4.5 NOISE

INTRODUCTION

This section of the EIR analyzes noise impacts associated with the project. The project involves modification of permitted uses and site development parameters within a defined project area to allow a larger scale of development encompassing increased densities, increased floor area ratio, reduced building setbacks, and increased building heights.

Redevelopment projected to occur under the proposed amendments could result in 79 net additional dwelling units (assumed to be attached units with two-bedrooms on average) and 25,770 square feet of new non-residential development (17,800 square feet of office space and 7,970 net new square feet of commercial development). New residential townhouse and condominium projects are assumed along B Street and new mixed-use projects are assumed along 3rd Street and at the corners of B Street and 3rd Street and B Street and 2nd Street.

This section discusses the existing noise environment in the immediate project vicinity, and identifies potential impacts and mitigation measures related to the project.

SETTING

Acoustical Terminology

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, called Hertz (Hz).

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals) as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by the A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels. Table 4.5-1 provides the descriptions of the various acoustical terminologies.

Table 4.5-1 Acoustical Terminology
Acoustics The science of sound.
Ambient Noise The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation The reduction of noise.
A-Weighting A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 pm) weighted by a factor of three and nighttime hours weighted by a factor of ten prior to averaging.
Frequency The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
L_{dn} Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
L_{eq} Equivalent or energy-averaged sound level.
L_{max} The highest root-mean-square (RMS) sound level measured over a given period of time.
Loudness A subjective term for the sensation of the magnitude of sound.
Noise Unwanted sound.
Threshold of Hearing The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain Approximately 120 dB above the threshold of hearing.

Community noise is commonly described in terms of the "ambient" noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptors such as L_{dn} and CNEL, and shows very good correlation with community response to noise.

The Day-Night Average Level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +ten decibel weighting applied to noise occurring during nighttime (10:00 pm to 7:00 am) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Major Noise Sources in the Project Vicinity

Transportation

Motor vehicle traffic on the local roadway network is the major contributor to the existing noise environment in the project vicinity. Vehicular noise within the project vicinity occurs primarily along B Street.

Non-Transportation (Stationary)

Non-transportation noise sources include the UC Davis Toomey Field football stadium located west of A Street and south of Russell Boulevard and Central Park located on the east side of B Street, north of 3rd Street. There are also a few neighborhood commercial uses primarily consisting of food service. The following is a discussion of the individual noise generating activities associated with these uses.

Toomey Field

The UC Davis Toomey Field stadium has been reported to be a potential source of noise disturbances to the surrounding residential uses. The stadium is used for a variety of events including UC Davis football games. Other events include track meets, physical education classes, intramural sports, and football practices. The most significant on-site noise generation from Toomey Field is reported to consist primarily of crowd noise and public address (PA) system noise during sporting events. It is also reported that nuisance noise from Toomey Field may occur off-site as the result of attendees traveling to and from the stadium.

UC Davis is currently in the process of building a new football stadium. Therefore, it is anticipated that Toomey Field may eventually become a less significant source of noise to the surrounding community. It should be noted that the City of Davis has no control over activities that occur on the UC Davis campus.

In order to approximate noise level data from Toomey Field, the following method was used. j.c. brennan & associates, Inc. used previously collected data from high school football stadiums with typical capacity crowds of approximately 3,000 to 5,000 attendees. A +five dB adjustment was applied to account for an estimated crowd capacity for Toomey Field of approximately three times that of a typical high school football stadium. The noise generation of the stadium will depends mainly on crowd size, the interest level in the sporting event, whether or not marching bands will play during events, and the design of the public address system.

Using this method the noise emissions at a distance of 500 feet from the center of the stadium is estimated to be approximately 65 dB L_{eq} and 70-75 dB L_{max}, based on a crowd size of 9,000 to 15,000. The project area is located approximately 725 feet from the center of the Toomey Field stadium. At this distance football stadium noise levels are estimated to be 52 dB L_{eq} and 57-62 dB L_{max}, adjusting for distance and applying a -ten dB reduction from shielding due to intervening buildings.

Central Park

In 2005 the City of Davis Central Park held approximately 200 reserved events, 30 of which included the use of amplified sound. According to the City of Davis Assistant Chief of Police, there were no reported complaints regarding noise from any of the Central Park events. Noise generation from parks varies greatly depending on the types of use; however, children playing and the use of amplified music are typically cited as being the primary source of noise from park uses. Typical noise levels associated with groups of approximately 50 children playing at a distance of 50 feet generally range from 55 to 60 dB L_{eq}, with maximum noise levels ranging from 70 to 75 dB. Noise levels from amplified sound may vary from event to event due to variations in the type of equipment used, the orientation of speakers, and the type of event. j.c. brennan & associates, Inc. conducted short term noise measurements at a Wednesday night Farmer's Market on April 5, 2006 at the City of Davis Central Park. The primary noise source associated with the Farmer's Market consisted of a live band which included the use of an amplification system. Short-term noise level measurements indicated that the live band resulted in noise levels of 68 dB L_{eq} and 72 dB L_{max} at a distance of 150 feet from the band. At the project area boundary, approximately 270 feet from the band, noise measurements of the band were difficult to obtain due to traffic noise from B Street. However, the band was audible during periods of calm traffic on B Street. During these times, the band measured approximately 60 dB L_{eq} and 65 dB L_{max}.

Neighborhood Commercial

Noise generation from neighborhood commercial uses consists primarily of minor amounts of parking lot noise and HVAC noise. Site observations indicated that traffic noise was the dominant noise source in the vicinity of the project area commercial uses.

Other Noise Sources

The project area is an urbanized area with a large student population. The area is characterized by a blend of traditional downtown single-family residential uses and higher density apartment-style housing which tends to be heavily student occupied. It is reported that noise complaints occur as the result of loud music from parties and people traveling to and from parties. Additional noise concerns stem from the use of yard maintenance equipment, particularly leaf blowers.

Noise-Sensitive Land Uses in the Project Vicinity

Noise sensitive land uses in the immediate project vicinity consist of single-family and multi-family residential uses. Most of the project area single family uses front onto University Avenue or B Street and are alley loaded. Future noise sensitive uses associated with the project include various residential uses.

Existing Noise Environment in the Project Vicinity

Existing Traffic Noise Levels

To determine the existing traffic noise levels at the identified sensitive receivers within the project vicinity, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used with the California Vehicle Noise Emission Levels. The FHWA Model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. Traffic volumes were obtained from Fehr and Peers Transportation Consultants (March 2006). Truck usage and vehicle speeds on the project roadways were estimated from field observations.

Table 4.5-2 shows the predicted existing traffic noise levels in terms of the Day/Night Average Level descriptor (L_{dn}) at a standard distance of 50 feet (20 feet for alleys) from the centerlines of the existing project-area roadways for existing conditions, as well as distances to existing traffic noise contours. The extent to which existing land uses in the project vicinity are affected by existing traffic noise depends on their respective proximity to the roadways and their individual sensitivity to noise.

Existing Ambient Noise Levels:

To quantify existing ambient noise levels in the vicinity of the project area, j.c. brennan & associates, Inc. staff conducted short-term and continuous noise level measurements at various locations. See Figure 4.5-1 for noise measurement locations. The noise level measurements were conducted on April 5 and 6, 2006. The noise level measurements were conducted to determine typical background noise levels and for comparison to the project-related noise levels. Table 4.5-3 shows a summary of the noise measurement results. Figure 4.5-2 graphically shows the results of the continuous hourly noise level measurements for each of the three continuous noise measurement sites. The continuous noise measurement sites are labeled A through C on Figure 4.5-1.

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

The following is a description of each of the noise monitoring locations contained in Table 4.5-3:

Site 1 — This ten minute ambient noise measurement was conducted on the south side of 4th Street on the northern boundary of the project site. The dominate noise source for this site was traffic on B Street. The maximum instantaneous noise level of 84 dB was caused by two motorcycles traveling on B Street. Other noise sources at this site included light traffic on 4th Street and music from the backyard of 327 4th Street.

Table 4.5-2
Existing Traffic Noise Levels and Distances to Contours

Roadway	Segment	L_{dn} @ 50 Feet (20 feet for Alleys)	Distance to Contours (feet) [1]		
			70 dB L_{dn}	65 dB L_{dn}	60 dB L_{dn}
Russell Blvd.	West of B Street	67 dB	33	72	155
Russell Blvd.	East of B. Street	66 dB	26	56	121
4th Street	Alley to University	50 dB	2	5	11
4th Street	Alley to B Street	50 dB	2	5	11
3rd Street	A Street to	46 dB	1	3	6
3rd Street	University Avenue to	49 dB	2	4	9
3rd Street	Alley to B Street	50 dB	2	5	11
3rd Street	East of B. Street	58 dB	8	17	36
2nd Street	West of Alley	52 dB	3	7	15
2nd Street	Alley to B Street	53 dB	3	7	16
2nd Street	East of B. Street	57 dB	7	14	31
A Street	North of 3rd Street	57 dB	6	14	30
A Street	South of 3rd Street	56 dB	6	13	28
University	North of 3rd Street	45 dB	1	2	5
University	South of 3rd Street	49 dB	2	4	9
Alley	South of 4th	46 dB	1	2	4
Alley	North of 3rd	46 dB	1	3	6
Alley	South of 3rd	46 dB	1	3	7
Alley	North of 2nd	47 dB	2	4	9
B Street	North of 3rd	67 dB	30	65	139
B Street	South of 3rd	66 dB	26	56	120

Source: FHWA-RD-77-108 with inputs from Fehr and Peers Transportation Consultants and j.c. brennan & associates, Inc.
[1]Distances to traffic noise contours are measured in feet from the centerlines of the roadways.

Figure 4.5-1

B and 3rd Streets Visioning Process EIR – Davis, California

Project Aerial and Noise Measurement Sites

: Noise Measurement Site

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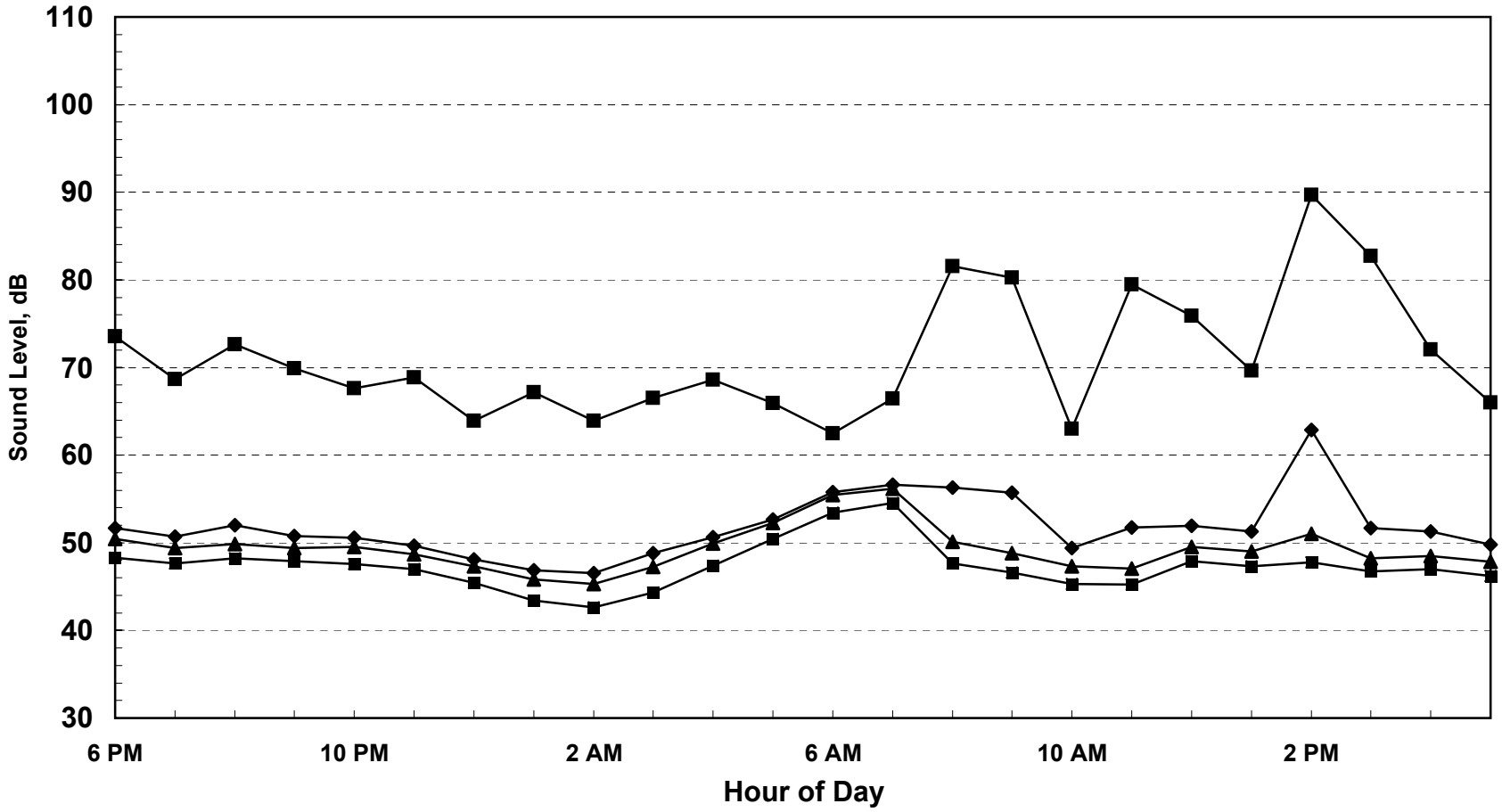
Figure 4.5-2A
Continuous Noise Measurement Results
B and 3rd Street Visioning Process EIR - Davis, California
April 5-6, 2006 - Site A



Ldn = 58 dB

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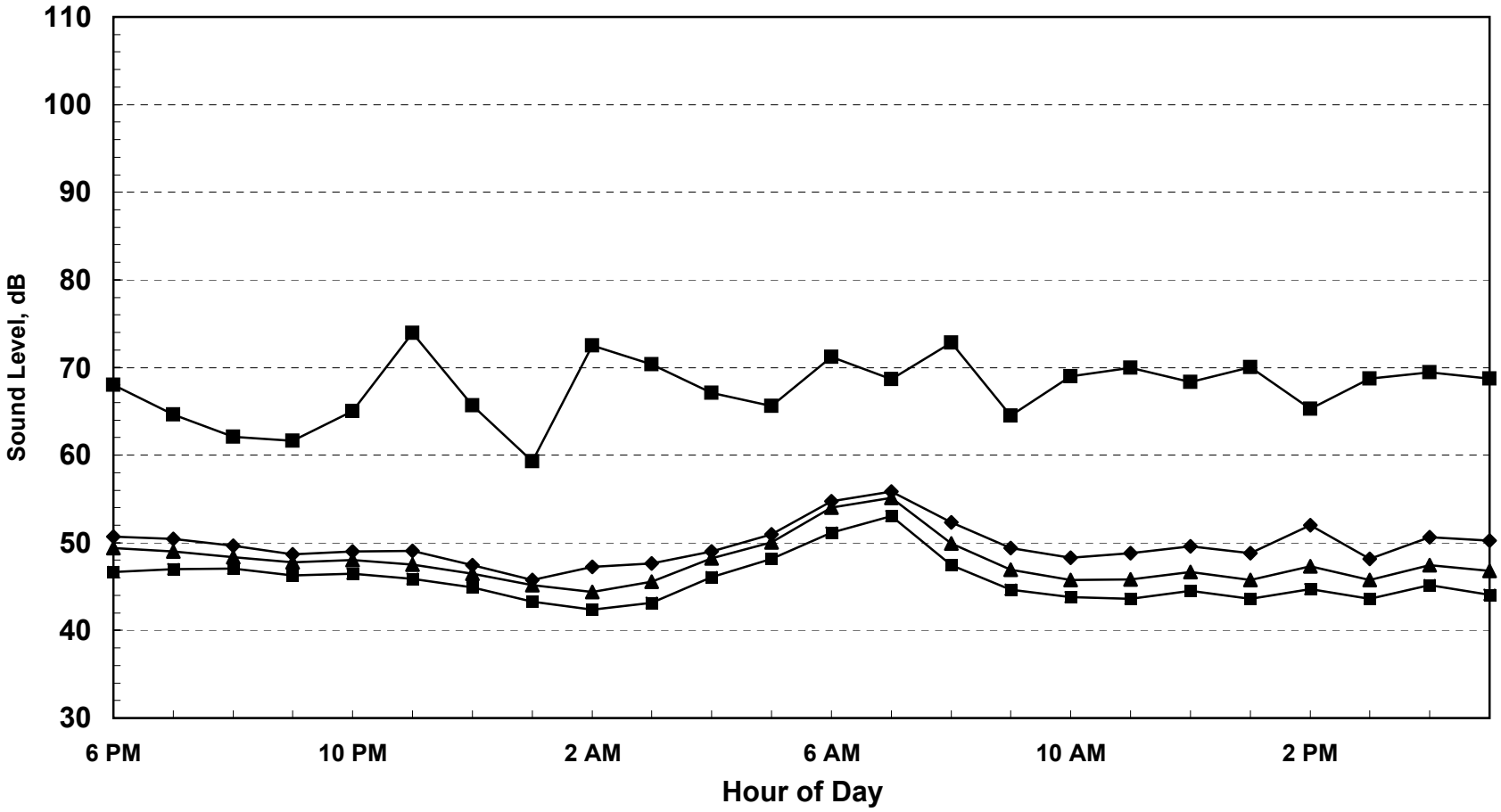
Figure 4.5-2B
Continuous Noise Measurement Results
B and 3rd Street Visioning Process EIR - Davis, California
April 5-6, 2006 - Site B



Ldn = 56 dB

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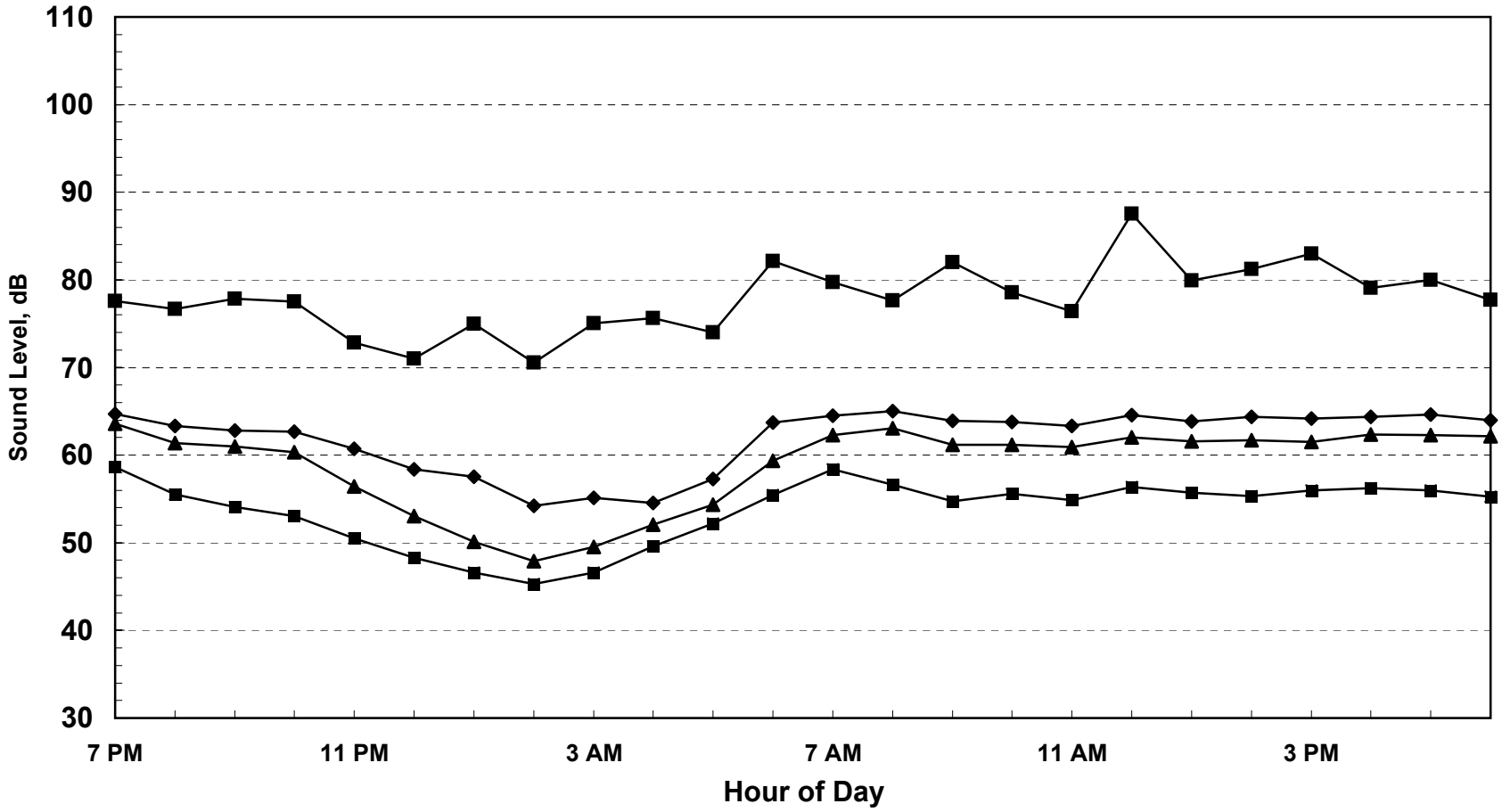
Figure 4.5-2C
Continuous Noise Measurement Results
B and 3rd Street Visioning Process EIR - Davis, California
April 5-6, 2006 - Site C



Ldn = 67 dB

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Table 4.5-3
Existing Ambient Noise Monitoring Results

Site	Location	Date - Time	Average Measured Hourly Noise Levels, dBA						
			24-hour	Daytime (7:00 am - 10:00 pm)			Nighttime (10:00 pm - 7 am)		
			L_{dn}	L_{eq}	L50	L_{max}	L_{eq}	L50	L_{max}
1	4th Street, West of B Street	4/6/06 – 3:55 pm	NA	64 dB	60 dB	84 dB	NA		
2	University Avenue, North of 3rd Street	4/6/06 – 4:36 pm	NA	55 dB	50 dB	75 dB	NA		
3	In Alley, North of Sam's Restaurant	4/6/06 – 4:54 pm	NA	57 dB	52 dB	68 dB	NA		
4	University Avenue, South of 3rd Street	4/6/06 – 5:11 pm	NA	55 dB	49 dB	70 dB	NA		
5	Northwest corner of Baker's Square Parking Lot	4/6/06 – 5:31 pm	NA	57 dB	53 dB	75 dB	NA		
6	B Street North of 2nd Street	4/6/06 – 5:49 pm	NA	63 dB	61 dB	73 dB	NA		
A	24-hr Site – Backyard of 222 University Avenue	April 5-6 – 6 pm to 5 pm	58 dB	55 dB	50 dB	74 dB	51 dB	49 dB	66 dB
B	24-hr Site – Backyard of 334 University Avenue	April 5-6 – 6 pm to 5 pm	56 dB	51 dB	48 dB	68 dB	50 dB	48 dB	68 dB
C	24-hr Site – Front yard of 311 B Street	April 5-6 – 7 pm to 6 pm	67 dB	64 dB	62 dB	80 dB	60 dB	54 dB	75 dB

Source - j.c. brennan & associates, Inc.

Site 2 This ten minute ambient noise measurement was conducted on the east side of University Avenue north of 3rd Street. This site was relatively quiet with the exception of a few vehicles traveling on University Avenue. The 75 dB instantaneous noise level was caused by a motorcycle traveling on University Avenue. Other noise sources included students walking and conversing, activities and a light aircraft flyover.

Site 3 This ten minute ambient noise measurement was conducted in the alley, north of 3rd Street and north of Sam's Restaurant. The primary noise source at this site was traffic on B Street. The 68 dB instantaneous noise level was caused by a light aircraft flyover. Other noise sources included a garage band in the adjacent neighborhood, a distant train horn, and parking lot activity at the adjacent restaurant uses.

Site 4 This ten-minute ambient noise measurement was conducted on the east side of University Avenue south of 3rd Street. This site was relatively quiet with the exception of a few vehicles traveling on University Avenue. The 70 dB instantaneous noise level was caused

by a vehicle traveling on University Avenue. Other noise sources included general neighborhood activity consisting of passing pedestrians and vehicles arriving and leaving nearby residential uses.

Site 5 This ten minute ambient noise measurement was conducted in the alley, north of 4th Street adjacent to the Baker's Square parking lot. The primary noise source at this site was traffic on B Street. The 75 dB instantaneous noise level was caused by a car alarm being activated in the Baker's Square parking lot. Other noise sources included alley traffic and a light aircraft flyover.

Site 6 This ten minute ambient noise measurement was conducted on the west side of B Street, 60 feet from the centerline of B Street. The primary noise source at this site was traffic on B Street.

24-hr Site A This continuous noise measurement site was located in the backyard of 222 University Avenue. The dominate noise source was traffic on B Street. Other noise sources included alley traffic and light aircraft flyovers. Activities at Toomey Field were audible between the hours of 4:30 pm to 6:30 pm on April 5.

24-hr Site B This continuous noise measurement site was located in the backyard of 334 University Avenue. The dominate noise source was traffic on B Street. Other noise sources included alley traffic and light aircraft flyovers. Activities at Toomey Field were audible between the hours of 4:30 pm to 6:30 pm on April 5.

24-hr Site C This continuous noise measurement site was located in the front yard of 311 B Street. The dominate noise source was traffic on B Street. Activities at Toomey Field and Central Park were audible between the hours of approximately 4:30 pm to 8:30 pm on April 5.

Regulatory Setting

City of Davis Noise Element Criteria

The City of Davis General Plan Noise Element requires that interior noise exposure from exterior noise sources (traffic) within residential dwellings not exceed 45 dB L_{dn} (or CNEL), regardless of exterior noise exposure. This standard is increased to 55 dB L_{dn} or less for office/professional uses.

The City of Davis has established an exterior noise level criterion of less than 60 dB L_{dn} (or CNEL) within outdoor activity areas of residential land uses. This standard is adjusted to a level less than 65 dB L_{dn} for office/professional uses. These are considered to be the "Normally Acceptable" criteria, and may be adjusted upward (60-70 dB L_{dn} for residential, 65-75 dB L_{dn} for office/professional) based on compliance with the interior noise criterion and the City's discretion.

City of Davis Noise Ordinance Criteria:

Section 24 of the City of Davis City Code establishes a maximum noise level standard of 55 dB during the hours of 7:00 AM to 9:00 PM, and 50 dB during the hours of 9:00 PM to 7:00 AM. The ordinance defines maximum noise level as the "maximum continuous

sound level or repetitive peak level produced by a sound source or group of sources. j.c. brennan & associates, Inc. interprets this definition to be equivalent to the average noise level descriptor, L_{eq}. The City Code makes exemptions for certain typical activities which may occur within the city. These exemptions are listed in Article 24.02.040 (Special Provisions) and are summarized below:

a) Normal operation of power tools for non-commercial purposes are typically exempted between the hours of 8:00 AM and 8: PM unless the operation unreasonably disturbs the peace and quiet of any neighborhood.

b) Construction or landscape operations would be exempt during the hours of 7:00 AM to 7:00 PM Mondays through Fridays and between the hours of 8:00 AM to 8:00 PM Saturdays and Sundays assuming that the operations are authorized by valid city permit or business license, or carrier out by employees or contractors of the city and one of the following conditions apply:

    1) No piece of equipment produces a noise level exceeding 83 dBA at 25 feet.
    2) The noise level at any point outside the property plane of the project shall not exceed 86 dBA.
    3) Requires that impact equipment and tools be fitted with the best available silencing equipment.
    4) Limits individual powered blowers to a noise level of 70 dBA at 50 feet.
    5) Prohibits more than one blower from simultaneously operating within 100 feet of another blower.
    6) The 70 dBA at 50 feet requirement does not apply to blowers operated on single-family residential property.

a) The City Code also exempts air conditioners, pool pumps, and similar equipment from the noise regulations, provided that they are in good working order.

b) Work related to public health and safety is exempt from the noise requirements.

c) Safety devices are exempt from the noise requirements.

d) Emergencies are exempt from the noise requirements.

The City Code also sets regulations for the use of amplified sound for special events located within the City. Section 24.04.0 of the City Code requires that special sound amplification permits be obtained from the Davis Police Department prior to the use of amplified sound.

Determination of a Significant Increase in Noise Levels

Another means of determining a potential noise impact is to assess a person's reaction to changes in noise levels due to a project. Table 4.5-4 is commonly used to show expected public reaction to changes in environmental noise levels. This table was developed on the basis of test subjects' reactions to changes in the levels of steady-state pure tones or broad-band noise and to changes in levels of a given noise source. It is probably most applicable to noise levels in the range of 50 to 70 dBA, as this is the usual range of voice and interior noise levels.

Table 4.5-4
Subjective Reaction to Changes in Noise Levels of Similar Sources

Change in Level, dBA	Subjective Reaction	Factor Change in Acoustical Energy
1	Imperceptible (Except for Tones)	1.3
3	Just Barely Perceptible	2.0
6	Clearly Noticeable	4.0
10	About Twice (or Half) as Loud	10.0

Source: Architectural Acoustics, M. David Egan, 1988.

Based upon the Table 4.5-4 data, a noise level increase of three dB would be barely perceptible and an increase of six dB would be clearly noticeable. Therefore, the significant increase threshold is typically considered to be any increase of five dB or more based upon Table 4.5-4 and on other recent EIRs in the City of Davis.

IMPACTS AND MITIGATION MEASURES

Generally, a project may have a significant effect on the environment if it will substantially increase the ambient noise levels for adjoining areas or expose people to severe noise levels. In practice, more specific professional standards have been developed. These standards state that a noise impact may be considered significant if it would generate noise that would conflict with local planning criteria or ordinances, or substantially increase noise levels at noise-sensitive land uses.

Standards of Significance

CEQA guidelines state that implementation of the project would result in significant noise impacts if the project would result in any of the following:

a. Exposure of persons to or generation of noise levels in excess of standards established in the City of Davis General Plan. Specifically, exterior and interior noise levels of 60-70 dB L_{dn} and 45 dB L_{dn}, respectively, for residential uses exposed to transportation noise sources and the City of Davis Noise Ordinance criteria for residential uses exposed to non-transportation noise sources.

b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project, typically defined as five dB or greater.

d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, typically defined as five dB or greater.

e. For a project located within an airport land use plan or, where such a plan has not be adopted, within two miles of a public airport or public use airport, where the project would expose people residing or working in the area to excessive noise levels.

f. For a project within the vicinity of a private airstrip, where the project would expose people residing or working in the project area to excessive noise levels.

There are no significant sources of groundborne vibrations or groundborne noise in the project are, therefore, item "b" above would not apply to this project. The project is not located within an airport land use plan area or within the vicinity of a private airstrip, therefore, items "e" and "f" would also not apply to this project.

Project-Specific Analysis

Impact 4.5-1

The proposed project would result in an increase in traffic noise levels at existing noise-sensitive uses in the project vicinity. This is considered a *less-than-significant* impact.

To assess noise impacts due to project-related traffic increases on the existing local roadway network, traffic noise levels are predicted at a representative distance for both existing and cumulative without and with project conditions.

The FHWA traffic noise prediction model was used to predict Existing With Project traffic noise levels at a representative distance of 50 feet (20 feet for alleys) from the project-area roadway centerlines. Table 4.5-5 shows the predicted traffic noise level increases on the local roadway network for existing conditions. Table 4.5-6 shows the predicted traffic noise level increases on the local roadway network for cumulative conditions.

The Table 4.5-5 and 4.5-6 data indicate that the proposed project would not result in traffic noise level increases exceeding five dB on the project-area roadways, when compared to no-project conditions. Therefore, this impact would be considered less than significant based upon the project significance criteria.

Mitigation Measure: None required.

Impact 4.5-2

The proposed project could expose new residences to traffic noise levels that exceed the City of Davis exterior and interior noise level standards. This is considered a *significant* impact.

Future noise-sensitive uses adjacent to B Street could be affected by noise levels exceeding the City of Davis exterior and interior noise level standards. The FHWA traffic noise prediction model was used to predict Cumulative With Project traffic noise levels adjacent to B Street. The Table 4.5-7 data show the estimated B Street noise exposure at a setback distance of 50 feet from the roadway centerline and the distances to the 60, 65, and 70 dB L_{dn} noise contours.

The Table 4.5-7 data indicate that noise sensitive uses adjacent to B Street would be exposed to traffic noise levels in excess of the City's "normally acceptable" exterior noise level standards of 60 dB Ldn for residential uses and 65 dB Ldn for office/commercial. However, the predicted exterior noise exposure would be within the limits of the City's "conditionally acceptable" exterior noise limits of 60-70 dB Ldn for residential and 65-75 dB Ldn for office/commercial. Pursuant to the General Plan (Table 19, Standards for Noise Exposure, p. 339) new construction or development in a "conditionally acceptable" noise environment should be undertaken only after an analysis of the development-specific noise reduction requirements is conducted and needed noise attenuation features are included. This analysis and the mitigations identified below satisfy that requirement.

Interior noise reduction may be obtained through acoustical design of building facades. Standard construction practices provide 10-15 dB noise reduction for building facades with open windows, and approximately 25 dB noise reduction when windows are closed. Thus a 25 dB exterior-to-interior noise reduction can be obtained by the requirement that building design include adequate ventilation systems, allowing windows on a noise-impacted facade to remain closed under any weather condition. Where greater noise reduction is required, acoustical treatment of the building facade is necessary. Reduction of relative window area is the most effective control technique, followed by providing acoustical glazing (thicker glass or increased air space between panes) in low air infiltration rate frames, use of fixed (non-movable) acoustical glazing or the elimination of windows. Noise transmitted through walls can be reduced by increasing wall mass (using stucco or brick in lieu of wood siding), isolating wall members by the use of double or staggered stud walls, or mounting interior walls on resilient channels. Noise control for exterior doorways is provided by reducing door area, using solid-core doors, and by acoustically sealing door perimeters with suitable gaskets. Roof treatments may include the use of plywood sheathing under roofing materials.

Table 4.5-5
Existing Traffic Noise Levels With and Without Project

Roadway	Segment	L_{dn} @ 50 Feet (20 feet for Alleys)[1]		
		Existing With No Project	Existing With Project	Change
Russell Blvd.	West of B Street	67 dB	67 dB	0.0 dB
Russell Blvd.	East of B. Street	66 dB	66 dB	0.1 dB
4th Street	Alley to University Avenue	50 dB	51 dB	0.8 dB
4th Street	Alley to B Street	50 dB	51 dB	0.7 dB
3rd Street	A Street to University	46 dB	46 dB	0.0 dB
3rd Street	University Avenue to Alley	49 dB	49 dB	0.2 dB
3rd Street	Alley to B Street	52 dB	54 dB	1.6 dB
3rd Street	East of B. Street	58 dB	58 dB	0.0 dB
2nd Street	West of Alley	53 dB	53 dB	0.4 dB
2nd Street	Alley to B Street	53 dB	54 dB	1.0 dB
2nd Street	East of B. Street	57 dB	57 dB	0.0 dB
A Street	North of 3rd Street	57 dB	57 dB	0.1 dB
A Street	South of 3rd Street	56 dB	57 dB	0.1 dB
University	North of 3rd Street	45 dB	45 dB	0.0 dB
University	South of 3rd Street	49 dB	49 dB	0.2 dB
Alley[2]	South of 4th	45 dB	50 dB	NA[3]
Alley[2]	North of 3rd	49 dB	52 dB	NA[3]
Alley[2]	South of 3rd	50 dB	53 dB	NA[3]
Alley[2]	North of 2nd	52 dB	55 dB	NA[3]
B Street	North of 3rd	66 dB	67 dB	0.1 dB
B Street	South of 3rd	66 dB	66 dB	0.1 dB

Bold = Significant increase in noise.

[1]Distances to traffic noise contours are measured in feet from the centerlines of the roadways. Traffic noise levels are predicted at a standard distance from the roadway centerlines and do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.

[2]It should be noted that existing noise measurements indicate that ambient noise levels in the project-area alleys are currently in the range of 54-58 dB L_{dn}. Based upon site observations and ambient noise measurements, it can be concluded that the noise environment in the project-area alleys is dominated by B Street traffic, not alley traffic.

[3] Because the overall alley noise levels are determined by B Street traffic, the project-related alley traffic is not expected to cause an overall increase in ambient noise levels at the backyards adjacent to the alleys.

Source: FHWA-RD-77-108 with inputs from Fehr and Peers and j.c. brennan & associates, Inc.

Table 4.5-6
Cumulative Traffic Noise Levels With and Without Project

Roadway	Segment	L_{dn} @ 50 Feet (20 feet for Alleys)[1]		
		Cumulative With No Project (dB)	Cumulative With Project (dB)	Change (dB)
Russell Blvd.	West of B Street	68 dB	68 dB	0.0 dB
Russell Blvd.	East of B. Street	67 dB	67 dB	0.0 dB
4th Street	Alley to University	51 dB	51 dB	0.4 dB
4th Street	Alley to B Street	51 dB	51 dB	0.4 dB
3rd Street	A Street to University	47 dB	47 dB	0.0 dB
3rd Street	University Avenue to	49 dB	49 dB	0.2 dB
3rd Street	Alley to B Street	52 dB	54 dB	1.6 dB
3rd Street	East of B. Street	59 dB	59 dB	0.1 dB
2nd Street	West of Alley	53 dB	53 dB	0.4 dB
2nd Street	Alley to B Street	54 dB	55 dB	1.2 dB
2nd Street	East of B. Street	57 dB	57 dB	0.1 dB
A Street	North of 3rd Street	47 dB	47 dB	0.0 dB
A Street	South of 3rd Street	56 dB	57 dB	0.2 dB
University	North of 3rd Street	47 dB	47 dB	0.0 dB
University	South of 3rd Street	49 dB	49 dB	0.2 dB
Alley[2]	South of 4th	48 dB	50 dB	NA[3]
Alley[2]	North of 3rd	50 dB	52 dB	NA[3]
Alley[2]	South of 3rd	50 dB	53 dB	NA[3]
Alley[2]	North of 2nd	52 dB	55 dB	NA[3]
B Street	North of 3rd	67 dB	67 dB	0.1 dB
B Street	South of 3rd	66 dB	66 dB	0.1 dB

Bold = Significant increase in noise.

[1]Distances to traffic noise contours are measured in feet from the centerlines of the roadways. Traffic noise levels are predicted at a standard distance of 50 feet from the roadway centerline and do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.

[2]It should be noted that existing noise measurements indicate that ambient noise levels in the project-area alleys are currently in the range of 54-58 dB L_{dn}. Based upon site observations and ambient noise measurements, it can be concluded that the noise environment in the project-area alleys is dominated by B Street traffic, not alley traffic.

[3] Because the overall alley noise levels are determined by B Street traffic, the project-related alley traffic is not expected to cause an overall increase in ambient noise levels at the backyards adjacent to the alleys.

Source: FHWA-RD-77-108 with inputs from Fehr and Peers and j.c. brennan & associates, Inc.

Table 4.5-7
Cumulative With Project Traffic Noise Levels Adjacent to B Street

Roadway	Segment	Distance (feet[1])	Approx-imate ADT	Predicted Exterior Noise Level, L_{dn}	Distances to traffic noise contours, L_{dn}		
					60 dB	65 dB	70 dB
B Street	North of 3rd Street	50	15,710	67 dB	145'	67'	31'
B Street	South of 3rd Street	50	13,320	66 dB	130'	60'	28'

[1] Distances are measured in feet from the roadway centerline.
Source: FHWA-RD-77-108 with inputs from Fehr and Peers and j.c. brennan & associates, Inc.

Buildings can be placed on a project site to shield other structures or areas, to remove them from noise-impacted areas, and to prevent an increase in noise level caused by reflections. The use of one building to shield another can significantly reduce overall project noise control costs, particularly if the shielding structure is insensitive to noise.

Site design should guard against the creation of reflecting surfaces which may increase on-site noise levels. For example, two buildings placed at an angle facing a noise source may cause noise levels within that angle to increase by up to three dB. The open end of "U"-shaped buildings should point away from noise sources for the same reason. Landscaping walls or noise barriers located within a development may inadvertently reflect noise back to a noise-sensitive area unless carefully located. Avoidance of these problems while attaining an aesthetic site design requires coordination between local agencies, the project engineer and architect, and the noise consultant.

The size and orientation of the existing parcels in the study area limit the flexibility available to achieve noise attenuation through site design, particularly as existing noise levels measured for the project along the alleys indicate that traffic noise from B Street is the largest contributor to ambient noise levels at the edge of the project area. However, careful building placement and interior layout can help to reduce noise impacts and should be considered during the design phase of new development.

Mitigation Measure 4.5-2(a): The following noise attenuation measures are required for all new construction/development in the project area:

1) All windows and sliding glass doors shall be weather stripped or mounted in low air-infiltration design frames meeting ANSI air infiltration standards. Standard energy-conserving building practices will satisfy this requirement.

2) Noise insulation features shall be incorporated into building construction and site improvement as may be necessary to ensure interior noise levels no greater than 45 dBA for residential and 55 for non-residential space.

Mitigation Measure 4.5-2(b): Reduce exposure to exterior noise levels through site design, building placement and interior building layout where feasible.

Implementation of these mitigation measures will reduce this impact to a less-than-significant level.

Impact 4.5-3

The proposed project could expose new noise-sensitive uses to noise levels from stationary noise sources that could exceed the Davis City Code exterior noise level standards. This is considered a *potentially significant* impact.

Proposed new residences located in the vicinity of Toomey Field or Central Park may periodically be exposed to elevated special event noise levels. Site observations and noise measurements indicate that Toomey Field and Central Park events are audible within the boundaries of the project area and may occasionally exceed the Davis City Code noise limits. Because the special event noise levels could be a source of annoyance and could exceed the Davis City Code limits, this impact is considered potentially significant. However the City has no control over activities occurring on the UC Davis campus. Activities generating noise occurring at Central Park are conducted with City approval as special events intended to serve broad community interests, and are considered within the range of normal uses occurring at a centrally located urban public park and plaza.

Most residents locating in a downtown area recognize that one of the tradeoffs for close proximity to public venues and entertainment is exposure to higher levels of noise. However, it is recommended that new property owners or new tenants in the project area receive a formal written disclosure that their property or unit will be subject to periodic exposure to varying levels of noise from Central Park and Toomey field that may exceed the City's noise ordinance standards. Such disclosure could be made a requirement of discretionary development approvals, with specific language and implementation device to be approved by the City Attorney.

Mitigation Measure 4.5-3(a) – New parcels created within the project area and future rental agreements and leases for rental housing within the area shall contain language approved by the City Attorney that discloses that special events at Toomey Field and/or Central Park may generate noise levels which vary and may approach or exceed the City's noise ordinance standards.

The City cannot restrict use of Toomey Field. The ability to conduct special outdoor events with amplified sound at Central Park is an intended function of this space. Disclosure of exposure to noise allows residents and tenants to make more informed decisions; however, it does not eliminate the impact. Therefore, this impact remains potentially significant and unavoidable.

Impact 4.5-4

The proposed project would create new commercial, office and residential uses which would contribute to ambient noise levels. This is considered a *significant* impact.

Future development within the project area has the potential to create noise levels in excess of the applicable Davis City Code noise standards or result in annoyance at existing and future noise-sensitive developments within the project area. Noise generating uses would typically include commercial and office uses. While residential uses are not typically considered noise generating, concern has been expressed over the increased density of the residential uses that could occur under this project.

Noise concerns related to the additional residential uses consist primarily of the possibility for increased traffic noise and nuisance issues regarding yard maintenance equipment and social functions. The change in traffic noise levels was discussed earlier in this section. Additionally, nuisance noise issues cannot practically be eliminated at the planning phase, and would be subject to the City Code enforcement by the City of Davis Police Department. This analysis cannot practically discuss the potential for noise conflicts arising out of City Code violations. Rather the focus is on the impacts of neighborhood commercial and office uses on existing and proposed residential uses in the project area.

At this time specific commercial and residential uses are not known and detailed site and grading plans have not yet been developed. As a result, it is not feasible to identify specific noise impacts associated with each of the proposed uses. However, a general discussion and assessment of impacts can be conducted based upon the types of commercial and office uses which would be allowed under this project. This is provided below.

Commercial and office land use activities can produce noise levels which affect adjacent sensitive land uses. These noise sources can be continuous and may contain tonal components which may be annoying to individuals who live in the nearby vicinity. In addition, noise generation from fixed noise sources may vary based upon climatic conditions, time of day and existing ambient noise levels. The primary noise sources generally include truck deliveries, parking lot use and HVAC equipment. The following is a list of potential noise sources and the noise levels generated by those sources at a distance of 50 feet:

- Delivery Trucks -- 50-60 dB L_{eq}
- Parking Lots -- 50-60 dB L_{eq}
- HVAC Equipment -- 45-70 dB L_{eq}

The proposed commercial and office uses developed within the plan area (including any emergency generators) will be required to comply with the City of Davis Noise Element and City Code noise standards, therefore this is not identified as a mitigation measure.

Mitigation Measure 4.5-4(a): Applicants for commercial projects within the project area shall be required to incorporate feasible and reasonable noise control measures into the project design so as to mitigate noise impacts on adjoining residential uses. Such noise control measures may include, but not be limited to, use of noise barriers, site-redesign, silencers, partial or complete enclosures of noisy equipment, etc.

Mitigation Measure 4.5-4(b): HVAC equipment for commercial uses within the project area shall be placed as far as feasible from residential uses and shall be located within mechanical rooms where possible or screened from view through the use of building parapets or other solid noise barriers/enclosures.

Mitigation Measure 4.5-4(c): Commercial parking lots shall be shielded from the residential uses through the use of intervening structures or solid noise barriers.

Implementation of these mitigation measures would reduce this impact to a less-than-significant level.

Impact 4.5-5

Activities associated with construction could result in elevated noise levels at existing noise-sensitive uses. This is considered a *less-than-significant* impact.

During the construction phases of the project, noise from construction activities would add to the noise environment in the immediate project vicinity. Activities involved in construction would generate maximum noise levels, as indicated in Table 4.5-8, ranging from 85 to 90 dB at a distance of 50 feet. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours, as regulated by the Davis City Code.

Table 4.5-8
Construction Equipment Noise

Type of Equipment	Maximum Level, dB at 50 feet
Bulldozers	87
Heavy Trucks	88
Backhoe	85
Pneumatic Tools	85

Source: *Environmental Noise Pollution*, Patrick R. Cunniff, 1977.

Noise would also be generated during the construction phase by increased truck traffic on area roadways and on-site grading. A significant project-generated noise source would include truck traffic associated with transport of heavy materials and equipment to

and from construction sites and the movement of heavy construction equipment on the project site. This noise increase would be of short duration, and would likely occur primarily during daytime hours, as regulated by the Davis City Code.

Mitigation Measure: None required.