

ACOUSTICAL ANALYSIS

YOLO MUTUAL HOUSING ASSOCIATION AND
SACRAMENTO MUTUAL HOUSING ASSOCIATION
PROJECT

DAVIS, CALIFORNIA

LSA

December 2007

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DAVIS, CALIFORNIA

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TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY	1
2.0 INTRODUCTION	3
3.0 METHODOLOGY	5
4.0 EXISTING CONDITONS.....	10
5.0 IMPACTS.....	14
6.0 RECOMMENDATIONS	22

FIGURES AND TABLES

FIGURES

Figure 1: Noise Monitoring Locations.....	11
Figure 2: Residential Setback Requirements to Meet Noise Attenuation Criteria.....	15
Figure 3: HUD Recommended Orientation of Buildings on Sites.....	18

TABLES

Table A: Summary of Human Effects in Areas Exposed to 55 dBA L_{dn}	7
Table B: Common Sound Levels and Their Noise Sources	7
Table C: Standards for Exterior Noise Exposure	8
Table D: Maximum Noise Levels From Stationary Noise Sources.....	8
Table E: Davis Exterior Noise Zones Definitions.....	9
Table F: Short-Term Ambient Noise Monitoring Results, dBA (August 22, 2007).....	12
Table G: Meteorological Conditions During Ambient Noise Monitoring.....	12
Table H: Long-Term Ambient Noise Monitoring Results (August 22–23, 2007)	12
Table I: Future (2025) Calibrated I-80 Traffic Noise Residential Parcel Barrier Analysis	16
Table J: Future (2025) Calibrated Traffic Noise Levels at Sensitive Receptors on Residential Parcels	17
Table K: Future (2025) Calibrated I-80 Traffic Noise Office/Commercial Parcel Barrier Analysis	19
Table L: Future (2025) Calibrated Traffic Noise Levels at Sensitive Receptors on Office/ Commercial Parcels	19
Table M: Typical Construction Equipment Maximum Noise Levels, L_{max}	20

1.0 EXECUTIVE SUMMARY

This Acoustical Analysis has been prepared to assess the potential noise impacts associated with the proposed Yolo Mutual Housing Association and Sacramento Mutual Housing Association development in Davis, California. The proposed project would develop multi-family residential units on parcels located south of Cowell Boulevard and west of Drummond Avenue, and develop office/commercial units on parcels north of Cowell Boulevard and west of Chiles Road. The parcels are located along the south side of Interstate-80 (I-80).

This report uses the data collected by an LSA technician in noise measurement surveys of the site. Future year 2025 traffic noise levels were analyzed and were shown to not result in a perceptible increase over existing traffic noise levels.

When noise impacts have been identified, noise abatement measures must be considered. Noise from traffic on I-80 would significantly impact noise sensitive land uses within the project site. Existing I-80 traffic noise levels at the nearest property boundary of the office/commercial parcels would range up to 78.7 dBA CNEL. I-80 traffic noise levels at the nearest property boundary of the residential parcels would range up to 74.9 dBA CNEL. These sound levels are within the City's conditionally unacceptable range for new office/commercial and residential development. To mitigate this impact to meet the City's interior noise level standards, LSA recommends that the following design features be incorporated into the project.

Residential:

- A densely landscaped berm at least 4 feet in height above the finished pad elevation (with an effective height of 5 feet) and extending the length of the property should be constructed on the northern property boundary of the residential parcels;
- An alternate form of ventilation, such as an air conditioning system, should be required for all residences directly exposed to I-80 to ensure that windows can remain closed for a prolonged period of time.
- A minimum setback of 260 feet from the centerline of I-80 should be required of all noise sensitive land uses on the residential parcels;
- Windows with a minimum STC-32 rating should be required for all upper floor residential units with façades directly exposed to I-80; and
- All outdoor active use areas (including playgrounds, patios, and balconies) should be located on the south side of buildings on the residential parcels.

Office/Commercial:

- A densely landscaped berm at least 4 feet in height above the finished pad elevation (with an effective height of 5 feet) and extending the length of the property should be constructed on the northern property boundary of the office/commercial parcels;

- An alternate form of ventilation, such as an air conditioning system, should be required for all office/commercial spaces directly exposed to I-80 to ensure that windows can remain closed for a prolonged period of time.
- A minimum setback of 165 feet from the centerline of I-80 should be required of all noise sensitive land uses on the office/commercial parcels;

In addition, LSA recommends that design and construction of the project buildings, especially those on the residential parcels, follow the Department for Housing and Urban Development (HUD) recommendations published in *The Noise Guidebook*, and shown in Figure 2 of this report.

2.0 INTRODUCTION

This acoustical analysis has been prepared to evaluate the potential noise impacts and mitigation measures associated with the Yolo Mutual Housing Association and Sacramento Mutual Housing Association project in the City of Davis, California (City). This report is intended to satisfy the City's requirement for a project specific noise impact analysis by examining the impacts of the proposed noise sensitive uses on the project site and evaluating the mitigation measures incorporated as part of the project design.

2.1 Project Location

The project site lies within the City of Davis on Cowell Boulevard. The project site consists of four undeveloped parcels located southeast of I-80 and west of Drummond Avenue/Chiles Road at the intersection with Cowell Boulevard.

2.2 Project Site Existing Setting

The two parcels that lie south of Cowell Boulevard consist of approximately 3.31 gross acres with 3.08 acres available for development. The two parcels that lie north of Cowell Boulevard and Chiles Road consist of approximately 1.09 acres each; the acreage available for development on these northern parcels is pending engineering survey and investigation. The General Plan designation for these parcels is Business Park; the current zoning is PD 12-87 Industrial Research (I-R).

The project site is bounded on the west by a commercial/business park, in which the nearest facility is the UC Davis bookstore warehouse. To the south of the project site lies the Owendale Community apartment complex on Albany Avenue. Additional undeveloped land bound the project site on the opposite side of Drummond Avenue/Chiles Road. Some of these parcels nonadjacent to and west of the project site between Chiles Road and Cowell Boulevard are planned for single family residential development. Land uses north of I-80 across from the project site consist of undeveloped and commercial land uses, including office park, retail, theater, and indoor fitness center facilities.

2.3 Project Description

The project would seek rezoning of the project site parcels to Multi-Family. This redesignation would allow for the development of multi-family residential units on the two parcels located south of Cowell Boulevard (described as residential parcels throughout the rest of this report). It would also permit the development of the two parcels north of Cowell Boulevard (described as office/commercial parcels throughout the rest of this report) as an office/commercial space land use.

The project proposes the development of approximately 77,000 square feet of residential development, to be constructed in three or four story units on the residential parcels south of Cowell Boulevard. Parking for at least 100 cars is planned for the north portion of these parcels, which may include covered car-ports. The City would require minimum setbacks for development from Cowell Boulevard and Drummond Avenue; the exact amounts have not been determined at the time of this report. To the south of the residential units the project plans to include as much open space as

possible. This portion of the project would also include a community building of approximately 2,000 square feet, the location of which is yet to be determined. Access to the residential parcels would be provided via Drummond Avenue.

The project would develop one or, possibly, two buildings on the office/commercial parcels adjacent to I-80, along with associated surface parking. The City would require a minimum setback for development along Chiles Road of approximately 50 feet. Access to the office/commercial parcels would be via Cowell Boulevard and Chiles Road.

3.0 METHODOLOGY

3.1 Methodology Related to Noise Impact Assessment

In this report, the evaluation of noise impacts associated with the proposed project includes documenting existing noise conditions in the vicinity of the project site; describing the criteria for determining the significance of noise impacts; and determining the likely noise impacts that would result from construction activities, vehicular traffic, aircraft, and other noise sources. Where appropriate, mitigation measures are recommended to reduce project-related noise impacts to a less-than-significant level.

3.1.1 Characteristics of Sound. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. A specific pitch can be an annoyance, while loudness can affect our ability to hear. Pitch is the number of complete vibrations or cycles per second of a wave that results in the range of tone from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment, and it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments.

3.1.2 Measurement of Sound. Several noise measurement scales exist which are used to describe noise in a particular location. A *decibel* (dB) is a unit of measurement which indicates the relative intensity of a sound. The 0 point on the dB scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Changes of 3.0 dB or less are only perceptible in laboratory environments. Audible increases in noise levels generally refer to a change of 3.0 dB or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Sound levels in dB are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness. Sound intensity is normally measured through the *A-weighted sound level* (dBA). This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive.

Noise impacts can be described in three categories. The first is audible impacts, which refers to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3.0 dB or greater, since this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1.0 and 3.0 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise level of less than 1.0 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate or be reduced, resulting in a 6-dB reduction in the noise level for each doubling of distance from a single point source of noise to the noise sensitive receptor of concern. There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq} and community noise equivalent level (CNEL) or the day-night average level (L_{dn}) based on A-weighted decibels (dBA). CNEL is the time-varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during the evening hours. CNEL and L_{dn} are within one dBA of each other and are normally exchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours. It should be noted that although the City's documents use both CNEL and L_{dn} , this report uses CNEL where feasible.

Other noise rating scales of importance when assessing the annoyance factor include the maximum noise level (L_{max}), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of maximum levels denoted by L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions and addresses the annoying aspects of intermittent noise.

Another noise scale often used together with the L_{max} in noise ordinances for enforcement purposes is noise standards in terms of percentile noise levels. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same.

3.1.3 Physiological Effects of Noise. Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tension, and thereby affecting blood pressure, functions of the heart, and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain.

Table A lists a Summary of Human Effects in Areas Exposed to 55 dBA L_{dn} . Table B lists common sound levels and their noise sources. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less developed areas. It is not only exposure to extremely high noise levels that can lead to hearing loss. Irreversible hearing damage can occur with long-term cumulative exposure to levels as low as 70 dBA. This 70 dBA threshold is not for singular or peak events; rather it is the average environmental sound level a person is exposed to

Table A: Summary of Human Effects in Areas Exposed to 55 dBA L_{dn}

Type of Effects	Magnitude of Effect
Speech – Indoors	100 percent sentence intelligibility (average) with a 5 dB margin of safety.
Speech – Outdoors	100 percent sentence intelligibility (average) at 0.35 meters. 99 percent sentence intelligibility (average) at 1.0 meters. 95 percent sentence intelligibility (average) at 3.5 meters.
Average Community Reaction	None evident; 7 dB below level of significant complaints and threats of legal action and at least 16 dB below “vigorous action.”
Complaints	1 percent dependent on attitude and other non-level related factors.
Annoyance	17 percent dependent on attitude and other non-level related factors.
Attitude Towards Area	Noise essentially the least important of various factors.

Source: U.S. Environmental Protection Agency, “Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.” March 1974.

Table B: Common Sound Levels and Their Noise Sources

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments
Near Jet Engine	140	Deafening
Civil Defense Siren	130	Threshold of Pain
Hard Rock Band	120	Threshold of Feeling
Accelerating Motorcycle at a few feet away	110	Very Loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud
Ambulance Siren; Food Blender	95	Very Loud
Garbage Disposal	90	Very Loud
Freight Cars; Living Room Music	85	Loud
Pneumatic Drill; Vacuum Cleaner	80	Loud
Busy Restaurant	75	Moderately Loud
Near Freeway Auto Traffic	70	Moderately Loud
Average Office	60	Moderate
Suburban Street	55	Moderate
Light Traffic; Soft Radio Music in Apartment	50	Quiet
Large Transformer	45	Quiet
Average Residence Without Stereo Playing	40	Faint
Soft Whisper	30	Faint
Rustling Leaves	20	Very Faint
Human Breathing	10	Very Faint

Source: Compiled by LSA Associates, Inc., 2005.

over weeks and years that is critical in preventing hearing loss. So, if enough “quiet times” are also experienced, this threshold can be surpassed without significant damage occurring.

3.2 THRESHOLDS OF SIGNIFICANCE

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of the community in which it is located. The applicable noise

standards governing the project site include EPA and State standards as well as the standards found in the City of Davis’s Noise Element of the General Plan and Municipal Code.

3.2.1 The City of Davis General Plan Noise Element and Municipal Code. The City of Davis addresses noise in the Noise Element of the General Plan¹ and in the City’s Municipal Code.² The City’s General Plan identifies interior noise standards for residences as 45 dBA L_{dn}, and 55 dBA L_{dn} for offices. Table C represents the City’s standards for acceptable exterior noise levels by land use.

Table C: Standards for Exterior Noise Exposure

USE	Community Noise Exposure, L _{dn} or CNEL, dBA			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential	Under 60	60-70*	70-75	Above 75
Transient Lodging – Motels, Hotels	Under 60	60-75	75-80	Above 80
Schools, Libraries, Churches, Hospitals, Nursing Homes	Under 60	60-70	70-80	Above 80
Auditoriums, Concert Halls, Amphitheaters	Under 50	50-70	NA	Above 70
Sports Arenas, Outdoor Spectator Sports	NA	Under 75	NA	Above 75
Playgrounds, Neighborhood Parks	Under 70	NA	70-75	Above 75
Golf Courses, Riding Stable, Water Recreation, Cemeteries	Under 70	NA	70-80	Above 80
Office Buildings, Business Commercial and Professional	Under 65	65-75	Above 75	NA
Industrial, Manufacturing, Utilities, Agriculture	Under 65	70-80	Above 80	NA

NORMALLY ACCEPTABLE: Specified land use is satisfactory assuming all buildings involved are of conventional construction, without special noise insulation requirements.

CONDITIONALLY ACCEPTABLE: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is conducted, and needed noise attenuation features are included in the construction or development.

NORMALLY UNACCEPTABLE: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be conducted and needed noise attenuation features shall be included in the construction or development.

CLEARLY UNACCEPTABLE: New construction or development shall not be undertaken.

NA: Not applicable.

* The City Council shall have discretion within the “conditionally acceptable” range for residential use to allow noise levels in outdoor spaces to go up to 65 dBA if cost effective or aesthetically acceptable measures are not available to reduce noise levels in outdoor use spaces to the “normally acceptable” levels. Outdoor spaces which are designed for visual use only (for example, streetside landscaping in an apartment project), rather than outdoor use space, may be considered acceptable up to 70 dBA.

Source: Davis, City of, *City of Davis General Plan, Chapter 21: Noise*. May.

The City also addresses noise in Chapter 24 of the Municipal Code, including regulating maximum noise limits on stationary noise sources, construction noise, and air conditioners and similar equipment. The City’s adopted maximum permitted noise levels from stationary noise sources by land uses are shown in Table D. The City’s exterior noise zone definitions are shown in Table E.

Table D: Maximum Noise Levels From Stationary Noise Sources

Land Use	Time Period	Maximum Noise Level (dBA)
Residential	9:00 p.m. -7:00 a.m.	50
	7:00 a.m. – 9:00 p.m.	55
Commercial/ Industrial/Core Commercial	10:00 p.m. -7:00 a.m.	55
	7:00 a.m. – 10:00 p.m.	60
High Noise Traffic Corridor	Anytime	65

Source: Davis, City of, 2007. *City of Davis Municipal Code, Chapter 24*.

¹ Davis, City of, 2001. *City of Davis General Plan, Chapter 21: Noise*. May.

² Davis, City of, 2007. *City of Davis Municipal Code, 24.0.0 Noise Regulations*.

Table E: Davis Exterior Noise Zones Definitions

Noise Zone	Definition (using general plan terms where applicable)
Residential use	Any parcel with a single-family or multi-family dwelling, including living groups, excluding those in the core commercial area as defined below.
Commercial use Industrial use	All non-residential properties (retail shopping, office, highway/service commercial, light industrial/business park, industrial, public/semi-public, commercial/ agricultural buffer, commercial recreation, agriculture, urban reserve).
Core Commercial	All property types in the core commercial area beginning at South West corner of 5th Street and the railroad tracks, Railroad tracks South to D Street, North on D Street, East on 4th Street, North on F Street, East on 5th Street to railroad tracks.
High noise traffic corridor	Properties bordering designated "high noise" corridors to be designated by resolution of City council. "Bordering" will be defined as falling wholly or partially within 100 feet of designated "high noise" corridor (e.g., Highway 113).

Source: Davis, City of, 2007. *City of Davis Municipal Code, Chapter 24.*

The Municipal Code further establishes acceptable hours of construction and limitations on construction related noise impacts on adjacent sensitive receptors. These regulations are included below.

(b) Construction and Landscape Maintenance Equipment. Notwithstanding any other provision of this chapter, between the hours of 7:00 a.m. and 7:00 p.m. on Mondays through Fridays, and between the hours of 8:00 a.m. and 8:00 p.m. on Saturdays and Sundays, construction, alteration, repair or maintenance activities which are authorized by valid city permit or business license, or carried out by employees of contractors of the city shall be allowed if they meet at least one of the following noise limitations:

- (1) No individual piece of equipment shall produce a noise level exceeding 83 dBA at a distance of 25 feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to 20 feet from the equipment as possible.
- (2) The noise level at any point outside of the property plane of the project shall not exceed 86 dBA.
- (3) The provisions of subdivisions (1) and (2) of this subsection shall not be applicable to impact tools and equipment; provided, that such impact tools and equipment shall have intake and exhaust mufflers recommended by manufacturers thereof and approved by the Director of Public Works as best accomplishing maximum noise attenuation, and that pavement breakers and jackhammers shall also be equipped with acoustically attenuating shields or shrouds recommended by the manufacturers thereof and approved by the Director of Public Works as best accomplishing maximum noise attenuation. In the absence of manufacturer's recommendations, the Director of Public Works may prescribe such means of accomplishing maximum noise attenuation as he/she may determine to be in the public interest.

Construction projects located more than 200 feet from existing homes may request a special use permit to begin work at 6:00 a.m. on weekdays from June 15th until September 1st. No percussion type tools (such as ramsets or jackhammers) can be used before 7:00 a.m. The permit shall be revoked if any noise complaint is received by the police department.

4.0 EXISTING CONDITIONS

4.1 Sensitive Land Uses in the Project Vicinity

There are existing sensitive land uses adjacent to the project site that would potentially be exposed to project related short-term construction noise impacts. The closest noise sensitive land uses are the multi-family units which border the project site immediately south of the project's residential parcels. The next closest sensitive receptors include single family units also located south of the project site on Benbow Court and Albany Avenue. One home at 607 Benbow Court is located within 75 feet of the project site.

4.2 Overview of Existing Noise Sources

Vehicular traffic on I-80 is the dominant source of ambient noise in the project vicinity. The existing noise conditions in the project vicinity are described below.

Ambient Noise Levels. An LSA noise technician conducted short-term ambient noise monitoring on the proposed project site on August 22, 2007 between the hours of 10:00 a.m. and 12:30 p.m. at four separate locations on the project site. A long-term ambient noise measurement was also conducted from August 22nd to 23rd, 2007. The noise monitoring locations are shown in Figure 1. The purpose of this noise monitoring was to document the existing noise environment and capture the noise levels associated with operations or activities in the project vicinity. Table F lists the noise levels measured during short-term noise monitoring. Maximum noise levels were recorded as well as the equivalent continuous noise level measure L_{eq} . The maximum noise levels all reflect vehicular traffic noise sources. Table G lists the meteorological conditions during each of the short-term monitoring measurements.

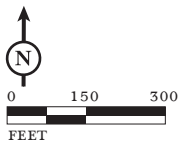
Table H lists the long-term noise monitoring results; these include the calculated 24-hour L_{eq} and CNEL values. CNEL is the time-varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). The ambient noise level for the measured time period was 71.0 dBA CNEL. This measurement was taken with the sound level meter equipment positioned 10 feet above the ground on a light pole located approximately 28 feet south of the Cowell Boulevard and 370 feet west of Drummond Avenue.

Vehicular Traffic. Noise from vehicular traffic is a major source of ambient noise levels in urban settings. The primary existing noise source in the project area is vehicular traffic on I-80. Traffic noise levels along Cowell Boulevard, Drummond Avenue and Chiles Road do not significantly influence the ambient noise levels at the project site.






FIGURE 1

LSA



LEGEND

-  PROJECT AREA
-  NOISE MONITORING LOCATIONS
-  24 HOUR NOISE MONITORING

Sacramento Mutual Housing
Noise Monitoring Locations Map

SOURCE: GOOGLE; LSA ASSOCIATES, INC., 2007

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Table F: Short-Term Ambient Noise Monitoring Results, dBA (August 22, 2007)

Location Number	Location	Start Time	L _{eq} ^a	L _{max} ^b	L _{min} ^c	Noise Sources
1	Residential parcel, southeast corner, 99 feet from Drummond Avenue, 40 feet from south fence	10:00 a.m.	54.8	64.7	50.6	Traffic on I-80, Cowell Boulevard, Drummond Avenue
2	Residential parcel, northwest corner, 55 feet south of Cowell Boulevard, 34 feet from west fence	10:35 a.m.	67.2	74.3	59.7	Traffic on I-80 & Cowell Boulevard, a few truck deliveries to adjacent UC Davis bookstore warehouse
3	Office/commercial parcel, 148 feet south of fence by I-80	11:05 a.m.	63.8	70.1	54.1	Traffic on I-80
4	Office/commercial parcel, 25 feet south of fence by I-80	11:30 a.m.	72.3	80.1	60.8	Traffic on I-80

^a L_{eq} represents the average of the sound energy occurring over the 20-minute time period.

^b L_{max} is the highest instantaneous sound level measured during the 20-minute time period.

^c L_{min} is the lowest instantaneous sound level measured during the 20-minute time period.

Source: LSA Associates, Inc., August 2007.

Table G: Meteorological Conditions During Ambient Noise Monitoring

Location Number	Maximum Wind Speed (mph)	Average Wind Speed (mph)	Temperature (F)	Relative Humidity (%)
1	2.1	0.8	83.0	44
2	3.4	1.0	88.1	29
3	3.5	0.9	91.8	33
4	3.3	0.8	93.8	26

Source: LSA Associates, Inc., August 2007.

Table H: Long-Term Ambient Noise Monitoring Results (August 22–23, 2007)

Measurement	Description	dBA	Time Period the Event Occurred
CNEL	Weighted 24 hour average	71.0	NA
L _{eq}	24 hour average	67.0	NA
L _{max}	Highest recorded L _{max} for 24 hour period	99.7	9:00 p.m. – 10:00 p.m.
L _{min}	Lowest recorded L _{min} for 24 hour period	44.8	3:00 p.m. – 4:00 p.m.

Source: LSA Associates, Inc., August 2007.

Besides the ambient noise monitoring that was conducted which documented the existing roadway traffic noise levels, the existing traffic noise levels from adjacent roadway segments were also modeled by using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model. The model used existing traffic data provided by the City of Davis for adjacent roadway segments. Traffic volumes on I-80 were obtained from the Caltrans 2005 annual average daily traffic report for California highways and assume a 3 percent annual increase in daily traffic volumes along this segment of I-80. It should be noted that the existing traffic noise levels along I-80 were shown to be more than 10 dBA higher than the traffic noise levels on Cowell Boulevard, Drummond Avenue, and Chiles Road. Therefore traffic noise levels on these roadways do not significantly affect the ambient noise levels in the project vicinity. This would be expected to remain true even with construction of the proposed office/commercial buildings.

In order to predict the future traffic noise increases and to determine noise mitigation, the traffic noise model was calibrated to the existing measured conditions. At the portion of the office/commercial parcels closest to I-80, located at a distance of approximately 65 feet from the centerline of the outermost travel lane, the noise from existing traffic on I-80 would be reduced to 78.7 dBA CNEL. At the nearest boundary line of the residential parcels, noise from existing traffic on I-80 would be reduced to 74.9 dBA CNEL. The calculated traffic noise level at the long-term monitoring location is 72.5 dBA CNEL. This is slightly higher than, but shows strong correlation to, the measured ambient noise level of 71.0 dBA CNEL.

Railroad Operations. Factors that influence the overall impact of railroad noise on adjacent uses include the distance of the uses from the tracks, surrounding land topography, the intermittent nature of train events, and the presence of sound walls or other barriers between the tracks and adjacent uses. The Union Pacific railroad tracks lie on the north side of I-80. The segment of the railroad line across from the project site consists of three tracks running parallel to I-80. The measured 24-hour noise level at the project site is 71.0 dBA CNEL; this includes all ambient noise sources in the project vicinity including train activity. Noise from vehicular traffic on I-80 was the dominant noise source, exceeding train noise sources in the project vicinity. Therefore, railroad related noise levels do not significantly affect ambient noise levels in the project vicinity.

Aircraft Operations. Airport related noise levels are primarily associated with aircraft engine noise made while aircraft are taking off, landing or running their engines while still on the ground. The University of California-Davis Airport is the closest airport, located approximately 3.9 miles west of the project site. The Yolo County-Davis Woodland Winters Airport is located 7.5 miles west of the project site. The next closest airport is the Sacramento International Airport located 10.5 miles to the northwest of the project site. Watts-Woodland Airport to the northwest and the Sacramento Executive Airport to the east are both located approximately 12 miles from the project site. Due to the orientation and distance of these airports from the project site, aircraft related noise levels do not significantly affect ambient noise levels in the project vicinity.

Stationary Noise Sources. Stationary noise sources in the project vicinity also influence the ambient noise levels at the project site. These sources include truck delivery loading/unloading activities at the UC Davis bookstore warehouse facility, located at 2828 Cowell Boulevard. Another stationary noise source adjacent to the project site is the City's Well 26 (a local pump for the City's department of public works water system) located at 2850 Cowell Boulevard. Noise levels from operation of these stationary noise sources were recorded and documented in the short-term ambient noise level measurements conducted by LSA on the project site. As was observed by the LSA technician at the time of the noise measurements, noise from vehicular traffic noise sources was the dominant influence on ambient noise levels at all measurement locations on the project site. Therefore, noise levels from stationary noise sources in the project vicinity would result in less-than-significant impacts on proposed sensitive land uses.

5.0 IMPACTS

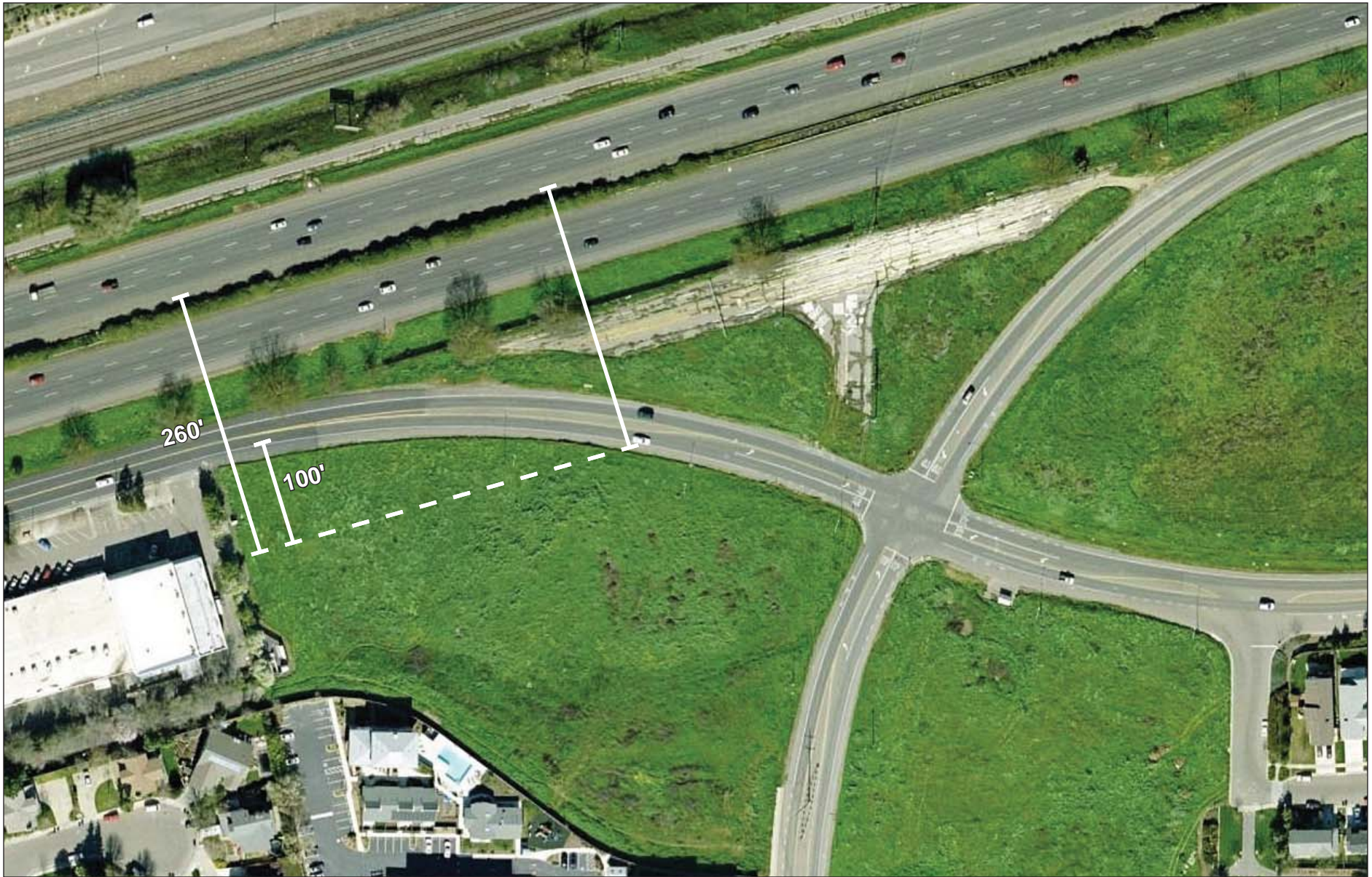
5.1 Long-Term Traffic Noise Impacts

Future roadway traffic noise levels along I-80 were calculated using the calibrated traffic noise model results. Results indicate that the I-80 traffic noise levels in 2025 would increase to 81.9 dBA at 50 feet from the centerline of the outermost travel lane, which is an increase of 2.3 dBA over existing conditions. The model outputs for this analysis are shown in Appendix A.

Since the existing traffic noise levels along I-80 would be more than 10 dBA higher than the traffic noise levels on Cowell Boulevard, Drummond Avenue, and Chiles Road, the traffic noise levels on these roadways do not significantly affect the ambient noise levels in the project vicinity. As this would be expected to remain true even with construction of the proposed office/commercial buildings, further analysis of on-site traffic noise impacts from adjacent roadway segments is not needed. In addition, the increase in traffic associated with the proposed project on adjacent roadways is not expected to result in a perceptible increase in ambient noise levels. Therefore, project related traffic noise impacts to off-site sensitive land uses would be considered less-than-significant. On-site traffic noise impacts are discussed below.

Impacts to Residential Parcels. Based on the traffic noise modeling performed, the closest outdoor sensitive receptor areas on the residential parcels would be exposed to future traffic noise levels from I-80 of up to 73.9 dBA CNEL as shown in Figure 2. The model inputs included a minimum setback of 260 feet from the centerline of I-80 and a K-factor (calibration) of -1.5 dBA based on noise monitoring measurements. This would reduce I-80 traffic noise to within the City's normally unacceptable range for new residential development. The City would therefore require that noise attenuation features be incorporated into the design and construction of the proposed residential parcel development to meet the City's interior noise level standard of 45 dBA CNEL for residential land uses.

To reduce the traffic noise impacts, a noise barrier analysis was performed assuming future year 2025 roadway traffic conditions. A berm of 4 feet, 6 feet, and 8 feet in height was modeled along the northern property lines of the residential parcels next to Cowell Boulevard. The sound levels from traffic noise sources on I-80 were calculated using a setback distance of 260 feet from the centerline of I-80 for sensitive receptors on the residential parcels. As shown in Table I, a berm at least 4 feet in height above the finished pad elevation would reduce I-80 traffic noise to 66 dBA CNEL at the closest ground floor sensitive receptors on the residential parcels. The effective height of this barrier would be approximately 5 feet in height due to the change in elevation between the expected finished pad elevation at the residential units and the existing I-80 roadway elevation. Landscaping with dense vegetation and trees would also aid in blocking the line of sight to the I-80 noise source. This berm and landscaping would reduce traffic noise levels to within the City's conditionally acceptable range for new residential developments where exterior active use areas are not planned.



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SOURCE: GOOGLE EARTH; LSA ASSOCIATES, INC., 2007.

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FIGURE 2

Sacramento Mutual Housing
Residential Setback Requirements to
Meet Noise Attenuation Criterion

Table I: Future (2025) Calibrated I-80 Traffic Noise Residential Parcel Barrier Analysis

Roadway Segment	Barrier Type	Barrier Height (feet)	CNEL at Closest Receptor without Barrier (dBA) ¹	CNEL at Closest Receptor with Barrier (dBA)
I-80 - Richards Boulevard to Mace Boulevard	BERM	4	73.9	66.0
		6		65.4
		8		64.5

¹Inputs included a minimum setback of 260 feet from the centerline of I-80 with modeled future I-80 traffic volumes adjusted with a calibration (or K-) factor of -1.5 dBA based on noise measurements taken on the project site with concurrent traffic counts.

Source: LSA Associates, Inc., August 2007.

Carport facilities are being considered as part of the residential portion of the project. Including such structures in the project, constructed with solid rear walls at least 6 feet in height and located along the entire property border with Cowell Boulevard, would provide equivalent or superior traffic noise reduction as that provided by the berm and landscaping option. Thus, with carports, I-80 traffic noise would be reduced to below 66 dBA CNEL at the closest ground floor sensitive receptors on the residential parcels.

Based on the EPA’s Protective Noise Levels (EPA 550/9-79-100, November 1978), with a combination of walls, doors, and windows, standard construction for northern California residential buildings would provide more than 25 dBA in exterior to interior noise reduction with windows closed and 15 dBA or more with windows open. With windows open, first floor rooms of buildings with façades exposed to I-80 would not meet the City’s residential interior noise standard of 45 dBA CNEL (i.e., 66 dBA – 15 dBA = 51 dBA). Therefore, all buildings on the residential parcels with façades exposed to I-80, an alternate form of ventilation, such as an air conditioning system, would be required to ensure that windows can remain closed for a prolonged period of time. This would reduce traffic noise levels for ground floor receptors to below the City’s interior noise standard of 45 dBA (i.e., 66 dBA – 25 dBA = 41 dBA).

However, upper floor rooms would be exposed to traffic noise levels of up to 73.9 dBA CNEL. Even with windows closed, upper floor residential rooms would not meet the City’s residential interior noise standard (i.e., 73.9 dBA – 25 dBA = 48.9 dBA). Therefore, in addition to an alternate form of ventilation, windows with a minimum STC-32 rating are recommended for all upper floor bedrooms associated with residential units with façades exposed to I-80.

A building located between a noise source and receptor would provide a minimum of 15 dBA reduction. Therefore, to reduce impacts to outdoor active use areas, such uses should be located on the south side of the planned residential units. Outdoor active use areas include yards, playgrounds, patios, decks, and balconies. It is understood that the specific design, orientation, and location of buildings on the project site has not yet been determined. Thus further specific impact evaluation is not possible. However, design and noise reduction features are recommended in the following section.

Table J lists the estimated future traffic noise levels for the year 2025 at sensitive receptors on the residential parcels. As shown, implementation of a 4-foot high berm would only reduce traffic noise levels at ground floor receptors. Outdoor active use area noise level estimates assume the project follows the Department for Housing and Urban Development (HUD) recommendations, published in

Table J: Future (2025) Calibrated Traffic Noise Levels at Sensitive Receptors on Residential Parcels

	Ground Floor Units	Upper Floor Units
Exterior of closest receptor without barrier	73.9	73.9
Exterior of closest receptor with 4-foot barrier	66.0	73.9
Interior of closest receptor with 4-foot barrier with windows open ¹	51.0	58.9
Interior of closest receptor with 4-foot barrier with windows closed ²	41.0	48.9
Interior of closest receptor without barrier with STC-32 windows closed ³	43.9	43.9
Interior of closest receptor with 4-foot barrier with STC-32 windows closed ³	36.0	43.9
Exterior active use areas with building as barrier ⁴	50.0	NA

¹ Assumes a 15 dBA exterior to interior noise reduction for entire wall assembly.

² Assumes a 25 dBA exterior to interior noise reduction for entire wall assembly.

³ Assumes a 30 dBA exterior to interior noise reduction for entire wall assembly.

⁴ Assumes a minimum setback of 290 feet from the centerline of I-80 and a 15 dBA reduction from building shielding.

Source: LSA Associates, Inc., 2007.

*The Noise Guidebook*³. Although this publication is a guideline for reducing noise impacts for HUD development projects their recommendations for building orientation are relevant for the proposed project. HUD’s recommendations for orientation of buildings on a project site to reduce traffic noise impacts are shown in Figure 3.

Impacts to Office/Commercial Parcels. Existing traffic noise levels at the nearest property line of the office/commercial parcels to I-80 range up to 78.7 dBA CNEL; this is within the normally unacceptable range for new office/commercial building development according to the City’s standards for exterior noise exposure. The City would therefore require that noise attenuation features be incorporated into the design and construction of the proposed office/commercial parcel development to meet the City’s interior noise level standard of 55 dBA CNEL for office/commercial land uses.

To reduce the traffic noise impacts, a noise barrier analysis was performed assuming future year 2025 roadway traffic conditions. A berm of 4 feet, 6 feet, and 8 feet in height was modeled at the northern property line of the office/commercial parcels next to I-80. The results of this analysis are shown in Table K. The sound levels from traffic noise sources on I-80 were calculated using a setback distance of 165 feet from the centerline of I-80 for sensitive receptors. As shown in Table K, a berm at least 4 feet in height above the finished pad elevation would reduce I-80 traffic noise to 69.2 dBA CNEL at the closest ground level sensitive receptor on the office/commercial parcels. The effective height of this barrier would be approximately 5 feet in height due to the change in elevation between the expected finished pad elevation at the office/commercial units and the existing I-80 roadway elevation. Landscaping with dense vegetation and trees would also aid in blocking the line of sight to the I-80 noise source. This berm and landscaping would reduce traffic noise levels to within the City’s conditionally acceptable ranges for new office/commercial developments. The estimated exterior and interior future traffic noise levels at sensitive receptors on the office/commercial parcels are shown in Table L.

³ U.S. Department of Housing and Urban Development, *The Noise Guidebook*.

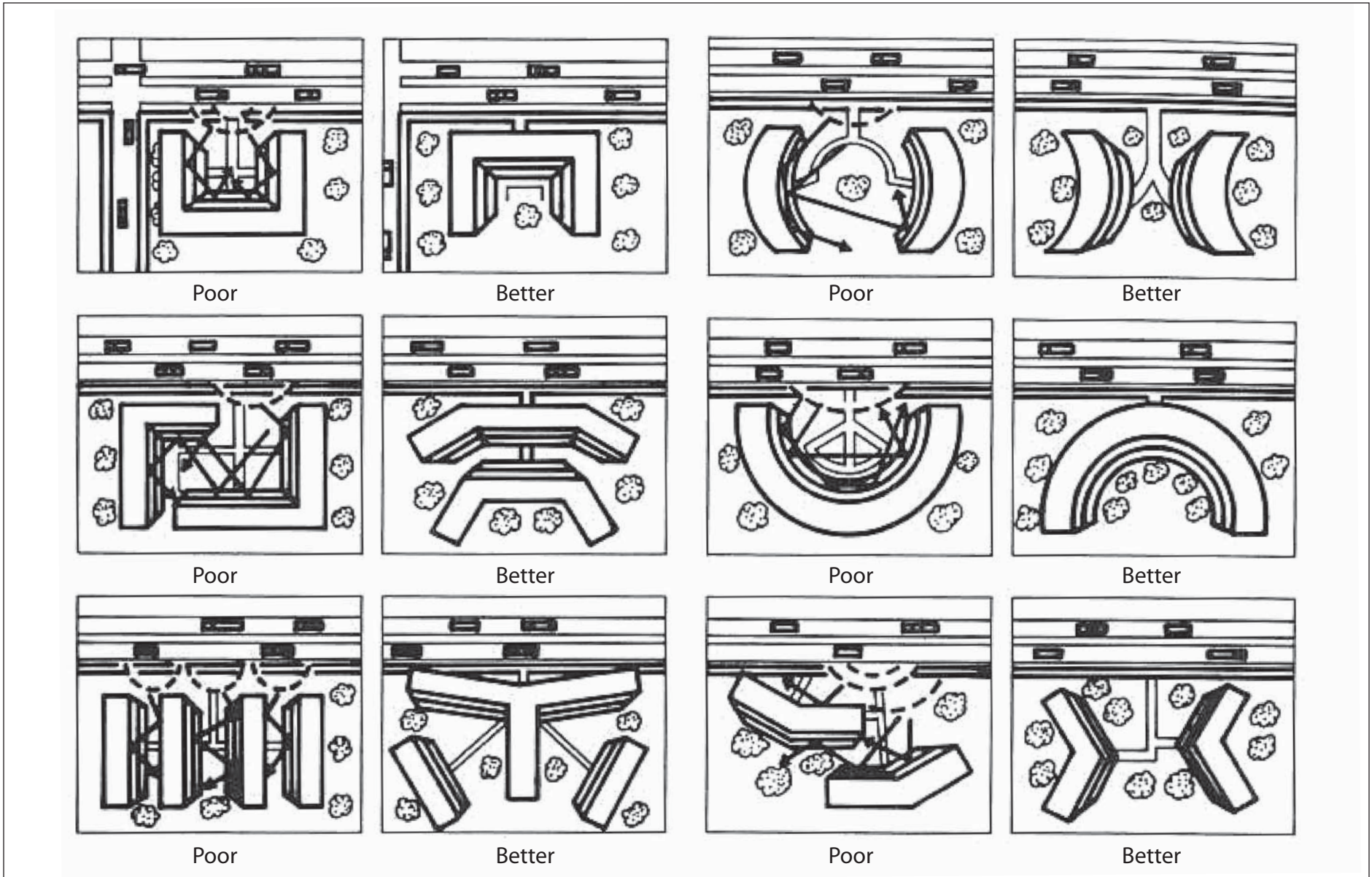


FIGURE 3

LSA



NOT TO SCALE

Sacramento Mutual Housing
 HUD Recommended Orientation of Buildings on Sites

SOURCE: U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT. THE NOISE GUIDEBOOK, 2007.

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Table K: Future (2025) Calibrated I-80 Traffic Noise Office/Commercial Parcel Barrier Analysis

Roadway Segment	Barrier Type	Barrier Height (feet)	CNEL at Closest Receptor without Barrier (dBA)	CNEL at Closest Receptor with Barrier (dBA)
I-80 - Richards Boulevard to Mace Boulevard	BERM	4	77.1	69.2
		6		68.3
		8		67.0

Source: LSA Associates, Inc., August 2007.

Table L: Future (2025) Calibrated Traffic Noise Levels at Sensitive Receptors on Office/Commercial Parcels

	Ground Floor Units	Upper Floor Units
Exterior of closest receptor without barrier	77.1	77.1
Exterior of closest receptor with 4-foot barrier	69.2	77.1
Interior of closest receptor with 4-foot barrier with windows open ¹	54.2	62.1
Interior of closest receptor with 4-foot barrier with windows closed ²	44.2	52.1
Interior of closest receptor without barrier with STC-32 windows closed ³	47.1	47.1
Interior of closest receptor with 4-foot barrier with STC-32 windows closed ³	39.2	47.1

¹ Assumes a 15 dBA exterior to interior noise reduction for entire wall assembly.

² Assumes a 25 dBA exterior to interior noise reduction for entire wall assembly.

³ Assumes a 30 dBA exterior to interior noise reduction for entire wall assembly. This measure would not be necessary to meet interior standard of 55 dBA CNEL for office/commercial land uses.

Source: LSA Associates, Inc., 2007.

Based on the EPA’s Protective Noise Levels (EPA 550/9-79-100, November 1978), with a combination of walls, doors, and windows, standard construction for northern California buildings would provide more than 25 dBA in exterior to interior noise reduction with windows closed and 15 dBA or more with windows open. With windows open, first floor rooms of offices facing I-80 would meet the City’s interior noise standard of 55 dBA CNEL for office/commercial land uses (i.e., 69.2 dBA – 15 dBA = 54.2 dBA). However, upper floor rooms facing I-80 would be exposed to traffic noise levels of up to 77.1 dBA CNEL and would not meet the interior noise standard with windows open (i.e., 77.1 dBA – 15 dBA = 62.1 dBA). Therefore, an alternate form of ventilation, such as an air conditioning system, would be required to ensure that windows can remain closed for a prolonged period of time to meet the City’s interior noise standard for office/commercial land uses of 55 dBA CNEL (i.e., 77.1 dBA – 25 dBA = 52.1 dBA).

5.2 Short-Term Construction-Related Impacts

The project site is bordered by multi-family residential units to the south. Single-family residences are located further south of the project along Albany Avenue and Benbow Court, and to further west along Koso Street. Impacts of construction noise to these adjacent land uses would potentially be significant. Project construction could result in short-term noise impacts, as discussed below.

Noise levels from typical site preparation and other construction activities for the proposed project may range up to 91 dBA L_{max} at the closest residential uses adjacent to the project site for very limited times when construction occurs near the project’s boundary. Construction related noise impacts from

the proposed project would be potentially adverse; however, compliance with the City’s construction noise mitigation requirements would reduce the impact to a less than significant level.

Short-term noise impacts would be associated with excavation, grading, and erecting of buildings on site during construction of the proposed project. Construction related short-term noise levels would be higher than existing ambient noise levels in the project area but would no longer occur once construction of the project is completed.

Two types of short-term noise impacts could occur during the construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. Although there would be a relatively high single event noise exposure potential causing intermittent noise nuisance (passing trucks at 50 feet would generate up to a maximum of 86 dBA L_{max}), the effect on longer term (hourly or daily) ambient noise levels would be small. Therefore, short-term construction related impacts associated with worker commute and equipment transport to the project site would be less than significant.

The second type of short-term noise impact is related to noise generated during excavation, grading, and erection of buildings on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction related noise ranges to be categorized by work phase. Table M lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor. Typical noise levels range up to 91 dBA L_{max} at 50 feet during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels, because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backhoes, bulldozers, draglines, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve one or two minutes of full-power operation followed by three or four minutes at lower power settings.

Construction of the proposed project is expected to require the use of earthmovers such as bulldozers and scrapers, loaders and graders, water trucks, and other trucks. Pile drivers and rock drills are not

Table M: Typical Construction Equipment Maximum Noise Levels, L_{max}

Type of Equipment	Range of Maximum Sound Levels (dBA at 50 feet)	Suggested Maximum Sound Levels for Analysis (dBA at 50 feet)
Pile Drivers	81 to 96	93
Rock Drills	83 to 99	96
Jackhammers	75 to 85	82
Pneumatic Tools	78 to 88	85
Pumps	68 to 80	77
Scrapers	83 to 91	87
Haul Trucks	83 to 94	88
Electric Saws	66 to 72	70
Portable Generators	71 to 87	80
Rollers	75 to 82	80
Dozers	85 to 90	88
Tractors	77 to 82	80
Front-End Loaders	86 to 90	88
Hydraulic Backhoe	81 to 90	86
Hydraulic Excavators	81 to 90	86
Graders	79 to 89	85
Air Compressors	76 to 89	85
Trucks	81 to 87	85

Source: Bolt, Beranek & Newman, 1987. *Noise Control for Buildings and Manufacturing Plants*.

expected to be used during construction of this project. As shown in Table M, the typical maximum noise level generated by backhoes on the proposed project site is assumed to be 86 dBA L_{max} at 50 feet from the operating equipment. The maximum noise level generated by bulldozers is approximately 88 dBA L_{max} at 50 feet. The maximum noise level generated by water and other trucks is approximately 86 dBA L_{max} at 50 feet from these vehicles. Each doubling of the sound sources with equal strength would increase the noise level by 3 dBA. Assuming each piece of construction equipment operates at some distance apart from the other equipment, the worst-case combined noise level at the nearest residences during this phase of construction would be 91 dBA L_{max} at a distance of 50 feet from an active construction area.

The closest existing noise sensitive receptors to the residential parcels are the Owendale Community apartment residences located south of the project site at 3023 Albany Avenue, with outdoor activity areas located at a distance of 50 feet from potentially active construction areas within the project site. At this distance these residences would be exposed to typical construction noise levels of up to 91 dBA L_{max} . Mitigation would be required to reduce this impact to a less-than-significant level.

The closest existing noise sensitive receptors to the office/commercial parcels are residential land uses located southeast of the project on Koso Street. However, these sensitive land uses are located approximately 465 feet from potential active construction areas on the office/commercial parcels site. Therefore, construction related noise levels would result in less-than-significant impacts on these existing sensitive receptors. However, if the proposed residential parcels are constructed and occupied before construction begins on the office/commercial parcels, construction related noise levels would impact these sensitive receptors. These off-site residential units would be within approximately 160 feet of potential active construction areas on the office/commercial parcels site. To mitigate this impact, the project contractor should implement the following recommendations:

- The project contractor should permit only one piece of earthmoving equipment (including scrapers, haul trucks, rollers, dozers, tractors, front end loaders, hydraulic backhoes or excavators, graders, or similar equipment) to operate at any single time within 100 feet of the Owendale Community property line. This would reduce the construction noise level to meet the City's construction noise standard of 86 dBA L_{max} outside of the property plane of the project.
- The project contractor should place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.
- The construction contractor should also locate equipment staging in areas that will create the greatest possible distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.
- The contractor should ensure that all construction equipment is equipped with manufacturers approved mufflers and baffles.
- During all project construction, the construction contractor should limit all noise-producing construction related activities to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, and to the hours of 8:00 a.m. and 8:00 p.m. on Saturdays and Sundays. For the office/commercial parcels which are located more than two hundred feet from existing homes, the contractor may request a special use permit to begin work at 6:00 a.m. on weekdays from June 15th until September 1st.

6.0 RECOMMENDATIONS

6.1 Long-Term Traffic Noise Impacts.

Traffic noise levels from traffic sources on I-80 would result in significant impacts for noise sensitive land uses within the project site. With the implementation of the following recommended measures, traffic related noise impacts would be reduced to below the level of significance.

To reduce I-80 traffic noise impacts on proposed noise sensitive land uses on the residential parcels (including the community building), LSA recommends that the following measures be implemented.

- (1) A berm at least 4 feet in height above the finished pad elevation or a carport structure with a solid, continuous back wall at least 6 feet in height should be constructed that extends the length of the property adjacent to Cowell Boulevard;
- (2) The berm should be landscaped with dense vegetation and tree cover to aid in blocking the line of sight to the traffic noise source;
- (3) A minimum setback of 260 feet from the centerline of I-80 should be required of all noise sensitive land uses on the residential parcels;
- (4) An alternate form of ventilation, such as an air conditioning system, should be required for all buildings on the residential parcels with façades exposed to I-80 to ensure that windows can remain closed for a prolonged period of time;
- (5) Windows with a minimum STC-32 rating should be required for all upper floor residential units with façades directly exposed to I-80; and
- (6) All outdoor active use areas (including playgrounds, patios, and balconies) should be located on the south side of buildings on the residential parcels.

Although specific design, orientation, and location of buildings on the project site have not yet been determined, LSA recommends that design and construction of the project buildings, especially those on the residential parcels, follow the HUD recommendations published in *The Noise Guidebook* and shown in Figure 3 of this report.

To reduce I-80 traffic noise impacts on proposed noise sensitive land uses on the office/commercial parcels, LSA recommends that the following measures be implemented.

- (1) A berm a minimum of 4 feet in height above the finished pad elevation and extending the length of the property should be constructed on the northern property boundary adjacent to I-80;
- (2) The berm should be landscaped with dense vegetation and tree cover to aid in blocking the line of sight to the traffic noise source;
- (3) A minimum setback of 165 feet from the centerline of I-80 should be required of all noise sensitive land uses on the office/commercial parcels;

- (4) An alternate form of ventilation, such as an air conditioning system, should be required for all office/commercial spaces directly exposed to I-80 to ensure that windows can remain closed for a prolonged period of time.

6.2 Short-Term Construction Noise Impacts.

Construction of the proposed project would potentially result in relatively high noise levels and annoyance at the closest residences. Implementation of the following recommended measures would reduce short-term construction related noise impacts associated with the proposed project to comply with the City's Municipal Code construction noise standards.

- (1) The project contractor should permit only one piece of earthmoving equipment (including scrapers, haul trucks, rollers, dozers, tractors, front end loaders, hydraulic backhoes or excavators, graders, or similar equipment) to operate at any single time within 100 feet of the Owendale Community property line;
- (2) During all project site excavation and on-site grading, the project contractors should equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers and bafflers consistent with manufacturers' standards;
- (3) The project contractor should place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site; and
- (4) The construction contractor should locate equipment staging in areas that will create the greatest possible distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.
- (5) During all project construction, the construction contractor should limit all noise-producing construction related activities to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, and to the hours of 8:00 a.m. and 8:00 p.m. on Saturdays and Sundays. For the office/commercial parcels which are located more than two hundred feet from existing homes, the contractor may request a special use permit to begin work at six a.m. on weekdays from June 15th until September 1st.

APPENDIX A

FHWA TRAFFIC NOISE MODEL PRINTOUTS