed Hours of Operation

Table 2-2 in the Project Description chapter of this EIR identifies the planned hours of operation for various aspects of the Project. However, as identified in Chapter 2.0, under certain conditions, such as during emergencies or Projects which specifically require materials during nighttime hours, operations may occur at any time during the day or night. As a result, this analysis does not place any restrictions on operating hours (assumes noise may be generated 24 hours per day, seven days per week), which addresses a conservative worst-case scenario with respect to potential noise impacts.

Reference Noise Levels for On-Site Noise Sources

Table 3.11-10 shows the reference noise levels corresponding to the operation of the proposed equipment that would be used at the Project site based on extensive aggregate industry noise level data collected by Bollard Acoustical Consultants in recent years for similar equipment. Table 3.11-10 also shows the approximate distances to the 55 and 50 dB L_{eq} noise contours for each on-site noise source without correction for shielding by intervening topography which exists between most of the proposed Project area noise sources and nearby residences. As a result, the contour distances should be considered worst-case.

TABLE 3.11-10: REFERENCE NOISE LEVEL DATA AND PREDICTED NOISE CONTOURS

NOISE SOURCE	REFERENCE NOISE LEVEL AT 100 FEET[1]	DISTANCE TO UNMITIGATED / UNSHIELDED NOISE CONTOURS, FEET[2]	
	(L_{EQ}, dB)	55 dB L_{EQ} (DAY)	50 dB L_{EQ} (NIGHT)
Excavation	80	1,400	2,200
Primary (Jaw) Crushing	85	2,200	3,200
Processing Plant (Secondary & Tertiary Crushing/Screening)	85	2,200	3,200
Hot-Mix Asphalt Plant	80	1,400	2,200
Ready-Mix Concrete Plant	75	850	1,400
Recycle Plant	78	1,150	1,800
Rail Car Loading	80	1,400	2,200
Load-Out (Haul Trucks Loaded at Main Processing Plant Area	70	500	850

Notes:

1- Average noise levels represent any 1-hour period and assume continuous operation of the noise sources.

2- The locations of the noise contours were computed from the reference levels assuming standard spherical spreading loss (-6 dB per doubling of distance) and a 1.5 dB reduction per 1,000 feet for atmospheric absorption and ground attenuation.

The distances to noise contours shown in this table DO NOT include corrections for shielding of these noise sources by existing topography. A discussion of such shielding is provided later in this analysis.

SOURCES: BOLLARD ACOUSTICAL CONSULTANTS, INC., AUGUST 2012.

Distances from Nearest Residences to On-Site Project Noise Sources

Figures 3.11-1 and 3.11-2 were used to scale the source-to-receiver distances needed to project the reference noise levels shown in Table 3.11-10 to the nearest residences. Table 3.11-11 summarizes the approximate distances from each receiver to the various noise-generating Project components identified in Table 3.11-10.

TABLE 3.11-11: SUMMARY OF APPROXIMATE DISTANCES FROM ON-SITE NOISE SOURCES TO NEAREST RECEPTORS

RECEIVER	SOURCE TO RECEIVER DISTANCE, FEET			
	EXCAVATION	JAW CRUSHING	PLANT OPERATIONS	RAIL OPERATIONS
1	11,100	103,00	8,000	7,500
2	9,300	7,600	5,900	4,900
3	8,400	6,600	4,800	3,900
4	10,700	10,100	8,400	7,600
5	5,300	4,500	2,700	1,800
6	5,900	5,500	4,700	3,600
7	4,500	3,600	4,100	4,000
8	4,000	4,400	5,300	4,500
9	4,200	3,800	5,000	5,200
10	2,900	3,800	5,500	6,200
11	1,900	4,200	6,000	6,900
12	3,100	5,100	7,600	4,800
13	6,400	8,500	10,600	11,100
14	5,500	11,000	11,000	11,700

Notes:

- The distances to the nearest noise-sensitive uses were obtained from USGS mapping and the locations of Project noise sources and identified representative sensitive receptors shown on Figures 3.11-1 and 3.11-2.
- Plant Operations includes the main crushing/screening plant, asphalt plant, ready-mix plant, and recycle plant.
- Rail Operations includes rail car loading and rail engine idle.
- The closest excavation locations were assumed to be at the mining border closest to the affected receiver.

SOURCES: BOLLARD ACOUSTICAL CONSULTANTS, INC., AUGUST 2012.

Evaluation of Topographic Shielding Between On-Site Noise Sources and Nearest Residences

As noted previously, there is considerable topographic relief within the Project site and surrounding areas. At locations where existing topography would intercept line of sight between Project noise sources and nearby residences, a perceptible decrease in Project noise levels would result. The extent of the decrease depends on the degree of intervening shielding. To visually depict the extent by which intervening topography would provide shielding of Project noise sources at nearby residences, the Terrain Navigator computer program was utilized. That program produces line of sight drawings between sources and receptors using USGS topographic maps, and allows for increasing the height above ground of both the noise source and receptor, which was

performed for this analysis as appropriate for each source type. Figures 3.11-3a through 3.11-3c show representative Terrain Navigator cross-sections for this Project.

3.11.5 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Criteria for determining the significance of noise impacts were developed based on information contained in the California Environmental Quality Act Guidelines (CEQA Guidelines, Appendix G). According to those guidelines, a Project may have a significant effect on the environment if it would result in the following conditions:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies.
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
- A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project.
- A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project.
- For a Project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the Project expose people residing or working in the Project area to excessive noise levels.
- For a Project within the vicinity of a private airstrip, would the Project expose people residing or working in the Project area to excessive noise levels.

As described in the Initial Study, the Project site is not located within an airport land use plan or within two miles of a public airport or private airstrip. Implementation of the proposed Project would not affect airport operations, nor would implementation of the proposed Project result in the development or relocation of any noise-sensitive land uses within two miles of any airport or airstrip. As a result, implementation of the proposed Project would not result in increased exposure of individuals to excessive aircraft noise levels associated with the existing airport. There are no existing private airstrips within two miles of the Project area. For these reasons, noise impacts associated with existing airports and airstrips were identified as having no impact and will not be further discussed in this section.

IMPACTS AND MITIGATION MEASURES

Impact 3.11-1: Noise associated with on-site Project operations may exceed applicable General Plan or CEQA ambient noise standards at nearby sensitive receptors under near-term and cumulative conditions (Significant and Unavoidable)

To Project would operate year-round, 24-hours per day, seven days per week. The SoundPlan model was used to analyze Project-generated noise levels at each of the representative receptor locations surrounding the Project site. SoundPlan is a three-dimensional noise prediction model capable of accounting for variations in noise sources, receiver locations, intervening ground topography, ground absorption, intervening structures, vegetation, and atmospheric conditions.

Table 3.11-12 summarizes the SoundPlan predicted noise exposure from on-site noise sources at the nearest identified noise-sensitive receivers, including the effects of intervening topography. Table 3.11-12 also compares the predicted noise levels against the daytime and nighttime average noise level standards of Shasta County (Table 3.11-6). The shaded cells of Table 3.11-12 indicate levels which could exceed the County noise standards. The Table 3.11-12 data indicate that the Shasta County noise standards are predicted to be satisfied for the majority of noise sources and nearby residences. However, Table 3.11-12 indicates that noise generated during excavation activities could exceed the County's nighttime noise standard at residences represented by Receptor 11, and that cumulative noise from a combination of all noise producing activities would exceed the County's nighttime noise standard, and reach the County's daytime noise standard at Receptor 5. This would be a **potentially significant** impact.

As noted previously, CEQA guidelines (Appendix G), require that noise impacts of a project be evaluated against ambient conditions without the project as well as relative to locally adopted noise standards. In response to this CEQA requirement, Table 3.11-13 was developed to compare project noise levels against existing ambient conditions without the project. The ambient noise levels reported in Table 3.11-4 were used with the FICON guidelines of Table 3.11-7 to establish the noise standards shown in Table 3.11-13.

The Table 3.11-13 data indicate that the Project standards of significance developed relative to ambient conditions are predicted to be satisfied for the majority of noise sources and nearby residences. However, noise generated by primary processing (jaw crushing), excavation, processing plant, rail car loading, and combined sources could exceed existing ambient conditions by five dB or more at the locations indentified by highlighted cells in Table 3.11-13. This would be a **potentially significant** impact.

A discussion of noise mitigation options follows for all sources identified in Tables 3.11-12 and 3.11-12 as potentially exceeding the Project standards of significance.

Figure 3.11-4 illustrates the approximate locations of the cumulative Project noise contours with all sources of noise operating concurrently.

TABLE 3.11-12: SUMMARY OF PREDICTED NOISE LEVELS FROM ON-SITE SOURCES AND ASSESSMENT OF IMPACTS RELATIVE TO COUNTY STANDARDS

Receiver	NOISE EXPOSURE- HOURLY LEQ DB											
	Excavation	**Jaw Crushing**	**Processing Plant**	**Asphalt Plant**	**Ready-Mix Plant**	**Recycle Plant**	**Rail Car Loading**	**Access Road Traffic**	**Rail Engine Idle**	**Cumulative**	**County Daytime Standard**	**County Nighttime Standard**
1	28	28	30	28	19	25	32	40	21	42	55	50
2	29	24	29	27	18	23	31	45-50	22	46-50	55	50
3	30	23	28	25	17	22	29	45-50	21	46-50	55	50
4	30	32	36	32	25	29	32	40	25	44	55	50
5	38	43	49	45	39	43	49	40	44	**55**	55	50
6	36	4	43	39	33	37	42	35	32	49	55	50
7	34	44	39	34	28	32	40	<30	27	47	55	50
8	34	41	37	32	26	30	38	<30	26	45	55	50
9	29	24	31	27	19	23	27	<30	24	36	55	50
10	41	25	27	23	15	20	17	N/A	10	43	55	50
11	**53**	25	31	28	20	24	26	N/A	18	**53**	55	50
12	43	23	21	18	10	14	29	N/A	19	44	55	50
13	28	16	22	19	11	15	15	N/A	7	32	55	50
14	37	11	13	9	2	6	7	N/A	0	37	55	50

Notes:

- Average (Hourly L_{eq}) noise levels represent any 1-hour period and assume continuous operation of each noise source.
- The predicted noise levels were calculated using the reference noise level data in Table 3.11-10 with the SoundPlan Noise Prediction Model.
- Highlighted values indicated levels in excess of the applicable County noise criteria.
- Excavation levels assume a direct line of sight between source(s) and receiver. Once excavation equipment progresses deeper into the mining pit, excavation-related noise levels will be significantly reduced.

SOURCES: BOLLARD ACOUSTICAL CONSULTANTS, INC., AUGUST 2012.

TABLE 3.11-13: SUMMARY OF PREDICTED NOISE LEVELS FROM ON-SITE NOISE SOURCES AND ASSESSMENT OF IMPACTS RELATIVE TO AMBIENT CONDITIONS

Receiver	NOISE EXPOSURE- HOURLY LEQ DB											
	Excavation	Jaw Crushing	Processing Plant	Asphalt Plant	Ready-Mix Plant	Recycle Plant	Rail Car Loading	Access Road Traffic	Rail Engine Idle	Cumulative	CEQA Ambient Daytime Standard	CEQA Ambient Nighttime Standard
1	28	28	30	28	19	25	32	40	21	42	55	45
2	29	24	29	27	18	23	31	**45-50**	22	**46-50**	55	45
3	30	23	28	25	17	22	29	**45-50**	21	**46-50**	55	45
4	30	32	36	32	25	29	32	40	25	44	55	45
5	38	43	**49**	45	39	43	**49**	40	44	**55**	55	45
6	36	40	**43**	39	33	37	**42**	35	32	**49**	50	40
7	34	**44**	39	34	28	32	40	<30	27	**47**	50	40
8	34	**41**	37	32	26	30	38	<30	26	**45**	50	40
9	29	24	31	27	19	23	27	<30	24	36	50	40
10	**41**	25	27	23	15	20	17	N/A	10	**43**	50	40
11	**53**	25	31	28	20	24	26	N/A	18	**53**	50	40
12	43	23	21	18	10	14	29	N/A	19	44	55	45
13	28	16	22	19	11	15	15	N/A	7	32	55	45
14	37	11	13	9	2	6	7	N/A	0	37	50	40

Notes:

- Average (Hourly L_{eq}) noise levels represent any 1-hour period and assume continuous operation of each noise source.
- The predicted noise levels were calculated using the reference noise level data in Table 3.11-10 with the SoundPlan Noise Prediction Model.
- Highlighted values indicated levels in excess of 5 dB over typical daytime and nighttime average ambient noise levels.
- Excavation levels assume a direct line of sight between source(s) and receiver. Once excavation equipment progresses deeper into the mining pit, excavation-related noise levels will be significantly reduced.

SOURCES: BOLLARD ACOUSTICAL CONSULTANTS, INC., AUGUST 2012.

As described above and shown in Tables 3.11-12 and 3.11-13, noise from some on-site activities, or combination of activities, could exceed the Project standards of significance at some existing residences. Tables 3.11-12 and 3.11-13 provide comparisons of calculated Project noise exposure from on-site sources to the applicable noise criteria at each of the closest identified noise-sensitive receivers for both daytime and nighttime operations. Because the noise standards developed relative to ambient conditions are more restrictive than the County's noise standards, more significant impacts were identified relative to Project-related increases in ambient noise levels than relative to compliance with the County's thresholds (Table 3.11-6). As a result, Table 3.11-13 provides the most conservative assessment of Project noise impacts, and indicates that noise impacts from on-site sources may result in the following cases:

1. Cumulative noise from all on-site sources could exceed the nighttime thresholds at receiver 2, 3, 5-8, 10, and 11.

2. Cumulative noise from all on-site sources could exceed the daytime thresholds at receiver 11.

3. The source of noise responsible for exceedences of the nighttime threshold at receiver 2 is access road traffic. The sources of noise responsible for the exceedances of the nighttime thresholds at receivers 5-8 are pre-processing (Jaw Crushing), the processing plant and rail car loading. The source of noise responsible for exceedence of the nighttime threshold at receiver 10 and 11 is initial excavation of the South Pit.

4. The only identified exceedance of the daytime thresholds would be attributable to initial excavation activities of the South Pit affecting Receptor 11.

The impacts described above result from relatively minor exceedances of the Project standards of significance during daytime operations and more substantial exceedances of the Project thresholds during nighttime operations. Noise mitigation options are provided below to reduce potential noise impacts of the Project to less than significant levels.

Because the degree of noise reduction required of each source to fully mitigate noise impacts at the affected receivers varies by location, the evaluation of mitigation measures is geared towards the most impacted receiver(s). The following source-specific noise mitigation measures are intended to not only reduce noise to a level below the applicable significance criteria for each receiver while the source is operating individually, but to also reduce noise impacts when noise from several sources is combined. As a result, although a given source may only require five dB of noise reduction to achieve the applicable criterion, when added to other sources, additional noise reduction may be required to maintain noise levels below those same thresholds.

In general, there are three primary avenues for noise mitigation: (1) treatment of the noise source; (2) treatment of the sensitive receiver; or (3) treatment of the path in between. Treatment of the

noise source involves reducing the sound output of the various Project components. Treatment of the receiver involves providing additional acoustical insulation of the affected residential structures (e.g., improved windows and doors, appropriate weather-stripping, other building facade upgrades, etc.). Treatment of the sound transmission path involves either increasing the length of the path through the creation of additional setbacks between the noise source and receiver, or constructing a physical barrier which intercepts line of sight between the noise source and receiver. The following section provides specific mitigation recommendations for the various aspects of the Project identified as either individually, or collectively contributing to a significant noise impact at an existing residence.

Main Processing Plant Noise Mitigation

Noise generated by main processing plant equipment is individually predicted to exceed the ambient nighttime standards at receivers 5 and 6. In order to ensure satisfaction with the Project standards of significance with respect to noise, the following specific measure would be required to reduce main processing plant noise levels at all potentially impacted receptors. The following specific measure is required to reduce this impact to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.11-1(a):

a) *If existing topography and/or natural vegetation, not removed as part of proposed site disturbance, does not provide line-of-sight interception between the equipment within the main processing and load-out facility, additional line-of-sight noise reduction measures shall be implemented. Line-of-sight noise reduction measures are considered any measure that impedes the view of noise-producing elements of stationary equipment within the secondary and ancillary processing and load-out area from Receivers R-5 and R-6. Line-of-sight noise reduction measures may include, but are not limited to, the following measures:*

    - *Aggregate stockpiles;*
    - *Earthen Berm; and/or*
    - *Barriers (e.g. straw hay bales, fencing, suspended acoustic curtains).*

b) *Back-up warning devices on mobile equipment (i.e. front-loaders, dozers, etc.), operating within the secondary and ancillary processing and load out area shall utilize radar or strobe-based warning mechanisms during nighttime hours provided such equipment complies with all regulatory requirements and can be safely utilized at this facility.*

Pre-Processing (Jaw Crushing) Noise Mitigation

As indicated in Table 3.11-13, noise generated by pre-processing (jaw) crushing operations could individually exceed the nighttime ambient noise standard at Receptors 7 and 8. In order to ensure satisfaction with the Project standards of significance with respect to noise, the following specific measure is required to reduce noise generated by pre-processing area (jaw crushing) noise sources at the residences represented by Receptors 7 and 8. The following specific measure is required to reduce this impact to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.11-1(b):

a) *If existing topography and/or natural vegetation, not removed as part of proposed site disturbance, does not provide line-of-sight interception between the equipment within the pre-processing area, additional line-of-sight noise reduction measures shall be implemented. Line-of-sight noise reduction measures are considered any measure that impedes the view of noise-producing elements of stationary equipment within the secondary and ancillary processing and load-out area from* Receivers R-7 and R-8*. Line-of-sight noise reduction measures may include, but are not limited to, the following measures:*

- *Aggregate stockpiles;*
- *Earthen Berm; and/or*
- *Barriers (e.g. straw hay bales, fencing, suspended acoustic curtains).*

b) *Back-up warning devices on mobile equipment (i.e. front-loaders, dozers, etc.), operating within the pre-processing (jaw crushing) area shall utilize radar or strobe-based warning mechanisms during nighttime hours provided such equipment complies with all regulatory requirements and can be safely utilized at this facility.*

c) *If line-of-sight noise reduction measures do not reduce noise generated by pre-processing equipment below all applicable thresholds of significance, rubber padding or other sound deadening technology shall be required to be installed on the crushing and screening equipment to mitigate excessive noise.*

Excavation Noise Mitigation

As shown in Table 3.11-13, initial excavation activities at the South Pit could result in exceedance of both daytime and nighttime ambient noise level standards at residences represented by Receptors 10 and 11.

It is important to note that the South Pit excavation noise predictions shown in Table 3.11-13 do not account for shielding which would develop as mining depths increase. Specifically, the

increases in ambient noise levels shown in Table 3.11-13 assume direct line of sight between the excavation noise sources in the South Pit and Receptor 10 and 11. Once excavation equipment is recessed into the South Pit, the pit walls would provide substantial shielding of excavation equipment noise to receivers 10 and 11. As a result, the duration of time during which the exceedances identified in Table 3.11-13 would be limited.

Shielding by pit walls will vary depending on the depth of the equipment in the South Pit, but would provide at least five dB of noise reduction once the pit walls intercept line of sight from noise source to receiver, and approximately one additional dB of noise reduction for each foot of depth thereafter. As a result, the noise impacts identified in Table 3.11-13 for Receptor 10 and 11 pertain to worst-case South Pit excavation locations and elevations, representing conditions which would be present for limited durations in each phase of excavation. Nonetheless, because such South Pit excavation operations are predicted to exceed the ambient significance criteria, potentially significant excavation-related noise impacts were identified for this Project at residences represented by Receptors 10 and 11. The following specific measures are required to reduce this impact to a **less than significant** level.

MITIGATION MEASURES

***Mitigation Measure 3.11-1(c)**:*

a) *The Operator shall limit South Pit land clearing, grading, and excavation operations to daytime hours as defined by the Shasta County General Plan Noise Element. South Pit operations shall be limited to daytime hours until supplemental noise monitoring demonstrates noise levels caused by South Pit operations are below the ambient nighttime noise threshold of 40dBA. The noise monitoring shall be conducted by a qualified acoustical consultant, approved by the Shasta County Department of Resource Management.*

b) *The Applicant shall commence excavation activities that would have direct line of sight to Receptors 10 and 11 on the portion of the pit furthest from the those receptors to maintain the maximum degree of shielding by existing topography for as long as possible.*

Rail Car Loading Noise Mitigation

As shown in Table 3.11-13 rail car loading may exceed nighttime ambient noise levels at Receivers R-5 and R-6. Receiver R-5 is the property line separating the project boundary and a potential future development that is currently undergoing environmental review by the City of Shasta Lake. Receiver R-6 is in the middle of the property proposed for future development. Trains will be delivered to the site by Union Pacific based on their rail schedule and availability. The Applicant does not have control of when trains may be delivered or when trains may leave the site after loading. Therefore, there is no mitigation available (e.g. hours of operation limitation) that could be feasibly implemented by the Applicant. This impact is considered **significant and unavoidable**.

Access Road Traffic Noise

As shown in Table 3.11-13, access road traffic may exceed ambient nighttime noise standards. Typical Project haul truck traffic would occur during daytime hours. Nighttime haul truck operations is necessary to supply construction materials to road improvements projects conducted at night to alleviate traffic and safety concerns. The following specific measure is required to reduce this impact to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.11-1(d)*: The following mitigation measures shall be included in the project's Conditional Use Permit:*

a) If existing topography and/or natural vegetation, not removed as part of proposed site disturbance, does not provide line-of-sight interception between haul truck traffic and Receivers R-2 and R-3, additional line-of-sight noise reduction measures shall be implemented. Line-of-sight noise reduction measures are considered any measure that impedes the view of noise-producing elements (e.g. haul trucks) from Receivers R-2 and R-3. Line-of-sight noise reduction measures may include, but are not limited to, the following measures:

- *Earthen Berm; and/or*
- *Barriers (e.g. straw hay bales, fencing, suspended acoustic curtains)*

Noise Mitigation for Cumulative Project Operations

As shown in Table 3.11-13, the cumulative contribution of noise from multiple sources such as excavation, jaw crushing, and rail car loading could cause an exceedance of the Project standards of significance at some residences in the immediate Project vicinity. The following measure is required to mitigate Project generated noise; however, given the nature of the round the clock operations and the uncertainty of timing of train arrivals, loading and departures, no mitigation measures can fully reduce the cumulative noise impacts for on-site operations to less than cumulatively considerable.

MITIGATION MEASURES

Mitigation Measure 3.11-1(e)*:*

a) The Operator shall perform supplemental noise monitoring as follows:

1. Supplemental noise monitoring shall occur once per year for the first five years of Project operations, when the north and south pits are opened, and if and when noise complaints are received, and shall be conducted at all receptor locations identified in Table 3.11-13 as having potential noise threshold exceedances.

2. *The noise monitoring shall occur during times of maximum site disturbance and materials processing, so as to reflect the maximum noise levels generated by the Project at a given stage of Project operations.*

3. *The noise monitoring shall be conducted by a qualified acoustical consultant, approved by the Shasta County Department of Resource Management. The cost of the noise monitoring and reporting shall be borne by the Project applicant.*

4. *The results of the noise monitoring shall be submitted to the Shasta County Department of Resource Management within three weeks of the data collection. If exceedances of any applicable noise thresholds are encountered, additional noise mitigation measures shall be developed and implemented, to the extent feasible, in order to reduce noise levels at nearby sensitive receptors (residences) to a level below the thresholds of significance identified in this EIR.*

    i. *Additional noise mitigation measures may include, but are not limited to: construction of additional berms or screening provisions to interrupt direct lines of site between project activities and nearby sensitive receptors.*

SIGNIFICANCE AFTER MITIGATION

The implementation of Mitigation Measures 3.11-1(a) through 3.11-1(d) should reduce excavation, pre-processing (jaw crushing), access road traffic, and processing plant noise levels at receptors 2, 3, 5-8, 10, and 11 below the applicable thresholds of significance. Rail car loading noise levels at receptors 5 and 6 cannot be reduced to a level below applicable thresholds of significance and therefore is considered a **significant and unavoidable** impact. Implementation of Mitigation Measure 3.11-1(e) would provide verification and monitoring of the effectiveness of the noise mitigation program, and would require additional noise mitigation measures, if available and feasible, in the event that noise standards continue to be exceeded. However, as shown in Table 3.11-12 and 3.11-13, the cumulative noise generated by all project activities would exceed the County's nighttime noise standards at two sensitive receptor locations, and result in a cumulative increase in average ambient noise levels greater than five dB at eight receptor locations. Mitigation Measures 3.11-1(a) through 3.11-1(e) would reduce noise impacts to the greatest extent feasible; however, because County and/or ambient noise standards may still be exceeded after implementation of mitigation this impact would be **cumulatively considerable and significant and unavoidable**.

Impact 3.11-2: Blasting activities associated with quarry excavation may result in significant noise levels at nearby sensitive receptors (Less than Significant)

Table 3.11-11 indicates that the nearest noise-sensitive receptor to proposed excavation activities is Receptor 11, located approximately 1,900 feet away. Based on Bollard Acoustical Consultants file data for two different hard rock quarry blasting events conducted at a distance of 1,400 feet, linear peak overpressures associated with blasting events at the Moody Flats Quarry are predicted to be below 110 dB, with A-weighted maximum noise levels below 65 dBA, L_{max}.

Assuming that the maximum noise level from a single blast is as high as 65 dBa, L_{max}, it can also be assumed that the Sound Exposure Level (SEL) would be no more than 75 dBA. This assumption can be made, since the duration of a blast can be characterized as instantaneous, and lasts for less than one second.

Even if it is assumed that up to four blasts occur in a single hour, which would be highly unlikely, the formula for determining the hourly L_{eq} is as follows:

L_{eq} = SEL = 10 times the logarithm of the number of events (N_{eq}) -35.6, where:

The SEL is 75, and the N_{eq} is 4, and 35.6 is 10 times the logarithm of the number of seconds in an hour. The hourly L_{eq} would be 45.4 dBA.

As shown in Table 3.11-6, the daytime noise standard established by the Shasta County General Plan is 55 L_{eq}, dBA. While blasting activities at the Project site would be audible from nearby residences, these activities would not exceed the County's daytime noise threshold of 55 L_{eq}, dBA. Therefore, this would be a **less than significant** impact, and no mitigation is required. It is further noted that blasting activities would only occur during the daytime hours, as required by Mitigation Measure 3.1-5, below. Limiting blasting to the daytime hours would further reduce the potential for nuisance noise impacts at nearby sensitive receptors.

Impact 3.11-3: Blasting activities conducted at the Project site may expose people or structure to excessive or damaging ground-borne vibration levels (Less than Significant with Mitigation)

With the exception of vibration generated by blasting events, the Project is not expected to produce any discernible levels of vibration at sensitive receivers (residences) in the Project vicinity. This is due to the type of equipment that would be used at the site, substantial intervening topography and relatively large distances between the Project operations and potential receivers.

When explosives are used to break rock in a mine or construction project, the blast produces both ground vibration and air overpressure (noise). In most cases the atmosphere selectively absorbs the higher frequencies from a blast, leaving relatively low energy (5 hertz) sound waves to effect structures. If a structure has a natural vibration frequency around 5 hertz, it will respond to the air overpressure by producing higher frequency secondary noise on internal walls. It is this response

from the middle of flat walls in a structure which causes much of the secondary rattling noise and other observed effects such as movement of pictures, clocks, etc.

Most concern about structural damage comes from people who feel the effects while inside their homes. The stress on a structure from a 131.7 dB overpressure produced by a blast is roughly equivalent to the stress produced by a 25 mph wind. The wind isn't as noticeable as the air overpressure due to its slow rate of pressure change and the correspondingly minor or nonexistent rattling, in contrast to the relatively rapid pressure changes produced by air overpressure waves. Air overpressure produced by blasting is expressed in pressure units called decibels (dB). This overpressure can be measured accurately with specialized instruments called seismometers. The U.S. Bureau of Mines has established 134 dB as the recommended "safe level" for blasting-induced air overpressure. As described above under Impact 3.11-2, based on Bollard Acoustical Consultants file data for two different hard rock quarry blasting events conducted at a distance of 1,400 feet, linear peak overpressures associated with blasting events at the Moody Flats Quarry are predicted to be below 110 dB, with A-weighted maximum noise levels below 65 dBA, L_{max}. As such, impacts associated with air overpressure from quarry blasting would be **less than significant**.

With respect to blast induced vibration, the type, sizes, number, depth and timing delay sequence of the charges, as well as the geology of the surrounding area, would all be variables which would affect the transmission of that vibration from the site. Bollard Acoustical Consultants vibration data collected at various northern California hard rock quarries was used to generally estimate the magnitude of vibration which can be expected off site. The highest measured Peak Particle Velocity (PPV) of a hard rock quarry blasting event was 0.11 inches per second measured 1,400 feet from the blast location. Given the assumption that vibration energy is radiating away from the blast site proportional to inverse square law, the level of vibration energy present at 1,900 feet from the mining area (1,900 feet is the distance from the proposed excavation area to the nearest residence) would be less than it would be at 1,400 feet. The resulting PPV then at the nearest identified sensitive areas would, therefore, be less than the 0.1 in/sec PPV vibration threshold for perception, and well below the U.S. Bureau of Mines thresholds for damage to structures. As shown above in Table 3.11-8, transient sources of ground-borne vibration (such as blasting) are not expected to cause structural damage to even the most fragile historic buildings at 0.1 in/sec PPV. As described in Table 3.11-9, transient ground-borne vibrations may be barely perceptible to people in areas surrounding the Project site, but would not be "distinctly perceptible."

Although empirical data indicates that vibration levels will be well within compliance with County requirements, because the geology of the sites where that empirical data was collected may not be representative of conditions present in the project vicinity, impacts associated with ground-borne vibration generated during periodic blasting operations is considered **potentially significant** at the nearest residences.

In order to further ensure that on-site blasting activities do not result in structural damages to nearby properties, or result in significant levels of annoyance, the following mitigation measure is required.

MITIGATION MEASURES

***Mitigation Measure 3.11-3**:*

1) *Blasting shall take place only between the hours of 9:00 a.m. to 4:00 p.m., Monday through Friday day, up to a total of 150 times per year.*

2) *Blasting shall be conducted to meet the following requirements. If there is a discrepancy between standards, the most restrictive standard shall apply:*

   a) *The peak particle velocity ("ground vibration") generated from any blast shall not exceed 0.1 inches per second for vibration frequencies below 40 hertz, and 2.0 inches per second for vibration frequencies of 40 hertz or more, measured directly between the nearest residence and the blast site (Source: U.S. Bureau of Mines Report of Investigations 8507 (1980) "Structure Response and Damage Produced by Ground Vibrations from Surface Mine Blasting").*

   b) *The maximum air over-pressure ("air blast") generated from this blast shall not exceed 0.014 pounds per square inch (psi), measured directly between the nearest residence and the blast site (Source: U.S. Bureau of Mines Report of Investigations 8485 (1980) "Structure Response and Damage Produced by Airblast from Surface Mining)."*

3) *Prior to the first blast, the operator shall establish blast criteria based on the maximum permitted ground vibration and air blast. The blast criteria shall include: the minimum distance between the nearest shot hole and the site of damage concern (i.e. residential structures), the maximum total amount of explosive used in a detonation sequence, the minimum and maximum depth of the blasting holes, the minimum depth and type of stemming of the holes, the spacing of the hole grid, the maximum number of pounds of explosive per hole, the maximum number of pounds of explosive per (time) delay, and the number of milliseconds per delay in each direction on the grid. The operator shall submit a report to the Planning Division containing the above information prior to the first blast.*

4) *The operator shall notify the Planning Division at least two weeks prior to the first blast.*

5) *A qualified independent consultant shall record the effect of the first blast with a minimum of three seismometers and three air pressure blast recording instruments set up at various locations between the blast site and nearby residential structures. The consultant shall submit a report to the Shasta County Planning Division within two weeks of the first blast. The report shall include copies of the recording instrument tapes of the blast, and an analysis of the recording data to determine whether the blast met the criteria of this*

resolution. First blast recordings and monitoring shall occur for blasting activities in both the North Pit and South Pit, given the differences in geologic formations in these two areas.

6) *Based on the blast monitoring data and analysis of the first blast, the blasting criteria shall be revised, if necessary, to ensure that the maximum levels of ground vibration and air blast are not exceeded. The operator shall report to the Planning Division whether and how the blasting criteria have been revised. All subsequent blasts occurring within the first year of blasting activities shall be monitored by the Applicant, and all future blasts shall comply with the blast criteria.*

7) *If complaints are received from the nearby residences, the County may require annual or more frequent blast monitoring by a qualified independent consultant.*

8) *The operator shall obtain, and maintain current, a blasting permit from the Shasta County Sheriff's Office prior to any blasting activities, and shall comply with all terms and conditions of the permit. The blasting permit shall be updated annually, as required by the Shasta County Sheriff's Office.*

9) *The operator shall notify the Fire Dispatch Center by telephone at 225-2411 prior to blasting.*

10) *Operator may store explosives on-site, provided that the storage complies with all applicable federal, state and local regulations.*

SIGNIFICANCE AFTER MITIGATION

Implementation of the above mitigation measures would ensure ongoing monitoring of blasting activities to ensure that blasting does not result in excessive ground-born vibration levels at nearby sensitive receptors. Implementation of this mitigation measure would ensure this impact is **less than significant.**

Impact 3.11-4: Noise associated with off-site Project traffic increases may exceed applicable noise standards (Less than Significant)

To quantitatively assess traffic noise levels associated with the Project, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The Model is based on the Calveno reference noise factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site.

Traffic volumes for existing (2009) and future (2030) conditions without the Project were provided by the Shasta Regional Transportation Agency (SRTA). The Project's proposed truck usage on the area roadways was provided by the Project applicant, taking into account the planned yearly material production. The truck and traffic volumes used in this noise analysis are consistent with the truck and traffic volumes used in the Transportation and Circulation chapter of this EIR. Table

3.11-14 shows the predicted existing plus Project (interim) and future plus Project (build-out) traffic noise levels in terms of $_{Ldn}$ at a reference distance of 100 feet from the centerlines of existing Project-area highways which would be most heavily utilized by Project heavy truck traffic. Given the Project access to rais, little or no Project heavy truck traffic is anticipated on minor roadways such as Digger Bay Road, Shasta Park Road, or Flintstone Avenue. Accordingly, noise impacts along those roadways are predicted to be inconsequential.

Table 3.11-14 also shows the change in traffic noise levels, in parentheses, due to the addition of Project trucks. The extent by which existing land uses located along the roadways listed below are affected by existing traffic noise depends on their proximity to the roads and their individual sensitivity to noise. A listing of the FHWA Model input data is provided in Appendix D of the Environmental Noise and Vibration Analysis.

TABLE 3.11-14: SUMMARY OF TRAFFIC NOISE EXPOSURE CALCULATIONS

ROADWAY	SEGMENT	$_{LDN}$, dB @ 100 FEET (CHANGE FROM NO PROJECT)
Interstate 5	North of Old Oregon Trail	75 (0)
Interstate 5	Old Oregon Trail to State Route 151	76 (0)
Interstate 5	State Route 151 to State Route 273	75 (+1)
Interstate 5	State Route 273 to State Route 299	77 (0)
Interstate 5	State Route 299 to State Route 44	77 (0)
Interstate 5	South of State Route 44	79 (0)
State Route 151	West of Interstate 5	66 (+1)
State Route 273	South of Interstate 5	66 (+1)
State Route 299	East of Interstate 5	70 (0)
State Route 44	East of Interstate 5	74 (0)

SOURCE: CALTRANS TRAFFIC VOLUMES (AADT), MOODY FLATS QUARRY PROJECT DESCRIPTION, AND BOLLARD ACOUSTICAL CONSULTANTS, INC, AUGUST 2012.

As shown in Table 3.11-14, the increase in off-site truck traffic generated by the proposed Project would not cause greater than a one $_{Ldn}$, dB increase in roadway noise on any of the roadways used by Project truck traffic in the Project vicinity. Accordingly, this would a **less than significant** impact.

MITIGATION MEASURES

None required.

Impact 3.11-5: The Project may result in off-site traffic noise impacts associated with nighttime operations (Less than Significant)

The Project does not propose to operate at night unless paving projects specifically require delivery of materials during nighttime hours; however, the Applicant anticipates this work may be necessary at some point during the life of the permit. Accordingly, this analysis assumes such work would occur, and analyzes the impacts. During such conditions, the Project's heavy truck generation could reach 20 loads per hour, or 40 individual trips. Extensive Bollard Acoustical Consultants' noise measurement data for the noise generation of individual aggregate truck pass-bys indicate that the mean Sound Exposure Level (SEL) for a truck pass-by travelling approximately 40 mph is approximately 85 dB at a reference distance of 50 feet.

The nearest existing residences on Flintstone Avenue is located approximately 500 feet from the proposed on-site heavy truck access road. At that nearest residence, the decrease in noise due to distance alone would be 15 dB relative to the reference level at 50 feet. Screening by intervening vegetation and excess ground attenuation is expected to further reduce haul road traffic noise levels by approximately five dB. The resulting SEL for individual heavy truck pass-bys at the nearest residences would be approximately 65 dB SEL.

Based on a heavy truck passby SEL of 65 dB, and an assumed 40 pass-bys per hour (20 loaded truck leaving the facility and 20 empty trucks returning), the computed hourly average noise level at the nearest residence would be approximately 45 dB L_{eq}. This level is predicted to satisfy both the Shasta County nighttime average noise level standard of 50 dB L_{eq}, but also the more restrictive standard of 45 dB recommended for the residences on Flintstone Avenue based on ambient noise monitoring results. As a result, no exceedance of the Project's standards of significance is identified for nighttime Project traffic on the proposed access road.

The potential for sleep disturbance at the existing residences on Flintstone Avenue during nighttime passages of heavy trucks on the Project access road was evaluated using the ANSI ANSI/ASA S12.9-2008 / Part 6 methodology. The ANSI methodology utilizes the typical Sound Exposure Level associated with a single noise event (such as a heavy truck passby), and accounts for the number of such events occurring during nighttime hours in predicting potential awakening. The ANSI methodology requires that interior SEL values exceed 50 dB to be evaluated by the ANSI methodology, and that interior SEL less than 50 dB be ignored.

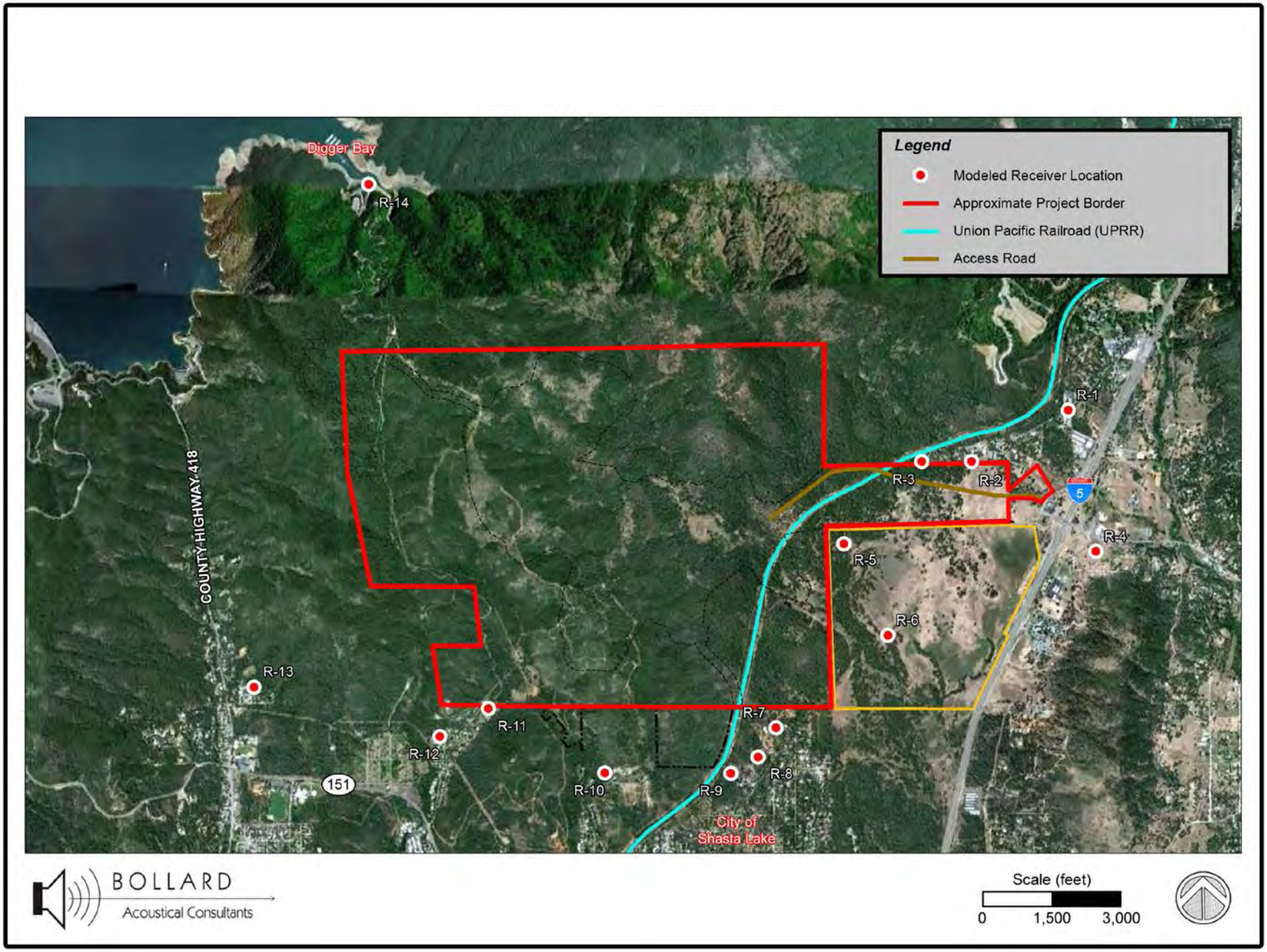
For this Project, worst-case exterior SEL values are predicted to 65 dB at the nearest residence on Flintstone Avenue to the access road. With windows of the nearest residence in the closed position, the building façade would provide approximately 25 dB of noise reduction, reducing SEL values to 40 dB, which would be below the level considered by the ANSI methodology. With windows in the open position, a building façade noise reduction of approximately 15 dB can be expected, reducing SEL values to approximately 50 dB within residences on Flintstone Avenue, which would not exceed the ANSI threshold. Because predicted interior SEL values associated with nighttime heavy truck pass-bys on the Project access road would fall well below the ANSI

evaluation trigger, significant noise impacts related to sleep disturbance are not identified for this Project. This would be a **less than significant** impact.

MITIGATION MEASURES

None required.

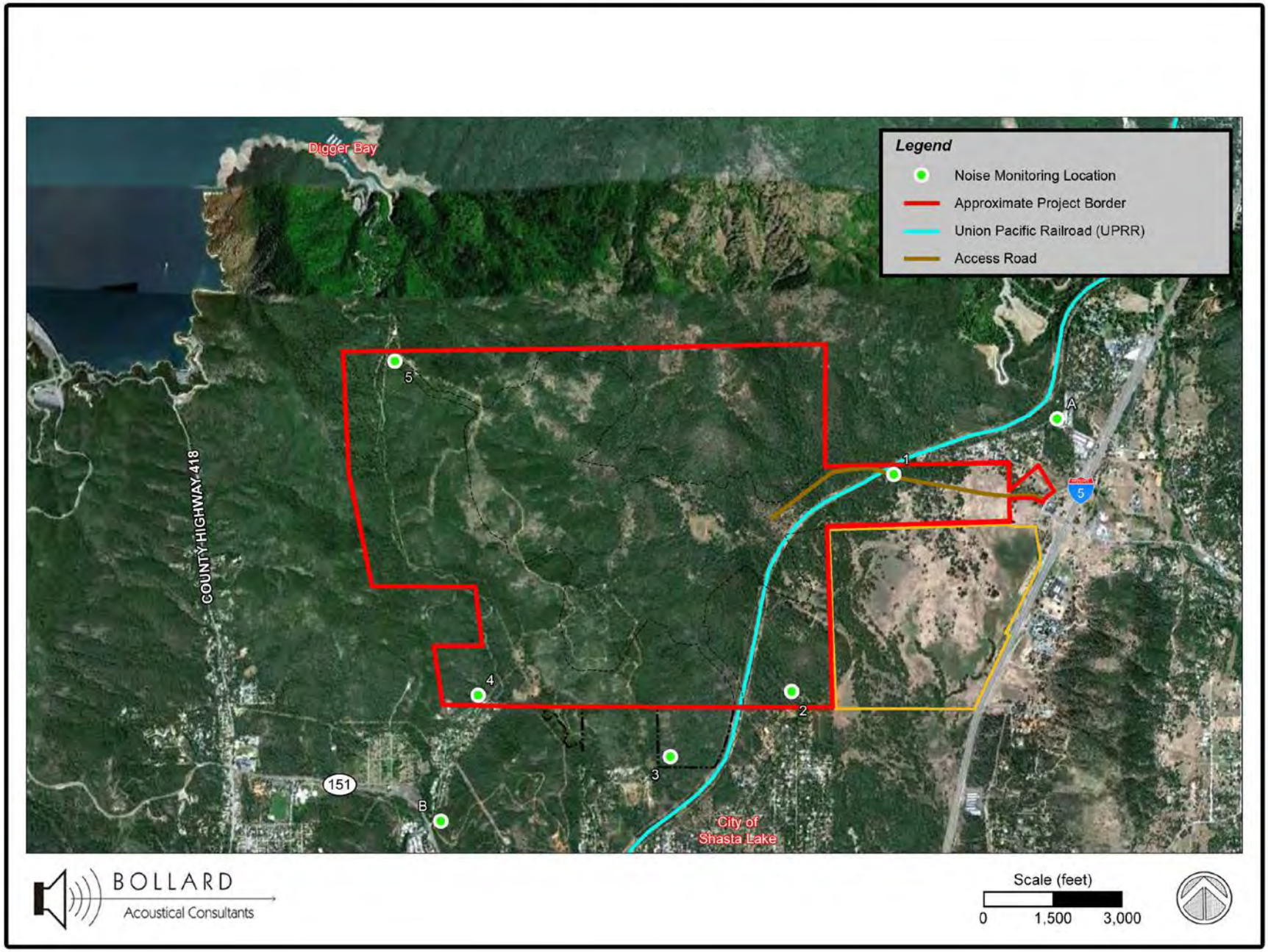
This page left intentionally blank



MOODY FLATS QUARRY EIR

Figure 3.11-1: Modeled Receiver Locations

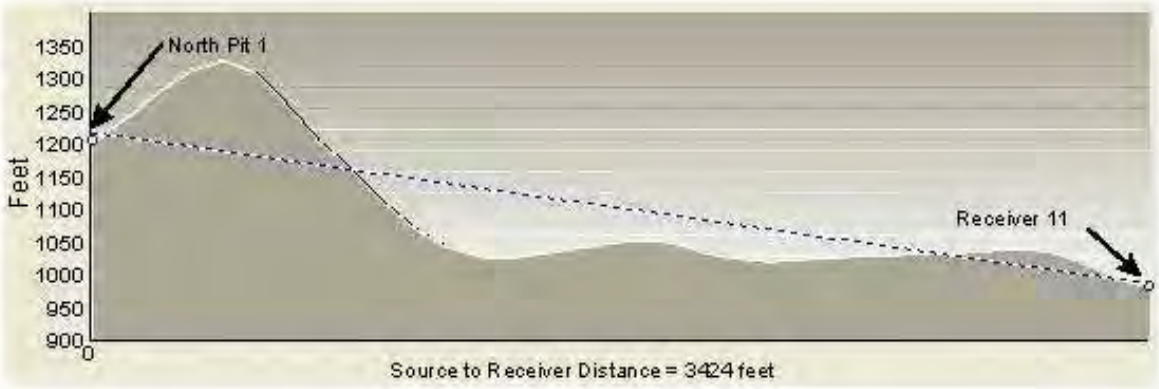
This page left intentionally blank.

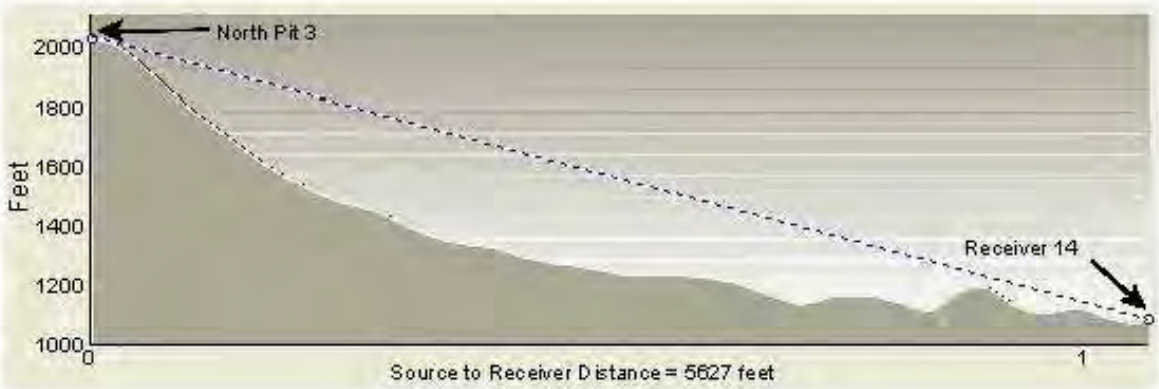


MOODY FLATS QUARRY EIR

Figure 3.11-2: Ambient Noise Monitoring Locations

This page left intentionally blank.





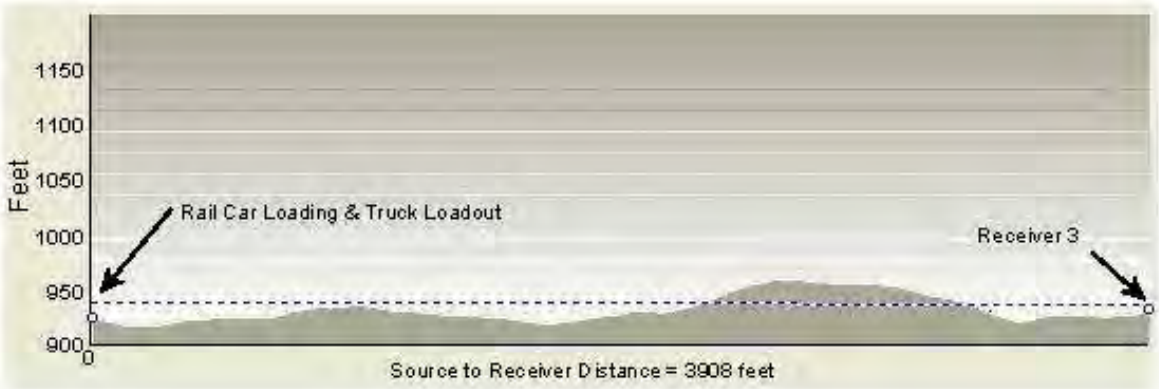
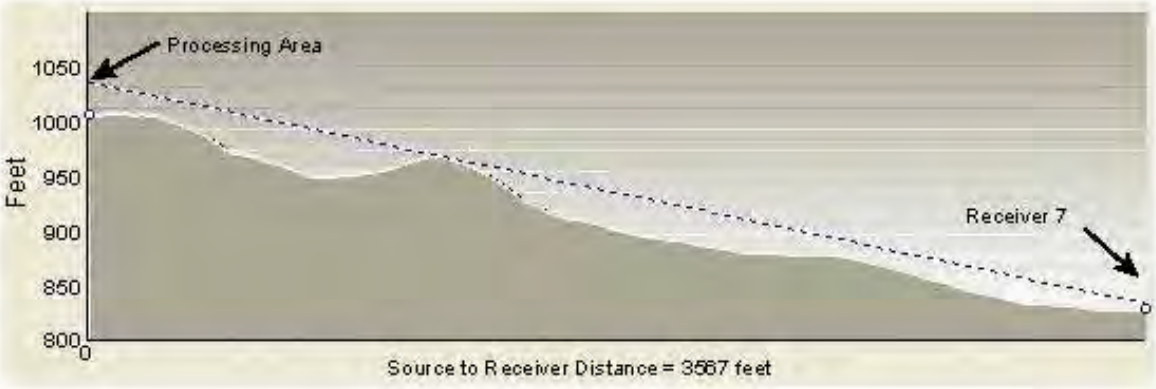
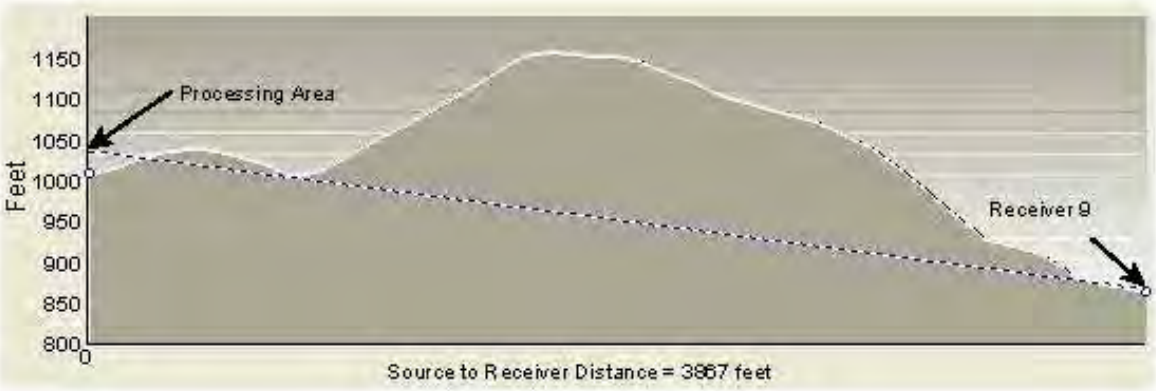
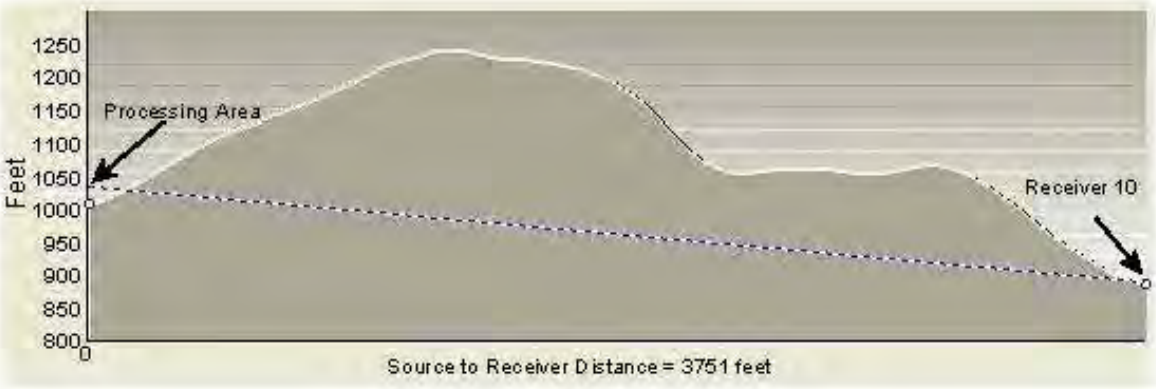


Figure 3.11-3A: Line of Sight from Noise Sources to Receivers

This page left intentionally blank.



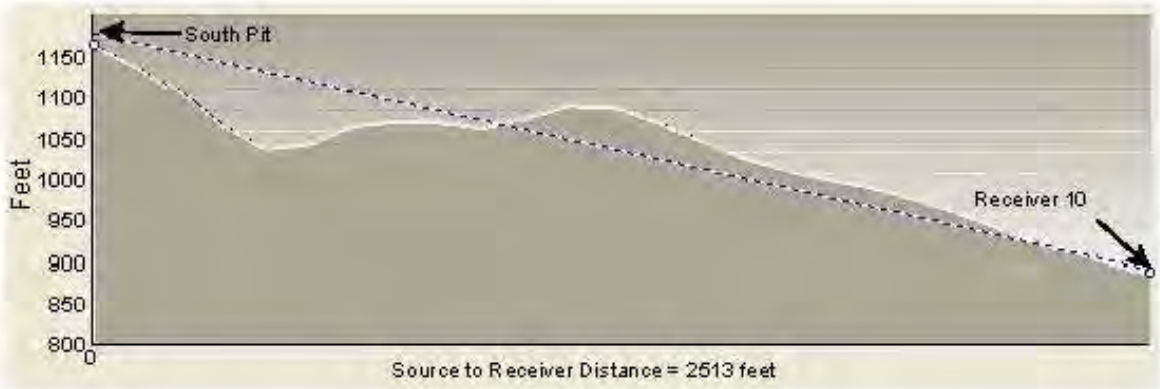


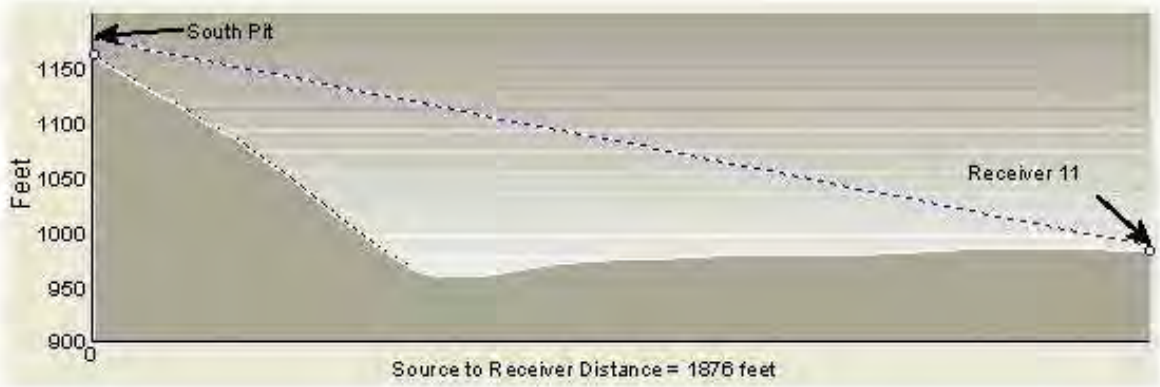


MOODY FLATS QUARRY EIR

Figure 3.11-3B: Line of Sight from Noise Sources to Receivers

This page left intentionally blank.

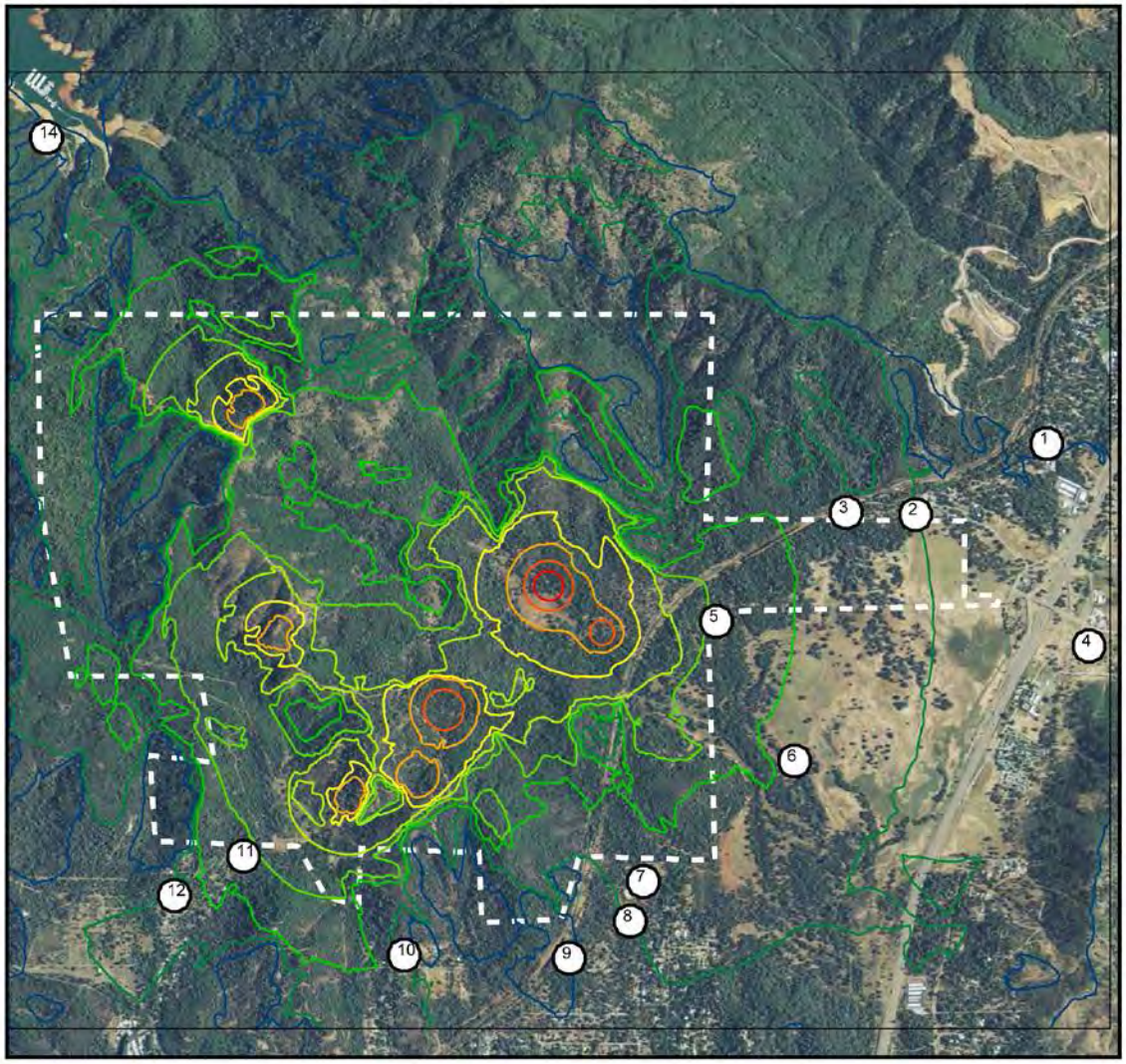




MOODY FLATS QUARRY EIR

Figure 3.11-3C: Line of Sight from Noise Sources to Receivers

This page left intentionally blank.



MOODY FLATS QUARRY EIR

Figure 3.11-4:
Project Noise Contours - Worst Case

Project Noise Levels
Leq, dBA

Legend

Receiver

40
45
50
55
60
65
70
75
80

Length scale 1:2512

0 500 1000 2000 3000 4000 feet

N

BOLLARD
Acoustical Consultants

This page left intentionally blank.

This section of the EIR analyzes the potential impacts of the proposed Project on the surrounding transportation system including roadways, bicycle/pedestrian facilities, and transit facilities/services. This chapter identifies the significant impacts of the proposed Project and recommends mitigation measures to lessen their significance.

Comments were received during the public review period and scoping meeting for the Notice of Preparation regarding this topic from the following agencies and individuals: Caltrans (February 9, 2012), City of Redding (January 25, 2012), Eric Cassano (February 13, 2012), John Husome (January 25, 2012), City of Shasta Lake (February 22, 2012), U.S. Department of Agriculture (February 10, 2012), Bill Jeffers and Cliff Jacoby (February 13, 2012), Darria Kosich (January 31, 2012), Pamelyn Morgan (February 14, 2012), Rob and Sheryl Sampley (January 25, 2012), Heidi Strand (February 8, 2012), Stephanie Thomas (February 6, 2012), and Richard and Georgia Tull (February 5, 2012).

Information in this section is derived from the following sources:

- Shasta County General Plan (September, 2004)
- Draft Transportation Impact Analysis (TIA) - Moody Flats Quarry, Kittelson & Associates, Inc. (May 2013) **(Appendix U)**
- City of Redding 2000-2020 General Plan (October 2000)
- City of Shasta Lake General Plan (June 1999)

3.12.1 ENVIRONMENTAL SETTING

PROJECT LOCATION

The Project site is located in Shasta County about one mile west of Interstate 5 (I-5), north of the City of Shasta Lake, and nine miles north of the City of Redding on approximately a 1,900-acre property. Vehicles would enter and exit the Project site using a paved private access road that would connect to Wonderland Boulevard via the Interstate 5 and Mountain Gate off-ramp (Figure 2-10). Access to the Project site would be controlled by a gate at the entrance to the Project site. 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, and delivery and employee traffic, primarily during the operation of the North Pit. No material transport would occur on this access road.

Figure 3.12-1 displays the Project site in relation to the study intersections included in the transportation analysis.

STUDY AREA ROADWAYS AND INTERSECTIONS

A paved access road connecting to Wonderland Boulevard, north of the Old Oregon Trail/Wonderland Boulevard intersection would provide direct access to the Project site. Other key roadways in the Project vicinity include Interstate 5 I-5), State Route 151 (SR 151), and Digger Bay Road. These roadways are described below.

STATE ROUTES

Interstate 5 (I-5) is a major north-south interstate freeway facility on the west coast of the United States. I-5 provides connections to Mexico to the south and Canada to the north. It is the primary route for trucks carrying goods to and from Mexico, Canada and California, Oregon and Washington. I-5 passes through Shasta County and provides access to the Project site via Old Oregon Trail interchange.

State Route 151 (SR 151) is a Caltrans maintained facility and an east-west arterial through the City of Shasta Lake. It provides a primary connection between Shasta Dam and I-5, where it terminates.

State Route 273 (SR 273) operates as an arterial from the northern end of the Redding Central Business District to Benton Drive and as an expressway from Benton Drive to I-5. SR-273 merges with 1-5 in north Redding. To the south, SR 273 continues through downtown Redding to the City of Anderson. The facility is primarily a four lane divided roadway north and south of the downtown core with a speed limit ranging from 55-60 mph at its northern and southern sections near 1-5, reducing incrementally to 25-35 mph within the downtown core**.**

SHASTA COUNTY

Old Oregon Trail is a two-lane, east-west minor collector that intersects I-5 north of the City of Shasta Lake's limits. The proposed Project access would connect with Wonderland Boulevard approximately 300 feet north of the Old Oregon Trail/Wonderland Boulevard intersection.

Wonderland Boulevard is a two-lane, north-south frontage road that runs parallel to I-5 north of the City of Shasta Lake's limits. It connects residences and businesses west of I-5 with the Old Oregon Trail interchange.

CITY OF SHASTA LAKE

Ashby Road is a north-south residential collector that connects SR 151 to the north and Pine Grove Avenue to the south in the City of Shasta Lake.

Cascade Boulevard is a north-south arterial that runs parallel to I-5 connecting the SR 151 and the Pine Grove interchanges in the City of Shasta Lake and the Oasis Road interchange in the City of Redding.

Pine Grove Avenue is an east-west collector street that extends east from Lake Boulevard to Leona Avenue in the City of Shasta Lake. The overpass crossing I-5 has a three lane cross-section, two travel lanes with a center left turn lane.

CITY OF REDDING

Oasis Road is a two lane arterial, which is generally aligned in a northeast-southwest alignment in the northernmost sections of the City of Redding. Oasis Road provides a direct continuation of Old Oregon Trail, giving southbound traffic access to I-5 and a direct route for traffic as it continues or arrives from areas of downtown Redding and other locations to the south.

Caterpillar Road is a two-lane east-west collector street in Redding. It connects Beltline Road with North Market Street, where ramps to I-5 are located. Caterpillar Road serves a large residential

subdivision to its south, but most of it is bordered by heavy equipment retail and service businesses.

South Market Street is a major four-lane arterial highway that links the City of Anderson with Redding's central business district. Near its northern terminus at Placer Street—in Redding's core—South Market Street becomes a three-lane one-way roadway.

Yuba Street is a two-lane local road in Redding's central business district. It has ample sidewalks and on-street parking throughout most of its short length.

Tehama Street is a two-lane major collector street in Redding's central business district. It is located immediately north of the Redding Amtrak train station. Its eastern end merges onto SR 44, which can be used to access I-5.

Placer Street is a four-lane arterial near Redding's central business district. It crosses the entire city of Redding east to west, and continues as County Road A16 for several miles west of the city.

South Street is a four-lane east-west collector on the southern part of Redding's central business district. The roadway is purely residential east of East Street, and has offices and retail from East Street until its western terminus at West Street.

3.12.2 PROJECT TRAVEL CHARACTERISTICS

PROJECT DESCRIPTION

Moody Flats Quarry, LLC, proposes to develop the Moody Flats Quarry Project a hard rock quarry that would provide a new source of aggregate construction material in Shasta County. Specifically, the applicant proposes to develop a hard rock quarry, aggregate processing facility, ancillary aggregate product facilities (e.g.., ready-mix concrete plant, asphalt batch plant, and recycled construction materials plant), and aggregate truck and railcar load-out facilities within the approximately 1,900-acre property. The Project would provide a new source of high quality aggregate for use as construction material in the County. In addition to supplying aggregate to the local market, the Project would supply construction aggregates to the northern California regional market by developing a rail siding/spur and load-out facility to access the Union Pacific rail line that traverses the site.

TRIP GENERATION

The standard source for trip generation for land use development project impact analysis is the *Trip Generation* reference published by the Institute of Transportation Engineers (ITE). The ITE *Trip Generation* manual does not provide trip generation information for a quarry. Therefore, this Project trip generation estimate is based on operational information provided by the Applicant.

The Project Applicant describes the proposed Moody Flats Quarry as a 100-year project with maximum annual sales of two million tons per year via rail and trucks. Annual production and distribution goals include shipping approximately 1.5 million tons of aggregate via rail to regional markets, and distributing 0.5 million tons of aggregate and finished products (e.g.., ready-mix concrete, asphalt) to local markets via trucks. Production is expected to ramp up as contractual linkages to customers are established in local and regional markets. Capital investments would be

made in order to supply demand for aggregate products. A permanent electrical supply would be established before aggregate production exceeds one million tons per a year. As volumes increase near the one million tons per a year level and customer contracts in regional markets are established the railroad load-out facility would be constructed, which would allow for full production at the site to occur. Actual production rates may vary, depending largely on aggregate consumption in the local and regional markets. Although sales would not exceed two million tons per year, annual sales in some years could be substantially less than proposed maximum annual levels.

Proposed operations, including mining, processing, and administrative functions, would employ between 25 and 50 people year round. Typical Project operating hours would be from 6:00 AM to 10:00 PM (16 hours per day), Monday through Friday, and 6:00 AM to 3:00 PM on Saturdays, year round. The employees in the morning shift would enter the facility around 6:00 AM and leave around 2:00 PM, when the employees for the second shift would arrive. Therefore no employee trips are expected during the standard morning and evening commute peak hours (typically 7:30 to 8:30 AM and 4:30 to 5:30 PM). However, this report assumes five entering and five exiting trips during the AM and PM peak hours to be conservative.

Based on the information described above, the Project Applicant provided the estimates for employee trips, truck trips and train trips as shown in Table 3.12-1.

TABLE 3.12-1: PROJECT TRIP GENERATION ESTIMATE

TRIP TYPE	AXLES	DAILY TRIPS (ROUND TRIPS)[6]	AM PEAK		PM PEAK	
			ENTERING	EXITING	ENTERING	EXITING
Facility employees [1]	2	24	5	5	5	5
Ready-mix trucks [2]	3/4	178	18	18	2	2
Asphalt trucks [3]	5	128	10	10	1	1
Aggregate trucks [4]	5	200	20	20	2	2
Cement trucks [5]	5	7	2	2	1	1
Liquid asphalt/propane trucks	5	9	2	2	1	1
Recycled material trucks	5	7	2	2	1	1
Fuel trucks	5	3	1	1	0	0
Outside services [5]	2	4	0	0	0	0
Annual Train Trip[7]	---	200	2		N/A	
Total		**560**	**60**	**60**	**13**	**13**

SOURCE: KITTELSON & ASSOCIATES, INC. TABLE 12 (MAY 2013).

NOTES:

1. Estimate based on 24 employees operating entire facility (aggregate plant, ready-mix, and asphalt).

2. Read-mix truck capacity of 18.2 tons per truck; assume sales of 3,300 tons per day equaling 178 trips per day.

3. Assume 25 tons per truck and maximum daily sales of 3,200 tons per day (or 128 trips per day).

4. Aggregate based on estimate for maximum sales per day of 5,000 tons per day (or 200 trips per day).

5. Outside deliveries (e.g., FedEx), subcontractor services.

6. Round-trip is defined as an empty vehicle entering the site, picking up material (i.e., asphalt, aggregate ready-mix), and exiting the site.

7. Based on 80-car unit train with 100-ton capacity per car.

Project Trip Distribution

The distribution of trips associated with the Project site was derived from two sources:

- Information provided by the Applicant on the likely destinations of truck trips; and
- The Shasta County travel model maintained by the Shasta Regional Transportation Agency.

The travel model information was based on a "select zone" analysis of the area containing the Project site (Transportation Analysis Zone or TAZ 1401) with industrial land uses coded into the model. The travel model is most reliable to identify the likely origins and destinations of employee-related trips, but would not have more specific information on truck trips related to quarry operations.

The draft trip distribution estimates were provided to the City of Shasta Lake, City of Redding, Shasta County and Caltrans for review. Comments and recommendations provided by Caltrans (March 1, 2012 email from Caltrans to Bill Walker, Shasta County) were incorporated in the final trip distribution estimates (Figure 3.12-5).

Project Traffic Assignment

Project-generated trips were assigned to the roadway network and study intersections based upon the trip distribution patterns described above. Project trips during the weekday AM peak hour and PM peak hour are presented for all study intersections in Figure 3.12-6 and Figure 3.12-7. Weekday total (24 hour) Project volumes are shown in Figure 3.12-8.

Given that the majority of the Project trips are expected to be five-axle trucks, the percentage of trucks was increased from the Existing (No Project) conditions to account for the increase in heavy vehicle activity in the study area. To estimate the increase, the percentage of existing trucks based on the vehicle classification counts were converted to absolute truck trips. Project only truck trips were added to the absolute truck trips and a percentage of trucks were recalculated for total truck trips with the Project at all study intersections, roadway segment and freeway segments.

3.12.3 ANALYSIS METHODS

LEVEL OF SERVICE

Roads and intersections are evaluated in terms of "level of service" (LOS), which is a measure of driving conditions and vehicle delay. Levels of service range from A (best) to F (poorest).

- Levels of service A, B and C indicate conditions where traffic can move relatively freely.
- Level of service D describes conditions where delay is more noticeable.
- Level of service E describes conditions where traffic volumes are at or close to capacity, resulting in significant delays and unstable traffic flow.
- Level of service F characterizes conditions where traffic demand exceeds available capacity, with very slow speeds (stop and go) and long delays and queuing at signalized intersections or on freeways and highways.

As discussed below, there are different level of service criteria used for intersections, roadway segments and freeway segments.

TRAFFIC OPERATIONS ANALYSIS METHODOLOGY

Traffic operations analysis was performed using procedures from the *Highway Capacity Manual 2000* (Transportation Research Board, Washington D.C., 2000,) (2000 HCM). The 2000 HCM provides different analysis methodologies for each type of traffic control, as described below.

Signalized Intersections

Signalized intersection analyses were conducted using the operational methodology outlined in the 2000 HCM Chapters 10 and 16. This procedure calculates an average control delay per vehicle at a signalized intersection, and assigns a level of service designation based upon the delay. The method also provides a calculation of the volume-to-capacity (v/c) ratio of the critical movements at the intersection. In general, the HCM 2000 default peak hour factor (PHF) of 0.92 was applied to all intersections. However, for study intersections on Oasis Road, a PHF of 1.00 was used for existing conditions, consistent with the analysis reported in previous transportation impact studies in the region, including the Mountain Gate at Shasta Lake Traffic Impact Analysis (TIA) Report and the Redding Oasis Center Final Master EIR. Table 3.12-2 shows the LOS criteria for signalized Intersections.

TABLE 3.12-2: SIGNALIZED INTERSECTION LOS CRITERIA

LEVEL OF SERVICE	DESCRIPTION	AVERAGE CONTROL DELAY (SECONDS)
A	LOS A represents free-flow travel with an excellent level of comfort and convenience and the freedom to maneuver.	≤ 10.0
B	LOS B has stable operating conditions, but the presence of other road users causes a noticeable, though slight, reduction in comfort, convenience, and maneuvering freedom.	> 10.0 to 20.0
C	LOS C has stable operating conditions, but the operation of individual users is substantially affected by the interaction with others in the traffic stream.	> 20.0 to 35.0
D	LOS D represents high-density, but stable flow. Users experience severe restriction in speed and freedom to maneuver, with poor levels of comfort and convenience.	> 35.0 to 55.0
E	LOS E represents operating conditions at or near capacity. Speeds are reduced to a low but relatively uniform value. Freedom to maneuver is difficult with users experiencing frustration and poor comfort and convenience. Unstable operation is frequent, and minor disturbances in traffic flow can cause breakdown conditions.	> 55.0 to 80.0
F	LOS F is used to define forced or breakdown conditions. This condition exists wherever the volume of traffic exceeds the capacity of the roadway. Long queues can form behind these bottleneck points with queued traffic traveling in a stop-and-go fashion.	> 80.0

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 2 (MAY 2013).

Unsignalized Intersections

Unsignalized intersection analyses were conducted using the methodology outlined in the 2000 HCM Chapters 10 and 17. At one- or two-way stop-controlled intersections, each turning movement that yields to other vehicles is evaluated separately and assigned a separate level of service. Each yielding movement (stop-sign controlled movements or left-turns from the uncontrolled approaches) is evaluated for the relative ability of yielding traffic to find adequate gaps in the conflicting traffic flows. The level of service for each movement is then based on the resulting average delay for that movement. This method does not provide an average level of service for the entire intersection, so results cannot be compared directly to results for signalized or all-way stop intersections. Table 3.12-3 identifies the LOS criteria for unsignalized intersections.

TABLE 3.12-3: UNSIGNALIZED INTERSECTION LOS CRITERIA

LEVEL OF SERVICE	DESCRIPTION	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)
A	Little or no delays	≤ 10.0
B	Short traffic delays	> 10.0 to 15.0
C	Average traffic delays	> 15.0 to 25.0
D	Long traffic delays	> 25.0 to 35.0
E	Very long traffic delays	> 35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded	> 50.0

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 3 (MAY 2013).

Roadway Segments

The LOS methodology used to analyze the capacity of roadway segments was based on the volume to capacity threshold. This methodology examines the average daily traffic (ADT) volumes as compared to the daily traffic volume capacity of the roadway facility. The threshold values are presented in Table 3.12-4.

TABLE 3.12-4: SEGMENT LEVEL OF SERVICE THRESHOLD

ROADWAY	LANES	MAXIMUM VOLUME FOR GIVEN SERVICE LEVEL				
		A	B	C	D	E
Freeway	4	24,000	28,000	32,000	36,000	40,000
Major Arterial	4	22,000	25,000	29,000	32,500	36,000
Major Collector	2	11,000	12,500	14,500	16,000	18,000
Minor Collector	2	9,000	10,500	12,000	13,500	15,000
Local Street	2	2,200	2,600	3,000	3,400	3,800

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 4 (MAY 2013).

Freeway Mainline Segments

The freeway mainline was analyzed utilizing the methodology outlined in the 2000 Highway Capacity Manual (HCM) Chapters 13 and 23. Maximum service flow rates of 2,200 vehicles per lane per hour (vplph) for typical freeway lanes were used for this analysis. The 2,200 vplph value was based on the capacity values recommended in the HCM and is consistent with the maximum observed traffic volume on I-5 at Oasis Road based on detector counts from the Caltrans Performance Measurement System (PeMS) station. Table 3.12-5 shows the relationship of freeway volume-to-capacity ratios and density to LOS.

TABLE 3.12-5: FREEWAY LEVEL OF SERVICE STANDARDS

LEVEL OF SERVICE	MAXIMUM VOLUME-TO-CAPACITY RATIO	MAXIMUM DENSITY (PASSENGER VEHICLES PER MILE PER LANE)
A	0.32	11
B	0.53	18
C	0.74	26
D	0.9	35
E	1	45
F	>1.00	>45

SOURCE: KITTELSON & ASSOCIATES, INC. TABLE 5.

Signal Warrant Analysis

Traffic signal warrants are standards that provide guidelines in the determination of the need for a traffic signal. A traffic signal should not be installed if no warrants are met since the installation of traffic signals may increase delays for the majority of through traffic and increase some types of accidents. If one or more warrants are met, a signal may be appropriate if an engineering study indicates that it will improve the overall safety and/or operation of the intersection.

As stated in the FHWA/Caltrans 2012 California Manual of Uniform Traffic Control Devices (CA MUTCD), "An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location. The investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants and other factors related to existing operation and safety at the study location:

- Warrant 1, Eight-Hour Vehicular Volume.
- Warrant 2, Four-Hour Vehicular Volume.
- Warrant 3, Peak Hour.
- Warrant 4, Pedestrian Volume.
- Warrant 5, School Crossing.
- Warrant 6, Coordinated Signal System.
- Warrant 7, Crash Experience.
- Warrant 8, Roadway Network.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal."

This traffic impact analysis did not evaluate the full panoply of warrants for traffic signals, but instead focused on the peak hour warrant. The MUTCD states that, "*This [peak hour] signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time*." The peak hour warrant is being used in this study as an "indicator" of the likelihood of an existing or future unsignalized intersection warranting a traffic signal in the future. Intersections that fall below the peak hour warrant are considered (for the purposes of this impact analysis) to be unlikely to meet one or more of the other signal warrants (such as the 4-hour or 8-hour warrants). However, this does not mean that a signal is definitely unwarranted. A signal may be warranted by other criteria, some of which cannot be known until the intersection is constructed and operational.

Unsignalized intersections were evaluated using the Peak Hour Volume Warrant (Warrant No. 11) in the Caltrans *Traffic Manual*, which is the same as Warrant No. 3 in the MUTCD. The Peak Hour Volume Warrant was applied where the minor street experiences long delays in entering or crossing the major street for at least one hour in a day.

EXISTING CONDITIONS

The traffic operational analyses were performed at selected study intersections and road segments (collectively, "the study area"). These study intersections and roadway segments were selected by the County Department of Public Works, the regional transportation planning agency, and Caltrans, based on the Project's trip distribution and potential to impact area roadway and intersections. Intersection index numbers from 17 through 21 were reserved for railroad crossing locations. These analyzed sections are listed below. Also see Figure 3.12-1.

Intersections

1. Old Oregon Trail / I-5 NB Ramps
2. Old Oregon Trail / I-5 SB Ramps
3. Wonderland Boulevard / Old Oregon Trail
4. Shasta Dam Boulevard/ I-5 SB Off-Ramps
5. Cascade Boulevard / Shasta Dam Boulevard
6. Shasta Park Drive/ Shasta Dam Boulevard
7. Pine Grove Avenue / I-5 NB Ramps
8. Pine Grove Avenue / I-5 SB Ramps
9. Oasis Rd. / I-5 NB Ramps
10. Oasis Rd. / I-5 SB Ramps
11. SR 273 / Caterpillar Road
12. SR 299 / I-5 NB Ramps
13. SR 299 / I-5 SB Ramps
14. Breslauer Way / S. Market St.
15. S. Bonneyview Rd. / S. Market St.
16. Girvan Ln. / S. Market St.
22. Wonderland Boulevard / Project Driveway

Railroad Crossing Intersections

17. Shasta Street/ Railroad Crossing
18. Tehama Street/Railroad Crossing
19. Yuba Street/Railroad Crossing
20. Placer Street/ Railroad Crossing
21. South Street/Railroad Crossing

Roadway Segments

1. Shasta Park Drive – Project Driveway to Shasta Dam Boulevard
2. Shasta Dam Boulevard – Shasta Park to Ashby Road
3. Shasta Dam Boulevard – Ashby Rd. to Cascade Boulevard
4. Black Canyon Road – Project Driveway to Red Bluff Avenue
5. Old Oregon Trail – Wonderland to I-5 SB Ramps.
6. Old Oregon Trail – I-5 SB Ramps to I-5 NB Ramps.
7. Wonderland Boulevard – Old Oregon Trail to Project Driveway

Freeway Segments

1. I-5 Mainline North of Old Oregon Trail (NB and SB)
2. I-5 Mainline between Old Oregon Trail and Shasta Dam Blvd. (NB and SB)
3. I-5 Mainline between Shasta Dam Blvd. and Pine Grove (NB and SB)
4. I-5 Mainline between Pine Grove and Oasis (NB and SB)
5. I-5 Mainline between Oasis and SR 273 (NB and SB)
6. I-5 Mainline between SR 273 and Twin View Boulevard (NB and SB)
7. I-5 Mainline between Twin View Boulevard and SR 299 (NB and SB)
8. I-5 Mainline between SR 299 and SR 44 (NB and SB)
9. I-5 Mainline south of SR 44 (NB and SB)

Existing Traffic Volumes

Intersections: Turning movement traffic volumes were collected at the study intersections during the weekday AM and PM commute periods in January 2012. Since these volumes were collected in the non-peak season, they were adjusted to reflect peak summer volumes using a seasonal adjustment factor of 1.21. The 21 percent factor corresponds to the proportion of volume in the peak month (August) to the average monthly volume, and was derived from three years of continuous automatic traffic (PeMS) volume counts at a detector station on I-5 near the Oasis Road interchange. The adjusted traffic volumes (i.e., weekday peak period existing turning movements) and lane configurations are shown in Figures 3.12-2, 3.12-3 and 3.12-4. Field-collected existing traffic counts and data used for developing the seasonal adjustment factor are presented in Appendix 1 of the Draft Traffic Study for the Moody Flats Mine EIR (Kittelson & Associates, Inc.).

Roadway Segments: Automated 24-hour counts were conducted for three consecutive mid-week days from January 31st to February 2nd of 2012 using pneumatic tubes. Since these volumes were collected in the non-peak season, they were adjusted to reflect peak summer volumes using a seasonal adjustment factor of 1.21, as described in the previous section. A vehicle classification

survey was also performed to determine the percentage of heavy vehicles in the study area and specific roadway segments. Heavy vehicles were converted to passenger car equivalents to obtain an analysis ADT.

Freeway Segments: Nine study area freeway segments on Interstate 5 were analyzed for the weekday AM and PM commute periods. Freeway mainline volumes on two segments, just south of the Project and just north of the Project, were estimated by multiplying the bidirectional Peak Hour Volumes from the Caltrans 2010 Traffic Volumes report with the appropriate directional (D)-factor from Caltrans 2010 Peak Hour Volume Data report. The applicable pages from the 2010 Traffic Volumes report and the 2010 Peak Hour Volume Data report are presented in Appendix 1 of the Moody Flats TIA (Appendix U to this EIR). The freeway volumes for the other segments were estimated by adding and subtracting on-ramp and off-ramp volumes. The intersection turning movement counts described above were used to compute the on-ramp and off-ramp volumes.

Existing Intersection Operations

Intersection level of service analysis was performed using the methodology described in the Traffic Operations Analysis Methodology section. The analysis calculates an average control delay per vehicle at a signalized intersection, and assigns a level of service designation based upon the delay. The method also provides a calculation of the volume-to-capacity (v/c) ratio of the critical movements at the intersection. As shown in Table 3.12-6, all of the study intersections operate at acceptable levels of service during the weekday AM and PM peak hours.

TABLE 3.12-6: EXISTING NO PROJECT CONDITIONS - INTERSECTION LEVEL OF SERVICE ANALYSIS

INTERSECTION	TARGET LOS	CONTROL	PEAK HOUR	DELAY	LOS	MEET SIGNAL WARRANT
1. I-5 NB Ramps & Old Oregon Trail	C	TWSC	AM	10.4	B	No
			PM	9.4	A	No
2. I-5 SB Ramps & Old Oregon Trail	C	TWSC	AM	12.6	B	No
			PM	10.1	B	No
3. Wonderland Blvd & Old Oregon Trail	C	TWSC	AM	9.1	A	No
			PM	8.8	A	No
4. I-5 SB Off-Ramp & Shasta Dam Blvd	C	Signalized	AM	17.3	B	---
			PM	10.5	B	---
5. Cascade Blvd & Shasta Dam Blvd	C	Signalized	AM	16.9	B	---
			PM	17.7	B	---
6. Shasta Park Dr & Shasta Dam Blvd	C	TWSC	AM	10.1	B	No
			PM	9.9	A	No
7. I-5 NB Ramps & Pine Grove Ave	C	TWSC	AM	14.2	B	No
			PM	16	C	No
8. I-5 SB Ramps & Pine Grove Ave	C	TWSC	AM	11.2	B	No
			PM	11.9	B	No
9. I-5 NB Ramps & Oasis Rd	D	Signalized	AM	11.3	B	---
			PM	9.4	A	---
10. I-5 SB Ramps & Oasis Rd	D	Signalized	AM	20.8	C	---
			PM	12.9	B	---
11. N Market St [SR-273] & Caterpillar Rd	D	Signalized	AM	36.8	D	---
			PM	48.5	D	---
12. I-5 NB Ramps & SR-299 [Lake Blvd E]	D	Signalized	AM	5.8	A	---
			PM	7.5	A	---
13. I-5 SB Ramps & SR-299 [Lake Blvd E]	D	Signalized	AM	20.8	C	---
			PM	17.9	B	---
14. S Market St [SR-273] & Breslauer Way	D	Signalized	AM	30.1	C	---
			PM	23.7	C	---
15. S Market St [SR-273] & S Bonneyview Rd	D	Signalized	AM	31.9	C	---
			PM	37.6	D	---
16. S Market St [SR-273] & Girvan Ln	D	Signalized	AM	20.2	C	---
			PM	26.9	C	---

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 6 (MAY 2013).

Notes: LOS based on HCM2000, Signal warrant is based on Peak Hour Warrant Control delays for unsignalized intersections are for the worst movement of the intersection (TWSC) or intersection average (AWSC).

Existing Road Segment Operations

Roadway segment level of service analysis was performed using the methodology described in the Traffic Operations Analysis Methodology section. As shown in 3.12-7, all study area roadway segments are found to be operating at LOS A, except Shasta Dam Boulevard between Ashby Road and Cascade Boulevard. This road segment was found to be operating at LOS D, below the City of Shasta Lake LOS C standard.

TABLE 3.12-7: EXISTING NO PROJECT CONDITIONS - ROADWAY LEVEL OF SERVICE ANALYSIS

ROADWAY SEGMENT	FROM	TO	ROADWAY TYPE	NUMBER OF LANES	DAILY VOLUME[1]	LOS	V/C[2]
Shasta Park Drive	Project Dwy	Shasta Dam Blvd	Local Street	2	378	A	0.10
Shasta Dam Blvd	Shasta Park	Ashby Rd	Minor Collector	2	3,145	A	0.21
Shasta Dam Blvd	Ashby Rd	Cascade	Major Collector	2	14,589	**D**	0.81
Black Canyon Rd	Project Dwy	Red Bluff Ave	Local Street	2	538	A	0.14
Old Oregon Trail	Wonderland	I-5 SB Ramps	Minor Collector	2	2,995	A	0.20
Old Oregon Trail	I-5 SB Ramps	I-5 NB Ramps	Minor Collector	2	2,578	A	0.17
Wonderland Boulevard	Old Oregon Trail	Project Driveway	Minor Collector	2	2,995	A	0.20

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 7 (MAY 2013).

Notes:

[1]Daily Volume in Passenger Car Equivalents (PCE).

[2]The LOS E maximum service volume was used to compute the V/C ratio.

Existing Freeway Segment Operations

Freeway basic segment level of service analysis was performed using the methodology described in the Traffic Operations Analysis Methodology section. As shown in Table 3.12-8 and Table 3.12-9, the only segment failing to meet the Caltrans LOS standard of "D" is the northbound I-5 segment between SR 44 and SR 299, which was evaluated as LOS E in the PM peak hour.

TABLE 3.12-8: EXISTING NO PROJECT CONDITIONS - FREEWAY LEVEL OF SERVICE ANALYSIS (I-5NB)

FREEWAY	SECTION	FROM	TO	AM PEAK			PM PEAK		
				AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]	AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]
I-5NB	1	North	Old Oregon Trail	63.00	12.71	B	63.00	15.00	B
	2	Old Oregon Trail	Shasta Dam	63.00	14.48	B	63.00	16.38	B
	3	Shasta Dam	Pine Grove	64.50	10.98	A	64.50	13.98	B
	4	Pine Grove	Oasis	64.50	12.19	B	64.50	16.09	B
	5	Oasis	SR 273	64.50	13.40	B	64.50	19.55	C
	6	SR 273	Twin View	63.00	18.35	C	62.92	25.95	C
	7	Twin View	SR 299	63.00	21.71	C	61.83	29.99	D
	8	SR 299	SR 44	62.65	27.53	D	55.17	40.31	**E**
	9	SR 44	South	64.50	18.56	C	64.50	21.84	C

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 8 (MAY 2013).

Notes: [1] Density expressed in pc/mi/ln, passenger cars per mile per lane.

[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 23, 2000 HCM .

Bold indicates locations that do not satisfy Caltrans deficiency criteria.

TABLE 3.12-9: EXISTING NO PROJECT CONDITIONS - FREEWAY LEVEL OF SERVICE ANALYSIS (I-5SB)

FREEWAY	SECTION	FROM	TO	AM PEAK			PM PEAK		
				AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]	AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]
I-5SB	1	North	Old Oregon Trail	63.00	9.14	A	63.00	9.35	A
	2	Old Oregon Trail	Shasta Dam	63.00	11.56	B	63.00	10.60	A
	3	Shasta Dam	Pine Grove	64.50	11.38	B	64.50	9.15	A
	4	Pine Grove	Oasis	64.50	11.29	B	64.50	10.64	A
	5	Oasis	SR 273	64.50	15.02	B	64.50	11.75	B
	6	SR 273	Twin View	63.00	18.84	C	63.00	15.43	B
	7	Twin View	SR 299	63.00	20.95	C	63.00	18.05	C
	8	SR 299	SR 44	62.79	26.85	D	63.00	23.43	C
	9	SR 44	South	64.50	13.18	B	64.50	13.55	B

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 9 (MAY 2013).
Notes: [1] Density expressed in pc/mi/ln, passenger cars per mile per lane.
[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 23, 2000 HCM .
Bold indicates locations that do not satisfy Caltrans deficiency criteria.

Existing Transit Facilities

Shasta County is served by several transportation providers. Traditional fixed-route transit is operated by the Redding Area Bus Authority (RABA), which operates Monday through Friday from 6:30am to 7:30pm and Saturday from 9:30am to 7:30pm. This service logs approximately 62,877 miles per month to complete approximately 27,161 passenger trips (Moody Flats TIA, May 2013, Kittelson & Associates, Inc. pg. 25).

RABA operates 10 fixed routes within the cities of Redding, Shasta Lake and Anderson. All but two routes operate at one hour headways, with the exceptions being Route 7 (30 minutes) and Route 9 (two hours). The fixed routes have shown an increase in annual ridership since 2001, with the exception of the fiscal year ending June 30, 2003. That year, ridership decreased 12 percent due to unidentifiable reasons.

The paratransit equivalent to the fixed-route transit service is also operated by RABA. The agency contracts with Veolia to offer lift-equipped demand-responsive transit to mobility-impaired residents. The service operates at the same time (i.e., concurrently) with the fixed-route service.

By far, the largest source of transportation besides the private auto is the public school bus. The 26 public school districts in Shasta County and the County Superintendent of Schools Office together operate 214 buses, traveling more than 2.85 million miles a year and transporting an average of 16,361 students a day.

Shasta College operates an interregional type of service between the college and Tehama County (Red Bluff), Trinity County (Weaverville) and Eastern Shasta County (McArthur). The college has a total of nine buses and uses four of these daily on the above runs, transporting 150 to 170 students daily, and also contracts for a lift-equipped van for disabled students.

More than a dozen private companies offer demand-responsive transit for disadvantaged or disabled residents.

Existing Pedestrian and Bicycle Facilities

No sidewalks or marked bicycle lanes are provided in the immediate vicinity of the proposed Project driveways, but paved shoulders on Wonderland Avenue may serve non-motorized traffic. The 2010 Regional Transportation Plan for Shasta County shows a proposed Class II bicycle lane for Old Oregon Trail, leading to Wonderland Boulevard and the proposed Project driveway.

In the final draft of the 2010 Regional Transportation Plan for Shasta County, the County's Metropolitan Planning Organization reports that three percent of work trips are done by bicycling or walking. The aforementioned report attributes the relatively low 0.38 percent bicycling mode share to major barriers in the urbanized area, including I-5, the Union Pacific Railroad, and the Sacramento River. Facilities for bicycling and walking include approximately eight miles of paved pedestrian/bicycle trails along the Sacramento River between Hilltop Drive and Keswick Dam Road. Notable recent additions to non-motorized infrastructure include the Sundial Bridge and the conversion of a former railroad grade into a 12-mile paved and unpaved trail from Keswick Dam Road to Shasta Dam (Moody Flats TIA, May 2013, Kittelson & Associates, Inc. pg. 27).

TABLE 3.12-10: SUMMARY OF PEDESTRIAN/BICYCLE TRAILS IN THE REDDING AREA

METRIC	TRAILS (PAVED AND DIRT)	BIKEWAYS (CLASS I, II, III)	TOTAL SYSTEM MILES
Existing Miles	80.25	75.46	155.71
Proposed Miles	78.45	54.56	133.01
Total	158.7	130.02	288.72

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 10 (MAY 2013).
Note: *Adapted from 2010 Regional Transportation Plan for Shasta County

In addition to these recreational trails, bicyclists may use certain segments of state and federal highways in Shasta County. In the Project's traffic study area, bicycles are allowed on I-5, except between Shasta Lake Boulevard and Oasis Road.

Existing Railroad Crossings

Railroad crossings are evaluated in terms of the length of time that streets are blocked by train movements, and the length of vehicle queues that result from railroad crossings. To evaluate the traffic operations and queue spill back at railroad crossings, a queue study was performed along with the traffic counts. Queues were observed for 8 study locations (Table 3.12-11). This table presents the (worst case scenario) queues during the AM and PM peak periods when the longest observed trains passed through the eight study locations. Table 3.12-11 provides data from the queue observation study.

TABLE 3.12-11: OBSERVED QUEUES (IN VEHICLES) AT RAILROAD CROSSINGS FOR EXISTING CONDITIONS

NODE	INTERSECTION	TRAIN PASSAGE TIME (S)		AM				PM			
		AM	PM	NB	WB	SB	EB	NB	WB	SB	EB
14	S Market St [SR-273] & Breslauer Way	90	95	0	3	3	0	0	24	7	1
15	S Market St [SR-273] & S Bonneyview Rd	73	100	8	15	8	2	15	30	5	6
16	S Market St [SR-273] & Girvan Ln	90	82	4	1	1	0	7	10	4	3
17	Shasta Street & Railroad Crossing	115	115	-	13	-	13	-	13	-	11
18	Tehama Street & Railroad Crossing	125	139	-	0	-	0	-	0	-	8
19	Yuba Street & Railroad Crossing	125	107	-	1	-	1	-	1	-	9
20	Placer Street & Railroad Crossing	134	110	-	4	-	4	-	4	-	18
21	South Street & Railroad Crossing	75	110	-	14	-	14	-	14	-	30

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 11 (MAY 2013).

These observed queues are based on the longest train that occurred during the AM peak period that took between 73 seconds and 134 seconds to pass through the study locations. Similarly, the PM peak hour train took between 95 seconds and 139 seconds to pass through the study intersections. The average headway between train counts that were performed over three weekdays was found to be one hour and 13 minutes.

For signalized intersection locations, queues on the westbound approaches of locations 14, 15 and 16 were observed to be the longest as the approach would be stopped during train passage. Given that the distance between intersections 14 and 16 and Eastside Road is less than 50 feet, these queues could cause blockage at the following intersections:

1. **Breslauer Way & Eastside Road** – NB and SB approaches of Eastside Road would be blocked due to WB queues at intersection 14. However, since the intersection is so close to the railroad crossing, drivers would be able to notice the gate arm and should be able to refrain from blocking Eastside Road.

2. **Girvan Lane & Eastside Road** – NB and SB approaches of Eastside Road would be blocked due to WB queues at intersection 16. However, since the intersection is so close to the railroad crossing, drivers would be able to notice the gate arm and should refrain from blocking Eastside Road.

For unsignalized locations, the longest queues were observed at the crossings of Shasta Street, Placer Street and South Street. The available storage space, calculated assuming an average of 25 feet per vehicle, can be compared to the measured queues.

1. **Shasta Street** –The nearest street intersections are 250 feet east and west of the railroad crossing. Because Shasta Street is four-lanes wide, it can hold about 20 cars in each direction. The observed queues indicate that this railroad crossing should not block adjacent street intersections.

2. **Placer Street** – The nearest street intersections are 250 feet east and west of the railroad crossing. Because Placer Street is four-lanes wide, it can hold about 20 cars in each direction. The observed queues indicate that this railroad crossing should not block adjacent street intersections. Note that vehicles on Railroad Avenue—a two-lane local street running parallel to the tracks—would be blocked by a two- or four-vehicle queue.

3. **South Street** –The nearest street intersection is South Street & California Street, about 350 feet to the east. The observed westbound queue is not expected to exceed the 28-vehicle storage capacity. To the west, the intersection with Court Street is nearly 500 feet away, leaving room for 40 cars. The observed queues indicate that this railroad crossing should not affect adjacent street intersections. Note that vehicles on Railroad Avenue—a two-lane local street running parallel to the tracks—would be blocked by a two- or four-vehicle queue.

Since 2009, only one accident involving a train and a vehicle has been reported at the study area intersections shown in Table 3.12-11 (Moody Flats TIA, May 2013, Kittelson & Associates, Inc., pg. 29). Generally, the study area intersections shown in Table 3.12-11 have good advance warning signage for railroad crossings including pavement markings, noticeable gate arms, and roadside signs.

EXISTING SAFETY CONDITIONS

Collision records were obtained from Caltrans for the 36-month period between January 1, 2008 and December 31, 2010. The records cover select study locations, including SR 273 and several streets in downtown Redding near the railroad crossings.

An analysis of the data found that in the last three years, SR 273 has had crash rates (per million vehicles entering its intersections) that are consistent with the Caltrans' averages. The Tehama Street and Shasta Street segments from Pine Street to Market Street-in downtown Redding—have experienced crash rates significantly higher than the average. One collision involving a train has been reported between June 7, 2009 to June 6, 2012 (Moody Flats TIA, May 2013, Kittelson & Associates, Inc., pg 29).

3.12.4 REGULATORY SETTING

Existing transportation polices, laws, and regulations that apply to the Proposed Project are summarized below. This information provides a context for the impact discussion related to the Project's consistency with applicable regulatory conditions and development of significance criteria for evaluating Project impacts.

STATE

California Department of Transportation

California Department of Transportation (Caltrans) policies are applicable to all state routes including Interstate 5, and are summarized in the Caltrans' "Guide for the Preparation of Traffic Impact Studies" (State of California Department of Transportation, December 2002). These

guidelines identify when a traffic impact study is required, what should be included in the study, analysis scenarios, and guidance on acceptable analysis methodologies.

Caltrans endeavors to maintain a target service level of LOS C on state highway facilities. However, this may not always be feasible and a lower service level may be acceptable.

Local

Shasta County General Plan

The Circulation Element of the Shasta County General Plan describes the following policies pertinent to this Project.

Policy C-6b: In order to adequately plan for the future circulation network regarding highways, roads, and streets, the General Plan shall use the functional hierarchy and related policies shown in Table RS-1 in its circulation planning. Arterial and collectors are further divided into urban and rural roads. Urban roads generally require more right-of-way per lane, more lanes, and full urban improvements such as curbs, gutters, and sidewalks. All projects shall be evaluated as to their conformance with this circulation network.

Policy C-6d: New commercial and industrial development accessing arterial and collectors shall provide access controls for public safety by means such as limiting the location and number of driveway access points and controlling ingress and egress turning movements.

Policy C-6k: Shasta County shall adopt the following Level of Service (LOS) standards for considering any new roads:

- Rural arterial and collectors - LOS C
- Urban/suburban arterial and collectors - LOS C

Policy C-6l: New development which may result in exceeding LOS E on existing facilities shall demonstrate that all feasible methods of reducing travel demand have been attempted to reach LOS C. New development shall not be approved unless traffic impacts are adequately mitigated. Such mitigation may take the form of, but not limited to, the following:

- Provision of capacity improvements to the specific road link to be impacted, the transit system, or any reasonable combination;
- Provision of demand reduction measures included as part of the project design or project operation or any feasible combination

Policy C-8a: Existing accessibility to rail service in the SCR and Northeast Shasta Planning Areas shall be protected by the development pattern from preemption by incompatible land uses. Opportunities for increasing accessibility to existing rail service shall be preserved by the development pattern.

Policy C-8b: Working in conjunction with Caltrans, the County shall designate and provide signed truck routes, ensure that adequate pavement depth, lane widths, loading areas, bridge capacities, vertical height of overpasses and utility lines, and turn radii are maintained on the designated truck routes, and prohibit commercial truck traffic from non-truck routes except for deliveries.

Policy C-8c: Adequate truck access to off-street loading areas in commercial and industrial areas shall be provided in all new development applications.

Policy C-11b: The County shall consider viable methods and refine its strategy for assessing fees on new development to address the impact of additional development on the County's transportation system. New development shall provide a prorata share of its financial impact on the County's transportation system.

Policy C-11e: The County shall assess fees on new development to address the impact of additional development on the County's transportation system.

City of Shasta Lake General Plan

The City of Shasta Lake General Plan Circulation Element contains the following policies and implementation measures, which could apply to the proposed Project:

Policy C-a: Monitor, maintain and improve, as necessary, the operation, safety and performance of the street system, including roadway surfaces, capacity, and traffic signals. For capacity and operational purposes, strive to attain a Level of Service (LOS) C to the maximum degree feasible, so that potential traffic congestion on streets and at intersections is minimized;

Implementation Measure C-(8): Continue to require that new development pays a fair share of the costs of street and other traffic and transportation improvements based on traffic generated and impacts on service levels;

Implementation Measure C-(14): Development shall mitigate any adverse impacts of a proposed development project on the existing street system. This may include necessary street improvements, traffic signs, or signals.

City of Redding General Plan

The circulation element of the City of Redding General Plan contains the following policies that apply to the proposed Project.

Policy T1A: Establish the following peak-hour LOS standards for transportation planning and project review. They reflect the special circumstances of various areas of the community:

- Use LOS C - for most arterial streets and their intersections.
- Use LOS D - for the Downtown area where vitality, activity, and pedestrian and transit use are primary goals

- Use LOS D - for streets within the State highway system and interchanges.
- Use LOS D - for river-crossing street corridors whose capacity is affected by adjacent intersections.

SUMMARY OF REGULATORY REQUIREMENTS

The study area intersections, roadway and freeway segments are controlled by different jurisdictions (Shasta County, City of Shasta Lake, City of Redding, Caltrans). The appropriate jurisdiction LOS threshold summarized below is used as the target LOS for each individual location.

- Caltrans - LOS C is considered an acceptable LOS threshold. Freeway mainline segments that fall within the City of Redding have a target LOS of D or better.
- Shasta County – LOS C is considered an acceptable LOS threshold.
- City of Shasta Lake – LOS C is considered an acceptable LOS threshold.
- City of Redding - LOS C is considered an acceptable LOS threshold. LOS D is considered "tolerable" for the downtown area and for streets within the state highway system and interchanges.

3.12.5 THRESHOLDS OF SIGNIFICANCE

Standards of significance define the thresholds used to analyze the impacts of a proposed project. Consistent with CEQA guidelines, the proposed Project would have a significant impact on the environment if it would:

- Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicles trips, the volume to capacity ratio on roads, or congestion at intersections)
- Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)
- Result in inadequate emergency access
- Result in inadequate parking capacity
- Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)

Traffic Operations Impact Thresholds

The following thresholds are based on LOS standards adopted by Shasta County and Caltrans.

Signalized Intersection

A traffic impact at signalized intersection is considered significant when:

- The traffic generated by the project degrades level of service (LOS) from an acceptable LOS (A, B, C) without project to an unacceptable LOS (D, E or F) with the project;
- The level of service (without project) is unacceptable and project generated traffic increases the average vehicle delay by five seconds or more.

Unsignalized Intersection

- The traffic generated by the project degrades level of service (LOS) from an acceptable LOS (A, B, C) without project to an unacceptable LOS (D, E or F) with the project;
- The level of service (without project) is unacceptable and project generated traffic increases the worst approach delay by five or more seconds.

Roadway Segments

- The traffic generated by the project degrades level of service (LOS) from an acceptable LOS (A, B, C) under without project to an unacceptable LOS (D, E or F) with the project;
- The level of service without project is unacceptable and project generated traffic increases the vehicle v/c ratio by more than 0.05.

3.12.6 IMPACTS AND MITIGATION MEASURES

EXISTING PLUS PROJECT TRAFFIC

Intersection Operations

Project trips were assigned to the study intersections in accordance with the trip generation estimates and distribution percentages described in Section 3.12.3. Those trips were then added to the existing volumes to yield “existing plus project” conditions.

The Project-only trips were added to the Existing (No Project) volumes to obtain Existing plus Project volumes (Figures 3.12-9 and 3.12-10). The results of the Existing plus Project traffic analysis shown in Table 3.12-12 indicate that all of the study intersections are forecast to operate at acceptable levels of service during the weekday AM and PM peak hours.

TABLE 3.12-12: EXISTING PLUS PROJECT CONDITIONS - INTERSECTION LEVEL OF SERVICE ANALYSIS

INTERSECTION	TARGET LOS	CONTROL	PEAK HOUR	EXISTING NO PROJECT			EXISTING PLUS PROJECT		
				DELAY	LOS	MEET SIGNAL WARRANT	DELAY	LOS	MEET SIGNAL WARRANT
1. I-5 NB Ramps & Old Oregon Trail	C	TWSC	AM	10.4	B	No	11.7	B	No
			PM	9.4	A	No	9.5	A	No
2. I-5 SB Ramps & Old Oregon Trail	C	TWSC	AM	12.6	B	No	13.2	B	No
			PM	10.1	B	No	10.3	B	No
3. Wonderland Blvd & Old Oregon Trail	C	TWSC	AM	9.1	A	No	11.1	B	No
			PM	8.8	A	No	9.5	A	No
4. I-5 SB Off-Ramp & Shasta Dam Blvd	C	Signal	AM	17.3	B	---	17.2	B	---
			PM	10.5	B	---	10.5	B	---
5. Cascade Blvd & Shasta Dam Blvd	C	Signal	AM	16.9	B	---	16.9	B	---
			PM	17.7	B	---	17.7	B	---
6. Shasta Park Dr & Shasta Dam Blvd	C	TWSC	AM	10.1	B	No	10.1	B	No
			PM	9.9	A	No	9.9	A	No
7. I-5 NB Ramps & Pine Grove Ave	C	TWSC	AM	14.2	B	No	14.4	B	No
			PM	16	C	No	16.1	C	No
8. I-5 SB Ramps & Pine Grove Ave	C	TWSC	AM	11.2	B	No	11.3	B	No
			PM	11.9	B	No	11.9	B	No
9. I-5 NB Ramps & Oasis Rd	D	Signal	AM	11.3	B	---	11.4	B	---
			PM	9.4	A	---	9.4	A	---
10. I-5 SB Ramps & Oasis Rd	D	Signal	AM	20.8	C	---	20.8	C	---
			PM	12.9	B	---	12.9	B	---
11. N Market St [SR-273] & Caterpillar Rd	D	Signal	AM	36.8	D	---	36.9	D	---
			PM	48.5	D	---	48.5	D	---
12. I-5 NB Ramps & SR-299 [Lake Blvd E]	D	Signal	AM	5.8	A	---	5.7	A	---
			PM	7.5	A	---	7.5	A	---
13. I-5 SB Ramps & SR-299 [Lake Blvd E]	D	Signal	AM	20.8	C	---	20.8	C	---
			PM	17.9	B	---	18.1	B	---
14. S Market St [SR-273] & Breslauer Way	D	Signal	AM	30.1	C	---	28.7	C	---
			PM	23.7	C	---	25	C	---
15. S Market St [SR-273] & S Bonneyview Rd	D	Signal	AM	31.9	C	---	32.1	C	---
			PM	37.6	D	---	39.5	D	---

INTERSECTION	TARGET LOS	CONTROL	PEAK HOUR	EXISTING NO PROJECT			EXISTING PLUS PROJECT		
				DELAY	LOS	MEET SIGNAL WARRANT	DELAY	LOS	MEET SIGNAL WARRANT
16. S Market St [SR-273] & Girvan Ln	D	Signal	AM	20.2	C	---	20.9	C	---
			PM	26.9	C	---	27.8	C	---
22. Wonderland Blvd & Project Driveway	C	TWSC	AM	-	-	-	11.3	B	No
			PM	-	-	-	9.7	A	No

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 19 (MAY 2013).
Notes: LOS based on HCM2000
Signal warrant is based on Peak Hour Warrant
Control delays for unsignalized intersections are for the worst movement of the intersection (TWSC) or intersection average (AWSC)

Existing Plus Project Roadway Segments

The roadway level of service methodology is based on volume to capacity threshold and is insensitive to the direct input of percentage of heavy vehicles unlike the intersection LOS methodology. Therefore, to account for a significant increase in percentage of trucks on the study area roadway segments, Project trips were converted into Passenger Car Equivalents (PCE) using a factor of 2.5 for heavy vehicles. The increase in volume was then compared to the volume to capacity threshold to forecast the LOS. Table 3.12-13 presents the roadway segment LOS under the Existing plus Project conditions.

TABLE 3.12-13: EXISTING PLUS PROJECT CONDITIONS - ROADWAY LEVEL OF SERVICE ANALYSIS

ROADWAY SEGMENT	ROADWAY TYPE	NUMBER OF LANES	EXISTING NO PROJECT			EXISTING PLUS PROJECT		
			DAILY VOLUME[1]	LOS	V/C[2]	DAILY VOLUME[1]	LOS	V/C[2]
Shasta Park Dr between Project Dwy and Shasta Dam Blvd	Local Street	2	378	A	0.10	378	A	0.10
Shasta Dam Blvd between Shasta Park Dr and Ashby Rd	Minor Collector	2	3,145	A	0.21	3,252	A	0.22
Shasta Dam Blvd between Ashby Rd and Cascade Blvd	Major Collector	2	14,589	**D**	0.81	14,726	**D**	0.82
Black Canyon Rd between Project Dwy and Red Bluff Ave	Local Street	2	538	A	0.14	538	A	0.14
Old Oregon Trail between Wonderland Blvd and I-5SB Ramps	Minor Collector	2	2,995	A	0.20	5,723	A	0.38
Old Oregon Trail between I-5SB Ramps and I-5NB Ramps	Minor Collector	2	2,578	A	0.17	3,942	A	0.26
Wonderland Blvd between Old Oregon Trail and Project Dwy	Minor Collector	2	2,995	A	0.20	5,723	A	0.38

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 20 (MAY 2013).
NOTES: [1]Daily Volume in Passenger Car Equivalents (PCE).
[2]The LOS E maximum service volume was used to compute the V/C ratio.

With the exception of Shasta Dam Boulevard between Ashby Road and Cascade Boulevard, all study area roadway segments are forecast to operate at an acceptable LOS under the Existing plus Project conditions. Notably, the Shasta Dam Boulevard segment was found to operate unacceptably even without the Project - under Existing (No Project) conditions.

Existing Plus Project Freeway Segments

Project only trips on the freeway mainline segments were added to the Existing (No Project) freeway segment volumes to estimate Existing plus Project volumes on the freeway segments. The percentages of heavy vehicles were increased by adding the Project truck trips to the overall number of trucks on the freeway (estimated by using Caltrans data on volume and percentage of trucks on I-5) and recalculating the percentage of trucks on each individual segment.

The freeway segment LOS results are presented in Tables 3.12-14 and 3.12-15. All segments except I-5 NB between SR 299 and SR 44 in the northbound direction are forecast to operate at acceptable LOS D or better with the Project.

Table 3.12-14: Existing plus Project Condition - Freeway Level of Service Analysis (I-5NB)

FREEWAY	SECTION	FROM	TO	AM PEAK			PM PEAK		
				AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]	AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]
I-5NB	1	North	Old Oregon Tr	63.00	12.76	B	63.00	15.03	B
	2	Old Oregon Tr	Shasta Dam	63.00	15.14	B	63.00	16.62	B
	3	Shasta Dam	Pine Grove	64.50	11.38	B	64.50	14.12	B
	4	Pine Grove	Oasis	64.50	12.56	B	64.50	16.23	B
	5	Oasis	SR 273	64.50	13.74	B	64.50	19.67	C
	6	SR 273	Twin View	63.00	18.78	C	62.90	26.10	D
	7	Twin View	SR 299	63.00	22.16	C	61.75	30.17	D
	8	SR 299	SR 44	62.54	27.98	D	54.94	40.63	**E**
	9	SR 44	South	64.50	18.78	C	64.50	21.88	C

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 21 (MAY 2013).
NOTES: [1] Density expressed in pc/mi/ln, passenger cars per mile per lane
[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 23, HCM 2000
Bold indicates locations that do not satisfy Caltrans deficiency criteria

TABLE 3.12-15: EXISTING PLUS PROJECT CONDITION - FREEWAY LEVEL OF SERVICE ANALYSIS (I-5SB)

FREEWAY	SECTION	FROM	TO	AM PEAK			PM PEAK		
				AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]	AVERAGE SPEED (MPH)	DENSITY 1 (PC/MI/LN)	LOS [2]
I-5SB	1	North	Old Oregon Tr	63.00	9.17	A	63.00	9.37	A
	2	Old Oregon Tr	Shasta Dam	63.00	12.21	B	63.00	10.79	A
	3	Shasta Dam	Pine Grove	64.50	11.78	B	64.50	9.27	A
	4	Pine Grove	Oasis	64.50	11.67	B	64.50	10.74	A
	5	Oasis	SR 273	64.50	15.38	B	64.50	11.86	B
	6	SR 273	Twin View	63.00	19.29	C	63.00	15.57	B
	7	Twin View	SR 299	63.00	21.38	C	63.00	18.19	C
	8	SR 299	SR 44	62.71	27.28	D	63.00	23.56	C
	9	SR 44	South	64.50	13.40	B	64.50	13.60	B

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 22 (MAY 2013).
NOTES: [1] Density expressed in pc/mi/ln, passenger cars per mile per lane
[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 23, HCM 2000
Bold indicates locations that do not satisfy Caltrans deficiency criteria

ADDITIONAL PROJECT EVALUATION

This section includes evaluation of Project transportation issues that are not related to thresholds of significance for impact criteria. These issues include the Project effects on pavement conditions and an assessment of truck turning movements at intersections.

Project Effects on Pavement Conditions

The effect of traffic on pavement is measured through use of the Traffic Index (TI). The Traffic Index is a measure of the number of equivalent single-axle loads (ESAL) expected in the traffic lane over the pavement design life of the facility. Traffic indexes for the study roadway segments were calculated in accordance to the *California Highway Design Manual*, Chapter 610: Pavement Engineering Considerations.

$$\textit{Traffic Index} = 9.0 \times (\textit{ESAL} \times \textit{Lane Distribution Factor} / 10^6)^{0.119}$$

The resulting TI provides an estimate of traffic loading during the pavement design life. The primary factor for determining pavement load is the projected average annual daily truck volumes. The TI calculations are presented by lane.

Table 3.12-16 shows the No Project and plus Project TIs for the study roadway segments. The equivalent TIs for the study ramps are presented in Table 3.12-17.

The analysis indicates that the Project would increase Traffic Index requirements slightly on the Shasta Dam Boulevard segments and more significantly on the two Old Oregon Trail segments. Project traffic through the Wonderland Boulevard segment from Old Oregon Trail to the Project's driveway is also expected to result in higher Traffic Index requirements. No impacts are expected at the Shasta Park Drive or Black Canyon Road segments due to minimal Project traffic.

At the I-5 freeway ramps, only the I-5 NB off-ramp and I-5 SB on-ramp at Old Oregon Trail would have significantly higher Traffic Index requirements in the plus Project scenario. The Market Street (SR 299) NB on-ramp is expected to have a slightly larger 10-Year Traffic Index compared to No Project conditions.

TABLE 3.12-16: ROAD SEGMENTS NO PROJECT AND PLUS PROJECT TRAFFIC INDEXES

LOCATION	TRAFFIC INDEX	NO PROJECT		PLUS PROJECT	
		EB OR NB	WB OR SB	EB OR NB	WB OR SB
		LANE 1	LANE 1	LANE 1	LANE 1
Shasta Park Drive – Project Dwy. To Shasta Dam Blvd.					
10 Year Design Constant - TI_{10}	TI_{10}	5.00	5.00	5.00	5.00
20 Year Design Constant - TI_{20}	TI_{20}	5.50	5.50	5.50	5.50
30 Year Design Constant - TI_{30}	TI_{30}	5.50	5.50	5.50	5.50
Shasta Dam – Shasta Park to Ashby Rd.					
10 Year Design Constant - TI_{10}	TI_{10}	6.50	6.50	**7.50**	**7.50**
20 Year Design Constant - TI_{20}	TI_{20}	7.00	7.00	**8.00**	**8.00**
30 Year Design Constant - TI_{30}	TI_{30}	7.50	7.50	**8.50**	**8.50**
Shasta Dam – Ashby Rd. to Cascade					
10 Year Design Constant - TI_{10}	TI_{10}	7.50	7.50	**8.00**	**8.00**
20 Year Design Constant - TI_{20}	TI_{20}	8.00	8.00	**9.00**	**9.00**
30 Year Design Constant - TI_{30}	TI_{30}	8.50	8.50	**9.50**	**9.00**
Black Canyon – Project Dwy to Red Bluff Ave.					
10 Year Design Constant - TI_{10}	TI_{10}	5.50	5.00	5.50	5.00
20 Year Design Constant - TI_{20}	TI_{20}	6.00	5.50	6.00	5.50
30 Year Design Constant - TI_{30}	TI_{30}	6.00	6.00	6.00	6.00
Old Oregon Trail – Wonderland to I-5 SB Ramps					
10 Year Design Constant - TI_{10}	TI_{10}	7.00	7.00	**10.50**	**10.50**
20 Year Design Constant - TI_{20}	TI_{20}	7.50	7.50	**11.50**	**11.50**
30 Year Design Constant - TI_{30}	TI_{30}	8.00	8.00	**12.00**	**12.00**
Old Oregon Trail – I-5 SB Ramps to I-5 NB Ramps					
10 Year Design Constant - TI_{10}	TI_{10}	6.00	7.50	**8.50**	**10.50**
20 Year Design Constant - TI_{20}	TI_{20}	6.50	8.00	**9.50**	**11.00**
30 Year Design Constant - TI_{30}	TI_{30}	7.00	8.50	**10.00**	**12.00**
Wonderland Blvd. -- Old Oregon Trail to Project Driveway					
10 Year Design Constant - TI_{10}	TI_{10}	7.00	7.00	**10.50**	**10.50**
20 Year Design Constant - TI_{20}	TI_{20}	7.50	7.50	**11.50**	**11.50**
30 Year Design Constant - TI_{30}	TI_{30}	8.00	8.00	**12.00**	**12.00**

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 27 (MAY 2013).

Note: Dark shading and bold numbers indicate Traffic Indexes that are higher in the plus Project scenario than in the No Project scenario.

TABLE 3.12-17: RAMPS' NO PROJECT AND PLUS PROJECT TRAFFIC INDEXES

Location	NO PROJECT[1]					PLUS PROJECT[1]				
	NB On	NB Off	SB On	SB Off	SB Off[2]	NB On	NB Off	SB On	SB Off	SB Off[2]
Old Oregon Trail										
10 Year Design Constant - TI 10	9.0	9.0	9.0	9.0		9.0	**10.5**	**10.5**	9.0	
20 Year Design Constant - TI 20	10.0	10.0	10.0	10.0		10.0	**11.5**	**11.5**	10.0	
30 Year Design Constant - TI 30	11.0	11.0	11.0	11.0		11.0	**12.0**	**12.0**	11.0	
Shasta Dam Blvd										
10 Year Design Constant - TI 10	**9.0**			9.0		9.0			9.0	
20 Year Design Constant - TI 20	10.0			10.0		10.0			10.0	
30 Year Design Constant - TI 30	11.0			11.0		11.0			11.0	
Pine Grove Ave										
10 Year Design Constant - TI 10	9.0			9.0		9.0			9.0	
20 Year Design Constant - TI 20	10.0			10.0		10.0			10.0	
30 Year Design Constant - TI 30	11.0			11.0		11.0			11.0	
Oasis Rd										
10 Year Design Constant - TI 10	9.0			9.0		9.0			9.0	
20 Year Design Constant - TI 20	10.0			10.0		10.0			10.0	
30 Year Design Constant - TI 30	11.0			11.0		11.0			11.0	
N Market St (SR 273)										
10 Year Design Constant - TI 10	9.0			9.0	9.0	**9.5**			9.0	9.0
20 Year Design Constant - TI 20	10.0			10.0	10.0	10.0			10.0	10.0
30 Year Design Constant - TI 30	11.0			11.0	11.0	11.0			11.0	11.0
SR 299										
10 Year Design Constant - TI 10	9.0			9.0		9.0			9.0	

Location	NO PROJECT[1]					PLUS PROJECT[1]				
	NB On	NB Off	SB On	SB Off	SB Off[2]	NB On	NB Off	SB On	SB Off	SB Off[2]
20 Year Design Constant - TI 20	10.0			10.0		10.0			10.0	
30 Year Design Constant - TI 30	11.0			11.0		11.0			11.0	

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 28 (MAY 2013).
Notes: [1]Truck Traffic Class = Medium dictates that traffic indexes should not be less than 9.0, 10.0, or 11.0 for 10-, 20-, and 30-year designs, respectively.
[2]This column is for ramps with a second lane
Dark shading and bold numbers indicate Traffic Indexes that are higher in the plus Project scenario than in the No Project scenario.

Truck Turning Movements

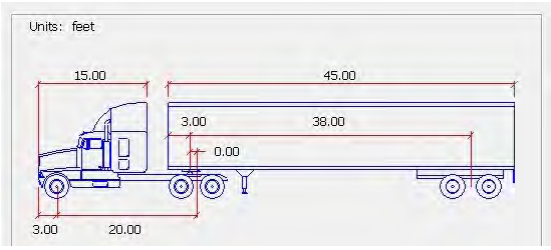


FIGURE 3.12-11: SCHEMATIC OF AUTOTURNS DESIGN VEHICLE

For each turning movement for which Project trips are greater than zero, the ability of California standard 65-foot long design vehicles to make turns within the existing available pavement was evaluated. Checks were also made to determine if turns can be made without encroaching on adjacent unpaved areas and without encroaching on travel lanes for on-coming traffic. The AutoTurns software package was used to overlay truck turning paths on aerial photos of the existing intersections to make the determinations.

The vehicle assumed for this analysis was the California standard 65-foot design vehicle with a 45-foot trailer (CA LEGAL-50, see Figure 3.12-11). When its paths were applied to the study intersections, the following turning conditions were identified:

Intersection 1 – Old Oregon Trail & I-5 NB Ramps

Trucks exiting northbound I-5 and turning left onto Old Oregon Trail must encroach into the oncoming travel lane to complete their turn within existing pavement. Since these trucks must stop and wait for adequate gaps regardless, no revisions are needed.

Intersection 2 – Old Oregon Trail & I-5 SB Ramps

No turning movement problems are expected.

Intersection 3 – Old Oregon Trail & Wonderland Boulevard

The Project would not add any right- or left-turning vehicles at this intersection. Therefore, no turning movement problems are expected.

Intersection 4 – Shasta Dam Boulevard & I-5 SB Ramp

Trucks exiting southbound I-5 and turning right onto Shasta Dam Blvd must use the shoulder if they want to keep their turn within the outside lane. However, because a signal is in place at this intersection, trucks can turn onto the inside lane without disrupting traffic. As a result, no revisions are needed.

Intersection 5 – Shasta Dam Boulevard & Cascade Boulevard

The Project would not add any right- or left-turning vehicles at this intersection. Therefore, no turning movement problems are expected.

Intersection 6 – Shasta Dam Boulevard & Cascade Boulevard

The Project would not add any right- or left-turning vehicles at this intersection. Therefore, no turning movement problems are expected.

Intersection 7 – Pine Grove Avenue & I-5 NB Ramps

Trucks entering northbound I-5 from eastbound Pine Grove Avenue may need to use the roadway shoulder to complete their turn. Since it is a minimal intrusion, no revisions are needed.

Intersection 8 – Pine Grove Avenue & I-5 SB Ramps

Trucks exiting southbound I-5 and turning left onto Pine Grove Avenue must encroach onto opposing travel lanes, especially the westbound left turn (i.e., vehicles wishing to enter southbound I-5). Because vehicles on the westbound left turn lane must yield to eastbound Pine Grove Avenue traffic, there may be a queue in the path of the trucks. Re-striping the pavement or adding a “KEEP CLEAR” marking to maintain a clear path is recommended.

Intersection 9 – Oasis Road & I-5 NB Ramps

Trucks entering northbound I-5 from eastbound Oasis Road are expected to have trouble completing turns in the narrow intersection. Because this problem would be solved by the proposed Oasis Road widening, no mitigation measures are recommended. The *Oasis Road Specific Plan*, prepared by the City of Redding in 2006, outlines several improvements to Oasis Road, contingent on development that is planned at this location. This analysis assumes completion of these improvements prior to 2030, based on the recent completion of first phase improvements to this area. The interchange improvement project would build upon the recent completion of a first phase of improvements, construction of a loop on-ramp from westbound Oasis Road to southbound I-5 and traffic signals at the ramp intersections, which are part of the “Existing” conditions. In addition to these improvements, the cumulative scenario assumes that Oasis Road will be widened to four lanes in each direction at the I-5 interchange area, as shown in the reference material presented in Appendix 11 of **Appendix U**.

Intersection 10 – Oasis Road & I-5 SB Ramps

Trucks exiting southbound I-5 and turning left onto Oasis Road may encroach into the opposing travel lane, near its stop bar. Because the intrusion is minimal and the Oasis Road widening would alleviate it, no additional revisions are recommended.

Intersection 11 – N Market Street (S.R. 273) & Caterpillar Road

No turning movement problems are expected.

Intersection 12 – S.R. 299 & I-5 NB Ramps

No turning movement problems are expected.

Intersection 13 – S.R. 299 & I-5 SB Ramps

No turning movement problems are expected.

Intersection 14 – S.R. 273 & Brensaluer Way

The Project would not add any right- or left-turning vehicles at this intersection. Therefore, no turning movement problems are expected.

Intersection 15 – S.R. 273 & S Bonneyview Road

The Project would not add any right- or left-turning vehicles at this intersection. Therefore, no turning movement problems are expected.

Intersection 16 – S.R. 273 & Girvan Lane

The Project would not add any right- or left-turning vehicles at this intersection. Therefore, no turning movement problems are expected.

Intersection 22 – Wonderland Boulevard & Project Driveway

Turning templates have been overlaid over the existing Wonderland Boulevard segment, at the approximate location and angle of the proposed Project driveway as shown in the site plan. No turning movement problems are expected if the Project sponsor designs the Project driveway with (a) a flared approach and departure and/or (b) a skewed intersection angle that allows trucks to access the Project easily from Wonderland Boulevard (south of the driveway). These design features will be a condition of Project approval imposed by the County.

IMPACTS AND MITIGATION MEASURES

Impact 3.12-1: The Project would cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system. (Less than Significant with Mitigation)

Impact Criterion 1 is for situations where the addition of Project traffic would result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections. This section includes evaluation of intersections and local road segments, for both the Existing plus Project and Cumulative plus Project scenarios.

The Project-only trips were added to the Existing (No Project) volumes to obtain Existing plus Project volumes (Figures 3.12-9 and 3.12-10). The results of the Existing plus Project traffic analysis shown in Table 3.12-12 indicate that all of the study intersections are forecast to operate at acceptable levels of service during the weekday AM and PM peak hours.

Because the Project traffic added to existing traffic would not cause any study intersection to exceed level of service standards, the Project impact on study intersections would be **less than significant.**

However, the increase in truck trips on Old Oregon Trail and Wonderland Boulevard from the I-5 north-bound ramp to the Project access road would be substantial, as documented in Table 3.12-16. Increased road maintenance would be required due to increased heavy truck traffic in order to keep pavement conditions in proper and safe operating conditions. The increase in traffic index and the associated increase in pavement deterioration that may result from heavy truck trips generated by the Project would be considered **potentially significant**.

Mitigation Measure 3.12-1 requires the Project Applicant to pay an annual road maintenance fee for increased wear on county roads. This fee will be $0.03 per ton of construction material hauled from the Project location by truck. The fee will be used to cover the costs of increased maintenance and construction on Old Oregon Trail and Wonderland Boulevard between the I-5 north bound ramp and the Project access road. Implementation of Mitigation Measure 3.12-1 would ensure that the County has adequate funding to properly maintain pavement conditions on County roads in the Project vicinity, and would reduce this impact to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.12-1*: The Project Applicant shall pay an annual road maintenance fee to Shasta County for increased wear on county roads. This fee will be $0.03 per ton of construction material hauled from the project location by truck. The fee will be used to cover the costs of increased maintenance and construction on Old Oregon Trail and Wonderland Boulevard between the I-5 north bound ramp and the project access road. Beginning the second year, the $0.03 per ton fee shall be annually adjusted automatically by the percentage equal to percentage change in the Engineering News Record's ENR.com Construction Cost Index rounded up to the nearest tenth of a cent.*

Impact 3.12-2: The Project would exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways. (Less than Significant)

Project-only trips on the freeway mainline segments were added to the Existing (No Project) freeway segment volumes to estimate Existing plus Project volumes on the freeway segments. The percentages of heavy vehicles were increased by adding the Project truck trips to the overall number of trucks on the freeway (estimated by using Caltrans data on volume and percentage of trucks on I-5) and recalculating the percentage of trucks on each individual segment.

The freeway segment LOS results are presented in Tables 3.12-13 and 3.12-14. All segments except I-5 NB between SR 299 and SR 44 in the northbound direction are forecast to operate at acceptable LOS D or better with the Project.

The Project would add traffic to one segment of northbound I-5 that is already operating at a deficient LOS E during the PM peak hour without the Project. The Project traffic contribution would be 0.13 percent of the total Existing plus Project traffic. Assuming an hourly capacity of 4,000 (2,000 per freeway lane), the Project would add traffic that is less than one percent of the capacity. Therefore, the Project impact would be **less than significant.**

MITIGATION MEASURES

None required.

Impact 3.12-3: The Project would result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks. (Less than Significant)

No airports exist in the vicinity of the Project. The Moody Flats Quarry Project would not result in a change in air traffic patterns, increase air traffic levels or cause substantial safety risks for air travel. Implementation of the Project would have a **less than significant** impact on air traffic.

MITIGATION MEASURES

None required.

Impact 3.12-4: The Project would substantially increase hazards due to a design feature or incompatible uses. (Less than Significant with Mitigation)

Existing plus Project Railroad Crossing Analysis

The proposed Project is expected to generate about 200 annual train trips based on 80-car unit trains with 100-ton capacity per car and a maximum of two trains per day. The Project- generated trains are expected to be shorter than the longest existing train that was observed for the existing queue analysis in the Existing Railroad Crossings section. The Existing plus Project analysis assumes a conservative scenario of two Project-generated trains, one during the AM peak hour and the

other during the PM peak hour. With an average headway of 1 hour and 13 minutes, there would be sufficient time between the departure of the No Project train and arrival of plus Project train (i.e., the train added by the Moody Flats Project) to dissipate traffic queues at the intersections. As a result, the queues that would occur under the Project scenario are expected to be the same or better than the observed queues under No Project conditions. As a result, implementation of the Project would have a **less than significant** impact on the length of queues at railroad crossings.

Collision Rates

According to the Traffic Study completed for the proposed Project, the Project is not expected to add significant traffic to the downtown Redding roadways identified as having higher-than-average crash rates. As described previously in this section, the Tehama Street and Shasta Street segments from Pine Street to Market Street in downtown Redding have experienced crash rates significantly higher than the average. The Proposed Project is not anticipated to result in increased traffic at these particular intersections in downtown Redding. As such, implementation of the Project would have a **less than significant** impact on collision rates.

Truck Turning Movements

As described previously in this Draft EIR section, and according to the Traffic Study completed for the proposed Project, trucks exiting southbound I-5 and turning left onto Pine Grove Avenue must encroach onto opposing travel lanes, especially the westbound left turn (i.e., vehicles wishing to enter southbound I-5). Because vehicles on the westbound left turn lane must yield to eastbound Pine Grove Avenue traffic, there may be a queue in the path of the trucks. This is considered a **potentially significant** impact. Implementation of Mitigation Measure 3.12-4 would require re-striping the pavement on Pine Grove Avenue or adding a "KEEP CLEAR" marking to maintain a clear path. Implementation of Mitigation Measure 3.12-4 would reduce this impact to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.12-4*: Prior to hauling aggregate products from the site by truck, the Project Applicant shall provide funding to Shasta County in order for the County to add pavement striping and markings to Pine Grove Avenue near the southbound I-5 off-ramp. The pavement markings and striping shall be placed in the westbound travel lanes of Pine Grove Avenue, east of the I-5 southbound on-ramp. The exact location and orientation of the pavement markings and striping shall be determined by the Shasta County Department of Public Works.*

Impact 3.12-5: The Project would result in inadequate emergency access. (Less than Significant)

As shown on the Project site map in Section 2.0, the Moody Flats Quarry Project would provide two emergency access driveways in addition to the main Project entrance driveway. All emergency access points would be designed according to Shasta County standards and approved by the County Fire Department. Accordingly, implementation of the Project would have a **less than significant** impact on emergency access.

MITIGATION MEASURES

None required.

Impact 3.12-6: The Project would result in inadequate parking capacity. (Less than Significant)

For industrial uses, the County Code (Section 17.86.140) requires one parking space per employee, plus one additional parking space per 300 square feet of office space. The Moody Flats Quarry Project anticipates employing a maximum of 50 employees, and would have an office of 300 square feet or less. The Applicant would provide parking spaces for employees and visitors per County standards and submit a parking plan for County approval prior to issuance of a building permit. Thus, implementation of the Project would have a **less than significant** impact on parking capacity.

MITIGATION MEASURES

None required.

Impact 3.12-7: The Project would conflict with adopted policies, plans, or programs supporting alternative transportation. (Less than Significant)

No sidewalks or marked bicycle lanes are provided in the immediate vicinity of the proposed Project driveways, but paved shoulders on Wonderland Avenue may serve non-motorized traffic. The 2010 Regional Transportation Plan for Shasta County shows a proposed Class II bicycle lane for Old Oregon Trail, leading to Wonderland Boulevard and the proposed Project driveway.

The proposed Project is not located on Old Oregon Trail and would not interfere with any proposed bicycle lanes on this roadway. Furthermore, trucks travelling to and from the Project site would not use Old Oregon Trail road. The Moody Flats Quarry Project would not conflict with adopted policies supporting transit, bicycle or pedestrian travel. Therefore, implementation of the Project would have a **less than significant** impact on alternative transportation.

MITIGATION MEASURES

None required.

CUMULATIVE CONDITIONS TRAFFIC IMPACTS

This section provides an analysis of overall cumulative traffic impacts of the proposed Project considered along with other past, present, and probable future projects producing related impacts, as required by the State CEQA Guidelines (14 Cal. Code Regs. §15130). The purpose of this analysis is twofold: first, to determine whether the overall long-term traffic impacts of all such projects would be cumulatively significant; and second, to determine whether the Project itself would cause a "cumulatively considerable" (and thus significant) incremental contribution to any such cumulatively significant impacts. (14 Cal. Code Regs. § 15064(h), 15065(c), 15130(a), 15130(b), and 15355(b).) The required analysis first creates a broad context in which to assess the Project's incremental contribution to anticipated cumulative traffic impacts, viewed on a geographic scale beyond the Project site itself. The analysis then determines whether the Project's

incremental contribution to any significant cumulative traffic impacts from all projects is itself significant (i.e., "cumulatively considerable").

Cumulative impacts are defined in the State CEQA Guidelines section 15355 as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." A cumulative impact occurs from "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (14 Cal. Code Regs. §15355(b).)

Consistent with the State CEQA Guidelines section 15130(a), the discussion of cumulative impacts in this DEIR section focuses on significant and potentially significant cumulative impacts. The State CEQA Guidelines section 15130(b) state that:

> The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.

The proposed Project would have a significant cumulative effect if:

(1) the cumulative effects of development without the Project would not be significant and the Project's additional impact would be substantial enough, when added to the cumulative effects, to result in a significant impact; or

(2) the cumulative effects of development without the Project are already significant and the Project would contribute measurably to the effect. The standards used herein to determine measurability are that the traffic impact must exceed the identified threshold of significance.

Cumulative Traffic Methodology

The State CEQA Guidelines identify two basic methods for establishing the cumulative environment in which the Project is to be considered: the use of a list of past, present, and probable future projects (i.e., the "list approach"), or the use of adopted projections from a general plan, other regional planning document, or certified EIR for such a planning document (i.e., the "plan approach"). For this analysis, plan approach has been taken since the Project would directly influence, and would be influenced by, county-wide development activities, which were contemplated by the regional plan utilized.

The 2030 Cumulative No Project baseline conditions represent traffic conditions expected in 2030 without the proposed Project. The cumulative 2030 traffic forecast volumes were developed based on the Shasta County travel demand model maintained by the Shasta Regional Transportation Agency (SRTA). The Shasta County model was updated in 2011 to reflect the most current information on overall countywide growth rates, specific development assumptions and road

improvement projects. Thus, the geographic scope of this analysis includes regional and local transportation facilities contemplated by SRTA.

CUMULATIVE BASELINE ROADWAY IMPROVEMENTS

The analysis of 2030 Cumulative No Project conditions includes the following road improvements for 2030:

- **Improvement of the Oasis Road Interchange** - Although many potential road improvement projects in the study area were identified, only the plan to improve the Oasis Road interchange was considered likely to be funded and constructed by 2030. The *Oasis Road Specific Plan*, prepared by the City of Redding in 2006, outlines several improvements to Oasis Road, contingent on development that is planned at this location. While an anticipated completion date is not known, it is likely that it will be before 2030. The interchange improvement project would build upon the recent completion of a first phase of improvements, construction of a loop on-ramp from westbound Oasis Road to southbound I-5 and traffic signals at the ramp intersections, which are part of the "Existing" conditions. In addition to these improvements, the cumulative scenario assumes that Oasis Road will be widened to four lanes in each direction at the I-5 interchange area, as shown in the reference material presented in Appendix 11 of Appendix U.

- **Widening of Interstate 5** - Another project which was considered for inclusion was the widening of I-5 from SR 44 to SR 299. This segment was included in a TIGER grant proposal (see Appendix 11 of Appendix U) to widen I-5 from South Bonnyview Road to SR 299. The proposal was partly successful as segments south of SR 44 were awarded funding for widening. Specifically, widening of I-5 south of SR 44 to six lanes was completed in 2012 and is reflected in the existing scenarios. With no committed funding for widening of I-5 to six lanes between SR 44 and SR 299, the cumulative I-5 condition is assumed to be identical to the existing I-5 condition.

The Cumulative No Project intersection lane configurations are shown in Figure 3.12-1

CUMULATIVE NO PROJECT TRAFFIC VOLUMES

The cumulative traffic forecasts for study intersections were developed using a three-step adjustment process. The traffic forecasts for road segments and freeway segments used growth factors derived from the Shasta County travel model that were applied to the Project's traffic counts.

Intersection Traffic Volumes

Forecasts of year 2030 intersection turning movement traffic volumes were prepared based on the Shasta County travel demand model. Since the travel demand model is not calibrated to reflect the accuracy of individual turning movements at intersections, the final 2030 intersection turning movement volumes were derived by applying a series of adjustments based on NCHRP 255, *Highway Traffic Data for Urbanized Area Project Planning and Design* (Transportation Research Board, 1982, Chapter 8, Page 104). This adjustment process is recommended given that travel models are calibrated to produce more accurate results on road segments than on individual turn movements. The following steps describe the overall forecasting process for developing 2030 Cumulative No Project intersection traffic volumes for the Moody Flats Quarry Project.

- Step 1 – The 2030 total approach and departure link volumes on each leg at each intersection were estimated by applying the increment between the 2010 base year model estimate and the 2030 future year model estimate, and adding that increment to the 2010 base year traffic counts.
- Step 2 – The 2030 turn movements at each intersection were estimated by factoring the 2010 turn movement traffic counts to match the adjusted 2030 approach and departure volumes from Step 1.
- Step 3 – The estimated 2030 turn movements from Step 2 were further adjusted to fully account for two nearby development projects, Mountain Gate at Shasta Lake and Shasta Wine Village.

Factoring Process. The factoring process used for Step 2 is named after its developer, Furness. The Furness method iteratively adjusts turning movement ground counts until the directional sum of the movements balance to the adjusted future link volumes. This factoring process produces forecast turn distributions that resemble the count distribution, but turn movement proportions will change in response to different growth rates on different legs as forecast by the Shasta County Travel Demand Model. A negative growth was not allowed in the adjustment process, in other words, future turning movement volumes were not allowed to be lower than existing traffic turning movement counts. All future year turn movement volumes were reviewed and adjusted as needed to ensure a reasonable balance between intersections.

Specific Development Projects

The Shasta County travel model includes a forecast of countywide development to the year 2030, constrained to projected county economic growth rates. The model's 2030 forecast may not include all access points for specific development projects, and may not include full development and occupancy of all approved or anticipated individual development projects. However, individual traffic studies for individual development projects assume full development and occupancy regardless of economic forecasts. In order to provide consistency with traffic studies for nearby development projects, the intersection traffic forecasts based on the travel model were further adjusted to incorporate information from traffic studies for the following two specific development projects: Mountain Gate at Shasta Lake and Shasta Wine Village. The location of these development projects in relation to the Moody Flats Project site is shown on Figure 3.12-16.

Mountain Gate at Shasta Lake. The Shasta County model assumed that all access for the proposed Mountain Gate at Shasta Lake (MGS) project would be to the south through Shasta Lake, and did not include access to the north at Old Oregon Trail. Traffic model assumptions were compared to the Traffic Impact Study (TIS) prepared specifically for the MGS project (Omni-Means, 2008). The TIS assumed that 79 percent of MGS traffic would access the site to/from the south and 21 percent would access the MGS project on the north via Old Oregon Trail. The cumulative traffic volumes for this Moody Flats Quarry study were adjusted to account for the MGS north access traffic. The Shasta County model assumes that approximately 57 percent of the total land uses and trip generation for the MGS project will be active by 2030 (Table 3.12-18), as compared to the full buildout assumed in the TIS. To remain consistent with this 2030 phased development assumption, 57 percent of the full buildout of traffic from the MGS TIS was added to study intersections 1 through 6, using the trip distribution from the TIS. Traffic volumes were then rebalanced between the Old Oregon Trail and Shasta Dam Boulevard interchanges.

Shasta Wine Village. The Shasta County model did not assume that the Shasta Wine Village Project would be in place by 2030. Therefore, the project-only traffic from the Shasta Wine Village traffic study (Omni- Means, March 2012) was added to the Old Oregon Trail/I-5 Ramps and Old Oregon Trail/Wonderland Boulevard intersections for this Project's traffic study. The Shasta Wine Village traffic study did not analyze intersections south of the Old Oregon Trail intersections. To ensure that these additional trips were reflected at the study intersections for the Moody Flats Quarry Project, the additional traffic volumes from the Shasta Wine Village that would exit/enter Interstate 5 were distributed throughout the study area using a trip distribution similar to that assumed for the Moody Flats Quarry and Mountain Gate at Shasta projects.

TABLE 3.12-18: COMPARISON OF SHASTA COUNTY MODEL LAND USE WITH MOUNTAIN GATE AT SHASTA TIS

LAND USE TYPE	QUANTITY	ITE DAILY TRIP RATES	SRTA MODEL ASSUMPTIONS FOR 2030 LAND USE		MOUNTAIN GATE AT SHASTA TIS	
			LAND USE QUANTITY	DAILY TRIPS	LAND USE QUANTITY	DAILY TRIPS
Single Family	DU	9.57	600	5,742	1,042	9,972
Multi-Family	DU	6.65	400	2,660	416	2,766
Retail	KSF	42.94	100	4,294	220	9,447
Office	KSF	3.32	---	---	15	50
Park	Acres	2.28	---	---	0.37	1
Total Trips				12,696		22,236
Percent Project Trips Assumed in Model (approximately)						*57%*

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 13 (MAY 2013).
Notes: DU = Dwelling Units KSF = 1,000 square foot.

Cumulative No Project 2030 weekday AM and PM peak hour intersection volumes are shown in Figure 3.12-13.

Road Segments

The forecast volumes on local road segments were estimated using growth factors applied to existing traffic counts. Base year and future year model link volumes were compared to estimate average annual growth rates. These growth rates were then applied to the roadway segment counts presented in Table 3.12-6 under the Existing No Project section. For roadway segments adjacent to a study intersection, the analysis uses the approach and departure cumulative volumes from the adjusted intersection forecasts described above. Heavy vehicle percentages were kept constant from their existing values. Consistent with the existing conditions analysis, heavy vehicle volumes were converted to passenger-car equivalents by multiplying by a 2.5 conversion factor based on the HCM 2000.

Freeway Segments

Freeway segment forecast volumes were estimated using a combination of growth factors on the I-5 mainline and the adjusted forecast intersection volumes at the freeway ramp intersections. The

mainline volumes at the two control points north and south of the Project area were factored based on growth rates obtained from the 2010 and 2030 scenarios from the Shasta County travel demand model. This resulted in approximately a 0.9 percent annual increase in entering and exiting mainline traffic volume, or slightly more than 30 percent over the 20 years. Freeway segment volumes *within* the study area exhibit growth due to both higher traffic volumes at the two mainline control points and increased turning volumes at the on and off ramp intersections.

Cumulative No Project Traffic Operations

INTERSECTIONS

After balancing traffic volumes between interchanges on I-5 and study intersections, all turning movement volumes were input into the intersection operation analysis software SYNCHRO to estimate peak hour intersection level of service and length of queue. A future peak hour factor (PHF) of 0.92 was used at all study area locations, consistent with HCM 2000 recommended default values (Chapter 13, Exhibit 13-5, page 13-11). Table 3.12-19 summarizes the LOS results for the study intersections under the Cumulative scenario.

TABLE 3.12-19: CUMULATIVE NO PROJECT CONDITIONS - INTERSECTION LEVEL OF SERVICE ANALYSIS

INTERSECTION	TARGET LOS	CONTROL	PEAK HOUR	DELAY	LOS	MEET SIGNAL WARRANT
1. I-5 NB Ramps & Old Oregon Trail	C	TWSC	AM	42.5	**E**	Yes
			PM	15.3	C	No
2. I-5 SB Ramps & Old Oregon Trail	C	TWSC	AM	21.1	C	No
			PM	13.6	B	No
3. Wonderland Blvd & Old Oregon Trail	C	AWSC	AM	15.6	C	No
			PM	14.7	B	No
4. I-5 SB Off-Ramp & Shasta Dam Blvd	C	Signal	AM	24.6	C	-
			PM	11.5	B	-
5. Cascade Blvd & Shasta Dam Blvd	C	Signal	AM	54.8	**D**	-
			PM	52.2	**D**	-
6. Shasta Park Dr & Shasta Dam Blvd	C	TWSC	AM	10.4	B	No
			PM	10.5	B	No
7. I-5 NB Ramps & Pine Grove Ave	C	TWSC	AM	97.9	**F**	No
			PM	365	**F**	No
8. I-5 SB Ramps & Pine Grove Ave	C	TWSC	AM	16.2	C	No
			PM	26.8	**D**	No
9. I-5 NB Ramps & Oasis Rd	D	Signal	AM	14.4	B	-
			PM	13.1	B	-
10. I-5 SB Ramps & Oasis Rd	D	Signal	AM	8.5	A	-
			PM	8.4	A	-

INTERSECTION	TARGET LOS	CONTROL	PEAK HOUR	DELAY	LOS	MEET SIGNAL WARRANT
11. N Market St [SR-273] & Caterpillar Rd	D	Signal	AM	40.9	D	-
			PM	37.5	D	-
12. I-5 NB Ramps & SR-299 [Lake Blvd E]	D	Signal	AM	6.5	A	-
			PM	7.8	A	-
13. I-5 SB Ramps & SR-299 [Lake Blvd E]	D	Signal	AM	18.9	B	-
			PM	23	C	-
14. S Market St [SR-273] & Breslauer Way	D	Signal	AM	40.7	D	-
			PM	35.9	D	-
15. S Market St [SR-273] & S Bonneyview Rd	D	Signal	AM	37.9	D	-
			PM	43.5	D	-
16. S Market St [SR-273] & Girvan Ln	D	Signal	AM	22.2	C	-
			PM	35.6	D	-

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 14 (MAY 2013).
Notes: LOS based on HCM2000, Signal Warrant is based on Peak Hour Warrant. Control delays for unsignalized intersections are for the worst movement of the intersection (TWSC) or intersection average (AWSC).

ROAD SEGMENTS

Roadway segments volumes projected for the Cumulative No Project scenario were used to forecast the future LOS at the study segments. The Cumulative No Project daily volumes and levels of service for these segments are presented in Table 3.12-20. As shown in this table, all the study segments except Shasta Dam Boulevard between Ashby Road and Cascade Boulevard are projected to operate at an acceptable LOS C or better.

TABLE 3.12-20: CUMULATIVE NO PROJECT CONDITIONS - ROADWAY LEVEL OF SERVICE ANALYSIS

ROADWAY SEGMENT	FROM	TO	ROADWAY TYPE	NUMBER OF LANES	DAILY VOLUME[1]	LOS	V/C[2]
Shasta Park Drive	Project Dwy	Shasta Dam Blvd	Local Street	2	517	A	0.14
Shasta Dam Blvd	Shasta Park	Ashby Rd	Minor Collector	2	3,568	A	0.24
Shasta Dam Blvd	Ashby Rd	Cascade	Major Collector	2	17,316	**E**	0.96
Black Canyon Rd	Project Dwy	Red Bluff Ave	Local Street	2	563	A	0.15
Old Oregon Trail	Wonderland	I-5 SB Ramps	Minor Collector	2	8,755	A	0.58
Old Oregon Trail	I-5 SB Ramps	I-5 NB Ramps	Minor Collector	2	5,637	A	0.38
Wonderland Blvd.	Old Oregon Trail	Project Driveway	Minor Collector	2	4,078	A	0.27

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 15 (MAY 2013).
Notes: [1]Daily Volume in Passenger Car Equivalents (PCE).
[2]The LOS E maximum service volume was used to compute the V/C ratio.

FREEWAY SEGMENTS

Freeway mainline operations for Cumulative No Project conditions were evaluated for the northbound and southbound direction on Interstate 5. Freeway LOS for the AM and PM peak hour is presented in Table 3.12-21 for the northbound direction and Table 3.12-22 for the southbound direction. In the northbound direction, the I-5 segments between SR 273 and Twin View Boulevard (#6), Twin View Boulevard and SR 299 (#7), and SR 299 and SR 44 (#8) are forecast to operate at unacceptable LOS E or worse during the AM, PM or both peak hours. In the southbound direction, all the freeway segments are anticipated to operate at acceptable LOS C or better.

TABLE 3.12-21: CUMULATIVE NO PROJECT CONDITION - FREEWAY LEVEL OF SERVICE ANALYSIS (I-5 NB)

FREEWAY	SECTION	FROM	TO	AM PEAK			PM PEAK		
				AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]	AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]
I-5NB	1	North	Old Oregon Trail	63.00	17.30	B	63.00	19.25	C
	2	Old Oregon Trail	Shasta Dam	63.00	20.90	C	63.00	22.59	C
	3	Shasta Dam	Pine Grove	64.50	16.70	B	64.50	20.45	C
	4	Pine Grove	Oasis	64.50	18.08	C	64.48	23.77	C
	5	Oasis	SR 273	64.50	19.43	C	64.04	26.73	D
	6	SR 273	Twin View	62.99	24.76	C	58.62	35.50	**E**
	7	Twin View	SR 299	62.33	28.67	D	Unstable	44.36	**E**
	8	SR 299	SR 44	56.64	38.29	E	35.78	>45	**F**
	9	SR 44	South	64.36	25.19	C	63.45	28.46	D

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 16 (MAY 2013).

Notes: [1] Density expressed in pc/mi/ln, passenger cars per mile per lane

[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 23, HCM 2000

Bold indicates locations that do not satisfy Caltrans deficiency criteria.

TABLE 1: CUMULATIVE NO PROJECT CONDITION - FREEWAY LEVEL OF SERVICE ANALYSIS (I-5 SB)

FREEWAY	SECTION	FROM	TO	AM PEAK			PM PEAK		
				AVE. SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]	AVE. SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]
I-5NB	1	North	Old Oregon Trail	63.00	10.73	A	63.00	11.97	B
	2	Old Oregon Trail	Shasta Dam	63.00	14.98	B	63.00	15.54	B
	3	Shasta Dam	Pine Grove	64.50	16.54	B	64.50	14.39	B
	4	Pine Grove	Oasis	64.50	16.40	B	64.50	15.91	B
	5	Oasis	SR 273	64.50	19.13	C	64.50	15.69	B
	6	SR 273	Twin View	63.00	22.25	C	63.00	19.02	C
	7	Twin View	SR 299	63.00	24.51	C	63.00	21.81	C
	8	SR 299	SR 44	61.05	31.58	D	62.73	27.18	D
	9	SR 44	South	64.50	15.55	B	64.50	17.38	B

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 17 (MAY 2013).

Notes: [1] Density expressed in pc/mi/ln, passenger cars per mile per lane

[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 23, HCM 2000

Cumulative No Project Railroad Crossing Analysis

Several adjustments were required to represent future cumulative operating conditions at the study railroad crossing locations.

SIGNAL OPERATION ADJUSTMENTS

For purposes of representing future railroad crossing operations at intersections with railroad crossings, the timings at these signals were adjusted. The adjustment consisted of adding a "hold" phase in which no movement was allowed at each intersection. The length of this hold phase was equal to the prorated average train passage time, which was 7.5 seconds per signal cycle in the No Project condition (1 train per peak hour) and 12.5 seconds per signal cycle (2 trains per peak hour) with the Project. These values were obtained by dividing the expected train passage time in an hour by the number of signal cycles in an hour. The minimum all-red time (0.5 seconds) and yellow times (2.0 seconds) were added to these train passage times to account for gate openings and start-up lost time.

QUEUE ANALYSIS

Future signalized intersection queues were obtained from the SYNCHRO analysis by coding additional time into the northbound and southbound through phases. This additional time, which was 120 seconds in the AM and 130 seconds in the PM, corresponds to the average train passage time. By assigning this time to through movements on South Market Street, the street paralleling the railroad tracks, the analysis emulates the passage of the train on the parallel track. The resulting 95th percentile queues on the westbound and eastbound approaches were calculated and are presented in Table 3.12-23. Consistent with South Market Street (SR 273) signal timing sheets obtained from Caltrans, the current lead-lag signal phasing was assumed for the analysis. By allocating part of the northbound through movement green time to the northbound left-turn as needed, northbound left-turn queues would be cleared intermittently.

Thus, the proportion of vehicles arriving on red is 1 – P. By substituting (g/C) ratio with the proportion of the peak hour that the train does *not* block the roadway segment and assuming a random-arrival platoon ratio (R_p)—a measure of progression—of 1.0, it is possible to calculate the number of vehicles arriving during a train passage event of a given duration. It can be shown through queuing theory that this number is equal to the maximum queue.

TABLE 3.12-23: RAILROAD CROSSING QUEUES (IN NUMBER OF VEHICLES) - CUMULATIVE NO PROJECT

NODE	INTERSECTION	AM (CARS)				PM (CARS)			
		NB	WB	SB	EB	NB	WB	SB	EB
14	S Market St [SR-273] & Breslauer Way	2	14	34	24	1	22	25	25
15	S Market St [SR-273] & S Bonneyview Rd	2	26	21	6	2	34	29	8
16	S Market St [SR-273] & Girvan Ln	2	15	10	4	5	24	27	7
17	Shasta Street & Railroad Crossing	-	45	-	15	-	29	-	13
18	Tehama Street & Railroad Crossing	-	4	-	17	-	5	-	16
19	Yuba Street & Railroad Crossing	-	3	-	5	-	5	-	11
20	Placer Street & Railroad Crossing	-	30	-	19	-	25	-	23
21	South Street & Railroad Crossing	-	29	-	18	-	20	-	35

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 18 (MAY 2013).

The unsignalized railroad crossings were also analyzed for train delays and resulting queues. To develop a cumulative peak hour volume data set, a growth rate was calculated based on the Shasta County model 2010 and 2030 scenarios. This growth rate was then applied to the existing tube count volumes to obtain Cumulative No Project volumes. The hourly volumes were further increased to represent a 95th percentile hourly volume-equivalent, assuming a Poisson (random) arrival rate.

Maximum queue lengths were based on the number of vehicles arriving during the train passage event. The calculations were based on the HCM 2000 Chapter 16: Signalized Intersections, which specifies that the proportion of vehicles arriving on green is:

$$P=Rp(gC) \text{ from HCM 2000: Exhibit 16-12}$$

Thus, the proportion of vehicles arriving on red is 1 – P. By substituting (g/C) ratio with the proportion of the peak hour that the train does *not* block the roadway segment and assuming a random-arrival platoon ratio (R_p)—a measure of progression—of 1.0, it is possible to calculate the number of vehicles arriving during a train passage event of duration (W). It can be shown through queuing theory that this number is equal to the maximum queue.

$$Qmax=Volume*(1-1.0*3600-W3600)$$

The resultant maximum queues for the Cumulative No Project condition are included in Table 3.12-23 for locations 17 to 21.

MITIGATION SHARE CALCULATIONS

Mitigation share percentages for recommended mitigation measures were calculated using intersection entering volumes and the equations below.

$$Mitigation\ Share\ \% = \begin{cases} \dfrac{Project\ Only\ Volume}{Existing\ Plus\ Project\ Volume}\ for\ Existing\ Scenario \\ \\ \dfrac{Project\ Only\ Volume}{Cumulative\ Plus\ Project - Existing\ No\ Project}\ for\ Cumulative\ Scenario \end{cases}$$

Cumulative Plus Project

EXISTING PLUS PROJECT INTERSECTION OPERATIONS

Table 3.12-24 summarizes the LOS results for the study intersections under the Cumulative plus Project scenario based on Project traffic volumes shown in Figures 3.12-14 and 3.12-15. Except for the Wonderland Boulevard and Old Oregon Trail intersection, all the study intersections that are forecast to operate at unacceptable LOS under the plus Project scenario are also forecast to operate at unacceptable LOS without the proposed Project.

TABLE 3.12-24: CUMULATIVE PLUS PROJECT CONDITIONS - INTERSECTION LEVEL OF SERVICE ANALYSIS

INTERSECTION	TARGET LOS	CONTROL	PEAK HOUR	CUMULATIVE NO PROJECT			CUMULATIVE PLUS PROJECT		
				DELAY	LOS	MEET SIGNAL WARRANT	DELAY	LOS	MEET SIGNAL WARRANT
1. I-5 NB Ramps & Old Oregon Trail	C	TWSC	AM	42.5	**E**	Yes	113.7	**F**	No
			PM	15.3	C	No	16.6	C	No
2. I-5 SB Ramps & Old Oregon Trail	C	TWSC	AM	21.1	C	No	24.7	C	No
			PM	13.6	B	No	14.1	B	No
3. Wonderland Blvd & Old Oregon Trail	C	AWSC	AM	15.6	C	No	31.5	**D**	No
			PM	14.7	B	No	16.5	C	No
4. I-5 SB Off-Ramp & Shasta Dam Blvd	C	Signalized	AM	24.6	C	-	24.6	C	-
			PM	11.5	B	-	11.5	B	-
5. Cascade Blvd & Shasta Dam Blvd	C	Signalized	AM	54.8	**D**	-	54.8	**D**	-
			PM	52.2	**D**	-	52.2	**D**	-
6. Shasta Park Dr & Shasta Dam Blvd	C	TWSC	AM	10.4	B	No	10.4	B	No
			PM	10.5	B	No	10.5	B	No
7. I-5 NB Ramps & Pine Grove Ave	C	TWSC	AM	97.9	**F**	No	102.8	**F**	Yes
			PM	365	**F**	No	368.8	**F**	Yes
8. I-5 SB Ramps & Pine Grove Ave	C	TWSC	AM	16.2	C	No	16.6	C	No
			PM	26.8	**D**	No	27	**D**	No
9. I-5 NB Ramps & Oasis Rd	D	Signalized	AM	14.4	B	-	14.7	B	-
			PM	13.1	B	-	13.1	B	-
	D		AM	8.5	A	-	8.6	A	-

INTERSECTION	TARGET LOS	CONTROL	PEAK HOUR	CUMULATIVE NO PROJECT			CUMULATIVE PLUS PROJECT		
				DELAY	LOS	MEET SIGNAL WARRANT	DELAY	LOS	MEET SIGNAL WARRANT
10. I-5 SB Ramps & Oasis Rd	D	Signalized	AM	8.5	A	-	8.6	A	-
			PM	8.4	A	-	8.4	A	-
11. N Market St [SR-273] & Caterpillar Rd	D	Signalized	AM	40.9	D	-	41.8	D	-
			PM	37.5	D	-	38.2	D	-
12. I-5 NB Ramps & SR-299 [Lake Blvd E]	D	Signalized	AM	6.5	A	-	6.5	A	-
			PM	7.8	A	-	7.8	A	-
13. I-5 SB Ramps & SR-299 [Lake Blvd E]	D	Signalized	AM	18.9	B	-	19.2	B	-
			PM	23	C	-	23.2	C	-
14. S Market St [SR-273] & Breslauer Way	D	Signalized	AM	40.7	D	-	41.4	D	-
			PM	35.9	D	-	37.2	D	-
15. S Market St [SR-273] & S Bonneyview Rd	D	Signalized	AM	37.9	D	-	38.9	D	-
			PM	43.5	D	-	45.2	D	-
16. S Market St [SR-273] & Girvan Ln	D	Signalized	AM	22.2	C	-	22.7	C	-
			PM	35.6	D	-	34.7	C	-
22. Wonderland Blvd & Project Driveway	C	TWSC	AM	-	--	-	12	B	No
			PM	-	-	-	10.4	B	No

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 23 (MAY 2013).
Notes: LOS based on HCM2000
Signal warrant is based on Peak Hour Warrant
Control delays for unsignalized intersections are for the worst movement of the intersection (TWSC) or intersection average (AWSC)

CUMULATIVE PLUS PROJECT ROADWAY SEGMENTS

Project -generated traffic volumes were added to the roadway segments volumes developed for the Cumulative No Project scenario to forecast the future LOS on the study road segments (Table 3.21-25). All the study area segments except Shasta Dam Boulevard are projected to operate at an acceptable LOS. The Shasta Dam Boulevard segment is projected to perform unacceptably even without the Project.

TABLE 3.12-25: CUMULATIVE PLUS PROJECT CONDITIONS - ROADWAY LEVEL OF SERVICE ANALYSIS

ROADWAY SEGMENT	ROADWAY TYPE	NUMBER OF LANES	CUMULATIVE NO PROJECT			CUMULATIVE PLUS PROJECT		
			DAILY VOLUME[1]	LOS	V/C[2]	DAILY VOLUME[1]	LOS	V/C[2]
Shasta Park Dr between Project Dwy and Shasta Dam Blvd	Local Street	2	517	A	0.14	517	A	0.14
Shasta Dam Blvd between Shasta Park Dr and Ashby Rd	Minor Collector	2	3,568	A	0.24	3,675	A	0.25
Shasta Dam Blvd between Ashby Rd and Cascade Blvd	Major Collector	2	17,316	**E**	0.96	17,453	**E**	0.97
Black Canyon Rd between Project Dwy and Red Bluff Ave	Local Street	2	563	A	0.15	563	A	0.15
Old Oregon Trail between Wonderland Blvd and I-5SB Ramps	Minor Collector	2	8,755	A	0.58	11,483	C	0.77
Old Oregon Trail between I-5SB Ramps and I-5NB Ramps	Minor Collector	2	5,637	A	0.38	7,001	A	0.47
Wonderland Blvd between Old Oregon Trail and Project Dwy	Minor Collector	2	4,078	A	0.27	6,806	A	0.45

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 24(MAY 2013).
Notes: [1]Daily Volume in Passenger Car Equivalents (PCE).
[2]The LOS E maximum service volume was used to compute the V/C ratio.
Bold indicates locations that do not satisfy Caltrans deficiency criteria.

CUMULATIVE PLUS PROJECT FREEWAY SEGMENTS

Freeway mainline operations for Cumulative plus Project conditions were evaluated for the northbound and southbound direction on Interstate 5. Freeway LOS for the AM and PM peak hour is presented in Table 3.12-26 for the northbound direction and Table 3.12-27 for the southbound direction. In the northbound direction, I-5 segments between SR 273 and Twin View Boulevard (#6), Twin View Boulevard and SR 299 (#7), and SR 299 and SR 44 (#8) are forecast to operate at unacceptable LOS E or worse during the AM, PM or both peak hours as shown in the tables below. In the southbound direction, all the freeway segments are projected to operate at acceptable LOS D or better.

TABLE 3.12-26: CUMULATIVE PLUS PROJECT CONDITION - FREEWAY LEVEL OF SERVICE ANALYSIS (I-5NB)

FREEWAY	SECTION	FROM	TO	AM PEAK			PM PEAK		
				AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]	AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]
I-5NB	1	North	Old Oregon Trail	63.00	17.35	B	63.00	19.27	C
	2	Old Oregon Trail	Shasta Dam	63.00	21.56	C	63.00	22.81	C
	3	Shasta Dam	Pine Grove	64.50	17.09	B	64.50	20.59	C
	4	Pine Grove	Oasis	64.50	18.43	C	64.48	23.92	C
	5	Oasis	SR 273	64.50	19.77	C	64.01	26.86	D
	6	SR 273	Twin View	62.98	25.22	C	58.42	35.79	**E**
	7	Twin View	SR 299	62.14	29.21	D	Unstable	44.80	**E**
	8	SR 299	SR 44	56.00	39.18	E	35.28	>45	**F**
	9	SR 44	South	64.33	25.42	C	63.43	28.50	D

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 25 (MAY 2013)..

Notes: [1] Density expressed in pc/mi/ln, passenger cars per mile per lane

[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 23, HCM 2000

Bold indicates locations that do not satisfy Caltrans deficiency criteria.

TABLE 3.12-27: CUMULATIVE PLUS PROJECT CONDITION - FREEWAY LEVEL OF SERVICE ANALYSIS (I-5SB)

FREEWAY	SECTION	FROM	TO	AM PEAK			PM PEAK		
				AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]	AVERAGE SPEED (MPH)	DENSITY [1] (PC/MI/LN)	LOS [2]
I-5SB	1	North	Old Oregon Trail	63.00	10.76	A	63.00	11.98	B
	2	Old Oregon Trail	Shasta Dam	63.00	15.60	B	63.00	15.73	B
	3	Shasta Dam	Pine Grove	64.50	16.93	B	64.50	14.51	B
	4	Pine Grove	Oasis	64.50	16.79	B	64.50	16.03	B
	5	Oasis	SR 273	64.50	19.47	C	64.50	15.80	B
	6	SR 273	Twin View	63.00	22.68	C	63.00	19.16	C
	7	Twin View	SR 299	62.99	24.94	C	63.00	21.95	C
	8	SR 299	SR 44	60.74	32.16	D	62.70	27.32	D
	9	SR 44	South	64.50	15.77	B	64.50	17.43	B

SOURCE: KITTELSON & ASSOCIATES, INC. MOODY FLATS TIA, TABLE 26 (MAY 2013).

Notes: [1] Density expressed in pc/mi/ln, passenger cars per mile per lane
[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 23, HCM 2000

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Impact 3.12-8: Under cumulative conditions, Project implementation would worsen levels of service at study intersections. (Cumulatively Considerable and Significant and Unavoidable)

Table 3.12-24 summarizes the LOS results for the study intersections under the Cumulative plus Project scenario. Except for the Wonderland Boulevard and Old Oregon Trail intersection, all the study intersections that are forecast to operate at unacceptable LOS under the plus Project scenario are also forecast to operate at unacceptable LOS without the proposed Project.

Based on the results in Table 3.12-24, Project implementation would worsen already unacceptable cumulative operations to a significant degree at the following intersections:

- **I-5 NB Ramps & Old Oregon Trail:** This intersection is projected to operate at LOS F with cumulative traffic without the Project during the AM peak hour. The Project would contribute 11.1 percent of the increase in traffic from existing conditions. With the addition of Project traffic, the intersection would continue to operate at LOS F and the delay would increase by more than five seconds.

- **Wonderland Boulevard & Old Oregon Trail** – This intersection would operate at LOS C with cumulative traffic without the Project. The Project would contribute 14.5 percent of the increase in traffic from existing conditions in the peak morning hours and increase the LOS at this intersection to D, which is below the target standard of LOS C.

MITIGATION MEASURES

Mitigation Measure 3.12-8(a)*: The following improvements to the intersection of I-5 NB Ramps/Old Oregon Trail would improve intersection operations to acceptable levels under Cumulative Plus Project conditions:*

- *Install full-actuated traffic signal*

The Project Applicant shall contribute fair share funding to cover its proportionate cost of the installation of a fully-actuated traffic signal. Shasta County, in consultation with the County RTPA shall determine the applicant's fair share fee based on the traffic generated by the proposed Project. The Project would contribute 11.1 percent of the increase in traffic from existing conditions.

SIGNIFICANCE AFTER MITIGATION

Implementation of the improvements identified above under Mitigation Measure 3.12-8(a) would require approval from Caltrans, as the facilities in question are under Caltrans' jurisdiction. Shasta

County, which is the lead agency for this EIR, cannot guarantee that these improvements would ultimately be constructed, even if fair-share fee payments are collected from the Project Applicant. Additionally, the improvements identified above are not currently part of a funded traffic improvement program being implemented by Caltrans. Due to the current and projected lack of total funding for these improvements, combined with the fact that Shasta County cannot ensure that these improvements would be implemented, this is considered to be a **cumulatively considerable and significant and unavoidable** impact.

Mitigation Measure 3.12-8(b)*: The following improvements to the intersection of Wonderland Boulevard/Old Oregon Trail would improve intersection operations to acceptable levels under Cumulative plus Project conditions:*

- *Construct a channelized, yield-controlled westbound right turn with at least 100 feet of storage.*

The Project Applicant shall contribute fair share funding to cover its proportionate cost of the construction of a channelized, yield-controlled westbound right turn with at least 100 feet of storage. Shasta County, in consultation with the County RTPA shall determine the Applicant's fair share fee based on the traffic generated by the proposed Project. The Project would contribute 14.5 percent of the increase in traffic from existing conditions.

SIGNIFICANCE AFTER MITIGATION

The improvements identified above are not currently part of any current Shasta County improvement plan or fee program, and its full implementation cannot be assured by the Applicant. Due to the current and projected lack of total funding for these improvements, combined with the fact that Shasta County and the Project Applicant cannot ensure that these improvements would be implemented, this is considered to be a **cumulatively considerable and significant and unavoidable** impact.

The Shasta County Department of Public Works operates a county-wide traffic impact fee program based on residential units or non-residential building square footage[1]. The Project may contribute to this program based on a methodology to be determined by Shasta County, as the building square footage basis may not be directly applicable to the Project. Shasta County may also update the road improvement projects to be funded by the fee program to include the intersections of Old Oregon Trail with the I-5 Northbound Ramps and with Wonderland Boulevard.

[1] http://www.co.shasta.ca.us/Resource_Management/bldg_forms/ImpactFeeFAQs.sflb.ashx

Impact 3.12-9: Under cumulative conditions, Project implementation would worsen already unacceptable levels of service at study intersections. (Less than Significant)

The Project would add traffic to three intersections that would operate at a deficient LOS with cumulative traffic without the Project, but the Project traffic would not cause the average intersection delay to increase by more than five seconds, the applicable threshold. Thus, this Project impact would be **less than significant.**

- **Cascade Blvd and Shasta Dam Blvd** - This intersection would operate at LOS D with Cumulative No Project conditions during the AM and PM peak hours; the delay with the Project would be the same as under the No Project conditions.

- **I-5 NB Ramps & Pine Grove Avenue-** This intersection is projected to operate at LOS F under the Cumulative No Project conditions and the Project would cause delay to increase by 4.9 seconds during the AM peak hour and 3.8 seconds during the PM peak hour.

- **I-5 SB Ramps and Pine Grove Ave -** This intersection would operate at LOS D with Cumulative No Project conditions and the Project would cause delay to increase by less than one second during the PM peak hour.

MITIGATION MEASURES

None required.

Impact 3.12-10: Under cumulative conditions, Project implementation would impact roadway segments. (Less than Significant)

Project generated traffic volumes were added to the roadway segments volumes developed for the Cumulative No Project scenario to forecast the future LOS on the study road segments (Table 3.12-25). All the study area segments except Shasta Dam Boulevard between Ashby Road and Cascade Boulevard are projected to operate at an acceptable LOS. This Shasta Dam Boulevard segment is projected to perform unacceptably at LOS E even without the Project. Although the Project would add traffic to the segment, it would not increase the volume to capacity ratio by 0.05 or more. Therefore, the Project impact would be **less than significant.**

MITIGATION MEASURES

None required.

Impact 3.12-11: Under cumulative conditions, Project implementation would impact freeway segments. (Less than Significant)

Freeway mainline operations for Cumulative plus Project conditions were evaluated for the northbound and southbound direction on Interstate 5. Freeway LOS for the AM and PM peak hour is presented in Table 3.12-26 for the northbound direction and Table 3.12-27 for the southbound direction. In the northbound direction, I-5 segments between SR 273 and Twin View Boulevard (#6), Twin View Boulevard and SR 299 (#7), and SR 299 and SR 44 (#8) are forecast to operate at unacceptable LOS E or worse during the AM, PM or both peak hours as shown in the tables below.

In the southbound direction, all the freeway segments are projected to operate at acceptable LOS D or better.

The Project would add traffic to three segments of northbound I-5 that are already projected to operate at a deficient LOS E or worse during the PM peak hour without the Project. The Project traffic contribution would be 2.4 percent of the traffic volume increment from existing conditions on the northbound I-5 segment between SR 44 and SR 299 and 0.7 percent of the traffic increase at the other two segments. Assuming an hourly capacity of 4,000 (2,000 per freeway lane), the Project would add traffic that is less than one percent of the capacity. Therefore, the Project impact would be **less than significant.**

MITIGATION MEASURES

None required.

Impact 3.12-12: Cumulative conditions may substantially increase hazards due to a design feature or incompatible uses. (Less than Significant)

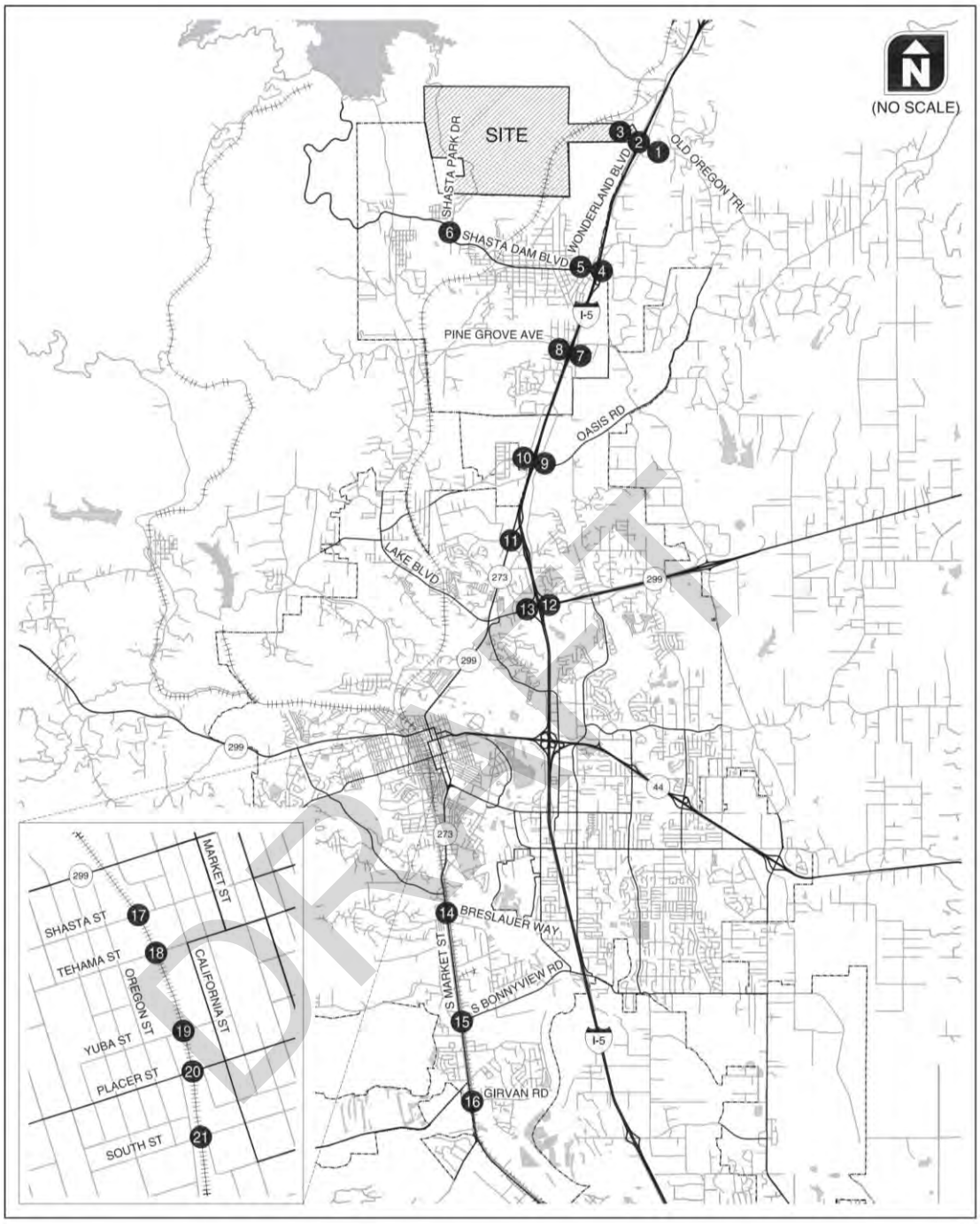
Cumulative plus Project Railroad Crossing Analysis

The proposed Project is expected to generate about 200 annual train trips based on 80-car unit trains with 100-ton capacity per car with a maximum of two trains per day. The Project-generated trains are expected to be shorter than the longest existing train that was observed for the queue analysis in Table 3.12-23. Additionally, the Cumulative plus Project analysis assumes the worst case scenario of two Project-generated trips per day: one during the AM peak hour and other during the PM peak. With an average headway of 1 hour and 13 minutes, there would be sufficient time between the departure of the current train and arrival of a Project-added train to dissipate queues at the intersection. As a result, the queues that would occur under the plus Project scenario due to the additional train are expected to be the same or better than the observed queues under No Project conditions.

The Project would not increase maximum queues at railroad crossings compared to Cumulative No Project conditions. Therefore, the Project impact would be **less than significant.**

MITIGATION MEASURES
None required.

This page left intentionally blank



DRAFT

LEGEND

● - STUDY INTERSECTIONS

PROJECT VICINITY MAP
SHASTA COUNTY, CALIFORNIA

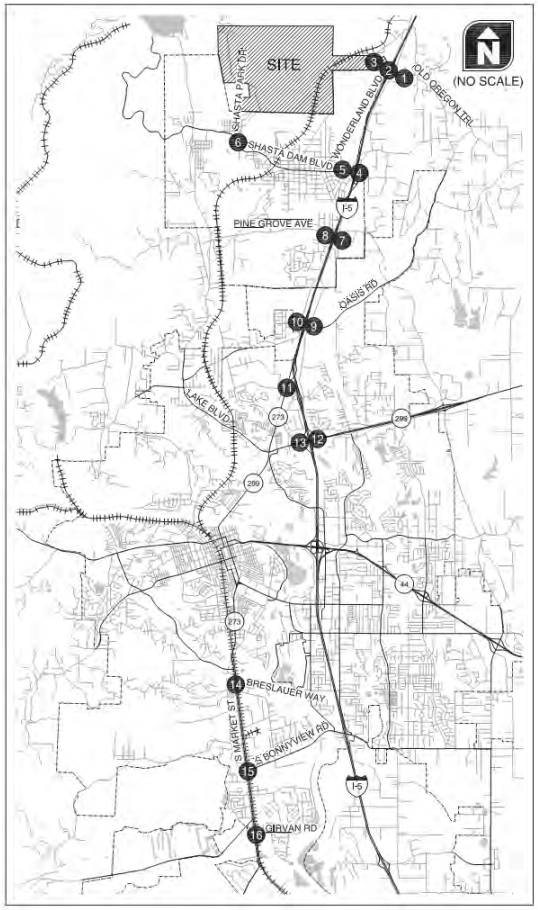
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

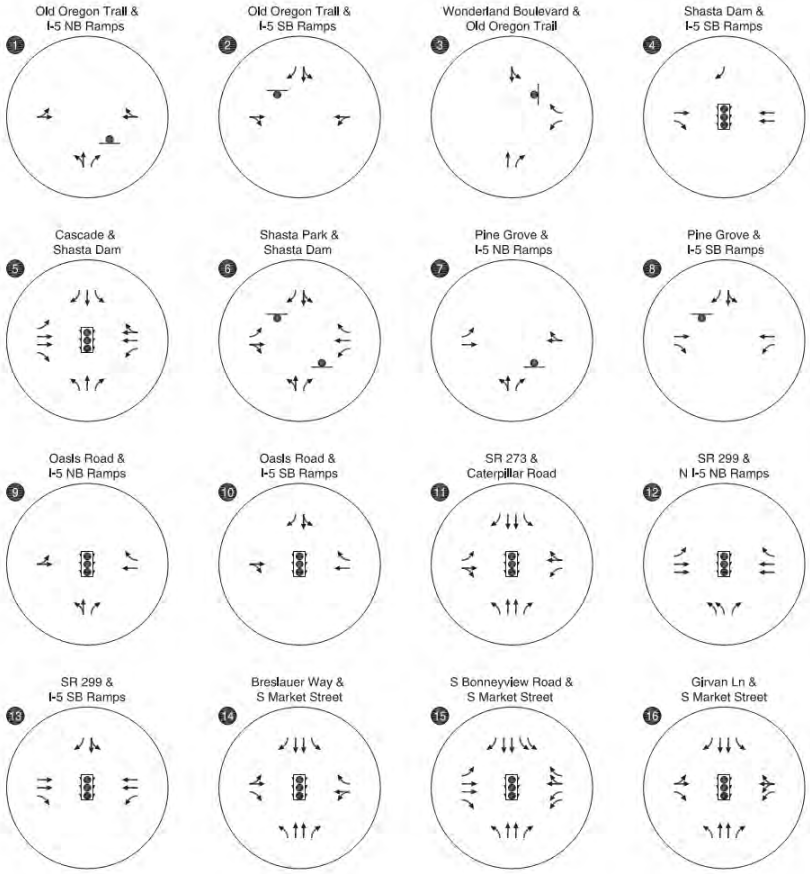
\\kittelson.com\fs\H_Oakland\profile\17239 - Moody Flats Quarry\dwgs\figs\17239_Figs_A.dwg Apr 15, 2013 - 9:02am - jsommerville Layout Tab: Fig01

MOODY FLATS QUARRY EIR

Figure 3.12-1: Site Vicinity Map

This page left intentionally blank.





LEGEND

- STOP SIGN
- TRAFFIC SIGNAL

EXISTING LANE CONFIGURATION
SHASTA COUNTY, CALIFORNIA

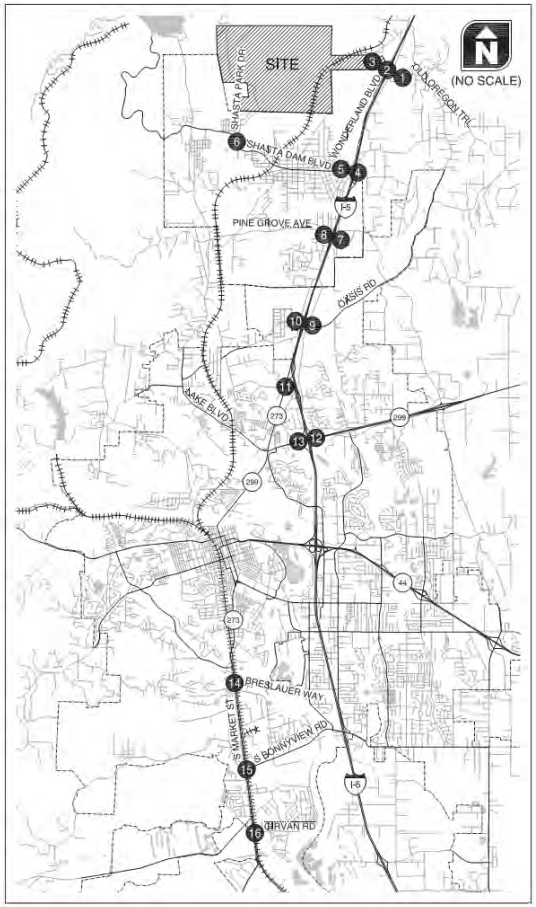
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

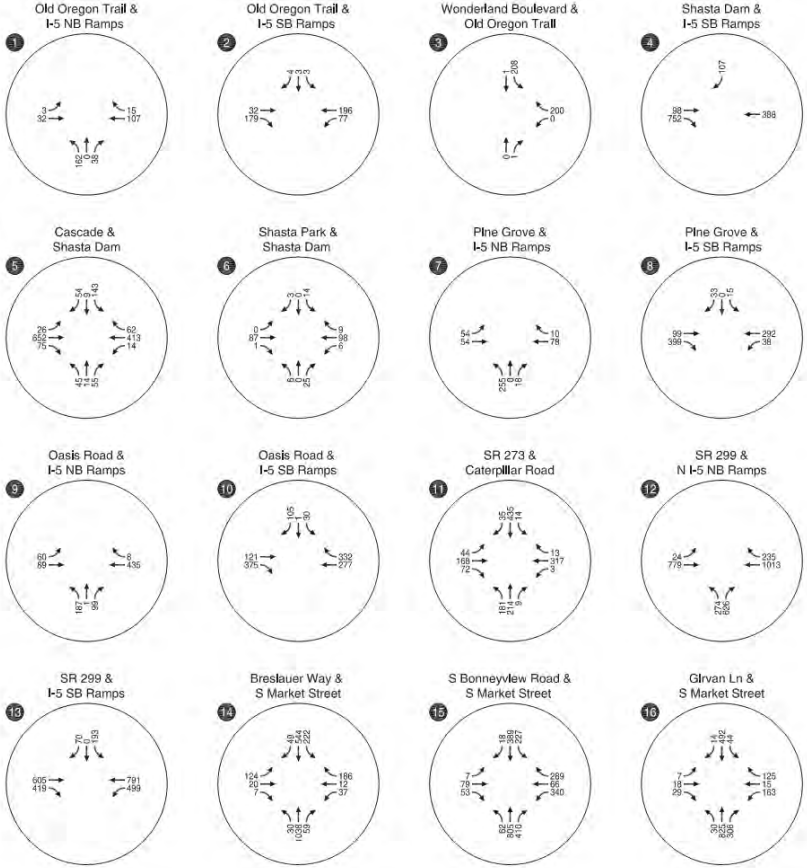
\\kittelson.com\fs\H_Oakland\proj\fat\17239 - Moody Flats Quarry\dwgs\fga\17239_Fig_A.dwg Apr 15, 2013 - 8:59am - jsommerville Layout Tab: Fig02

MOODY FLATS QUARRY EIR

Figure 3.12-2: Existing No Project Lane Configurations

This page left intentionally blank.





LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

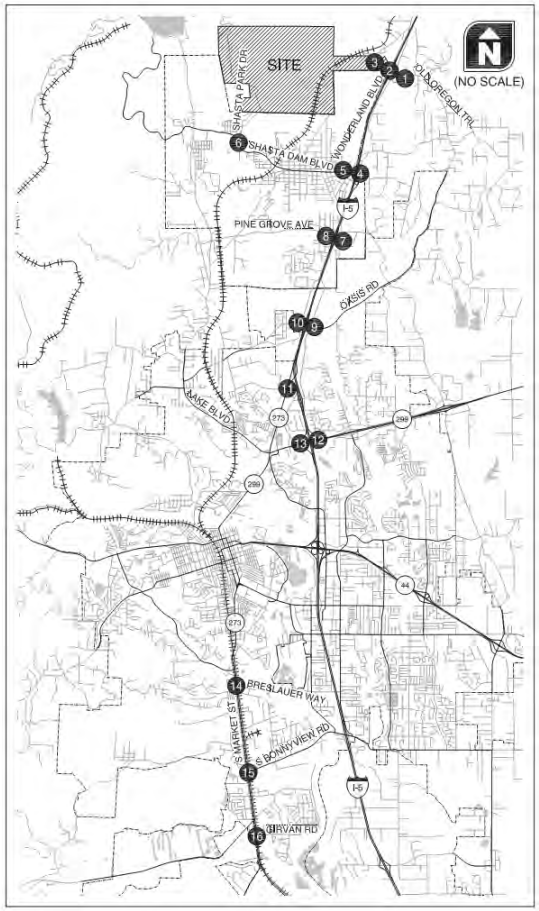
EXISTING AM PEAK HOUR
SHASTA COUNTY, CALIFORNIA

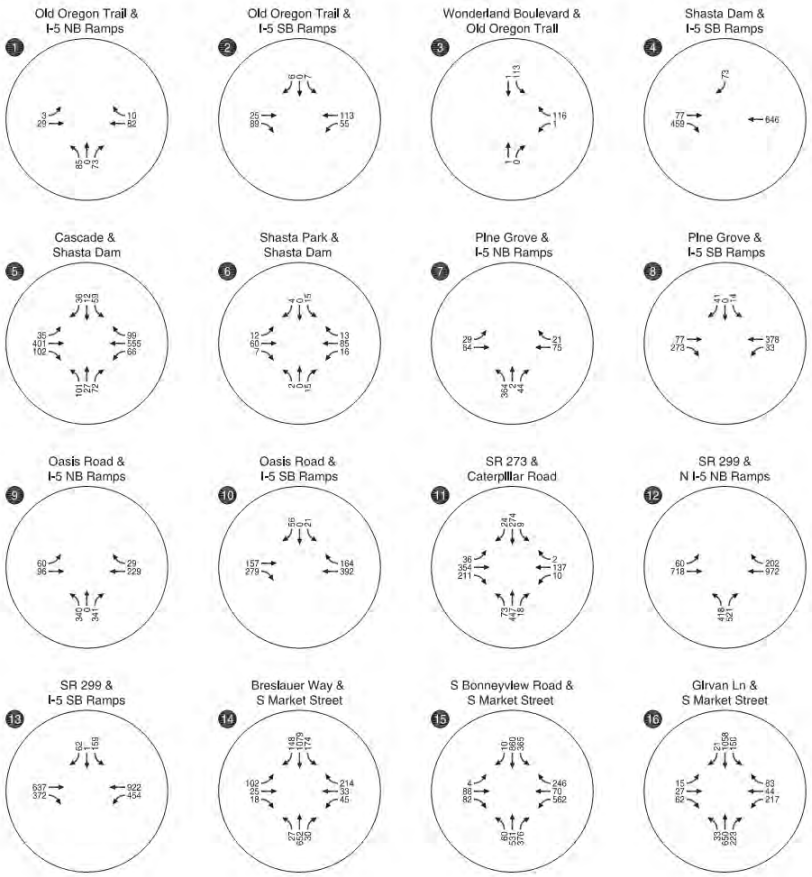
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

\\kittelson.com\ls\H_Oakland\projfiles\17239_Moody Flats Quarry\dwgs\figs\17239_Figs_A.dwg Apr 15, 2013 - 8:55am - jsommerville Layout Tab: Fig03

Figure 3.12-3: Existing No Project Peak Hour Volumes (AM)

This page left intentionally blank.





LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

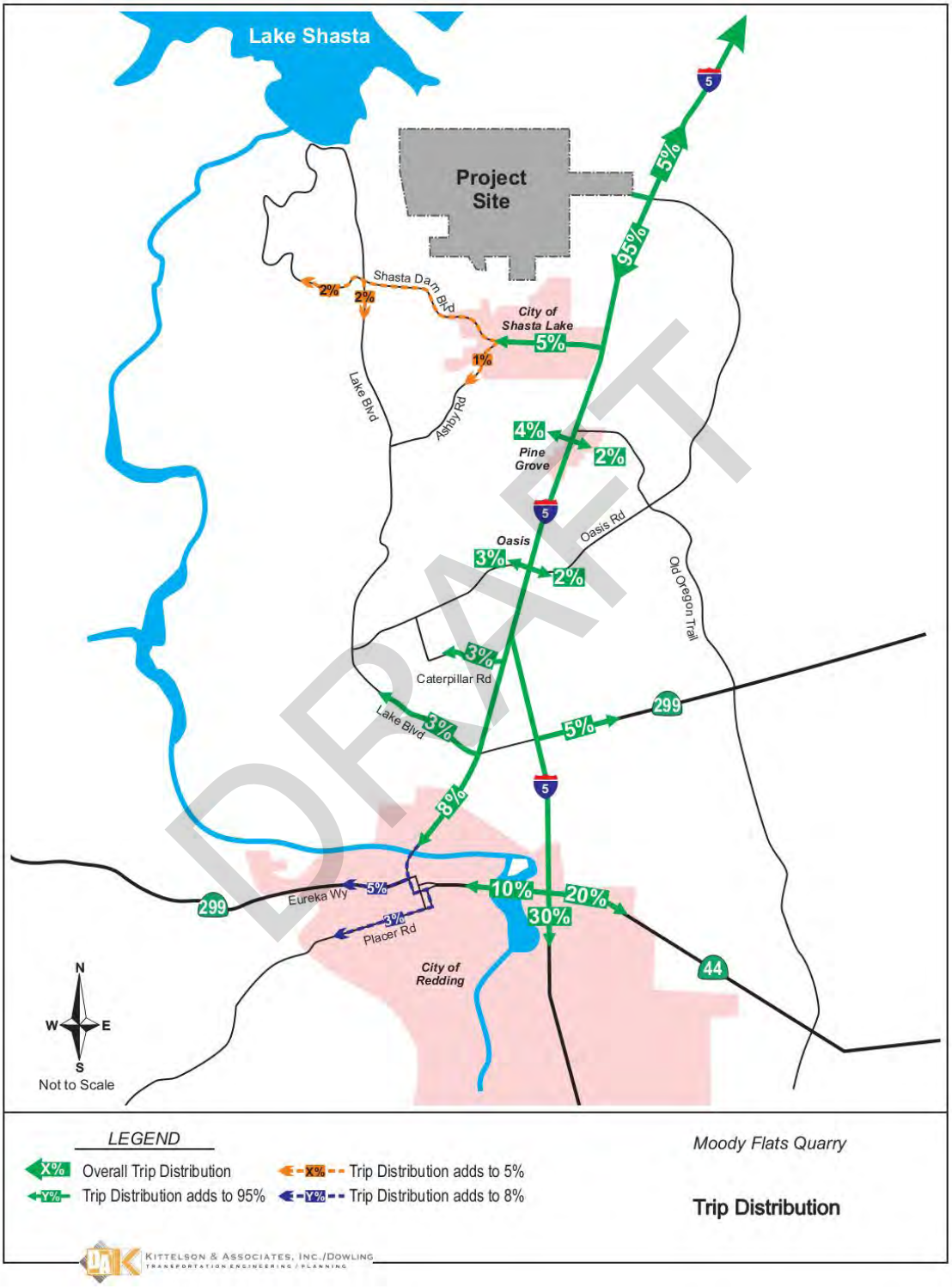
EXISTING PM PEAK HOUR
SHASTA COUNTY, CALIFORNIA

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

\\kittelson.com\sf\H_Oakland\projfile\17259 - Moody Flats Quarry\dwgs\figs\17259_Figs_A.dwg Apr 15, 2013 - 8:55am - jsommerville Layout Tab: Fig\4

Figure 3.12-4: Existing No Project Peak Hour Volumes (PM)

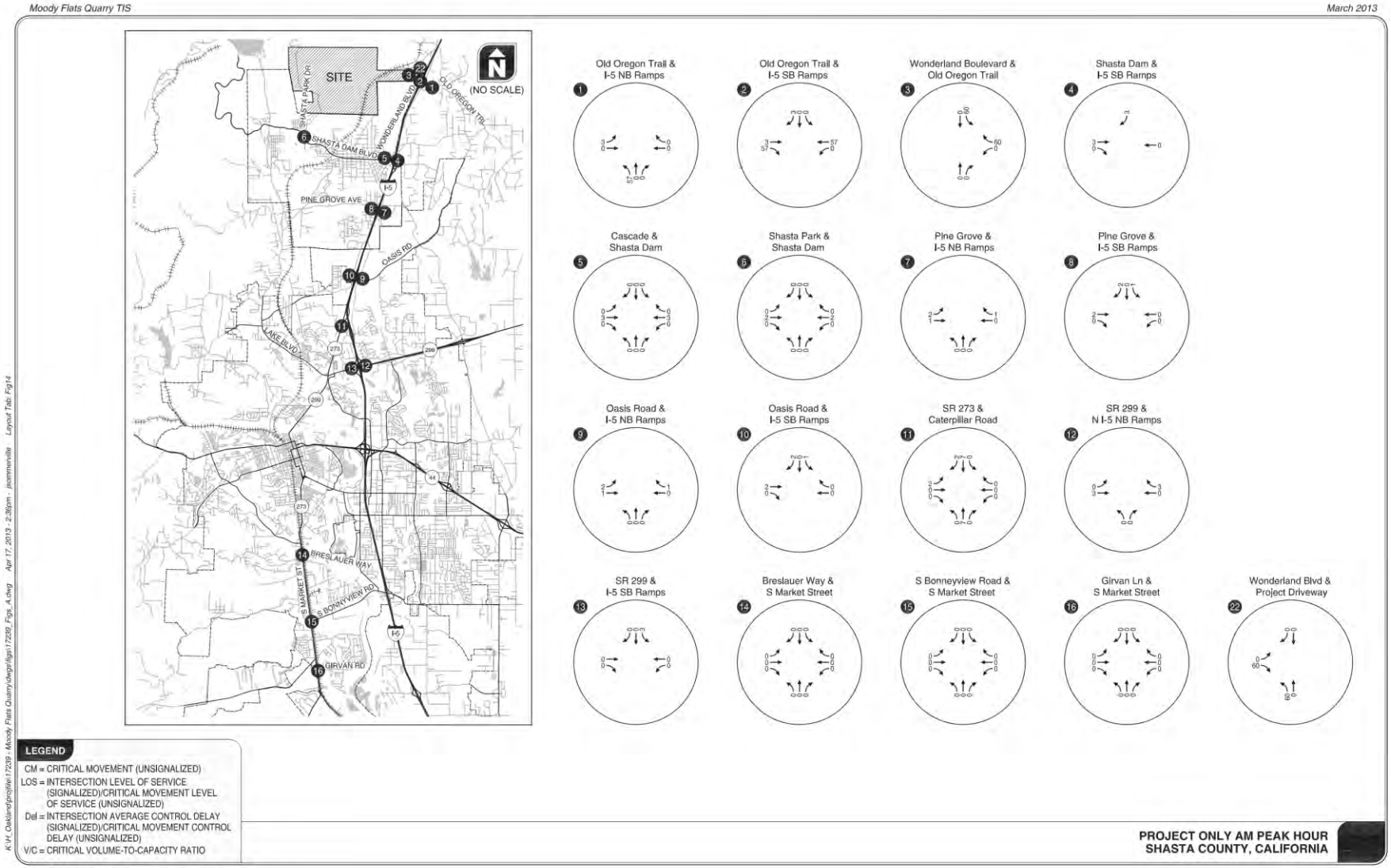
This page left intentionally blank.



DRAFT

Figure 3.12-5: Project Trip Distribution

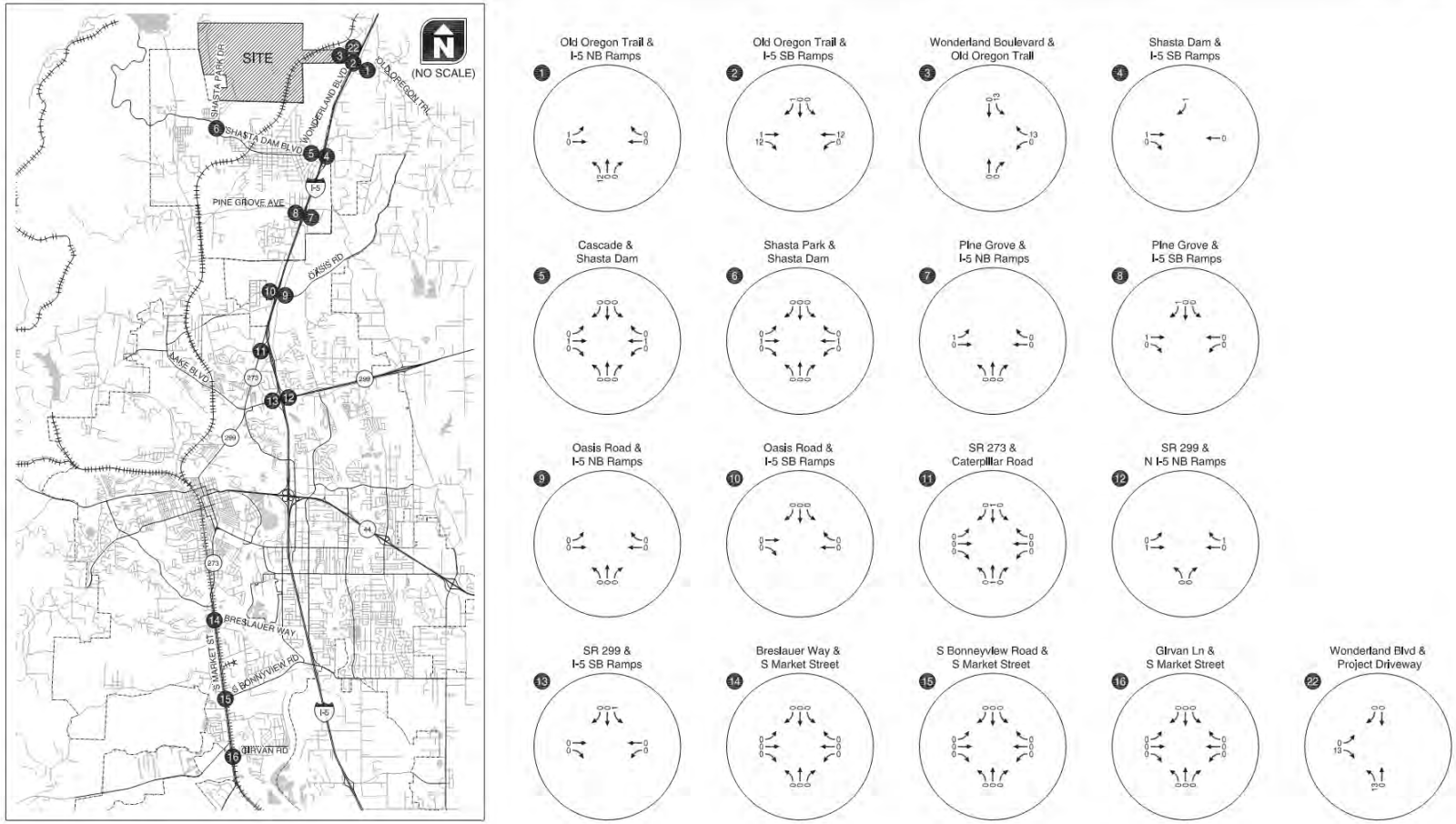
This page left intentionally blank.



MOODY FLATS QUARRY EIR

Figure 3.12-6: Project Only Peak Hour Volumes (AM)

This page left intentionally blank.



LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

PROJECT ONLY PM PEAK HOUR
SHASTA COUNTY, CALIFORNIA

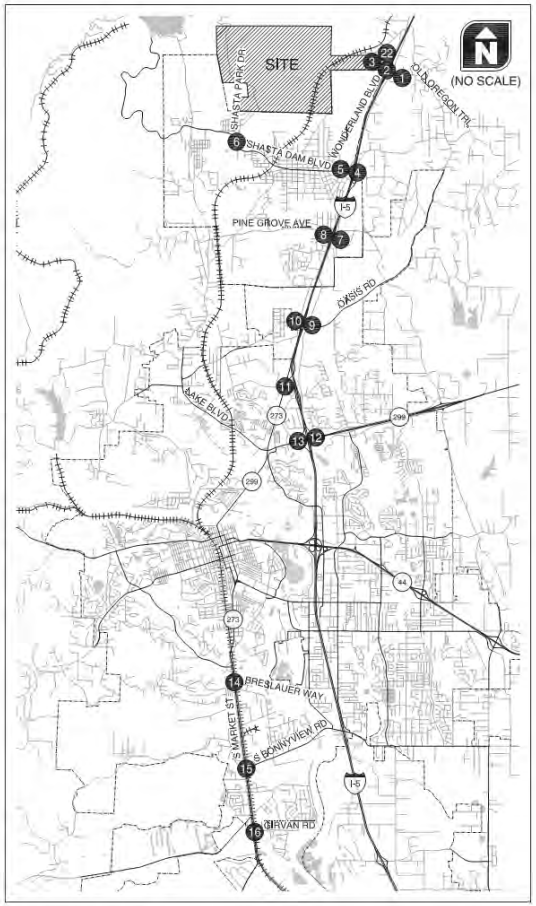
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

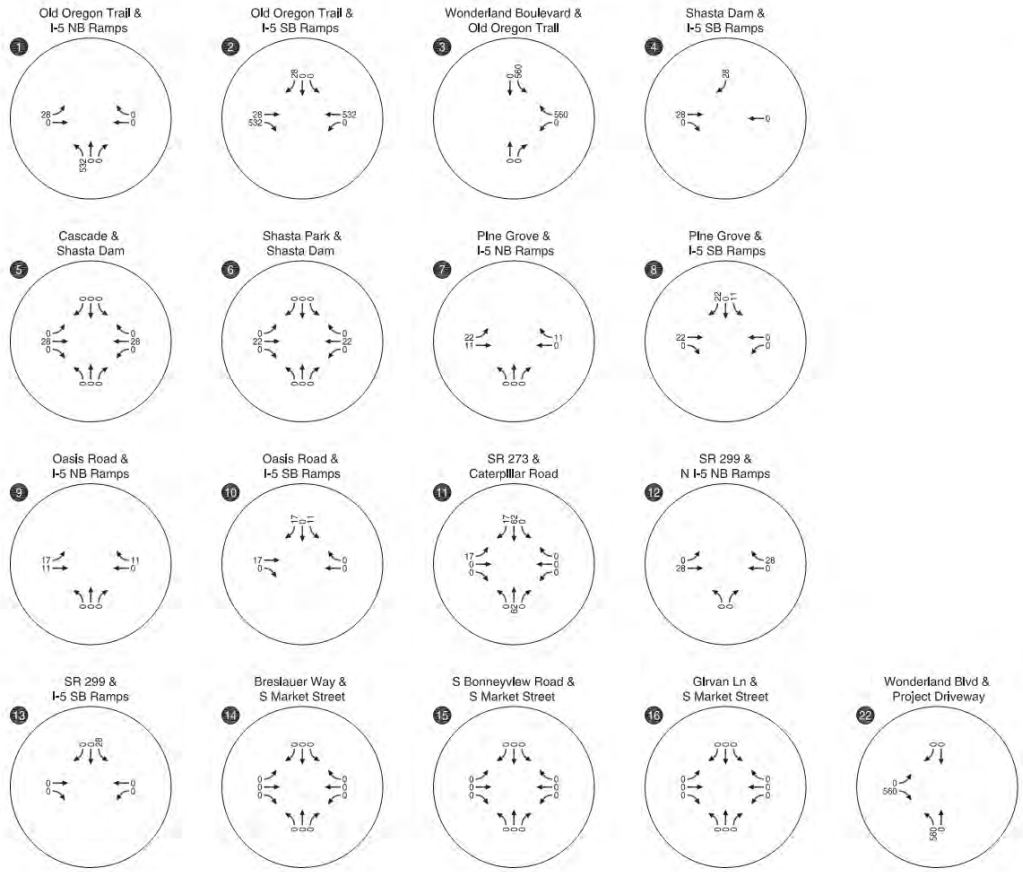
\\kittelson.com\sfH_Oakland\proj\fel17239 - Moody Flats Quarry\dwgs\figs\17239_Figs_A.dwg Apr 15, 2013 - 8:57am - jsommerville Layout Tab: Fig15

MOODY FLATS QUARRY EIR

Figure 3.12-7: Project Only Peak Hour Volumes (PM)

This page left intentionally blank.





LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

PROJECT ONLY DAILY
SHASTA COUNTY, CALIFORNIA

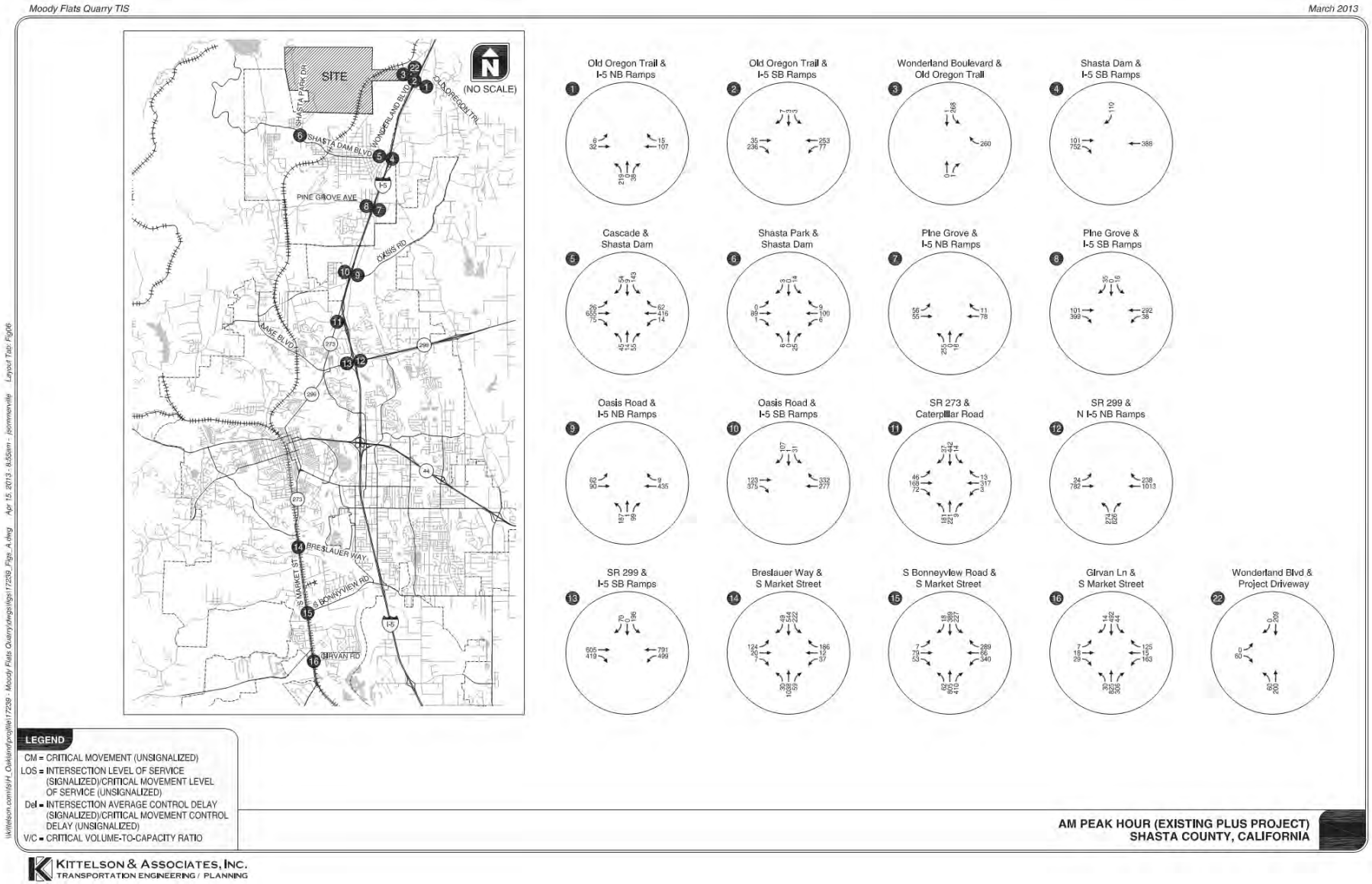
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

\\kittelson.com\sf\H_Oakland\proj\fer\17239 - Moody Flats Quarry\dwgs\figs\17239_Figs_A.dwg Apr 15, 2013 - 9:57am - pommerville Layout Tab: Fig16

MOODY FLATS QUARRY EIR

Figure 3.12-8: Project Only Weekday Volumes

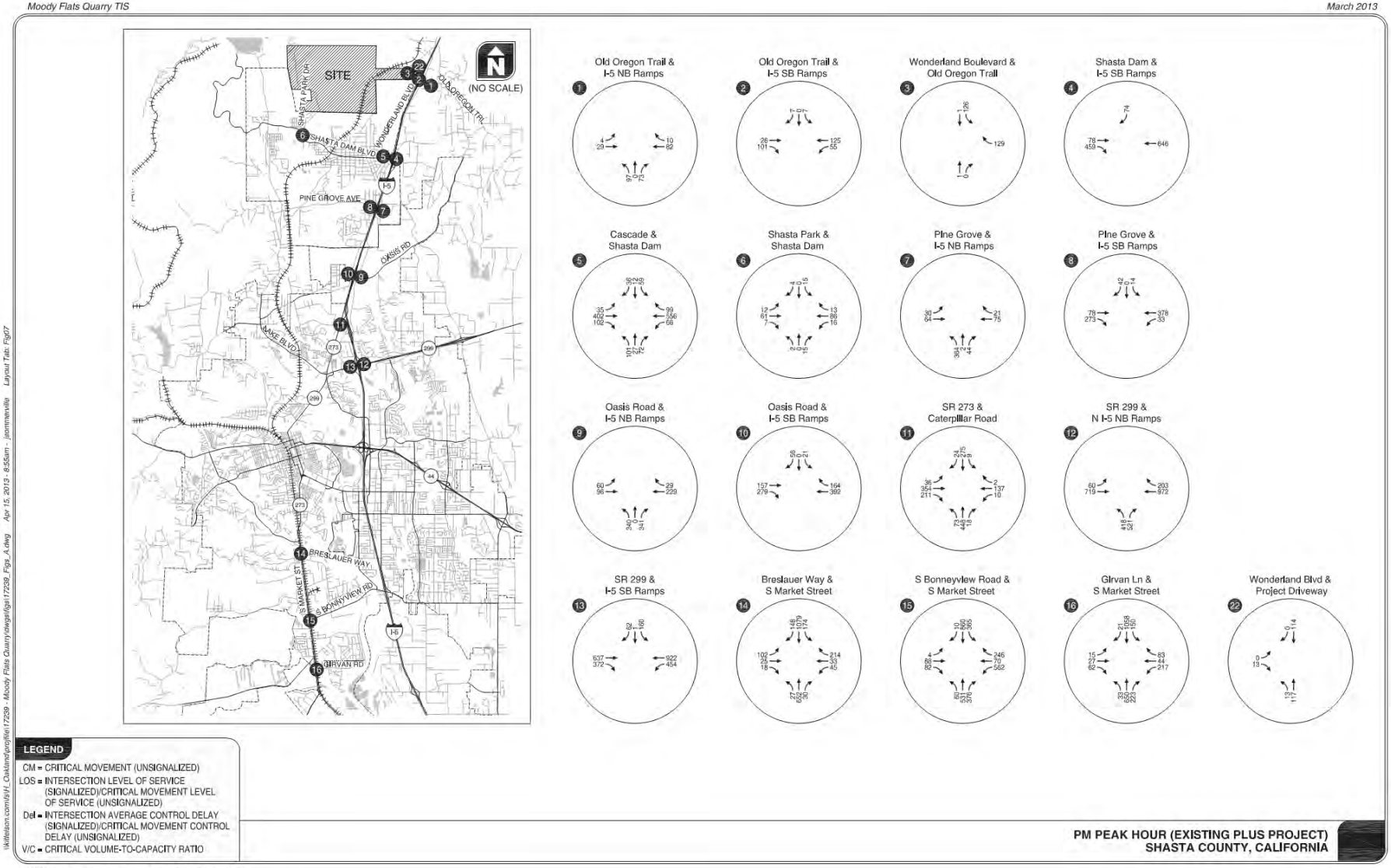
This page left intentionally blank.



MOODY FLATS QUARRY EIR

Figure 3.12-9: Existing plus Project Peak Hour Volumes (AM)

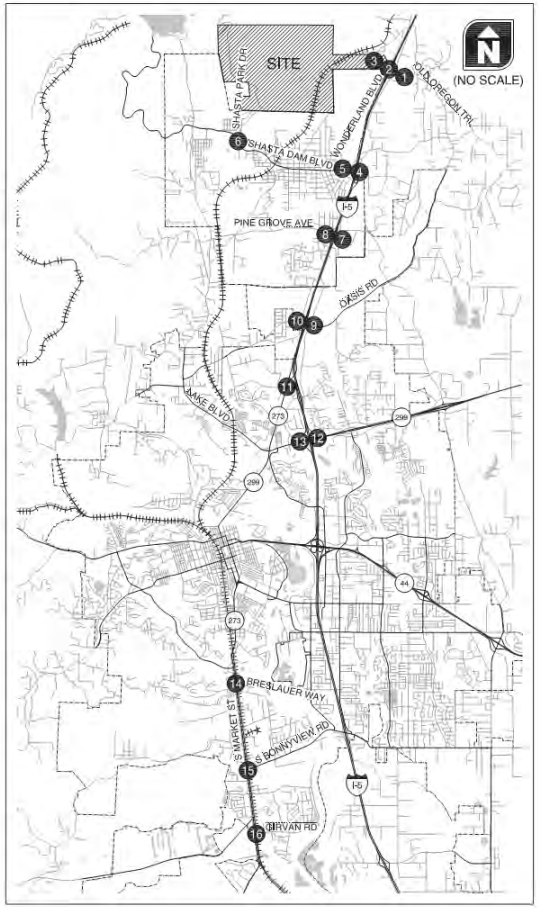
This page left intentionally blank.

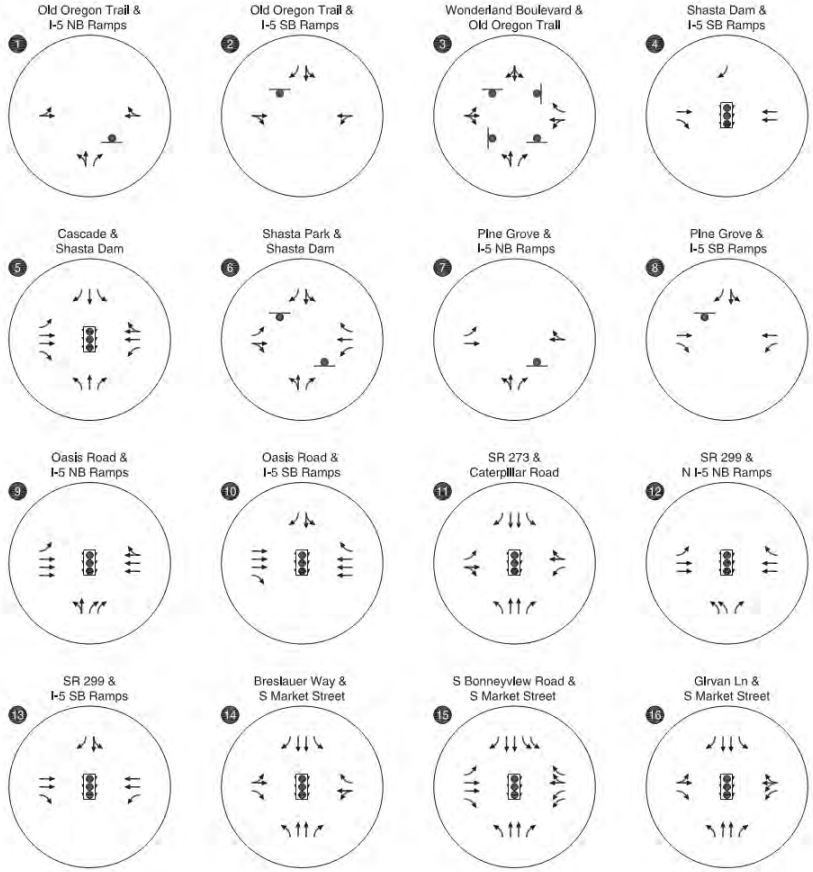


MOODY FLATS QUARRY EIR

Figure 3.12-10: Existing plus Project Peak Hour Volumes (PM)

This page left intentionally blank.





LEGEND

- STOP SIGN
- TRAFFIC SIGNAL

CUMULATIVE LANE CONFIGURATION
SHASTA COUNTY, CALIFORNIA

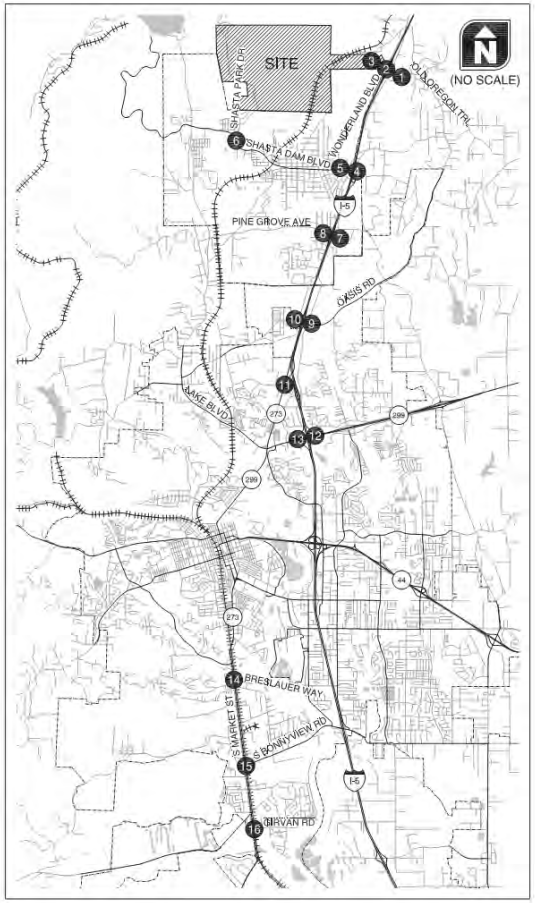
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

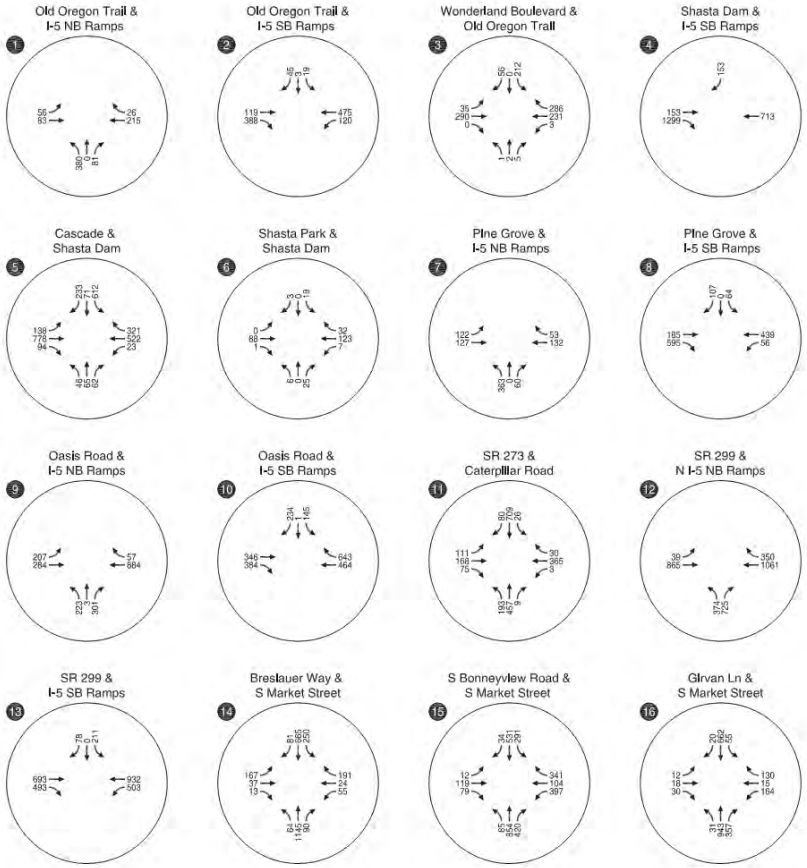
\\kittelson.com\dfs\H_Oakland\proj\file17239 - Moody Flats Quarry\dwg\fig\17239_Fig6_A.dwg Apr 15, 2013 - 8:56am - jcommerville Layout Tab: Fig08

MOODY FLATS QUARRY EIR

Figure 3.12-12: Cumulative Lane Configuration

This page left intentionally blank.





LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

CUMULATIVE AM PEAK HOUR
SHASTA COUNTY, CALIFORNIA

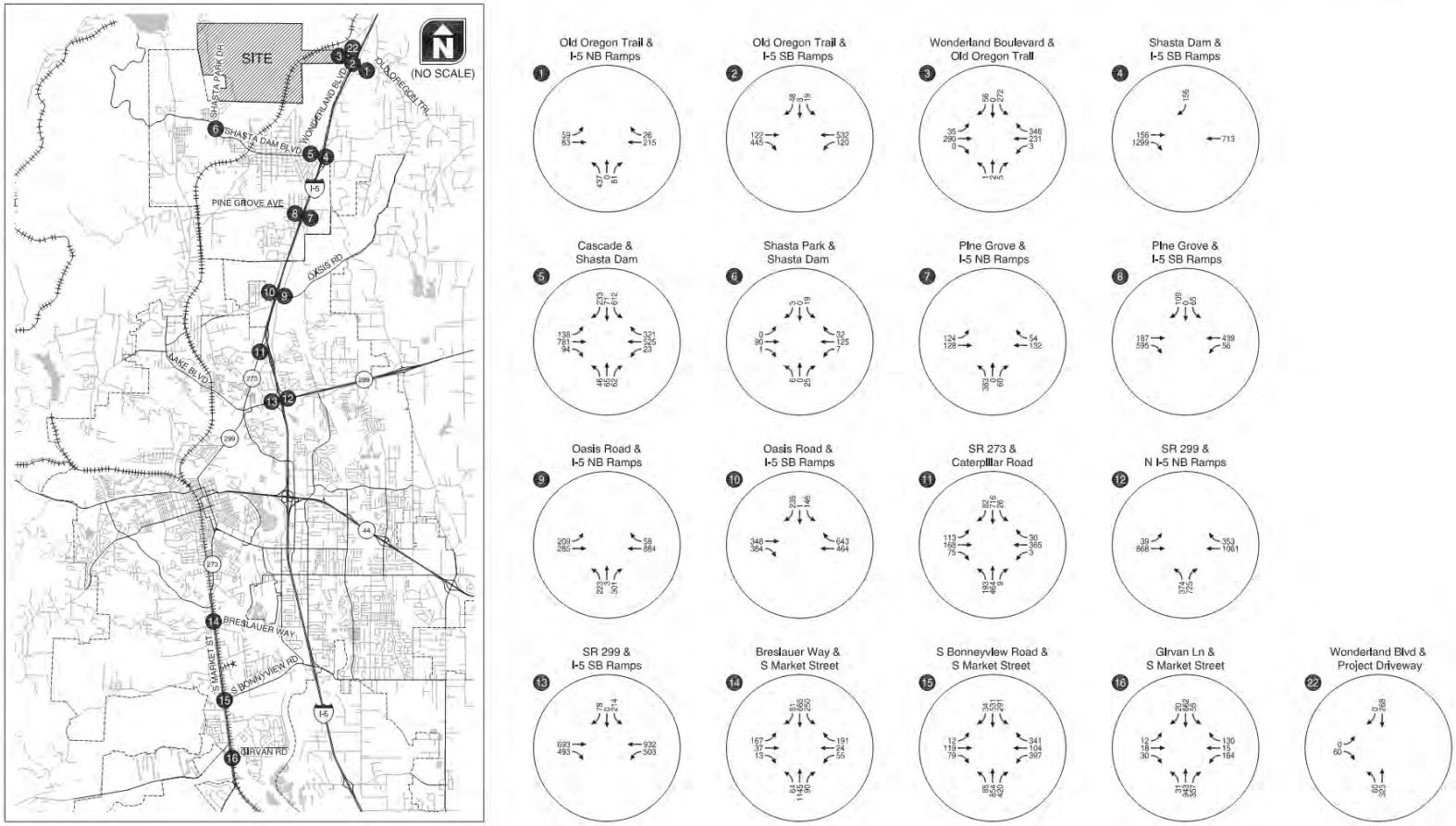
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

\\kittelson.com\sf1_Oakland\proj\file\17239 - Moody Flats Quarry\dwgs\figs\17239_Figs_A.dwg Apr 15, 2013 - 8:55am - jscrimerville Layout Tab: Fig09

MOODY FLATS QUARRY EIR

Figure 3.12-13: Cumulative No Project Traffic Volumes (AM)

This page left intentionally blank.



LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

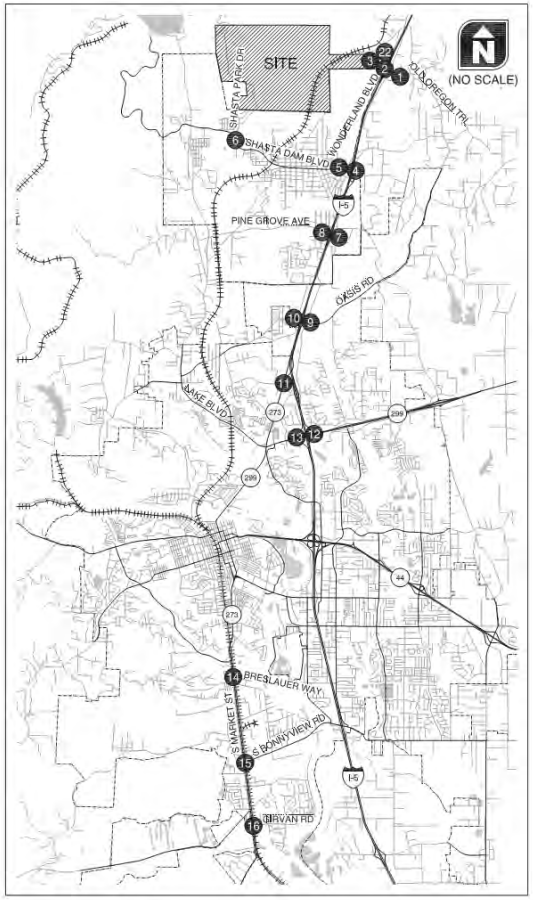
CUMULATIVE PLUS PROJECT AM PEAK HOUR
SHASTA COUNTY, CALIFORNIA

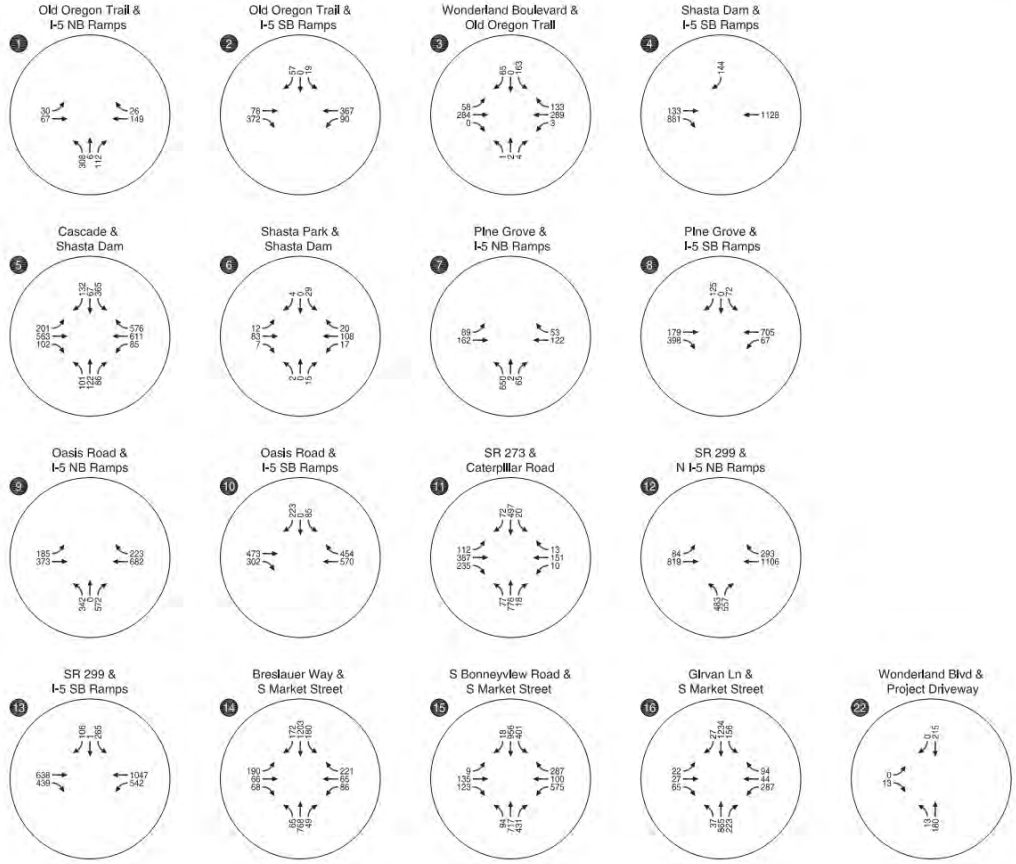
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

MOODY FLATS QUARRY EIR

Figure 3.12-14: Cumulative plus Project Traffic Volumes (AM)

This page left intentionally blank.





LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

CUMULATIVE PLUS PROJECT PM PEAK HOUR
SHASTA COUNTY, CALIFORNIA

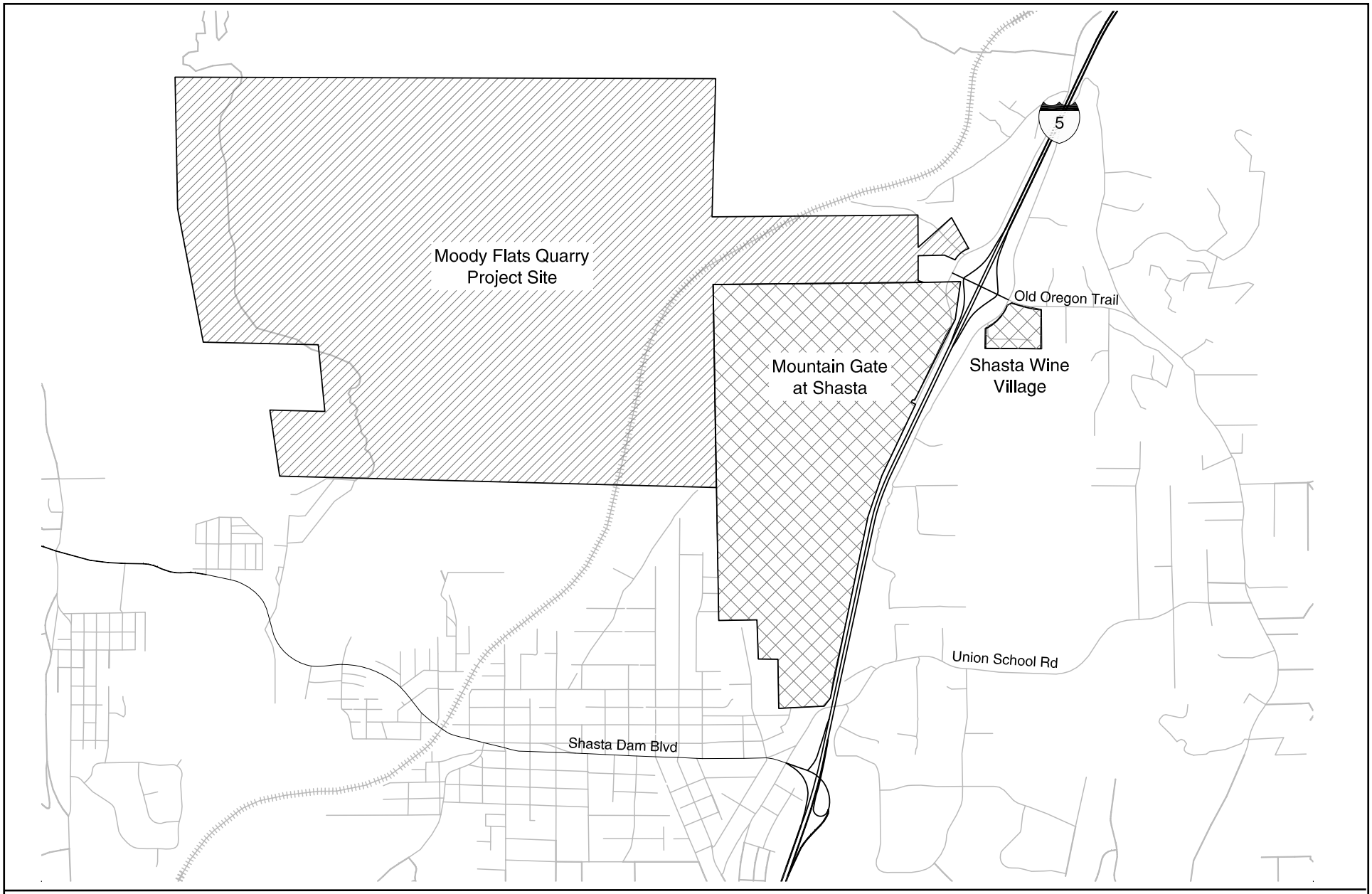
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

\\kittelson.com\sf\1_Oakland\proj\lie\17239 - Moody Flats Quarry\dwgs\figs\17239_Fig_A.dwg Apr 15, 2013 - 8:56am - jsemmerville Layout Tab: Fig13

MOODY FLATS QUARRY EIR

Figure 3.12-15: Cumulative plus Project Traffic Volumes (PM)

This page left intentionally blank.



MOODY FLATS QUARRY EIR

Figure 3.12-16: Nearby Development Projects

Source: Kittelson & Associates, Inc., October 2013

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

This section describes and evaluates the potential for the proposed Project to result in impacts related to new or expanded water or wastewater treatment facilities, new storm water drainage facilities, and the adequacy of proposed water supply as well as energy sources for the Project.

There were several comments received during the public review period and scoping meeting for the Notice of Preparation regarding these topics. 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 agencies and individuals: Central Valley Regional Water Quality Control Board (January 25, 2012), Central Valley Flood Protection Board (February 7, 2012), Eric Cassano (February 13, 2012), City of Shasta Lake (February 22, 2012), U.S. Department of Agriculture (February 10, 2012), Western Shasta Resource Conservation District (January 26, 2012), Bill Jeffers and Cliff Jacoby (February 13, 2012), Robert Atwood (February 3, 2012), Cinnamon Kern (February 4, 2012), Rose Flame (February 14, 2012), Debbie Mynatt (February 10, 2012), Gary Fodge (January 18, 2012), Cliff Jacoby (January 24, 2012), Lisa Grill (February 14, 2012), Robert McGill (February 13, 2012), Rob and Sheryl Sampley (January 25, 2012), Heidi Strand (February 8, 2012), and Stephanie Thomas (February 6, 2012).

Information for this section was derived from the following sources:

- Air Quality Impact Analysis, Moody Flats Quarry Project, Golder Associates, Inc. (August 30, 2012) (**Appendix D);**
- Moody Flats Quarry Stormwater, Erosion Control, and Drainage Plan (EMKO Environmental, Inc., May 2010) (**Appendix I**);
- Addendum to the Stormwater, Erosion Control and Drainage Plan, Moody Flats Quarry (EMKO Environmental, Inc., August 2012) (**Appendix J**);
- Update to the Hydrology and Water Quality Analysis of the Proposed 3M Moody Flats Quarry (EMKO Environmental, Inc., August 2012) (**Appendix M**);
- Field Investigation Report, Hydrology Analysis, 3M Redding Hard-Rock Aggregate Quarry (Brown and Caldwell, June 2009) (**Appendix N**);
- Addendum, Field Investigation Report, Hydrology Analysis, 3M Redding Hard-Rock Aggregate Quarry (Brown and Caldwell, January 2010) (**Appendix N-1**);
- Addendum 2, Field Investigation Report, Hydrology Analysis, 3M Redding Hard-Rock Aggregate Quarry (Brown and Caldwell, May 2011) (**Appendix N-2**);
- Update to the SB 610 Water Supply Assessment for the Moody Flats Quarry Project (EMKO Environmental, Inc., August 2012) (**Appendix S**);
- *Cupp Electric Utility Service Analysis* (Gerald Cupp, September 27, 2012); and
- Shasta County General Plan (Shasta County, 2004);

As discussed in the Initial Study and Section 3.9 of this Draft EIR, impacts related to wastewater treatment requirements of the Regional Water Quality Control Board, wastewater treatment capacity, landfill capacity, and compliance with solid waste disposal regulations were determined to be less than significant. Therefore, the analysis of impacts to utilities in this section is limited to an analysis of construction or expansion of water and wastewater facilities, construction or expansion of storm water drainage facilities, and water supply and energy availability.

3.13.1 EXISTING CONDITIONS

Wastewater Treatment

There are no wastewater treatment facilities or wastewater treatment infrastructure located on the Project site. As described in greater detail in Section 2.0, the Project proposes the construction and operation of an onsite septic system to dispose of wastewater generated on the site.

Water Supply

There is no public or municipal water supply infrastructure located on the Project site. There is an existing well on the Project site (Well OW-1). Well OW-1 would provide potable water to the office area to supply the needs of both office and bathroom uses on-site. Well OW-1 has a production capacity of two gallons per minute, which is equivalent to 2,880 gallons per day. The Applicant proposes to install above-ground water storage tanks adjacent to Well OW-1 to augment and supplement the potable water supply demands of the Project. Two 10,000-gallon above-ground storage tanks may be used to store potable water. See Section 3.9 for a discussion of groundwater conditions.

Stormwater Drainage

The Project site is located in undeveloped land that consists primarily of meadows and forest land. In the Project vicinity, elevations range from approximately 900 feet above mean sea level (ft msl) to over 2000 ft msl. The Union Pacific right-of-way crosses the southeast part of the Project area.

The most significant surface-water feature in the area is Shasta Lake, located approximately one to two miles northwest of the Project area. Shasta Dam has a crest elevation of 1077.5 ft msl. Water levels fluctuate seasonally within the lake. The recent peak water elevation occurred in June 2006 at 1064 ft msl. In October 2008, the water elevation in the lake was 909 ft msl. (www.cdec.water.ca.gov)

There are several surface water drainages located within the Project area. Moody Creek flows through the middle of the Project site. Salt Creek flows through the western side of the Project site. Salt Creek and Moody Creek are tributaries to the Sacramento River downstream of Shasta Dam.

Electricity Consumption

There are no electricity-generating facilities located on the Project site, and the Project site is not currently served by municipal electricity supply sources. As described in greater detail in Section 2.0, the Project Applicant eventually plans to connect to the power grid through the extension of power lines. The Project Applicant is pursuing an agreement with the City of Shasta Lake to provide electrical power to the Project site. As shown in Figure 2-15A, there is an existing City of Shasta Lake 12Kv power line located immediately to the southeast of the Project boundary. Existing power poles and a three-phase power line are located along Black Canyon Road, extending northwest to the Project boundary near the UPRR right of way. As shown in Figure 2-15B, the

Project Applicant proposes to extend the power lines to the west, across the UPRR to provide power to the Project site.

The Project Applicant would not exceed one million tons of annual production until electrical power was provided onsite by the local service provider. In the interim, portable diesel generators would provide power for equipment on-site.

3.13.2 REGULATORY SETTING

Federal Clean Water Act

The federal Clean Water Act (CWA) 33 USC § 1251 *et seq.* places the primary responsibility for the control of surface water pollution and for planning the development and use of water resources with the states, although the Act does establish certain guidelines for the states to follow in developing their programs and allows the EPA to withdraw control from states with inadequate implementation mechanisms.

National Pollutant Discharge Elimination System (NPDES)

The CWA requires National Pollutant Discharge Elimination System (NPDES) permits for discharges of pollutants from a point source to navigable waters of the United States. (Section 402; (33 USC §1342 *et seq.*) A "discharge" can include any addition of a pollutant to navigable waters, including lakes, rivers, streams, bays, the ocean, dry stream beds, wetlands, and storm sewers that are tributary to any surface water body. (33 USC § 1362 *et seq*.)

The State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs) issue NPDES permits in lieu of direct issuance by the US Environmental Protection Agency (USEPA), subject to review and approval by the USEPA Regional Administrator (USEPA Region 9). The terms of these NPDES permits implement pertinent provisions of the federal Clean Water Act and the Act's implementing regulations, including pre-treatment, sludge management, effluent limitations for specific industries, and anti- degradation. In general, the discharge of pollutants is to be eliminated or reduced as much as practicable so as to achieve the Clean Water Act's goal of "fishable and swimmable" navigable waters. All NPDES permits issued by the RWQCBs include Waste Discharge Requirements (WDRs) issued under the authority of the California Porter-Cologne Water Quality Control Act, discussed below.

These NPDES permits regulate discharges from publicly owned treatment works, industrial discharges, stormwater runoff, dewatering operations, and groundwater cleanup discharges. NPDES permits are technically issued for five years or less, but in practice may not be updated regularly.

The SWRCB has adopted four statewide general permits in order to efficiently regulate different types of stormwater discharges under a single permit. Two of those general permits are relevant to this Project: the general permit for stormwater runoff from an industrial site and the general permit for stormwater runoff from a construction site.

Dischargers whose projects disturb one or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Order 2009-0009-DWQ). Effective July 1, 2010 all dischargers are required to obtain coverage under the Construction General Permit, as it was amended June 25, 2012. Construction activity subject to the Construction General Permit includes clearing, grading and disturbances to the ground such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must list Best Management Practices (BMPs) the discharger will use to protect storm water runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program and a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs. Finally, unlike the previous general construction permit, the new permit now requires that dischargers identify which risk level their site is and Risk Level 3 and LUP Type 3 Dischargers with direct discharges to surface waters must conduct receiving water monitoring whenever their effluent exceeds specified receiving water monitoring triggers. The receiving water monitoring triggers include pH outside the range of 6.0 and 9.0 pH units or turbidity in excess of 500 NTU.

The Industrial Storm Water General Permit Order 97-03-DWQ (General Industrial Permit) is an NPDES permit that regulates discharges associated with 10 broad categories of industrial activities, including mining activities like the proposed Project. The General Industrial Permit requires the implementation of management measures that will achieve the performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT). Like the General Construction Permit, the General Industrial Permit also requires the development of a Storm Water Pollution Prevention Plan (SWPPP) and a monitoring plan. Through the SWPPP, sources of pollutants are to be identified and the means to manage the sources to reduce storm water pollution are described. The General Industrial Permit requires that an annual report be submitted annually on July 1. A new draft General Industrial Permit has been circulated for public comment and is expected to be adopted by the end of 2014.

Coverage under both the General Construction Permit and the General Industrial Permit may be obtained by filing a Notice of Intent with the SWRCB.

Federal Emergency Management Agency (FEMA)

Shasta County is a participant in the National Flood Insurance Program (NFIP), a federal program administered by FEMA. Participants in the NFIP must satisfy certain mandated floodplain management criteria. The National Flood Insurance Act of 1968 has adopted as a desired level of protection, an expectation that developments should be protected from floodwater damage of the Intermediate Regional Flood (IRF). The IRF is defined as a flood that has an average frequency of occurrence on the order of once in 100 years, although such a flood may occur in any given year.

Communities are occasionally audited by the Department of Water Resources to insure the proper implementation of FEMA floodplain management regulations.

The regulations of the National Flood Insurance Program (NFIP), which is administered by FEMA, require that communities adopt land use restrictions for the 100-year floodplain in order to qualify for federally subsidized flood insurance. Included is a requirement that residential structures be elevated above the level of the 100-year floodplain and that other types of structures be flood-proofed. FEMA issues Flood Insurance Rate Maps for communities participating in NFIP. These maps delineate flood hazard zones in each participating community.

Shasta County participates in the National Flood Insurance Program and must therefore, require development permits to ensure that construction materials and methods will mitigate future flood damage.

California Water Code

California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater is the Porter-Cologne Water Quality Control Act of 1970 (California Water Code § 13000 *et seq.)* (Porter-Cologne Act). The Porter-Cologne Act grants the State Water Resources Control Board (SWRCB) and each of the nine RWQCBs power to protect water quality, and is the primary vehicle for implementation of California's responsibilities under the federal Clean Water Act. The Porter-Cologne Act grants the SWRCB and the RWQCBs authority and responsibility to adopt water quality control plans and policies, to regulate discharges to surface and groundwater, to regulate waste disposal sites and to require cleanup of discharges of hazardous materials and other pollutants. The Porter-Cologne Act also establishes reporting requirements for unauthorized discharges of soils, hazardous substances, sewage, and oil or petroleum product, among others.

Each RWQCB must formulate and adopt one or more water quality control plans (Basin Plan) for its region. The regional plans are to conform to the policies set forth in the Porter-Cologne Act and established by the SWRCB policy. The Porter-Cologne Act also provides that a RWQCB may include within its regional plan water discharge prohibitions applicable to particular conditions, areas, or types of waste.

Water Quality Control Plan and Waste Discharge Requirements for the Central Valley Region

The Project site is located within the Central Valley RWQCB or Region 5. There are two Water Quality Control or Basin Plans that apply in the Central Valley: the Sacramento-San Joaquin River Basin Plan and the Tulare River Basin Plan. The Sacramento-San Joaquin River Basin Plan applies to the proposed Project. This Basin Plan includes a summary of beneficial water uses, water quality objectives needed to protect the identified beneficial uses, and implementation measures. The Basin Plan establishes water quality standards for all the ground and surface waters of the region. The term "water quality standards," as used in the Clean Water Act, includes both the beneficial uses of specific water bodies and the levels of quality that must be met and maintained to protect those uses. The Basin Plan includes an implementation plan describing the actions by the RWQCB

and others that are necessary to achieve and maintain the water quality standards. Water quality concerns in the region are listed in the Basin Plan, along with the causes, where they are known. For water bodies with quality below the levels necessary to allow all the beneficial uses of the water to be met, plans for improving water quality are included. The Basin Plan reflects, incorporates, and implements applicable portions of a number of national and statewide water quality plans and policies, including the California Water Code and the Clean Water Act.

The RWQCBs can also regulate waste discharges to minimize and control their effects on the quality of the region's ground and surface water through Waste Discharge Requirements (WDRs).

Water Code section 13260 requires that a Report of Waste Discharge (ROWD) be filed with the Central Valley RWQCB prior to any discharge of water to land that has the potential to affect groundwater quality. WDRs are issued in accordance with Section 13263. WDRs are issued to ensure discharges comply with the applicable Basin Plan, protect the beneficial uses listed in the Basin Plan, comply with applicable water quality objectives, consider the import of other waste discharges and the need to prevent nuisance.

Senate Bill 610 – Water Supply Assessments

Senate Bill (SB) 610 requires that public agencies considering certain projects check with the water agency proposed to serve the project to determine if there are sufficient water supplies available to accommodate the project. SB 610 applies to projects that meet the following criteria:

- A proposed residential development of more than 500 dwelling units.
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
- A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
- A proposed hotel or motel, or both, having more than 500 rooms.
- A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
- A mixed-use project that includes one or more of the projects specified above.
- A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

SB 610 amended Public Resources Code Section 21151.9 to provide that whenever a city or county decides that a project meets any of the above criteria, it must comply with Section 10910 *et seq.* of the Water Code. Section 10910 *et seq.* of the Water Code was also amended by SB 610 to require a city or county to coordinate the CEQA analysis with the water agency proposed to serve the project. Section 10910 *et seq*. requires a city or county to identify any public water system that

may supply water to a proposed project. The city or county must ask each of these water providers to indicate whether its "total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses." If the city or county does not receive this information from the water provider, it must provide the water supply assessment itself. The proposed Project is subject to SB 610 and has prepared a water supply assessment. (See Appendix S.)

Appendix F of the CEQA Guidelines

In order to assure that energy implications are considered in project decisions, the California Environmental Quality Act requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy (see Public Resources Code §21100(b)(3)). Energy conservation implies that a project's cost effectiveness be reviewed not only in dollars, but also in terms of energy requirements. Potentially significant energy implications of a project shall be considered in an EIR to the extent relevant and applicable to the project.

Shasta County General Plan

The September 2004 Shasta County General Plan contains policies that seek to develop comprehensive, long-range plans for public facilities and utilities through the understanding of the opportunities and constraints within the County and land use patterns. To accomplish this objective, Shasta County has adopted policies, which require new development to provide resources for public facilities and utilities, permit requirements for alternative disposal systems, and cooperative planning efforts to ensure adequate public facilities and utilities. The Shasta County General Plan also includes an Energy Element, which includes a range of policies and objectives aimed at reducing energy consumption and reducing vehicle miles traveled throughout the County. There are no policies or objectives within the Energy Element that are directly applicable to the proposed Project.

Relevant General Plan policies are identified below.

6.6.4 Water Resource Policies

- **W-a** Sedimentation and erosion from proposed developments shall be minimized through grading and hillside development ordinances and other similar safeguards as adopted and implemented by the County.
- **W-b** Septic systems, waste disposal sites, and other sources of hazardous or polluting materials shall be designed to prevent contamination to streams, creeks, rivers, reservoirs, or groundwater basins in accordance with standards and water resource management plans adopted by the County.
- **W-c** All proposed land divisions and developments in Shasta County shall have an adequate water supply of a quantity and a quality for the planned uses. Project proponents shall submit sufficient data and reports, when requested, which demonstrate

that potential adverse impacts on the existing water users will not be significant. The reports for land divisions shall be submitted to the County for review and acceptance prior to a completeness determination of a tentative map. This policy will not apply to developments in special districts which have committed and documented, in writing, the ability to provide the needed water supply.

- **W-d** The potential for cumulative water quality impacts resulting from widespread use of septic systems in poorly suited soil areas shall be periodically evaluated by the County for the need to provide greater monitoring and possible changes to applicable sewage disposal standards.

5.2.4 Flood Protection Policies

- **FL-a** New development in floodplains shall be regulated through zoning regulations addressing land use type, density, and siting of structures.
- **FL-c** Whenever possible, flood control measures should consist of channel diversions or limited floodplain designs which avoid alteration of creeks and their immediate environs.
- **FL-h** The impacts of new development on the floodplain or other downstream areas due to increased runoff from that development shall be mitigated. In the case of the urban or suburban areas, and in the urban and town centers, the County may require urban or suburban development to pay fees which would be used to make improvements on downstream drainage facilities in order to mitigate the impacts of upstream development.

Shasta County Groundwater Management Ordinance

Adopted in 1998, Shasta County Ordinance 98-1 officially adopted a groundwater management plan prepared by the Shasta County Water Agency pursuant to AB 3030 the Groundwater Management Act (California Water Code § 10750 *et seq*.). The California Department of Water Resources defines groundwater management plans as a "planned use of the groundwater basin yield, storage space, transmission capability, and water in storage."

3.13.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project will have a significant impact on utilities and service systems if it would:

- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;

- Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects; or,

- Have insufficient water supplies available to serve the Project from existing entitlements and resources, or require new or expanded entitlements for water supply.

The IS/NOP prepared for this Project determined that the proposed Project would result in less than significant impacts related to wastewater treatment requirements of the Regional Water Quality Control Board, the capacity of the applicable wastewater treatment provider to serve the Project, the capacity of a landfill that would serve the Project, and compliance with applicable regulations regarding solid waste. Therefore, these topics are not addressed in this section, and this section will only address the environmental topics in the bulleted list above.

Consistent with Appendix F of the CEQA Guidelines, the energy implications analysis addresses and considers the following potential environmental impacts:

- The Project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the Project, including construction, operation, maintenance, and/or removal;
- The effects of the Project on local and regional energy supplies and on requirements for additional capacity;
- The effects of the Project on peak and base period energy demands for electricity and other forms of energy;
- The degree to which the Project complies with existing energy standards;
- The effects of the Project on energy resources; and
- The Project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

IMPACTS AND MITIGATION MEASURES

Impact 3.13-1: Implementation of the proposed Project may require new or expanded water or wastewater treatment facilities, the construction of which could cause significant environmental effects (Less than Significant)

WASTEWATER TREATMENT FACILITIES

The proposed Project would not connect to a municipal wastewater treatment system. As described in greater detail under Impact 3.6-4, 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. The toilets would be pumped by a contracted hauler, licensed to dispose of chemical toilet waste, and emptied in an approved offsite location. 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 can be conducted. On occasion other tests may be requested by the EHD. 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 Project would not result in the construction of any offsite wastewater treatment or conveyance facilities, nor would it increase wastewater treatment demands at an offsite treatment plant. The potential impacts associated with construction and operation of the proposed septic system have been addressed under Impact 3.6-4. Mitigation Measure 3.6-4 would reduce potential impacts associated with the installation and operation of the septic system to a **less than significant** level. No additional mitigation is required.

WATER TREATMENT FACILITIES

Water for the proposed Project would be developed onsite and supplied by the Project Applicant. Water would come primarily from stormwater runoff that would be retained onsite and secondarily from groundwater from wells located or to be located on the Project site.

The proposed Project would require water for various components of the operation. In the processing operations, water consumption would occur due water retained in the product after washing, water used to manufacture concrete, water used for processing recycled material, water used for truck washing (aggregate, concrete, and asphalt trucks), misters on conveyor belts to control dust, and evaporation from the retention basins. In addition to these non-potable water uses in the processing area, non-potable water would also be used for dust control in the quarry and on the haul roads. Potable water would be required for the use by onsite employees.

The Project would not result in the construction or expansion of any offsite water treatment facilities, and the Project would not utilize any municipal water sources. As described in greater detail in Section 3.9, including Impact 3.9-3, the proposed stormwater system on the Project site has been designed and sized to capture stormwater runoff in sufficient quantities to provide all of the non-potable water demands of the proposed Project. Additionally, potable water for the office area would be provided by a groundwater well, either by converting existing well OW-1 to a production well, or installing one or more new wells. If the Project proponent drills additional supply wells in the future, then these wells would provide additional capacity. Any new wells drilled could provide either primary or reserve water-supply capacity. (See Impacts 3.9-3 and 3.13-3 for further analysis of impacts to groundwater and other users.)

All of the proposed stormwater retention facilities and onsite potable water supply wells are within the area of proposed disturbance on the Project site. As such, the potential environmental impacts associated with the construction of these facilities have been addressed throughout the relevant sections of this EIR. There are no offsite water supply or water treatment facilities or improvements that would result from implementation of the proposed Project. As such, this is a **less than significant** impact, and no additional mitigation measures are required.

Impact 3.13-2: Implementation of the proposed Project would require new or expanded stormwater drainage facilities, the construction of which may cause significant environmental effects (Less than Significant with Mitigation)

The Project would substantially alter the existing drainage patterns on the site, and would result in the construction of an extensive network of on-site drainage and stormwater control facilities and features.

As described in greater detail in Section 2.0, Project Description, and Section 3.9, Hydrology and Water Quality, mining at the Project site would eventually reach a production rate of two million tons of aggregate per year, with a maximum duration of 100 years. Initially, however, mining is anticipated to occur at a rate of 500,000 to 1,000,000 tons per year for five to 15 years, until the rail load-out facilities and additional processing capacity are constructed. Therefore, disturbance of the site would be gradual, and would not involve all areas simultaneously. Stormwater conveyance, erosion control, and drainage features would be constructed as needed, in advance of new disturbance in any given area of the Project site.

GENERAL APPROACH FOR STORMWATER MANAGEMENT

Figure 3.9-4 in Section 3.9 presents the anticipated layout of the stormwater conveyance, erosion control, and drainage features. Figure 3.9-5 presents a Site Stormwater Plan Concept Map, which is a general process flow diagram for the entire Stormwater, Erosion Control, and Drainage system.

In general, stormwater from the North Pit (4S) and the South Pit (5S) would be retained within sumps within each pit (i.e. the North Pit Sump-4B and the South Pit Sump-5B, respectively). Runoff from the Primary Processing Plant (5S) would also be directed into the South Pit Sump (5B). These sumps would change in size and location as each pit is developed. For example, initially the sumps would need to be constructed at the downslope edge of the pit. Once the pits are larger, the sumps would be relocated within the lowest part of the pits. Water from the sumps within the mine pits would be pumped out of the pits as needed to maintain adequate storage within the sumps. The sumps, however, would be over-sized so that they also provide storage to meet the Project water needs.

The excess water in the North Pit Sump (4B) would be pumped to one of the Overburden Channels (1R or 5R), which would then direct the water to the Overburden Surge Basin (3B). Excess water from the South Pit Sump (5B) would be pumped either to the Overburden Surge Basin (3B) or to Rate Control Basin 2 (2B). Notably, the pit sumps would only be pumped out when there is minimal or no flow within the other stormwater conveyances, for example, between storms or at the end of the wet season. The pit sumps would not contribute to peak storm flows within the rest of the system. In this way, the stormwater system would reduce the peak storm flows from the site.

Runoff from the Overburden Fill Area (3S and 4S) would be collected by Overburden Channel 1 (1R), along the north side of the Overburden Fill Area, and by Overburden Channel 2 (5R), along the south side of the Overburden Fill Area. The two overburden channels would be routed to the Overburden Surge Basin (3B). From the Overburden Surge Basin (3B), stormwater would be routed to Rate Control Basin 2 (2B) by the Overburden Channel (7R) and Overburden Culvert (6R). The culvert would be used to direct the stormwater under a local drainage and the Access Ramp. It is also anticipated that the system would include an option to route water from the Overburden Surge Basin to Rate Control Basin 1 (1B), depending on final site configuration and the sequencing of various Project components.

Runoff from the Primary Processing Area and the Access Ramp (18S) would move as sheet flow downslope to Rate Control Basin 2 (2B). Runoff from the Southwest Loading Area (17S) would be directed to Rate Control Basin 2 (2B) by Railroad Channel 2 (9R), once the railroad spur and load-out area is constructed. From Rate Control Basin 2 (2B), stormwater would be routed to Water Quality Pond 1 (1WQ) through the Rate Basin 2 Culvert (11R).

Runoff from the Secondary and Ancillary Processing Area (16S) would move as sheet flow to Rate Control Basin 1 (1B). Runoff from the Northeast Loading and Plant Area (1S) would be collected by Railroad Drainage Channel 1 (8R) and directed to Rate Control Basin 1 (1B), once the railroad spur

and load-out area is constructed. From Rate Control Basin 1 (1B), stormwater would be routed to Water Quality Pond 1 (1WQ) through the Rate Basin 1 Culvert (10R).

Water Quality Pond 1 (1WQ) would be constructed to provide sufficient retention time to meet the size requirements specified in the SWRCB NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Appendix D, for removal of suspended sediment for the entire stormwater system. However, to provide additional improvement in stormwater quality, a second stormwater settling pond (Water Quality Pond 2-2WQ) would be constructed. Both Water Quality Ponds would have the same dimensions and capacities. Therefore, the Water Quality Ponds would provide twice the retention time recommended by the SWRCB.

Despite the fact that the Water Quality Ponds provide twice the recommended retention time for removal of sediment from stormwater, an additional measure of water quality protection would also be provided. Stormwater leaving Water Quality Pond 2 (2WQ) would be directed by the Water Quality Pond Culvert (12R) to a 3.4-acre Vegetated Sheet Drain (13R). The Vegetated Sheet Drain (13R) would act to further entrain and remove any suspended particles in the storm water and to reduce, or attenuate, the rate of water flow prior to discharge to a natural drainage that is tributary to Moody Creek.

As discussed in Section 3.9, Hydrology and Water Quality, impacts related to stormwater are determined to be less than significant with mitigation incorporated. Implementation of the proposed Project would not result in an increased volume of stormwater leaving the Project site. The Project would not result in additional demand for stormwater conveyance through infrastructure in the vicinity of the site (off-site). All of the proposed stormwater drainage facilities for the Project would be constructed on-site, within the boundaries of the Project. Potential impacts associated with the construction and operation of the proposed on-site stormwater drainage facilities have been addressed throughout this Draft EIR. For example, potential impacts related to hydrology and water quality have been thoroughly addressed in Section 3.9. Potential impacts to biological resources associated with construction and operation of the stormwater drainage infrastructure have been thoroughly addressed in Section 3.4. Potential impacts to cultural resources have been addressed in Section 3.5.

The proposed stormwater drainage facilities and infrastructure to be constructed and operated on the Project site would fall within the areas proposed for disturbance, as shown on Figure 2-10. This Draft EIR includes a detailed analysis of the potential environmental impacts associated with construction and operation of the proposed Project within the areas proposed for disturbance, in addition to potential impacts that may result from Project operations outside of the areas proposed for disturbance. As stated above, the Project would not result in, or require the construction of, any off-site stormwater drainage improvements or facilities.

As described in Section 3.9, Mitigation Measure 3.9-1(a) requires the Project proponent to submit engineered design plans to Shasta County for the final Stormwater, Erosion Control, and Drainage Plan that comply with the County's grading and drainage requirements. Moreover, Mitigation Measure 3.9-1(b) requires the Project proponent 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 proponent is required to implement all required WDRs identified by the RWQCB throughout the life of the Project. Mitigation Measure 3.9-1(c) also requires the Project proponent to 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 during the operational life of the Project. The SWPPP must 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 must comply with the most current standards established by the Central Valley RWQCB. BMPs must be selected from a menu according to site requirements and shall be subject to approval by the Central Valley RWQCB. The Project proponent must implement appropriate Best Management Practices (BMPs) as identified in the SWPPP throughout the life of the Project. Mitigation Measure 3.9-4 requires the Project proponent to submit annual inspection reports as required under the SWPPP to both RWQCB and the County. These reports would verify compliance with the conditions in the SWPPP and the effectiveness of any BMPs that are installed. Mitigation Measure 3.13-1 requires the Project proponent to prepare and implement a SWPPP during initial construction and site grading activities on the Project site.

Implementation of Mitigation Measure 3.13-2 and the mitigation measures identified in the various sections of this Draft EIR, including the mitigation measures described above, would ensure that potential impacts related to the construction of new stormwater drainage facilities are reduced to a **less than significant** level. No additional mitigation is required.

MITIGATION MEASURES

Mitigation Measure 3.13-2: *Prior to the commencement of grading or any other ground-disturbing activities, the Project proponent shall submit, and obtain approval of, an NOI and SWPPP to the Central Valley RWQCB in accordance with the NPDES General Construction Permit requirements. The SWPPP shall utilize BMPs and technology to reduce erosion and sediments to meet water quality standards. Such BMPs may include: temporary erosion control measures such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation. The SWPPP shall be kept on site and implemented during construction activities and shall be made available upon request to representatives of Shasta County and/or RWQCB.*

Impact 3.13-3: Implementation of the proposed Project would increase the demand for water and may require new or expanded water entitlements (Less than Significant)

Water for the proposed Project would be developed onsite and supplied by the Project Applicant. Water would come primarily from stormwater runoff that would be retained onsite and secondarily from groundwater from wells located or to be located on the Project site.

The proposed Project would require water for various components of the operation. In the processing operations, non-potable water consumption would occur due to water retained in the product after washing, water used to manufacture concrete, water used for processing recycled material, water used for truck washing (aggregate, concrete, and asphalt trucks), misters on conveyor belts to control dust, and evaporation from the retention basins. In addition to these non-potable water uses in the processing area, non-potable water would also be used for dust control in the quarry and on the haul roads. Potable water would be required for the use by onsite employees.

Water used at the Project site would not come from municipal sources. Table 3.9-1, in Section 3.9, provides the estimated water usage for each of these items listed above. At peak production, the total volume of water used in the processing of aggregate for the Project each year is estimated to be 206 acre feet (AF). An additional 48 AF would be used annually for dust control in the quarry and on the haul roads. Thus, the total estimated water use at peak production would be approximately 254 AF/yr.

As described in greater detail under Impact 3.9-3, stormwater from the North Pit and the South Pit would be retained within sumps located in each pit. Runoff from the Primary Processing Plant would also be directed into the South Pit Sump. These sumps would increase in size and change location as each pit would be developed as mining operations expand and progress across the site. For example, initially the sumps would need to be constructed at the downslope edge of the pit. Once the pits are larger, the sumps would be relocated within the lowest part of the pits. Water from the sumps within the mine pits would be pumped out of the pits as needed to maintain adequate storage within the sumps to accommodate additional stormwater flows. The sumps, however, would be oversized so that they also provide storage to meet the Project water needs. The analysis following Impact 3.9-1 and Impact 3.9-3 demonstrates that the proposed onsite stormwater detention system would provide adequate storage and retention capacity to meet the non-potable water demands of the proposed Project.

As described in the Updated Water Supply Assessment (EMKO, 2012), under average conditions, it is estimated that over 800 AF/yr of runoff would occur from the North and South pit areas, combined, and additional runoff would be generated from the overburden storage area, and the processing and loadout areas. During dry periods, the runoff may be reduced to as low as 320 AF/yr from the North and South pit areas. The amount of water available from runoff during two-year, three-year, and multiple dry year conditions lasting more than three years, may range from 400 AF/yr to 600 AF/yr.

As discussed in Section 5.0 of the Updated Water Supply Assessment (EMKO, 2012), the net water demand for the proposed Project is 260 AF/yr at full production, but will initially be approximately 65 AF/yr and increase over five to 15 years as the rate of aggregate production is increased. There is more than adequate stormwater runoff from the Project site, and capacity within the storm water retention basins, to provide the necessary water for the Project under normal and dry-year conditions. The updated storm water system design (EMKO, 2012) provides the retention capacity necessary for the Project.

Potable water for the office area would be provided by a groundwater well, either by converting existing well OW-1 to a production well, or installing one or more new wells. The two gallons per minute production of well OW-1 would be sufficient to supply the needs of both office and bathroom uses on the site. If the Applicant drills additional supply wells in the future, then these wells would provide additional capacity. Any new wells drilled could provide either primary or reserve water-supply capacity. Although not needed to supply the Project with adequate water, based on production by Mountain Gate CSD in the Spring Branch Creek watershed to the north, the Kennett Formation at the Project site alone has the potential to provide sufficient groundwater to supply the entire Project demand. Thus, the Project Applicant has two available sources of supply, both with independent anticipated capacity sufficient to supply all the Project's water-supply needs.

There are no known groundwater supply wells completed within the Unnamed Volcanic Unit bedrock formation that would be mined within the vicinity of the proposed Project. Groundwater production for domestic and municipal supply use occurs in adjacent watersheds and from different geologic formations. The Project would not affect these watersheds and would not involve the mining of these other geologic formations because as discussed above, the groundwater surface tends to mimic the topography, but is located approximately 18 feet below ground surface (bgs) to 49 ft bgs. The fractured bedrock contains very little groundwater, with maximum production rates of only one to two gallons per minute (1 to 2 gpm) observed in the area of the South Pit. Since the mine pit locations are on small peaks located along a topographic ridge, the pits form their own watersheds and would not intercept groundwater that has percolated into the subsurface from outside the pit boundaries. Therefore, the quarry pits would not affect groundwater supplies outside of the pit boundaries or at depths below the pit floors.

As described above, there is sufficient groundwater available to meet the potable water demands of the proposed Project. Based on the available data and the discussion and analysis provided under Impact 3.9-3, the Project would not deplete groundwater supplies, interfere with recharge, or affect the production rate of preexisting wells.

Implementation of the proposed Project would not result in insufficient water supplies, nor would it require expanded water supply entitlements. The mitigation measures presented in Section 3.9 would ensure that the proposed onsite stormwater drainage and retention infrastructure is adequately sized and operated to meet the non-potable water demands of the Project, and that onsite wells are constructed and operated to meet the potable water supply demands of the Project. As demonstrated under Impact 3.9-3, impacts to groundwater levels would be less than significant.

As such, the proposed Project would have a **less than significant** impact with respect to water supply availability and would not require new or expanded water entitlements. No additional mitigation is required.

Impact 3.13-4: Project implementation may result in the inefficient or wasteful use of energy resources (Less than Significant)

The Project is a mining project, and as such, there are no large commercial or industrial buildings proposed that would have a high or wasteful demand for energy. The amount of energy used at the Project site would directly correlate to the volume of aggregate materials mined and transported to market in a given year. The process of mining aggregate requires the use of heavy machinery, including scrapers, dozers, hydraulic shovels or front-end loaders, and other equipment identified in Table 2-3 (Section 2.0, Project Description).

Operation of the proposed Project would utilize two primary sources of energy: diesel fuel and electricity. Diesel fuel would be used to power mobile equipment associated with quarrying operations, material haul trucks transporting aggregate materials to the marketplace, and train locomotives used onsite to manage railcars loaded with aggregate material headed to the marketplace, as well as a diesel generator in the first phase of the Project. Electricity provided by the City of Shasta Lake would be used to power onsite operations, including aggregate processing equipment including the primary, secondary, and tertiary screeners and crushers, onsite office and lighting power needs, and other basic onsite infrastructure during the second phase of the Project.

FUEL USAGE AND CONSUMPTION

As described in Section 2.0, Project Description, and Section 3.3, Air Quality, during the initial phase of Project operations the Project site would utilize power from an onsite diesel generator for processing equipment, including the primary, secondary, and tertiary screeners and crushers would be powered. The Project Applicant plans to connect to the City of Shasta Lake's electric utility grid as soon as feasible, however, for the purposes of the analysis in this EIR, it is assumed that the Project would receive power exclusively from a diesel-powered generator until production levels reach 1,000,000 tons per year. The analysis presented below is based on the total power output and diesel fuel consumption from use of a generator on the Project site. It is possible that the Project Applicant would utilize more than one generator to provide electricity during phase I, however, the total power output and fuel consumption associated with the use of more than one generator would not exceed the assumptions presented below.

Diesel Generator Fuel Consumption: The Moody Flats Quarry Air Quality Impact Analysis (**Appendix D**) includes information that can be used to calculate fuel usage of the diesel generator required to provide adequate power for site operations during initial phases of the Project (annual production less than 1,000,000 tons per year). The estimated annual diesel fuel usage associated with the generator can be calculated using information found in the footnotes to the table containing the criteria pollutant emission estimates for the generator in the August 2012 Air Quality Impact Analysis; i.e. Table 20 in Appendix A of the report. This estimate is calculated as:

30.6 gal/hr x 0.74 (annual load factor) x 3,168 hrs/yr = 71,736 gal/yr.

Quarrying Equipment: Based on a sample size of 2,500,000 tons of crusher feed, average diesel usage in quarries similar to the Moody Flats Quarry Project for mobile equipment, including water trucks, graders, and rock breakers, is 0.014 gallons per ton of aggregate.[1] At a maximum output of two million tons of aggregate per year, mobile equipment for the Project would require 28,000 gallons of diesel fuel annually.

The Project Applicant has committed to utilizing "Tier 4" off-road diesel engineers for its mobile equipment, including quarrying equipment. The use of "Tier 4" equipment is a requirement under Mitigation Measure 3.3-1, and is discussed in greater detail in Section 3.3 of the Draft EIR. Under the Tier 4 emissions standards, as set forth by the USEPA, engine manufacturers are able to produce off-road diesel engines that integrate engine and fuel controls as a system to gain emissions reductions of more than 90 percent.[2] To protect the emission control devices in the Tier 4 engines from sulfur damage, ultra-low sulfur fuel would also be used which, per EPA requirements, reduces sulfur levels in in-use diesel by more than 99 percent and limits maximum sulfur concentration to 15 parts per million.[3]

Haul Trucks: It is difficult to accurately or reliably evaluate transportation energy impacts for haul trucks that will off-haul mined aggregate from the Project site. Providing fuel usage estimates for 25-ton on-road haul trucks is, in and of itself, speculative given that the haul trucks are not under the ownership or control of the Project proponent and the type, make, model, engine size and age cannot be determined. In addition, accurate and reliable evaluation of the transportation energy impacts for haul trucks is not feasible because the Project Applicant has no control over the haul trucks, does not know their fuel requirements, does not know their end destinations, and vigorous analytic models do not exist to evaluate these impacts (such as for calculating vehicle air emissions). As such, assessing the energy impacts for the production-consumption region's existing haul trucks would be highly speculative.

Although there is no way the Project Applicant or County can provide exact data regarding fuel usage requirements for the haul trucks, conservative fuel usage estimates for typical on-road trucks hauling 25 tons of aggregate may average six to seven gallons of diesel per hour, or six to seven miles per gallon.[4] This is consistent with a fuel usage estimate of 5.9 miles per gallon based

---

[1] This fuel-per-ton-of-aggregate calculation is based on data provided by 3M (the Project proponent), which was developed based on extensive experience and expertise as a producer of aggregate from the mining industry.

[2] *Regulatory Announcement Clean Air Nonroad Diesel Rule*, EPA420-F-04-032, US EPA, (May 204), available at http://www.epa.gov/otaq/documents/nonroad-diesel/420f04032.pdf, p. 1

[3] *Id*. at p. 4.

[4] *See Data Collection for Class-8 Long-Haul Operations and Fuel Economy Analysis*, Oak Ridge National Laboratory, available at http://web.ornl.gov/sci/ees/etsd/cta/Data%20Collection%20for%20Class-8%20Long%20Haul%20Ops%20and%20Fuel%20Economy.pdf (indicating fuel efficiency generally between 6 to 7 miles per gallon for Class-8 heavy long-haul trucks). *See also Caterpillar Performance Handbook 43*, Caterpillar (June 2013), available at http://www.albancat.com/UserFiles/Uploaded/cms/cat-performance-

on carbon dioxide emissions for heavy duty diesel trucks (such as 25-ton on-road haul trucks).[5] Even assuming these fuel usage estimates, transportation energy impacts for haul trucks cannot be reliably evaluated for the reasons outlined above. However, as discussed below, energy usage and the impacts associated with aggregate hauling by truck would occur regardless of the Project in order to satisfy the region's constant demand for aggregate.

Given the inelastic nature of aggregate demand, off-hauling 500,000 tons per year of aggregate from the Project site via haul truck is considered a reasonable "baseline" amount that would be quarried and transported for sale within the production-consumption region regardless of whether the Moody Flats Project is approved.[6] Haul trucks, or haulers, are defined as construction companies, smaller independent contractors, and larger cement companies that have construction arms, such as Teichert, who do not have quarries in the area, but work on major freeway and other types of projects that require large volumes of aggregate materials. These haulers have - and will continue to - exist and conduct business in the region that requires large volumes of aggregate materials regardless of whether the proposed Project is approved and operational. These haulers would simply come to the Moody Flats site as opposed to another site if the Project is approved and permitted. As stated by Dr. Peter Berck (UC Berkeley), aggregate has inelastic demand—that is, an increase or decrease in the price of aggregate has little or no effect on the quantity of aggregate demanded by consumers. (Dr. Peter Berck Working Paper No. 994, "A Note on the Environmental Costs of Aggregate," (Jan. 2005), pp. 5, 7.) That said, transportation costs associated with delivering aggregate to the end user is one of the largest components of aggregate pricing. (California Department of Conservation, "Map Sheet 52 (Updated 2012) Aggregate Sustainability in California," (2012), pp. 18-19 ("DOC Aggregate Report").) As local sources of aggregate are depleted and aggregate is hauled longer distances to the consumer, prices will

---

handbook-43.pdf, p. 24-22 (fuel requirements for the 770 off-road haul truck, which utilizes similar engines to many on-road trucks, used for "low" work applications).

[5] Carbon dioxide emissions per mile for these trucks equal 1.743 kg (based on the emission factor used in a typical emissions inventory for on-road travel over a typical range of speeds as determined by the EMFAC model). Given a MW ratio of 12/44, equivalent carbon emissions per mile equal 0.475 kg [(12/44) x 1.743 kg]. Given an 87% mass percent of carbon in diesel fuel and a density of 3.24 kg/gal for diesel fuel, diesel fuel used per mile equals 0.169 gal [0.475 kg / (3.24 kg/gal x 0.87)]. Therefore, miles per gallon equals 5.9 [1 / 0.169 gal/mile].

[6] In 2012 the California Geological Survey determined that Shasta County to date had only permitted 52 million tons of its aggregate reserves, whereas the 50-year demand for aggregate in Shasta County was 93 million tons. Thus, Shasta County has only permitted 56 percent of its aggregate reserves compared to its 50-year demand, and the permitted aggregate is projected to run out within 21 to 30 years. (John P. Clinkenbeard, *Aggregate Sustainability in California*, California Geological Survey, Department of Conservation (2012), available at http://www.conservation.ca.gov/cgs/information/publications/ms/Documents/MS_52.pdf, p. 7)

increase. (Id. at p. 18.) In fact, "[t]ransportation cost is the principal constraint defining the market area for an aggregate mining operation." (Id.) Given aggregate's inelastic demand, however, increased prices will not reduce the demand for aggregate. Conversely, an aggregate mine expansion that increases local aggregate supply and lowers local aggregate prices by reducing haul distances would have little effect on aggregate demand. In the case of a new mine, the overall benefit is that it results in decreased air emissions and decreased fuel used in the delivery of the area's aggregate material demand since: a) the demand is constant regardless of the price; b) no new trucks are added to the area circulation; and c) those trucks are hauling the material fewer miles. As such, Project operations may end up decreasing the fuel consumption of the area's haul truck fleet since the material would be closer to the delivery points. The updated 2012 DOC Aggregate Report expressly connects increased aggregate haul distances to "increase[d] environmental and societal impacts such as increased fuel consumption, carbon dioxide emissions, air pollution, traffic congestion and road maintenance." (DOC Aggregate Report, p. 19.)

As a result, energy usage and impacts associated with the hauling of aggregate by truck would occur regardless of the Project in order to satisfy the region's constant demand for aggregate.

Locomotive Switcher: The Project would also include the transport of aggregate by rail. The Project would utilize a locomotive similar in size to the SW1200 (produced by GATX Locomotives) to load rail cars with aggregate. The SW1200 uses an average of six gallons of diesel per hour at lower throttle speeds up to notch two.[7] In a switching operation for assembling, disassembling, and organizing loads for offsite transport, the locomotive normally idles and requires throttling only a few notches beyond the idle setting. Higher throttle settings are utilized for steep grades and higher speeds, which are not factors at the Project site. Loading 1,500,000 tons of aggregate at 1,000 tons per hour would take 1,500 hours, and the locomotive would require 9,000 gallons of diesel fuel annually.

Union Pacific's railcars would be used at the Project site as an efficient transportation alternative to truck-hauling 1,500,000 tons of aggregate by taking advantage of energy efficiencies in train locomotion and by taking advantage of Union Pacific's existing rail infrastructure and operations. On average, locomotive trains are four times as fuel efficient as trucks.[8] In 2013, U.S. freight railroads were able to move one ton of freight an average of 473 miles per gallon of fuel.[9] As an

[7] *Fuel Consumption*, GATX Locomotive Group, Available at http://gatx.com/wps/wcm/connect/58111180461da43d984af913d02d902a/Fuel_Consumption_Chart.pdf?MOD=AJPERES

[8] *The Environmental Benefits of Moving Freight by Rail* (April 2014), Association of American Railroads, available at http://www.aar.org/keyissues/Documents/Background-Papers/Environ%20Benefits%20of%Moving%20by%20Rail%20April%202013.pdf, p. 1.

[9] *Id.*

added benefit, because fuel consumption is directly related to greenhouse gas emissions, moving freight by railcar instead of truck reduces greenhouse gas emissions by 75 percent.[10]

Additionally, the use of freight rail rather than haul trucks to transport aggregate materials from the Project site would reduce highway congestion. In 2011 highway congestion nationwide resulted in 2.9 billion gallons of wasted fuel.[11] As stated in Section 2.0, trains hauling aggregate material from the Project site would consist of an average 80-car train, with each car capable of carrying approximately 100 tons of material. Therefore, each train could transport approximately 8,000 tons of aggregate per trip, whereas haul trucks typically can only carry 25-ton loads. At maximum peak production of 1,500,000 tons of aggregate, the Project would need 60,000 haul trucks (requiring 120,000 vehicle trips to and from the Project site) in order to carry the equivalent load of 188 trains.

In summary, utilizing rail transportation instead of haul trucks for three-quarters (3/4) of total aggregate production would result in less-than-significant impacts, considering transportation energy requirements, by taking advantage of fuel efficiencies, obviating the need for more haul trucks, and reducing trip generation for off-hauling aggregate, thus reducing air emissions and fuel consumption.

Rail Freight Transport: As described above, the Project would transport approximately three-quarters of its finished aggregate products to regional sites via rail, and would add rail cars totaling less than one train trip per day to the existing level of rail use (approximately 188 train trips per year would be required to haul 1,500,000 tons of material). To set a proper baseline at the Project site for rail line use, lead agencies should consider the environmental conditions currently existing at the site. Union Pacific Railroad has been running trains along the rail line at the Project site since the early 1900's. Peak rail traffic, ranging between 18 and 20 train trips per day, took place during 2005-2007. Although in the wake of the economic downturn starting in 2008, rail transport has decreased to roughly 12 trips per day, the rail line has historically experienced the more extensive baseline use of up to 20 trains per day. Accordingly, the additional rail trips that the Project would contribute to Union Pacific's existing rail operation impacts would fall easily within this baseline of operations of 20 train trips per day. As such, Union Pacific's existing infrastructure, engines, and operations constitute baseline conditions for which the Project does not need to evaluate transportation energy impacts.

ELECTRICITY CONSUMPTION

At or before the time that material production reaches 1,000,000 tons per year, the Project would receive electric line power from the City of Shasta Lake. On September 27, 2012 Gerald Cupp, a former Public Utilities Director, prepared an Electric Utility Service Analysis (*Cupp Electric Utility*

---

[10] *Id.*

[11] *Id.* at p. 2.

Service Analysis) to evaluate the potential for the City of Shasta Lake to service the Project with electric line power. Below are the relevant findings from that analysis related to the ability of the City to provide sufficient electric line power to the Project and the impact of the Project on existing electricity resources and regional demand.

Existing Infrastructure and Capacity: The City is a direct connect customer of the Sierra Nevada Region of the Western Area Power Administration (WAPA) with supplemental energy needs satisfied through an integration power contract with the City of Redding. WAPA is one of four power marketing administrations within the U.S. Department of Energy that provides cost-based hydroelectric power from dams owned by the U.S. Bureau of Reclamation.[12] In the Project region, the Sierra Nevada Region of WAPA generates hydroelectric power from Shasta Dam and provides wholesale hydroelectric power to the City,[13] who then in turn would be able to provide retail electric service to the Project site to power the Project's non-mobile needs (e.g., processing equipment, buildings, and site infrastructure).

The City's Central Valley Substation has two 115/12.47 kV transformers and six 12 kV circuits. The 115 kV transmission system is looped to the WAPA 230 kV transmission via the City's Flanagan substation and WAPA's Keswick substation. These two substation banks have namplate ratings of 46 megavolt-amperes (mVA) and 37 mVA. The City experiences peak summer demands of 20 mVA (not including Knauf Fiberglass GmbH[14]), and the load is split with three circuits on each substation bank.

Electricity Consumption and Utility Service: According to the Cupp Electric Utility Service Analysis, the Project would require a peak monthly demand load of 2,500 kilovolt-amperes (kVA) and 1,575 horsepower of motor load. Although 2,500 kVA represents the peak monthly demand load, the Project would normally operate at between 60 to 65 percent load factor at two shifts, six days per week. Therefore, the Project would require an estimated monthly energy consumption of 1,087,470 kilowatt hours (kWh) at 60 percent load factor. The Cupp Electric Utility Service Analysis concluded that the City has adequate capacity to serve the peak monthly demand load of 2,500 kVA at the Project site.

Based on the size of the estimated load, the City would serve the Project at 12 kilovolts (kV), or primary service voltage, and would meter service at the 12 kV voltage level. The City could provide service at two points of service. The optimal service point is at Mussel Shoals, approximately 300 feet south of the City's property line with the Project at the northern end of the City and the southern end of the Project. Another possible service point is near the Union Pacific railroad tracks west and north of Black Canyon Road on an existing City utility easement. In either case, the Project would need to install serving equipment (e.g., transformer). The impacts of the installation

[12] *About Western*, WAPA, http://ww2.wapa.gov/sites/Western/about/Pages/default.aspx, (last visited May 22, 2014).
[13] *About SNR*, WAPA Sierra Nevada Region, http://www.wapa.gov/sn/about, (last visited May 22, 2014).
[14] GmbH is the German equivalent of a Limited Liability Corporation, or LLC.

of the utility infrastructure have been previously considered throughout this EIR, since the electricity infrastructure would fall within the areas proposed for surface disturbance on the Project site.

Notably, in any service agreement with the City, the Project Applicant would be responsible for correcting power quality, system interference, or harmonic generation issues that may cause disturbances affecting other customers that are deemed to be caused by the Project that may arise from equipment use, such as large motors starting and ramping up to speed. Considering the above information, the Project would have a **less-than-significant impact** on regional electricity supply and would not require additional capacity, even during peak demand periods.

This page left intentionally blank

CEQA requires an EIR to evaluate a project's effects in relationship to broader changes occurring, or that are foreseeable to occur, in the surrounding environment. Accordingly, this chapter presents discussion of CEQA-mandated analysis for cumulative impacts, irreversible impacts, and growth inducement associated with the proposed Project.

4.1 CUMULATIVE SETTING AND IMPACT ANALYSIS

INTRODUCTION

The California Environmental Quality Act (CEQA) requires that an Environmental Impact Report (EIR) contain an assessment of the cumulative impacts that could be associated with the proposed Project. According to CEQA Guidelines Section 15130(a), "an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable." "'Cumulatively considerable' means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects."(14 Cal. Code Regs. §15065(a)(3).) As defined in CEQA Guidelines Section 15355, a cumulative impact consists of an impact that is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts.

> The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. (14 Cal. Code Regs. § 15355(b).)

Where a lead agency is examining a project with an incremental effect that is not "cumulatively considerable," a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

CUMULATIVE SETTING

Unless otherwise specified, the cumulative geographic setting for the Project is the unincorporated area of Shasta County, which includes the lands immediately north of the City of Shasta Lake. Under CEQA, the discussion of cumulative impacts should focus on the severity of the impacts and the likelihood of their occurrence. This cumulative scenario includes all development envisioned through 2030, with a development pattern consistent with the Shasta County General Plan and the City of Shasta Lake General Plan.

The cumulative scenario also includes two separate development projects: a residential and commercial development, Mountain Gate at Shasta, which project is being processed by the City of Shasta Lake concurrently with this Project; and a highway commercial project, the Shasta Wine Village, which was approved by the Shasta County Planning Commission on August 9, 2012.

The Mountain Gate at Shasta project is located in the northeastern corner of the City of Shasta Lake due west of Interstate 5 (I-5) between the Shasta Dam Boulevard interchange (Exit #685) and the Mountain Gate interchange (Exit #687), immediately southeast of the Moody Flats Quarry Project site. The City of Shasta Lake has received an application for a project that consists of the following four elements: (1) General Plan Amendment, (2) Area Plan adoption, (3) rezone; and (4) approval of a tentative map. The Mountain Gate at Shasta project would include a new Mountain Gate at Shasta Area Plan (Area Plan), which would allow for a theoretical maximum of 1,787 dwelling units; however, topography and site constraints would limit the overall density. Approximately 1,604 units are considered the development limit of the site in the EIR currently being prepared for the Mountain Gate project. The Area Plan also could lead to approximately 195,584 square feet of non-residential development on approximately 590 acres.

The Shasta Wine Village project is also located in the Mountain Gate area at the southeast corner of Old Oregon Trail and Holiday Road. That project includes a use permit for a commercial and retail project on a 10.08-acre property consisting of the development of four buildings (35,600 square feet total) to be used as follows: restaurant (5,000 sq. ft.) with 96 indoor and 56 outdoor seating, deli (1,500 sq. ft.), warehouse/storage (15,600 sq. ft.), common space (500 sq. ft.), as well as a vineyard for aesthetic, demonstration, and educational purposes.

The cumulative setting area also includes a number of existing quarries and aggregate materials processing facilities, including:

- Falkenbury Quarry
  - Material Produced: Shale for production of Portland cement
  - 2013 area: 98 acres
  - Ancillary facilities: None
  - Owner/Operator: Lehigh Southwest Cement Company
- Fawndale Quarry
  - Material produced: Andesite for aggregate and asphalt cement
  - 2013 area: 45 acres
  - Ancillary facilities: Crushing and screening plant, asphalt plant
  - Owner/Operator: J. F. Shea Company
- Gray Rocks Quarry
  - Material produced: Limestone for production of Portland cement
  - 2013 area: 140 acres

- Ancillary facilities: Primary crusher
- Owner/Operator: Lehigh Southwest Cement Company

- SWA Mountain Gate Quarry
  - Material produced: Limestone for aggregate and agricultural use
  - 2013 area: 70 acres
  - Ancillary facilities: Crushing and screening plant, agricultural lime plant
  - Owner/Operator: Stimpel-Wiebelhaus Associates, Inc.
- Lehigh Southwest Cement Company, Redding, CA
  - Material produced: Portland cement
  - 2013 area: about 40 acres
  - Owner/Operator: Lehigh Southwest Cement Company
  - Receives limestone by conveyor belt from Gray Rocks Quarry and shale by truck from Falkenbury Quarry

CUMULATIVE EFFECTS OF THE PROJECT

Method of Analysis

Although the environmental effects of an individual project may not be significant when considered separately, the combined effects of several projects may be significant when considered collectively. As noted above, CEQA Guidelines 15130 requires a reasonable analysis of a project's cumulative impacts, which are defined as "two or more individual effects which, when considered together are considerable or which compound or increase other environmental impacts." The cumulative impact that results from several projects in close proximity is: the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonable foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time (State CEQA Guidelines 15355[b]). Cumulative impact analysis may be less detailed than the analysis of the project's individual effects (State CEQA Guidelines 15130[b]). Section 15130(b) identifies the elements necessary for an adequate cumulative analysis.

First, the lead agency must identify what other projects exist or are reasonably foreseeable. This can be done by either (1) identifying a “list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or, (2) providing a summary of projections contained in an adopted local such as a specific plan or general plan, a regional (e.g., a regional transportation plan) or statewide plan, or

another related planning document, that describes or evaluates conditions contributing to the cumulative effect. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such projections may be supplemented with additional information such as a regional modeling program. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency. (14 Cal. Code Regs. §15130(b)(1)(A)-(B).)

In short, the list approach identifies individual projects known to be occurring or proposed in the surrounding area in order to potential cumulative impacts. The projection approach uses a summary of projections in adopted General Plans or related planning documents to identify potential cumulative impacts.

This EIR uses a combination of the list approach and the projection approach for the cumulative analysis and considers the development anticipated at buildout of the Shasta County General Plan and the City of Shasta Lake General Plan, in addition to the two individual projects identified above (Mountain Gate at Shasta and Shasta Wine Village).

Second, the DEIR should identify a geographic scope for the cumulative analysis and then provide a summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available. (14 Cal. Code Regs. §15130(b)(3)-(4).) As noted above, the cumulative geographic setting for this Project is the unincorporated area of Shasta County, which includes the lands immediately north of the City of Shasta Lake.

Finally, the DEIR must include a reasonable analysis of the cumulative impacts of the relevant projects, and shall examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects. (14 Cal. Code Regs. §15130(b)(5).)

Project Assumptions

The Project's contribution to environmental impacts under cumulative conditions is based on the full maximum operation of the proposed quarry, which includes mining, processing and shipping approximately 1.5 million tons of aggregate annually via rail to regional markets and distributing 0.5 million tons of aggregate and finished products (e.g., ready-mix concrete, asphalt) annually to local markets via trucks. The total maximum annual sales proposed for aggregate from the Project would be two million tons per year. See Chapter 2.0, Project Description, for a complete description of the proposed Project.

Cumulative Impacts

Effects associated with forest resources, mineral resources, population growth and housing, public services, and recreation were discussed in the Initial Study and determined to not have an impact or to have a less than significant impact. The analysis in the Initial Study has identified that these impacts would not contribute any substantial incremental effects, no comments were received in response to the NOP regarding these issues, and the analysis performed for preparation of this Draft EIR did not indicate that the Project would have a considerable contribution to significant

cumulative effects in these issue areas; therefore, the Project is determined to have a less than considerable contribution to cumulative impacts associated with forest resources, mineral resources, population growth and housing, public services, and recreation.

Cumulative impacts for most issue areas are not quantifiable and are therefore, discussed in general terms as they pertain to development patterns in the surrounding region. Exceptions to this are traffic, noise and air quality (the latter two of which are associated with traffic volumes and/or operational emissions from the proposed quarry facility and processing plant operations), which may be quantified by estimating future traffic patterns, pollutant emitters, etc. and determining the combined effects that may result. In consideration of the cumulative scenario described above, the proposed Project may result in the following cumulative impacts.

AESTHETICS

Impact 4.1: Cumulative Degradation of the Existing Visual Character of the Region (Considerable Contribution and Significant and Unavoidable)

The cumulative setting for aesthetics is the area north of the City of Shasta Lake in the Mountain Gate area of the unincorporated portion of Shasta County. Under cumulative conditions, buildout of the City of Shasta Lake and Shasta County General Plans, including the development of the Mountain Gate at Shasta and Shasta Wine Village projects, would result in changes to the visual character of the area from a more rural setting to one that is more characterized by urban uses. Despite the General Plan's policies and actions, in conjunction with adopted state, County and city regulations to enhance "hometown feel" and preserve open space, development permitted under the applicable General Plans and the individual projects identified above would result in a significant impact to the existing visual identity and character of the area due to the amount of proposed growth.

As described in Section 3.1- Aesthetics, 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 its natural condition. However, this transformation back to a naturalized condition would occur over a century from now. Further, the mountain tops would be permanently removed. Over the life of the quarry, the visual impacts would get progressively more visible as mining progressed in the North Pit area, and the area of disturbance increased over the next several decades. This project-specific impact was determined to be significant and unavoidable, and there is no feasible mitigation available to reduce this impact to a less than significant level. Thus, the Project's contribution to visual resource impacts under cumulative conditions would be **cumulatively considerable** and **significant and unavoidable**.

AGRICULTURAL AND FOREST RESOURCES

Impact 4.2: Cumulative Loss of Agricultural Resources (Less than Cumulatively Considerable)

The cumulative setting for agricultural resources includes all agriculturally zoned lands within the unincorporated portion of Shasta County. There are no Prime Farmlands, Unique Farmlands, or Farmlands of Statewide Importance located on, or in the vicinity of the Project site. Moreover, there are no existing agricultural operations occurring on the Project site. Finally, the County has not designated or zoned any portion of the Project site for agricultural uses. The Project site is currently designated by the Shasta County General Plan as Mining Resource (MR), Industrial (I), Rural Residential A (RA), Commercial (C), 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). Therefore, implementation of the proposed Project would not result in any adverse impacts to agricultural lands or agricultural operations. Accordingly, there would be a **less than cumulatively considerable** impact.

AIR QUALITY

Impact 4.3: Cumulative Impact on the Region's Air Quality (Considerable Contribution and Significant and Unavoidable)

The cumulative setting for Project air quality impacts is the Northern Sacramento Valley Air Basin, which includes existing quarries and aggregate processing facilities in the region, as identified previously in this section. Under buildout conditions in the Shasta County General Plan and the City of Shasta Lake General Plan, the Northern Sacramento Valley Air Basin would continue to experience increases in criteria pollutants and efforts to improve air quality throughout the basin would be hindered.

As discussed under Impact 3.3-2, and as shown in Tables 3.3-5 and 3.3-6, indirect Project emissions under Scenario 1 and 2 are predicted to exceed the SCAQMD Level A thresholds for ROG. In addition, indirect Project emissions are predicted to exceed the SCAQMD Level A and B thresholds for NO_x. 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. 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.

As discussed under Impact 3.3-3, Project operations would contribute to exceedances of established state and federal ambient air quality standards. Mitigation measures, which include dust controls and ROG and NOx emissions reduction plans, have been imposed upon the Project in order to reduce operational emissions levels to the greatest extent feasible. However, as further discussed under Impact 3.3-2, operation of the proposed Project would exceed the ambient air

quality standard for NO_2, PM_{10}, $PM_{2.5}$. There are no feasible mitigation measures, beyond those already imposed, that would reduce this cumulative impact to a less than significant level.

As a result, the Project's contribution to cumulative air quality impacts would be **cumulatively considerable** and **significant and unavoidable**.

BIOLOGICAL RESOURCES

Impact 4.4: Cumulative Loss of Biological Resources Including Habitats and Special Status Species (Less than Considerable Contribution)

The cumulative setting for biological resources includes the bioregions within Shasta County, as described in greater detail in Section 3.4. Development associated with implementation of the City of Shasta Lake and Shasta County General Plans could contribute to the ongoing loss of natural lands and sensitive habitat in the area, which currently provide habitat for a variety of species. Cumulative development would result in the conversion of existing biological habitat to urban and mineral resource extraction uses. However, the Shasta County General Plan, in addition to regional, state and federal regulations, includes policies and measures that would mitigate impacts to biological resources associated with General Plan buildout.

As described in Section 3.4- Biological Resources, implementation of the proposed Project has the potential to result in impacts to a wide range of special-status species and sensitive natural habitat. Section 3.4 includes a wide range of comprehensive mitigation measures that must be implemented by the Project Applicant in order to reduce impacts to special-status species and sensitive natural habitat. These measures include, but are not limited to, extensive pre-construction surveys to identify and avoid sensitive natural resources, the acquisition of incidental take permits and the provision of compensatory habitat acreage to offset for the loss of special-status species habitat that would result from Project implementation. The mitigation measures presented in Section 3.4 identify the regulatory roles of agencies such as the California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service in issuing permits, providing guidance regarding species and habitat avoidance, and securing compensatory mitigation for potentially significant impacts to biological resources. As described in Section 3.4, the implementation of the range of mitigation measures required by the proposed Project would reduce impacts to biological resources to a less than significant level because there would be no net loss of biological habitat. As such, this is considered a **less than cumulatively considerable** impact, and no additional mitigation measures beyond those identified in Section 3.4, are required.

CULTURAL RESOURCES

Impact 4.5: Cumulative Impacts on Known and Undiscovered Cultural Resources (Less than Cumulatively Considerable)

The cumulative setting for cultural resources includes the unincorporated areas of Shasta County. Cumulative development anticipated in the greater Shasta County area, may result in the

discovery and removal of cultural resources, including archaeological, paleontological, historical, and Native American resources and human remains. As discussed in Section 3.5- Cultural Resources, there are known cultural and historic resources present on the Project site that would be impacted by implementation of the Project. Mitigation measures provided in Section 3.5 would require the Project applicant/developer to consult with appropriate Native American Groups to further evaluate the known cultural resources that are present on the Project site, and to develop a detailed plan for data recovery excavations, resource protection, and permanent curatorial care for the collections derived from the Project site. Any significant finds would be required to be preserved, either through relocation or documentation.

The documentation and preservation efforts required by the mitigation measures presented in Section 3.5 would ensure that Project implementation would not considerably contribute to a significant reduction in cultural resources. Therefore, the Project would have a **less than cumulatively considerable** contribution to impacts to cultural resources and no further mitigation is required.

GEOLOGY AND SOILS

Impact 4.6: Cumulative Impact on Geologic and Soils Characteristics (Less than Cumulatively Considerable)

The cumulative setting for geology and soils includes the unincorporated areas of Shasta County. As discussed in Section 3.6- Geology and Soils, implementation of the proposed Project would not result in any significant impacts related to geology or soils. Mitigation measures have been included in Section 3.6 in order to reduce any potential on-site geologic and soils impacts to a less than significant level. Mitigation Measures included in Section 3.9 include detailed requirements for the control of erosion and water quality, which ensure that the Project would not result in any off-site geologic, soils, or erosion impacts. Geologic and soils impacts tend to be site-specific and project-specific. Implementation of the proposed Project would not result in increased risks or hazards related to geologic conditions in the cumulative setting area, nor would it result in any off-site or indirect impacts. This is considered to be a **less than cumulatively considerable** impact, and no further mitigation is required.

GREENHOUSE GASES AND CLIMATE CHANGE

Impact 4.7: Cumulative Impact Related to Greenhouse Gases and Climate Change (Less than Cumulatively Considerable)

As described in Section 3.7, 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. The analysis of GHGs and climate change presented in Section 3.7 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.

The cumulative setting 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, as previously detailed in Section 3.7, 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.

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.

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.

HAZARDS AND HAZARDOUS MATERIALS

Impact 4.8: Cumulative Impact Related to Hazards and Hazardous Materials (Less than Cumulatively Considerable)

The cumulative setting for hazards includes the unincorporated areas of Shasta County. As discussed in Section 3.8- Hazards and Hazardous Materials, implementation of the proposed Project would not result in any significant impacts that could not be mitigated to a less than significant level. Hazard-related impacts tend to be site-specific and project-specific. Implementation of the proposed Project would not result in increased risks of hazards in the cumulative setting area, nor would it result in any off-site or indirect impacts. Mitigation measures have been included to reduce the risk of on-site hazards, fires, and to reduce potential risks associated with blasting and the transport, use and storage of hazardous materials. Thus, there would be a **less than cumulatively considerable** impact related to hazards and hazardous materials, and no further mitigation is required.

HYDROLOGY AND WATER QUALITY

Impact 4.9: Cumulative Impacts to Groundwater Levels, Groundwater Recharge, Off Site Flooding and Water Quality (Less than Cumulatively Considerable)

The cumulative setting for hydrology and water quality includes the unincorporated areas of Shasta County, specifically the four water bodies in the vicinity of the Project site: Shasta Lake, Moody Creek, Rancheria Creek and Salt Creek. Future development throughout the County, as identified in the County General Plan, would increase demand for groundwater, increase the amount of impervious surfaces in the County, which could impact groundwater recharge rates, and increase runoff throughout the County, which could impact surface 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 local , state and federal grading and drainage requirements. In addition, as discussed in Section 3.9, 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 extensive 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 Section 3.9, the current peak discharge for a 25-year, 24-hour storm from the site is estimated to be approximately 633 cfs. The stormwater system would reduce the peak discharge for the same storm event to about 200 cfs, which is a substantial reduction. Furthermore, by retaining and recycling 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, down from 800 acre-feet per year (SB 610 Water Supply Assessment, September 2011).

Furthermore, as discussed in Section 3.9, and shown on Exhibit 3.9-1, the proposed stormwater system has more than adequate capacity to control runoff from the Project site. The system would reduce runoff rates and volumes. In addition, the Water Quality Ponds and the Vegetated Sheet Drain would provide reduction of suspended sediment in the final discharge beyond that recommended by the SWRCB. Together, these mitigation measures would reduce all water quality impacts to less than significant.

As discussed in greater detail under Impact 3.9-3, water for the proposed Project would come primarily from storm water runoff that would be retained onsite and secondarily from groundwater from wells located on the Project site. There are no known groundwater supply wells completed within the Bass Mountain Diabase bedrock formation that would be mined within the vicinity of the proposed Project. Groundwater production for domestic and municipal supply use occurs in adjacent watersheds and from different geologic formations. The Project would not affect these watersheds and would not involve the mining of these other geologic formations. Potable water for the office area would be provided by a groundwater well, either by converting

existing well OW-1 to a production well, or installing one or more new wells. The two gallons per minute production of well OW-1 would be sufficient to supply the needs of both office and bathroom uses on the site. If the Applicant drills additional supply wells in the future, then these wells would provide additional capacity. Any new wells drilled could provide either primary or reserve water-supply capacity. Although not needed to supply the Project with adequate water, based on production by Mountain Gate CSD in the Spring Branch Creek watershed to the north, the Kennett Formation at the Project site alone has the potential to provide sufficient groundwater to supply the entire Project demand. The average annual runoff from the North and South pit areas alone would be over 800 afy. Thus, retention of storm water runoff from and retained on the Project site would be more than sufficient to operate the Project. The updated storm water system design (EMKO, 2012) provides the retention capacity necessary for the Project. The mine pits would not interfere with or reduce water recharge. During mining, all rain that falls within the pit would be retained within the pit. Part of the water retained within the pit would recharge groundwater through fractures in the bedrock. After mining is completed, reclamation would re-establish the natural surface drainage patterns in the area. The flat quarry floors, however, would enhance recharge locally.

The Project would not deplete groundwater supplies, interfere with recharge, or affect the production rate of preexisting wells. Thus, the Project would have a **less than cumulatively considerable** impact on water quality, supply and recharge.

LAND USE AND PLANNING

Impact 4.10: Cumulative Impact on Communities and Local Land Uses (Less than Cumulatively Considerable)

The cumulative setting for land use includes the unincorporated areas of Shasta County and the City of Shasta Lake, as well as existing quarries and aggregate processing facilities in the region, as identified previously in this section. The Project site is currently designated by the Shasta County General Plan as Mining Resource (MR), Industrial (I), Rural Residential A (RA), Commercial (C), and Suburban Residential (SR) (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").

Approximately 80 percent of the land area within the Project site currently complies with this policy, however, 10 parcels require changes to their existing General Plan and/or zoning designation. Table 3.10-1, "Existing and Proposed General Plan Designations and Zone Districts," provides the existing land use designation and zoning of each parcel within the Project site and their respective proposed designation and zoning.

The full range of uses proposed by the Project Applicant, including the aggregate mining, processing and transport, would be consistent with the proposed General Plan Land Use Designation of Mineral Resource (MR). The Applicant's request to have the entire 1,850-acre

Project site designated as MR under the General Plan would ensure that the proposed land uses and activities would not conflict with the County General Plan Land Use Map.

All of the uses proposed by the Project Applicant are allowed within the MR Zone District if a use permit is issued, as described in Section 17.12 of the Shasta County Zoning Ordinance. This section of the Shasta County Zoning Ordinance also includes site development standards, including setback requirements and height limitations. The proposed Project complies with all applicable site development standards contained in Section 17.12 of the Shasta County Zoning Ordinance. However, the proposed term of the Project conflicts with Shasta County Code Section 17.88.020(F) and General Plan Policy MR-n, both of which limit mining permits to 30-year operational periods. Therefore, the proposed Project includes amendments to the County Zoning Code and General Plan to remove the 30-yaer time limitation to allow for a 100-year operational period. As discussed in Section 3.10 of this DEIR, these text amendments would have a less than significant impact.

The Project also includes a detailed Reclamation Plan, as described in greater detail in Chapter 2.0 of this EIR. The Reclamation Plan has been developed to be consistent with SMARA and Chapter 18.04, Surface Mining and Reclamation, of the Shasta County Code. This is a l**ess than cumulatively considerable** impact.

NOISE

Impact 4.11: Cumulative Exposure of Existing and Future Noise- Sensitive Land Uses to Increased Noise Resulting from Cumulative Development (Cumulatively Considerable and Significant and Unavoidable)

The cumulative setting for noise includes the unincorporated areas of Shasta County, the City of Shasta Lake, and the Mountain Gate at Shasta and Shasta Wine Village development projects. Cumulative development conditions associated with General Plan buildout and the buildout of the above-referenced development projects would result in increased cumulative roadway noise levels, and would also result in increased noise associated with future development. As described in greater detail in Section 3.11- Noise, ambient noise levels in the Project area are influenced primarily by traffic noise emanating from area roadways, railroad noise and natural sounds.

Impact 3.11-1 includes a cumulative analysis of noise impacts associated with Project operations. As shown in Table 3.11-13 rail car loading may exceed nighttime ambient noise levels at Receivers R-5 and R-6. Receiver R-5 is the property line separating the project boundary and a potential future development that is currently undergoing environmental review by the City of Shasta Lake. Receiver R-6 is in the middle of the property proposed for future development. Trains will be delivered to the site by Union Pacific based on their rail schedule and availability. The Applicant does not have control of when trains may be delivered or when trains may leave the site after loading. Therefore, there is no mitigation available (e.g. hours of operation limitation) that could be feasibly implemented by the Applicant. This impact is considered **significant and unavoidable**.

The implementation of Mitigation Measures 3.11-1(a) through 3.11-1(d) should reduce excavation, pre-processing (jaw crushing), access road traffic, and processing plant noise levels at receptors 2, 3, 5-8, 10, and 11 below the applicable thresholds of significance. Rail car loading noise levels at receptors 5 and 6 cannot be reduced to a level below applicable thresholds of significance. Implementation of Mitigation Measure 3.11-1(e) would provide verification and monitoring of the effectiveness of the noise mitigation program, and would require additional noise mitigation measures, if available and feasible, in the event that noise standards continue to be exceeded. However, as shown in Table 3.11-12 and 3.11-13, the cumulative noise generated by all project activities would exceed the County's nighttime noise standards at two sensitive receptor locations, and result in a cumulative increase in average ambient noise levels greater than five dB at eight receptor locations. Mitigation Measures 3.11-1(a) through 3.11-1(e) would reduce noise impacts to the greatest extent feasible; however, because County and/or ambient noise standards may still be exceeded after implementation of mitigation this impact would be **cumulatively considerable and significant and unavoidable**.

TRANSPORTATION AND CIRCULATION

Impact 4.12: Cumulative Impact on the Transportation Network (Cumulatively Considerable and Significant and Unavoidable)

The cumulative setting for transportation and circulation impacts includes the study roadways and intersections identified in Section 3.12 and shown in Tables 3.12-12, 3.12-13, 3.12-14, and 3.12-15.

Under cumulative conditions, the increase in development associated with General Plan buildout is anticipated to result in increased traffic congestion on local and regional roadways and intersections.

Cumulative Conditions refer to analysis scenarios that would exist following assumed build out of the local General Plans, and typically refer to analysis scenarios approximately 20 years in the future. Within this analysis, Cumulative Conditions are assumed as those that would exist in the year 2030 consistent with the Shasta County Regional Travel Demand Model.

The cumulative traffic forecasts for study intersections were developed using a three-step adjustment process. The traffic forecasts for road segments and freeway segments used growth factors derived from the travel model that were applied to the traffic counts.

<u>Intersection Traffic Volumes</u>

Forecasts of year 2030 intersection turning movement traffic volumes were prepared based on the Shasta County travel demand model. Since the travel demand model is not calibrated to reflect the accuracy of individual turning movements at intersections, the final 2030 intersection turning movement volumes were derived by applying a series of adjustments based on NCHRP 255, *Highway Traffic Data for Urbanized Area Project Planning and Design* (Transportation Research Board, 1982). This adjustment process is recommended given that travel models are calibrated to produce more accurate results on road segments than on individual turn movements. The

following steps describe the overall forecasting process for developing 2030 Cumulative No Project intersection traffic volumes for the Moody Flats Quarry project.

- Step 1 – The 2030 total approach and departure link volumes on each leg at each intersection were estimated by applying the increment between the 2010 base year model estimate and the 2030 future year model estimate, and adding that increment to the 2010 base year traffic counts.
- Step 2 – The 2030 turn movements at each intersection were estimated by factoring the 2010 turn movement traffic counts to match the adjusted 2030 approach and departure volumes from Step 1.
- Step 3 – The estimated 2030 turn movements from Step 2 were further adjusted to fully account for two nearby development projects, Mountain Gate at Shasta Lake and Shasta Wine Village.

Factoring Process. The factoring process used for Step 2 is named after its developer, Furness. The Furness method iteratively adjusts turning movement ground counts until the directional sum of the movements balance to the adjusted future link volumes. This factoring process produces forecast turn distributions that resemble the count distribution, but turn movement proportions will change in response to different growth rates on different legs as forecast by the Shasta County Travel Demand Model. A negative growth factor was not allowed in the adjustment process. In other words, future turning movement volumes were not allowed to be lower than existing traffic turning movement counts. All future year turn movement volumes were reviewed and adjusted as needed to ensure a reasonable balance between intersections.

Specific Development Projects

The Shasta County travel model includes a forecast of countywide development to the year 2030, constrained to projected County economic growth rates. The model's 2030 forecast may not include all access points for specific development projects, and may not include full development and occupancy of all approved or anticipated individual development projects. However, individual traffic studies for individual development projects assume full development and occupancy regardless of economic forecasts. In order to provide consistency with traffic studies for nearby development projects, the intersection traffic forecasts based on the travel model were further adjusted based on traffic studies for two specific development projects: Mountain Gate at Shasta Lake and Shasta Wine Village.

Mountain Gate at Shasta Lake. The Shasta County model assumed that all access for the proposed Mountain Gate at Shasta Lake (MGS) project would be to the south through Shasta Lake, and did not include access to the north at Old Oregon Trail. Traffic model assumptions were compared to the Traffic Impact Study (TIS) prepared specifically for the MGS project (Omni-Means, 2008). The TIS assumed that 79 percent of MGS traffic would access the site to/from the south and 21 percent would access the MGS project on the north via Old Oregon Trail. The cumulative traffic volumes for this Moody Flats Quarry study were adjusted to account for the MGS north access traffic. The Shasta County model assumes that approximately 57 percent of the total land uses and trip generation for the MGS project would be active by 2030 (Table 3.12-18), as compared to the full buildout assumed in the TIS. To remain consistent with this 2030 phased development assumption, 57 percent of the full buildout MGS traffic from the TIS was added to study

intersections 1 through 6, using the trip distribution from the TIS. Traffic volumes were then rebalanced between the Old Oregon Trail and Shasta Dam Boulevard interchanges.

Shasta Wine Village. The Shasta County model did not assume that the Shasta Wine Village project would be in place by 2030. Therefore the project-only traffic from the Shasta Wine Village traffic study (Omni- Means, March 2012) was added to the Old Oregon Trail/I-5 Ramps and Old Oregon Trail/Wonderland Boulevard intersections. The Shasta Wine Village traffic study did not analyze intersections south of the Old Oregon Trail intersections. To ensure that these additional trips were reflected at the study intersections for the Moody Flats Quarry Project, the additional traffic volumes from the Shasta Wine Village that would exit/enter Interstate 5 were distributed throughout the study area using a trip distribution similar to that assumed for the Moody Flats Quarry and Mountain Gate at Shasta projects.

The 2030 Cumulative No Project baseline conditions represent traffic conditions expected in 2030 without the proposed Project. The cumulative 2030 traffic forecast volumes were developed based on the Shasta County travel demand model maintained by the Shasta Regional Transportation Agency (SRTA). The Shasta County model was updated in 2011 to reflect the most current information on overall countywide growth rates, specific development assumptions and road improvement projects.

Cumulative Baseline Roadway Improvements

The analysis of 2030 Cumulative No Project conditions includes the following road improvements that are assumed to be in place by 2030:

- Improvement of the Oasis Road Interchange - Although many potential road improvement projects in the study area were identified, only the plan to improve the Oasis Road interchange was considered likely to be funded and constructed by 2030. The *Oasis Road Specific Plan*, prepared by the City of Redding in 2006, outlines several improvements to Oasis Road, contingent on development that is planned at this location. While an anticipated completion date is not known, it is likely that it will be before 2030. The interchange improvement project would build upon the recent completion of a first phase of improvements, construction of a loop on-ramp from westbound Oasis Road to southbound I-5 and traffic signals at the ramp intersections, which are part of the "Existing" conditions. In addition to these improvements, the cumulative scenario assumes that Oasis Road will be widened to four lanes in each direction at the I-5 interchange area, as shown in the reference material presented in Appendix 11 of **Appendix U**.

- Widening of Interstate 5 - Another project which was considered for inclusion was the widening of I-5 from SR 44 to SR 299. This segment was included in a TIGER grant proposal (see Appendix 11 of **Appendix U**) to widen I-5 from South Bonnyview Road to SR 299. The proposal was partly successful as segments south of SR 44 were awarded funding for widening. Specifically, widening of I-5 south of SR 44 to six lanes was completed in 2012 and is reflected in the existing scenarios. With no committed funding for widening of I-5 to six lanes between SR 44 and SR 299, the cumulative I-5 condition is assumed to be identical to the existing I-5condition.

Cumulative plus Project transportation and circulation impacts are addressed quantitatively and qualitatively in Section 3.12, under Impacts 3.12-8 through 3.12-12. Table 3.12-24 summarizes the LOS results for the study intersections under the Cumulative plus Project scenario. Except for the Wonderland Boulevard & Old Oregon Trail intersection, all the study intersections that are forecast to operate at unacceptable LOS under the plus Project scenario are also forecast to operate at unacceptable LOS without the proposed Project.

Based on the results in Table 3.12-24, Project implementation would worsen already unacceptable cumulative operations to a significant degree at the following intersections:

- **I-5 NB Ramps & Old Oregon Trail:** This intersection is projected to operate at LOS F with cumulative traffic without the Project during the AM peak hour. The Project would contribute 11.1 percent of the increase in traffic from existing conditions. With the addition of Project traffic, the intersection would continue to operate at LOS F and the delay would increase by more than five seconds**.**

- **Wonderland Boulevard & Old Oregon Trail** – This intersection would operate at LOS C with cumulative traffic without the Project. The Project would contribute 14.5 percent of the increase in traffic from existing conditions in the peak morning hours and increase the LOS at this intersection to D, which is below the target standard of LOS C.

Mitigation Measure 3.12-8(a) requires the Project Applicant to contribute fair share funding to cover its proportionate cost of improvements to the intersection of I-5 NB Ramps and Old Oregon Trail. Implementation of the improvements identified under Mitigation Measure 3.12-8(a) would require approval from Caltrans, as the facilities in question are under Caltrans' jurisdiction. Shasta County, which is the lead agency for this EIR, cannot guarantee that these improvements will ultimately be constructed, even if fair-share fee payments are collected from the Project Applicant. Additionally, the improvements identified above are not currently part of a funded traffic improvement program being implemented by Caltrans. Due to the current and projected lack of total funding for these improvements, combined with the fact that Shasta County cannot ensure that these improvements will be implemented, this is considered to be a **cumulatively considerable and significant and unavoidable** impact.

Mitigation Measure 3.12-8(b) requires the Project Applicant to contribute fair share funding to cover its proportionate cost of improvements to the intersection of Wonderland Boulevard/Old Oregon Trail. The improvements identified under Mitigation Measure 3.12-8(b) are not currently part of any current Shasta County improvement plan or fee program, and its full implementation cannot be assured by the Applicant. Due to the current and projected lack of total funding for these improvements, combined with the fact that Shasta County and the Project Applicant cannot ensure that these improvements will be implemented, this is considered to be a **cumulatively considerable and significant and unavoidable** impact.

UTILITIES

Impact 4.13: Cumulative Impacts to Utilities Systems (Less than Cumulatively Considerable)

The cumulative setting for utilities includes the unincorporated areas of Shasta County, the City of Shasta Lake, and the Mountain Gate at Shasta and Shasta Wine Village development projects. As described under Impact 3.13-1, the proposed Project would not connect to a municipal wastewater treatment system. As described in greater detail under Impact 3.6-4, during the initial early stages (approximately first five years) of the Project, portable chemical toilets would be used on the Project site. 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 potential impacts associated with construction and operation of the proposed septic system have been addressed under Impact 3.6-4. Mitigation Measure 3.6-4 would reduce potential impacts associated with the installation and operation of the septic system to a **less than cumulatively considerable** level. No additional mitigation is required.

Water for the proposed Project would be developed onsite and supplied by the Project proponent. Water would come primarily from stormwater runoff that would be retained onsite and secondarily from groundwater from wells located or to be located on the Project site. The Project would not result in the construction or expansion of any offsite water treatment facilities, and the Project would not utilize any municipal water sources. As described in greater detail in Section 3.9, including Impact 3.9-3, the proposed stormwater system on the Project site has been designed and sized to capture stormwater runoff in sufficient quantities to provide all of the non-potable water demands of the proposed Project. Additionally, potable water for the office area would be provided by a groundwater well, either by converting existing well OW-1 to a production well, or installing one or more new wells. All of the proposed stormwater retention facilities and onsite potable water supply wells are within the area of proposed disturbance on the Project site. As such, the potential environmental impacts associated with the construction of these facilities have been addressed throughout the relevant sections of this EIR. There are no offsite water supply or water treatment facilities or improvements that would result from implementation of the proposed Project. As such, this is a **less than cumulatively considerable** impact.

4.2 GROWTH-INDUCING EFFECTS

INTRODUCTION

Section 15126.2(d) of the CEQA Guidelines requires that an EIR evaluate the growth-inducing impacts of a proposed action as follows:

> *Discuss the ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth….*

CEQA prohibits assuming that growth in an area is necessarily beneficial, detrimental, or of little significance to the environment.

Based on the CEQA Guidelines, growth inducement is any growth that exceeds planned growth of an area and results in new development that would not have taken place without implementation of a particular project. A project can have direct and/or indirect growth inducement potential. Direct growth inducement would result if a project, for example, involved construction of new housing. A project would have indirect growth inducement potential if it established substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises) or if it would involve a construction effort with substantial short-term employment opportunities that would indirectly stimulate the need for additional housing and services to support the new employment demand *(Napa Citizens for Honest Government v. Napa County Board of Supervisors)*. Similarly, a project would indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service. A project providing an increased water supply in an area where water service historically limited growth could be considered growth-inducing.

The State CEQA Guidelines further explain that the environmental effects of induced growth are considered indirect impacts of the proposed action. These indirect impacts or secondary effects of growth may result in significant, adverse environmental impacts. Potential secondary effects of growth include increased demand on other community and public services and infrastructure, increased traffic and noise, and adverse environmental impacts such as degradation of air and water quality, degradation or loss of plant and animal habitat, and conversion of agricultural and open space land to developed uses.

Growth inducement may constitute an adverse impact if the growth is not consistent with or accommodated by the land use plans and growth management plans and policies for the area affected. Local land use plans provide for land use development patterns and growth policies that allow for the orderly expansion of urban development supported by adequate urban public services, such as water supply, roadway infrastructure, sewer service, and solid waste service.

Components of Growth

The timing, magnitude, and location of land development and population growth in a region are based on various interrelated land use and economic variables. Key variables include regional economic trends, market demand for residential and non-residential uses, land availability and cost, the availability and quality of transportation facilities and public services, proximity to employment centers, the supply and cost of housing, and regulatory policies or conditions. Since the general plan of a community defines the location, type, and intensity of growth, it is the primary means of regulating development and growth in California.

GROWTH EFFECTS OF THE PROJECT

Direct Population Growth

No housing is proposed as part of this Project; therefore, Project implementation would not directly cause population growth.

Indirect Population Growth

As described above, projects that do not directly induce population growth still have the potential to result in indirect population growth through the creation of jobs or the extension of infrastructure into areas that were not previously served. Implementation of the proposed Project would not lead to significant job growth in Shasta County. As described in Section 2.0, proposed operations, including mining, processing, and administrative functions, would employ between 25 and 50 people. Employees would be primarily skilled workers in the construction materials industry, such as heavy equipment operators, maintenance personnel, and support staff, from the Shasta County area. Given the past years of recession, local skilled workers would be available to fill all of the necessary positions. The addition of skilled jobs directly generated by the Project may also lead indirectly to various service and support jobs in the nearby communities (restaurant employees, etc).

While the Project would require an extension of an electrical power line to connect the site to the surrounding electrical network (i.e., the 12kV power line located immediately southeast of the Project boundary and the existing power poles and power line located along Black Canyon Road, extending northwest to the Project boundary near the UPRR right of way), no new additional infrastructure would be required or constructed for the Project.

For instance, no new roadway infrastructure connecting remote areas to urban areas would be constructed. Vehicles would enter and exit the Project site using a paved private access road that would connect to Wonderland Boulevard via the Interstate 5/Mountain Gate off-ramp (shown in Figure 2-10). . 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. 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 extension and construction of the primary Project access road, secondary access road, and emergency access would not provide new access to potential future development areas in the Project vicinity.

Similarly, no new public water or wastewater systems would be constructed. The Project would be served by an on-site septic system, and would not connect to any existing public or private wastewater systems. Water for the Project would come primarily from storm water runoff

retained in the onsite storm drainage system ponds and limited amounts of potable water from onsite wells.

Based on the foregoing facts, the Project would involve the limited extension of infrastructure, but would not lead to indirect population growth as a result of the extension of infrastructure to an area that was not previously served. Additionally, although the Project would provide additional sources of aggregate material for use in regional markets, the use of aggregate material extracted and processed at the Project site would not in and of itself lead to population growth. Rather, this aggregate material would be used to meet existing demand for roadway projects and other projects that require the use of aggregate materials.

Any indirect population growth induced by the Project would be minimal (assumed to be less than 75 people in the region) and would not result in any adverse environmental impacts.

4.3 SIGNIFICANT IRREVERSIBLE EFFECTS

Legal Considerations

CEQA Guidelines Section 15126.2(c) and Public Resources Code Sections 21100(b)(2) and 21100.1(a), require that the EIR include a discussion of significant irreversible environmental changes which would be cause by the proposed Project should it be implemented. Irreversible environmental effects are described as:

- The project would involve a large commitment of nonrenewable resources;
- The primary and secondary impacts of a project would generally commit future generations to similar uses (e.g., a highway provides access to previously remote area);
- The project involves uses in which irreversible damage could result from any potential environmental accidents associated with the project; or
- The phasing of the proposed consumption of resources is not justified (e.g., the project involves the wasteful use of energy).

Determining whether a proposed project would result in significant irreversible effects requires a determination of whether key resources would be degraded or destroyed such that there would be little possibility of restoring them. Irretrievable commitments of resources should be evaluated to assure such current consumption is justified.

Analysis

A variety of resources, including land, energy, water, construction materials, and human resources would be irretrievably committed for the Project's initial construction and ongoing operation.

The primary purpose of the proposed Project is to provide construction-grade aggregate materials to local and regional markets. The Project site is known to contain large amounts of construction-grade aggregate materials, which are a key non-renewable resource to the State of California.

As described in Section 2.0, the availability, consumption, and demand for aggregate resources in California are issues of concern for planning and transportation agencies as well as construction and building industries throughout the state. Aggregate resources provide the construction materials necessary for a wide range of public works and private-sector construction projects. The availability and consumption of aggregate resources is critical to the maintenance and growth of the state and local economy and infrastructure.

Pursuant to state mandate, the California Geological Survey (CGS) published a report entitled, Aggregate Availability in California in 2002, with subsequent updates issued in 2006 and 2012. The updated report documents the projected 50-year supply and need for aggregate resources in each production construction region (i.e., County, portion of County) of the state. According to the CGS report, Shasta County needs a total of approximately 93 million tons of aggregate through 2062. Shasta County's current aggregate reserves (resources that have been permitted for mining) represent only 56 percent of this 50-year demand (approximately 41 million tons).

The Project site contains subsurface non-renewable materials (soils and rock) that are suitable for use in the production of aggregate materials, including ready-mix concrete, asphalt concrete, and raw hard rock materials suitable for use in roadbeds and other aggregate construction materials. The Project Applicant estimates that approximately 175 million tons of aggregate material is located on the site in areas suitable for extraction and recovery over the 100-year operational life of the quarry. In addition to the presence of aggregate materials on the Project site, the Project site is located immediately adjacent to Interstate 5 and an existing Union Pacific rail line, both of which would facilitate the transport and distribution of aggregate materials throughout the County, state, and region via truck and rail.

As described in greater detail throughout this Draft EIR, Project implementation would require the removal of significant areas of vegetation, and would alter the natural condition of the land within the Project site.

Mine reclamation is required by the California Surface Mining and Reclamation Act (SMARA). SMARA requires mines to be reclaimed to a usable condition that is readily adaptable for a productive alternative land use. The reclaimed mine must also create no danger to public health or safety. A reclamation plan has been submitted as part of the application materials in compliance with SMARA regulations, and is attached as **Appendix C**.

The anticipated land use following reclamation varies based on its use during active mining. As shown on Figure 2-17, approximately 378 acres of the disturbed portion of the Project site would be reclaimed following mining operations.

The North and South Pits, overburden fill area, and primary processing plant areas would be returned to open space through revegetation measures consistent with surrounding vegetation.

The North Pit would not be backfilled. The benches and pit floor of the North Pit would remain at the same topography as their post-mining conditions.

The South Pit may be partially backfilled with overburden to an elevation of approximately 1,050 amsl and revegetated. If not backfilled, the pit may be used for water storage.

The secondary and ancillary processing and load-out area, rail siding/spur, and access road would remain indefinitely as the same post-reclamation land uses. These post-mining land uses would be suitable for post-mining open space and mineral processing facilities as allowed under the proposed General Plan land use designation and Zoning of Mineral Resource.

Figure 2-17, "Reclamation Plan," and Figures 2-18a and 2-18b, "Reclamation Plan Cross-Sections," shows the proposed plans for reclamation. A full and detailed description of the Reclamation Plan is included in **Appendix C**.

The proposed revegetation plan, which is part of the Reclamation Plan, identifies the revegetation goals and actions necessary to meet the obligations outlined in SMARA. The proposed Revegetation Plan is attached as **Appendix C**.

In summary, revegetation efforts would reestablish native plant habitats that currently occur within and/or adjacent to proposed areas of surface disturbance. A native plant/seed collection and propagation program would be initiated to provide watershed and/or plant materials for the revegetation work. Monitoring and performance standards are included to assess revegetation performance and success. Revegetation maintenance would continue until planted areas were revegetated and established consistent with proposed success criteria for each revegetation area. A test plot program is specified to determine the best methods and techniques to achieve the revegetation objectives.

In summary, Project implementation would access and distribute a necessary resource to the region (aggregate materials), and would ultimately result in the reclamation of the majority of the Project site to a naturalized condition. As such, the Project would not result in a significant irreversible effect.

4.4 SIGNIFICANT AND UNAVOIDABLE IMPACTS

CEQA Guidelines Section 15126.2(b) requires an EIR to discuss unavoidable significant environmental effects, including those that can be mitigated but not reduced to a level of insignificance. The following significant and unavoidable impacts of the proposed Project are discussed in Chapters 3.1 through 3.12 (project-level) and previously in this chapter (cumulative-level). Refer to those discussions for further details and analysis of the significant and unavoidable impact identified below:

- Impact 3.1-2: Project implementation would substantially degrade the existing visual character or quality of the site and its surroundings

- Impact 3.3-2: Project operations may result in emissions of Criteria Air Pollutants in excess of SCAQMD thresholds of significance
- Impact 3.3-3: Project operations would contribute to an exceedance of an established ambient air quality standard
- Impact 3.11-1: Noise associated with on-site Project operations would exceed applicable General Plan or CEQA ambient noise standards at nearby sensitive receptors under near-term and cumulative conditions
- Impact 3.12-8: Under cumulative conditions, Project implementation would worsen levels of service at study intersections
- Impact 4.1: Cumulative Degradation of the Existing Visual Character of the Region
- Impact 4.3: Cumulative Impact on the Region's Air Quality
- Impact 4.11: Cumulative Exposure of Existing and Future Noise- Sensitive Land Uses to Increased Noise Resulting from Cumulative Development
- Impact 4.12: Cumulative Impact on the Transportation Network

This page left intentionally blank

5.1 CEQA REQUIREMENTS

CEQA requires that an EIR analyze a reasonable range of feasible alternatives that meet most or all project objectives while reducing or avoiding one or more significant environmental effects of the project (CEQA Guidelines Section 15126.6[a]). The range of alternatives required in an EIR is governed by a "rule of reason" that requires an EIR to set forth only those alternatives necessary to permit a reasoned choice (CEQA Guidelines Section 15126.6[f]). Where a potential alternative was examined but not chosen as one of the range of alternatives, the CEQA Guidelines require that the EIR briefly discuss the reasons the alternative was dismissed.

PROJECT OBJECTIVES

The alternatives to the proposed Project selected for analysis in the EIR were developed to minimize significant environmental impacts while fulfilling the basic Project objectives. As described in Chapter 2, Project Description, the following objectives have been identified for the proposed Project.

1. Create a long-term, dependable source of high-quality aggregate to meet the current and projected demand for construction materials within the intended market area, including Shasta County and the northern California region, through truck and rail haul of aggregate material.

2. Secure the ability to mine and process a known high-quality aggregate resource and establish a new, long-term supply of aggregate reserves capable of producing Ready-Mix Concrete Grade aggregate products as well as other construction aggregate products such as riprap, ballast, aggregate base, asphalt concrete, and ready-mix concrete.

3. Provide for a maximum annual permitted sales level of two million tons of aggregate material to meet regional and local market demand.

4. Mine in a location that provides sufficient buffer distances from incompatible adjacent land uses (i.e., schools, residences, other receptors) so that hard-rock mining activities, which include blasting and nighttime load-out operations, minimizes substantial land use incompatibilities with existing uses and potential future uses that are consistent with existing land use and zoning designations.

5. Minimize impacts on wetlands and significant cultural resources, and avoid impacts to Shasta Lake watershed.

6. Locate the Project near the intended local market area and major transportations corridors (including Interstate 5 and the Union Pacific rail line), thereby reducing current and future truck traffic and associated impacts on local roadways.

7. For products distributed outside of the County, use an alternative transportation method for aggregate distribution (i.e., rail haul) that reduces additional strain on County infrastructure.

5.2 ALTERNATIVES CONSIDERED IN THIS EIR

A Notice of Preparation was circulated to the public to solicit recommendations for a reasonable range of alternatives to the proposed Project. Additionally, a public scoping meeting was held during the public review period to solicit recommendations for a reasonable range of alternatives to the proposed project. No specific alternatives were recommended by commenting agencies or the general public during the NOP public review process.

Three alternatives to the proposed Project were developed based on County input and the technical analysis performed to identify the environmental effects of the proposed Project. The alternatives analyzed in this EIR include the following three alternatives in addition to the proposed Moody Flats Quarry Project.

- No Project Alternative
- South Pit Only Alternative
- North Pit Only Alternative

The environmental effects of each of these alternatives are identified and compared with those environmental impacts resulting from the proposed Project that are identified in environmental issue areas in Chapters 3.1 through 4.0. Table 5.0-1 at the end of this section provides a comparison of the environmental benefits and detriments of each alternative and identifies the "environmentally superior" alternative.

Rejected Alternatives

In addition to the alternatives analyzed herein, other alternatives were considered, but rejected for detailed analysis. An alternative location for the proposed Project was considered, but rejected as being infeasible and overly speculative for the following reasons.

The proposed Project is an aggregate mine and processing facility. A project of this nature and type is only viable within a specific area that is known to contain viable aggregate materials. The Project Applicant purchased the Project site in the early 1980s. At that time, the Applicant was actively looking for properties that met the numerous requirements necessary to approve and operate a successful aggregate operation, including the following requirements:

- Sufficient property size: The Property holding is approximately 1,850 acres. The location of the identified aggregate resource must be surrounded by a significant buffer from surrounding receptors.
- Identified, high-quality aggregate reserves: The Project site contains at least 100 years' worth of high-quality aggregate reserves.
- Proximity to major transportation corridor: The Project site is close to both Interstate 5 and the Union Pacific mainline.
- Owner willing to sell the property: The owner of the Project site was willing to sell it at a fair price.

- Location and distance to Market: The Project site is unique because it provides access to both a local (Redding and surrounding communities) and regional markets (Sacramento and San Francisco Bay Area via the Union Pacific mainline).

There are significant obstacles to finding an alternative site location for potential purchase or CEQA alternatives analysis. First, examination of available lands would be limited to those with access to both Interstate 5 and the Union Pacific mainline. This limits the potential properties to those north and south of the current site location. Directly south of the site is the city of Shasta Lake, making it highly unlikely that parcel sizes and land use designations meet the requirements for permitting an aggregate operation. Second, to the north of the site, is the Shasta Trinity National Forest and Shasta Lake. Purchase of lands within this area would be extremely difficult. Last, 3M has owned this property for over 30 years, and to purchase property today would be significantly more expensive.

In addition, it should be noted that the CEQA Guidelines (§ 15126.6[f][2][b]) recognize mining projects to be an example of why evaluation of an alternative location may not be feasible, because location of any mineral resources is fixed to the specific site, cannot move, and may not be available elsewhere.

PROPOSED PROJECT

The proposed Project consists of the development of a hard rock quarry, aggregate processing facility, ancillary aggregate product facilities (e.g., ready-mix concrete plant, asphalt concrete batch plant, and recycled construction materials plant), and aggregate truck and railcar load-out facility within the approximately 1,850-acre Applicant-owned property. Products would include ready-mix concrete grade aggregate products as well as other construction aggregate products such as riprap, ballast, aggregate base, asphalt concrete, and ready-mix concrete.

Production and distribution goals include shipping approximately 1.5 million tons of aggregate annually via rail to regional markets and distributing 0.5 million tons of aggregate and finished products (e.g., ready-mix concrete, asphalt) annually to local markets via trucks. The maximum annual sales proposed for aggregate from the Project would be two million tons per year. The Project is planned to operate for 100 years and would generate approximately 175 million tons of aggregate material over the operational life of the quarry.

Following the completion of mining activities at the Project site, reclamation, including revegetation would be implemented. As mining activities within areas of the site are completed, concurrent reclamation activities may occur as other areas of the site continue to be mined. The Reclamation Plan, including the revegetation plan, is a component of the proposed Project, and is described in greater detail below. The Reclamation Plan including the revegetation plan is attached as **Appendix C**. A detailed description of the proposed Project and a description of Project operations are contained in Section 2.0 of this Draft EIR.

NO PROJECT ALTERNATIVE

The CEQA Guidelines require consideration of a no project alternative that represents the existing conditions, as well as what would reasonably be expected to occur in the foreseeable future if the Project were not approved. (14 Cal. Code Regs. § 15126.6[e].) For purposes of this analysis, the No Project Alternative is the continuation of the existing uses on the Project site, which consist of undeveloped and natural open space. No facilities would be developed under this alternative, and no mining or processing activities would occur on the Project site under this alternative.

SOUTH PIT ONLY ALTERNATIVE

Under the South Pit Only Alternative, only the South Pit would be mined; the North Pit would be left undisturbed in its current condition. The South Pit would encompass approximately 65 acres, and be located in the area shown on Figure 2-10.

At present the South Pit area is a hill with a peak elevation of approximately 1,380 feet above mean sea level (amsl). Under this alternative, the hilltop would be mined to create a mining pit with a base elevation of approximately 950 feet amsl at the bottom of the pit. Under the South Pit Only Alternative, the primary and secondary processing facilities, and the load-out facility would be constructed and operated in the same manner as currently proposed and described in Section 2.0 of this Draft EIR. Under this alternative, production and distribution would include shipping approximately 0.75 million tons of aggregate annually via rail to regional markets and distributing 0.25 million tons of aggregate and finished products (e.g., ready-mix concrete, asphalt) annually to local markets via trucks. The maximum annual sales of aggregate under this alternative would be reduced by half to one million tons per year.

NORTH PIT ONLY ALTERNATIVE

Under the North Pit Only Alternative, only the North Pit would be mined and the South Pit would be left undisturbed in its current condition. The North Pit Only Alternative would encompass approximately 220 acres.

At present, the North Pit is a slope hillside with an elevation of approximately 1,950 feet amsl. Under this alternative, the North Pit would have a base elevation of approximately 1,175 feet amsl. Under the North Pit Only Alternative, the primary and secondary processing facilities, and the load-out facility would be constructed and operated in the same manner as currently proposed and described in Section 2.0 of this Draft EIR. Under this alternative, production and distribution would include shipping approximately 0.75 million tons of aggregate annually via rail to regional markets and distributing 0.25 million tons of aggregate and finished products (e.g., ready-mix concrete, asphalt) annually to local markets via trucks. The maximum annual sales of aggregate under this alternative would be reduced by half to one million tons per year.

5.3 ENVIRONMENTAL ANALYSIS

The alternatives analysis provides a summary of the relative impact level of significance associated with each alternative for each of the environmental issue areas analyzed in this EIR. Following the analysis of each alternative, Table 5.0-1 summarizes the comparative effects of each alternative.

NO PROJECT ALTERNATIVE

Aesthetics

The No Project Alternative would leave the Project site in its existing natural state. It would not result in increases in daytime glare or nighttime lighting, would not introduce new structures or new buildings to the Project site, and would not result in the dramatic changes to the visual landscape that would occur as a result of implementation of the proposed Project. The mine pits would not be developed, and the visual impacts associated with Project implementation would not occur. The significant and unavoidable impact identified in Section 3.1 would not occur under this alternative as there would be no impact on the visual character of the site The No Project Alternative would avoid these impacts altogether and would have less of an impact than the proposed Project on aesthetics..

Agricultural Resources

As described in Section 3.2, the proposed Project would not result in any significant impacts to agricultural resources. Similarly, the No Project Alternative would not result in any significant impacts to agricultural resources. There would be no change in impacts to this environmental topic under this alternative.

Air Quality

The No Project Alternative would not result in any increases of emissions from Project implementation above the existing environmental baseline conditions. The significant and unavoidable air quality impacts identified in Section 3.3 would not occur under this alternative, since there would be no emissions generated from vehicle trips, mining activities, or materials processing activities. The No Project Alternative would avoid these impacts altogether and would have less of an impact than the proposed Project on air quality.

Biological Resources

The No Project Alternative would not result in any ground disturbing or operational activities. As a result, potential impacts to biological resources identified in Section 3.4 would not occur under this alternative. Therefore, the No Project Alternative would have a reduced impact on biological resources when compared to the proposed Project.

Cultural Resources

The proposed Project would have less than significant impacts with mitigation. The No Project Alternative would not result in ground-disturbing activities; thus, it would avoid disturbing or

destroying cultural, historic, and archaeological resources, as well as paleontological resources Therefore, the No Project Alternative would have a reduced impact on cultural resources when compared to the proposed Project.

Geology and Soils

The No Project Alternative would result in the Project site remaining in its existing condition. As described in Section 3.6, implementation of the proposed Project would result in potentially significant site-specific impacts related to geology and soils, which would be reduced to a less than significant level through the implementation of mitigation measures. The No Project Alternative would avoid these potentially significant geology and soils impacts altogether. Therefore, the No Project Alternative would have a reduced impact on geology and soils when compared to the proposed Project.

Greenhouse Gases and Climate Change

The No Project Alternative would not result in the direct emission of GHGs associated with Project operations, nor would it result in the indirect emission of GHGs associated with tree removal. The No Project Alternative would avoid these potentially significant GHG impacts altogether. Therefore, the No Project Alternative would have a reduced impact on greenhouse gases and climate change when compared to the proposed Project.

Hazards

The No Project Alternative would result in the Project site remaining in its existing condition. As described in Section 3.8, implementation of the proposed Project would result in potentially significant site-specific impacts related to the use, storage and transport of hazardous materials, which would be reduced to a less than significant level through the implementation of mitigation measures. The No Project Alternative would avoid these potentially significant hazards impacts altogether. Therefore, the No Project Alternative would have a reduced impact on hazards and hazardous materials when compared to the proposed Project.

Hydrology and Water Quality

The No Project Alternative would not result in any onsite changes to creeks, streams, groundwater, or natural drainage channels. As described in Section 3.9, the proposed Project would implement an extensive system of drainage control and water quality features that would actually result in a reduction of stormwater discharge from the Project site when compared to the existing baseline environmental condition. However, since the No Project Alternative would not change or alter the existing drainage and natural water quality features of the site, it is considered superior to the proposed Project in terms of this environmental topic.

Land Use and Planning

Approximately 1,600 acres (86 percent) of the land within the site boundary is designated and zoned as Mineral Resource. The Applicant is proposing a General Plan amendment and zoning amendment for the remaining approximately 250 acres not currently designated and zoned as Mineral Resource. Additionally, the Applicant seeks to amend General Plan Policy MR-n and

Zoning Code section 17.88.020(F) to remove the 30-year limit on mining permits. While the proposed Project would not result in significant impacts related to land use, the No Project Alternative would not require a change to the zoning district or land use designation assigned to the Project site, and would not require text amendments to both the General Plan and Zoning Code. Therefore, there would be no impact to land use and planning under this alternative as compared to the proposed Project.

Noise

The No Project Alternative would not generate any noise from new sources. The Project site would remain in its current condition, and the only noises generated on the site under this alternative would be from existing rail operations and natural sounds. The proposed Project would result in significant and unavoidable, and cumulatively considerable noise impacts. Therefore, the No Project Alternative would have a reduced impact on noise when compared to the proposed Project.

Transportation and Circulation

The No Project Alternative would not introduce additional vehicle trips onto the study area intersections identified in Section 3.12. The proposed Project would result in increases in daily vehicle trips on area roadways, freeway segments and intersections. As described in Section 3.12, implementation of the proposed Project would require intersection improvements to ensure less than significant impacts to intersections under cumulative conditions. However, these intersection improvements may not occur do to a lack of funding and a lack of County jurisdictional authority over the roadway improvements. Therefore, these impacts would remain significant and unavoidable under the proposed Project. These trip increases would not occur under the No Project Alternative. Therefore, this alternative would have reduced traffic impacts when compared to the proposed Project.

Utilities

The No Project Alternative would not require the use of onsite septic systems, the use of wells for potable water, and the use of captured surface water for non-potable water use. Additionally, the No Project Alternative would not require the use of energy resources, including diesel fuel and electricity for Project operations. While the proposed Project would result in less than significant impacts to these utilities resources, as described in Section 3.13, the No Project Alternative would have a reduced impact to utilities when compared to the proposed Project.

SOUTH PIT ONLY ALTERNATIVE

Aesthetics

The South Pit Only Alternative would result in mining activities at only the South Pit location, as shown on Figure 2-10. As a result of the topography of the Project site and the topography of the areas surrounding the Project site, the South Pit is much less visually prominent from the surrounding areas when compared to the North Pit. Under the South Pit Only Alternative, the

visual character of the Project site would change when compared to the existing baseline environmental conditions.

This is due to the fact that the North Pit would remain in a natural condition under this alternative. The undisturbed east-facing slope of the North Pit would be the most highly visible aspect of the Project site. If no mining activities occurred in the North Pit area, the view of this highly visible area from Interstate 5, and the Shasta Lake Ranger Station and Visitor Information Center, as shown on Figures 3.1-2A through 3.1-2F, would not be impacted. Portions of the North Pit 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; thus, views from the City of Shasta Lake would also remain undisturbed under the South Pit Only Alternative.

As a result, the change to the visual character of the site would be greatly reduced under the South Pit Only Alternative when compared to the proposed Project.

Agricultural Resources

As described in Section 3.2, the proposed Project would not result in any significant impacts to agricultural resources. Similarly, the South Pit Only Alternative would not result in any significant impacts to agricultural resources. There would be no change in impacts to this environmental topic under this alternative.

Air Quality

This alternative would result in the mining and processing of approximately half as much aggregate materials as would be mined and processed by the proposed Project. As such, this alternative would result in reduced emissions from aggregate processing activities, reduced emissions associated with mining activities, and fewer annual truck trips. Air quality impacts would be reduced under this alternative when compared to the proposed Project.

Biological Resources

As noted above, under the South Pit Only Alternative, the 220-acre North Pit would not be mined. Therefore, under this alternative, a reduced area of biological habitat would be impacted when compared to the proposed Project. The South Pit is approximately 65 acres in size. As such, when compared to the North Pit Only Alternative or the proposed Project, the South Pit Only Alternative would have fewer impacts on existing habitat. Thus, impacts to biological resources would be reduced under this alternative when compared to the proposed Project and the North Pit Only Alternative.

Cultural Resources

As described in Section 3.5, there are a number of known cultural sites of significance on the Project site that may be impacted by Project activities and Project implementation. The location of these known sites has not been disclosed in this EIR in order to help preserve and protect the integrity of the sites. However, it is noted that none of the known cultural resources sites within the Project boundary are located within either the North Pit or the South Pit areas. As such, the

potential for impacts to known cultural resources would be the same under this South Pit Only Alternative when compared to the proposed Project or the North Pit Only Alternative. Furthermore, under this alternative, a reduced area of land would be disturbed during mining activities, which would reduce the potential to impact previously undiscovered cultural resources. Therefore, the South Pit Only Alternative would have a slightly reduced impact related to cultural resources when compared to the proposed Project or the North Pit Only Alternative.

Geology and Soils

As described in Section 3.6, implementation of the proposed Project would result in potentially significant impacts related to geology and soils, which would be reduced to a less than significant level through the implementation of mitigation measures. Under the South Pit Only Alternative, fewer mine bench cuts would be made, and a reduced area of land would be mined for aggregate materials. This would reduce the potential for slope-stability impacts to occur when compared to the proposed Project or the North Slope Only Alternative. Additionally, while mitigation measures included in this Draft EIR would reduce the potential for soil erosion to occur on the Project site, the reduction in the amount of land mined under this alternative would further reduce the potential for erosion to occur when compared to the proposed Project or the North Slope Only Alternative. Overall, this alternative would have a reduced impact to geology and soils when compared to the proposed Project and North Slope Only Alternative.

Greenhouse Gases and Climate Change

As described in Section 3.7, implementation of the proposed Project would result in the direct emission of GHGs associated with Project operations, and the indirect emission of GHGs associated with tree and vegetation removal from the Project site. Under the South Pit Only Alternative, a reduced area of the Project site would be mined for aggregate materials and fewer total tons of materials would be extracted and processed when compared to the proposed Project. Therefore, this alternative would generate fewer direct GHG emissions when compared to the proposed Project. This alternative would also require the removal of fewer trees and a reduced area of vegetated land would be disturbed. Therefore, indirect GHG emissions would also be reduced under this alternative. Overall, this alternative would have reduced GHG emissions when compared to the proposed Project.

Hazards and Hazardous Materials

As described in Section 3.8, Project implementation may result in potentially significant impacts associated with the use, transport, and storage of hazardous materials. The mitigation measures presented in Section 3.8 would reduce these potentially significant hazards impacts to a less than significant level. Under the South Pit Only Alternative, mining activities would be reduced when compared to the proposed Project. As a result, fewer hazardous materials would be used, stored, or transported to the Project site. This impact would be reduced under this alternative when compared to the proposed Project.

Hydrology and Water Quality

This alternative would result in the disturbance of a smaller area of land when compared to the proposed Project. As such, the existing drainage pattern of the Project site would not be disturbed and altered to the same degree as it would under the proposed Project. As described under Section 3.9, the proposed Project includes an extensive network of onsite drainage and water quality facilities, which would limit the potential for offsite drainage impacts, and would reduce potential water quality issues to a less than significant level. Under this alternative, the amount and size of the onsite water quality and water detention facilities would be reduced, and a larger percentage of the Project site would remain in a natural hydrologic condition. As such, this impact would be reduced under this alternative when compared to the proposed Project.

Land Use and Planning

Approximately 1,600 acres (86 percent) of the land within the site boundary is designated and zoned as Mineral Resource. The Applicant is proposing a General Plan map and zoning map amendment for the remaining approximately 250 acres not currently designated as Mineral Resource. Additionally, the Applicant proposes amending General Plan Policy MR-n and Zoning Code section 17.88.020(F) to eliminate the 30-year term on mining permits. While the South Pit Only Alternative would result in fewer acres of disturbed area for mining and processing activities, the entire site would still be rezoned and redesignated as Mineral Resources under the Shasta County General Plan and Zoning Code maps. Furthermore, the General Plan and Zoning Code text would still be amended to eliminate the 30-year limitation on mining permits. Therefore, because the proposed Project would not result in significant impacts related to land use and planning, this alternative would result in comparable levels of less than significant impacts related to this topic. There would be no change to this topic when compared to the proposed Project.

Noise

The proposed Project has the potential to generate significant increased noise levels from truck traffic, processing plant operations, and mining activities within the North and South Pits. Under the South Pit Only alternative, the North Pit would not be mined. However, the primary and secondary processing plants would still be constructed in the same locations as the proposed Project, and would operate in much the same manner. It is assumed that processing plant noise levels would remain unchanged under this alternative when compared to the proposed Project. As shown in Figure 3.11-4, the greatest concentration of existing residences near the Project site is located to the south and southeast of the Project site, within and adjacent to the City of Shasta Lake. The North Pit is the area proposed for mining that is furthest removed from the existing sensitive receptors in the vicinity of the Project site. The North Pit is also further from the potential future sensitive residential receptors that may be located within the Mountain Gate at Shasta project site in the future. The South Pit is closer than the North Pit to these existing and future sensitive receptors. Therefore, while the South Pit Only Alternative would result in reduced noise impacts when compared to the proposed Project, it would result in greater noise impacts when compared to the North Pit Only

Alternative. The primary source of noise that would contribute to the significant and unavoidable noise impacts of the proposed Project would be from rail loading operations. Rail loading operations would continue to occur under this alternative, and noise impacts would remain significant and unavoidable under this alternative.

Transportation and Circulation

The South Pit Only Alternative would result in the extraction, processing and transport of approximately half as much aggregate material as the proposed Project. As such, vehicle trips, including heavy truck trips, would be reduced under this alternative when compared to the proposed Project. As described in Section 3.12, the proposed Project would result in less than significant transportation and circulation impacts under Existing plus Project conditions, and would result in significant impacts under Cumulative plus Project conditions. Under this alternative, fewer vehicle and truck trips would be generated, and impacts related to transportation and circulation would be reduced when compared to the proposed Project. However, cumulative impacts to the I-5 NB Ramps and Old Oregon Trail intersection and the Wonderland Boulevard and Old Oregon Trail intersection would remain significant and unavoidable under this alternative.

Utilities

The South Pit Only Alternative would result in the extraction, processing and transport of approximately half as much aggregate material as the proposed Project. As such, this alternative would require reduced amounts of potable and non-potable water supplies, and would require fewer energy resources, such as diesel fuel and electricity. As such, this impact would be reduced under this alternative when compared to the proposed Project.

NORTH PIT ONLY ALTERNATIVE

Aesthetics

This alternative would result in mining activities at only the North Pit location, as shown on Figure 2-10. The South Pit would remain in a natural condition under this alternative. The east-facing slope of the North Pit will be the most highly visible aspect of the proposed Project. Mining activities within the North Pit area will be highly visible from Interstate 5, and the Shasta Lake Ranger Station and Visitor Information Center, as shown on Figures 3.1-2A through 3.1-2F. Portions of this area of the site will also be visible from areas within the City of Shasta Lake, as shown on Figures 3.1-2G through 3.1-2L.

As a result of the topography of the Project site and the topography of the areas surrounding the Project site, the South Pit is much less visually prominent from the surrounding areas when compared to the North Pit. Under the North Pit Only Alternative, the visual character of the Project site would change dramatically when compared to the existing baseline environmental conditions. The development of the mining bench cuts into the face of the North Pit would be the most significant aspect of the visual impacts associated with implementation of the proposed Project. Under this alternative, these visual impacts would not be reduced. As such,

this alternative would have a similar impact to visual resources when compared to the proposed Project.

Agricultural Resources

As described in Section 3.2, the proposed Project would not result in any significant impacts to agricultural resources. Similarly, the North Pit Only Alternative would not result in any significant impacts to agricultural resources. There would be no change in impacts to this environmental topic under this alternative.

Air Quality

This alternative would result in the mining and processing of approximately half as much aggregate materials as would be mined and processed by the proposed Project. As such, air quality emissions under this alternative would be reduced when compared to the proposed Project. This alternative would result in fewer annual truck trips, reduced emissions from aggregate processing activities, and reduced emissions associated with mining activities. This alternative would also place mining activities in an area of the site that is further from existing and future sensitive receptors than the South Pit Only Alternative. Air quality impacts would be reduced under this alternative when compared to the proposed Project and the South Pit Only Alternative.

Biological Resources

Under this alternative, the 65-acre South Pit would not be mined. Under this alternative, a reduced area of natural biological habitat would be impacted when compared to the proposed Project. The North Pit is approximately 220 acres in size. As such, when compared to the South Pit Only Alternative, this alternative would impact a greater area of natural habitat. Impacts to biological resources would be reduced under this alternative when compared to the proposed Project, but would be greater than the South Pit Only Alternative.

Cultural Resources

As described in Section 3.5, there are a number of known cultural sites of significance on the Project site that may be impacted by Project activities and Project implementation. The location of these known sites has not been disclosed in this EIR in order to help preserve and protect the integrity of the sites. However, it is noted that none of the known cultural resources sites within the Project boundary are located within either the North Pit or the South Pit. As such, the potential for impacts to known cultural resources would be the same under this alternative when compared to the proposed Project. However, under this alternative, a reduced area of land would be disturbed during mining activities, which would reduce the potential to impact previously undiscovered cultural resources. Therefore, this alternative would have a slightly reduced impact related to this topic when compared to the proposed Project.

Geology and Soils

As described in Section 3.6, implementation of the proposed Project would result in potentially significant site-specific impacts related to geology and soils, which would be reduced to a less

than significant level through the implementation of mitigation measures. Under the North Pit Only Alternative, fewer mine bench cuts would be made, and a reduced area of land (220 acres) would be mined for aggregate materials. This would reduce the potential for slope-stability impacts to occur, when compared to the proposed Project. Additionally, while mitigation measures included in this Draft EIR would reduce the potential for soil erosion to occur on the Project site, the reduction in the amount of land mined under this alternative would further reduce the potential for erosion to occur when compared to the proposed Project. Overall, this alternative would have a reduced impact to geology and soils when compared to the proposed Project, but would have greater impacts when compared to the South Pit Only Alternative.

Greenhouse Gases and Climate Change

As described in Section 3.7, implementation of the proposed Project would result in the direct emission of GHGs associated with Project operations, and the indirect emission of GHGs associated with tree and vegetation removal from the Project site. Under the North Pit Only Alternative, a reduced area of the Project site would be mined for aggregate materials and fewer total tons of materials would be extracted and processed when compared to the proposed Project. Therefore, this alternative would generate fewer direct GHG emissions when compared to the proposed Project. This alternative would also require the removal of fewer trees and a reduced area of vegetated land would be disturbed. Therefore, indirect GHG emissions would also be reduced under this alternative. Overall, this alternative would have reduced GHG emissions when compared to the proposed Project, but would have greater GHG impacts when compared to the South Pit Only Alternative.

Hazards and Hazardous Materials

As described in Section 3.8, Project implementation may result in potentially significant impacts associated with the use, transport, and storage of hazardous materials. The mitigation measures presented in Section 3.8 would reduce these potentially significant hazards impacts to a less than significant level. Under the North Pit Only Alternative, mining activities would be reduced when compared to the proposed Project. As a result, fewer hazardous materials would be used, stored, or transported to the Project site. This impact would be reduced under this alternative when compared to the proposed Project.

Hydrology and Water Quality

This alternative would result in the disturbance of a smaller area of land when compared to the proposed Project. As such, the existing drainage pattern of the Project site would not be disturbed and altered to the same degree as it would under the proposed Project. As described under Section 3.9, the proposed Project includes an extensive network of onsite drainage and water quality facilities, which would limit the potential for offsite drainage impacts, and would reduce potential water quality issues to a less than significant level. Under this alternative, the amount and size of the onsite water quality and water detention facilities would be reduced, and a larger percentage of the Project site would remain in a natural condition. As such, this impact would be reduced under this alternative when compared to the proposed Project, but would be greater than impacts associated with the South Pit Only Alternative.

Land Use and Planning

Approximately 1,600 acres (86 percent) of the land within the site boundary is designated and zoned as Mineral Resource. The Applicant is proposing a General Plan amendment and zoning amendment for the remaining approximately 250 acres not currently designated as Mineral Resource. Additionally, the Applicant proposes amending General Plan Policy MR-n and Zoning Code section 17.88.020(F) to remove the 30-year term on mining permits. While the North Pit Only Alternative would result in fewer acres of disturbed area for mining and processing activities, the entire site would still be rezoned and redesignated as Mineral Resources under the Shasta County General Plan and Zoning Code maps. Furthermore, the General Plan and Zoning Code text would still be amended to remove the 30-year limitation on mining permits. Therefore, because the proposed Project would not result in significant impacts related to land use and planning, this alternative would result in comparable levels of less than significant impacts related to this topic. There would be no change to this topic when compared to the proposed Project.

Noise

The proposed Project has the potential to generate increased noise levels from truck traffic, processing plant operations, and mining activities within the North and South Pits. Under the North Pit Only Alternative, only the North Pit area would be mined. However, the primary and secondary processing plants would still be constructed in the same locations as the proposed Project, and would still operate in much the same manner. It is assumed that processing plant noise levels would remain unchanged under this alternative when compared to the proposed Project. As shown in Figure 3.11-4, the greatest concentration of existing residences near the Project site is located to the south and southeast of the Project site, within and adjacent to the City of Shasta Lake. The North Pit is the area proposed for mining that is furthest removed from the existing sensitive receptors in the vicinity of the Project site. The North Pit is also further away from the potential future sensitive residential receptors that may be located within the Mountain Gate at Shasta project site in the future. The South Pit is closer than the North Pit to these existing and future sensitive receptors. Therefore, the North Pit Only Alternative would result in reduced noise impacts when compared to the proposed Project, as well as the South Pit Only Alternative. The primary source of noise that would contribute to the significant and unavoidable noise impacts of the proposed Project would be from rail loading operations. Rail loading operations would continue to occur under this alternative, and noise impacts would remain significant and unavoidable under this alternative.

Transportation and Circulation

The North Pit Only Alternative would result in the extraction, processing and transport of approximately half as much aggregate material as the proposed Project. As such, vehicle trips, including heavy truck trips, would be reduced under this alternative when compared to the proposed Project. As described in Section 3.12, the proposed Project would result in less than significant transportation and circulation impacts under Existing plus Project conditions, and would result in significant impacts under Cumulative plus Project conditions. Under this alternative, fewer vehicle and truck trips would be generated, and impacts related to

transportation and circulation would be reduced when compared to the proposed Project. However, cumulative impacts to the I-5 NB Ramps and Old Oregon Trail intersection and the Wonderland Boulevard and Old Oregon Trail intersection would remain significant and unavoidable under this alternative.

Utilities

The North Pit Only Alternative would result in the extraction, processing and transport of approximately half as much aggregate material as the proposed Project. As such, this alternative would require reduced amounts of potable and non-potable water supplies, and would require fewer energy resources, such as diesel fuel and electricity. As such, this impact would be reduced under this alternative when compared to the proposed Project.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires that an environmentally superior alternative be identified among the alternatives that are analyzed in the EIR. The environmentally superior alternative is that alternative with the least adverse environmental impacts when compared to the proposed Project. Table 5.0-1 presents a comparison of the Project alternative impacts with those of the proposed Project.

TABLE 5.0-1: COMPARISON OF ALTERNATIVE PROJECT IMPACTS TO THE PROPOSED PROJECT

ENVIRONMENTAL ISSUE	*NO PROJECT ALTERNATIVE*	*SOUTH PIT ONLY ALTERNATIVE*	*NORTH PIT ONLY ALTERNATIVE*
	RELATIVE CHANGE IN IMPACT AS COMPARED TO PROJECT		
Aesthetics	Less	Less	Equal
Agricultural Resources	Equal	Equal	Equal
Air Quality	Less	Less	Less
Biological Resources	Less	Less	Less
Cultural Resources	Less	Less	Less
Geology and Soils	Less	Less	Less
Greenhouse Gases	Less	Less	Less
Hazards and Hazardous Materials	Less	Less	Less
Hydrology and Water Quality	Less	Less	Less
Land Use and Planning	Less	Less	Less
Noise	Less	Equal	Equal
Transportation and Circulation	Less	Less	Less
Utilities	Less	Less	Less

As shown in the table above, the No Project Alternative is the environmentally superior alternative. The No Project Alternative would not result in any changes to the Project site. As such, all of the potentially significant environmental impacts associated with the proposed Project would be avoided under this alternative.

However, as required by CEQA, when the No Project Alternative is the environmentally superior alternative, the environmentally superior alternative among the others must be identified.

The South Pit Only Alternative would result in a reduced area of land disturbance when compared to the proposed Project and the North Pit Only Alternative. As such, impacts associated with ground disturbing activities (biological resources, cultural resources, geology and soils, greenhouse gases, and hydrology and water quality) would be reduced under this alternative when compared to the proposed Project and the North Pit Only Alternative. However, the South Pit is located closer to existing and future sensitive receptors than the North Pit, and when compared to the North Pit Only Alternative, has a greater potential to expose

existing and future sensitive receptors to impacts associated with noise and air quality. It is also noted that the South Pit is less visually prominent than the North Pit, and as such, visual resource impacts would be reduced under the South Pit Only Alternative when compared to the North Pit Only Alternative.

The North Pit Only Alternative would result in the disturbance of a greater area of land than the South Pit Only Alternative. As such, impacts associated with ground disturbing activities (biological resources, cultural resources, geology and soils, greenhouse gases, and hydrology and water quality) would be greater under this alternative when compared to the South Pit Only Alternative. However, as discussed above, the North Pit is located further from existing and future sensitive receptors than the South Pit, and when compared to the South Pit Only Alternative, has a reduced potential to expose existing and future sensitive receptors to impacts associated with noise and air quality. It is also noted that the North Pit is more visually prominent than the South Pit, and as such, visual resource impacts would be greater under the North Pit Only Alternative when compared to the South Pit Only Alternative.

The analysis contained in this Draft EIR concludes that the proposed Project would result in significant and unavoidable impacts associated with degradation of the visual character of the site, noise during nighttime hours, exceedances of established ambient air quality standards for NO_x, PM_{10} and $PM_{2.5}$., and cumulative impacts to intersection LOS standards, regional air quality, noise exposure, and the transportation network. The severity of these impacts would be reduced under all three of the alternatives analyzed above.

Notwithstanding, although there would be no impacts related to air quality, noise, and transportation under the No Project Alternative, it is assumed that air quality, noise and transportation impacts would remain significant and unavoidable under both the South Pit Only and North Pit Only Alternatives.

With respect to visual resources, the east-facing slope of the North Pit is visually prominent. Thus, the North Pit Only Alternative would result in significant and unavoidable impacts associated with visual resources. However, given the intervening topography and the visual screening provided by existing vegetation, while the South Pit Only Alternative would result in visual changes to the Project site, the visual simulations indicate the South Pit Only Alternative would result in less than significant visual resource impacts. Therefore, the South Pit Only Alternative is considered the environmentally superior alternative.

This page left intentionally blank.

SHASTA COUNTY

Richard W. Simon, AICP.....Director, Department of Resource Management

Bill Walker, AICP.....Senior Planner, Department of Resource Management

DE NOVO PLANNING GROUP

Prime consultant retained to prepare the EIR

Ben Ritchie .....Principal Planner/Project Manager

Steve McMurtry .....Principal Planner

Beth Thompson .....Principal Planner

Kittleson and Associates- Traffic Study

Mike Aronson, PE ..... Principal-in-Charge

Jorge Barrios..... Transportation Analyst

Maxey Architect- Visual Simulations

Carl Maxey, AICP ..... Principal-in-Charge

CGI Technical Services- Slope Stability and Geotechnical Peer Review

James Bianchin, PG, CEG ..... Project Manager

JBR Environmental Consultants- Revegetation Plan, Air Quality Study, Stormwater, Erosion Control, and Drainage Plan, and Project Description Peer Review

Debra Lemke, PWS, CPESC .....Environmental Specialist

Marit Sawyer .....Environmental Specialist

JC Brennan and Associates- Noise Study Peer Review

Jim Brennan.....President

Peak and Associates- Cultural Resources Investigation and Cultural Resources Report Peer Review

Melinda Peak.....President

Neal Neuenschwander ..... Senior Cultural Investigator

Stillwater Sciences- Fish Use and Channel Adjustments Analysis

Dennis Halligan..... Senior Fisheries Biologist

Jay Stallman..... Senior Geologist/Geomorphologist

TSS Consultants- Greenhouse Gas Analysis of Tree Removal

Tad Mason.....President

West Yost Associates- Stormwater, Erosion Control and Drainage Plan, Water Supply Assessment, and Hydrology and Water Quality Report Peer Reviews

Doug Moore, PE .....Engineering Manager

Jeff Pelz, PE.....Engineering Manager

Ken Loy, PG, CEG, CHG ..... Principal Hydrogeologist

7.1 GLOSSARY

A number of technical terms are used in surface mining and reclamation and at the Moody Flats Quarry to describe the operations and equipment that are in use there. This glossary includes selected definitions to aid decision-makers and the public in evaluating the environmental impacts of the Project.

Aggregate construction material: A broad category of coarse particulate material used in construction, including sand, gravel, crushed stone, slag, and recycled concrete. Aggregates are a component of composite materials such as concrete and asphalt concrete; the aggregate serves as reinforcement to add strength to the overall composite material.

Aggregate processing facility: Machinery and equipment used to process, crush, and break down raw aggregate materials into finished products, including sand, gravel, and crushed stone.

Ammonium nitrate and fuel oil (ANFO): A widely used bulk industrial explosive mixture. It consists of 94 percent porous prilled ammonium nitrate (NH_4NO_3), (AN) that acts as the oxidizing agent and absorbent for the fuel – six percent number 2 fuel oil.

Asphalt concrete batch plant: A plant used for the manufacture of asphalt, macadam and other forms of coated roadstone, sometimes collectively known as blacktop. The manufacture of coated roadstone demands the combination of a number of aggregates, sand and a filler (such as stone dust), in the correct proportions, heated, and finally coated with a binder, usually bitumen based.

Asphalt concrete: Asphalt concrete (commonly called asphalt, blacktop, or pavement in North America, and tarmac in Great Britain) is a composite material commonly used to surface roads, parking lots, and airports. It consists of mineral aggregate bound together with asphalt, laid in layers, and compacted.

Backfill: Earth, overburden, mine waste or imported material used to replace material removed during mining (14 Cal. Code Regs. §3501).

Baghouse system: A dust collection system attached to industrial processing equipment to remove dust and particulate matter generated during aggregate processing activities.

Ballast: Gravel or coarse stone used to form the bed of a railroad track or road.

Buffer zone: An area within the Project Area of undeveloped, vegetated open space where no active mining activities have occurred and that has been designated to remain in this condition to serve as a physical separation between the Quarry's activities and other land uses.

Catchment berms: A shelf or raised earthen area used to capture water within a mining area or water quality retention pond.

Crusher: A machine that crushes larger sizes of excavated materials to sizes appropriate for commercial use.

Drag-slat conveyor: A conveyor, consisting of many smaller horizontal bars or slats, used to move aggregate material.

Fines: Very small granular or powdery material that results from the crushing and processing of aggregate materials.

Grizzly: Course screening or scalping device that prevents oversized bulk material form entering a material transfer system. Constructed of rails, bars, beams, etc.

Highwall: The unexcavated face of exposed overburden and aggregate in a surface mine.

Load-out facility: A facility and area used to load processed aggregate products onto trucks or railcars for shipment to the marketplace.

Mined lands: The surface, subsurface, and ground water of an area in which surface mining operations will be, are being, or have been conducted, including private ways and roads appurtenant to any such area, land excavations, workings, mining waste, and areas in which structures, facilities, equipment, machines, tools, or other materials or property which result from, or are used in, surface mining operations are located (Pub. Res. Code §2729).

Mining waste: The residual of soil, rock, mineral, liquid, vegetation, equipment, machines, tools, or other materials or property directly resulting from, or displaced by, surface mining operations (Pub. Res. Code §2730).

Overburden fill area: Onsite stockpiles of topsoil and other surface materials removed during initial site excavation activities prior to reaching subsurface the aggregate material to be mined.

Overburden: Soil, rock, or other materials that lie above a natural mineral deposit or in between mineral deposits, before or after their removal by surface mining operations (Pub. Res. Code §2732).

Portland cement concrete: Portland cement is the most common type of cement in general use around the world, used as a basic ingredient of concrete, mortar, stucco, and most non-specialty grout. It is a fine powder produced by heating materials in a kiln to form what is called Portland cement clinker, grinding the clinker, and adding small amounts of other materials.

Quarry benches: Horizontal steps or benches along a sloped hillside that are mined.

Reclamation plan: The applicant's completed and approved plan for reclaiming the lands affected by its surface mining operations conducted after January 1, 1976, as called for in Section 2772 of the Surface Mining and Reclamation Act of 1975 (SMARA).

Reclamation: The combined process of land treatment that minimizes water degradation, air pollution, damage to aquatic or wildlife habitat, flooding, erosion, and other adverse effects from surface mining operations so that mined lands are reclaimed to a usable condition for alternate land uses and create no danger to public health or safety. The process may extend to affected

lands surrounding mined lands, and may require backfilling, grading, resoiling, revegetation, soil compaction, stabilization, or other measures (Pub. Res. Code §2733).

Recycled construction materials: Post-mart finished materials included concrete, asphalt, and other aggregate-based materials, usually derived from demolished roadbeds and building foundations, that are crushed and processed for reuse.

Riprap: Rock or other material used to armor shorelines, streambeds, bridge abutments, pilings and other shoreline structures against scour, water or ice erosion. It is made from a variety of rock types, commonly granite or limestone, and occasionally concrete rubble from building and paving demolition. It can be used on any waterway or water containment where there is potential for water erosion.

Settling pond: A collection basin for stormwater runoff that allows suspended materials to settle out of the water.

Silts: A sedimentary material consisting of very fine particles intermediate in size between sand and clay.

Stockpile: Piles or mounds of aggregate material awaiting processing or transport.

Surface mining operations: All, or any part of, the process involved in the mining of minerals on mined lands by removing overburden and mining directly from the mineral deposits, open-pit mining of minerals naturally exposed, mining by the auger method, dredging and quarrying, or surface work incident to an underground mine. Surface mining operations shall include, but are not limited to: (a) Inplace distillation or retorting or leaching; (b) The production and disposal of mining waste; and (c) Prospecting and exploratory activities (Pub. Res. Code §2735). The term also includes segregation and stockpiling of mined materials and the recovery of same (14 Cal. Code Regs. §3501).

Surge pile: An open pile or mound of material at the end of a conveyor belt awaiting further processing.

Wash water: Water used in the washing and processing of aggregate material.

7.2 ACRONYMS

This section identifies acronyms and abbreviations used in this EIR. The acronyms and abbreviations are organized by topic, but may appear in multiple EIR sections.

AGENCIES

Cal EPA:	California Environmental Protection Agency
Cal OSHA:	California Occupational Safety and Health Administration
CARB:	California Air Resources Board
CDFW:	California Department of Fish and Wildlife
CEC:	California Energy Commission
CPUC:	California Public Utilities Commission
FEMA:	Federal Emergency Management Agency
MSHA:	Mine Safety and Health Administration
RWQCB:	Regional Water Quality Control Board
SCAQMD:	Shasta County Air Quality Management District
SWRCB:	State Water Resources Control Board
USACE:	United States Army Corps of Engineers
USFWS:	United States Fish and Wildlife Service
WAPA:	Western Area Power Administration
DTSC:	Department of Toxic Substances Control
Caltrans:	California Department of Transportation
CUPA:	Certified Unified Program Agency
SCEHD:	Shasta County Environmental Health Division

LAWS

CCR:	California Code of Regulations
CEQA:	California Environmental Quality Act

CESA: California Endangered Species Act

ESA: Endangered Species Act

SMARA: Surface Mining and Reclamation Act

CEQA TERMS

EIR: Environmental Impact Report

NOA: Notice of Availability

NOC: Notice of Completion

NOD: Notice of Determination

NOP: Notice of Preparation

AIR QUALITY

BMP: Best Management Practice

CAAQS: California Ambient Air Quality Standard

CO: Carbon Monoxide

DPM: Diesel Particulate Matter

FCAA: Federal Clean Air Act

MMT: Million Metric Tons

NAAQS: National Ambient Air Quality Standard

NOx: Nitrogen Oxide

PM_{10}: Particulate Matter- 10 microns in diameter

$PM_{2.5}$: Particulate Matter- 2.5 microns in diameter

PPB: Parts per Billion

PSD: Prevention of Significant Deterioration

RCAP: Regional Climate Action Plan

ROG: Reactive Organic Gases

SVAB: Sacramento Valley Air Basin

TAC: Toxic Air Contaminant

VOC: Volatile Organic Compound

BIOLOGICAL

Cal-IPC: California Invasive Plant Council

CNDDB: California Natural Diversity Databse

CNPS: California Native Plant Society

CWHR: California Wildlife Habitat Relationships

VELB: Valley Elderberry Longhorn Beetle

GREENHOUSE GASES

CO_2e: Carbon Dioxide Equivalent

GHG: Greenhouse Gas

GWP: Global Warming Potential

LSD: Limits of Surface Disturbance

$MMTCO_2e$: Million Metric Tons of Carbon Dioxide Equivalent

$MTCO_2e$: Metric Tons of Carbon Dioxide Equivalent

HAZARDS

HMBP: Hazardous Materials Business Plan

SPCC: Spill Prevention, Control, and Countermeasure

CFR: Code of Federal Regulations

RCRA: Federal Resource Conservation and Recovery Act

UST: Underground Storage Tank

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

HWCL: Hazardous Waste Control Law

APS: Aboveground Petroleum Storage Act

SCHMP: Shasta County Multi-Jurisdictional Hazard Mitigation Plan

WATER QUALITY

BMP:	Best Management Practice
NPDES:	National Pollutant Discharge Elimination System
RoWD:	Report of Waste Discharge
SWPPP:	Storm Water Pollution Prevention Plan
TMDL:	Total Maximum Daily Load
WDR:	Waste Discharge Requirements

NOISE

CNEL:	Community Noise Equivalent Level
DNL or L_{dn}:	Day-Night Average Noise Level
L_{eq}:	Energy Equivalent Noise Level
L_{max}:	Maximum Noise Level
L_{min}:	Minimum Noise Level
SEL:	Single Event Level

TRAFFIC

LOS:	Level of Service

This page left intentionally blank