
4.10 NOISE

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INTRODUCTION

This section describes the existing noise environment affecting the UCP area and the regulatory programs or adopted plans shaping the noise environment. This section analyzes the effects of the proposed UCP in its relationship with the existing and future noise environment. Topics addressed in this section include new noise-generating land uses, siting of development relative to existing and future mobile and stationary noise sources, and construction-related noise effects. The environmental setting information contained in this section has been derived primarily from the Background Studies Report for the University Community Plan.¹

NOP comments received relating to UCP noise impacts expressed concern about increased noise levels in the UCP area.

ENVIRONMENTAL SETTING

Fundamentals of Environmental Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. The effects of noise can range from interference with sleep, concentration, and communication, to the causation of physiological and psychological stress, and at the highest levels, hearing loss.

Sound is technically described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The decibel scale adjusted for A-weighting (dBA) provides this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. Over the audible range of pitch, the human ear is less sensitive to low frequencies and is more sensitive to mid-level and high-pitched sound. Table 4.10-1 lists dBA noise levels for common events in the environment and industry.

Community noise usually consists of a base of steady “background” noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major thoroughfare.

A number of descriptors are used to analyze the adverse effect of community noise on people. To account for the varying nature of environmental noise, these scales consider that the potential effect of

Noise Source (Distance)	A-Weighted Sound Level in Decibels (dBA)	Subjective Impression
Civil Defense Siren (100')	130	Pain Threshold
Jet Takeoff (200')	120	
Rock Music Concert (50')	110	
Pile Driver (50')	100	Very Loud
Ambulance Siren (100')	90	
Pneumatic Drill (50')	80	
Freeway (100')	70	Moderately Loud
Vacuum Cleaner (10')	60	
Light Traffic (100')	50	
Large Transformer (200')	40	Quiet
Soft Whisper (5')	30-0	Threshold of Hearing

Source: EIP Associates, 2001.

noise upon people is largely dependent upon the total acoustical energy content of the noise, as well as the time of day when the noise occurs. Common measures along these scales are:

- L_{eq} , the equivalent energy noise level, is the average acoustic energy content of noise, usually measured over one hour. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. L_{eq} values do not include a penalty for noise that might occur at night.
- L_{dn} , the day-night average noise level, is a 24-hour average L_{eq} with a 10 dBA “penalty” added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for the greater nocturnal noise sensitivity of people.

Other noise measures give information on the range of instantaneous noise levels experienced over time. Examples include:

- L_{max} is the peak instantaneous noise level experienced during a given period of time.
- L_n values indicate noise levels that were exceeded “n” percent of the time. For instance, L_{25} is the noise level that was exceeded 25 percent of the time during a measurement period (e.g., 15 minutes in an hour measurement period).

Community noise environments are typically represented by noise levels measured throughout the day and night, or over a 24-hour period (i.e., by L_{dn}); the one-hour period is especially useful for characterizing noise caused by short-term events, such as operation of construction equipment or concert noise (i.e., with L_{eq} s). Community noise levels are generally perceived as quiet when the L_{dn} is below 45 dBA, moderate in the 45 to 60 dBA range, and loud above 60 dBA. Very noisy urban residential areas are usually around 70 dBA L_{dn} . Along major thoroughfares, roadside noise levels are typically between 65 and 75 dBA L_{dn} . Noise levels above 45 dBA at night can disrupt sleep, and levels greater than 85 dBA

can cause temporary or permanent hearing loss. In general, a difference of 3 dBA is a minimally perceptible change, while a 5 dBA difference is the typical threshold that would cause a change in community reaction. An increase of 10 dBA would be perceived by people as a doubling of loudness.

Noise levels from a source generally diminish as distance to the receptor increases. Other factors such as the weather and reflecting or shielding also help intensify or reduce noise levels at any given location. A commonly used rule of thumb for traffic is that for every doubling of distance from the road, the noise level is reduced by about 3 to 4.5 dBA, and for a single source of noise, such as a piece of stationary equipment, the noise is reduced by about 6 dBA for each doubling of distance. A doubling of traffic on any given roadway would cause a noise increase of approximately 3 dBA. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA.

Existing Conditions

The UCP area is largely undeveloped, and no major noise source that is fixed or transportation-related exists within the UCP area. Transportation-related noise sources are the most widely distributed, while noise from agricultural activities primarily affects adjacent land uses. Managing both of these types of noise sources is a concern in the unincorporated portions of the county.

Roadways and Freeways

The most pervasive noise sources in developed areas are transportation related. Motor vehicle noise along heavily traveled roadways and freeways commonly causes sustained noise levels. In dense communities, traffic noise often occurs in close proximity to land uses where people are sensitive to noise. No heavily traveled roads or freeways are within the UCP area; State Route (SR) 99 is about four miles southwest of the site. Other state highways (SR 59 and SR 140) pass within about three miles of the UCP area and do not affect the noise environment of the UCP area. Nearby roadways tend to be lightly traveled, at moderate vehicle speeds, and do not handle large volumes of heavy-duty trucks or buses. As such, while motor vehicle traffic causes noise within the UCP area, the resulting noise levels are not excessive.

Railroad Traffic

The Burlington Northern/Santa Fe (BNSF) Railroad main line also passes through the City of Merced and bypasses the UCP area approximately three miles to the west and south. This rail line carries frequent north-south freight train traffic and daily Amtrak passenger trains. Trains occur at any time during a typical 24-hour period and sound whistles and horns that can be heard over great distances. Because the railroad is sufficiently distant from the UCP area, noise from railroad traffic does not affect the noise environment of the site.

Aircraft Overflights

The Merced Municipal Airport is approximately five miles to the southwest of the UCP area, and Castle Airport (the former Castle Air Force Base) is approximately six miles to the west. Existing and potential operations at each airport would affect the noise levels of the surrounding land uses. Because none of the

UCP area is within two miles of any airport, noise from aircraft overflights is occasionally perceptible within the UCP area, but it does not substantially affect the noise environment. A private airstrip is located east of the UCP area (east of Hunt property). The airstrip is used by planes involved in agriculture operations (e.g., fertilizing, seeding, and baiting). Historically, as many as 50 take offs and landings would occur in a single day, although the airstrip was used seasonally, not every day. In the last two years, no more than 5 or 6 flights per day have occurred.²

Stationary Sources

Stationary noise sources include common building or home mechanical equipment, such as air conditioners, ventilation systems, or pool pumps, and industrial or agricultural operations. These noise sources become a concern when they are in close proximity to land uses where people would be noise-sensitive. No industrial or manufacturing facilities are located in the UCP area; however, some agricultural-related operations and land maintenance cause occasional, daytime noise within portions of the UCP area (e.g., noise from farm equipment, cropdusting, etc.). To the northwest of the UCP area, the Lake Yosemite facilities provide recreational boating opportunities which generate noise primarily during the daytime hours of the warmer months.

Existing Noise-Sensitive Uses

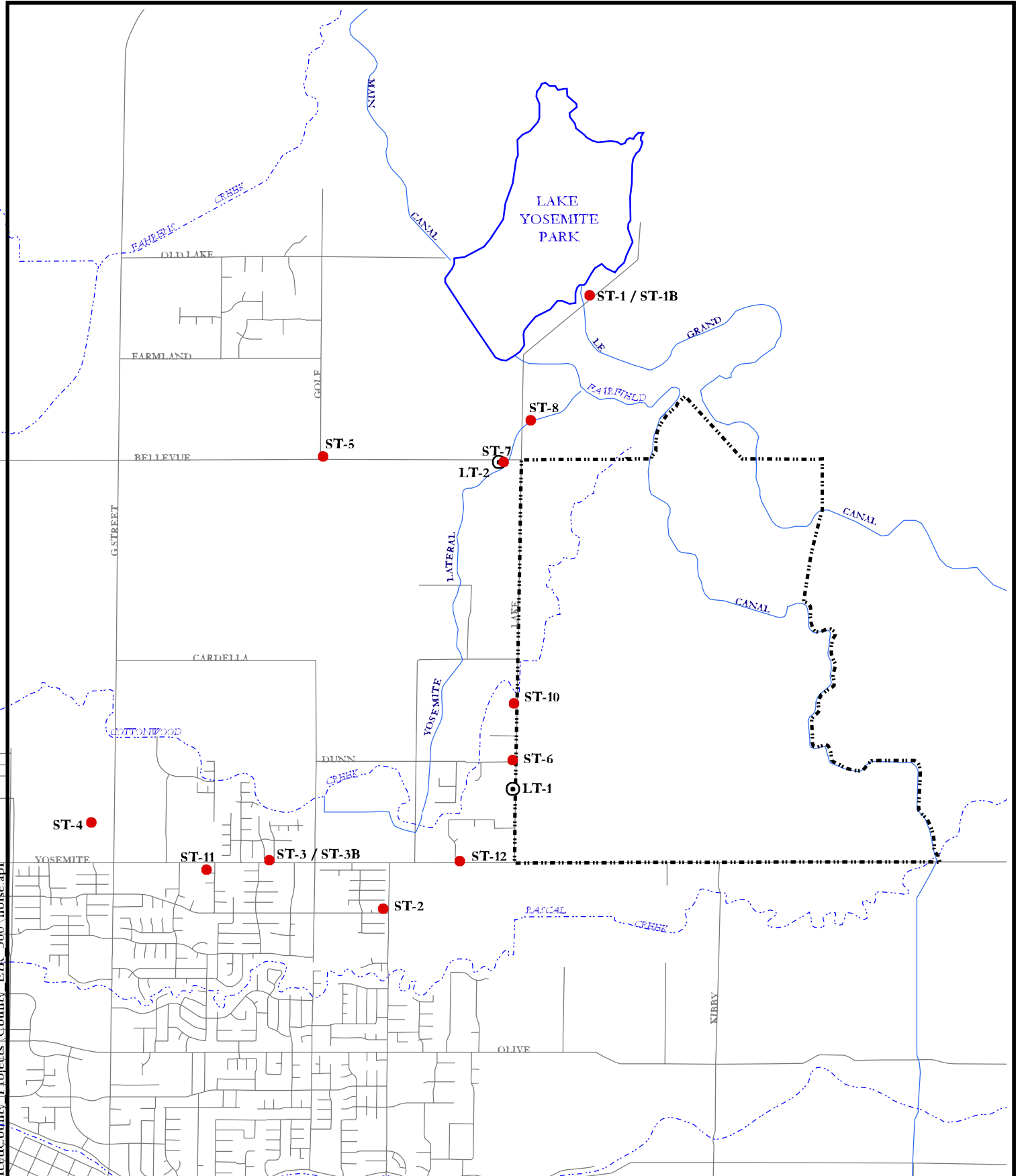
Certain types of land uses are considered to be more sensitive than others to higher noise levels. Examples of sensitive receptors include schools, religious facilities, hospitals, nursing homes, and outdoor amphitheaters. Within the UCP area, there are approximately three rural residences, located on the Hunt Farm, in the southwest portion of the UCP area. Outside the UCP area, rural residential development exists along certain access routes to the west of the UCP area, primarily along Yosemite Avenue and Cardella Road, west of Lake Road, and along Old Lake Road. The existing residences in these areas, and those that would occur with implementation of the proposed UCP would be sensitive to noise, but they are considered less sensitive than the other uses described above.

Existing Noise Levels within UCP Area

In order to evaluate current conditions and assess potential project noise impacts on the surrounding community, an ambient sound level survey was conducted by URS Greiner on May 30 and 31, 2001.

The noise survey was conducted in the vicinity of the UCP area. The measurement locations were selected to be representative of the noise-sensitive receptors in the study area (consisting of residential, recreational, educational and church land uses) and are depicted in Figure 4.10-1.

Unattended long-term (24 hours in duration) and attended short-term (15 minutes in duration) noise measurements were conducted. The long-term measures were made with Type 2, Metrosonics db3080 community noise analyzers. The short-term measurements were made with a tripod-mounted Type 1 Brüel & Kjær Type 2231 sound level meter (SLM) with statistical analyzer. The sound measuring instruments used for the survey were set on slow time response using the A-weighted decibel (dBA) scale



Source: Merced County, Planning & Community Dev. Dept., Roads, Creeks and Canals County GIS Files, 1999; URS Noise Measurement Locations, 2001; and EIP Associates GIS Program, July 2001.

- Short-Term Noise Measurement
- ⊙ Long-Term Noise Measurement
- University Community Plan Area

FIGURE 4.10-1
NOISE MEASUREMENT LOCATIONS
 University Community Plan EIR
 Merced, CA

for all of the noise measurements. To ensure accuracy, the laboratory calibration of the instruments was field checked before and after each measurement period using an acoustical calibrator. The accuracy of the acoustical calibrator is maintained through a program established by the manufacturer, and is traceable to the National Institute of Standards and Technology. The sound measurement instruments meet the requirements of the American National Standard S 1.4-1983 and the International Electrotechnical Commission Publications 804 and 651. In all cases, the microphone height was five feet above the ground and the microphone was equipped with a windscreen.

The results of the long-term noise measurements are summarized in Table 4.10-2. Long-term noise measurements were conducted at two locations. The monitoring location designated Long-Term (LT-1) was located on a tree on the front lawn of the residence at 3629 Lake Road, approximately midway between Atlantic Street and Dunn Road. The monitoring location designated Long-Term 2 (LT-2) was located on a tree on the front lawn of the residence at 2897 Bellevue Road, west of Lake Road. The noise environment at both locations was dominated by noise from local traffic. The hourly daytime noise levels at LT-1 varied from 57 dBA L_{eq} to 54 dBA L_{eq} . Nighttime hourly noise levels at LT-1 varied from 54 dBA L_{eq} to 44 dBA L_{eq} . Daytime hourly noise levels at LT-2 varied from 61 dBA L_{eq} to 53 dBA L_{eq} . Nighttime hourly noise levels at LT-2 varied from 59 dBA L_{eq} to 44 dBA L_{eq} . The L_{dn} values for LT-1 and LT-2 were 59 dBA and 61 dBA respectively. These levels are both below Merced County's exterior noise standard of 65 dBA L_{dn} .

Fourteen short-term noise measurements (ST-1 through ST- 12 plus ST- 1B and ST-3B) were conducted at twelve sites, concurrently with the long-term noise measurements. Weather conditions during the survey period were calm, with clear skies. Air temperatures varied from 82 °F to 100 °F, with 16 to 46 percent relative humidity. Wind speed varied from 0 to 10 miles per hour (mph) during the survey period, with light breezes (0 to 3 miles per hour) most of the time. The weather conditions were ideal for conducting noise measurements and thus there was no adverse effect on the measurement accuracy due to the weather. The data for short-term measurements are summarized in Table 4.10-3. The measured ambient noise levels vary from 52 to 59 dBA L_{eq} , Along Bellevue Road, and noise levels range from 53 to 57 L_{eq} . Along Yosemite Avenue, ambient noise levels vary from 58 to 68 L_{eq} , and along Lake Road range from about 58 to 68 L_{eq} . The measurements were all dominated by traffic noise.

LONG-TERM NOISE MEASUREMENT DATA SUMMARY					
Site ID	Measurement Date	Location	24 hr L_{eq} (dBA)	24 hr L_{dn} (dBA)	24 hr CNEL (dBA)
LT- 1	5/30/01 -5/31/01	Front yard area of 3629 Lake Road (approx. 20 feet from front facade)	55	59	59
LT-2	5/30/01 -5/31/01	Front yard area of 2897 Bellevue Road (approx. 25 feet from front facade)	57	61	62

Source: URS, 2001.

TABLE 4.10-3

SHORT-TERM NOISE MEASUREMENT DATA SUMMARY

Site ID	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Date	Start Time	Duration (minutes)		L _{eq}	L _{max}	L _{min}	L ₉₀	L ₅₀	L ₁₀
ST-1	Near picnic tables. South central portion of Lake Yosemite Park. Site overlooks project site to south.	5/30/01	13:20	15	Dist. Const. Noise (Heavy Trucks with Trailers)	48.0	65.6	32.1	35.6	41.1	48.6
ST-1B	Same as ST-1. At Lake Yosemite County Park, near picnic benches	5/31/01	12:40	15	Dist. Const. Noise (Heavy Trucks with Trailers), not as much activity as prior measurement	44.0	55.3	21.3	37.1	41.1	47.6
ST-2	McKee Rd. @ Silverado Ave (NW Corner). Mic is flush w/ nearby p/l wall (6'), & also in-line w/ S.F. homes to S. ≈38' to centerline	5/30/01	14:50	15	Traffic, McKee Rd: 2 lane, undivided	64.1	77.2	28.7	46.1	60.6	68.6
ST-3	Yosemite Ave @ White Dove Ave (NW Corner). Mic is flush w/ resi's to W., ≈30' closer to rdwy than church to E. (Shepherd of the Valley Lutheran Church)	5/30/01	13:15	15	Traffic, Yosemite Ave: 2 lane, undivided	61.7	74.8	39.3	46.1	59.1	65.1
ST-3B	Same as ST-3 (Yosemite Ave @ White Dove Ave)	5/31/01	10:05	15	Traffic, Yosemite Ave: 2 lane, undivided	61.7	81.1	36.3	41.1	54.1	65.6
ST-4	On athletic field grounds, Merced Tri College Center (on 6 th Street, n/o Yosemite Ave., W/S). ≈200' from Mic to CL of r-o-w. ≈35' SE corner of Bldg TC-1 (temp. classrooms)	5/30/01	15:45	15	Traffic, G Street: 3 lanes on SB side, 1 lane NB w/ 12' median	52.1	67.4	40.8	43.6	48.6	55.1
ST-5	Front yard area of 5024 Bellevue Rd., @ NE corner of Bellevue Rd & Golf Rd. Mic is ≈70' from CL of Bellevue Rd, ≈30' from house facade	5/30/01	16:20	15	Traffic, Bellevue: 2 lane, undivided	52.5	66.6	38.6	41.6	46.1	56.1
ST-6	NW corner of Lake Rd & Dunn Rd. Mic ≈63' from Lake Rd CL. Flush w/ side yard & driveway, Adj. to 3763 N. Lake Rd	5/30/01	16:55	15	Traffic, Lake Road	58.7	79.1	31.6	35.1	42.6	62.1

TABLE 4.10-3

SHORT-TERM NOISE MEASUREMENT DATA SUMMARY

Site ID	Measurement Location	Measurement Period				Measurement Results, dBA					
		Date	Start Time	Duration (minutes)	Noise Sources	L _{eq}	L _{max}	L _{min}	L ₉₀	L ₅₀	L ₁₀
ST-7 (same location as LT-2)	2897 Bellevue Rd, front lawn area, approx. Mic is ~flush w/ LT-1 Mic, and ~30' from house façade. ~75' from Mic to CL Bellevue Rd	5/31/01	8:10	15	Traffic, Bellevue Rd: 2 lane, undivided. Ambient: birds calling	57.1	73.8	31.3	36.1	47.6	59.6
ST-8	Merced Hills Golf Club, Adj. to Hole #8 (near entrance, ~450' from CL of Lake Rd	5/31/01	8:45	15	Traffic, Lake Rd, birds, golfers (at nearby hole), Lake Rd: 2 lane, undivided. Very distant landscaping noise: leaf blower	45.2	62.1	29.0	37.6	42.6	48.1
ST-9	4787 N. Lake Rd, in front yard area, Mic ~75' CL of Lake Rd, ~30' from façade of house	5/31/01	9:15	15	Traffic, Lake Rd: 2 lane, undivided. Ambient: resident's radio low	52.1	71.9	34.3	37.1	39.1	51.1
ST-10	NW corner of Lake Rd & Boardwalk Dr, adj. to several residences. Mic is ~flush w/ façade of 1 of them, front yard of other (3829 N. Lake Mic ~110' from CL Lake Rd)	5/31/01	9:40	15	Traffic, Lake Rd: 2 lane, undivided. Ambient: 1 dog bark, birds chirping, rooster crowing	53.6	77.0	29.1	31.0	37.6	54.1
ST-11	994 Yosemite Ave @ Paulsen Rd, Mic is ~12' in front of duplex units, no exterior living areas fronting on Yosemite Ave. Mic is ~42' from CL Yosemite Ave.	5/31/01	10:40	15	Traffic, Yosemite Ave: 2 lane w/ center median. Distant construction noise	68.3	80.8	53.2	57.1	65.1	72.1
ST-12	Yosemite Ave @ Perch Lane, NE corner adj. to 3518 Yosemite Ave (S.F.Resi.). Mic is ~flush w/ corner of house, ~78' from Yosemite Ave. CL	5/31/01	11:07	15	Traffic, Yosemite Ave: 2 lane, undivided	57.5	74.8	30.4	34.1	42.6	62.1

REGULATORY SETTING

For informational purposes, federal and State programs influencing the noise environment in Merced County are identified, and the applicable planning goals and policies of the Merced County General Plan are discussed below.

Federal Regulations

There are no federal noise requirements or regulations that bear directly on local actions of Merced County. The Noise Control Act of 1972 directed the United States Environmental Protection Agency (EPA) to develop noise guidelines that would protect the population from the adverse effects of environmental noise. The EPA published a guideline, entitled EPA Levels Document, Report No. 556/9-74-664, containing recommendations for noise levels affecting residential land use of 55 Ldn dBA for outdoors and 45 Ldn dBA for indoors. The agency is careful to stress that the recommendations contain a factor of safety and do not consider technical or economic feasibility issues, and therefore, should not be construed as standards or regulations.

The Federal Department of Housing and Urban Development (HUD) standards (24 CFR Part 51, subpart B) define the 65 Ldn dBA as an acceptable outdoor noise level for residential uses. If outdoor noise levels exceed 75 dBA Ldn, the interior noise level in residential homes could exceed 45 dBA, however, with proper insulation and other construction techniques, the interior noise level can be reduced to the 45 dBA level.

There are federal regulations that influence the audible landscape, especially for projects where federal funding is involved. The Federal Highway Administration (FHWA) requires abatement of highway traffic noise for highway projects through the Code of Federal Regulations (23 CFR Part 772), and the Federal Transit Administration (FTA) and Federal Railroad Administration (FRA) each recommend thorough noise and vibration assessments for any mass transit or high-speed railroad projects that would pass by residential areas.

State Regulations

The California Department of Health Services had developed guidelines for acceptable community noise levels, which are frequently adopted by local agencies. Selected relevant noise levels are as follows:

- CNEL below 60- normally acceptable for low-density residential use.
- CNEL of 55 to 70 dBA- conditionally acceptable for low-density residential use.
- CNEL below 65- normally acceptable for high-density residential, transient lodging, churches, educational and medical facilities.
- CNEL below 70 dBA-normally acceptable for playgrounds, neighborhood parks.

“Normally acceptable” is defined as satisfactory for the specified land use, assuming that normal conventional construction is used in buildings. “Conditionally acceptable” may require some additional noise attenuation or study. Under most of these land use categories, overlapping ranges of acceptability and unacceptability are presented, leaving some ambiguity in areas where noise levels fall in within the overlapping range.

The State of California additionally regulates the noise emission levels of licensed motor vehicles traveling on public thoroughfares, sets noise emission limits for certain off-road vehicles and watercraft, and sets required sound levels for light rail transit vehicle's warning signals. The extensive State regulations pertaining to worker noise exposure are for the most part only applicable to the construction phase of any project.

California encourages each local jurisdiction to perform noise studies and implement a noise element as part of its general plan. The Governor's Office of Planning and Research (in conjunction with the California Department of Health Services) has published guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The Department of Health guidelines indicate that residential land uses and other noise-sensitive uses would generally be acceptable without special noise insulation requirements in areas where exterior ambient noise levels do not exceed approximately 60 dBA (day-night noise levels, L_{dn} or CNEL). Residential uses in areas with L_{dn} between 60 and 65 dBA would generally be acceptable with noise reduction measures or insulation, and residential uses should generally be discouraged in areas where noise levels are above 65 dBA L_{dn} . The Merced County General Plan of 2000 contains equivalent land use compatibility guidelines. The guidelines are reproduced in Figure 4.10-1.

Above 60 dBA L_{dn} or CNEL, the state Building Code (Title 24) requires the installation of noise insulation in new multiple-family residences and hotels. The Title 24 standards (Title 24, Part 2, of the California Code of Regulations) require that acoustical studies be performed prior to construction at residential building locations where the existing exterior L_{dn} or CNEL exceeds 60 dBA. Such acoustical studies are required to establish mitigation measures that will limit maximum noise levels to 45 dBA L_{dn} or CNEL inside any habitable room.

Local Regulations

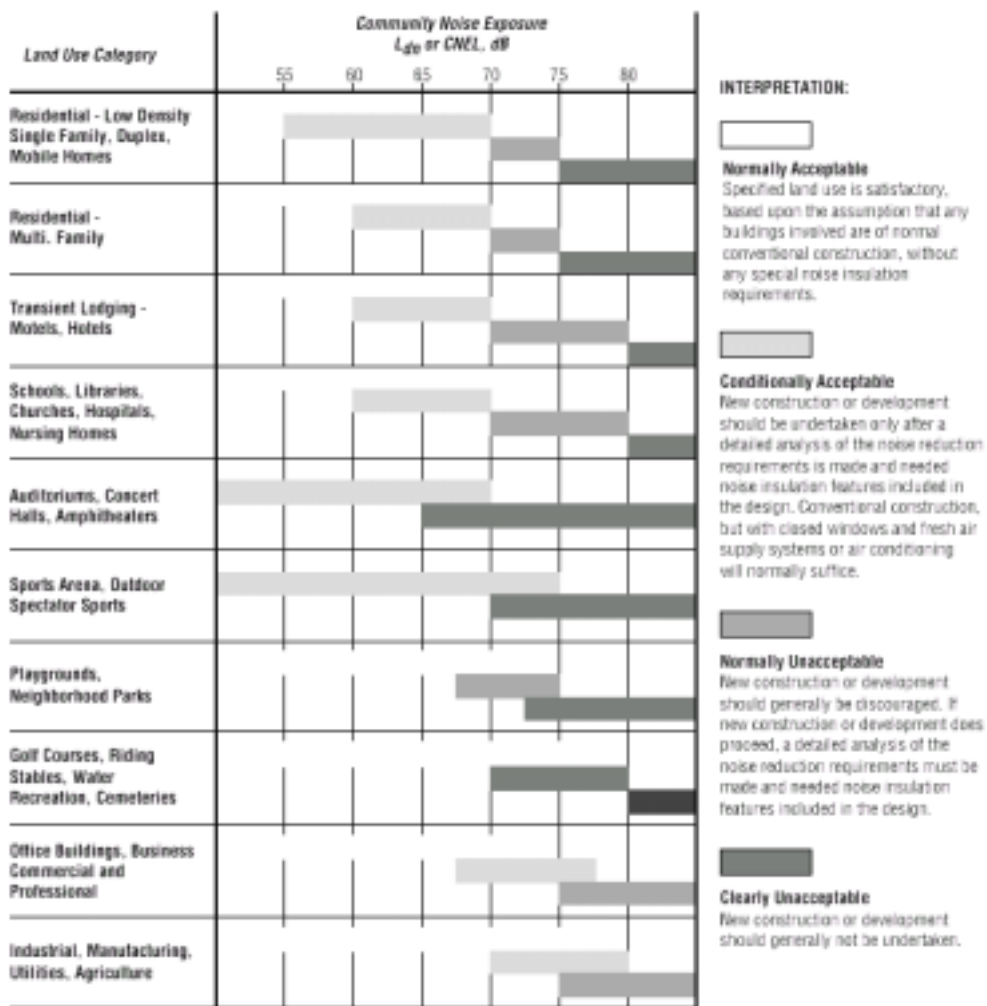
Merced County General Plan

The Noise Chapter of the Merced County General Plan includes mechanisms to ensure that future noise and land use conflicts are minimized through application of land use compatibility criteria and participation in the discretionary review process. The Land Use Compatibility Guidelines of the Noise Chapter (Table 4.10-4) identify the noise levels that would be acceptable for planned land uses and specify the level of analysis necessary to identify noise reduction requirements. Following are the General Plan policies relevant to the proposed UCP.

Noise Chapter

- Goal 1: All citizens of the county free from the harmful effects of excessive noise.
Objective 1A: Residential areas are not significantly impacted by excessive exterior noise levels.

**TABLE 4.10-4
LAND USE COMPATIBILITY GUIDELINES**



Source: Figure IV-2, Merced County Year 2000 General Plan, and Governor's Office of Planning and Research, General Plan Guidelines, November 1998.

Policies:

1. New residential land use designations shall not be approved in locations where it is determined that existing or projected exterior noise levels will exceed 65 L_{dn} .
2. Residential subdivisions and multiple family developments should incorporate appropriate measures to reduce exterior noise exposure from ground sources to less than 65 L_{dn} .
3. Any existing residentially designated areas that are identified to be exposed to exterior noise levels greater than 65 L_{dn} shall be considered “noise impacted” and should be reviewed by the county to identify possible means to correct the identified noise/land use incompatibilities.

Objective 1B: Interior noise levels for residential dwelling units in residential areas do not exceed 45 L_{dn} .

Policies:

4. Design standards and construction measures must be incorporated into all new residences to achieve an interior noise level which does not exceed 45 L_{dn} .
5. For existing houses in residential areas, the County will provide technical assistance to property owners to achieve an interior noise level which does not exceed 45 L_{dn} .

Objective 1C: Hospitals and schools are not significantly impact by excessive exterior noise levels.

Policies:

6. Proposed new land use designations for the development of hospitals and schools shall not be approved in locations where it is determined that existing or projected noise levels exceed 70 L_{dn} .

Goal 2: Noise generating land uses and facilities important to the economic health of the county are not adversely affected by incompatible land uses.

Objective 2B: New commercial and industrial areas are located to minimize encroachment by incompatible noise sensitive land uses.

Policies:

2. When establishing new commercial and industrial designations, the potential for encroachment by residential and other noise sensitive land uses on adjacent lands which could significantly impact the viability of the commercial or industrial area shall be considered.

Objective 2D: Authorized noise generating facilities in agricultural and foothill pasture designated areas are not significantly impacted by encroachment of new incompatible noise sensitive land uses.

Policies:

5. Recognize authorized noise generating land uses located in rural areas when new noise sensitive land uses are proposed.

Merced County Code

The Merced County Code does not contain a noise ordinance. Certain sections of the code require noise control for specific nuisance or industrial sources (such as domestic animals, refuse pickup, or surface mining activities). Because there is no code to control noise within the proposed UCP area after development, no comprehensive regulatory tool exists to resolve noise conflicts between developed land uses.

PLAN ELEMENTS

The Land Use and Transportation Elements affect the distribution and orientation of new noise sources and noise-sensitive uses associated with the proposed UCP. Implementation of the proposed UCP would involve land use changes that would introduce new sources of urban and suburban noise, including traffic noise, to the undeveloped area. Existing residences within the UCP area and other existing noise-sensitive land uses along transportation corridors could be affected. Along with new sources of noise introduced to the UCP area would be new land uses in the plan area that would be considered noise-sensitive. The compatibility of the new land uses with the future noise environment internal to the UCP area is a focus of this analysis.

The Land Use Compatibility Guidelines would encourage noise-sensitive uses to be designed with noise protection features. Additional policies have been identified to minimize noise through the appropriate design of anticipated noise-generating land uses.

- N 1.1:** Design and construct new noise-generating land uses in a manner that does not cause excessive noise on any location of nearby residential properties. The noise standard of 65dBA L_{dn} shall not be exceeded by noise generating land uses at any existing or planned residential land use. Noise reduction features shall be included in the design of any land use that has noise sources affecting residential land uses.
- N 1.2:** Minimize transportation noise by the development of a grid street pattern with "flexible corridors" that disperses local traffic and minimizes the need for major corridors carrying high volumes of traffic at high speeds and by integrating traffic calming measures into neighborhood street design.
- N 2.1:** Use the Land Use Compatibility Guidelines of the County of Merced General Plan Noise Chapter (Figure IV-2) to characterize the acceptability of a noise environment for proposed residential uses and specify the level of analysis and design features necessary to provide appropriate noise insulation.
- N 2.2:** Require that residential uses located in noise environments above 65 dBA L_{dn} mitigate the interior noise level to a 45 dBA L_{dn} through adequate noise mitigation techniques (insulation, double pane window, and so on).
- N 2.3:** Reduce noise exposure 65 dBA L_{dn} for large outdoor recreational spaces that are a part of housing developments as feasible through insulation, landscape, berms, and other techniques.

- N 2.4:** Provide noise protection for residences in mixed use projects that integrate housing with retail, office, or other non-residential use, including the use of construction techniques that prevent adverse noise transmission between differing uses or tenants located in the same structure or site.
- N 2.5:** Identify a County agency or department for the coordination of noise control efforts.
- N 2.6:** Manage noise from construction activities by:
- Limiting the hours of construction activities that generate noise, when adjacent to housing and other "sensitive" uses. Typically, construction is limited to the hours of 7:00 AM to 10:00 PM, weekdays and Saturday, and prohibited on Sundays and holidays.
 - Requiring that all construction vehicles or equipment, fixed or stationary, be equipped with properly operating and maintained mufflers.
 - Requiring that construction vehicle staging areas be located as far as practical from existing residential uses.
 - Schedule the noisiest construction operations to occur together to avoid continuing periods of the greatest annoyance, wherever possible.
 - Requiring that construction vehicle trips be routed as far as practical from existing residential uses.
- N 2.7:** Evaluate the noise impacts of the adjacent airstrip on the University Community's land uses during the formulation of each Specific Plan and mitigate potential impacts through the siting and design of buildings, use of insulation, and/or working with the airstrip owner to control hours of operation and /or modify flight patterns, as feasible.
- N 3.1:** Locate and design new noise-sensitive land uses to preclude impacts by recreational activities at Lake Yosemite.
- N 3.2:** Require that educational, recreational, commercial, and industrial land uses (including educational campuses, parks, stadiums, and public event facilities) be designed in such a manner that:
- vehicle access points are located away from noise sensitive uses;
 - loading and shipping facilities and noise generating equipment are concealed or located away from noise sensitive uses;
 - parking areas and structures are located away from noise sensitive uses;
 - structural building materials are incorporated to mitigate sound transmission;
 - use of outside speakers and amplifiers is minimized; and
 - interior spaces are configured to minimize sound amplification and transmission.
- N 3.3:** Require that facilities used for active recreation in the University Community that are likely to draw cheering crowds, elicit loud play, or have amplified game announcements be located in parks or at locations away from noise-sensitive uses.

Transportation Policies

- T 1.2** Develop individual but coordinated master plans to guide design and implementation of the principal circulation infrastructure, including plans that address streets, bikeways, pedestrian ways, transit, and parking.
- T 4.1** Create a complete, interconnected bicycle and pedestrian circulation system that serves both commuter and recreational travel, and provides access to major destinations.
- T 4.3** Install amenities to serve bicyclists and pedestrians, such as secure and convenient bicycle parking and shaded seating areas at public facilities.

Land Use Policies

- LU 5.16** Develop and design public streetscapes to enhance pedestrian activity including the integration of landscape, street furniture, signage, lighting, public art, distinctive paving materials, and other amenities. Local and/or campus artists should be involved in the design of streetscapes, in lieu of the exclusive use of traditional “catalogue” elements, to impart a distinctive character and enhance ownership by the community.
- LU 5.19** Design internal local streets to emphasize pedestrian activity (minimum of 15’ wide sidewalks) and slow traffic using such techniques as appropriate width, angled parking, traffic circles, landscaped “bulb outs,” alleys, and comparable techniques.

IMPACTS AND MITIGATION MEASURES

Methods of Analysis

Noise impacts from implementation of the proposed UCP would be caused by construction activities and vehicular traffic with the occupation of new land uses in the UCP area. Construction activities, increases in traffic, and new activity related to the proposed land uses in the UCP area are each assessed. The ability of the existing Merced County General Plan and County Code to manage the effects is discussed. Where the identified policies or regulations, or the proposed UCP Noise Policies, would not be sufficient to reduce impacts, additional mitigation measures are identified.

The analysis of the existing and future noise environments presented in this section is based on noise prediction modeling. Noise levels were modeled for several existing noise sensitive land use locations along with several roadway segments with nearby noise sensitive uses. This was accomplished using the Federal Highway Administration Highway Noise Prediction Model (FHWA-RD-77-108). This model calculated the average noise level at specific locations based on average daily traffic volumes, average speeds, and site environmental conditions. The FHWA model has been modified to utilize average vehicle noise rates identified for California Department of Transportation (Caltrans). Caltrans data show that automobile noise in California is generally 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. The “CALVENO” rates have been prepared by Caltrans and incorporated into the FHWA model to reflect local characteristics. Traffic volumes utilized as data inputs into the noise prediction model were provided by the project traffic

engineer and are consistent with the traffic and circulation analysis presented in Section 4.14 of this EIR. All traffic related noise impacts were quantitatively evaluated. Noise data from the modeling are located in Appendix E. All other noise impacts are addressed qualitatively.

Additional Baseline Assumptions

The above setting information constitutes a portion of the baseline condition for the UCP. However, as discussed in Section 4.0, Introduction to the Analysis, the UCP would be adopted only after adoption of the UC Merced Long Range Development Plan. Therefore, concurrent development of the UC Merced campus and the University Community is assumed and the UC Merced campus is assumed in the baseline conditions. The existing conditions on the UC Merced campus site and anticipated conditions at buildout of the UC Merced campus are discussed below.

Noise generating activities associated with the UC Merced campus would include construction (short-term) and campus-related traffic. In addition, the campus would generate noise from daily activities (such as landscaping maintenance, equipment, heating, ventilation and air conditioning equipment, recreational activities, and parking lot activities) and sports events in the campus.

Please refer the UC Merced LRDP EIR for a complete description of setting and LRDP elements related to noise.

Standards of Significance

The following standards of significance are based on Appendix G of the State CEQA Guidelines.

For the purposes of this EIR, an impact is considered significant if the UCP would:

- Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Expose persons to or generate excessive ground-borne vibration or ground-borne noise levels;
- Cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Cause 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, expose people residing or working in the project area to excessive noise levels; or
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

The County standard for residential land uses is 65 dBA Ldn for exterior noise levels and 45 dBA Ldn for interior noise levels. The County standard for exterior noise levels for land adjacent to hospitals and schools is 70 dBA Ldn. The County refers to the State Land Use Compatibility Guidelines for the acceptable noise level at parks, which is listed as 70 dBA Ldn.

In addition to the standards of significance listed in Appendix G of CEQA Guidelines, the following noise standards will also be used to determine if the UCP area will result in a significant noise impact:

- An increase in noise which causes the significant thresholds to be exceeded by 3 dBA or more;
- An increase of 3 dBA where the noise levels without the project are above the County significance thresholds (65 dBA for residential and 70 dBA for parks);
- An increase of 5 dBA, where the noise levels without the project are 50 to 65 dBA Ldn for residential uses;
- An increase of 10 dBA, where noise levels without the UCP area, are less than 50 dBA Ldn for residential uses.

It should be noted that a noise decrease of 3 decibels is a perceptible increase and has been used as a standard in this EIR to evaluate impacts in areas where the ambient or background noise levels without the UCP area are close to or over the County and State noise thresholds for affected land uses (i.e. 65 dBA for residential land uses or 70 dBA for parks). Increases of 5 and 10 decibels are used to evaluate noise impacts in areas where the ambient or background noise levels without the project are low or moderate. The use of this “sliding scale” is appropriate because where ambient/background levels are low, an increase of 5 to 10 decibels would be perceptible and create an annoyance or nuisance. Where as if the ambient/background noise levels are low to moderate and there is an increase of 3 dBA, this slight increase in noise levels maybe perceptible but would not be enough to create an annoyance or nuisance.

In contrast, if the ambient/ background noise level is already moderately high (65 dBA in residential areas and 70 dBA for parks), an increase of 3 dBA would exacerbate an existing noise problem and would increase the level of annoyance perceived by sensitive receptors and increase the inability to have a conversation without raising voices.

Project-Specific Impacts and Mitigation Measures

4.10-1 Sensitive receptors within the UCP area could be exposed to noise levels that exceed the County’s noise standards.

Applicable Regulations: State Building Code (Title 24)

Significance: Significant

Mitigation Included in the UCP: Policies N 1.1, 1.2, 2.1 through 2.5, and 3.1 through 3.3

Significance After Mitigation Included in the UCP: Less than Significant

Additional Mitigation: None required

Residual Significance: Less than SignificantBaseline Plus Buildout Scenario

The UCP area could include land uses that would exceed the County's noise standards thereby exposing sensitive receptors to unacceptable noise levels. Specifically, the wide variety of proposed land uses within the UCP area could result in noise sensitive receptors, such as homes and schools, being located in close proximity to known sources of noise, such as commercial centers and transportation facilities.

As previously discussed, Policy 1 of the Noise Element of the Merced County General Plan states that no new residential land use designation shall be approved in locations where it is determined that existing or projected exterior noise levels will exceed 65 Ldn. Policy 2 of the Noise Element states that residential and multi-family developments should incorporate appropriate measures to reduce exterior noise exposure to less than 65 Ldn. Policies 4 and 5 require that future residences and existing residences achieve an interior noise level of 45 Ldn.

There are a series of UCP policies that would ensure noise levels within the community would not exceed County standards. Policy N 1.1 would require that the design and construction of new noise generating land uses be in a manner that does not exceed the 65 dBA Ldn noise standard when placed near any existing or planned residential land uses. Policy N 2.1 would require that future development within the UCP area comply with Merced County's Land Use Compatibility Guidelines (Table 4.10-3) in the Noise Element of the General Plan. Policy N 2.2 would require that residential uses located in a noise environment that is greater than 65 dBA Ldn ensure that interior noise levels do not exceed 45 dBA Ldn. Policy N 2.4 would require future development in the UCP area to provide noise protection for residences located in mixed use areas that integrate housing with retail, office and commercial uses. Policy N 3.2 would require that educational, recreational, commercial and industrial land uses be designed in a manner in which: vehicle access points are located away from noise sensitive uses; loading and shipping facilities and noise generating equipment are concealed or located away from noise sensitive uses; parking areas and structures are located away from noise sensitive uses; structural building materials are incorporated to mitigate sound transmission; use of outside speakers and amplifiers is minimized; and interior spaces are configured to minimize sound amplification. Finally, Policy N 3.3 would require that facilities used for active recreation in the community be located at a location away from noise sensitive uses.

Compliance with all of the above UCP policies would ensure that development within the Community would not exceed Merced County's adopted noise standards. Therefore, this impact would be less than significant.

Baseline Plus 2015 Scenario

It is anticipated that portions of the Town Center and Residential Villages 1 and 2 would be constructed by 2015. Sensitive receptors within the Town Center and Residential Villages could be exposed to noise levels that exceed the County standards. However, as with the Baseline Plus Buildout Scenario, future development within the UCP area would be required to comply with the above UCP policies. Compliance with these policies would ensure that sensitive receptors would not be adversely impacted by elevated noise levels. Therefore, this impact would be less than significant.

4.10-2 The proposed UCP includes development of noise sensitive uses that could encroach on existing noise sources, and therefore, be exposed to unacceptable noise levels.

Applicable Regulations: None

Significance: Significant

Mitigation Included in the UCP: Policies LU 2.13, 3.1, 3.3, 3.4, and 3.5, and N 3.1, 3.2, and 3.3.

Significance After Mitigation Included in the UCP: Less than Significant

Additional Mitigation: None required

Residual Significance: Less than Significant

Baseline Plus Buildout Scenario

The Merced County General Plan includes policies to protect existing sources of noise from encroachment of noise sensitive uses. Existing noise sources in the vicinity of the UCP area include recreational activities at Lake Yosemite to the northwest and agricultural lands, primarily to the south and east. The Merced Hills Golf Course would not be affected by encroaching land uses because it is not a substantial noise source or a noise-sensitive use, and it would be displaced by the UC campus and the Town Center.

Development of the UCP area could place new residential uses in the vicinity of recreational activities at Lake Yosemite, and would likely bring a variety of sensitive uses within close proximity of agricultural operations. At Lake Yosemite, recreational motorboats can create noise that is carried over large distances. Merced County General Plan documents that certain ski boats cause noise levels of up to 67 dBA within 1000 feet. Noise from farm equipment due to agricultural operations on surrounding lands is generally less intense. However, without proper land use planning, each issue could cause noise conflicts from encroaching land uses.

UCP Policies N 3.1 to 3.3 would discourage new noise-sensitive uses from encroaching upon the recreational uses at Lake Yosemite. The proposed UCP is adjacent to an existing RRC to the west. The RRC is intended to serve as a buffer between dense urban areas and rural areas. Because of the nature of the RRC as a semi-rural area, residents of the RRC would be more tolerant of agricultural activities than residents of urban areas. As the UCP is developed, residents in the RRC, particularly those on the eastern portion, would no longer be adjacent to agricultural land. Therefore, this would be a less-than-significant impact

Another potential source of noise is the private airstrip located east of the UCP area. The existing private airstrip to the east of the UCP area is a potential noise source that could adversely affect future non-residential uses within the University Community. Policy 2.7 would require that each Specific Plan consider noise from the adjacent airstrip, and that potential aircraft noise be addressed through siting, building design and construction and/or working with the airstrip owner to modify hours of operation

and/or flight patterns. UCP Policy N 2.7 would require that, prior to approval of a specific plan within the area that is adjacent to the airstrip, it shall be demonstrated that operations of the airstrip would not result in unacceptable noise levels at any proposed residential areas. This would ensure that airstrip operations are not interrupted by urban development and do not adversely affect future residents.

With implementation of the policies described above, residents of the UCP would not be exposed to unacceptable noise levels. Therefore, this would be a less-than-significant impact.

Baseline Plus 2015 Scenario

As with buildout conditions, new development could encroach upon existing sources of noise. With the proposed policies (noise and land use policies) discouraging new sensitive uses in the vicinity of existing noise sources, this would be a less-than-significant impact.

4.10-3 The proposed UCP would generate increased vehicular traffic on the regional road networks which would result in an increase in the ambient noise levels.

Applicable Regulations: None

Significance: Significant

Mitigation Included in the UCP: Policies N 1.2, 2.2, 2.3, and 2.4 and LU 5.16 and 5.19, and T 1.2, 4.1, and 4.3

Significance After Mitigation Included in the UCP: Significant

Additional Mitigation: Mitigation Measure 4.10-3(a) and 4.10-3(b)

Mitigation Measure 4.10-3(a)

The County shall construct barriers and/or retrofit affected homes with noise attenuation measures (e.g., sound-rated windows) necessary to achieve a 45 L_{dn} interior noise level.

Mitigation Measure 4.10-3(b)

For development within the UCP area, noise considerations should be taken into account during initial site planning, in order to maximize shielding by the planned structures or other on-site features.

Residual Significance: Significant and Unavoidable

Baseline Plus Buildout Scenario

As previously discussed and as illustrated in Table 4.10-5, short-term and long-term noise measurements were made in the vicinity of the UCP area to determine noise levels from existing traffic. When comparing existing noise levels to those predicted during the year 2025 with development of the UCP

area, Campus and Parkway, multiple roadway segments would exceed the 5 dBA threshold. Noise impacts would occur along Bellevue Road, G Street and along the Campus Parkway. Segments specifically impacted include:

- Mc Kee Road – North of Olive
- Yosemite Avenue- East of G Street
- G Street – North of Yosemite
- Bellevue Road – West of Lake Road
- Yosemite Avenue- West of Lake Road

Existing residents and future residents along G street and Bellevue roadway would be adversely impacted by this increase in traffic related noise levels resulting in a significant impact.

It should be noted that although the Campus Parkway will result in increased noise levels, it would remove traffic from local surface streets, such as Lake Road, thereby decreasing future traffic noise levels on local surface streets when compared with the 2025 Campus Only scenario (Column C of Table 4.10-5).

In addition to noise impacts along regional roadways, development of the community and associated land uses could result in noise impacts along roadways within the UCP area. At the present time, there is no proposed roadway system proposed that would allow a quantitative evaluation of potential noise impacts to sensitive receptors within the UCP area.

Several UCP policies would reduce the amount of noise generated by vehicles. Policy N 1.2 minimizes transportation noise by the development of a grid street system with flexible corridors that disperses local traffic and minimizes the need for major corridors that carry high volumes of traffic. Noise levels associated with traffic are directly related to the volume of traffic as well as the speed of traffic. With implementation of the above policy, noise from motor vehicles would be reduced by incorporating a grid system that disperses local traffic and reduces vehicle speeds. In general, fewer cars on a street and decreased speeds result in lower noise levels.

Policies LU 5.16 and 5.19 promote pedestrian access throughout the UCP area to minimize the use of vehicles. Policies T 1.2, 4.1, and 4.3 also promote alternative forms of transportation such as biking and walking, thereby minimizing the use of vehicles. Implementation of these policies would reduce potential noise impacts that would occur within the UCP area.

In addition to the UCP policies, additional mitigation measures are proposed to further reduce noise impacts. Although sound walls are limited in their effectiveness, and are often perceived as undesirable or infeasible, in specific instances, they are necessary and effective. Therefore, when feasible and appropriate, the construction of a sound wall could reduce future noise impacts.

Although implementation of the above policies and mitigation measures would minimize potential noise impacts, the ambient noise level would still increase to level that exceeds adopted standards. Therefore, this impact would remain significant and unavoidable.

TABLE 4.10-5							
EXISTING AND PREDICTED NOISE LEVELS							
Road Segment	A: 2001 Existing No Project	B: 2025 No Project	C: 2025 Campus Only	D: 2025 Full Project Campus, Community and Parkway	Change between D and A ²	Change between D and B ²	Change between D and C ²
St-2 (Mc Kee Rd- N. of Olive)- 40' from c.l.	57	65	65	65	8	0	0
ST-3 (Ysmte-E of G St)- 60' from c.l	61	67	69	67	6	2	-2
ST-4 (G St.- N. of Yosemite) – 200' from c.l.	60	64	65	65	5	1	0
ST-4 (Bliv-E of G St) – 100' from c.l.	67	65	70	69	2	4	-1
ST-6 (Lake Rd- N. of Yosemite) – 70' from c.l.	54 ¹	65	66	56	2	-9	-10
ST-7 (Bliv- W of Lake Rd.)- 70' from c.l.	56 ¹	65	71	71	15	6	0
ST-9 (Lake Rd.- S of Bellevue) – 100' from c.l.	54 ¹	63	64	55	1	-8	-9
ST-10 (Lake Rd.-N. of Yosemite) – 100' from c.l.	52	63	64	55	3	-8	-9
ST-11 (Ysmte-E. of G St.) – 42' from c.l.	63	68	71	69	6	1	-2
ST-12 (Ysmte W of Lake Rd) – 60' from c.l.	57	66	70	67	11	1	-3
Bellevue – W of Lake Rd- 100' from c.l.	54 ¹	63	69	70	16	7	1
G St.- N. of Yosemite – 100' from c.l.	63	67	68	68	5	1	0
G St.- S. of Yosemite – 100' from c.l.	65	68	69	69	4	1	0
Ysmte- W of Lake Rd. – 100' from c.l.	55	63	67	65	10	2	-2
Ysmte E of G St.- 100' from c.l.	59	64	67	65	6	1	-2
McKee Rd.- N. of Olive- 100' from c.l.	53	61	61	61	8	0	0
Campus Pkwy – S. of Yosemite- 100' from c.l. ³	54	64	68	71	17	7	3
Campus Pkwy – S. of Yosemite- 200' from c.l. ³	54	61	65	68	14	7	3
Campus Pkwy – S. of Yosemite- 300' from c.l. ³	54	60	63	66	12	6	3
Campus Pkwy – S. of Yosemite- 400' from c.l. ³	54	58	62	65	11	7	3
Campus Pkwy – S. of Yosemite- 500' from c.l. ³	54	57	61	64	10	7	3
Campus Pkwy – N. of Yosemite- 100' from c.l. ³	54	n/a	68	71	17	N/a	3
Campus Pkwy – N. of Yosemite- 200' from c.l. ³	54	n/a	65	68	14	N/a	2
Campus Pkwy – N. of Yosemite- 300' from c.l. ³	54	n/a	63	66	12	N/a	3
Campus Pkwy – N. of Yosemite- 400' from c.l. ³	54	n/a	62	64	10	N/a	2
Campus Pkwy – N. of Yosemite- 500' from c.l. ³	54	n/a	61	64	10	N/a	3

Source: EIP Associates, Vehicle Noise Calculations on major roads in the vicinity of the Project Site based on Fehr & Peers Associates Graphic Model Output for year 2000 existing conditions.

Notes:

- These numbers are based on measurements conducted in 2001. All other values are modeled based on year 2000 traffic volumes.
- Bold cells indicate a significant impact due to:
 - An increase of 3 dBA where the noise levels without the project are above the County significance thresholds (65 dBA for residential and 70 dBA for parks);
 - An increase of 5 dBA, where the noise levels without the project are 50 to 65 dBA Ldn for residential uses;
 - An increase of 10 dBA, where noise levels without the UCP area, are less than 50 dBA Ldn for residential uses.
- Based on measurements at Lake Road 100' from center line, which is similar in location and condition.

Baseline Plus 2015 Scenario

As with the Baseline Plus Buildout Scenario, residents located along Bellevue Road and Yosemite Avenue would be adversely impacted by the increase in traffic volume and associated increase in the ambient noise level during 2015. As discussed above, The UCP policies and mitigation measures would reduce the magnitude of this impact, however, the noise impact associated with increase in vehicles traveling along regional roadways and the related noise impact to sensitive receptors would be significant and unavoidable.

4.10-4 Construction of the proposed UCP would include activities that could result in substantial temporary or periodic increases in ambient noise levels.

Applicable Regulations: None

Significance: Significant

Mitigation Included in the UCP: Policy N 2.6

Significance After Mitigation Included in the UCP: Significant

Additional Mitigation: Mitigation Measure 4.10-4

Construction contractors shall comply with the following or an equivalent noise control program:

- *All noise-producing project equipment and vehicles using internal combustion engines shall be equipped with exhaust mufflers and air-inlet silencers where appropriate, in good operating condition that meet or exceed original factory specification.*
- *Mobile or fixed “package” equipment (e.g. arc-welders, air compressors) shall be equipped with shrouds and noise control features that are readily available for that type of equipment.*
- *All mobile or fixed noise producing equipment used on the project, that is regulated for noise output by local, state or federal agency, shall comply with such regulation while engaged in project-related activities.*
- *Electrically powered equipment shall be used instead of pneumatic or internal combustion powered equipment, where practicable.*
- *Material stockpiles and mobile equipment staging, parking and maintenance areas shall be located as far as practicable from noise-sensitive receptors.*
- *The use of noise-producing signals, including horns, whistles, alarms, and bells shall be for safety warning purposes only. No project-related public address loudspeaker, two-way radio, or music system shall be audible at any adjacent noise-sensitive receptor except for emergency use.*
- *The erection of temporary noise barriers will be considered where project activity is unavoidably close to noise-sensitive receptors.*

Residual Significance: Significant and UnavoidableBaseline Plus Buildout Scenario

Development under the proposed UCP would result in the construction of new infrastructure along with construction of individual projects. The proposed land use policies would encourage development activities to occur within urban limit lines; this would increase the likelihood of construction activities occurring in close proximity to built and occupied uses. Noise from construction activities associated with the development could adversely affect noise-sensitive uses existing within the plan area, future noise-sensitive uses as they are developed within the plan area, and noise sensitive uses outside of the plan area along major access routes.

Foreseeable construction activities would occur due to development of utilities and other infrastructure (including drinking water systems and stormwater management systems), road construction (including grading, rehabilitation, and intersection improvements), and individual site development (with site preparation, placement of foundations for structures, and fabrication of structures). Such activities would be expected to require use of heavy trucks, grading and excavation equipment, concrete mixers, cranes, and other miscellaneous mobile and stationary construction equipment. For larger projects, construction and operation of temporary stationary facilities, such as temporary concrete or asphalt plants, could be necessary.

Noise levels from typical construction equipment varies widely depending on the process underway, the type and condition of the equipment used, the layout of the construction site and staging areas, and the day-by-day schedule of activities. Because construction contractors would have some discretion over many of the construction methods and activities, and because development of the UCP area would occur gradually in phases, the level and timing of construction noise that would affect any one location cannot be estimated. Typical construction equipment (bulldozers, loaders, trucks, etc.) can cause combined noise levels to exceed 90 dBA within 50 feet of the equipment operating simultaneously. Drilling rigs and impact tools such as pile drivers can cause higher peaks of approximately 100 dBA within 50 feet of the equipment. At greater distances, the noise levels are attenuated, but within 600 feet of a construction site, typical equipment could generate about 70 dBA, while peak noise levels from impact equipment would be about 80 dBA. These noise levels would vary substantially throughout the day, and the peaks would occur only intermittently. Nonetheless, for any existing or future noise-sensitive receptors in the vicinity of construction activities, or along access routes to construction sites, adverse affects would occur due to the increased noise levels.

It is possible that numerous sites within the UCP area would be under construction at the same time. Furthermore, residents located west of the UCP area, in the RRC area, would be exposed to these construction activities and could experience increased noise levels due to construction equipment accessing the site from Lake Boulevard.

UCP Policy N 2.6 would address noise from construction activities by encouraging creation of noise control requirements in the Merced County Code and identifying best management practices for noise from construction related to UCP area. Additionally, noise from construction activities would be managed with potential limitations on the hours of construction, noise control specifications on construction vehicles and equipment, and recommendation of other techniques to minimize affects on

noise-sensitive uses near construction sites, including construction vehicle routing in areas of sensitive land uses along access routes.

Although construction related noise impacts would be reduced with the above UCP policy this impact would remain significant and unavoidable because multiple sites within the UCP area would be simultaneously under construction creating a substantial source of noise and because residents within the RRC would be adversely affected by the on-going construction activities.

Baseline Plus 2015 Scenario

Under this scenario, construction noise impacts would be similar to those discussed above. Construction related activities would be substantially less than that associated with buildout of the UCP area, however, residents along Lake Road and those located on Hunt Farms would be subjected to the construction noise impacts. Implementation of the above UCP policy would minimize these noise impacts, however, this impact would remain significant and unavoidable.

4.10-5 Construction of the proposed UCP would involve activities that could generate ground-borne vibration or ground-borne noise levels.

Applicable Regulations: None

Significance: Significant

Mitigation Included in the UCP: None required

Significance After Mitigation Included in the UCP: Significant

Additional Mitigation: Mitigation Measure 4.10-5

Limit groundborne vibration due to construction activities to 0.2 in/sec velocity (limit of potential for damage to structures) in the vertical direction at sensitive receptors. For construction adjacent to highly sensitive uses, apply additional measures as feasible, including advance notice to occupants of sensitive facilities to ensure precautions are taken in those facilities to protect ongoing activities from the effects of vibration.

Residual Significance: Less than Significant

Baseline Plus Buildout Scenario

Normal project construction activities would not generate substantial levels of vibration. Pile driving, if required during the construction phase of a project, could produce groundborne vibration levels that might be perceptible within approximately 650 feet of the pile driving activity. Groundborne vibration levels at distances of approximately 200 feet or more would not result in substantial effects. Pile driving very close to structures (within 10 feet) can cause structural damage due to displacement of soil and resulting lateral movement corresponding to approximately 0.2 inches per second peak particle velocity.³ Vibration from pile driving occurring within 100 feet can cause architectural and structural damage to

unreinforced or older buildings, which are not present on the site. If distances of 10 feet or more are observed for pile driving, no undue annoyance to persons or damage to existing structure is expected to occur at most locations from construction pile driving.

Implementation of the above mitigation measure which would limit groundborne vibration due to construction activities to 0.2 in/sec velocity in the vertical direction at sensitive receptors and would ensure that potential impacts associated with groundborne vibrations would be less than significant.

Baseline Plus 2015 Scenario

As discussed above, vibration and groundborne noise would be managed through the County's permitting process. Therefore, this impact would be less than significant.

Cumulative Impacts and Mitigation Measures

The cumulative context for noise is development in Merced County, including UC Merced and the Campus Parkway.

4.10-6 Development of the UCP, in combination with other development in the County, would generate increased vehicular traffic on the regional road network which would result in an increase in ambient noise levels.

Applicable Regulations: State Building Code (Title 24)

Significance: Buildout: Significant
2015: Significant

Mitigation Included in the UCP: Policies T 2.1, N 1.2, 2.2, 2.3, and 2.4

Significance After Mitigation Included in the UCP: Buildout: Significant
2015: Less than significant

Additional Mitigation: Mitigation Measure 4.10-6

Implement Mitigation Measure 4.10-3.

Residual Significance: Buildout: Significant and Unavoidable
2015: Less than Significant

Cumulative Buildout Scenario

Using traffic volumes for 2025 and comparing the 2025 No Project Scenario with the 2025 UCP, Campus and Campus Parkway scenario, noise level along the roadways in the project were estimated and are presented in Table 4.10-5. During year 2025 No Project conditions, noise levels are anticipated to meet or exceed 65 dBA along McKee Road- North of Olive, Yosemite Avenue – East of G Street, Bellevue Road - East of G Street, Lake Road- North of Yosemite, Bellevue Road - West of Lake Bellevue,

Yosemite – East of G Street, Bellevue Road – West of Lake Boulevard, G Street - North of Yosemite, and G Street – South of Yosemite. Due to the predicted ambient noise level of 65 dBA or more along these roadways, an increase of 3 dBA or more would be a significant impact.

When comparing the 2025 No Project Conditions with the 2025 Full Project conditions, an increase of 4 dBA would occur along Bellevue Road- East of G Street and an increase of 6 dBA would occur along Bellevue Road- West of Lake Road. As a result, development of the UCP area, Campus and Campus Parkway would result in a significant noise impact.

In addition to an increase in the ambient noise level along existing roadways, development of the campus parkway would also be a substantial source of noise. As shown in Table 4.10-5, development of the Campus Parkway would result in up to a 7 dBA increase in the ambient noise level for any distance up to 500 feet from the centerline of the road. Because development of the Campus Parkway would exceed the 5 dBA threshold, this would be a significant impact.

Several UCP policies would reduce the amount of noise generated by vehicles. Policy N 1.2 minimizes transportation noise by the development of a grid street system with flexible corridors that disperses local traffic and minimizes the need for major corridors that carry high volumes of traffic. Noise levels associated with traffic are directly related to the volume of traffic as well as the speed of traffic. With implementation of the above policy, noise from motor vehicles would be reduced by incorporating a grid system that disperses local traffic and reduces vehicle speeds. In general, fewer cars on a street and decreased speeds result in lower noise levels.

Policies LU 5.16 and 5.19 promote pedestrian access throughout the UCP area to minimize the use of vehicles. Policies T 1.2, 4.1, and 4.3 also promote alternative forms of transportation such as biking and walking thereby minimizing the use of vehicles. Implementation of these policies would reduce potential noise impacts that would occur within the UCP area.

Although these policies would promote alternative forms and transportation and minimize noise impacts within the UCP, they would not reduce noise impacts associated with cumulative development within the County. Because the cumulative ambient noise levels associated with increased traffic volumes would increase to exceed the County standard of 65 dBA and because cumulative development would result in an increase in a noise increase more than 5 decibels along roadways, this impact is significant and unavoidable.

2015 Cumulative Scenario

Noise from future traffic during the year 2015 would be substantially less than that associated with buildout of the UCP area. Portions of the Town Center and Residential Villages 1 and 2 would be constructed by the year 2015, less than 10 percent of the total UCP area would be constructed. Because less than 10 percent of the UCP area would have been constructed, traffic volumes would be substantially less than those associated with buildout of the UCP area. Other development within Merced would also be less when compared with the year 2025. For these reasons, cumulative roadway noise levels associated with the UCP area and other development in the County would not exceed County standards and this impact would be less than significant.

4.10-7 Development of the UCP would contribute to cumulative increases in non-traffic noise at land uses within and near the UCP.

Applicable Regulations: State Building Code (Title 24)

Significance: Significant

Mitigation Included in the UCP: Policies N 1.1, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 3.1, 3.2, and 3.3

Significance After Mitigation Included in the UCP: Less than Significant

Additional Mitigation: None required

Residual Significance: Less than Significant

Cumulative Buildout Scenario

The proposed UCP, in combination with cumulative development in the vicinity, would increase non-traffic noise throughout the UCP area and vicinity, primarily in the areas nearest the proposed UC Merced campus. Cumulative development would bring campus uses close to the UCP boundaries and to some locations within the UCP area. This would bring noise sources and increased noise levels to persons at the edges of the UCP area where cumulative development (i.e., the campus) would occur. UCP Policies N 1.1, 2.1, 2.2, 2.3, 2.4, and 2.5 would each effectively manage noise from land uses changes within County jurisdiction, taking into consideration land uses planned on the campus. Therefore, even though the campus would be outside County jurisdiction and would not be subject to the General Plan or UCP Policies, noise levels within and near the UCP should meet County standards.

2015 Cumulative Scenario

In 2015, portions of the Town Center and Residential Villages 1 and 2 would be developed. As a result, there would likely be some residential uses in proximity to the campus. Depending on the types of uses developed on the southern portion of the campus, residents could be exposed to high noise levels. However, as discussed above, the design and construction of new residential uses would take into account surrounding planned uses, and would ensure that County noise standards for residential areas are met. Therefore, this would be a less-than-significant impact.

4.10-8 Construction of the proposed UCP, in combination with other development in the County, could result in a substantial temporary or periodic increase in ambient noise levels.

Applicable Regulations: None

Significance: Significant

Mitigation Included in the UCP: Policy N 2.6

Significance After Mitigation Included in the UCP: Significant

Additional Mitigation: Mitigation Measure 4.10-8

Implement Mitigation Measures 4.10-4 and 4.10-5.

Residual Significance: Significant and UnavoidableCumulative Buildout Scenario

Construction activities related to cumulative development would likely overlap with construction related to UCP implementation. The combination of cumulative and project-related construction activities occurring throughout the area could substantially increase ambient noise levels above those occurring without the project. Implementation of UCP Policy N 2.6 would require sources affecting properties within the County to adequately reduce construction noise. Although construction related noise impacts would be reduced with the above UCP policy and implementation of Mitigation Measures 4.10-4 and 4.10-5 this impact would remain significant and unavoidable because multiple sites within the UCP area would be simultaneously under construction creating a substantial source of noise and because residents within the RRC would be adversely affected by the on-going construction activities.

2015 Cumulative Scenario

As with the Baseline plus Buildout Scenario, construction activities during the year 2015 in combination with other construction activities in the County, such as the campus, would contribute to excessive construction related noise levels. Mobile construction equipment may access both the campus and UCP area using Lake Boulevard and noise associated with construction activities would adversely impact residents along Lake Boulevard and residents on Hunt Farm. The above UCP policies and mitigation measures would reduce noise levels associated with construction activities but not to a level that is below County standards. Therefore, this would be a significant and unavoidable impact.

ENDNOTES

1. EIP Associates, *Draft Merced County University Community Plan Baseline Studies Report*, prepared for Community Planning Advisory Committee Review, August 2001.
2. John Brigham, Pilot, Bettencourt Aviation, personal communication, July 19, 2001.
3. Transportation Related Earthborne Vibrations, Caltrans Technical Advisory, July 24, 1992, regarding reconstruction of the San Francisco-Oakland Bay Bridge Toll Plaza in June of 1987.