APPENDIX 3.8

Acoustical Assessment Report for the San Diego State University Plaza Linda Verde Project, **Dudek (June 2010)**

ACOUSTICAL ASSESSMENT REPORT
for the
SAN DIEGO STATE UNIVERSITY
PLAZA LINDA VERDE PROJECT

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LIST OF ACRONYMS AND ABBREVIATIONS

Caltrans	California Department of Transportation
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
City	City of San Diego
CNEL	Community Noise Equivalent Level
County	County of San Diego
CSU	California State University
dB	decibel(s)
FHWA	Federal Highway Administration
HVAC	heating, ventilation, and air conditioning
I-8	Interstate 8
Leq	equivalent continuous sound level
Proposed Project	Plaza Linda Verde project
SDSU	San Diego State University
State	State of California

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SUMMARY OF FINDINGS

Noise impacts associated with the proposed San Diego State University ("SDSU") Plaza Linda Verde project ("Proposed Project") include short-term construction activities, project-generated traffic, and outdoor mechanical equipment noise. A short-term significant noise impact would result during grading activities. The construction noise impact would be reduced to a level below significant by incorporating various construction equipment noise-abatement measures. The traffic generated by the Project would result in a less than significant noise impact.

The Proposed Project includes residential components that would be exposed to traffic noise from College Avenue and Montezuma Road. Interior noise studies will be required for the student residential housing at Buildings 1, 2, 4, 5, and 7 to ensure that the interior Community Noise Equivalent Level would not exceed 45 decibels. These buildings would require air conditioning and/or mechanical ventilation to meet the State of California's interior noise standard. Sound-rated windows may also be required.

Mechanical equipment plans shall be prepared and evaluated for the buildings to ensure that outdoor mechanical equipment noise would not exceed the City of San Diego's noise ordinance standards for commercial and residential uses at adjacent properties. Mitigation may consist of such measures as selecting quieter types of equipment, constructing rooftop equipment screen walls/parapets, or locating the equipment within the interior portion of the sites.

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1.0 INTRODUCTION

1.1 Regional and Local Setting

The proposed San Diego State University ("SDSU") Plaza Linda Verde project ("Proposed Project") would be located adjacent to the main SDSU campus, which is located approximately 8 miles east of downtown San Diego (Figure 1). As shown on Figure 2, the Proposed Project would be developed on California State University ("CSU")-owned property south of the existing Campus Master Plan boundary, generally between Aztec Walk and Montezuma Road. The land is currently owned by SDSU, the SDSU Foundation, and private entities. Lands that are owned by private entities would be purchased by SDSU prior to redevelopment. The existing boundaries of the SDSU campus generally are Hardy Avenue on the south, East Campus Drive on the east, 55th Street/Remington Road on the west, and Adobe Falls Road/Del Cerro Boulevard (north of Interstate 8 ["I-8"]) on the north.

The Proposed Project would be located within the College Area Community Planning Area of the City of San Diego ("the City"). The Proposed Project area is also located in a designated redevelopment area referred to as the College Community Redevelopment Project Area. The College Area Community Plan, which is a component of the City's General Plan, designates parcels included in the area of the Proposed Project as a mixture of land uses, including "Undeveloped," "Commercial, Single-Family Residential," "Communication Utilities (Transportation Related)," and "Institutional." The College Community Redevelopment Project Area includes the Proposed Project site within its "Core Subarea."

1.2 Project Description

The Proposed Project consists of the development of additional on-campus student housing and retail services to support SDSU and the surrounding community. The Proposed Project is a mixed-use development featuring ground-floor commercial and upper-floor student housing, student apartments, additional parking facilities to accommodate increased parking demand within the area, a Campus Green featuring a public promenade, and pedestrian malls in place of existing streets/alleys linking the proposed mixed-use buildings to the main campus.

The Proposed Project would be located adjacent to the main SDSU campus approximately 8 miles east of downtown San Diego. The existing boundaries of the SDSU campus generally are Hardy Avenue on the south, East Campus Drive on the east, 55th Street/Remington Road on the west, and Adobe Falls Road/Del Cerro Boulevard (north of I-8) on the north. The Proposed Project would be developed on property located south of the existing Campus Master Plan boundary, generally between Aztec Walk and Montezuma Road. The land on which the

Proposed Project would be developed is currently owned by SDSU, the SDSU Foundation, and private entities. Lands currently owned by private entities would be purchased by SDSU prior to development.

The project consists of the demolition of existing structures and parking lots and is on an approximately 18-acre site located immediately south of the SDSU main campus. The development of certain portions of the Proposed Project, primarily including the pedestrian malls, would be contingent upon the vacation of certain existing vehicular rights-of-way; if the subject vacations are not approved, the Proposed Project would proceed on a modified basis.

In conjunction with the Proposed Project, SDSU also is proposing to amend the SDSU Campus Master Plan boundary such that the southern campus boundary between 55th Street and one block east of College Avenue would extend south generally from Aztec Walk to Montezuma Road.

The Proposed Project would consist of development of the following five project components (Figure 3):

I. **Mixed-Use Retail/Student Housing.** This Project component consists of the development of four ground-floor retail and upper-floor residential buildings located south of Hardy Avenue, north of Montezuma Road, and west and east of College Avenue. Collectively, the four buildings would contain approximately 294 apartments to house approximately 1,216 students, and also would contain approximately 75,394 square feet of community serving/university serving retail uses.

II. **Student Apartments.** This Project component would consist of two four-story buildings located west of Campanile Drive, north of Montezuma Road, and south of Lindo Paseo. Collectively, the two buildings would contain approximately 96 apartments to house 416 students.

III. **Parking Facilities.** A freestanding parking structure would be constructed at the northwest corner of Lindo Paseo and Montezuma Place. The structure would consist of five levels—one underground parking deck and four aboveground decks—and would provide approximately 342 parking spaces. The parking structure also would support approximately 1,815 square feet of ground-floor retail space. The Mixed-Use Retail/Student Housing buildings to be developed east of College Avenue would contain underground parking for an additional 160 to 210 vehicles, depending on the ultimate configuration.

IV. **Campus Green.** A Campus Green is planned for development south of the existing SDSU Transit Center and would consist of active and passive recreational areas for public use.

V. **Pedestrian Malls.** The Proposed Project also would include two pedestrian malls, in place of existing streets/alleys, to be located along the western and eastern flanks of the main mixed-use building area. These corridors would facilitate non-motorized movement between the proposed buildings and main campus and would support meeting/resting space and outdoor eating facilities associated with the adjacent retail shops. This project component would be ancillary to the Mixed-Use Retail/Student Housing component and would not be essential to development of the overall project site.

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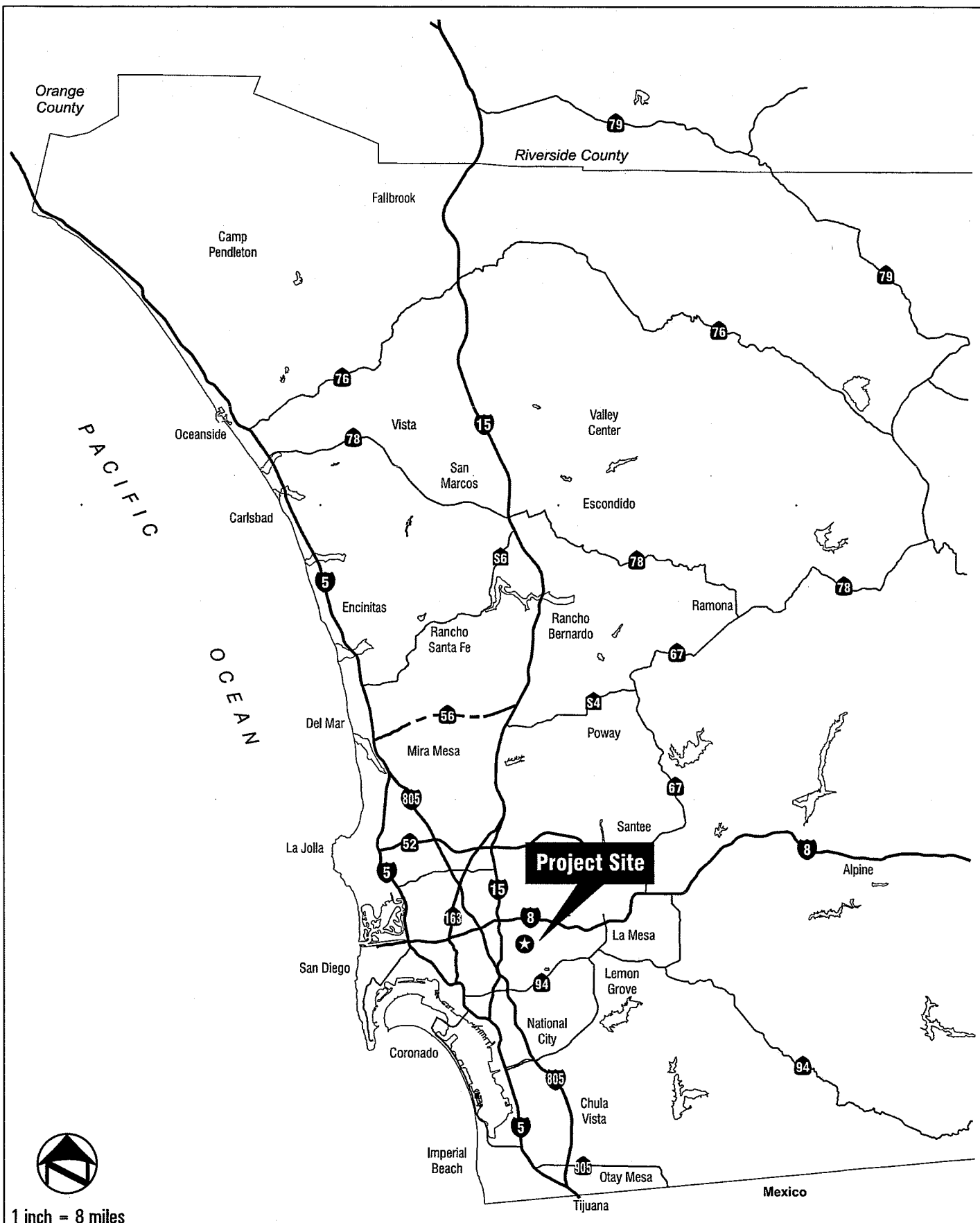

SDSU Plaza Linda Verde

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Figure 1

Regional Map

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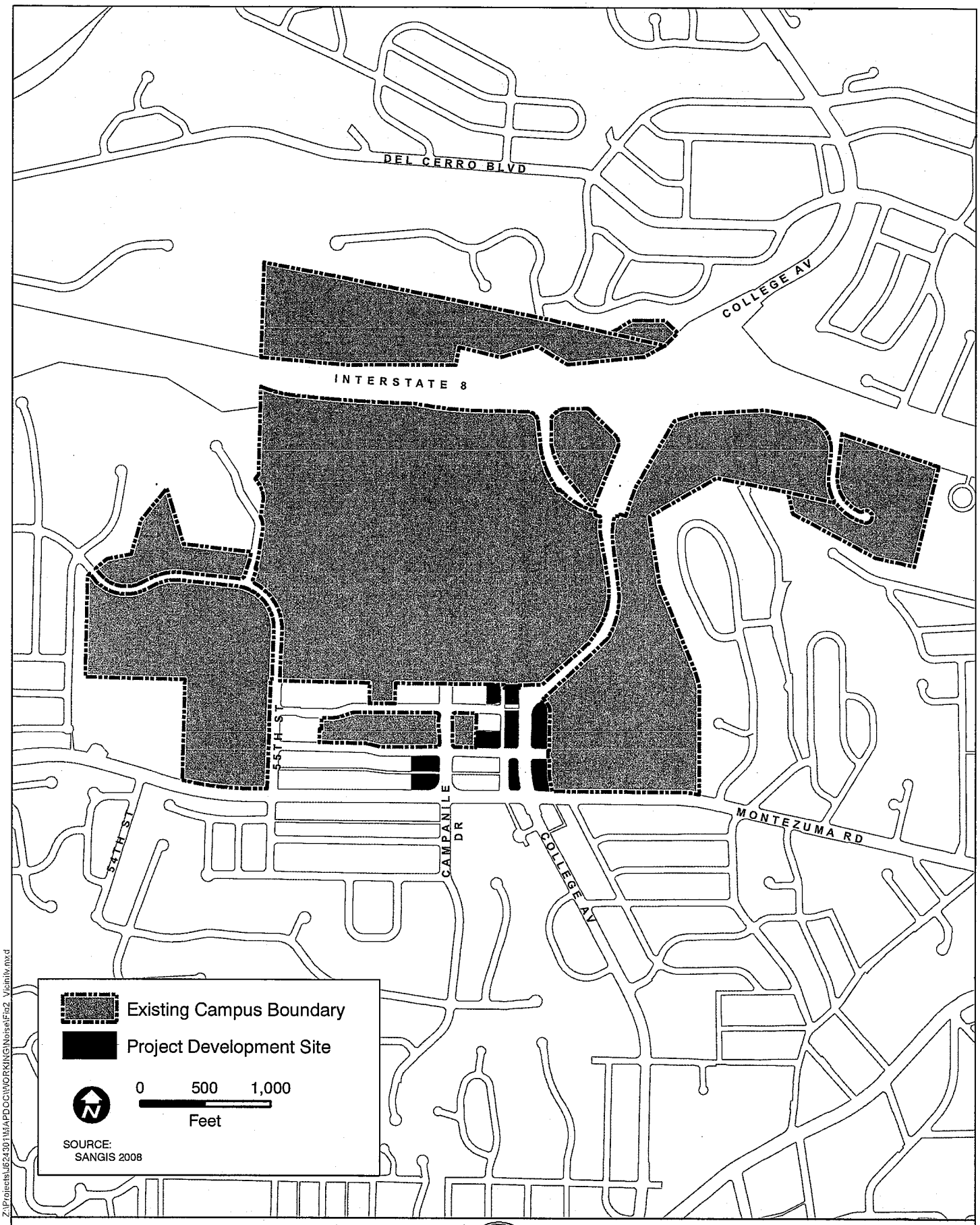

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SDSU Plaza Linda Verde

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Figure 2

Vicinity Map

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SDSU Plaza Linda Verde

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Figure 3

Proposed Project

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2.0 METHODOLOGY

Ambient noise measurements were conducted to quantify the existing daytime noise environment at two sites (described in Section 3.1). Noise and vibration levels resulting from the proposed construction activities have been obtained from reports prepared by the Federal Transit Administration (2006), the California Department of Transportation (Caltrans 2004), and field data from files. The assumptions regarding hours of construction activities, construction equipment, duration of construction activities, etc. is based on information provided by SDSU. The noise impact assessment utilized criteria established in the City of San Diego General Plan Noise Element (City of San Diego 2008a) and Noise Ordinance (City of San Diego 2008b). The noise level associated with selected roadways was determined based on ambient noise measurements and using the Federal Highway Administration's TNM 2.5 Traffic Noise Prediction Model (FHWA 2004). The results of the noise model are contained in Appendix B.

2.1 Noise Concepts

Community sound levels are measured in terms of the A-weighted sound level. The A-weighted scale measures sound levels corresponding to the human frequency response. All sound levels discussed in this report are A-weighted. In community noise, it is necessary to use a noise scale that averages varying noise exposure over time and quantifies the results using a single number descriptor. Units of measure to evaluate the long-term characteristics of sound that are applicable to this analysis are the equivalent continuous sound level ("Leq") and the Community Noise Equivalent Level ("CNEL"). The Leq is a single-number representing the fluctuating sound level in decibels ("dB") over a specified period of time. It is a sound energy average of the fluctuating level and is equal to a constant unchanging sound level of that dB level. CNEL is a 24-hour average A-weighted sound level with 10 dB added to noise during the nighttime hours from 10:00 p.m. to 7:00 a.m., and 5 dB added to the noise during the evening hours from 7:00 p.m. to 10:00 p.m. The 5 and 10 dB penalties are applied to account for increased noise sensitivity during the evening and nighttime hours. Appendix A contains definitions of acoustical terms used in this report. Typical sound levels generated by various activities are listed in Table 1.

2.2 Noise Criteria

In general, a project may be deemed to have a significant effect on the environment if it will substantially increase the ambient noise level for adjoining areas. However, this significance criterion does not define the phrase "substantial increase in ambient noise," and it does not provide an impact threshold for potential on-site noise impacts.

The project site is adjacent to property located within the City. The City has established noise criteria within both the City's General Plan and the City's Municipal Code as summarized in Section 2.2.1. SDSU is a State of California ("State") agency and is not required to comply with local standards. However, this report will consider local noise standards as they relate to compatibility with the Proposed Project.

Table 1
Typical Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

SOURCE: Caltrans 1998.

2.2.1 City of San Diego Noise Criteria

The City has established noise criteria within the City's General Plan Noise Element as well as the City's Municipal Code. The noise criteria are summarized below.

City of San Diego General Plan Noise Element Guidelines: The City's General Plan Noise Element identifies compatible exterior noise levels for various land use types (City of San Diego 2008a). The maximum allowable noise exposure varies depending on the land use. The maximum acceptable exterior noise level for residential uses and other noise-sensitive uses, including Kindergarten through Grade 12 schools, libraries, hospitals, day care facilities, hotels, and motels, is a CNEL of 65 dB for exterior usable areas. Exterior noise levels are considered compatible up to 75 dB CNEL at higher education institutions. New single- and multi-family residences are also required to meet an interior noise level of 45 dB within the habitable rooms.

City of San Diego Municipal Code Noise Standards: The City's noise ordinance contains quantitative noise standards to reduce excessive noise within the City (City of San Diego 2008b). The noise level limits are defined in terms of a one-hour average sound level. The allowable noise level limits depend upon the land use and time of day. Single-family residences are located adjacent to the western and eastern boundaries of the Proposed Project. The noise ordinance limits for low-density residential development are that the one-hour average noise level will not exceed 50 dB between the hours of 7:00 a.m. to 7:00 p.m.; 45 dB between 7:00 p.m. and 10:00 p.m.; and 40 dB between 10:00 p.m. and 7:00 a.m. The City's noise ordinance limits are summarized in Table 2.

Table 2
City of San Diego Municipal Code Noise Limits

Land Use Zone	Time Of Day	One-Hour Average Sound Level (Decibels)
1) Single-Family Residential	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45 40
2) Multi-Family Residential (Up to a maximum density of 1/2000)	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50 45
3) All other Residential	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55 50
4) Commercial	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	65 60 60
5) Industrial or Agricultural	any time	75

The City's noise ordinance criteria are applicable to stationary equipment such as mechanical equipment.

The City's noise ordinance also regulates construction activity. Construction activity is allowed Monday through Saturday from 7:00 a.m. to 7:00 p.m. The construction activities are not to exceed an average sound level greater than 75 dB during the 12-hour time period from 7:00 a.m. to 7:00 p.m. at or beyond the property lines of any property zoned residential.

2.2.2 State of California

Applicable to this project, the State of California has adopted a CNEL of 45 dB as the maximum acceptable interior environmental noise level for new attached residential facilities (i.e., dormitories, multi-family homes, hotels, etc.).

3.0 EXISTING CONDITIONS

The primary noise source in the area is traffic along College Avenue, Montezuma Road, and campus access roads. Noise is also generated by students and people at various events on campus. The site is not located in relative close proximity to any airports. The closest airport is Montgomery Field approximately 3 miles northwest of the site. The campus is subject to occasional overflights by helicopters and commercial and general aviation aircraft. However, the campus is not located within the 60 dB CNEL noise contour of any airport and is not subject to aircraft noise in excess of regulatory limits.

3.1 Ambient Noise Levels

Noise measurements were conducted at the site to determine the existing noise level. The measurements were made using a calibrated Larson-Davis Laboratories Model 700 (S.N. 2132) integrating sound level meter equipped with a Type 2551 0.5-inch pre-polarized condenser microphone with pre-amplifier. When equipped with this microphone, the sound level meter meets the current American National Standards Institute standard for a Type 1 precision sound level meter. The sound level meter was positioned at a height of approximately 5 feet above ground.

The noise measurements were conducted on April 30, 2009. The noise measurement locations are depicted as Sites 1 and 2 on Figure 4. These sites were selected to provide an unobstructed view to Montezuma Road (Site 1) and College Avenue (Site 2). The measured average noise level was 68 dB at Site 1 and 69 dB at Site 2. The measured average noise levels and the concurrent traffic volumes along the roads are depicted in Table 3. The existing noise level is approximately 70 dB CNEL at Site 1 along Montezuma Road and 71 dB CNEL at Site 2 along College Avenue. It should be noted that noise measurements do not have to be made during peak traffic hours to determine the CNEL. Short-term noise measurements can be correlated to the CNEL by normalizing the traffic counts observed during the noise measurements.

Table 3
Measured Noise Level and Traffic Volumes

Site	Description	Date Time	L_{eq} [1]	CNEL	Cars [2]	MT [3]	HT [4]
1	Approximately 50 feet to the centerline of Montezuma Road	4/30/09 1:15 p.m. to 1:45 p.m.	68 dB	70	874	17	6
2	Approximately 50 feet to centerline of College Avenue	4/30/09 2:05 p.m. to 2:35 p.m.	69 dB	71	1018	19	12

[1] Equivalent Continuous Sound Level (Time-Average Sound Level)
[2] Community Equivalent Noise Level
[3] Medium Trucks
[4] Heavy Trucks

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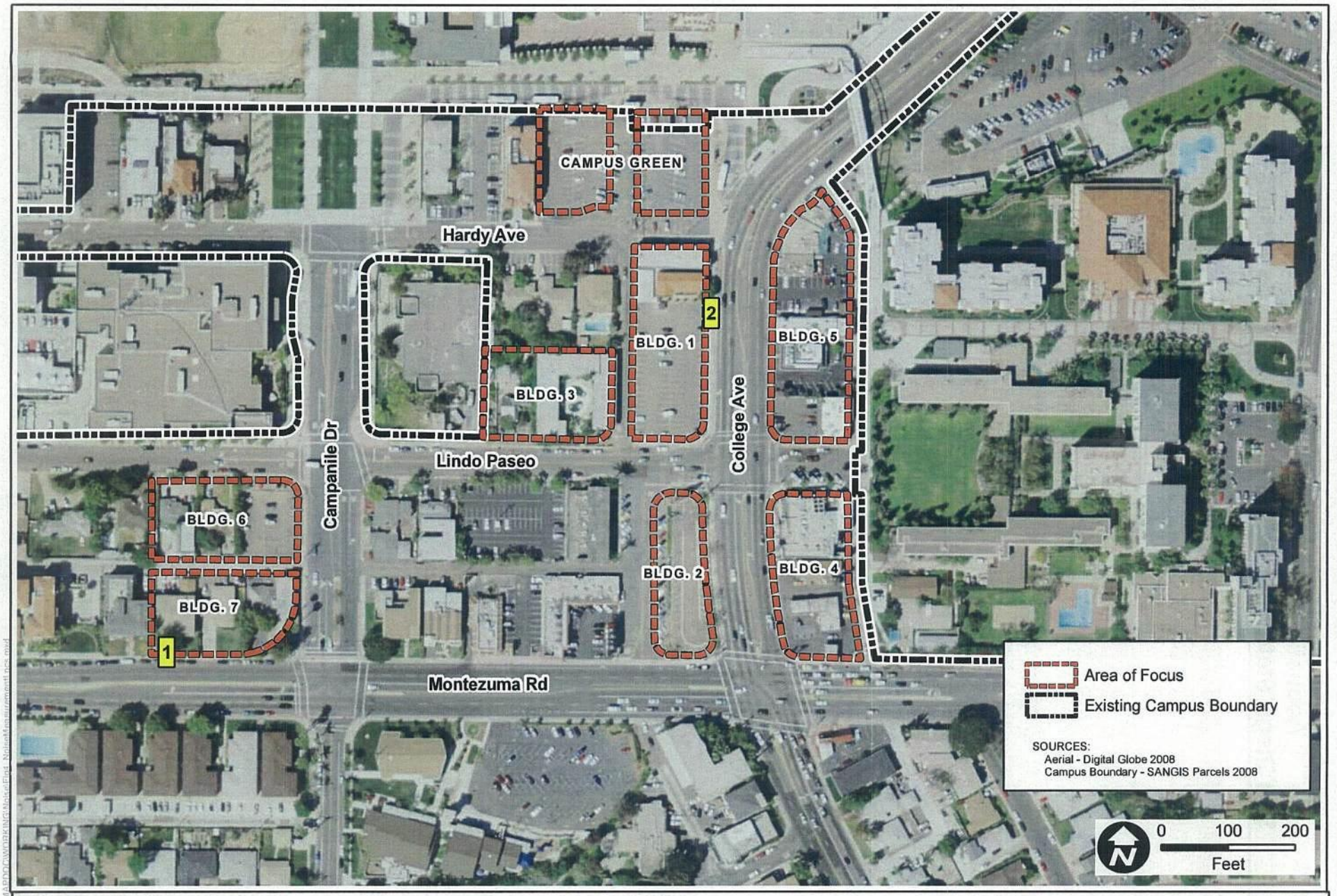

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Figure 4

Noise Measurement Locations

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4.0 SIGNIFICANCE THRESHOLDS

The following significance criteria included in Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.) assist in determining the significance of a noise impact. Impacts would result if:

1. Persons are exposed to or the project generates noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
2. Persons are exposed to or the project generates excessive groundborne vibration or groundborne noise levels.
3. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project would occur.
4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project would occur.
5. A project is located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and would, therefore, expose people residing or working in the project area to excessive noise levels.
6. A project is located within the vicinity of a private airstrip and the project would expose people residing or working n the project area to excessive noise levels.

As indicated in Significance Threshold 1, the City's General Plan and Noise Ordinance (outlined in Section 2 above), were utilized to develop the following project-specific thresholds of significance:

Traffic: A significant noise impact would result if the Project would increase the existing noise level by 3 dB or more in areas where the existing noise level exceeds 65 dB CNEL. A significant noise impact would result if the Project would exceed the City's General Plan 65 dB CNEL exterior noise criteria at an outdoor use area of proposed residential uses. A significant noise impact would result if the project would exceed the State's interior 45 dB CNEL for multi-family dwelling units.

Stationary Uses: A significant noise impact would result if the stationary equipment generates noise levels exceeding the City's noise ordinance criteria.

Temporary construction noise: A significant noise impact would result if temporary construction noise impacts exceed 75 dB for 12 hours within a 24-hour period at residences.

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5.0 IMPACTS

The Project would result in short-term construction and vibration noise impacts, long-term off-site traffic noise impacts, and outdoor mechanical equipment noise. Also, traffic noise would affect the Project's proposed residential uses.

5.1 Construction Noise and Vibration Impacts

Would the project expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? Or, would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project would occur?

Construction activities would be generally the same regardless of the development component. The discussion below pertains to all the project components.

Construction activities would occur during the City's allowable hours of operation. The noise levels generated by construction equipment would vary greatly depending upon factors such as the type and specific model of the equipment, the operation being performed and the condition of the equipment. The average sound level of the construction activity also depends upon the amount of time that the equipment operates and the intensity of the construction during the time period.

Construction would involve several phases including demolition, clearing and grubbing, grading, foundation construction, and finish construction. Construction equipment would include standard equipment such as graders, scrapers, backhoes, loaders, cranes, dozers, water trucks, jack hammers, portable generators and air-compressors, and miscellaneous trucks. The construction contractor may mobilize more than one crew. Each area would be in a different location and would affect different receptors.

The maximum noise level ranges for various pieces of construction equipment at a distance of 50 feet are depicted in Figure 5. The maximum noise levels at 50 feet would range from approximately 65 to 90 dB for the type of equipment normally used for this type of project. Construction noise in a well-defined area typically attenuates at approximately 6 dB per doubling of distance.

The closest off-site existing residences are located along Hardy Avenue west of Building 1, along the south side of Montezuma Road across from Building 7, and along the west side of the site adjacent to Buildings 6 and 7. On-campus housing is located east of the site adjacent to Buildings 4 and 5. At the residences located west of Buildings 1, 6, and 7, and on-campus

housing adjacent to Buildings 4 and 5, the noise level could exceed the City's 75 dB noise level criterion. Therefore, construction activities at the site could result in noise impacts at adjacent noise sensitive land uses. In order to mitigate for impacts, mitigation is provided (see Section 6.0, Mitigation Measure 1).

Construction noise impacts primarily affect the areas immediately adjacent to the construction site. Thus, although construction activities may simultaneously occur at several areas on campus, the cumulative noise impacts would be similar to the specific project component construction noise impact.

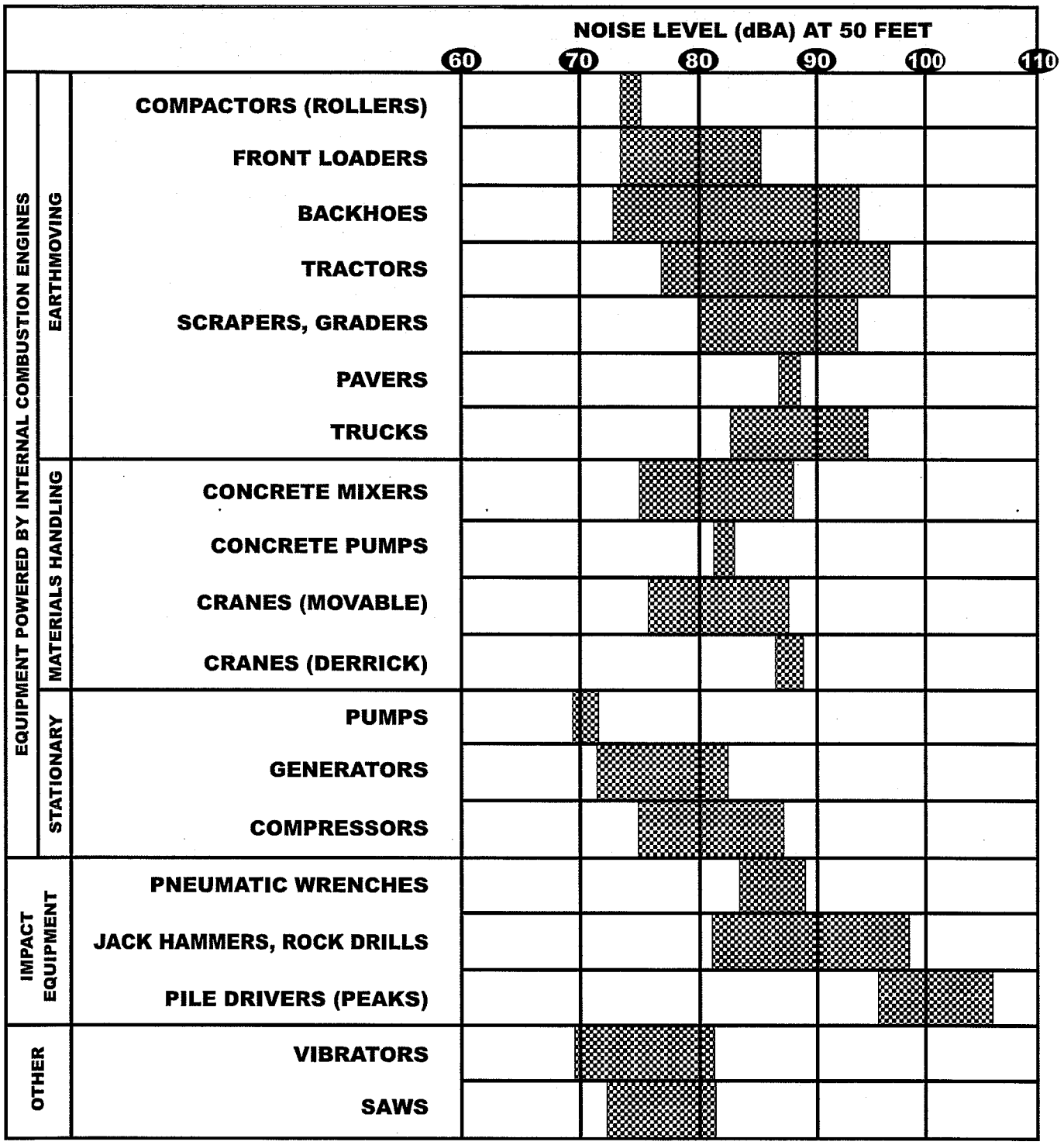
Would the project expose persons to or generate excessive groundborne vibration or groundborne noise levels?

The heavier pieces of construction equipment used at this site could include bulldozers, graders, loaded trucks, water trucks, pavers, and cranes. Groundborne vibration and noise information related to construction activities has been collected by Caltrans (Caltrans 2004). Information from Caltrans indicates that continuous vibrations with a peak particle velocity of approximately 0.1 inches/second begin to annoy people. Groundborne vibration is typically attenuated over short distances. However, vibration is very subjective, and some people may be annoyed at continuous vibration levels near the level of perception (or approximately a peak particle velocity of .01 inches/second). Construction activities are not anticipated to result in continuous vibration levels that typically annoy people, and the vibration impact would be less than significant.

5.2 Long-Term Off-Site Traffic Noise Impacts

Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

The project would ultimately generate a net traffic volume of increase (LLG 2009). The majority of the traffic would be along College Avenue and Montezuma Road. The additional traffic would increase the noise along the adjacent roads by 1 dB CNEL or less. The additional project-generated traffic volume along the roads would not substantially increase the ambient noise level. The near-term (year 2015) with project noise level increase associated with the additional traffic volume is depicted in Table 4.



NOTE: Based on limited available data samples.

SOURCE: EPA PB 206717, Environmental Protection Agency, Dec. 31, 1971, "Noise from Construction Equipment & Operations"

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Table 4
Off-Site Traffic Noise Level Increase

Street Segment	Existing ADT	Near-Term Project Buildout ADT (2015)	CNEL Increase [1] (dB)	Long-Term (2030) Without Project ADT	CNEL Increase [2] (dB)	Long-Term with Project ADT (2030)	CNEL Increase [3] (dB)
College Avenue							
Canyon Crest Dr. to Zura Way	44,000	45,933	<1	76,140	2	76,815	2
Zura Way to Montezuma Rd	30,000	31,689	<1	56,040	3	56,715	3
Montezuma Rd. to El Cajon Blvd.	29,100	33,366	<1	40,200	1	40,495	1
Montezuma Road							
Collwood Blvd. to 55th Street	30,600	34,832	1	33,850	<1	34,495	<1
55th Street to College Ave	26,100	31,662	1	35,010	1	35,565	1
College Ave. to Catoctin Dr.	14,800	18,757	1	28,800	3	29,050	3

[1] Existing vs. near-term plus project
[2] Existing vs. Long-term without project
[3] Existing vs. Long-term plus project

As shown in Table 4, the long-term (year 2030) without project traffic noise level increase would range up to 3 dB CNEL along portions of College Avenue and Montezuma Road. With the project, the long-term CNEL increase would be essentially the same as without the project. Therefore, the noise level increase associated with project's long-term cumulative traffic volume is less than significant.

5.3 Traffic Noise Impacts to the Project

Would the project expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

The project includes noise-sensitive uses (i.e., residential student apartments) that would be exposed to traffic noise.

5.3.1 Buildings 1, 2, 4, and 5

Buildings 1, 2, 4, and 5 would consist of mixed-use retail/student housing with ground-floor retail and upper-floor residential student apartments. Buildings 1 and 5 would primarily be exposed to traffic noise along College Avenue. Based on the results of the traffic noise modeling, the future (year 2030) noise level would range up to approximately 72 dB CNEL at the facades of Buildings 1 and 5. Buildings 2 and 4 would be exposed to traffic noise along College Avenue

and Montezuma Road, and the future noise level would range up to approximately 74 dB CNEL at these building facades. Exterior usable space areas are not proposed, thus, the exterior noise impact would be less than significant.

The State requires that interior noise levels not exceed a CNEL of 45 dB within habitable rooms of multi-family dwelling units. The buildings would be exposed to noise levels greater than 60 dB CNEL. Therefore, the noise level within the student apartments could result in an interior CNEL greater than 45 dB. This noise level would result in a significant noise impact. In order to mitigate for impacts, mitigation is provided (see Section 6.0, Mitigation Measure 2).

5.3.2 Buildings 6 and 7

Buildings 6 and 7 would be student apartments. Building 7 would be located adjacent to Montezuma Road. Based on the results of the traffic noise modeling, the future (year 2030) noise level would range up to approximately 71 dB CNEL at the façade of Building 7 and 60 dB CNEL at the façade of Building 6. The exterior noise level would be less than 65 dB CNEL at the exterior usable space areas Building 7 (exterior usable areas do not include residential front yards). The exterior noise impact would be less than significant.

The State requires that interior noise levels not exceed a CNEL of 45 dB within habitable rooms of multi-family dwelling units. Building 7 would be exposed to noise levels greater than 60 dB CNEL. Therefore, Building 7 could result in an interior CNEL greater than 45 dB. This noise level would result in a significant noise impact. In order to mitigate for impacts, mitigation is provided (see Section 6.0, Mitigation Measure 2).

5.4 Outdoor Mechanical Equipment

Would the project expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Outdoor mechanical equipment such as heating, ventilation, and air conditioning ("HVAC") equipment could be mounted on roofs or at the ground level of the buildings. Mechanical equipment plans depicting the location and types of equipment are not currently available. The noise levels generated by this equipment would vary, but levels typically range from approximately 45 to 55 dB at a distance of 50 feet. Existing land uses located adjacent to the proposed buildings could be exposed to HVAC equipment noise. Thus, there is a potential that the outdoor mechanical equipment noise level would exceed the City's noise ordinance standards resulting in a significant noise impact. In order to mitigate for impacts, mitigation is provided (see Section 6.0, Mitigation Measure 3).

5.5 Other Noise Impacts

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

For a project that is located within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

As indicated in Section 3.0, the site is not located in relative close proximity to any airports. The closest airport is Montgomery Field approximately 3 miles northwest of the site. The campus is subject to occasional overflights by helicopters and commercial and general aviation aircraft. However, the campus is not located within the 60 dB CNEL noise contour of any airport and is not subject to aircraft noise in excess of regulatory limits.

The Project would not involve blasting or other groundborne vibration; therefore, vibration and noise impacts related to these types of activities would not occur as a result of the Project.

5.6 Cumulative Impacts

Construction noise impacts primarily affect the areas immediately adjacent to the construction site. Thus, although several construction activities may simultaneously occur at several areas on campus and in the surrounding community, the increased noise would not result in significant cumulative impacts. Project traffic impacts would be 1 dB or less along the adjacent roadways. Therefore, the increase in noise associated with cumulative traffic would not be cumulatively considerable and is less than significant.

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6.0 MITIGATION MEASURES

The mitigation measures described below would mitigate the noise impacts identified in Section 5.

1. The Contractor will be required to comply with the City's noise ordinance criteria. Thus, the construction contractor should work in a manner so that the 12-hour average sound level does not exceed 75 dB at any residence and construction activity is only permitted between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday. Construction is prohibited on Sundays or legal holidays. The Contractor will include measures such as:

   - Locate noisy equipment as far as possible from the site boundaries and occupants of buildings
   - Install stationary equipment in enclosures
   - Equip construction equipment, fixed or mobile, with properly operating and maintained muffler exhaust systems
   - Locate stockpile and vehicle staging areas as far as practical from residences and occupants of buildings
   - Use quieter (i.e., typically smaller pieces of equipment) while working immediately adjacent to the existing residences located west of Buildings 1, 6, and 7 and the on-campus housing adjacent to Buildings 4 and 5.

2. The following measure is identified to mitigate the traffic noise impacts that affect the Project's residential components.

   Without mitigation the interior noise levels would exceed the State's interior noise requirement at the student residential apartments in Buildings 1, 2, 4, 5, and 7. An interior noise study should be prepared for these buildings to ensure that the interior noise level is mitigated to 45 dB CNEL or less. Noise abatement would most likely require sound-rated windows. Also, the dwelling units would require air conditioning or mechanical ventilation so that the windows could be closed at the occupant's discretion.

3. The planning and design of the buildings should consider the potential outdoor mechanical equipment noise. The noise should be designed to comply with the City's noise ordinance standard for commercial and residential uses at the adjacent properties.

   When mechanical equipment plans are prepared, the plans shall be evaluated for the buildings to ensure that outdoor mechanical equipment noise would not exceed the City's

noise ordinance standard for commercial and residential uses at adjacent properties. Mitigation may consist of such measures as selecting quieter types of equipment, constructing rooftop equipment screen walls/parapets, or locating the equipment within the interior portion of the sites.

7.0 SIGNIFICANCE OF IMPACTS AFTER MITIGATION

With implementation of the recommended mitigation measures, the Project noise impacts would be less than significant.

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8.0 LIST OF PREPARERS

This report was prepared by the following Dudek staff:

Sarah Lozano, Project Manager

Mike Komula, Senior Acoustician

Andrew Greis, Graphics and GIS support

Mark Lathram, Word Processing

Matthew Caselli, Technical Editor.

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9.0 REFERENCES

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APPENDIX A

Definitions

APPENDIX A
Definitions

Term	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
A-Weighted Sound Level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Community Noise Equivalent Level (CNEL)	CNEL is the A-weighted equivalent continuous sound exposure level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during the nighttime hours (10 p.m. to 7 a.m.) and 5 dB added to the sound during the evening hours (7 p.m. to 10 p.m.).
Decibel (dB)	A unit for measuring sound pressure level and is equal to 10 times the logarithm to the base 10 of the ratio of the measured sound pressure squared to a reference pressure, which is 20 micropascals.
Equivalent Continuous Sound Level (L_{eq})	The sound level corresponding to a steady state sound level containing the same total energy as a varying signal over a given sample period. L_{eq} is designed to average all of the loud and quiet sound levels occurring over a time period.
Maximum A-weighted Sound Level, (L_{max})	The greatest sound level measured on a sound level (L_{max}) meter during a designated time interval or event using fast time-averaging and A-weighting.
Sound Transmission Class, STC	A single number rating of the noise reduction of a building element.

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APPENDIX B

Noise Modeling Data

Dudek 19 June 2009
MK TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: SDSU Plaza Linda Verde
RUN: Montezuma Ave. (Future Year 2030)

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Montezuma (Westbound)	24.0	point1	1	-1,500.0	24.0	0.00				Average	
		point2	2	1,500.0	24.0	0.00					
Montezuma (Eastbound)	24.0	point3	3	-1,500.0	-24.0	0.00				Average	
		point4	4	1,500.0	-24.0	0.00					

Dudek 19 June 2009
MK TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SDSU Plaza Linda Verde
RUN: Montezuma Ave. (Future Year 2030)

Roadway Name	Points Name	No.	Segment Autos V veh/hr	Autos S mph	MTrucks V veh/hr	MTrucks S mph	HTrucks V veh/hr	HTrucks S mph	Buses V veh/hr	Buses S mph	Motorcycles V veh/hr	Motorcycles S mph
Montezuma (Westbound)	point1	1	1725	35	36	35	18	35	0	0	0	0
	point2	2										
Montezuma (Eastbound)	point3	3	1725	35	36	35	18	35	0	0	0	0
	point4	4										

Dudek 19 June 2009
MK TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: SDSU Plaza Linda Verde
RUN: Montezuma Ave. (Future Year 2030)

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Receiver1	1	1	0.0	45.0	0.00	4.92	0.00	66	10.0	8.0	Y
Receiver2	2	1	0.0	50.0	0.00	4.92	0.00	66	10.0	8.0	Y
Receiver3	3	1	0.0	55.0	0.00	4.92	0.00	66	10.0	8.0	Y

Dudek
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19 June 2009
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SDSU Plaza Linda Verde
RUN: Montezuma Ave. (Future Year 2030)
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	72.4	66	72.4	10	Snd Lvl	72.4	0.0	8	-8.0
Receiver2	2	1	0.0	71.6	66	71.6	10	Snd Lvl	71.6	0.0	8	-8.0
Receiver3	3	1	0.0	71.0	66	71.0	10	Snd Lvl	71.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	3	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 19 June 2009
MK TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: SDSU Plaza Linda Verde
RUN: College Ave. (Future 2030)

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
College (Northbound)	24.0	point1	1	24.0	1,500.0	0.00				Average	
		point2	2	24.0	-1,500.0	0.00					
College (South bound)	24.0	point3	3	-24.0	1,500.0	0.00				Average	
		point4	4	-24.0	-1,500.0	0.00					

Dudek 19 June 2009
MK TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SDSU Plaza Linda Verde
RUN: College Ave. (Future 2030)

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
College (Northbound)	point1	1	2751	33	57	33	28	33	0	0	0	0
	point2	2										
College (South bound)	point3	3	2751	33	57	33	28	33	0	0	0	0
	point4	4										

Dudek 19 June 2009
MK TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: SDSU Plaza Linda Verde
RUN: College Ave. (Future 2030)

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Receiver1	1	1	45.0	0.0	0.00	4.92	0.00	66	10.0	8.0	Y
Receiver2	2	1	50.0	0.0	0.00	4.92	0.00	66	10.0	8.0	Y
Receiver3	3	1	55.0	0.0	0.00	4.92	0.00	66	10.0	8.0	Y

Dudek
MK

19 June 2009
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SDSU Plaza Linda Verde
RUN: College Ave. (Future 2030)
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	73.8	66	73.8	10	Snd Lvl	73.8	0.0	8	-8.0
Receiver2	2	1	0.0	73.0	66	73.0	10	Snd Lvl	73.0	0.0	8	-8.0
Receiver3	3	1	0.0	72.4	66	72.4	10	Snd Lvl	72.4	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	3	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0