APPENDIX F
ENVIRONMENTAL NOISE ASSESSMENT

ENVIRONMENTAL NOISE ASSESSMENT
NORTH SAN JOSE AREA EIR
SAN JOSE, CALIFORNIA

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INTRODUCTION

This report presents the results of the environmental noise assessment conducted for the North San Jose Redevelopment Area EIR. The major issues evaluated in the noise assessment include the compatibility of residential development with the noise environment at the respective development sites and the potential long-term and short-term impacts on existing sensitive development near each of the proposed sites due to construction noise and increased traffic noise. The Setting Section of the report presents a discussion of the fundamentals of environmental acoustics, regulatory background information, and a discussion of the existing noise environment in and around the North San Jose Redevelopment Area. The Impacts and Mitigation Measures Section describes the significance criteria used in the impact assessment, and evaluates project impacts with regard to noise and land use compatibility, project generated traffic, and project construction. Mitigation measures are presented to reduce potentially significant noise and land use compatibility and construction noise impacts to a less than significant level. Traffic noise generated by the project would result in a significant and unavoidable impact along certain roadway segments within and around the project area.

SETTING

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. *A decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level or dBA.* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for

describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level, CNEL*, is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level, L_{dn},* is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration (OSHA) has a noise exposure standard which is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for

multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA L_{dn} with open windows and 65-70 dBA L_{dn} if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. There is, therefore, an increase of about 1 percent per dBA between an L_{dn} of 60-70 dBA. Between an L_{dn} of 70-80 dBA, each decibel increase increases by about 2 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} is 60 dBA, approximately 10 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 2 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 3 percent increase in the percentage of the population highly annoyed.

TABLE 1 Definitions of Acoustical Terms Used in this Report

Term	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, Leq	The average A-weighted noise level during the measurement period. The hourly Leq used for this report is denoted as dBA $L_{eq[h]}$.
Lmax RMS Level	The maximum root-mean-square (RMS) sound pressure level during a measurement – measured using the "fast" exponential time constant.
L_{01}, L_{05}, L_{10}, L_{90}	The A-weighted noise levels that are exceeded 1%, 5%, 10%, and 90% of the time during the measurement period.
Day-Night Average Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Noise Source	Noise Level (dBA)	Common Indoor Noise Source
	120 dBA	
Jet fly-over at 300 meters		Rock concert
	110 dBA	
Pile driver at 20 meters	100 dBA	
		Night club with live music
	90 dBA	
Large truck pass by at 15 meters		
	80 dBA	Noisy restaurant
		Garbage disposal at 1 meter
Gas lawn mower at 30 meters	70 dBA	Vacuum cleaner at 3 meters
Commercial/Urban area daytime		Normal speech at 1 meter
Suburban expressway at 90 meters	60 dBA	
Suburban daytime		Active office environment
	50 dBA	
Urban area nighttime		Quiet office environment
	40 dBA	
Suburban nighttime		
Quiet rural areas	30 dBA	Library
		Quiet bedroom at night
Wilderness area	20 dBA	
	10 dBA	Quiet recording studio
	0 dBA	Threshold of human hearing

Regulatory Background

The State of California, the Santa Clara County Airport Land Use Commission (ALUC), and the City of San Jose establish guidelines, regulations, and policies designed to limit noise exposure at noise sensitive land uses. Appendix G of the State CEQA Guidelines, the State of California Building Code, the Santa Clara County Airport Land Use Plan, and the City of San Jose's 2020 Plan present the following:

State CEQA Guidelines. The California Environmental Quality Act (CEQA) contains guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. CEQA asks whether the proposed project would result in:

- 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?
- 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?

CEQA does not define what noise level increase would be considered substantial. Typically, project-generated noise level increases of 3 DNL or greater would be considered significant where exterior noise levels would exceed the normally acceptable noise level standard (60 DNL). Where noise levels would remain below the normally acceptable noise level standard with the project, noise level increases of 5 DNL or greater would be considered significant.

Section 1208 of the 1998 California Building Code. New multi-family housing in the State of California is subject to the environmental noise limits set forth in Appendix Chapter 1208A.8.4 of the California Building Code. The noise limit is a maximum interior noise level of 45 DNL. Where exterior noise levels exceed 60 DNL, a report must be submitted with the building plans describing the noise control measures that have been incorporated into the design of the project to meet the noise limit.

Santa Clara County Airport Land Use Plan. The Santa Clara County Airport Land Use Plan establishes airport noise and land use compatibility standards for development within the vicinity of the airport. CNEL noise contours presented in this plan are used to evaluate land use compatibility for the proposed developments, and the 65 CNEL noise contour is recognized as the residential and commercial land use "satisfactory" noise limit for compatible land uses.

Residential land uses proposed within this noise contour should be avoided unless they are related to airport service. Commercial land uses proposed within the 65 CNEL noise contour and the 75 CNEL noise contour should be reviewed carefully to ensure that the noise insulation features to maintain an acceptable interior noise environment are adequate.

Policies adopted by the ALUC that pertain to the project are as follows:

N-1: The CNEL noise contours, which have been developed for San Jose International Airport, shall be used for general guidance in determining suitability for various types of land uses.

N-2: Within the 65 CNEL noise contour at SJIA, the ALUC shall also consider single-event noise exposure levels in addition to the CNEL contours, when determining suitability of new land uses.

N-3: New residential uses within the 65 CNEL and 70 CNEL noise contours, which can be classified as infill, will be considered only if it is demonstrated that such structures can be adequately insulated to control interior noise, if the ALUC finds that exterior noise will not be intrusive, and if an avigation easement has been willingly granted to the jurisdiction owning the airport (i.e., City of San Jose).

N–4: New land uses other than residential proposed within areas deemed incompatible are subject to case-by-case review, and can only be approved if the ALUC finds that adequate insulation for control of interior noise levels is designed into the plans and the single-event noise level for that new land use is compatible with the type of use proposed, and does not pose public health or safety issues.

N-7: Establishes the basis for determining the interior noise control required for various land uses located certain distances from aircraft operations at SJIA.

N-8: Establishes the acoustical rating system, Sound Transmission Class (STC) as a guide to the acoustical performance of common building construction elements in determining noise transmission loss.

City of San Jose General Plan. The Noise Element of the City of San Jose's 2020 Plan identifies noise and land use compatibility standards for various land uses. The City's goal is to, "...minimize the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies."

Residential land uses are considered "satisfactory" up to 60 DNL as the short-range exterior noise quality level, and 55 DNL as the long-range exterior noise quality level. The guidelines state that where the exterior DNL is above the "satisfactory" limit (between 60 and 70 DNL), and the project requires a full EIR, an acoustical analysis should be made indicating the amount of

attenuation necessary to maintain an indoor level of less than or equal to 45 DNL (consistent with the State Building Code). Noise levels exceeding 70 DNL require that new development would only be permitted if uses are entirely indoors and building design limits interior levels to less than or equal to 45 DNL. Outside activity areas should be permitted if site planning and noise barriers result in levels of 60 DNL or less.

Policy 1. The City's acceptable noise level objectives are 55 DNL as the long-range exterior noise quality level, 60 DNL as the short-range exterior noise quality level, 45 DNL as the interior noise quality level, and 76 DNL as the maximum exterior noise level necessary to avoid significant adverse health effects. These objectives are established for the City, recognizing that the attainment of exterior noise quality levels in the environs of the San Jose International Airport, the Downtown Core Area, and along major roadways may not be achieved in the time frame of this Plan. To achieve the noise objectives, the City should require appropriate site and building design, building construction and noise attenuation techniques in new residential development.

Policy 9. Construction operations should use available noise suppression devices and techniques.

Policy 11. When located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses, non-residential land uses should mitigate noise generation to meet the 55 DNL guideline at the property line.

The General Plan sets forth the following urban design policies regarding sound attenuation along city streets:

Policy 18. To the extent feasible, sound attenuation for development along city streets should be accomplished through the use of landscaping, setback, and building design rather than the use of sound attenuation walls. Where sound attenuation walls are deemed necessary, landscaping and an aesthetically pleasing design shall be used to minimize visual impact.

Policy 21. To promote safety and to minimize noise impacts in residential and working environments, development which is proposed adjacent to railroad lines should be designed to provide the maximum separation between the rail line and dwelling units, yards or common open space areas, offices, and other job locations, facilities for the storage of toxic or explosive materials and the like. To the extent possible, areas of development closest to an adjacent railroad line should be devoted to parking lots, public streets, peripheral landscaping, the storage of non-hazardous materials, and so forth.

Existing Noise Environment

This section discusses the sources of environmental noise within and around the project area. A noise monitoring survey was conducted between July 15th, 2004 and August 9th, 2004. The survey consisted of a combination of 8 long-term noise measurements and 5 short-term noise measurements. Each noise measurement was made with a Larson Davis Model 820 sound level meter fitted with a precision microphone. Noise monitoring locations are shown on Figure 1. Existing hourly noise levels measured at the long-term sites are shown graphically on Figures 2-9.

The North San Jose Redevelopment Area can be roughly defined as the land bounded to the north by Route 237, to the east by Interstate 880, to the south by Highway 101, and to the west by the Guadalupe River. The project area is primarily developed with office buildings and other commercial land uses (including retail stores and restaurants). Existing residential areas within the plan area are generally located in the Rincon North area. Residential land uses also bound the project area to the west, east, and south. The noise environment throughout the project area consists primarily of vehicular traffic along the arterial roadways. Aircraft associated with the Mineta San Jose International Airport also contribute to the noise environment throughout the project limits and surrounding areas. The majority of the North San Jose Development Area is outside of the 60 CNEL contour for 2010 Master Plan Conditions of the Mineta San Jose International Airport. There are portions of the plan area north and east of the airport that would be located within the 2010 Master Plan Conditions 60 CNEL noise contour.

After reviewing the existing and projected traffic volumes for roadways in and around the project area, the following locations were selected to best represent the noise environment generated by the predominant roadway noise sources.

LT-1 was located approximately 36 yards (108 feet) from the centerline of Zanker Road, south of Montague Expressway. The meter was placed in the parking lot of an unoccupied office building, to quantify noise generated by traffic along Zanker Road. The day-night average noise level (DNL) on a typical weekday, calculated based on the hourly noise level data measured at this monitoring location, was 64 dBA.

LT-2 was located approximately 22 yards (66 feet) from the centerline of Montague Expressway, between Zanker Road and Trimble Road. The noise environment at this location consisted entirely of traffic along Montague Expressway. The day-night average noise level (DNL) was 77 dBA.

LT-3 was located approximately 27 yards (81 feet) from the centerline of North 1st Street, south of Montague Expressway. Again, the meter was placed in the parking lot of an unoccupied office building to document noise generated by North 1st Street and the San Jose Light-Rail.

Through observation and review of the data collected at the site, it was determined that the light rail is not a major contributor to the overall noise environment. The day-night average noise level (DNL) was 68 dBA.

LT-4 was located approximately 27 yards (81 feet) from the centerline of Trimble Road, west of North 1st Street. The noise environment at this location consisted primarily of vehicular traffic along Trimble Road. The day-night average noise level (DNL) was 73 dBA.

LT-5 was located behind the Bay 101 Hotel on Bering Drive. The hotel property is bounded to the south by Highway 101. The meter was placed approximately 37 yards (111 feet) from the centerline of Highway 101. The day-night average noise level (DNL) generated by Highway 101 was 83 dBA.

LT-6 was located along O'Toole Drive adjacent to Interstate 880. With the exception of intermittent traffic on O'Toole Drive, the noise environment at this location consisted primarily of traffic along Interstate 880. The day-night average noise level (DNL) was 75 dBA.

LT-7 was located approximately 30 yards (90 feet) from the centerline of Tasman Drive, east of North 1st Street. Similar to North 1st Street, the San Jose Light Rail runs down the center of this section of Tasman Drive. The day-night average noise level (DNL) was 66 dBA.

LT-8 was located approximately 39 yards (117 feet) from the centerline of Route 237, east of North 1st Street. The noise environment at this location consists primarily of traffic along Route 237. The day-night average noise level (DNL) was 80 dBA.

Five short-term measurements were made along other roadways within and around the project area. The locations of these five measurements are as follows:

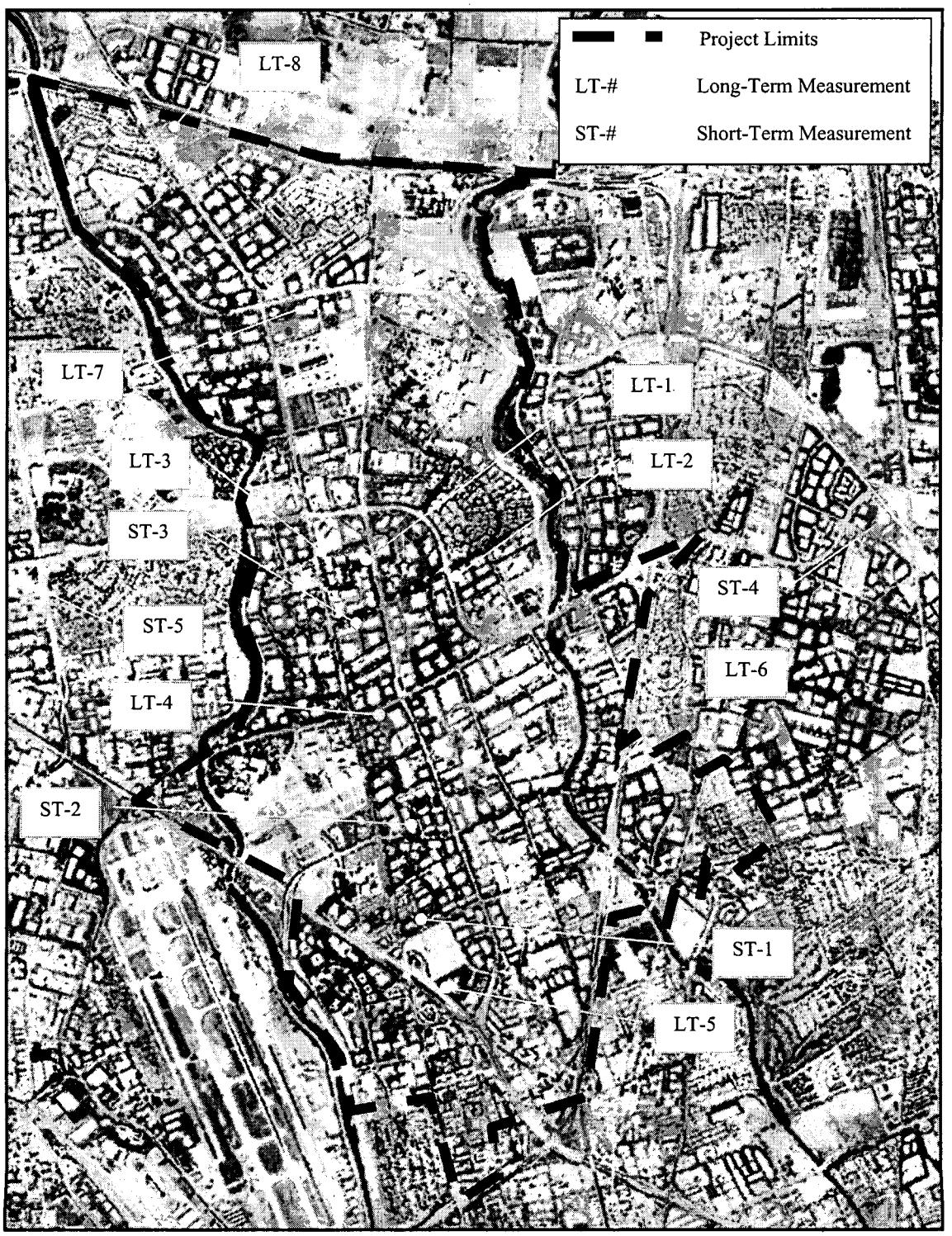
- ST-1: Approximately 27 yards (81 feet) from the centerline of Brokaw Road, east of North 1st Street.
- ST-2: Approximately 19 yards (57 feet) from the centerline of Charcot Road, east of North 1st Street.
- ST-3: Approximately 19 yards (57 feet) from the centerline of Plumeria Road, east of North 1st Street.
- ST-4: Approximately 34 yards (102 feet) from the centerline of Capitol Avenue, south of Montague Expressway.
- ST-5: Approximately 19 yards (57 feet) from the centerline of Lafayette Street, south of Montague Expressway.

During each of the five measurements, data were recorded and traffic was counted for a period of 10 minutes. The results of these short-term measurements are summarized in the following table (Table 3).

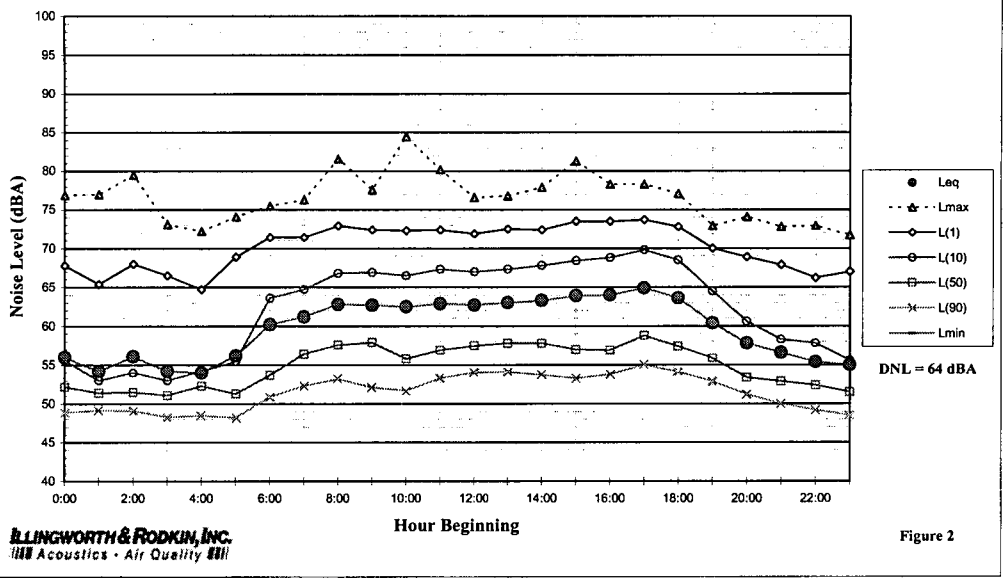
TABLE 3 Short-Term Noise Measurement Data

Site	Location	Date	Leq	L(1)	L(10)	L(50)	L(90)
ST-1	~ 27 yards from the centerline of Brokaw Road, east of North 1st Street.	7/15/2004	66	73	70	63	57
ST-2	~ 19 yards from the centerline of Charcot Road, north of North 1st Street.	7/15/2004	66	75	70	64	56
ST-3	~ 19 yards from the centerline of Plumeria Road, east of North 1st Street.	7/15/2004	58	67	62	53	50
ST-4	~ 34 yards from the centerline of Capitol Avenue, south of Montague Expressway.	8/9/2004	69	78	73	63	56
ST-5	~ 19 yards from the centerline of Lafayette Street, south of Montague Expressway.	8/9/2004	72	85	75	66	60

Figure 1 Plan Area Showing Approximate Noise Measurement Locations



Noise Levels at LT-1
~ 36 yards from theCenterline of Zanker Road
July 16th, 2004



DNL = 64 dBA

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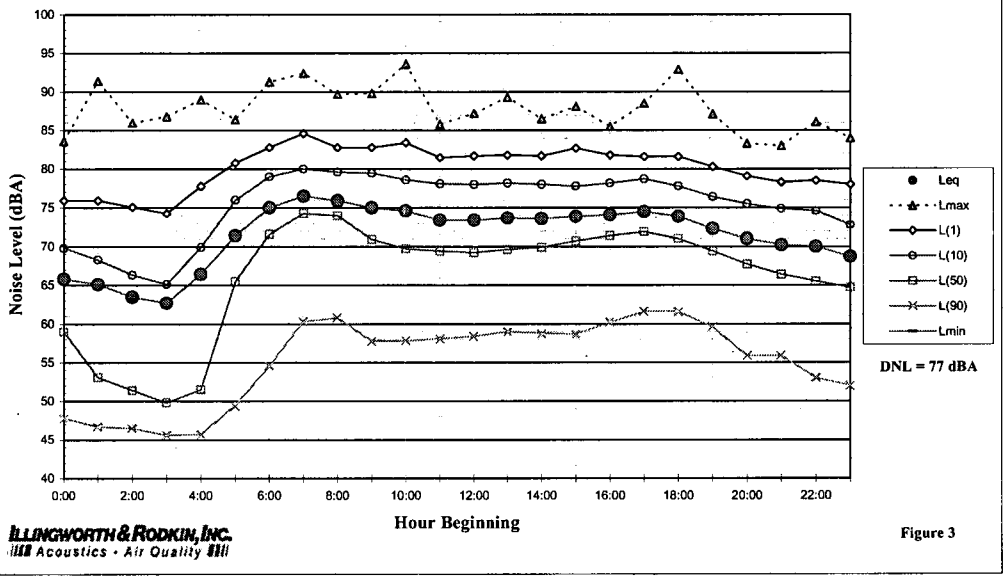
Figure 2

Noise Levels at LT-2
~ 22 yards from the Centerline of Montague Expressway
July 16th, 2004



DNL = 77 dBA

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Figure 3

Noise Levels at LT-3
~ 27 yards from the Centerline of North First Street
July 16th, 2004

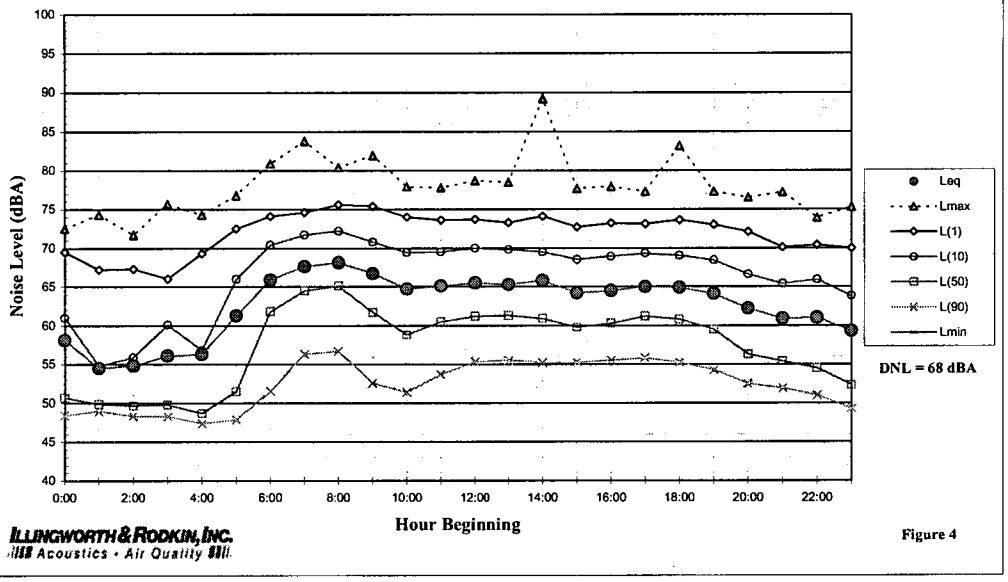

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Figure 4

Noise Levels at LT-4
~ 27 yards from the Centerline of Trimble Road
July 16th, 2004

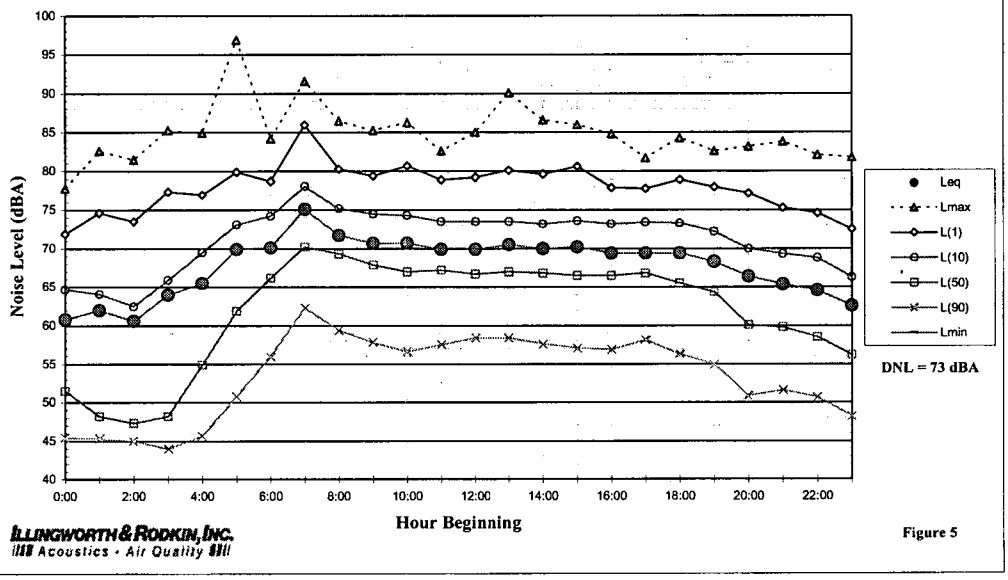

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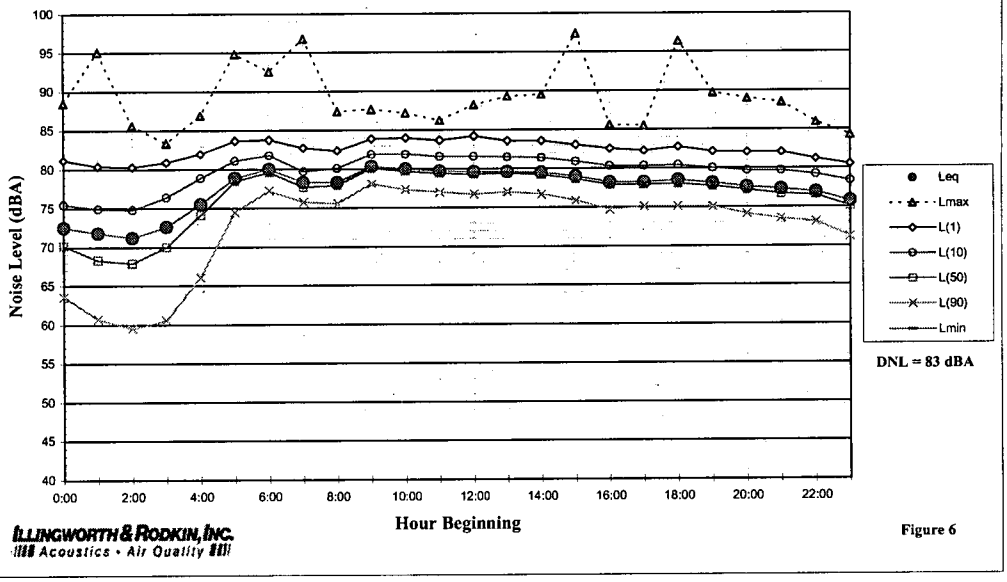
Figure 5

Noise Levels at LT-5
~ 37 yards from the Centerline of Highway 101
August 6th, 2004



DNL = 83 dBA

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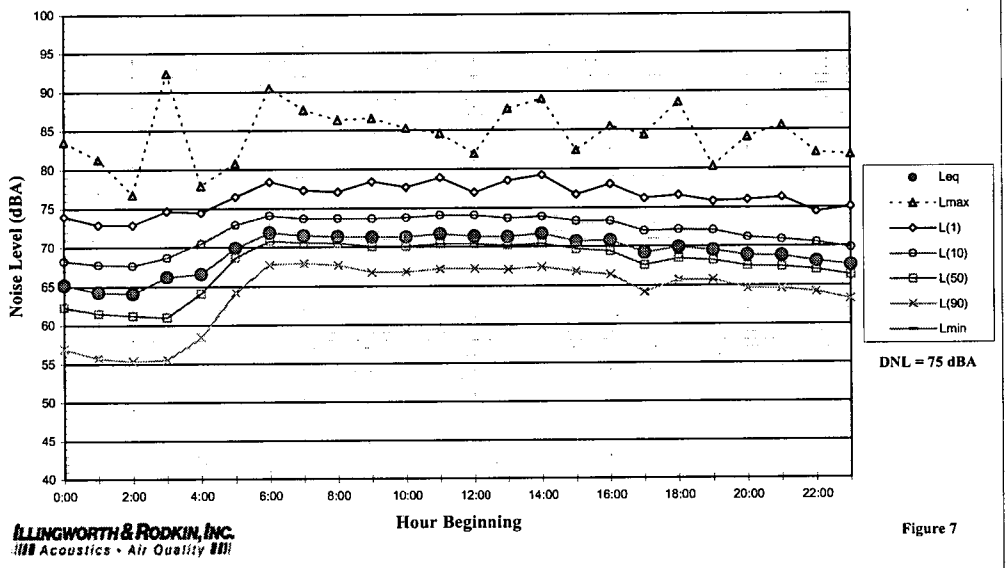
Figure 6

Noise Levels at LT-6
~ 65 yards from the Centerline of Interstate 880
August 6th, 2004



DNL = 75 dBA

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Figure 7

Noise Levels at LT-7
~ 30 yards from the Centerline of Tasman Drive
August 6th, 2004

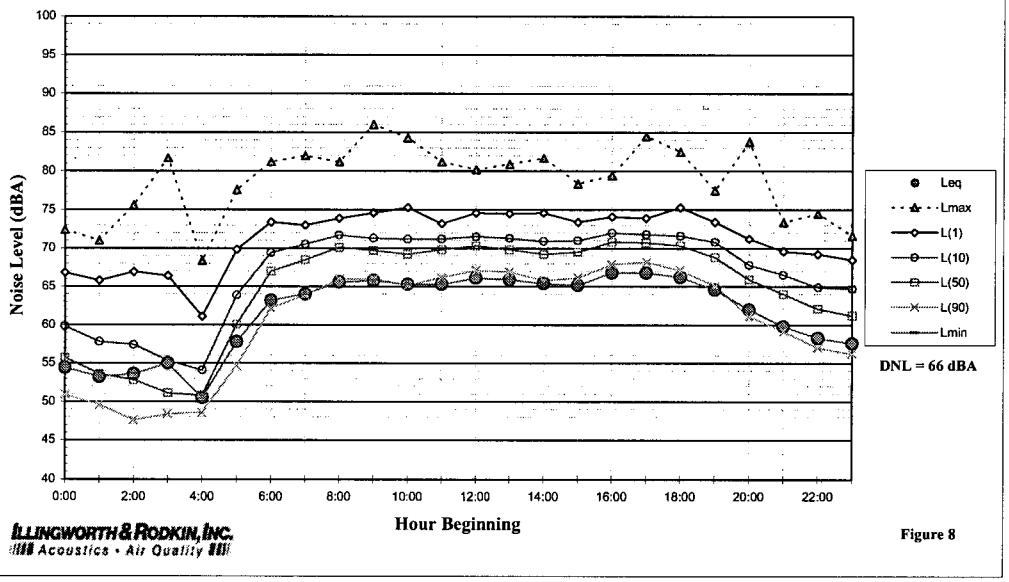

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Figure 8

Noise Levels at LT-8
~ 39 yards from the Centerline of Highway 237
August 6th, 2004

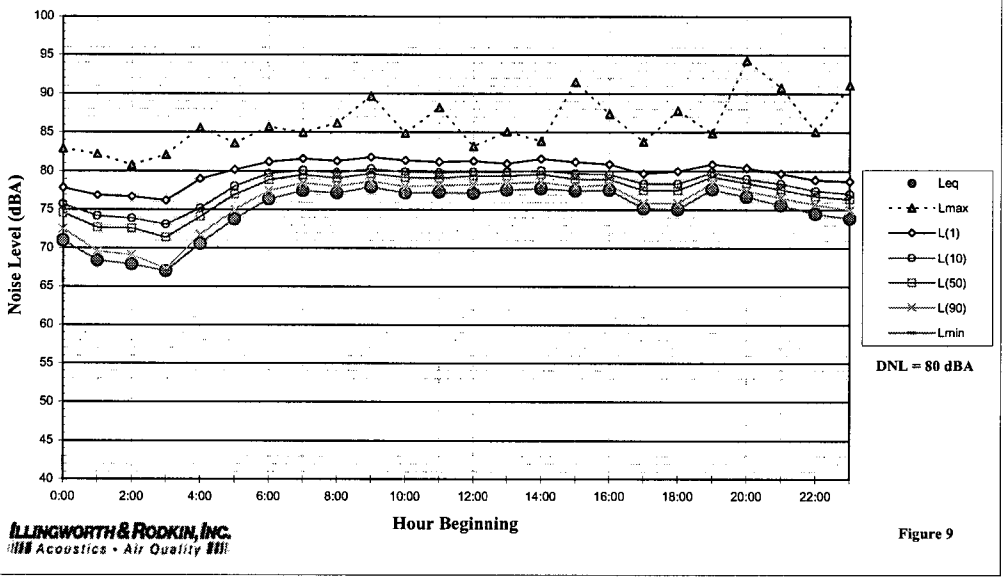

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Figure 9

PROJECT IMPACT AND MITIGATION MEASURES

Significance Criteria

- A significant impact would be identified for a proposed land use if it would be exposed to noise levels exceeding the City's established guidelines for noise and land use compatibility. For the proposed project, a significant impact would be identified if noise-sensitive receivers proposed by the project would be exposed to noise levels exceeding the City's established guidelines for "satisfactory" noise and land use compatibility.

- According to CEQA, a significant noise impact would result if noise levels increase substantially at existing noise-sensitive land uses (e.g., residences) as a result of the project. A substantial increase to noise levels would occur if the project resulted in an increase of 3 dBA or greater at noise-sensitive land uses where noise levels already exceed 60 DNL.

- Construction noise levels would be treated somewhat differently because they are temporary. Significant noise impacts would result from construction if noise levels are sufficiently high to interfere with speech, sleep, or normal residential activities. Construction-related hourly average noise levels received at noise-sensitive land uses exceeding 60 dBA $L_{eq(hr)}$, and at least 5 dBA above the ambient, would be considered significant if the noise-generating construction phase lasted more than 12 months.

- A significant noise impact would occur if the project located noise sensitive land uses in the vicinity of the Mineta San Jose International Airport and noise levels exceeded the applicable standards of the Santa Clara County ALUC or the City of San Jose.

Noise impacts resulting from the proposed project fall into four major categories:

(1) The potential effects of environmental noise on the developability of the sites;
(2) Potential increases in traffic noise resulting from project-generated traffic;
(3) Short-term noise impacts resulting from construction;
(4) Effects of environmental noise generated by the Mineta San Jose International Airport on proposed noise-sensitive receivers.

Impact 1: Noise and Land Use Compatibility.
The project would introduce noise-sensitive uses into a noise environment that exceeds the "satisfactory" level for new construction. **This is a potentially significant impact.**

Approximately 38,400 new dwelling units would be constructed with the implementation of the project. Noise-sensitive residential uses would generally be concentrated along the North 1st Street, Zanker Road, and North 4th Street corridors in the vicinity of major cross-streets including Tasman Drive, River Oaks Parkway, Montague Expressway, Plumeria Drive, Trimble Road, Guadalupe Parkway, Charcot Avenue, and Brokaw Road. In addition, residential land uses are proposed in areas adjoining Highway 101 and Interstate 880 east of Mineta San Jose International Airport. Vehicular traffic along highways and major roadways traversing the project area would generate noise levels in excess of 60 DNL. Mineta San Jose International Airport would also generate noise levels in excess of 60 DNL at portions of the project area northeast and east of the airport (discussed in detail in Impact 4).

Table 4 summarizes noise contour distances calculated for highway and major north-south and east-west roadways in and around the project area. The contour distances are given by roadway segment and are relative to the center of the roadway. These contours do not account for shielding by barriers, buildings, or other excess attenuation that may occur at a particular development site, but are provided to identify the "worst-case" noise exposure that could affect residential land use proposals in the project area. A noise-sensitive development site falling within the 60 DNL noise contour would exceed the "satisfactory" level for noise and land use compatibility and should be analyzed during project level design to identify exterior and interior noise attenuation measures that could be included into the project design to achieve acceptable exterior and interior noise levels.

TABLE 4 Noise Contour Distances for Project Conditions

Roadway	Segment	Project DNL (dBA) 75' from Roadway Center	Contour Distance from Roadway Center (feet) 70 DNL	65 DNL	60 DNL
HIGHWAYS					
SR 237	Project Vicinity - 100 ft. from Center	81	520	1110	2400
Highway 101	Project Vicinity - 100 ft. from Center	83	680	1470	3160
Interstate 880	Project Vicinity - 100 ft. from Center	80	450	970	2090
SR 87	Project Vicinity - 100 ft. from Center	78	340	740	1580
NORTH-SOUTH					
North 1st Street					
	south of SR 237	69	60	140	300
	south of Headquarters Drive	70	70	160	340
	south of Tasman Drive	69	70	140	310
	south of River Oaks Drive	71	80	180	380
	south of Montague Expressway	70	80	170	360
	south of Plumeria Drive	70	80	170	360
	south of Trimble Road	72	100	210	460
	south of Charcot Avenue	71	90	190	410
	south of Brokaw Road	71	80	180	390
	south of Skyport Drive	72	100	220	470
Zanker Road					
	south of SR 237	70	80	170	370
	south of Tasman Drive	70	80	160	360
	south of River Oaks Drive	72	100	210	460
	south of Montague Expressway	71	90	200	430
	south of Plumeria Drive	72	100	230	490
	south of Trimble Road	73	130	270	590
	south of Charcot Avenue	73	110	240	520
	south of Brokaw Road	72	90	200	440
Lafayette Street					
	north of Hope Drive	72	110	230	490
	south of Hope Drive	73	110	240	520
	south of Montague Expressway	72	110	240	510
	south of Central Expressway	73	120	270	580
	south of El Camino Real	72	100	220	480
	south of Benton Street	73	120	250	540
McCarthy Boulevard					
	north of Tasman Drive	65	--	80	160
	south of Tasman Drive	66	--	80	180
	south of Montague Expressway	65	--	80	160
Junction Avenue					
	north of Trimble Road	61	--	--	90
	south of Trimble Road	64	--	60	130
	south of Charcot Avenue	65	--	70	150
	south of Brokaw Road	63	--	--	110
Orchard Road					
	north of Trimble Road	62	--	--	100
	south of Trimble Road	65	--	80	160
Oakland Road					
	north of Montague Expressway	75	150	330	700
	south of Montague Expressway	75	150	320	700
	south of Brokaw Road	74	150	320	680
	south of Highway 101	74	140	310	670
North 4th Street					
	north of Hedding Street	64	--	60	130
	south of Hedding Street	64	--	60	140
	south of Julian Street	64	--	70	150
	south of St. James Street	64	--	60	140
North 11th Street					
	south of Hedding Street	61	--	--	80
	south of Julian Street	62	--	--	100
	south of St. James Street	62	--	--	100

TABLE 4 Noise Contour Distances for Project Conditions

Roadway	Segment	Project DNL (dBA) 75' from Roadway Center	Contour Distance from Roadway Center (feet) 70 DNL	65 DNL	60 DNL
EAST-WEST					
Tasman Drive					
	east of Lawrence Expressway	68	--	110	240
	east of Great America Parkway	68	--	120	250
	east of Renaissance Drive	69	60	130	280
	east of North 1st Street	69	60	130	290
	east of Zanker Road	71	90	190	410
	east of McCarthy Road	70	80	170	370
River Oaks Parkway					
	west of North 1st Street	61	--	--	90
	east of North 1st Street	63	--	60	120
	east of Zanker Road	65	--	70	150
	west of Montague Expressway	67	--	100	210
Montague Expressway					
	west of Mission College Boulevard	82	450	970	2080
	east of Mission College Boulevard	81	390	840	1810
	east of De La Cruz Boulevard	81	380	810	1750
	east of North 1st Street	80	330	710	1530
	east of Zanker Road	78	270	590	1260
	east of Trimble Road	81	400	860	1850
	east of Oakland Road	80	350	740	1600
	east of Milpitas Boulevard	79	280	600	1290
Plumeria Drive					
	west of North 1st Street	60	--	--	80
	east of North 1st Street	62	--	--	110
	east of Zanker Road	65	--	70	150
Trimble Road					
	east of De La Cruz Boulevard	76	190	410	880
	east of Orchard Parkway	75	170	360	770
	east of North 1st Street	76	190	420	900
	east of Zanker Road	76	200	430	930
	east of Junction Avenue	75	160	350	750
Guadalupe Parkway					
	west of Orchard Parkway	71	90	200	420
	east of Orchard Parkway	71	90	190	410
Charcot Avenue					
	east of North 1st Street	70	70	160	340
	east of Zanker Road	69	70	150	320
	east of Junction Avenue	70	70	160	340
Brokaw Road					
	west of North 1st Street	71	80	180	380
	east of North 1st Street	71	90	190	400
	east of Zanker Road	73	110	240	530
	east of Junction Avenue	71	90	200	440
	east of Ridder Park Drive	71	90	190	420
	east of Oakland Road	71	90	190	410
Hedding Street					
	west of The Alameda	65	--	70	150
	east of The Alameda	65	--	80	170
	east of North 4th Street	65	--	70	150
	east of North 10th Street	66	--	90	200
	east of North 13th Street	65	--	70	150
Taylor Street					
	west of The Alameda	62	--	--	100
	east of The Alameda	64	--	60	130
	east of North 4th Street	65	--	80	160
	east of North 10th Street	65	--	70	150
	east of North 13th Street	65	--	80	160
Julian Street					
	west of North 4th Street	63	--	60	120
	east of North 4th Street	62	--	--	110
	east of North 7th Street	64	--	60	140
	east of North 10th Street	63	--	60	120
	east of North 11th Street	63	--	--	120
	east of North 17th Street	62	--	--	110
	east of North 13th Street	63	--	60	120
St. James Street					
	west of North 4th Street	61	--	--	90
	east of North 4th Street	61	--	--	90
	east of North 10th Street	62	--	--	110
	east of North 11th Street	62	--	--	100

Mitigation Measures:

The following mitigation measures would reduce the impact to a less-than-significant level:

- Prohibit residential construction within the 60 DNL noise contours for area roadways, or:

- Maintain a sufficient buffer (open space) between area roadways and future sensitive land uses. Mitigation measures could include a combination of open space buffer areas, sound barriers, and building design to create common and private outdoor use areas with noise exposures of 60 DNL or less. As an alternative, less sensitive land uses (commercial, office, business park, or industrial) should be located between more-sensitive uses and project area roadways. Such uses would act to shield the more-sensitive uses allowing for a compatible residential noise environment closer than the distances identified in the impact section above.

- Retain a qualified Acoustical Engineer to prepare for City review and approval a detailed acoustical analysis of exterior and interior noise reduction requirements and specifications for all project phases, in accordance with State and City standards. Project-specific acoustical analyses are mandated by the State for new multi-family uses. Appropriate noise control treatments necessary to achieve a compatible interior noise environment (45 DNL) shall be incorporated into the proposed structures located within the 60 DNL contour. The City of San Jose also establishes 45 DNL as the interior noise limit for residential and commercial land uses. Interior noise levels could be reduced to acceptable levels by including such measures as forced-air mechanical ventilation systems and/or sound-rated construction to allow occupants the option of controlling noise in interior spaces by maintaining the windows closed.

Impact 2: **Off-Site Project-Generated Traffic Noise.**
The operation of the project will generate an increase in traffic along the local roadway network and will substantially increase noise levels at noise sensitive receptors in the project area on a permanent basis. Additionally, there are several roadway links outside of the project area that would be adversely affected by the implementation of the project. **This is a significant and unavoidable impact.**

Based upon a review of the traffic study prepared by *Hexagon Transportation Consultants, Inc.*, the proposed project would substantially increase traffic noise levels throughout the project area and in surrounding areas. Table 5 shows the roadway links that are calculated to experience a substantial (3 dBA or more) noise increase as a result of the project.

The North San Jose Redevelopment Area and vicinity contains a variety of land uses with varying sensitivities to noise. Residential land uses would likely be most affected by traffic noise level

increases. Industrial land uses would not generally be affected by an increase in traffic noise. Office and commercial uses may or may not be affected by traffic noise increases along the local roadway network. The noise environment would be noticeably increased over existing conditions with the implementation of the project and would affect various land uses differently.

Methods available to mitigate project generated noise level increases would need to be studied on a case-by-case basis at receivers that would be considered noise impacted. Noise reduction methods could include the following:

- New or larger noise barriers or other noise reduction techniques could be constructed to protect existing residential land uses where reasonable and feasible.

- Alternative noise reduction techniques could be implemented, such as re-paving the streets with "quiet" pavement types such as Open-Grade Asphaltic Concrete. The use of "quiet" pavement can reduce noise levels by 2 to 5 dBA depending on the existing pavement type, traffic speed, traffic volumes, and other factors.

- Installing traffic calming measures to slow traffic.

- Affected residences could be provided building sound insulation such as sound rated windows and doors on a case-by-case basis as a method of reducing noise levels in interior spaces.

Given the scope of the project and expected noise level increases resulting from project traffic, it may not be reasonable or feasible to reduce project-generated traffic noise at affected receivers. The increase in development density would increase noise levels noticeably at receivers. Measures available to reduce the project noise level increases would not likely be reasonable or feasible in all areas, therefore, the impact would be considered significant and unavoidable.

TABLE 5 Project Generated Noise Level Increases

Roadway	Segment	Existing DNL (dBA) 75' from Roadway Center	Project DNL (dBA) 75' from Roadway Center	Traffic Noise Level Increase (dBA)
NORTH-SOUTH				
North 1st Street				
	south of SR 237	66	69	**3**
	south of Headquarters Drive	67	70	**3**
	south of Tasman Drive	67	69	2
	south of River Oaks Drive	69	71	1
	south of Montague Expressway	68	70	2
	south of Plumeria Drive	67	70	**3**
	south of Trimble Road	70	72	2
	south of Charcot Avenue	68	71	**3**
	south of Brokaw Road	69	71	2
	south of Skyport Drive	69	72	**3**
Zanker Road				
	south of SR 237	68	70	**3**
	south of Tasman Drive	66	70	**4**
	south of River Oaks Drive	66	72	**6**
	south of Montague Expressway	66	71	**6**
	south of Plumeria Drive	67	72	**5**
	south of Trimble Road	70	73	**4**
	south of Charcot Avenue	69	73	**4**
	south of Brokaw Road	69	72	**3**
Lafayette Street				
	north of Hope Drive	71	72	2
	south of Hope Drive	71	73	2
	south of Montague Expressway	70	72	2
	south of Central Expressway	73	73	1
	south of El Camino Real	71	72	1
	south of Benton Street	72	73	1
McCarthy Boulevard				
	north of Tasman Drive	63	65	2
	south of Tasman Drive	63	66	**3**
	south of Montague Expressway	63	65	2
Junction Avenue				
	north of Trimble Road	60	61	1
	south of Trimble Road	61	64	**3**
	south of Charcot Avenue	62	65	**3**
	south of Brokaw Road	61	63	1
Orchard Road				
	north of Trimble Road	60	62	2
	south of Trimble Road	<60	65	**NA**
Oakland Road				
	north of Montague Expressway	72	75	2
	south of Montague Expressway	72	75	**3**
	south of Brokaw Road	72	74	**3**
	south of Highway 101	73	74	1
North 4th Street				
	north of Hedding Street	63	64	1
	south of Hedding Street	63	64	1
	south of Julian Street	63	64	2
	south of St. James Street	62	64	2
North 11th Street				
	south of Hedding Street	58	61	**3**
	south of Julian Street	59	62	**3**
	south of St. James Street	59	62	**3**

TABLE 5 Project Generated Noise Level Increases

Roadway	Segment	Existing DNL (dBA) 75' from Roadway Center	Project DNL (dBA) 75' from Roadway Center	Traffic Noise Level Increase (dBA)
EAST-WEST				
Tasman Drive				
	east of Lawrence Expressway	67	68	0
	east of Great America Parkway	67	68	1
	east of Renaissance Drive	68	69	1
	east of North 1st Street	67	69	2
	east of Zanker Road	69	71	2
	east of McCarthy Road	68	70	2
River Oaks Parkway				
	west of North 1st Street	60	61	1
	east of North 1st Street	62	63	2
	east of Zanker Road	62	65	3
	west of Montague Expressway	63	67	4
Montague Expressway				
	west of Mission College Boulevar	79	82	2
	east of Mission College Boulevar	78	81	2
	east of De La Cruz Boulevard	77	81	3
	east of North 1st Street	77	80	2
	east of Zanker Road	76	78	2
	east of Trimble Road	79	81	2
	east of Oakland Road	78	80	2
	east of Milpitas Boulevard	77	79	2
Plumeria Drive				
	west of North 1st Street	57	60	3
	east of North 1st Street	59	62	3
	east of Zanker Road	60	65	5
Trimble Road				
	east of De La Cruz Boulevard	75	76	1
	east of Orchard Parkway	74	75	1
	east of North 1st Street	74	76	3
	east of Zanker Road	74	76	2
	east of Junction Avenue	73	75	2
Guadalupe Parkway				
	west of Orchard Parkway	67	71	4
	east of Orchard Parkway	68	71	3
Charcot Avenue				
	east of North 1st Street	67	70	3
	east of Zanker Road	65	69	5
	east of Junction Avenue	65	70	4
Brokaw Road				
	west of North 1st Street	69	71	2
	east of North 1st Street	69	71	2
	east of Zanker Road	70	73	2
	east of Junction Avenue	70	71	1
	east of Ridder Park Drive	71	71	1
	east of Oakland Road	70	71	1

TABLE 5 Project Generated Noise Level Increases

Roadway	Segment	Existing DNL (dBA) 75' from Roadway Center	Project DNL (dBA) 75' from Roadway Center	Traffic Noise Level Increase (dBA)
EAST-WEST				
Hedding Street				
	west of The Alameda	63	65	2
	east of The Alameda	64	65	1
	east of North 4th Street	63	65	2
	east of North 10th Street	64	66	2
	east of North 13th Street	64	65	0
Taylor Street				
	west of The Alameda	60	62	2
	east of The Alameda	63	64	1
	east of North 4th Street	63	65	2
	east of North 10th Street	62	65	**3**
	east of North 13th Street	62	65	**3**
Julian Street				
	west of North 4th Street	59	63	**4**
	east of North 4th Street	59	62	**3**
	east of North 7th Street	59	64	**5**
	east of North 10th Street	59	63	**5**
	east of North 11th Street	58	63	**5**
	east of North 17th Street	58	62	**4**
	east of North 13th Street	60	63	**3**
St. James Street				
	west of North 4th Street	61	61	0
	east of North 4th Street	61	61	0
	east of North 10th Street	60	62	2
	east of North 11th Street	60	62	2

Impact 3: Construction Noise.
The construction of the project would temporarily elevate noise levels at adjacent noise-sensitive land uses. **This is a potentially significant impact.**

The development of the project would generate noise and would temporarily increase noise levels at adjacent land uses. Noise impacts resulting from construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise generating activities, and the distance between construction noise sources and noise sensitive receptors. Where noise from construction activities exceeds 60 dBA $L_{eq(hr)}$ and the ambient noise environment by at least 5 dBA, the impact would be considered significant.

Construction activities generate considerable amounts of noise, especially during the demolition phase and the construction of project infrastructure when heavy equipment is used. The highest maximum noise levels generated by project construction would typically range from about 90 to 105 dBA at a distance of 50 feet from the noise source. Typical hourly average construction generated noise levels are about 81 dBA to 89 dBA measured at a distance of 50 feet from the center of the site during busy construction periods (e.g., earth moving equipment, impact tools, etc.) Construction generated noise levels drop off at a rate of about 6 dBA per doubling of distance between the source and receptor. Shielding by buildings or terrain often result in much lower construction noise levels at distant receptors.

Typically, small residential, commercial, or office construction projects do not generate significant noise impacts when standard construction noise control measures are enforced at the project site and when the duration of the noise generating construction period is limited to one construction season (typically one year) or less. Construction noises associated with projects of this type are disturbances that are necessary for the construction or repair of buildings and structures in urban areas. Reasonable regulation of the hours of construction, as well as regulation of the arrival and operation of heavy equipment and the delivery of construction materials, are necessary to protect the health and safety of persons, promote the general welfare of the community, and maintain the quality of life.

Larger construction projects are typically built out over more than one construction season, and some construction methods, such as pile driving, generate higher noise levels and noise that would be considered impulsive. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise sensitive land uses, or when construction durations last over extended periods of time. Limiting the hours when construction can occur to daytime hours is often a simple method to reduce the potential for noise impacts. In areas immediately adjacent to construction, controls such as constructing temporary noise barriers and utilizing "quiet" construction equipment can also reduce the potential for noise impacts.

Mitigation Measures:

The following mitigation measures shall be included in all construction projects to reduce the impact to a less-than-significant level:

- Noise-generating activities at the construction site or in areas adjacent to the construction site associated with the project in any way should be restricted to the hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, and 8:00 a.m. to 5:00 p.m. on Saturdays. No construction activities should occur Sundays or holidays.

- Equip all internal combustion engine driven equipment with intake and exhaust mufflers which are in good condition and appropriate for the equipment.

- Locate stationary noise generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.

- Utilize "quiet" air compressors and other stationery noise sources where technology exists.

- Multiple-pile drivers shall be considered to expedite construction. Although noise levels generated by multiple pile drivers would be higher than the noise generated by a single pile driver, the total duration of pile driving activities would be reduced.

- Temporary noise control blanket barriers shall shroud pile drivers or be erected in a manner to shield the adjacent land uses. Such noise control blanket barriers can be rented and quickly erected.

- Foundation pile holes shall be pre-drilled to minimize the number of impacts required to seat the pile Pre-drilling foundation pile holes is a standard construction noise control technique. Pre-drilling reduces the number of blows required to seat the pile.

- The contractor shall prepare a detailed construction plan identifying the schedule for major noise-generating construction activities. The construction plan shall identify a procedure for coordination with the adjacent noise sensitive facilities so that construction activities can be scheduled to minimize noise disturbance.

- Designate a "disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and will require that reasonable measures warranted to correct the problem be implemented.

Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

Impact 4: **Aircraft Noise.**
The project would locate noise-sensitive residential land uses within the airport's 65 CNEL and 60 CNEL noise contours. New residential construction within the 65 CNEL contour would not be compatible with State of California, City of San Jose, or Santa Clara County Airport Land Use Commission policies. Development within the 60 CNEL contour would not be compatible with the State of California or City of San Jose's exterior noise level limits. **This is a potentially significant impact.**

Year 2010 Master Plan noise contours established by the Mineta San Jose International Airport are shown in Figure 10. Portions of the project area immediately northeast and east of the airport would be located in noise environments exceeding 65 CNEL and 60 CNEL. The westernmost portion of the Urban Industrial Core Area (north of the Highway 101 and the Guadalupe Parkway (SR 87) Interchange) would be located in a noise environment resulting from aircraft that would exceed 65 CNEL. Residential land uses proposed within the 65 CNEL noise contour should be avoided unless they are related to airport service. Commercial land uses proposed within the 65 CNEL noise contour and the 75 CNEL noise contour should be reviewed carefully to ensure that the noise insulation features to maintain an acceptable interior noise environment are adequate.

Urban Industrial Core Area residential developments between Trimble Road and Highway 101, west of Orchard Parkway, could be located in areas exceeding 60 CNEL. Residential development proposed within the 60 CNEL noise contour would be considered an incompatible land use as defined by state (California Building Code) and local regulations (City of San Jose General Plan).

The project also plans residential development west of North 1st Street in the Rincon South area. Portions of these parcels are located within the 60 CNEL noise contour of the airport. Residential development proposed in these areas would fall within the noise impact boundary (60 CNEL) with regard to the California Building Code and the City of San Jose General Plan.

Mitigation Measures:

The following mitigation measures would reduce the impact to a less-than-significant level:

- Prohibit residential construction within the 65 CNEL noise contour for the Mineta San Jose International Airport, or:

- Attach an avigation easement for noise to any residential development proposed within the 65 dBA CNEL noise contour for aircraft operations. The easement shall grant to the airport a perpetual public use avigation/noise easement for the free and unobstructed passage and flight of aircraft of any and all kinds of the class size and category operationally compatible with the airport.

- Retain a qualified Acoustical Engineer to prepare for City review and approval a detailed acoustical analysis of exterior and interior noise reduction requirements and specifications for all project phases, in accordance with State, County and City standards. Appropriate noise control treatments necessary to achieve a compatible interior noise environment (CNEL/DNL 45 dBA) shall be incorporated into the proposed structures located within the 60 CNEL contour.

- During final design, detailed acoustical analyses should be conducted. Project-specific acoustical analyses are mandated by the State for new multi-family uses. The City of San Jose also establishes 45 dBA DNL as the interior noise limit for commercial land uses. The analyses should meet the following noise reduction requirements:

    - Interior noise levels shall be reduced to 45 dBA DNL or lower to meet State and local standards. Building sound insulation requirements would need to include the provision of forced-air mechanical ventilation for all new units, so that windows could be kept closed at the occupant's discretion to control noise. Special building construction techniques (e.g., sound-rated windows and building facade treatments) would likely be required for new residential uses. Feasible construction techniques such as these would adequately reduce interior noise levels to 45 dBA DNL or lower.

    - County ALUC guidelines shall be considered to control maximum single-event interior noise levels from aircraft for residential land uses proposed within the 65 CNEL noise contour. Feasible construction techniques such as sound-rated windows and building facade treatments would adequately reduce interior noise levels to 45 dBA DNL or lower.

Figure 10 North San Jose Plan Area in the Vicinity of Mineta San Jose International Airport