

APPENDIX K
NOISE TECHNICAL REPORT

NOISE TECHNICAL REPORT
for the
2007 SDSU CAMPUS MASTER PLAN REVISION
San Diego, California

Prepared for:
SAN DIEGO STATE UNIVERSITY

Facilities Planning Design and Construction
5500 Campanile Drive
San Diego, California 92182-1624

Prepared by:
DUDEK
605 Third Street
Encinitas, California 92024
Contact: Sarah Lozano
(760) 479-4251

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SUMMARY OF FINDINGS

Noise impacts associated with the proposed project include short-term construction activities and project generated traffic. A short-term significant noise impact would result during grading activities at the Adobe Falls Faculty/Staff Housing, Alvarado Campus, Alvarado Hotel, Campus Conference Center and Student Housing. 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 project includes residential components that would be exposed to traffic noise from Interstate 8 (I-8), College Avenue, Montezuma Road, Alvarado Road as well as trolley noise. The Adobe Falls Faculty/Staff Housing (Upper Village) will require a ten-foot high noise barrier to mitigate the exterior traffic noise impact. A seven-foot high noise barrier will be required to mitigate the exterior noise impact at the Alvarado Hotel. Further, acoustical studies will be required when site plans are prepared for the Adobe Falls Faculty/Staff Housing (Lower Village) and C Lot Villa Alvarado Residence Hall project components to ensure that exterior outdoor use areas do not exceed 65 dB CNEL. Also, interior noise studies will be required for the Adobe Falls Faculty/Staff Housing multi-family homes, Student Housing dormitory rooms and Hotel guest rooms to ensure that the interior CNEL would not exceed 45 dB. These buildings would most likely require air-conditioning and/or mechanical ventilation to meet the State's interior noise standard. Sound-rated windows may also be required for some of the buildings.

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1.0 INTRODUCTION

1.1 Local and Regional Setting

The proposed project site is on the campus of San Diego State University (SDSU) and adjacent to the university boundary, which is located within the College Area and Navajo Communities in the City of San Diego (see *Figure 1, Regional Map*). As shown on *Figure 2, Vicinity Map*, the general boundaries of the site are Adobe Falls Drive to the north and Montezuma Road to the south. The east and west boundaries are located near 55th Street and approximately 1,000 feet east of Alvarado Court, respectively. The project site is located approximately 10.3 miles from downtown San Diego.

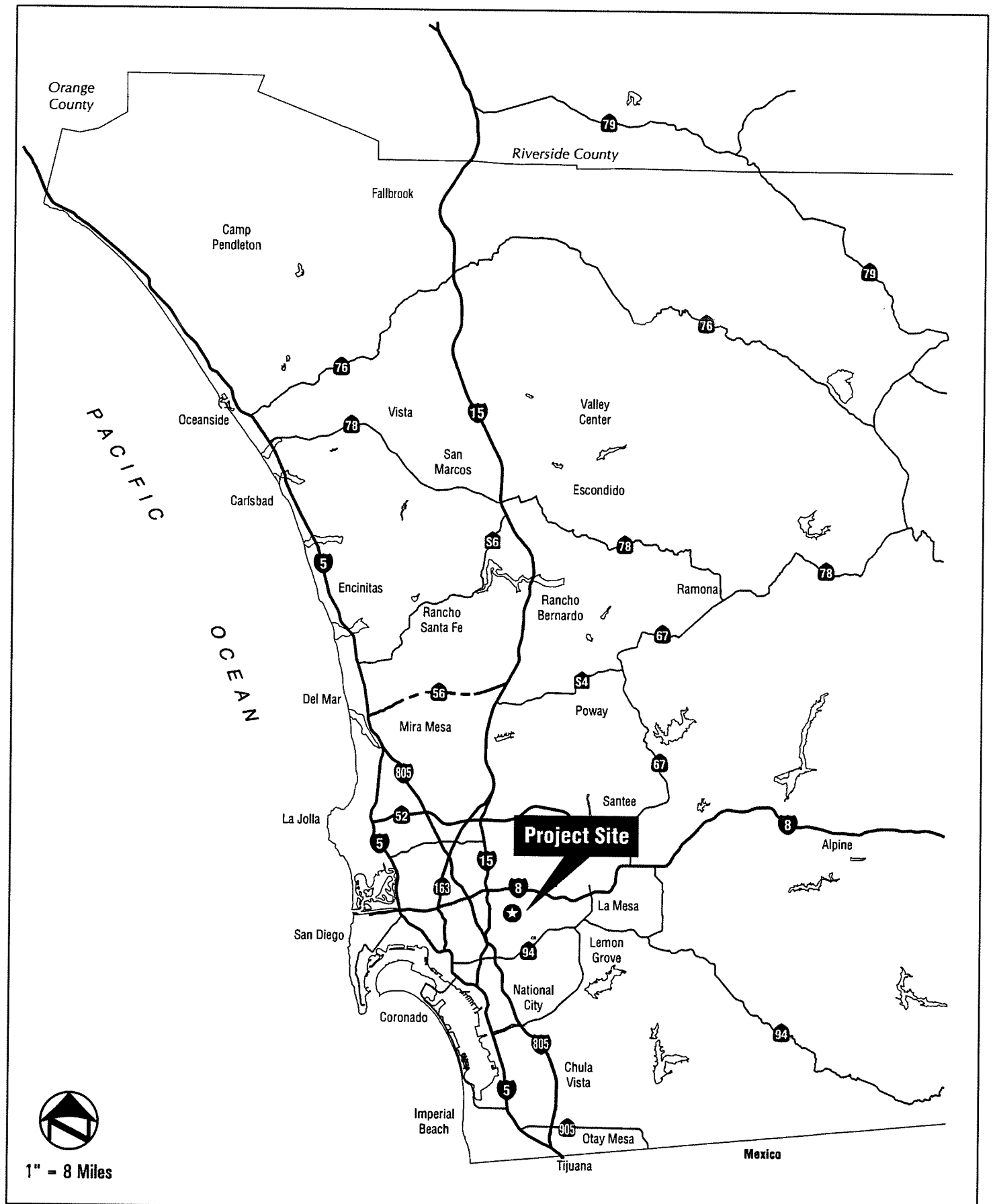
1.2 Project Description

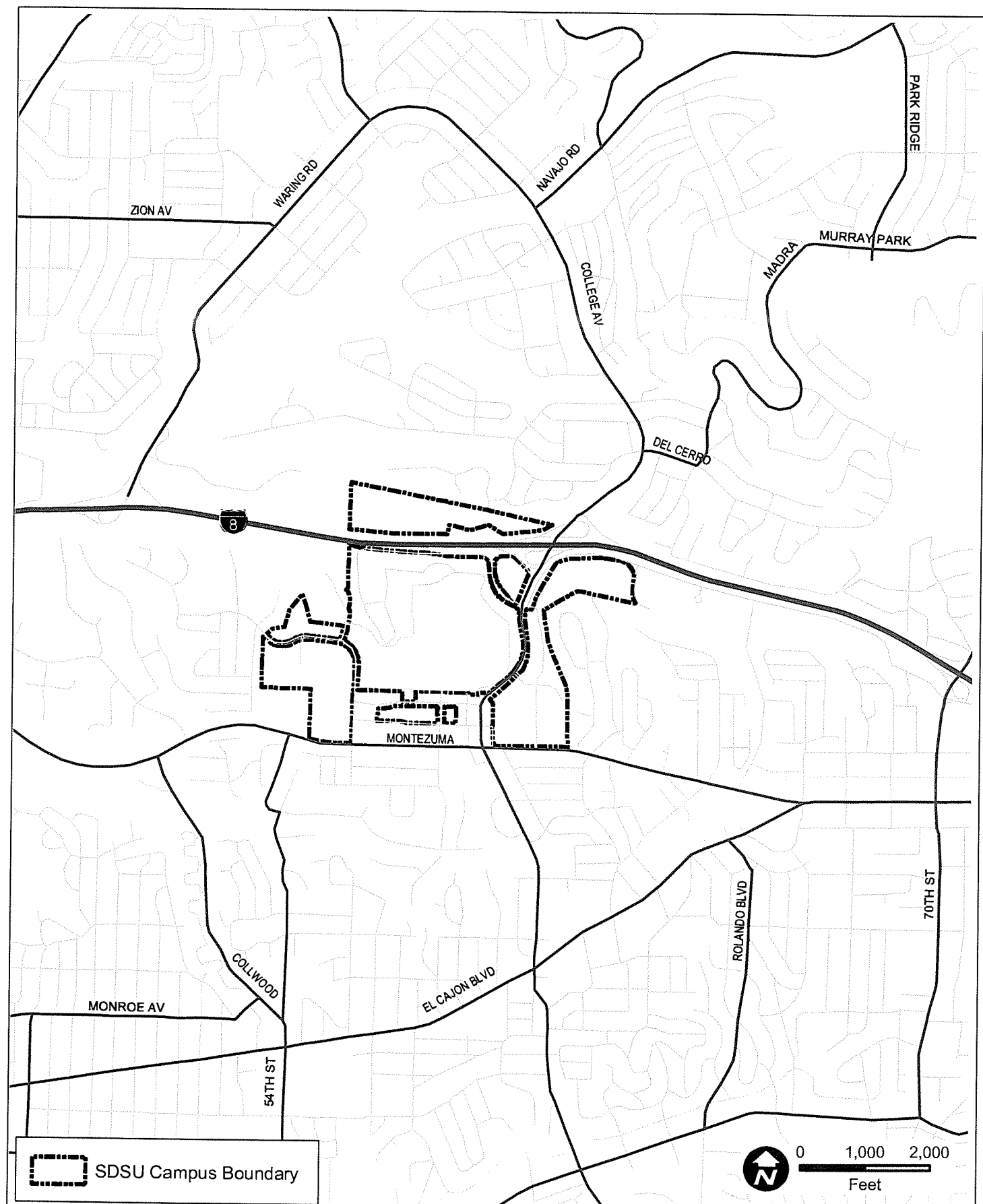
The 2007 Campus Master Plan Revision (proposed project) is intended to improve, enhance, rehabilitate and provide new facilities. This project will enable SDSU to meet the projected increases in student demand for higher education. To accommodate the projected student increase, the proposed project involves the development of classroom, housing and student support facilities on land located on the SDSU campus and immediately adjacent to it.

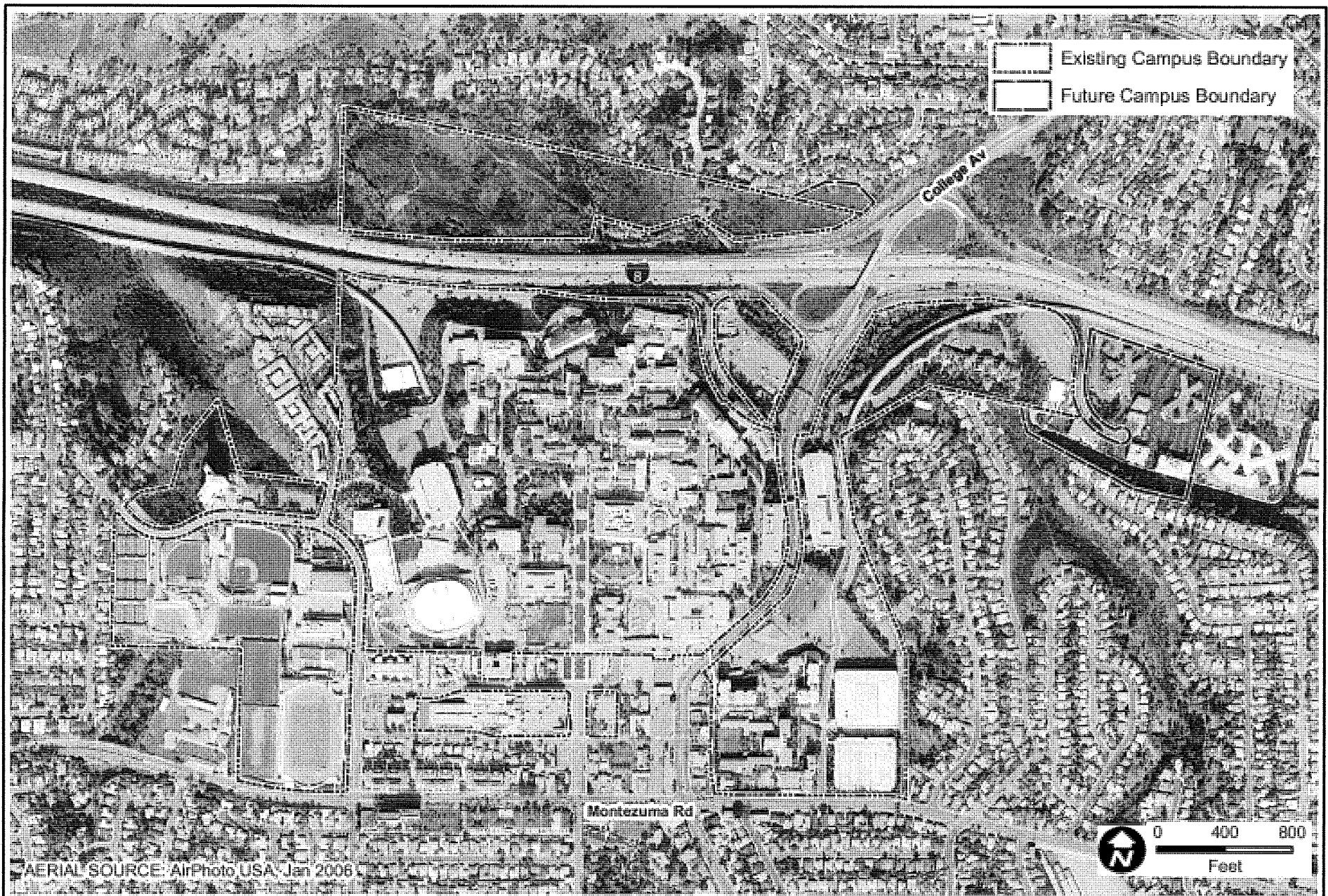
Figure 3, Existing Land Use, is an aerial photograph documenting existing land uses on campus. *Figure 4, Existing Campus Master Plan*, shows SDSU's existing Campus Master Plan. *Figure 5, Proposed Campus Master Plan*, shows the proposed 2007 Campus Master Plan Revision, including proposed project components.

The following five project components are proposed. Several of the five components are being analyzed at a project level while the remaining portions are being analyzed at a program level. *Table 1, Proposed Project Components*, summarizes the following:

ADOBE FALLS/FACULTY/STAFF HOUSING. This project component is proposed for the University's 33-acre undeveloped land located north of I-8. The site is bordered by Adobe Falls Drive/Del Cerro Boulevard to the north, I-8 to the south and residential communities to the north.







SAN DIEGO STATE UNIVERSITY

CAMPUS MASTER PLAN

MASTER PLAN APPROVED BY THE BOARD OF TRUSTEES: MAY 1963
MASTER PLAN REVISION APPROVED BY THE BOARD OF TRUSTEES: JULY 2005





MASTER PLAN APPROVED BY THE BOARD OF TRUSTEES: MAY 1963
LAST MASTER PLAN REVISION APPROVED BY THE BOARD OF TRUSTEES: MARCH 2001



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Figure 5
Proposed Campus Master Plan

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TABLE 1
Proposed Project Components

Component Name	Existing Land Use	Existing Campus Master Plan Use	Level of Analysis
Adobe Falls Faculty/Staff Housing	Upper Village Undeveloped land (ii) Lower Village Undeveloped land	(i) Not designated (ii) Not designated	(i) Project (ii) Program
Alvarado Campus	(i) D Parking Lot (SDSU-owned land) (ii) Alvarado Core Site - Medical office park (SDSU Foundation-owned land)	(i) East Campus Development Area (ii) None	(i) Project (ii) Program
Alvarado Hotel	C Lot	C Lot	Project
Campus Conference Center	Undeveloped Land	Undeveloped Land	Program
Student Housing	(i) G Lot Residence Hall and Student and Residential Life Administration Building - G Parking Lot (ii) Olmeca/Maya Reconstruction – Student housing (iii) U Lot Residence Hall - U Parking Lot (iv) Villa Alvarado Residence Hall Expansion - C Lot	(i) G Lot (ii) Student Housing (iii) Parking Structure 7 (iv) C Lot	(i) Project (ii) Project (iii) Program (iv) Program
Student Union Addition	Aztec Center	Aztec Center	Project

Note: The eastern portion of the Alvarado Campus is situated on property owned by the SDSU Foundation. The Alvarado Campus land is designated "Redevelopment Project Area" on the City of San Diego College Area Community Plan Planned Land Use Map.

The Adobe Falls site is proposed as a new residential community to provide faculty and staff housing. Due to topographical features created by the meandering nature of Alvarado Creek, the development would consist of two general areas. The western or "Lower Village" would include townhomes and condominiums, while the eastern or "Upper Village" portion would include primarily townhomes. Both segments would contain ancillary facilities, including vehicle parking, a community center and a bicycle/pedestrian path.

ALVARADO CAMPUS. The Alvarado Campus component of the proposed project is located in the northeast portion of the SDSU campus, extending eastward onto property presently owned by the SDSU Research Foundation. The site is bordered by Alvarado Road to the north, an undeveloped slope and Alvarado Creek to the south. The northward trending bend in Alvarado Creek forms the western boundary, and the edge of the existing medical office facility property serves as the eastern boundary. The Alvarado Campus project component consists of two distinct areas: D

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Lot, which is an existing SDSU parking lot with 432 spaces, and the existing Alvarado Medical Center, a complex of medical offices and research facilities located east of D Lot, and owned by the SDSU Research Foundation. Under the proposed project, the two areas that make up the Alvarado Campus component would function as one contiguous campus region.

The Alvarado Campus component ultimately will include a total of approximately 612,000 square feet of academic/research/medical space. A 1,840-car, multi-story parking structure is also planned for this project component. Access between the Alvarado Campus and central campus would occur through expansion of the Red and Black Shuttle Service. The proposed project also would entail the reconfiguration of Alvarado Court to allow for the development of a more unified campus node.

STUDENT UNION EXPANSION AND RENOVATION. The existing Student Union, referred to as “Aztec Center” is located immediately west of College Avenue, along the southern border of campus. This component would consist of renovations to the existing Aztec Center, including up to a 70,000 gross square foot expansion, to include social space, meeting space, recreation facilities, student organization offices, food services and retail services.

STUDENT HOUSING. This project component, which would be developed in multiple phases, includes the demolition of two existing student housing structures and the construction of five new housing structures, ultimately resulting in a net increase of 2,976 new student housing beds on campus. This component would occur in four distinct phases, impacting four areas of campus: G Lot, Olmeca/Maya Residence Halls/Office of Housing Administration and Residential Education, U Lot and C Lot.

The G Lot project component would include construction of a 10-story 350,000 gross square foot Type-1 (reinforced concrete) structure to house 800 student beds and the reconfiguration of existing G Lot which would result in a 90% reduction in available surface parking spaces. G Lot is bordered on the northwest by College Avenue, the northeast by Zura Way (an internal campus street) and the south by the East Residence Hall Complex, which includes Tepeyac, Cuicacalli and Tacuba Halls.

The Olmeca/Maya/ Office of Housing Administration and Residential Education (HARE) component would consist of demolition of the existing Olmeca and Maya Residence Halls and HARE buildings. A new two-story, 15,000 gross square foot HARE building would be constructed immediately north of H Lot. Two new 10-story 350,000 square foot residence halls would be constructed on the site formerly supporting Olmeca and Maya Residence Halls. Each of these Type 1 structures would support 800 beds.

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The U Lot portion of this project component would consist of removing existing U Lot parking space uses for replacement with a 10-story 350,000 gross square foot, Type-1 structure to house 800 student beds. This structure would be constructed over the previously master-planned, but not yet built Parking Structure 7. The parking structure would contain spaces for 750 vehicles, 250 more than previously master-planned.

The C Lot portion of this project component would result in the redevelopment of this existing parking lot into a 200 student bed residence hall. This component would consist of 50 two-bedroom apartments, housing 200 student beds, in 2-3 story structures. These structures would mirror the existing Villa Alvarado Residence Hall located immediately east of this project component.

ALVARADO HOTEL. This project component is proposed to be located on approximately 2.0 acres of existing Lot C, immediately north of Villa Alvarado Residence Hall, a coeducational apartment style residence hall, and south of Alvarado Road. The site abuts Alvarado Creek to the north and east, and campus parking lots to the west.

The Alvarado Hotel would consist of an approximately 60,000 gross square foot six-story building, with up to 120 rooms and studio suites. The facilities will contain a small meeting room, exercise room, board room, business center, on-site restaurant and hospitality suite. The hotel would be developed by Aztec Shops and operated in cooperation with the SDSU School of Hospitality and Tourism Management. Site parking will be provided for 130-140 cars either on grade or in a subterranean garage. Trash enclosures, storage, and an entry canopy will be provided.

CAMPUS CONFERENCE CENTER. This component would consist of the development of a new 70,000 gross square foot 3-story building on approximately one half acre located east of Cox Arena for meeting/conference space. The new building would provide meeting/conference space, office space, food services, and retail services. This facility would be utilized by student, faculty, and staff organizations, as well as off-campus groups. This facility would be located on the old tennis court site.

2.0 METHODOLOGY

Ambient noise measurements were conducted to quantify the existing daytime noise environment at five sites. Noise levels resulting from the proposed construction activities have been obtained from reports prepared by the Environmental Protection Agency (EPA 1971), Federal Transit Administration (FTA 2006) and field data from files. The assumptions regarding

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hours of construction activities, construction equipment, duration of construction activities etc. is based on information provided by the SDSU. The noise impact assessment utilized criteria established in the City of San Diego Progress Guide and General Plan (City of San Diego 1989) and Noise Ordinance (City of San Diego 2000). 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).

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 (L_{eq}) and the Community Noise Equivalent Level (CNEL). The L_{eq} 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 ten dB added to noise during the nighttime hours from 10:00 p.m. to 7:00 a.m., and five dB added to the noise during the evening hours from 7:00 p.m. to 10:00 p.m. The five and ten dB penalties are applied to account for increased noise sensitivity during the evening and nighttime hours. *Attachment 1* contains definitions of acoustical terms used in this report. Typical sound levels generated by various activities are listed in *Table 2*.

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 of San Diego. The City has established noise criteria within both the City's General Plan and the City's Municipal Code as summarized below in *Section 2.2.1*. San Diego State University is a 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.

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TABLE 2
Typical Sound Levels Measured in the Environment and Industry

Noise Source	A-Weighted Sound Level in Decibels	Noise Environment	Subjective Impression
Civil Defense Siren (100 ft.)	130		
	120		Threshold of pain
	110	Rock Music Concert	
Pile Driver (50 ft.)	100		Very loud
Power Lawn Mower (3 ft.)			
Motorcycle (25 ft.)	90	Boiler Room	
Diesel Truck (50 ft.)		Printing Press Plant	
Garbage Disposal (3 ft.)	80		
Vacuum Cleaner (3 ft.)	70		Moderately loud
Normal Conversation (3 ft.)			
	60		
		Department Store	
Light Traffic (100 ft.)	50	Private Business Office	
Bird Calls (distant)	40		Quiet
Soft Whisper	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of hearing

2.2.1 City of San Diego Noise Criteria

The City has established noise criteria within the City's Progress Guide and General Plan as well as the City's municipal code. The noise criteria are summarized below.

City of San Diego Progress Guide and General Plan Noise Guidelines: The City's Progress Guide and General Plan identifies compatible exterior noise levels for various land use types. 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 schools, libraries, hospitals, day care facilities, hotels, motels and parks is a CNEL of 65 dB for exterior usable areas. New single and multi-family residences are also required to meet an interior noise level of 45 dB within the habitable rooms.

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City of San Diego Municipal Code Noise Standards: The City's noise ordinance contains quantitative noise standards to reduce excessive noise within the City. The noise level limits are defined in terms of a one-hour average sound level. The allowable noise level limits depend upon the City's zoning district 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 3* below.

TABLE 3
City of San Diego Municipal Code Noise Limits

Land Use Zone	Time Of Day	One-Hour Average Sound Level (Decibels)
1) Residential: All R-1	7 a.m. to 7 p.m.	50
	7 p.m. to 10 p.m.	45
	10 p.m. to 7 a.m.	40
2) All R-2	7 a.m. to 7 p.m.	55
	7 p.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
3) R-3, R-4 and all other Residential	7 a.m. to 7 p.m.	60
	7 p.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
4) All Commercial	7 a.m. to 7 p.m.	65
	7 p.m. to 10 p.m.	60
	10 p.m. to 7 a.m.	60
5) Manufacturing all other Industrial, including Agricultural and Extractive Industry	any time	75

The City's noise ordinance criteria are applicable to stationary equipment such as mechanical equipment. The noise ordinance criteria may not be applicable to outdoor activities such as tennis, swimming, softball, baseball, playgrounds *etc.*, as the City's Code Enforcement Department does not apply the City's noise ordinance limits for these types of outdoor activities.

The City's noise ordinance also regulates construction activity. Construction activity is allowed Monday through Saturdays 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.

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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.).

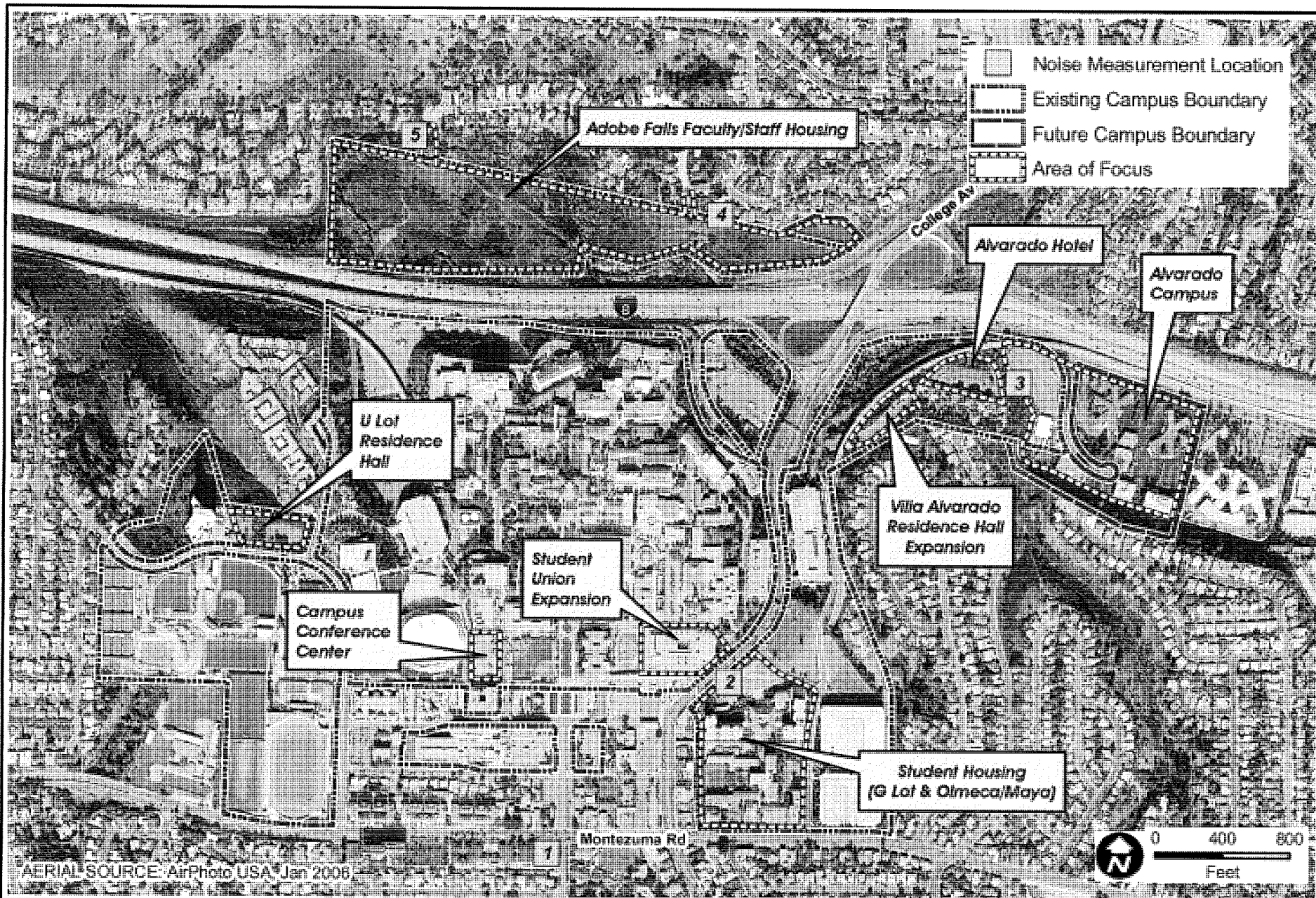
3.0 EXISTING CONDITIONS

The primary noise source in the area is traffic along College Avenue, Montezuma Road, Alvarado Road, I-8 and campus access roads. Noise is also generated by the San Diego Trolley line located along portions of the campus, students on campus and by people at various events on campus. The site is not located in relative close proximity to any airports. The closest airport is Montgomery Field located approximately three miles northwest of the site. The campus is subject to occasional overflights by helicopters, as well as 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 ½-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 five-feet above the ground.

The noise measurements were conducted on November 2, 2004 and December 8, 2004. The noise measurement locations are depicted as Sites 1-5 on *Figure 6, Noise Measurement Locations*. These sites were selected to provide an unobstructed view to Montezuma Road (Site 1), College Boulevard (Site 2), Alvarado Road and I-8 (Site 3) and I-8 (Sites 4 and 5). The measured average noise level was 68 dB at Site 1, 69 dB at Site 2, 70 dB at Site 3, 73 dB at Site 4 and 57 dB at Site 5. The measured average noise levels and the concurrent traffic volumes along the City roads are depicted in *Table 4*.



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TABLE 4
Measured Noise Level and Traffic Volumes

Site	Description	Date Time	L _{eq} ¹	CNEL	Cars	MT ²	HT ³
1	Approximately 45 feet to the centerline of Montezuma Rd.	11/2/04 12:45 to 1:15 p.m.	68 dB	70	680	13	5
2	Approximately 45 ft. to centerline of College Blvd.	11/2/04 1:35 to 2:05 p.m.	69 dB	71	1,080	22	3
3	Approximately 300 ft. to the centerline of I-8	12/8/04 10:10 to 10:25 a.m.	70 dB	73	-	-	-
4	Approximately 500 ft. to the centerline of I-8	12/8/04 10:50 to 11:05 a.m.	73 dB	76	-	-	-
5	Approximately 1,000 ft. to the centerline of I-8	12/8/04 11:15 to 11:30 a.m.	57 dB	60	-	-	-

Notes: ¹ Equivalent Continuous Sound Level (Time-Average Sound Level)

² Community Equivalent Noise Level

³ Medium Trucks

⁴ Heavy Trucks

It should be noted that where the noise measurements were conducted in 2004, the difference between the 2004 and 2007 ADT traffic volumes is acoustically insignificant. The ADT volume changes result in noise level changes from 0 to 0.7 dB. The accuracy of precision sound level meters is approximately one dB. Thus, the measured noise levels are within the accuracy limits of field measurements. The CNEL values in *Table 4* reflect year 2007 ADT volumes.

3.1.1 Adobe Falls Faculty/Staff Housing

The primary noise source is traffic along I-8. Based on the noise measurement shown in *Table 4*, the noise levels at Site 4 and 5 are 76 dB and 60 dB CNEL, respectively. The measured noise level at Site 5 is lower than at Site 4 because the location is below the elevation of I-8 and the majority of the highway is shielded by existing earth embankment along the highway.

3.1.2 Alvarado Campus

The primary noise source is traffic along I-8, and to a lesser degree, along Alvarado Road. Based on the noise measurement shown in *Table 4*, the noise level at Site 3 is 73 dB CNEL. The San Diego Trolley line is located adjacent to the site and generates substantially less noise than I-8.

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3.1.3 Alvarado Hotel

The primary noise source is traffic along I-8, and to a lesser degree, along Alvarado Road. Based on the noise measurement shown in *Table 4*, the noise level at Site 3 is 73 dB CNEL. The San Diego Trolley line is adjacent to this site and generates substantially less noise than I-8.

3.1.4 Campus Conference Center

There are no major sources of noise adjacent to the campus conference center site. The site is located within the internal portion of the campus.

3.1.5 Student Housing

The primary noise source at the proposed G Lot residence hall is traffic along College Avenue. Based on the noise measurement shown in *Table 4*, the noise level at Site 2 is 71 dB CNEL. Olmeca/Maya residence halls are primarily exposed to traffic noise along Montezuma Road and College Avenue. The U Lot residence hall is exposed to traffic noise along Remington Road, and to a lesser extent vehicles along 55th Street. Also, this area is exposed to noise from the adjacent baseball field located across Remington Road. The C Lot Villa Alvarado Residence Hall is primarily exposed to traffic noise from I-8, College Avenue and Alvarado Road. The San Diego Trolley line is located adjacent to the C Lot Villa Alvarado Residence Hall location.

3.1.6 Student Union Addition

The primary noise source in the area is generated by buses within the transit center located south of the site. The expansion portion of the building is located on the west side of the existing student union building and shielded from the traffic noise from College Avenue.

4.0 SIGNIFICANCE THRESHOLDS

The following significance criteria included in Appendix G of the CEQA Guidelines 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 groundbourne vibration or groundborne noise levels.

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- 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 in the project area to excessive noise levels.

As indicated in Significance Threshold 1), above, the City's General Plan and Noise Ordinance (as 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 three 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 areas 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.

5.0 PROJECT IMPACTS

The project would result in short-term construction noise impacts as well as long-term off-site traffic noise impacts. Also, traffic noise would affect the project's proposed residential uses.

5.1 Construction Noise Impacts

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

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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. Specialized equipment such as pile drivers are not anticipated to be frequent during implementation of the project components. The construction contractor may mobilize more than one crew. Each of these areas 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 7, Typical Construction Equipment Noise Generation Levels*. 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 six dB per doubling of distance.

5.1.1 Adobe Falls Faculty/Staff Housing

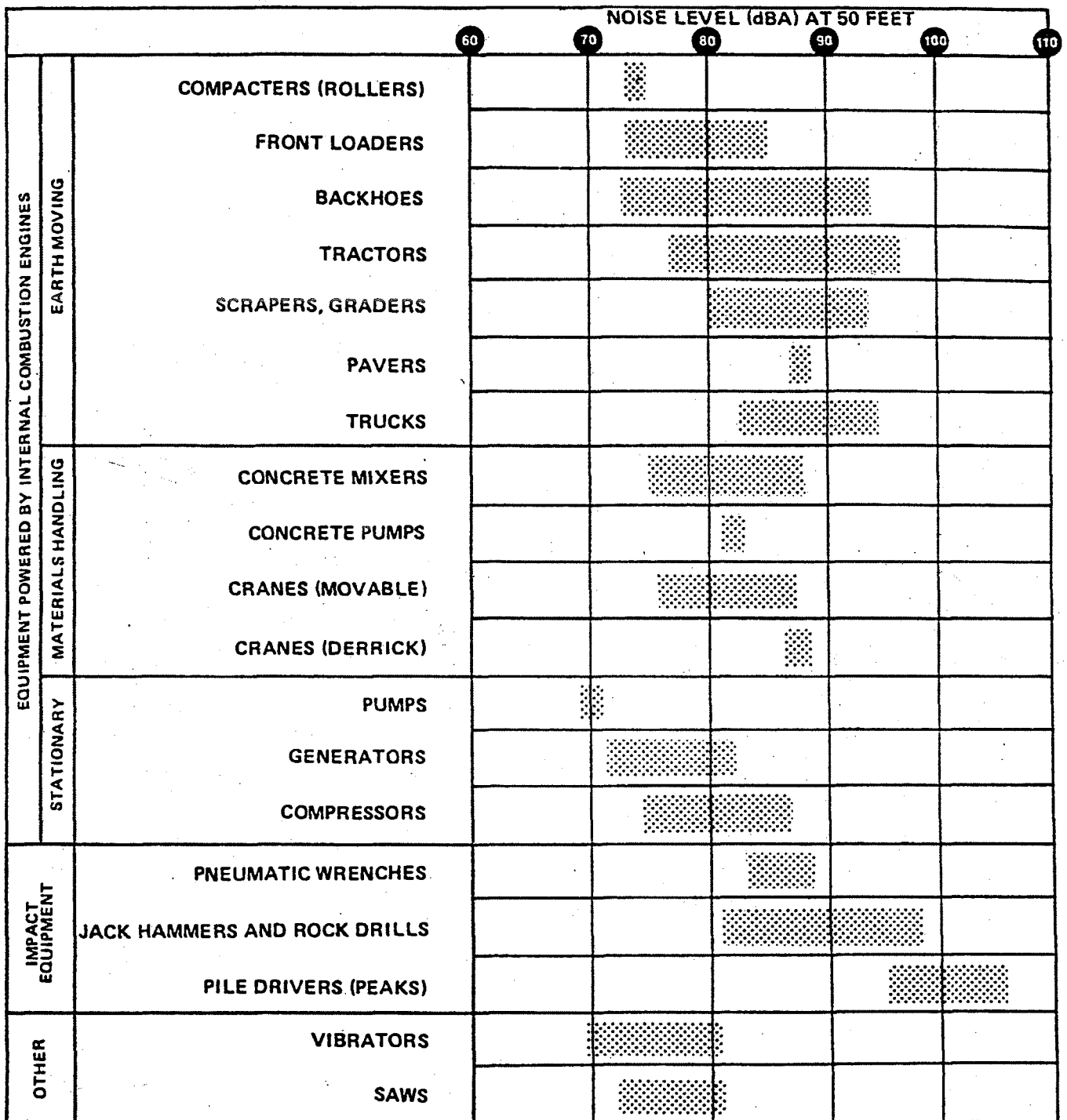
The closest off-site existing residences are located adjacent to the site along Arno Drive, Mill Peak Road and Adobe Falls Road. Multi-family residences are proposed to be constructed at both the Upper and Lower Village areas. These areas would be adjacent to existing residences. Therefore, construction activities at the site could result in noise impacts at adjacent noise sensitive land uses.

5.1.2 Alvarado Campus

The closest off-site existing residences are located approximately 150 feet south of the site along Cleo Street and Brockbank Place. Alvarado Hospital Medical Center is located immediately east of the site. On-campus housing is located west of the site. Therefore, construction activities at the site could result in noise impacts at adjacent noise sensitive land uses.

Noise Technical Report for the 2007 SDSU Campus Master Plan Revision

Figure 7 Typical Construction Equipment Noise Generation Levels



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

Noise Technical Report for the 2007 SDSU Campus Master Plan Revision

5.1.3 Alvarado Hotel

On-campus housing is located south of the site. Therefore, construction activities at the sites could result in noise impacts at adjacent noise sensitive land uses.

5.1.4 Campus Conference Center

There are existing residents located approximately 100 feet southwest of the site. Therefore, construction activities at the site could result in noise impacts at adjacent noise sensitive land uses.

5.1.5 Student Housing

G Lot Residence Hall:

On-campus housing is located south of the site. Therefore, construction activities at the sites could result in noise impacts at adjacent noise sensitive land uses.

Olmecca/Maya Residence Hall:

On-campus housing is located adjacent to the site. Therefore, construction activities at the sites could result in noise impacts at adjacent noise sensitive land uses.

U Lot Residence Hall:

On-campus housing is located west of the site. Therefore, construction activities at the sites could result in noise impacts at adjacent noise sensitive land uses.

C Lot Villa Alvarado Residence Hall:

Existing residences are located south of the site. Therefore, construction activities at the site could result in noise impacts at adjacent noise sensitive land uses.

5.1.6 Student Union Addition

There are no residents in close proximity to the site. Therefore, construction activities would result in less than significant noise impacts.

5.1.7 Cumulative Construction Noise 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

Noise Technical Report for the 2007 SDSU Campus Master Plan Revision

campus, the cumulative noise impacts would be similar to the specific project component construction noise impact.

5.2 Long-Term Off-Site Traffic Noise Impacts

The project would generate additional traffic along various roads in the area. The project's traffic could increase the traffic noise level as discussed below.

5.2.1 Adobe Falls Faculty/Staff Housing

This project component would generate 1,374 ADT (LLG 2007). In the vicinity of the Adobe Falls Faculty/Staff Housing site, the traffic volume would increase along residential roads including Rockhurst Drive, Del Cerro Boulevard, Genoa Drive, Capri Drive, Adobe Falls Road and Arno Drive. The traffic noise level increase associated with the project would range from approximately one to five dB as indicated in *Table 5*. The existing plus project noise level would be less than 65 dB CNEL along the various roads. Thus, the noise impact would be less than significant.

TABLE 5
Off-Site Traffic Noise Level Increase

Street (Segment)	Existing ADT	Existing W/ Project ADT	CNEL Increase ¹ (dB)	Existing W/ Project CNEL at 50 feet ² (dB)
Rockhurst Drive Lambda Drive to College Avenue	500	570	1	50
Lambda Drive Rockhurst Drive to College Avenue	600	670	<1	51
Adobe Falls Road North of Genoa Dr.	410	1450	5	54
Del Cerro Boulevard Genoa Dr. to Capri Dr. Capril Dr. to College Ave.	3,640 5,170	3,990 6,410	<1 1	59 61
Genoa Drive Arno Drive to Capri Drive	400	880	3	52
Capri Drive East of Arno Dr.	720	1,610	3	55
Arno Drive Helena Place to Capri Drive	370	1,260	5	54

Notes:

¹ Existing vs. existing plus project noise increase

² Assumes travel speed of 30 mph, 1% medium trucks and 0.5% heavy trucks.

Noise Technical Report for the 2007 SDSU Campus Master Plan Revision

5.2.2 Alvarado Campus

This project component would generate additional traffic along various roads including Alvarado Road and I-8 in the vicinity of the site. The project's traffic noise impact is discussed in *Section 5.2.7*.

5.2.3 Alvarado Hotel

This project component would generate additional traffic along various roads including Alvarado Road and I-8 in the vicinity of the site. The project's traffic noise impact is discussed in *Section 5.2.7*.

5.2.4 Campus Conference Center

The project's traffic noise impact is discussed in *Section 5.2.7*.

5.2.5 Student Housing

This project component would generate additional traffic along various roads including Montezuma Road, College Avenue, Alvarado Road and I-8 in the vicinity of the site. The project's traffic noise impact is discussed in *Section 5.2.7*.

5.2.6 Student Union Addition

The project's traffic noise impact is discussed in *Section 5.2.7*.

5.2.7 Traffic Noise Increase

The project would ultimately generate a net traffic volume of increase of approximately 12,484 ADT (LLG 2007). The majority of the traffic would be along College Boulevard, Montezuma Road, Alvarado Road and Interstate 8. The additional traffic would increase the noise along the adjacent roads by two dB CNEL or less. The additional project-generated traffic volume along the roads would not substantially increase the ambient noise level. The existing plus project noise level increase associated with the additional traffic volume is depicted in *Table 6*.

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TABLE 6
Off-Site Traffic Noise Level Increase

Street (Segment)	Existing ADT	Existing + Project ADT	CNEL Increase ¹ (dB)	Near-Term ADT	CNEL Increase ² (dB)	Near-Term + Project ADT	CNEL Increase ³ (dB)
College Boulevard							
North of I-8	29,530	31,700	<1	32,360	<1	32,910	<1
I-8 to Zura Way	39,400	45,970	1	45,800	1	47,260	1
Zura Way to Montezuma Road	33,950	36,790	<1	37,480	<1	38,090	<1
South of Montezuma Rd.	30,220	31,930	<1	34,990	1	35,320	1
Montezuma Road							
West of Collwood Blvd.	49820	51,100	<1	56,030	<1	56,210	<1
Collwood Blvd. to 55 th Street	29,610	30,890	<1	31,990	<1	32,170	<1
55 th St. to College Boulevard	24,460	26,040	<1	30,990	1	31,160	1
East of College Boulevard	21,550	22,100	<1	23,870	<1	24,070	<1
Alvarado Road							
College Blvd. to Reservoir Dr.	8,300	11,860	2	9,220	<1	9,490	1
Reservoir Dr. to 70 th St.	9,890	11,960	1	11,040	<1	11,310	1
Interstate 8							
West of College Blvd.	238,000	240,910	<1	239,960	<1	240,660	<1
College Blvd. to 70 th St.	214,000	216,030	<1	219,040	<1	219,410	<1
Notes:							
¹ Existing vs. existing plus project noise increase							
² Existing vs. near-term without project							
³ Existing vs. near-term plus project							

5.2.8 Cumulative Traffic Noise Impacts

As previously shown in *Table 6*, the near term with project traffic noise impacts would be one dB or less along the adjacent roads. The increase associated with near term cumulative traffic is less than significant.

5.3 Traffic Noise Impacts to the Project

The project's Adobe Falls Faculty/Staff Housing, Student Housing and Alvarado Hotel include residential components that would expose residences to traffic noise.

Noise Technical Report for the 2007 SDSU Campus Master Plan Revision

5.3.1 Adobe Falls Faculty/Staff Housing

Upper Village:

This project component includes multi-family residential uses that would be located adjacent to I-8. The future noise level would range up to 79 dB CNEL at portions of the site. Outdoor usable areas are typically considered compatible with noise levels up to 65 dB CNEL. Therefore, significant noise impacts would occur if outdoor useable areas are exposed to noise levels greater than 65 dB CNEL. A review of the site and grading plan prepared for this project component indicates that the exterior noise level would exceed 65 dB CNEL at the Upper Village site. Thus, the exterior noise impact would be significant if not mitigated.

The State requires that interior noise levels not exceed a CNEL of 45 dB within habitable rooms of multi-family dwelling units. Typically, with the windows open, and using standard California construction materials and methods, the building shells provide approximately 15 dB of noise reduction. Therefore, rooms exposed to an exterior CNEL greater than 60 dB could result in an interior CNEL greater than 45 dB. The site is exposed to noise levels greater than 60 dB CNEL. Therefore, the rooms in the dwelling units could result in an interior CNEL greater than 45 dB. If not mitigated, this noise level would result in a significant noise impact.

Lower Village:

The noise level at the proposed residences at the lower village area could exceed 65 dB CNEL depending on the location of the residences. Therefore, the exterior and interior noise impacts would be significant if not mitigated.

5.3.2 Student Housing

G Lot Residence Hall:

The residence hall would be adjacent to College Avenue. The future noise level would range up to approximately 73 dB CNEL at the site. 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 site is exposed to noise levels greater than 60 dB CNEL. Therefore, the dormitory rooms could result in an interior CNEL greater than 45 dB. This noise level would result in a significant noise impact.

Noise Technical Report for the 2007 SDSU Campus Master Plan Revision

Olmecca/Maya Residence Hall:

The residence hall would be adjacent to Montezuma Road. The future noise level would range up to approximately 72 dB CNEL at the site. 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 site is exposed to noise levels greater than 60 dB CNEL. Therefore, the dormitory rooms could result in an interior CNEL greater than 45 dB. This noise level would result in a significant noise impact.

U Lot Residence Hall:

The residence hall would be adjacent to Remington Road. However, the traffic volume adjacent to this road is not anticipated to result in future noise levels in excess of 60 dB CNEL. Therefore, the noise impact would be less than significant.

C Lot Villa Alvarado Residence Hall:

The residence hall would be exposed to traffic noise from I-8, Alvarado Road and College Avenue as well as the San Diego Trolley. If exterior usable space areas are proposed, the exterior noise impact would be significant if not mitigated. The State requires that interior noise levels not exceed a CNEL of 45 dB within habitable rooms of multi-family dwelling units. The site is exposed to noise levels greater than 60 dB CNEL. Therefore, the dormitory rooms could result in an interior CNEL greater than 45 dB. This noise level would result in a significant noise impact.

5.3.3 Alvarado Hotel

The hotel would be located adjacent to I-8 and Alvarado Road. The primary noise source affecting the site is traffic from I-8. The future noise level would exceed 70 dB CNEL at the site. Outdoor usable areas are typically considered compatible with noise levels up to 65 dB CNEL. Based on the preliminary site plan prepared for the hotel, the outdoor usable area would be exposed to a future noise level of approximately 73 dB CNEL. Therefore, if not mitigated the noise impact would be significant.

The State requires that interior noise levels not exceed a CNEL of 45 dB within guest rooms of hotels. The noise level would exceed an exterior CNEL of 60 dB at the site. Therefore, the rooms in the dwelling units could result in an interior CNEL greater than 45 dB. This noise level would result in a significant noise impact.

Noise Technical Report for the 2007 SDSU Campus Master Plan Revision

5.4 Other Noise Impacts

As indicated in *Section 3.0*, above, the site is not located in relative close proximity to any airports. The closest airport is Montgomery Field located approximately three miles northwest of the site. The campus is subject to occasional overflights by helicopters, as well as 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 ground-borne vibration, therefore vibration and noise impacts related to these types of activities would not occur as a result of the project.

6.0 MITIGATION MEASURES

The mitigation measures described below would mitigate the noise impacts identified in *Section 5 (Project Impacts)*.

6.1 Construction Noise

Construction noise mitigation would be similar for each of project components that have been identified as potentially significant (i.e., Adobe Falls Faculty/Staff Housing, Alvarado Campus, Alvarado Hotel, Campus Conference Center and Student Housing).

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 noise-sensitive land use 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 Sunday 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.
- All construction equipment, fixed or mobile, will be equipped with properly operating and maintained muffler exhaust systems.
- Stockpile and vehicle staging areas will be located 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.

Noise Technical Report for the 2007 SDSU Campus Master Plan Revision

6.1.1 Adobe Falls Faculty/Staff Housing

See above mitigation.

6.1.2 Alvarado Campus

See above mitigation.

6.1.3 Alvarado Hotel

See above mitigation.

6.1.4 Campus Conference Center

See above mitigation.

6.1.5 Student Housing

See above mitigation.

6.1.6 Student Union Addition

Mitigation not required.

6.2 Traffic Noise

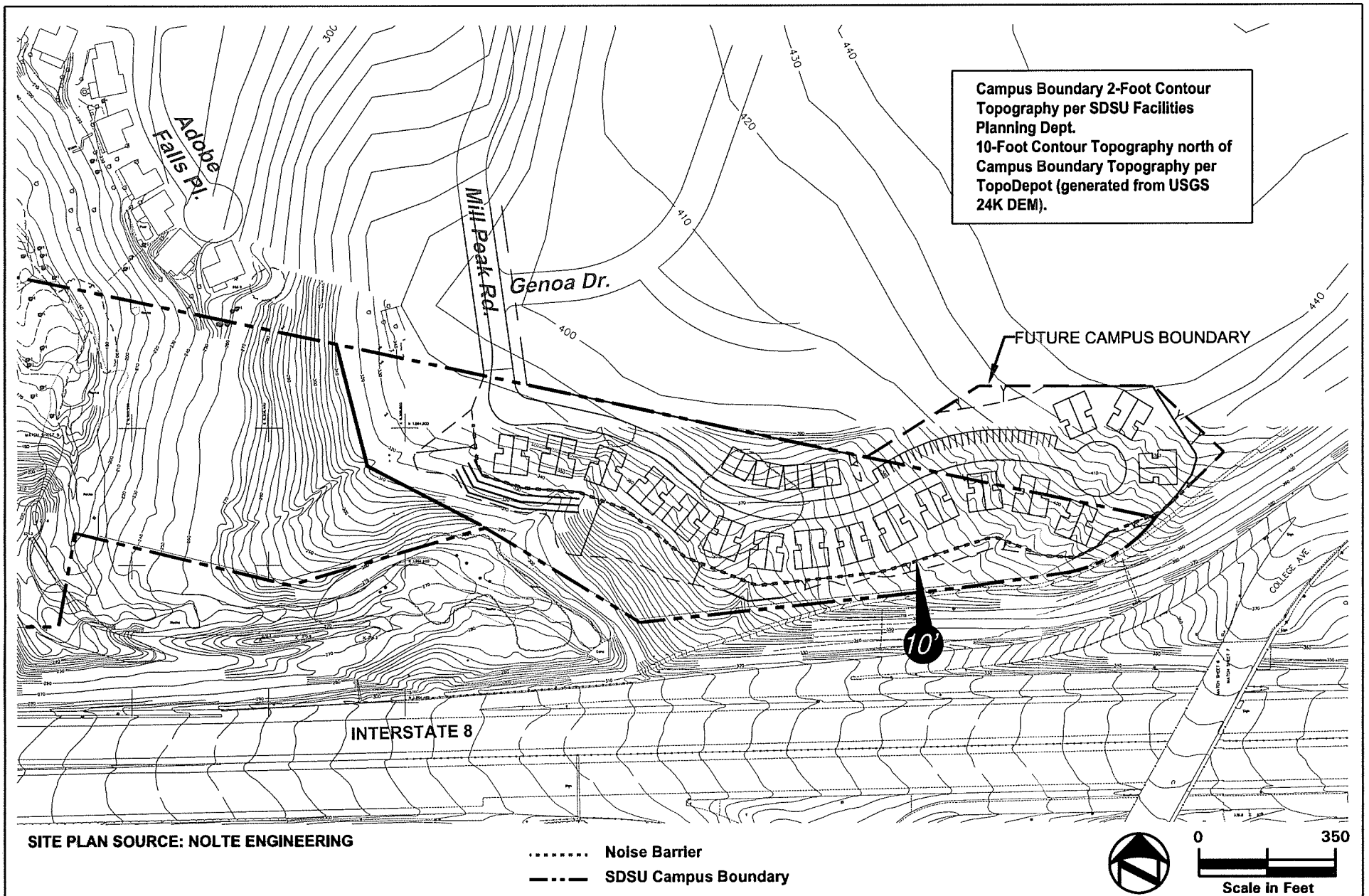
The following measures are identified to mitigate the traffic noise impacts that affect the project's residential components.

6.2.1 Adobe Falls Faculty/Student Housing

Upper Village:

A ten-foot high noise barrier would be required to mitigate the traffic noise to 65 dB CNEL or less at the proposed outdoor usable areas of the Upper Village area. The noise barrier height is relative to the adjacent pad elevations. The noise barrier height and location area depicted in *Figure 8, Noise Barrier Height and Location at Adobe Falls Upper Village*.

The materials used in the construction of the barrier should typically have a minimum surface density of four pounds per square foot. They may consist of masonry material, 1/2-inch thick Plexiglas, 1/4-inch thick tempered glass, earthen berm or a combination of these materials. The barrier must be designed so there are no openings or cracks.



Noise Technical Report for the 2007 SDSU Campus Master Plan Revision

Without mitigation the interior noise levels would exceed the State's interior noise requirement at the multi-family units. An interior noise study should be prepared to ensure that the interior noise level is mitigated to 45 dB CNEL or less. Noise abatement would include sound-rated windows along the building adjacent to I-8 and College Avenue. Also, the dwelling units would most likely require air-conditioning or mechanical ventilation so that the windows could be closed at the occupant's discretion.

Lower Village:

A site-specific acoustical study should be prepared for proposed sensitive uses to ensure that the exterior noise level does not exceed 65 dB CNEL at outdoor use areas. The noise study may suggest implementing mitigation measures such as orienting buildings to shield the outdoor use areas from I-8 traffic noise as well as constructing sound walls or berms around the outdoor use areas.

Interior noise levels may exceed the State's interior noise requirement at the condominiums and townhomes. An interior noise study should be prepared to ensure that the interior noise level is mitigated to 45 dB CNEL or less. Noise abatement would most likely require sound-rated windows along the building facades facing I-8. Also, the dwelling units would most likely require air-conditioning or mechanical ventilation so that the windows could be closed at the occupant's discretion.

6.2.2 Alvarado Hotel

A minimum seven-foot high noise barrier should be constructed around the common outdoor usable area (i.e., pool area) to mitigate the traffic noise impact.

Interior noise levels may exceed the State's interior noise requirement. An interior noise study should be prepared to ensure that the interior noise level is mitigated to 45 dB CNEL or less. Noise abatement would most likely require sound-rated windows along the building facades facing I-8. Also, the dwelling units would most likely require air-conditioning or mechanical ventilation so that the windows could be closed at the occupant's discretion.

6.2.3 Student Housing

G Lot Residence Hall:

Interior noise levels may exceed the State's interior noise requirement. An interior noise study should be prepared to ensure that the interior noise level is mitigated to 45 dB CNEL or less. Noise abatement would most likely require sound-rated windows along the building facades

Noise Technical Report for the 2007 SDSU Campus Master Plan Revision

facing College Avenue. Also, the dwelling units would most likely require air-conditioning or mechanical ventilation so that the windows could be closed at the occupant's discretion.

Olmeca/Maya Residence Hall:

Interior noise levels may exceed the State's interior noise requirement. An interior noise study should be prepared to ensure that the interior noise level is mitigated to 45 dB CNEL or less. Noise abatement would most likely require sound-rated windows along the building facades facing College Avenue and Montezuma Road. Also, the dwelling units would most likely require air-conditioning or mechanical ventilation so that the windows could be closed at the occupant's discretion.

U Lot Residence Hall:

No mitigation is required.

C Lot Villa Alvarado Residence Hall:

A site-specific acoustical study should be prepared to ensure that the exterior noise level does not exceed 65 dB CNEL at outdoor use areas. The noise study may suggest implementing mitigation measures such as orienting the hotel to shield the outdoor use area from I-8, College Avenue, and Alvarado Road traffic noise, trolley noise as well as constructing sound walls or berms around the outdoor use area.

Interior noise levels may exceed the State's interior noise requirement. An interior noise study should be prepared to ensure that the interior noise level is mitigated to 45 dB CNEL or less. Noise abatement would most likely require sound-rated windows along the building facades facing I-8, College Avenue and Alvarado Road. Also, the dwelling units would most likely require air-conditioning or mechanical ventilation so that the windows could be closed at the occupant's discretion.

7.0 SIGNIFICANCE OF IMPACT AFTER MITIGATION

With implementation of the mitigation measures identified in *Section 6 (Mitigation)*, the noise impact level would be reduced to less than significant.

Noise Technical Report for the 2007 SDSU Campus Master Plan Revision

8.0 ACKNOWLEDGEMENTS

This report was prepared by the following Dudek & Associates staff members:

Sarah Lozano, Project Manager/Analyst
Mike Komula, Acoustician
Lesley Terry, Graphics and GIS support
Tiffany White, Word Processing and Formatting

9.0 REFERENCES

Federal Transit Administration, April 2006. *Transit Noise and Vibration Impact Assessment*.

Linscott Law & Greenspan, May 15, 2007. *Traffic Impact Analysis SDSU 2007 Campus Master Plan Revision*.

Federal Highway Administration, April 2004. *FHWA Traffic Noise Model User's Guide (Version 2.5 Addendum)*.

City of San Diego. June 1989. *City of San Diego Progress Guide and General Plan*.

City of San Diego, June 2000. *San Diego Municipal Code, Chapter 5, Article 9.5: Noise Abatement and Control*.

ATTACHMENT A

Definitions

Attachment 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, (dB[A]) (Symbol LA)	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 ten dB adjustment added to sound levels occurring during nighttime hours (10 pm to 7 am) and a five dB adjustment added to the sound levels occurring during the evening hours (7 pm to 10 pm).
Decibel, (dB)	A unit for measuring sound pressure level, 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 (Symbols Leq)	The sound level corresponding to a steady state sound level containing the same total energy as a time varying signal over a given sample period. Leq is designed to average all of the loud and quiet sound levels occurring over a specific time period.

ATTACHMENT B

Noise Level Calculations

Attachment B Noise Level Calculations

INPUT: ROADWAYS

SDSU Master Plan

<Organization?>

28 May 2007

<Analysis By?>

TNM 2.5

INPUT: ROADWAYS

PROJECT/CONTRACT:

SDSU Master Plan

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

RUN:

SDSU Upper Village – Future Unmitigated

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	%		
I-8 Eastbound	12.0	point19	19	6,307,246.0	1,864,422.4	232.00				Average	
		point18	18	6,307,813.0	1,864,328.1	250.00				Average	
		point17	17	6,308,683.5	1,864,259.5	276.00				Average	
		point16	16	6,309,725.0	1,864,287.2	306.00				Average	
		point15	15	6,310,176.5	1,864,297.6	320.00				Average	
		point14	14	6,310,634.0	1,864,302.8	334.00				Average	
		point13	13	6,311,126.0	1,864,316.1	346.00					
I-8 Westbound	12.0	point20	20	6,311,077.0	1,864,380.4	346.00				Average	
		point21	21	6,310,629.0	1,864,373.0	334.00				Average	
		point22	22	6,310,166.5	1,864,359.6	320.00				Average	
		point23	23	6,309,701.5	1,864,352.2	306.00				Average	
		point24	24	6,308,640.5	1,864,351.1	270.00				Average	
		point25	25	6,307,777.0	1,864,444.1	228.00				Average	
		point26	26	6,307,226.5	1,864,553.0	200.00					

Attachment B Noise Level Calculations

INPUT: TRAFFIC FOR LAeq1h Volumes

SDSU Master Plan

<Organization?>

28 May 2007

<Analysis By?>

TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes

PROJECT/CONTRACT:

SDSU Master Plan

RUN:

SDSU Upper Village -- Future Unmitigated

Roadway	Points											
Name	Name	No.	Segment		MTrucks		HTrucks		Buses		Motorcycles	
			Autos		V	S	V	S	V	S	V	S
					veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
I-8 Eastbound	point19	19	11661	65	266	65	169	65	0	0	0	0
	point18	18	11661	65	266	65	169	65	0	0	0	0
	point17	17	11661	65	266	65	169	65	0	0	0	0
	point16	16	11661	65	266	65	169	65	0	0	0	0
	point15	15	11661	65	266	65	169	65	0	0	0	0
	point14	14	11661	65	266	65	169	65	0	0	0	0
	point13	13										
I-8 Westbound	point20	20	11661	65	266	65	169	65	0	0	0	0
	point21	21	11661	65	266	65	169	65	0	0	0	0
	point22	22	11661	65	266	65	169	65	0	0	0	0
	point23	23	11661	65	266	65	169	65	0	0	0	0
	point24	24	11661	65	266	65	169	65	0	0	0	0
	point25	25	11661	65	266	65	169	65	0	0	0	0
	point26	26										

Attachment B Noise Level Calculations

INPUT: RECEIVERS

SDSU Master Plan

<Organization?>

28 May 2007

<Analysis By?>

TNM 2.5

INPUT: RECEIVERS

PROJECT/CONTRACT:

SDSU Master Plan

RUN:

SDSU Upper Village -- Future Unmitigated

Receiver

Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	
			ft	ft	ft		dBA	dBA	dB	dB	
Receiver1	1	1	6,309,764.0	1,864,732.0	363.00	4.92	0.00	66	10.0	8.0	Y
Receiver2	2	1	6,309,980.0	1,864,650.0	367.00	4.92	0.00	66	10.0	8.0	Y
Receiver3	3	1	6,310,240.0	1,864,590.0	376.00	4.92	0.00	66	10.0	8.0	Y
Receiver4	4	1	6,310,391.0	1,864,629.0	386.00	4.92	0.00	66	10.0	8.0	Y
Receiver5	5	1	6,310,593.0	1,864,628.0	405.00	4.92	0.00	66	10.0	8.0	Y
Receiver6	6	1	6,310,719.0	1,864,703.0	410.00	4.92	0.00	66	10.0	8.0	Y

Attachment B Noise Level Calculations

INPUT: BARRIERS

SDSU Master Plan

<Organization?>
<Analysis By?>

28 May 2007
TNM 2.5

INPUT: BARRIERS

PROJECT/CONTRACT:

SDSU Master Plan

RUN:

SDSU Upper Village – Future Unmitigated

Barrier									Points											
Name	Type	Height		If Wall	If Berm			Add'l	Name	No.	Coordinates (bottom)			Height	Segment					
		Min	Max	\$ per Unit Area	\$ per Unit Vol.	Top Width	Run:Rise	\$ per Unit Length			X	Y	Z	at Point	Seg Ht	Perturbs	On	Important		
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft			ft	ft	ft	ft	ft	#Up	#Dn	Reflec-tions?		
Proposed topography	W	0.00	99.99	0.00				0.00	point1	1	6,310,735.5	1,864,701.5	416.00	0.00	0.00	0	0			
									point2	2	6,310,581.5	1,864,609.1	405.00	0.00	0.00	0	0			
									point3	3	6,310,533.5	1,864,610.2	405.00	0.00	0.00	0	0			
									point4	4	6,310,460.0	1,864,638.8	393.00	0.00	0.00	0	0			
									point5	5	6,310,306.0	1,864,590.8	380.00	0.00	0.00	0	0			
									point6	6	6,310,116.0	1,864,568.1	369.00	0.00	0.00	0	0			
									point7	7	6,310,017.0	1,864,607.5	368.00	0.00	0.00	0	0			
									point8	8	6,309,958.0	1,864,653.9	367.00	0.00	0.00	0	0			
									point9	9	6,309,849.0	1,864,706.5	363.00	0.00	0.00	0	0			
									point10	10	6,309,712.5	1,864,731.6	363.00	0.00	0.00	0	0			
									point11	11	6,309,697.5	1,864,825.0	363.00	0.00						

Attachment B Noise Level Calculations

RESULTS: BARRIER DESCRIPTIONS

SDSU Master Plan

<Organization?>

28 May 2007

<Analysis By?>

TNM 2.5

RESULTS: BARRIER DESCRIPTIONS

PROJECT/CONTRACT:

SDSU Master Plan

RUN:

SDSU Upper Village – Future Unmitigated

BARRIER DESIGN:

INPUT HEIGHTS

Barriers										
Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top Width	Run:Rise	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	\$
Proposed topography	W	0.00	0.00	0.00	0	0				0
									Total Cost:	0

Attachment B Noise Level Calculations

RESULTS: SOUND LEVELS

SDSU Master Plan

<Organization?>

28 May 2007

<Analysis By?>

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

SDSU Master Plan

RUN:

SDSU Upper Village -- Future Unmitigated

BARRIER DESIGN:

INPUT HEIGHTS

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

ATMOSPHERICS:

68 deg F, 50% RH

Receiver

Name	No.	#DUs	Existing	No Barrier		Increase over existing		Type Impact	With Barrier			
			LAeq1h	LAeq1h	Crit'n	Calculated	Crit'n		Calculated	Noise Reduction		Calculated minus Goal
				Calculated			Sub'l Inc		LAeq1h	Calculated	Goal	
			dB	dB	dB	dB	dB		dB	dB	dB	dB
Receiver1	1	1	0.0	76.2	66	76.2	10	Snd Lvl	76.2	0.0	8	-8.0
Receiver2	2	1	0.0	76.6	66	76.6	10	Snd Lvl	76.6	0.0	8	-8.0
Receiver3	3	1	0.0	78.8	66	78.8	10	Snd Lvl	78.8	0.0	8	-8.0
Receiver4	4	1	0.0	78.1	66	78.1	10	Snd Lvl	78.1	0.0	8	-8.0
Receiver5	5	1	0.0	77.1	66	77.1	10	Snd Lvl	77.1	0.0	8	-8.0
Receiver6	6	1	0.0	69.3	66	69.3	10	Snd Lvl	69.3	0.0	8	-8.0

Dwelling Units

	#DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	6	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Attachment B Noise Level Calculations

INPUT: ROADWAYS

SDSU Master Plan

<Organization?>

28 May 2007

<Analysis By?>

TNM 2.5

INPUT: ROADWAYS

PROJECT/CONTRACT:

SDSU Master Plan

RUN:

SDSU Upper Village -- Future Mitigated

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	%		
I-8 Eastbound	12.0	point19	19	6,307,246.0	1,864,422.4	232.00				Average	
		point18	18	6,307,813.0	1,864,328.1	250.00				Average	
		point17	17	6,308,683.5	1,864,259.5	276.00				Average	
		point16	16	6,309,725.0	1,864,287.2	306.00				Average	
		point15	15	6,310,176.5	1,864,297.6	320.00				Average	
		point14	14	6,310,634.0	1,864,302.8	334.00				Average	
		point13	13	6,311,126.0	1,864,316.1	346.00					
I-8 Westbound	12.0	point20	20	6,311,077.0	1,864,380.4	346.00				Average	
		point21	21	6,310,629.0	1,864,373.0	334.00				Average	
		point22	22	6,310,166.5	1,864,359.6	320.00				Average	
		point23	23	6,309,701.5	1,864,352.2	306.00				Average	
		point24	24	6,308,640.5	1,864,351.1	270.00				Average	
		point25	25	6,307,777.0	1,864,444.1	228.00				Average	
		point26	26	6,307,226.5	1,864,553.0	200.00					

Attachment B Noise Level Calculations

INPUT: TRAFFIC FOR LAeq1h Volumes

SDSU Master Plan

<Organization?>

28 May 2007

<Analysis By?>

TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes

PROJECT/CONTRACT:

SDSU Master Plan

RUN:

SDSU Upper Village -- Future Mitigated

Roadway	Points											
Name	Name	No.	Segment		MTrucks		HTrucks		Buses		Motorcycles	
			Autos									
			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
I-8 Eastbound	point19	19	11661	65	266	65	169	65	0	0	0	0
	point18	18	11661	65	266	65	169	65	0	0	0	0
	point17	17	11661	65	266	65	169	65	0	0	0	0
	point16	16	11661	65	266	65	169	65	0	0	0	0
	point15	15	11661	65	266	65	169	65	0	0	0	0
	point14	14	11661	65	266	65	169	65	0	0	0	0
	point13	13										
I-8 Westbound	point20	20	11661	65	266	65	169	65	0	0	0	0
	point21	21	11661	65	266	65	169	65	0	0	0	0
	point22	22	11661	65	266	65	169	65	0	0	0	0
	point23	23	11661	65	266	65	169	65	0	0	0	0
	point24	24	11661	65	266	65	169	65	0	0	0	0
	point25	25	11661	65	266	65	169	65	0	0	0	0
	point26	26										

Attachment B Noise Level Calculations

INPUT: RECEIVERS

SDSU Master Plan

<Organization?>

28 May 2007

<Analysis By?>

TNM 2.5

INPUT: RECEIVERS

PROJECT/CONTRACT:

SDSU Master Plan

RUN:

SDSU Upper Village -- Future Mitigated

Receiver

Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	
			ft	ft	ft		dBA	dBA	dB	dB	
Receiver1	1	1	6,309,764.0	1,864,732.0	363.00	4.92	0.00	66	10.0	8.0	Y
Receiver2	2	1	6,309,980.0	1,864,650.0	367.00	4.92	0.00	66	10.0	8.0	Y
Receiver3	3	1	6,310,240.0	1,864,590.0	376.00	4.92	0.00	66	10.0	8.0	Y
Receiver4	4	1	6,310,391.0	1,864,629.0	386.00	4.92	0.00	66	10.0	8.0	Y
Receiver5	5	1	6,310,593.0	1,864,628.0	405.00	4.92	0.00	66	10.0	8.0	Y
Receiver6	6	1	6,310,719.0	1,864,703.0	410.00	4.92	0.00	66	10.0	8.0	Y

Attachment B Noise Level Calculations

INPUT: BARRIERS

SDSU Master Plan

<Organization?>

28 May 2007

<Analysis By?>

TNM 2.5

INPUT: BARRIERS

PROJECT/CONTRACT:

SDSU Master Plan

RUN:

SDSU Upper Village – Future Mitigated

Barrier									Points											
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment					
		Min	Max		\$ per Unit Area	\$ per Unit Vol.	Top Width				Run:Rise	\$ per Unit Length	X			Y	Z	at Point	Seg Ht	Perturbs
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft			ft	ft	ft	ft	ft	ft	#Up	#Dn	Struct?	Reflec- tions?
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	6,310,735.5	1,864,701.5	416.00	6.00	0.00	0	0			
									point2	2	6,310,581.5	1,864,609.1	405.00	10.00	0.00	0	0			
									point3	3	6,310,533.5	1,864,610.2	405.00	10.00	0.00	0	0			
									point4	4	6,310,460.0	1,864,638.8	393.00	10.00	0.00	0	0			
									point5	5	6,310,306.0	1,864,590.8	380.00	10.00	0.00	0	0			
									point6	6	6,310,116.0	1,864,568.1	369.00	10.00	0.00	0	0			
									point7	7	6,310,017.0	1,864,607.5	368.00	10.00	0.00	0	0			
									point8	8	6,309,958.0	1,864,653.9	367.00	10.00	0.00	0	0			
									point9	9	6,309,849.0	1,864,706.5	363.00	10.00	0.00	0	0			
									point10	10	6,309,712.5	1,864,731.6	363.00	10.00	0.00	0	0			
									point11	11	6,309,697.5	1,864,825.0	363.00	10.00						

Attachment B Noise Level Calculations

RESULTS: BARRIER DESCRIPTIONS

SDSU Master Plan

<Organization?>

28 May 2007

<Analysis By?>

TNM 2.5

RESULTS: BARRIER DESCRIPTIONS

PROJECT/CONTRACT:

SDSU Master Plan

RUN:

SDSU Upper Village – Future Mitigated

BARRIER DESIGN:

INPUT HEIGHTS

Barriers										
Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top Width	Run:Rise	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	\$
Barrier1	W	6.00	9.70	10.00	1195	11592				0
									Total Cost:	0

Attachment B Noise Level Calculations

RESULTS: SOUND LEVELS

SDSU Master Plan

<Organization?>

28 May 2007

<Analysis By?>

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

SDSU Master Plan

RUN:

SDSU Upper Village -- Future Mitigated

BARRIER DESIGN:

INPUT HEIGHTS

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

ATMOSPHERICS:

68 deg F, 50% RH

Receiver

Name	No.	#DUs	Existing	No Barrier		Increase over existing		Type	With Barrier			
			LAeq1h	LAeq1h	Crit'n	Calculated	Crit'n		Calculated	Noise Reduction	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB	Impact	dBA	Calculated	dB	dB
Receiver1	1	1	0.0	61.8	66	61.8	10	---	61.8	0.0	8	-8.0
Receiver2	2	1	0.0	62.1	66	62.1	10	---	62.1	0.0	8	-8.0
Receiver3	3	1	0.0	63.2	66	63.2	10	---	63.2	0.0	8	-8.0
Receiver4	4	1	0.0	63.1	66	63.1	10	---	63.1	0.0	8	-8.0
Receiver5	5	1	0.0	61.8	66	61.8	10	---	61.8	0.0	8	-8.0
Receiver6	6	1	0.0	62.3	66	62.3	10	---	62.3	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0