4.11 NOISE

This section considers existing noise levels and analyzes the potential noise-related impacts from implementation of the General Plan. Impacts relating to noise and vibration generated by construction, traffic, industrial, commercial, agricultural uses, railroads, and airports are addressed. Analysis of existing traffic noise exposure along the major corridors and arterials located in Tuolumne County and potential new noise associated with Tuolumne County's proposed General Plan Update is based partially on traffic data analysis provided by Wood Rodgers, Inc. in the Tuolumne County General Plan and Regional Transportation Plan Update Draft EIR Traffic Study dated September 2015.

4.11.1 Setting

a. Overview of Sound Measurement. Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound power levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz). In addition to the actual instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time. Typically, Leq is summed over a one-hour period.

The sound pressure level is measured on a logarithmic scale with the 0 dB level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Decibels cannot be added arithmetically, but rather are added on a logarithmic basis. Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dB. Because of the nature of the human ear, a sound must be about 10 dB greater than the reference sound to be judged as twice as loud. In general, a 3 dB change in community noise levels is noticeable, while 1-2 dB changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while those along arterial streets are in the 50-60+ dBA range. Normal conversational levels are in the 60-65 dBA range and ambient noise levels greater than that can interrupt conversations.

Noise levels typically attenuate at a rate of 6 dB per doubling of distance from point sources such as industrial machinery (Harris, 1979). For example, a person standing 25 feet from an industrial machine may experience noise levels of 75 dBA, while a person standing 50 feet from the same noise source would experience noise levels of 69 dBA, and a person standing 100 feet from the source would experience noise levels of 63 dBA. Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dB per doubling of distance. Noise from heavily traveled roads typically attenuates at about 3 dB per doubling of distance (Harris, 1979).

The actual time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the daytime. The Day-Night average

level (Ldn) recognizes this characteristic by weighting the hourly Leqs over a 24-hour period. The weighting involves the addition of 10 dBA to actual nighttime (10 PM to 7 AM) noise levels, accounting for the greater amount of disturbance associated with noise during that time period.

Vibration. Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration can be a serious concern, causing buildings to shake and rumbling sounds to be heard. In contrast to noise, vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings and is usually measured in inches per second. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration.

High levels of vibration may cause physical personal injury or damage to buildings. However, groundborne vibration levels rarely affect human health. Instead, most people consider groundborne vibration to be an annoyance that can affect concentration or disturb sleep. In addition, high levels of groundborne vibration can damage fragile buildings or interfere with equipment that is highly sensitive to groundborne vibration (e.g., electron microscopes).

In contrast to noise, groundborne vibration is not a phenomenon that most people experience every day. The background vibration velocity level in residential areas is usually 50 RMS or lower which is well below the threshold of perception for humans (human perception is around 65 RMS). Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If the roadway is smooth, the vibration from traffic is rarely perceptible.

b. Sensitive Receptors. Noise level allowances for various types of land uses reflect the varying noise sensitivities associated with those uses. In general, noise-sensitive land uses ("sensitive receptors") are any residence, hospital, school, hotel, library, office, or similar facility where quiet is an important attribute of the environment. Such uses have more stringent noise level allowances than most commercial or agricultural uses that are not subject to impacts such as sleep disturbance. As described in the Tuolumne County General Plan Noise Element, sensitive receptors include but are not limited to residential development, schools, hospitals, convalescent homes, churches, and libraries. Sensitive receptors most affected by roadway noise are those immediately adjacent to roadways and corridors with high traffic volume, such as State Routes 108, 49, and 120, as well as other local high-volume streets such as Mono Way or Tuolumne Road that may experience elevated noise levels.

c. Current Noise Levels in Tuolumne County. The ambient noise environment in Tuolumne County is largely defined by traffic on highways and county roadways, commercial and industrial uses, agricultural uses, railroad operations, and aircraft.

A noise contour map provides a depiction of areas of equivalent noise level exposure from various noise sources. The innermost noise contour will represent the area of greatest noise exposure, and outer noise contours show noise attenuation by distance. Figure 4.11-1 shows the existing noise contours of the selected corridors and roadways. Table 4.11-1 lists the calculated existing noise contours for the selected corridor and roadways. The noise contours are calculated based upon peak traffic volumes and show the maximum estimated noise levels that would be reached on any given day.

Table 4.11-1
Existing 2015 Noise Contours

Corridor and Segment	Noise Contour		
	60 dba*	65 dba*	70 dba*
	Distance in Feet		
State Route 108			
Between East Junction State Route 120 and West Junction State Route 49	1,459	460	145
East of East Junction State Route 49	963	303	96
West of Mono Way	258	81	26
Between Mono Way and Hess Avenue	858	270	85
Between Hess Avenue and Peaceful Oak Road	621	195	62
Between Peaceful Oak Road and Mono Way	540	170	54
Between Mono Way and Soulsbyville Road	470	148	47
Between Soulsbyville Road and W Connector Twain Harte Drive	713	225	71
Between West & East Connector Twain Harte Drive	333	105	33
East of East Connector Twain Harte Drive	340	107	34
West of Chief Fuller Road	303	96	30
East of Chief Fuller Road	348	110	35
West of West Long Barn Connector	200	63	20
State Route 49 (Columbia-Tuttletown-Calaveras County Line)			
East of Rawhide Road	270	85	27
Between Rawhide Road and Tuttletown	148	47	15
Between Tuttletown and Tuolumne/Calaveras County Line	210	66	21
State Route 49 (Chinese Camp-Mariposa County Line)			
South of South Junction State Route 120	62	19	6
North of North State Route 120 Junction	79	25	8
South of South Junction State Route 108	178	56	18
State Route 120 (Stanislaus County Line-Chinese Camp)			
Between Tulloch Road and La Grange Road	246	78	28
Between East Junction 108 and North Junction State Route 49	78	24	8

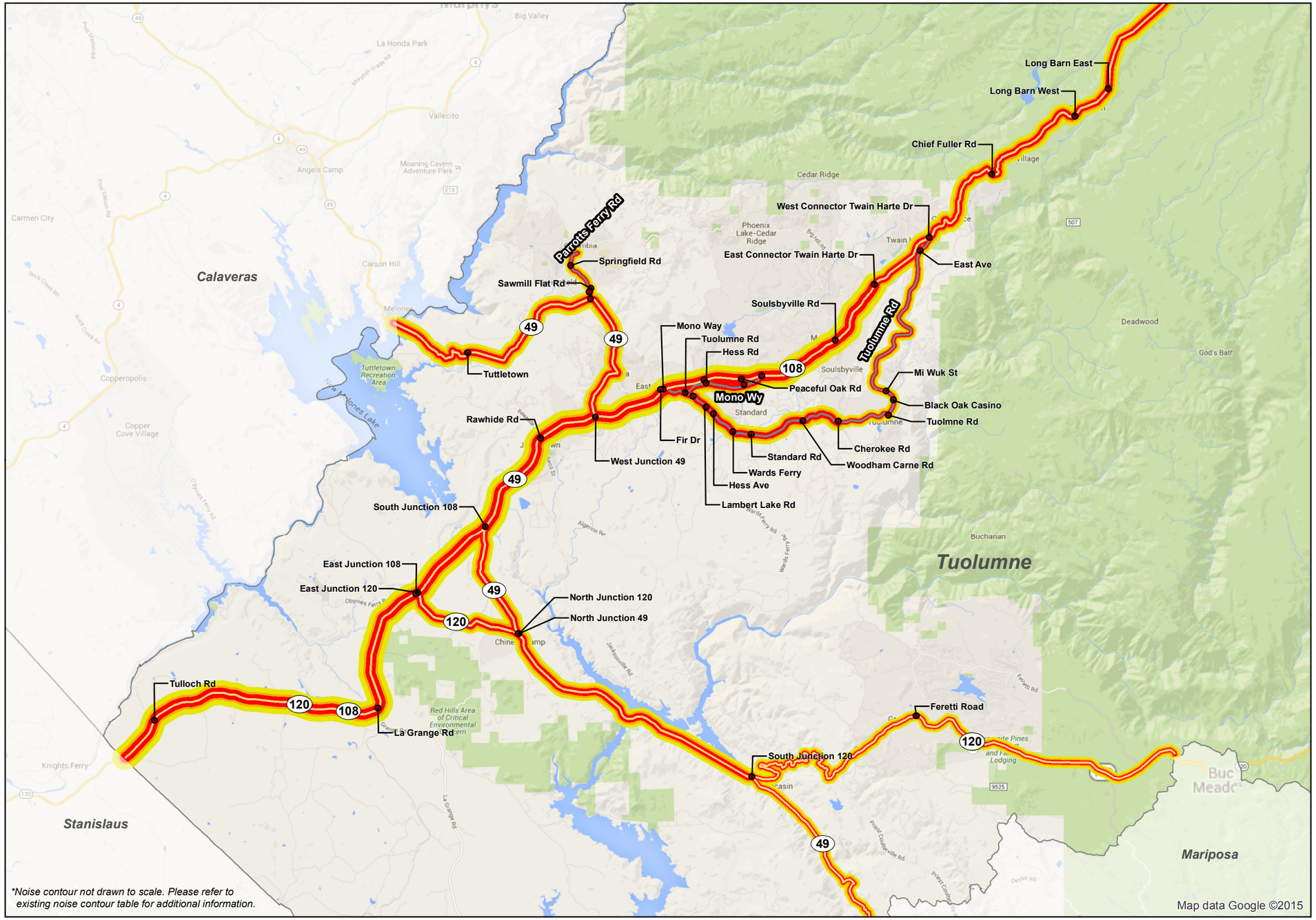
Table 4.11-1
Existing 2015 Noise Contours

Corridor and Segment	Noise Contour		
	60 dba*	65 dba*	70 dba*
	Distance in Feet		
State Route 120 (Groveland)			
West of Ferretti Road	39	12	4
Mono Way			
Between Fir Drive & Tuolumne Road	318	100	32
Between Tuolumne Road & Hess Avenue	129	41	13
Between Hess Ave & standard Road/Peaceful Oak Drive	200	63	20
Parrotts Ferry Road			
Between State Route 49 & Sawmill Flat Road	72	23	7
Between Sawmill Flat Road & Springfield Drive	87	27	9
North of Springfield Drive	100	32	10
Tuolumne Road			
Between Mono Way & Lambert Lake Road	270	85	27
Between Lambert Lake Road & Hess Avenue	166	52	16
Between Hess Avenue & Wards Ferry Road	200	63	20
Between Wards Ferry Road & Standard Road	141	45	14
Between Standard Road & Woodhams Carne	225	71	22
Between Woodhams Carne & Cherokee Road	141	45	14
Between Tuolumne Road & Black Oak Casino Entrance Street	74	23	7
North of Mi Wuk Street	29	9	3
North of East Avenue	35	11	3

**- Noise Levels and contours are expressed in $LA_{eq\ 1h}$, which shows the highest potential noise levels based on peak hour traffic data.*

Source: Rincon Consultants, Inc. Tuolumne County General Plan Update and RTP EIR Noise Study and Noise Contours, July 2015

Highway/Roadway Noise. Streets and Highways throughout the County are identified as the most extensive source of mobile noise in the County. There are two east-west state highways in the County: Highway 108 and Highway 120. State Highway 49 is the only north-south highway in the County. The majority of the towns exist on or near these transportation corridors. Highways 108, 120, and 49 are the major transportation routes through the County. As shown in Table 4.11-1, most noise levels at locations immediately adjacent to major transportation routes can reach up to or exceed 70 dB. State Routes 108 and 49 noise contours extend the furthest, indicating that high traffic noise levels are generated from those roadways. A segment of State Route 132 traverses the southern edge of Tuolumne County near the shore of the Don Pedro Reservoir and produces traffic noise that would potentially affect nearby residences. None of the State Routes are Interstates.



Imagery provided by Google and its licensors © 2015.

Existing Noise Contours

Figure 4.11-1

Industrial and Commercial Operations. Mining and timberland production operations are located throughout Tuolumne County. Noise generation within industrial and commercial facilities such as mining or timberland production facilities or from many types of agricultural equipment are controlled by federal and state employee health and safety regulations (e.g., OSHA and Cal-OSHA), but exterior noise from such operations may exceed locally acceptable standards at nearby noise-sensitive land uses. Typical commercial and industrial noise sources include loading dock operations, parking lot activity, on-site equipment (including heating and air conditioning), and heavy truck idling. Other stationary noise sources of concern typically include generators, pumps, air compressors, outdoor speakers, motors, heavy equipment, back up alarms and similar machinery. There is potential for blasting or demolition noise impacts associated with the mines, which may occur once every other year (Adam Paszkowski, personal communication, August 12, 2015).

Agricultural Operations. Agricultural production is recognized throughout the General Plan as vital to Tuolumne County. Some of the more common noise sources associated with farming operations include tractors, harvesting equipment, spray equipment, and stationary power sources, including internal combustion pump engines. Maximum noise levels generated by farm-related tractors typically range from 77 to 85 dB at a distance of 50 feet from the tractor, depending on the horsepower of the tractor and the operating conditions. Due to the seasonal nature of the agricultural industry, there are often extended periods of time when no noise is generated on properties, which are actively being farmed, followed by short-term periods of intensive mechanical equipment usage and corresponding noise generation. Due to this high degree of variability of agricultural activities, it is not feasible to reliably quantify the noise generation of agricultural uses in terms of noise standards commonly utilized to assess impacts of other noise sources. However, these uses generate short-term periods of elevated noise during all hours of the day and night and possess the potential to generate adverse public reaction during intensive farm-related activities.

Railroads. Tuolumne County is served by the Sierra Railroad which operates between Oakdale, in Stanislaus County, and Standard, in Tuolumne County. The Sierra Railroad currently runs through urbanized areas of Jamestown and Sonora, with existing structures and development located roughly 100 feet away from the track centerline. Connections are made with both the Southern Pacific and the Santa Fe Railroads in Oakdale. The Sierra Railroad includes 49 miles of track and has been in operation since 1897. The Sierra Railroad is vital to the local economy. The railroad not only provides local industry with access to distant markets, but also provides historic rail excursions and scenic cinemagraphic opportunities for the film industry. Located along the Sierra Railroad in Jamestown is Railtown 1897 State Historic Park, which includes a functional roundhouse, several steam engines and an inventory of vintage passenger and freight cars. According to data from the Federal Railroad Administration dated March 2015, railroad crossings in Tuolumne County that are currently in use are not crossed more than four times per day and the speed of the trains do not exceed 25 mph at railroad crossings. According to the Federal Highway Administration Traffic Noise Model (TNM) Version 2.5, a train travelling 25 mph would generate 42 dB to a sound receptor 50 feet away.

Airports. Two airports are located in Tuolumne County: Columbia Airport and Pine Mountain Lake Airport. Pine Mountain Lake Airport includes both a public use airport as well as a residential use airport. It is located three miles northeast of the town of Groveland, serving

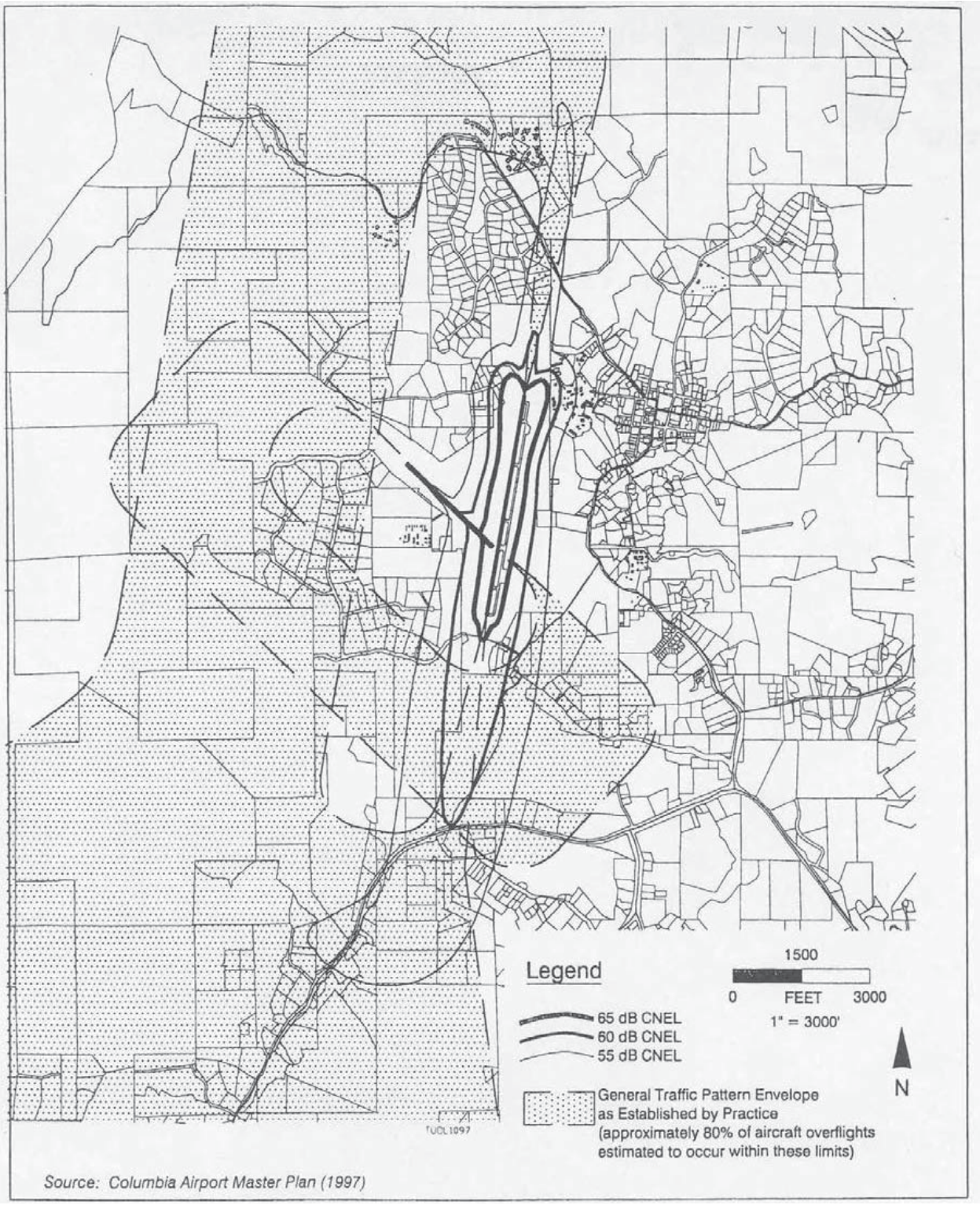
Tuolumne County, California, and is the gateway airport for Highway 120, the most northern route to Yosemite National Park. The airport is used mostly for general aviation aircraft. Pine Mountain Lake Airport covers 52 acres and has one runway. The runway is 3,625 feet by 50 feet and has an asphalt surface (Tuolumne County Emergency Services Plan 2012).

Columbia Airport covers an area of 356 acres which contains two runways: the first runway is paved asphalt and measures 4,670 feet by 75 feet and the second runway is turf measuring 2,600 feet by 100 feet. There are approximately 25,000 aircraft operations per year at this airport. General Aviation Aircraft make up about 96% of the flight operations, about 4% air taxi, and 1% military aircraft. There are over 200 aircraft based at this airport: 95% single engine, 2% multi-engine, 2% helicopters, and 1% ultra-light aircraft (Tuolumne County Emergency Services Plan 2012). Columbia Airport is also the home of a CAL FIRE Air Attack Base. The CAL FIRE Air Attack crews respond to fires throughout the area and provide support for fighting wildfires. The base provides initial attack for the California Department of Forestry and Fire Protection (CDF) Madera-Mariposa-Merced and Amador-El Dorado Units and the Stanislaus National Forest and Yosemite National Park. This area spans north to the town of Plymouth, south to the town of Mariposa, east over the Sierras and west to the Unit's state responsibility area (SRA) boundary: an initial attack area of approximately 3.6 million acres. Columbia Air Attack Base responds to an average of 150 calls per year (CAL FIRE 2005).

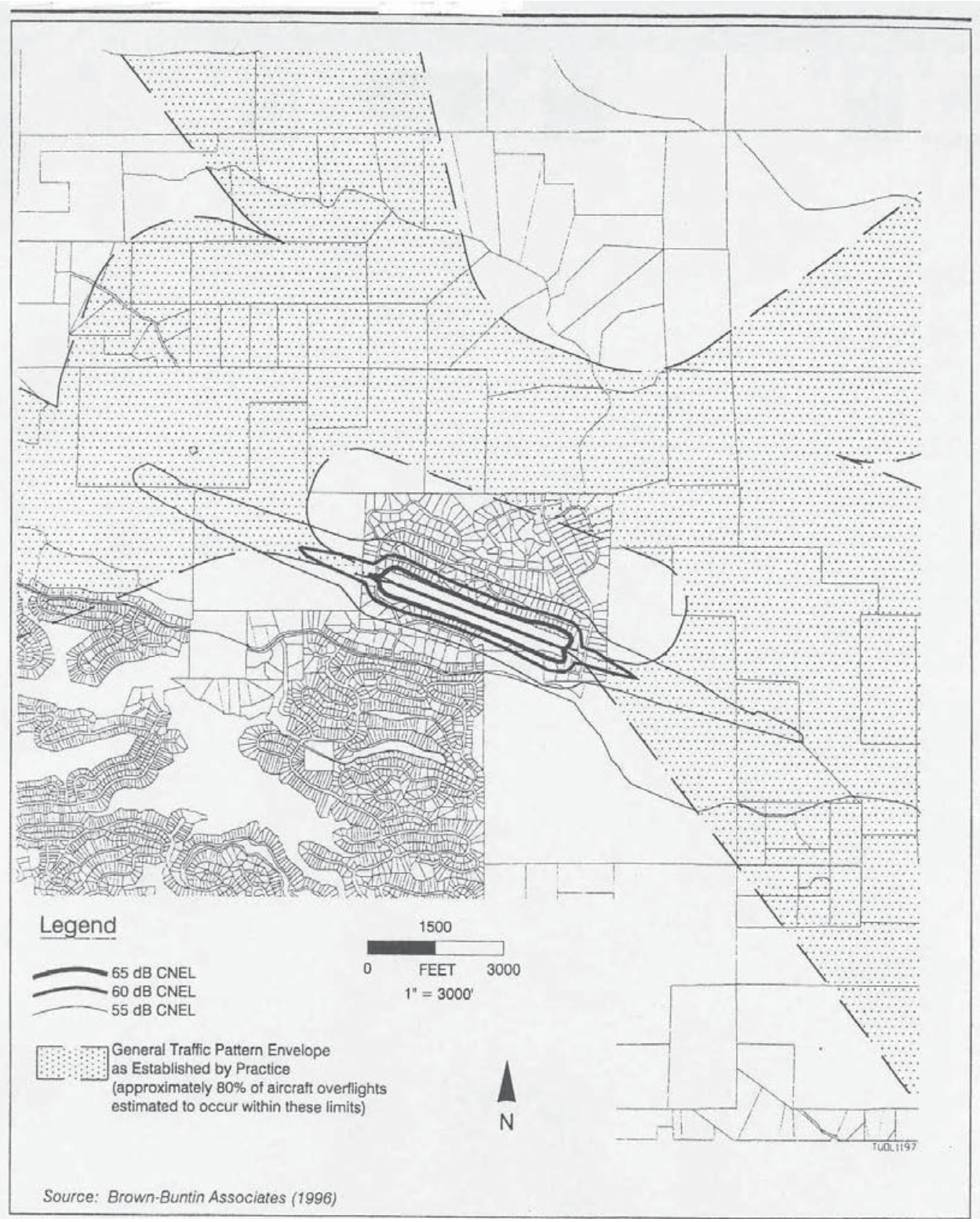
The Tuolumne County Airport Land Use Compatibility Plan, adopted in January 2003, includes calculated 2015 noise contour maps for both the Columbia Airport and Pine Mountain Lake Airport, shown in Figures 4.11-2 and 4.11-3.

d. Regulatory Setting. As required by Section 65302 of the Government Code of California, desirable noise levels are embodied within the Noise Element of General Plans. Division 28 of the California Health and Safety Code requires that the State Office of Noise Control within the Department of Health Services develop model elements and model noise ordinances for consideration by local jurisdictions in developing noise standards.

Tuolumne County's current (1996) Noise Element establishes noise standards for the range of uses present in and around the county. These standards are used to determine whether proposed new development in the county requires mitigation to avoid potential land use conflicts. Land use categories where a quiet environment is particularly desirable include residential, transient lodging (e.g., hotels, motels, and RV parks), and noise-sensitive institutional uses (e.g., hospitals, school, nursing homes, churches, and libraries).



Columbia Airport Noise Impact Area - 2015 Figure 4.11-2



Pine Mountain Lake Airport
Noise Impact Area - 2015

Figure 4.11-3

The interior and exterior noise standards (see Table 4.11-2 below) establish maximum noise levels that are allowable for new development in Tuolumne County. Under the existing General Plan, this matrix is used to determine whether a proposed new use would be compatible with the ambient noise environment in which it is proposed as well as whether the proposed new use would create noise compatibility conflicts with established uses. For the most sensitive uses such as most residences and noise-sensitive institutional uses, 60 dBA Ldn is the maximum allowable exterior level. The maximum allowable interior noise level for all spaces is 45 dBA.

Table 4.11-2
Maximum Allowable Noise Exposure-Transportation Noise Sources Excluding Aviation Related Noise[1]

Land Use Receptors	Outdoor Activity Areas[2]	Interior Spaces[3]
	Ldn/CNEL, dB	Ldn/CNEL, dB
Urban Residential	60	45
Transient Lodging[4]	60	45
Hospitals, Nursing Homes[5]	60	45
Churches, Meeting Halls, Office Buildings, Mortuaries	---	45
Schools[5], Libraries, Museums	---	45

Note:
[1]This table applies to noise exposure levels that result from a transportation noise source other than aircraft. For existing receiving land uses, consideration shall be given to the noise exposure from new transportation noise sources during the design and approval of the new transportation project. In the case of existing transportation noise sources, projects or consideration of land use changes involving noise-sensitive land uses shall address the noise exposure environment and use these standards as thresholds.
[2]An outdoor activity area is a location outside of the immediate structure where formal or informal activities are likely to happen. For example, anywhere on an urban residential property could be an outdoor activity area, while the outdoor activity area for a school would be the playground or sporting fields, and for a hospital would be an exterior patio or exercise area. Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land uses.
[3]For typical construction methods, the reduction in the noise level from the outside of the structure to the inside is approximately 20-25 dB. In a high noise environment, special construction techniques may be necessary to reduce the interior noise level to the standard.
[4]Transient lodging are overnight accommodations usually intended for occupancy by tourists or other short-term paying customers, examples include hotels, motels, or homeless shelters. Transient lodging, as used in this case, do es not include bed and breakfast establishments which are located in rural areas, campgrounds or guest ranches.
[5]These standards only apply to nursing homes or schools that have more than 6 beds or students, respectively.

The Airport Land Use Commission is responsible for reviewing airport and adjacent land use proposals on and near Columbia Airport and Pine Mountain Lake Airport. The criteria and affected areas in proximity to the airports are defined in the Tuolumne County Airport Land Use Compatibility Plan (ALUCP), which was approved in 2003. The goal of the plan is to promote compatibility between the public-use airports within Tuolumne County and the land uses which surround them. The Airport Land Use Compatibility Plan serves as the primary tool for use by the Tuolumne County Airport Land Use Commission in its review of land development proposals at county airports and on surrounding land. The Airport Land Use Compatibility Plan contains policies regarding noise, safety, airspace protection, and aircraft overflights which apply primarily to property located within the airport influence area boundaries associated with the two county public-use airports.

Table 4.11-3 below shows the maximum allowable noise exposure from aircraft-related sources as shown in the existing General Plan Noise Element.

Table 4.11-3
Maximum Allowable Noise Exposure-Aircraft Noise Sources[1]

	Outdoor Activity Areas[2]	Interior Spaces[3]		
Land Use Receptors	**Ldn/CNEL, dB**	**Ldn/CNEL, dB**	**L_{max} Db[4]**	
			Day	**Night**
Residential – Living Areas	55	45	45	45
Residential – Sleeping Areas	55	40	45	40
Transient Lodging[5]	60	45	--	40
Hospitals, Nursing Homes[6]	60	45	--	40
Churches, Meeting Halls, Office Buildings, Mortuaries	60	45	45	45
Schools Libraries, Museums	60	45	55	55

Note:
[1]This table applies to noise exposure levels that result from aircraft. For existing receiving land uses, consideration shall be given to the noise exposure from new aviation-related sources during the design and approval of the new aviation-related project. In the case of existing aviation-related sources, projects or consideration of land use changes that lie within the jurisdictional area of the Tuolumne County Airport Land Use Commission, which involve noise-sensitive land uses shall address the noise exposure environment and use these standards as thresholds.

[2]An outdoor activity area is a location outside of the immediate structure where formal or informal activities are likely to happen. For example, anywhere on an urban residential property could be an outdoor activity area, while the outdoor activity area for a school would be the playground or sporting fields, and for a hospital would be an exterior patio or exercise area. Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land uses.

[3]For typical construction methods, the reduction in the noise level from the outside of the structure to the inside is approximately 15 dB. In a high noise environment, special construction techniques may be necessary to reduce the interior noise level to the standard.

[4] L_{max} refers to the maximum interior noise level. The design L_{max} value shall be established as the maximum aircraft noise level which is exceeded by 10 percent of the aircraft noise events occurring during a typical 24-hour day of aircraft operations. In other words, the L_{max} value used in the evaluation shall be determined by eliminating the loudest 10 percent of the aircraft events measured during the sample period, which should be a typical 24-hour day.

[5]Transient lodging are overnight accommodations usually intended for occupancy by tourists or other short-term paying customers, examples include hotels, motels, or homeless shelters. Transient lodging, as used in this case, does not include bed and breakfast establishments which are located in rural areas, campgrounds or guest ranches.

[6]These standards only apply to nursing homes or schools that have more than 6 beds or students, respectively.

Table 4.11-4 below shows the maximum allowable noise exposure from stationary sources as shown in the existing General Plan Noise Element.

Table 4.11-4
Maximum Allowable Noise Exposure-Stationary Noise Sources[1]

	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly L_{eq}, dB[2]	50	45
Maximum level, dB[3]	70	65

[1] This table applies to noise exposure as a result of stationary noise sources. For a development project or land use change involving a noise-sensitive land use, the noise from nearby noise sources will be considered during design and approval of the project, or in determining whether the land use change is appropriate. For development projects which may produce noise, land use changes and project review will consider the effects of the noise on possible noise-sensitive land uses. When considering modification or expansion at a site that already produces noise levels which exceed these standards at noise-sensitive land uses, the modification or expansion shall be reviewed to consider if the proposed action will further raise the existing noise levels received at the noise-sensitive land use(s).

Noise-sensitive land uses include urban residential land uses, libraries, churches, and hospitals, in addition to nursing homes or schools which have over 6 beds or students, respectively. Transient lodging establishments which are considered noise sensitive land uses include hotels, motels, or homeless shelters, but not bed and breakfast establishments located in rural areas, campgrounds, or guest ranches.

[2] The sound equivalent level as measured or modeled for a one-hour sample period. The daytime or nighttime value should not be exceeded as determined at the property line of the noise-sensitive land use. When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers or other property line noise mitigation measures.

[3] Similar to the hourly L_{eq}, except this level should not be exceeded for any length of time.

Table 4.11-5 below shows the maximum allowable noise exposure in cumulative noise that may result from development of a project. Cumulative noise refers to all noise generated from the entire development site, which could include noise generated from both operational noise sources. The allowable change in cumulative noise exposure depends on the existing ambient noise level without the project.

Table 4.11-5
Significance of Changes in Cumulative Noise Exposure[1]

Ambient Noise Level Without Project (Ldn or CNEL)[2]	Significant Impact if Cumulative Level Increases By:
<60 dB	+ 5.0 dB or more
60-65 dB	+ 3.0 dB or more
>65 dB	+ 1.5 dB or more

Source – Tuolumne County General Plan Noise Element, Federal Interagency Committee on Noise (FICON), Federal Agency Review of Selected Airport Noise Analysis Issues, August 1992

[1]These standards shall be applied when considering the noise impacts from projects that could cause a significant increase in the cumulative noise exposure of existing noise-sensitive land uses. If it is likely that existing noise-sensitive land uses could experience these increases in cumulative noise exposure, as measured in CNEL or Ldn, then an acoustical analysis that meets the requirements of Figure 5.1 shall be accomplished and the results considered in project design.

[2]Ambient Noise is defined as the composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

4.11.2 Impact Analysis

a. Methodology and Significance Thresholds. The analysis of noise impacts focuses upon the General Plan Update's impact to noise-sensitive land uses within Tuolumne County and the impact of existing noise sources upon county residents. The General Plan Update would result in potentially significant impacts if development facilitated by the General Plan would result in any of 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 applicable standards of other agencies;*
- *Exposure of persons to or generation of excessive ground borne vibration or ground borne 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 or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels; or*
- *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?*

The FHWA Highway Traffic Noise Prediction Model was used to predict existing and future traffic noise levels within Tuolumne County. The FHWA Model is the traffic noise prediction model currently preferred by the FHWA, Caltrans, and most county governments for use in traffic noise assessment.

Noise contours were created from the FHWA model results for the purposes of evaluating whether a given increase in noise is "substantial." A "substantial" increase in traffic noise is defined in the Tuolumne County General Plan Noise Element and shown in Tables 4.11-2 and 4.11-4.

b. Project and Cumulative Impacts.

Impact N-1 **The General Plan Update would facilitate construction of future residences and other noise-sensitive land uses in close proximity to existing transportation noise sources that would be exposed to noise levels exceeding the maximum allowable range. However, implementation of noise attenuation features for new development, as required by General Plan policies, would reduce impacts to a Class III, *less than significant*, level.**

The General Plan Update would facilitate the development of new residential and other noise-sensitive uses that could be exposed to long-term noise exceeding acceptable levels shown in Table 4.11-2. Potential sources of noise exposure include: (1) traffic on state routes 120, 108, and 49, local state routes, and countywide arterial roadways; and (2) transportation sources related

to operations of commercial, industrial, and agricultural sites that are adjacent to or near noise-sensitive uses.

The FHWA Model was used with existing and future peak hour traffic data to develop L_{eq} contours for the major highways and roadways within Tuolumne County. The General Plan Update's Noise Element depicts the distances from the centerlines of major roadways to the 60, 65 and 70 dB L_{dn} contours for existing (2015) and future (2040) conditions. In actuality, these distances may be less than modeled because of topographic attenuation and intervening buildings and vegetation.

The General Plan Update is based on a preferred growth scenario, the Distinctive Communities Alternative Growth Scenario, which lays out a pattern of future growth emphasizing intensified land use distribution that concentrates growth in urban areas and corridors. Infill and mixed-use are encouraged to take advantage of existing public infrastructure and services. Residential and commercial areas would become more compact within new urban development boundaries promoting mixed-use and higher density residential development to supply housing demand. With compact neighborhoods, auto dependency and new roads are reduced and transportation options are increased. As a result, however, development of infill and mixed-use projects under the draft General Plan land use map within existing communities and along existing transportation roadways would potentially expose residences to noise from various roadways as well as from commercial activity. For most sites, the primary generator of noise that could affect noise-sensitive uses would be roadway traffic. Table 4.11-6 lists the calculated future noise contours for the selected corridor and roadways.

Table 4.11-6
Proposed 2040 Noise Contours

Corridor and Segment	Noise Contour		
	60 dba*	65 dba*	70 dba*
	Distance in Feet		
State Route 108			
Between East Junction State Route 120 and West Junction State Route 49	1,838	579	182
East of East Junction State Route 49	1,106	348	110
West of Mono Way	296	93	29
Between Mono Way and Hess Avenue	941	296	93
Between Hess Avenue and Peaceful Oak Road	681	214	68
Between Peaceful Oak Road and Mono Way	606	191	60
Between Mono Way and Soulsbyville Road	566	178	56
Between Soulsbyville Road and West Connector Twain Harte Drive	858	270	85
Between West & East Connector Twain Harte Drive	373	118	37
East of East Connector Twain Harte Drive	382	120	38
West of Chief Fuller Road	318	100	32
East of Chief Fuller Road	365	115	36
West of West Long Barn Connector	210	66	21

Table 4.11-6
Proposed 2040 Noise Contours

Corridor and Segment	Noise Contour		
	60 dba*	65 dba*	70 dba*
	Distance in Feet		
State Route 49 (Columbia-Tuttletown-Calaveras County Line)			
East of Rawhide Road	325	102	32
Between Rawhide Road and Tuttletown	152	48	15
Between Tuttletown and Tuolumne/Calaveras County Line	252	79	25
State Route 49 (Chinese Camp-Mariposa County Line)			
South of South Junction State Route 120	78	24	8
North of North State Route 120 Junction	174	55	17
South of South Junction State Route 108	310	98	31
State Route 120 (Stanislaus County Line-Chinese Camp)			
Between Tulloch Road and La Grange Road	310	98	31
Between East Junction 108 and North Junction State Route 49	98	31	10
State Route 120 (Groveland)			
West of Ferretti Road	49	15	5
Mono Way			
Between Fir Drive & Tuolumne Road	400	126	40
Between Tuolumne Road & Hess Avenue	178	56	18
Between Hess Ave & Standard Road/Peaceful Oak Drive	296	93	29
Parrotts Ferry Road			
Between State Route 49 & Sawmill Flat Road	85	27	8
Between Sawmill Flat Road & Springfield Drive	100	32	10
North of Springfield Drive	112	35	11
Tuolumne Road			
Between Mono Way & Lambert Lake Road	348	110	35
Between Lambert Lake Road & Hess Avenue	187	59	19
Between Hess Avenue & Wards Ferry Road	235	74	23
Between Wards Ferry Road & Standard Road	159	50	16
Between Standard Road & Woodhams Carne	252	79	25
Between Woodhams Carne & Cherokee Road	162	51	16
Between Tuolumne Road & Black Oak Casino Entrance Street	78	24	8
North of Mi Wuk Street	33	10	3
North of East Avenue	49	15	5
Between Mono Way & Lambert Lake Road	348	110	35
Between Lambert Lake Road & Hess Avenue	187	59	19

**- Noise Levels and contours are expressed in $LA_{eq\ 1h}$, which shows the highest potential noise levels based on peak hour traffic data.*

Source: Rincon Consultants, Inc. Tuolumne County General Plan Update and RTP EIR Noise Study and Noise Contours, July 2015

The General Plan Update includes land use changes that would increase residential development within the calculated noise contours. As indicated, depending on the distance from roadway, existing and future residential development within the calculated noise contours could potentially be exposed to noise exceeding 60 dBA CNEL during peak traffic hours. However, this does not take into account modern building construction methods that may reduce exterior to interior noise, or any walls or barriers, berms, trees, or other materials that might also further reduce traffic noise. New residences could also be exposed to noise generated by commercial, industrial, and agricultural activity that exceeds the normally acceptable range. In particular, mixed-use and infill development that could be facilitated within the community plan areas could be exposed to noise from commercial activity, including noise associated with deliveries, loading dock operations, mechanical equipment, and parking lot activities.

The draft General Plan Update's Noise Element includes the following policy that would ensure noise standards are enforced and that new projects take into consideration noise impacts to sensitive land uses.

Policy 5.A.1 *Advocate the design and site layout of new development of noise-sensitive land uses proposed adjacent to existing transportation noise sources to incorporate noise reduction techniques so that the new development will not be affected by noise that exceeds the exposure threshold standards.*

Implementation of this policy would ensure that projects proposed in noise environments that potentially exceed acceptable standards would be evaluated and that appropriate sound attenuation techniques would be implemented on a case-by-case basis. Depending on what is proposed and the location and source of noise, sound attenuation techniques may include site design to shield noise-sensitive uses from noise, special building standards to reduce interior noise, or the use of barriers to reduce exterior noise.

Mitigation Measures. The draft Noise Element goals and policies discussed above address the prevention and reduction of unwanted noise. Mitigation beyond the draft General Plan policies is not required.

Significance After Mitigation. Impacts relating to the placement of new uses in noise environments exceeding the normally acceptable range specified in Table 4.11-2 would be less than significant without mitigation.

Impact N-2 **Development facilitated by the General Plan Update would increase traffic and associated noise levels along area highways and roadways in Tuolumne County, thereby exposing existing land uses to increased traffic noise. At General Plan buildout, receptors along county roadways could experience noise level increases that exceed thresholds. However, implementation of draft General Plan policies would reduce impacts to a Class III, *less than significant*, level.**

Development facilitated by the General Plan Update and regional traffic growth would increase noise along area roadways over the life of the General Plan. Table 4.11-7 compares calculated noise levels along major roadways in the County under existing conditions to those that could

occur with traffic levels associated with buildout facilitated by the General Plan. In order to provide a point of comparison for existing and future noise conditions, noise levels were calculated at a distance of 50 feet from the roadway centerline Noise levels at receptors farther away from roadway noise sources, or in locations with intervening topography, vegetation, or structures, would be lower than shown in the table.

Table 4.11-7
Comparison of Existing and Future Noise Levels Along Road Segments

Road Segment	Existing Noise (2015)*	Future Noise (2040)*	Change in Db*
State Route 108			
Between East Junction State Route 120 and West Junction State Route 49	74.6	75.6	1.0
East of East Junction State Route 49	72.8	73.4	0.6
West of Mono Way	67.1	67.7	0.6
Between Mono Way and Hess Avenue	72.3	72.7	0.4
Between Hess Avenue and Peaceful Oak Road	70.9	71.3	0.4
Between Peaceful Oak Road and Mono Way	70.3	70.8	0.5
Between Mono Way and Soulsbyville Road	69.7	70.5	0.8
Between Soulsbyville Road and West Connector Twain Harte Drive	71.5	72.3	0.8
Between West & East Connector Twain Harte Drive	68.2	68.7	0.5
East of East Connector Twain Harte Drive	68.3	68.8	0.5
West of Chief Fuller Road	67.8	68.0	0.2
East of Chief Fuller Road	68.4	68.6	0.2
West of West Long Barn Connector	66.0	66.2	0.2
State Route 49 (Columbia-Tuttletown-Calaveras County Line)			
East of Rawhide Road	67.3	68.1	0.8
Between Rawhide Road and Tuttletown	64.7	64.8	0.1
Between Tuttletown and Tuolumne/Calaveras County Line	66.2	67.0	0.5
State Route 49 (Chinese Camp-Mariposa County Line)			
South of South Junction State Route 120	60.9	61.9	1.0
North of North State Route 120 Junction	**62.0**	**65.4**	**3.4**
South of South Junction State Route 108	**65.5**	**67.9**	**2.4**
State Route 120 (Stanislaus County Line-Chinese Camp)			
Between Tulloch Road and La Grange Road	66.9	67.9	1.0
Between East Junction 108 and North Junction State Route 49	61.9	62.9	1.0
State Route 120 (Groveland)			
West of Ferretti Road	58.9	59.9	1.0
Mono Way			
Between Fir Drive & Tuolumne Road	68.0	69.0	1.0

Table 4.11-7
Comparison of Existing and Future Noise Levels Along Road Segments

Road Segment	Existing Noise (2015)*	Future Noise (2040)*	Change in Db*
Between Tuolumne Road & Hess Avenue	64.1	65.5	1.4
Between Hess Ave & Standard Road/Peaceful Oak Drive	**66.0**	**67.7**	**1.7**
Between Standard Road/Peaceful Oak Drive & State Route 108	65.8	67.0	1.2
Parrotts Ferry Road			
Between State Route 49 & Sawmill Flat Road	61.6	62.3	0.7
Between Sawmill Flat Road & Springfield Drive	62.4	63.0	0.6
North of Springfield Drive	63.0	63.5	0.5
Tuolumne Road			
Between Mono Way & Lambert Lake Road	67.3	68.4	1.1
Between Lambert Lake Road & Hess Avenue	65.2	65.7	0.5
Between Hess Avenue & Wards Ferry Road	66.0	66.7	0.7
Between Wards Ferry Road & Standard Road	64.5	65.0	0.5
Between Standard Road & Woodhams Carne	66.5	67.0	0.5
Between Woodhams Carne & Cherokee Road	64.5	65.1	0.6
Between Tuolumne Road & Black Oak Casino Entrance Street	61.7	61.9	0.2
North of Mi Wuk Street	57.7	58.2	0.5
North of East Avenue	58.4	59.9	1.5

Note – All noise calculations made 50 feet away from roadway centerline
**- Noise Levels and contours are expressed in $LA_{eq\ 1h}$, which shows the highest potential noise levels based on peak hour traffic data.*
Source: Rincon Consultants, Inc. Tuolumne County General Plan Update and RTP EIR Noise Study and Noise Contours, July 2015

As Table 4.11-7 indicates, traffic associated with buildout under the General Plan Update would increase noise along all of the studied roadways. According to the noise contours depicted in the draft General Plan Update's Noise Element, noise levels along the edges of many county roadways currently exceed the normally acceptable range for certain uses. Of all roadway segments examined, two are projected to experience a noise level increase that exceeds the thresholds described in Table 4.11-2. According to the Tuolumne County General Plan Noise Element thresholds, potential significant impacts related to noise could occur along State Route 49 between Chinese Camp and the southernmost SR 49/120 junction and on Mono Way between Hess Avenue and Standard Road/Peaceful Oak Road. It is worth noting there are very few sensitive receptors along Route 49 that would be affected by this increase. Along the Mono Way segment, there are existing residences along Mono Way that may experience an increase of roadway noise of 1.7 dBA, which would exceed the 1.5 dBA change in cumulative noise threshold as described by the Tuolumne County General Plan Noise Element shown in Table 4.11-4. The projected increases assume full buildout under the General Plan Update.

The manner in which older homes in California were constructed (approximately 30 years old or older) generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. Standard new residential construction typically provides a reduction of

exterior-to-interior noise levels of 25 dBA or more (Federal Transit Administration, May 2006). This reduction of exterior-to-interior noise is typically sufficient to reduce significant noise impacts to a less than significant level. These factors are not considered or replicated in the TNM model. Therefore, the existing noise levels for nearby sensitive receptors are likely lower than modeled in TNM.

Policy 5.A.2 — *Consider the effects of the development of new transportation noise sources on non-sensitive land uses and sensitive wildlife habitat, including the habitat of rare, threatened, or endangered species. Encourage new development of transportation noise sources be located and designed so that existing noise-sensitive land uses will not be exposed to noise levels that exceed the standards shown in Figures 5.2, 5.3 or 5.5 (of the Noise Element.)*

As necessary, the County may consider a range of traffic noise attenuation techniques, potentially including the use of sound reducing paving materials (such as rubberized asphalt) and, in certain instances, the use of sound barriers. In addition, as noted in numerous Circulation Element policies such as:

Policy 2.B.4 — *Maintain and expand, where possible and appropriate, the system of non-motorized connections that link neighborhoods to larger roadways, activity centers, and nodes, businesses, community services, parks and recreational facilities, and transit stops and stations.*

Policy 2.C.8 — *Encourage a continuous and interconnected pedestrian friendly system of paths that lead to transit stops, by encouraging all new residential and commercial development to include a pedestrian circulation system that is connected to existing (and where possible, planned) transit stops.*

Policy 2.C.9 — *Encourage building site designs that cater to transit riders, pedestrians and cyclists, as well as those arriving by car. Examples of transit, pedestrian and bicycle friendly building site design features include, but are not limited to, segregated entrances, pavement markings and warning and directional signage.*

Policy 2.C.10 — *Encourage a mixture of high density land uses in proximity to high frequency transit stops.*

Policy 2.C.13 — *Encourage the Tuolumne County Transit Agency to market the transit trolley service to tourists to reduce daily internal County trips.*

Policy 2.C.14 — *Encourage the Tuolumne County Transit Agency to enhance public transportation trips by improving performance, reliance, safety, security, and bus stop facilities.*

Policy 2.C.15 — *Encourage integration of different alternate transportation modes to facilitate multi-modal trips. Examples of methods to integrate transportation modes include, but are not limited to, provision of bicycle parking at transit and park and ride facilities and buses that provide bicycle storage.*

The County will continue to emphasize vehicle trip reduction techniques to address traffic issues, with the added benefit that the use of such techniques would also reduce vehicular noise. With implementation of draft General Plan policies, increases in roadway noise would be reduced to a less than significant level.

Mitigation Measures. The draft Noise Element goals and policies address the prevention and reduction of unwanted noise. Mitigation beyond the draft General Plan policies is not required.

Significance After Mitigation. Impacts relating to the exposure of sensitive receptors to unacceptable noise levels due to traffic generated on roadways and freeways would be less than significant without mitigation.

Impact N-3 Construction of individual projects facilitated by the General Plan Update could produce noise levels ranging from 58 to 75 dBA at 50 feet from the source in addition to vibration potentially affecting adjacent land uses. Such noise and vibration could cause temporary disturbance to nearby receptors. These impacts would be a Class II, *significant but mitigable,* impact.

Noise from individual construction projects that could be facilitated under the General Plan Update would create temporary noise level increases on and adjacent to individual construction sites. Since there are no specific plans or time scales for individual development projects, it is not possible to determine exact noise levels, locations, or time period for construction. However, construction noise would be highest and of the longest duration adjacent to sites where more future development/redevelopment is anticipated to occur. As discussed previously, the Distinctive Communities Alternative Growth Scenario that the draft General Plan Update implements would encourage infill and mixed-use development in close proximity to existing urban areas. In such areas, as well as other areas where land-use designations have changed, considerable demolition and construction activity may occur over the life of the General Plan.

Noise. The operation of equipment during the construction of roadway and utility infrastructure, as well as development projects, would result in temporary increases in noise in the immediate vicinity of individual construction sites. As shown in Table 4.11-8, average noise levels associated with the use of heavy equipment at construction sites can range from about 76 to 89 dBA at 50 feet from the source, depending upon the types of equipment in operation at any given time and the phase of construction. The highest noise levels generally occur during excavation and foundation development, which involve the use of such equipment as backhoes, bulldozers, shovels, and front end loaders.

Noise generated by construction activity would be variable depending on the project and intensity of equipment use. Roadway widening projects would likely require the operation of many pieces of heavy-duty equipment that generate high noise levels. Alternatively, repainting/restriping would typically be less intense requiring minimal, if any, use of heavy equipment. This conservative analysis assesses construction noise based on the operation of heavy-duty equipment.

Noise levels from point sources such as construction sites typically attenuate at a rate of about 6 dBA per doubling of distance. Therefore, areas within 800 feet of construction site with heavy-duty equipment may be exposed to noise levels exceeding 65 dBA. Mitigation Measures N-1(a) through N-1(e) would reduce impacts from construction noise. Although Tuolumne County does not have a noise ordinance restricting construction hours, many land development projects are conditioned to restrict days and hours when construction can occur (Tuolumne County FAQ, Tuolumne County Homepage). Through the use of such scheduling controls, typical construction activities would be restricted to hours with least potential to affect nearby properties. Thus, perceptible vibration can be kept to a minimum and not result in human annoyance or structural damage. Impacts would be less than significant.

Vibration. Construction-related vibration has the potential to damage structures, cause cosmetic damage (e.g., crack plaster), or disrupt the operation of vibration-sensitive equipment. Vibration can also be a source of annoyance to individuals who live or work close to vibration-generating activities. Heavy construction operations can cause substantial vibration near the source. As shown in Table 4.11-9, the highest impact caused by equipment such as pile drivers or large bulldozers can generate vibrations of 1.518 to 0.089 inches per second of peak particle velocity (PPV) at a distance of 25 feet. Similar to construction noise, vibration levels would be variable depending on the type of construction project and related equipment use.

Table 4.11-8
Typical Construction Noise Levels (in dBA)

Equipment	Typical Level 25 Feet from the Source	Typical Level 50 Feet from the Source	Typical Level 100 Feet from the Source	Typical Level 200 Feet from the Source	Typical Level 800 Feet from the Source
Air Compressor	87	81	75	69	57
Backhoe	86	80	74	68	56
Concrete Mixer	91	85	79	73	61
Grader	91	85	79	73	61
Paver	95	89	83	77	65
Saw	82	76	70	64	52
Scraper	95	89	83	77	65
Truck	94	88	82	76	64

Source: Typical noise level 50 feet from the source was taken from FTA, May 2006. Noise levels at 25 feet, 100 feet and 200 feet were extrapolated using a 6 dBA attenuation rate for the doubling of distance. Noise levels are measured in Leq for the expected duration that each piece of equipment is expected to operate. Each noise level assumes the piece of equipment is operating at full power for the expected duration to complete the construction activity. The duration varies widely between each piece of equipment. Noise levels also depend on the model and year of the equipment used. The noise levels assume simultaneous construction activities associated with the respective phase of construction and equipment being used.

Table 4.11-9
Construction Equipment Vibration Levels

Equipment		Peak Particle Velocity (PPV) at 25 Feet (Inches per Second)	Root Mean Square (RMS) at 25 Feet (Vdb)
Pile Driver (Impact)	Upper Range	1.518	112
	Typical	0.644	104
Pile Driver (Sonic)	Upper Range	0.734	105
	Typical	0.170	93
Vibratory Roller		0.210	95
Clam Shovel Drop (Slurry Wall)		0.202	94
Hydrol Mill (Slurry Wall)	In Soil	0.008	66
	In Rock	0.017	75
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Loaded Trucks		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, 2006.

Typical project construction activities, such as the use of jackhammers, other high-power or vibratory tools, compactors, and tracked equipment, may also generate substantial vibration (i.e., greater than 0.2 inches per second PPV) in the immediate vicinity, typically within 15 feet of the equipment. Although Tuolumne County does not have a noise ordinance restricting construction hours, many land development projects are conditioned to restrict days and hours when construction can occur (Tuolumne County FAQ, Tuolumne County Homepage). Through the use of such scheduling controls, typical construction activities would be restricted to hours with least potential to affect nearby properties. Thus, perceptible vibration can be kept to a minimum and not result in human annoyance or structural damage.

Some specific construction activities result in higher levels of vibration. Pile driving has the potential to generate the highest vibration levels and is the primary concern for structural damage when it occurs within 50 feet of structures. Vibration levels generated by pile driving activities would vary depending on project conditions, such as soil conditions, construction methods and equipment used. Depending on the proximity of existing structures to each construction site, the structural soundness of the affected buildings and construction methods, vibration caused by pile driving or other foundation work with a substantial impact component such as blasting, rock or caisson drilling, and site excavation or compaction may be high enough to be perceptible within 100 feet and damage existing structures within 50 feet.

To date, the County has not adopted any specific standards relating to construction noise.

Mitigation Measures. The following policy and implementation programs are recommended as a mitigation measure for noise impacts from development related to the General Plan Update.

N-1 **Construction Noise and Vibration.** The County shall include the following policies and programs in its Noise Element to address applicable projects that result in construction noise and vibration impacts. Project-specific environmental impacts may require these mitigation measures be revised or expanded in response to site-specific conditions:

Policy 5.A.7	*The County shall ensure that construction activity and temporary construction impacts do not expose existing noise-sensitive land uses to noise levels that exceed standards shown in General Plan Noise Element Figures 5.2, 5.3, or 5.5 to the extent feasible.*
Implementation Program 5.A.f	*The County shall ensure that, where residences or other noise sensitive uses are located within 800 feet of construction sites, appropriate measures shall be implemented to ensure consistency with noise ordinance requirements relating to construction. Specific techniques may include, but are not limited to, restrictions on construction timing, use of sound blankets on construction equipment, and the use of temporary walls and noise barriers to block and deflect noise.*
Implementation Program 5.A.g	*If a particular project within 800 feet of sensitive receptors requires pile driving, the County shall require the use of pile drilling techniques instead, where feasible. This shall be accomplished through the placement of conditions on the project during its individual environmental review.*
Implementation Program 5.A.h	*The County shall ensure that equipment and trucks used for project construction utilize the best available noise control techniques (including mufflers, use of intake silencers, ducts, engine enclosures and acoustically attenuating shields or shrouds).*
Implementation Program 5.A.i	*The County shall ensure that impact equipment (e.g., jack hammers, pavement breakers, and rock drills) used for project construction be hydraulically or electrical powered wherever feasible to avoid noise associated with*

compressed air exhaust from pneumatically powered tools. Where use of pneumatically powered tools is unavoidable, the use of an exhaust muffler on the compressed air exhaust is recommended to lower noise levels from the exhaust by up to about 10 dBA. When feasible, external jackets on the impact equipment should also be incorporated to achieve a further reduction of 5 dBA. Whenever feasible, use quieter procedures, such as drilling rather than impact equipment operation.

Implementation Program 5.A.j — *Locate stationary noise sources as far from sensitive receptors as possible. Stationary noise sources that must be located near existing receptors will be adequately muffled.*

Significance After Mitigation. With adherence to the General Plan Update's Noise Element including Implementation Programs 5.A.a and 5.A.b, along with addition of Policy 5.A.7 and Implementation Programs 5.A.f-5.A.j as described in Mitigation N-1, impacts relating to temporary construction activity would be less than significant after mitigation.

Impact N-4 **Development facilitated by the General Plan Update could result in exposure of existing and future residences and other noise-sensitive land uses to air-traffic-related noise levels exceeding the "acceptable" range and noise standards as listed in the Tuolumne County Airport Land Use Compatibility Plan (ALUCP). However, implementation of policies in the General Plan to enforce noise standards for new development would reduce impacts to a Class III, *less than significant*, level.**

Aircraft operations associated with the county airports can generate noise levels exceeding 65 dBA CNEL, and new development would be potentially subjected to airport-related noise exceeding acceptable levels, depending on its proximity to the airport. Future development under General Plan Update could fall within the noise impact areas of the Columbia and Pine Mountain Lake Airports as described in the ALUCP and as shown in Figures 4.11-2 and 4.11-3. Land uses that would be immediately adjacent to the Columbia Airport or that fall within its noise impact area include Rural Residential (RR), Homestead Residential (HR), Low Density Residential (LDR), Business Park (BP), General Commercial (GC), High Density Residential (HDR), Special Commercial (SC), and Agricultural (AG). Land uses that would be immediately adjacent to the Pine Mountain Lake Airport or that fall within the noise impact area include primarily Low Density Residential (LDR), Rural Residential (RR), General Commercial (GC) and Agricultural.

However, the following policy and programs of the General Plan Noise Element address potential noise conflicts related to airport land use:

Policy 5.A.6 — *Require new development located within the Noise Impact Area diagrams identified by the Tuolumne County Airport Land Use Compatibility Plan to*

be located and designed so that it will not be affected by noise levels exceeding the standards within the Airport Land Use Compatibility Plan.

Implementation Program 5.A.b — *Analyze Potential Conflicts. Require an acoustical analysis where activities associated with proposed development are likely to produce noise levels exceeding those specified in Figures 5.2, 5.3, 5.4, or 5.5 of this Element. The acoustical analysis shall be conducted early in the review process so that the possible effects of noise and noise mitigation can be considered in the project design. The requirements of an acoustical analysis are listed in Figure 5.1.*

Implementation Program 5.A.e — *Enforce Noise Standards Adjacent to County Airports. Continue to utilize and enforce the noise standards listed in the Tuolumne County Airport Land Use Compatibility Plan for new development located within the Noise Impact Area diagrams identified by the Airport Land Use Compatibility Plan and determine that the new development will not be affected by noise levels exceeding those standards.*

Implementation of these policies would ensure that projects proposed within the noise environment of local airports would be evaluated and that appropriate sound attenuation techniques would be implemented on a case-by-case, project-level basis. Implementation of the above General Plan Update policy and implementation programs and enforcement of the Maximum Allowable Noise Exposure thresholds from aircraft noise sources as shown in Table 4.11-3 above would ensure that impacts related to airport generated noise exceeding County standards would be less than significant without mitigation.

Mitigation Measures. The proposed General Plan policies and implementation programs would address exposure to potentially unacceptable noise levels associated with air traffic.

Significance After Mitigation. Impacts would be less than significant without mitigation. No mitigation measures beyond implementation of the policies included in the draft General Plan Noise Element would be required.

Impact N-5 — **Development facilitated by the General Plan Update could potentially result in exposure of future residences and other noise-sensitive land uses to noise impacts generated from operational stationary noise sources, especially from mining, timberland production, sawmills, and agricultural operations. However, implementation of policies in the General Plan to enforce noise standards for new development would reduce impacts to a Class III, *less than significant*, level.**

Mining, timberland production, sawmills, agricultural operations, and other commercial or industrial operations could be potential stationary noise sources or generate substantial levels of noise. Typical commercial and industrial noise sources include loading dock operations, parking lot activity, on-site equipment (including heating and air conditioning), and heavy

truck idling. Other stationary noise sources of concern typically include generators, pumps, air compressors, outdoor speakers, motors, heavy equipment, back-up alarms and similar machinery. There is potential for blasting or demolition noise impacts associated with the mines, which may occur once every other year. Industrial and commercial operations can be substantial sources of noise, depending on the type and hours of operation. Such operations may result in noise impacts when they are adjacent to noise sensitive land uses. The General Plan Update Natural Resources Element includes policies and programs to ensure land use compatibility between mining and timberland production zones and adjacent land uses.

Policy 4.B.1	*Discourage the development of incompatible land uses on lands adjacent to commercial timberlands.*
Implementation Program 4.B.a	*Reduce Conflicts Between Timber Activities and Non-timber Related Uses. Reduce potential conflicts between timber management activities and non-timber related land uses by encouraging the development of new non-timberland uses on land adjacent to commercial timberlands to be sited away from common boundaries with the timberlands. Allow flexibility in development regulations so that the overall density of the proposed development project can be concentrated in the portion of the parcel away from the timberland boundary.*
Implementation Program 4.B.b	*Discourage Incompatible Land Uses on Lands Adjacent to Timberlands. Encourage the siting of proposed new urban residential development (HDR, MDR, LDR, and MU land use designations) on land that is not adjacent to commercial timberlands.*

In terms of mining operations, the Natural Resources Element includes:

Policy 4.E.2	*Reduce potential conflicts between mining operations and non-mining land uses by considering the provision of buffers between potentially incompatible uses. The provision of buffers shall be the responsibility of new development.*
Implementation Program 4.E.a	*Consider Buffers Between Mining and Non-mining Land Uses. Consider buffer areas between extraction sites or mining operations and non-mining land uses. The buffer areas between newly permitted mining activities and existing non-mining land uses shall be provided on lands of the new mining site. The buffer areas between new non-mining development and existing mining operations shall be on lands proposed for such new development adjacent to the existing mining operation. Mining operations which have been operated intermittently or considered idle shall be exempt from providing buffer areas at the time they are reactivated but may be subject to such buffer areas in conjunction with approval of permits for expansion of the operation. Creative solutions and flexibility should be encouraged in the creation of buffer zones. The designation of conservation easements, setbacks or open space zones for buffers shall not in any manner authorize trespass*

upon private property, or increase the right of public agencies to gain access to private property.

Implementation Program 4.E.b — *Protect Existing Development. Existing development (commercial, residential and public facilities) as well as undeveloped private lands, shall be protected from adverse environmental effects caused by mining through appropriate mitigation measures.*

Implementation Program 4.E.c — *Notify Property Owners of Targeted Mineral Lands. The County shall use the Mineral Preserve (-MPZ) overlay on the General Plan Land Use Diagrams as a means to provide for the public awareness of the existence of significant mineral deposits and the potential for mining in that area.*

Finally, regarding agricultural operations, the Agricultural Resource Element includes the following policy and program:

Policy 11.A.4 — *New development adjacent to land designated Agricultural (AG) by the General Plan land use diagrams shall provide a buffer on the development site so the new development would not be substantially detrimental to adjacent agricultural operations consistent with Implementation Program 11.A.d*

Implementation Program 11.A.d — *Provide Buffers from Adjacent Agricultural Land. Development proposed adjacent to land designated Agricultural (AG) by the General Plan land use diagrams shall provide a buffer from the agricultural land. The buffer shall be 200 feet in width and located on the development site. No residential or non-agricultural buildings may be erected in the buffer are as long as the adjacent land remains designated Agricultural (AG). The buffer may be reduced in width by the Board of Supervisors after considering the recommendation of the Agricultural Advisory Committee if such a reduction is determined appropriate based upon the topography, vegetation, roads or other physical features of the buffer area or other factors considered by the committee.*

If the General Plan land use designation of the adjacent land is amended in the future to a designation other than Agricultural (AG), the need for the buffer area will be eliminated and the land use restrictions imposed pursuant to this program will cease at that time.

Under the policies and programs discussed above, new potentially noise-sensitive development would be sited away from mining, timberland production, and agricultural operations or be provided a buffer area. Additional noise protection measures would also be provided in the case of mining operations near sensitive receptors if necessary. Potential noise impacts from noise generated by such operations to nearby sensitive receptors would therefore be reduced. In addition to ensuring land use compatibility between mining, timberland production, and agricultural operations with those of adjacent land uses, additional policies and implementation

programs are included in the General Plan Update Noise Element to ensure new development under the General Plan Update would not be subject to noise levels that exceed the noise level standards:

Policy 5.A.3	*Require new development of noise-sensitive land uses in proximity to existing stationary noise sources or land designated on the General Plan land use diagrams as HI, LI, BP, HC, TPZ OR MPZ to be designed so that they will not be affected by noise levels exceeding the standards of Figure 5.4*
Policy 5.A.4	*Consider the effects of the development of new stationary noise sources or modifications of existing stationary noise sources on noise-sensitive land uses and sensitive wildlife habitat, including the habitat of rare, threatened, or endangered species. Determine that new development or changes to existing development which requires a discretionary entitlement will not create new or exacerbate existing noise levels which exceed the standards shown in Figures 5.3 or 5.5. This policy does not apply to noise levels associated with agricultural operations.*
Implementation Program 5.A.a	*Review new public and private development proposals to determine conformance with the policies and programs of the Noise Element and determine that noise levels from new development will not exceed the noise level standards of Figures 5.2, 5.3, 5.4, or 5.5 (of the Noise Element) on lands designated for noise-sensitive uses. For modifications or expansions of existing stationary noise sources that already exceed the standards of Figure 5.4 on lands designated for noise-sensitive uses, Tuolumne County will determine that the new development will not increase the noise level received at the noise-sensitive land uses and the cumulative noise generated from the entire development site is equal to or less than the pre-modification or pre-expansion ambient noise level.*

Implementation of these policies and programs would ensure that projects proposed in noise environments that potentially exceed acceptable standards would be evaluated and that appropriate sound attenuation techniques would be implemented on a case-by-case basis. For development that would occur near noise-sensitive areas where noise levels already exceed the standards shown in Table 4.11-4, implementation program 5.A.a would ensure existing noise levels would not be further increased. Depending on what is proposed and the location and source of noise, sound attenuation techniques may include site design to shield noise-sensitive uses from noise, special building standards to reduce interior noise, or the use of barriers to reduce exterior noise. These policies and programs would ensure that impacts related to noise impacts generated from operational stationary noise sources, especially from mining, timberland production, and agricultural operations, are reduced to a less than significant level.

Mitigation Measures. The proposed General Plan policies and implementation programs would address exposure to potentially unacceptable noise levels associated with industrial and commercial operations. No mitigation is required.

Significance After Mitigation. Impacts would be less than significant without

mitigation. No mitigation measures beyond implementation of the policies and implementation programs included in the General Plan Update would be required.

Impact N-6 **Development facilitated by the General Plan Update could result in exposure of future residences and other noise-sensitive land uses to railroad-related noise and vibration levels exceeding the "acceptable" range and noise standards. Implementation of policies in the General Plan to enforce noise standards for new development would generally reduce impacts. However, impacts related to railroad-related noise and vibration levels would be a Class II, *significant but mitigable*, level.**

Operation of the Sierra Railroad and new development near or adjacent to the railroad as a result of the General Plan Update could be subject to significant noise and vibration impacts. Policy 2.D.2 of the Circulation Element would support and encourage the revival of passenger train operations on the Sierra Railroad, which currently runs through urbanized areas of Jamestown and East Sonora. In addition, numerous goals and policies of the General Plan Update would encourage infill and mixed-use development within existing urbanized areas, including some areas close to the railroad tracks. In doing so, the orientation of new development near or adjacent to railroad tracks would potentially subject residential land uses in Jamestown and East Sonora to significant noise and vibration impacts.

The draft General Plan Update's Noise Element includes a policy that would ensure noise standards are enforced and that new projects take into consideration noise impacts to sensitive land uses.

Policy 5.A.1 *Advocate the design and site layout of new development of noise-sensitive land uses proposed adjacent to existing transportation noise sources to incorporate noise reduction techniques so that the new development will not be affected by noise that exceeds the exposure threshold standards shown in Figures 5.2 and 5.3.*

Table 4.11-10 shows the approximate vibration decibels (VdB) from passenger and freight trains at 30, 50, 100, 200, and 300 feet from the track centerline traveling at 50 miles per hour. These are vibration levels at ground floor elevation. Upper level floors would experience less vibration due to dispersion and attenuation of the vibration energy as it propagates through a building. Vibration typically attenuates by 1 to 2 VdB for each floor.

Table 4.11-10
Vibration Levels for Rail Transit

	Approximate VdB					
	30 Feet	50 Feet	100 Feet	120 Feet	200 Feet	300 Feet
Locomotive Powered Passenger or Freight Train (50 mph)	88	85	78	76	72	67

Source: FTA, Transit Noise and Vibration Assessment, May 2006.

Vibration levels at 100 feet would be approximately 78 VdB, which is below the structural damage threshold of 100 VdB and below the FTA threshold of 80 VdB for residential uses where people normally sleep. It is worth noting that the above table refers to passenger or freight trains travelling at 50 mph, but according to data from the Federal Railroad Administration dated March 2015, the speed of the trains do not exceed 25 mph at railroad crossings in Tuolumne County. It is possible that trains on the Sierra Railroad may accelerate to greater speeds between railroad crossings, so vibration levels for a train traveling at 50 mph rather than 25 mph was used as a worst case scenario. In addition, as discussed previously, generally existing structures are also placed roughly 100 feet from the track centerline. Therefore, placing residential units at least 100 feet away from the track centerline would ensure vibration impacts would be less than significant.

Implementation of General Plan policy 5.A.1 would ensure that projects proposed in noise environments that potentially exceed acceptable standards would be evaluated and that appropriate sound attenuation techniques would be implemented on a case-by-case basis. Depending on what is proposed and the location and source of noise, sound attenuation techniques may include site design to shield noise-sensitive uses from noise, special building standards to reduce interior noise, or the use of barriers to reduce exterior noise. However, as new sensitive land uses in urbanized areas such as Jamestown and East Sonora may be located within 100 feet to railroad track centerline, impacts would be significant but mitigable.

Mitigation Measures. Mitigation Measure N-2 is required to reduce impacts related to railroad noise and vibration on sensitive land uses.

N-2 **Railroad Noise and Vibration.** Policy 5.A.8, as follows, shall be added to the Noise Element of the Tuolumne County General Plan:

Policy 5.A.8 *The County shall ensure that, where new residences or other noise sensitive uses would be located adjacent to existing or new railroad tracks that would be in use, such as the Sierra Railroad, appropriate measures shall be implemented to ensure such residences would be located at least 100 feet away from the railroad track centerline.*

Significance After Mitigation. With adherence to General Plan Update Noise Element Policy 5.A.1, in addition to Mitigation Measure N-2 which would add Policy 5.A.8 to the Noise Element, impacts relating to railroad noise and vibration would be less than significant after mitigation.

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