

## 4.7 NOISE

### 4.7.1 Environmental Setting

#### Existing Noise Environment

The existing noise environment at the project site is typical of suburban neighborhoods, with the primary source of noise being vehicular traffic on Fruitvale Avenue and Allendale Avenue. The SR 85 freeway is located approximately one-half mile north of West Valley College, but the intervening distance and existing development both help to attenuate freeway noise at the campus.

**Existing Noise Levels.** In order to characterize the existing noise environment at the site, noise levels were measured over a 24-hour period at three locations on the West Valley College campus (Figure 4.7-1). Results of the noise measurements are presented in Table 4.7-1. As shown in this table, noise levels in the western portion of the campus (Locations #1 and #2, Figure 4.7-1) are 54 dBA (Leq)<sup>1</sup> during the day (7 a.m. to 7 p.m.), 50 to 51 dBA (Leq) during the evening (7 p.m. to 10 p.m.), and 48 to 49 dBA (Leq) during the night (10 p.m. to 7 a.m.). Based on these Leq noise measurements, the calculated CNEL<sup>2</sup> noise levels at the site is 56 dBA at approximately 125 feet from the centerline of Fruitvale Avenue.

Noise levels in the eastern portion of the campus are lower since it is away from any major noise sources. Noise levels in the southeast corner of the campus (Location #3, Figure 4.7-1) are 47 dBA (Leq) during the day, 44 dBA (Leq) during the evening, and 47 dBA during the night. Using these Leq noise measurements, calculated CNEL noise levels are 54 dBA.

**Sensitive Receptors.** Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication, physiological and psychological stress, and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. In general, residences, schools, hospitals, and nursing homes are considered to be the most sensitive to noise. The Saratoga Noise Element also declares the following uses to be noise-sensitive: nursing, convalescent, and retirement homes, schools (while in session), places of worship (while services are being conducted) and libraries (during hours of operation). Residential uses are located east and south of the campus. Residential properties adjoining

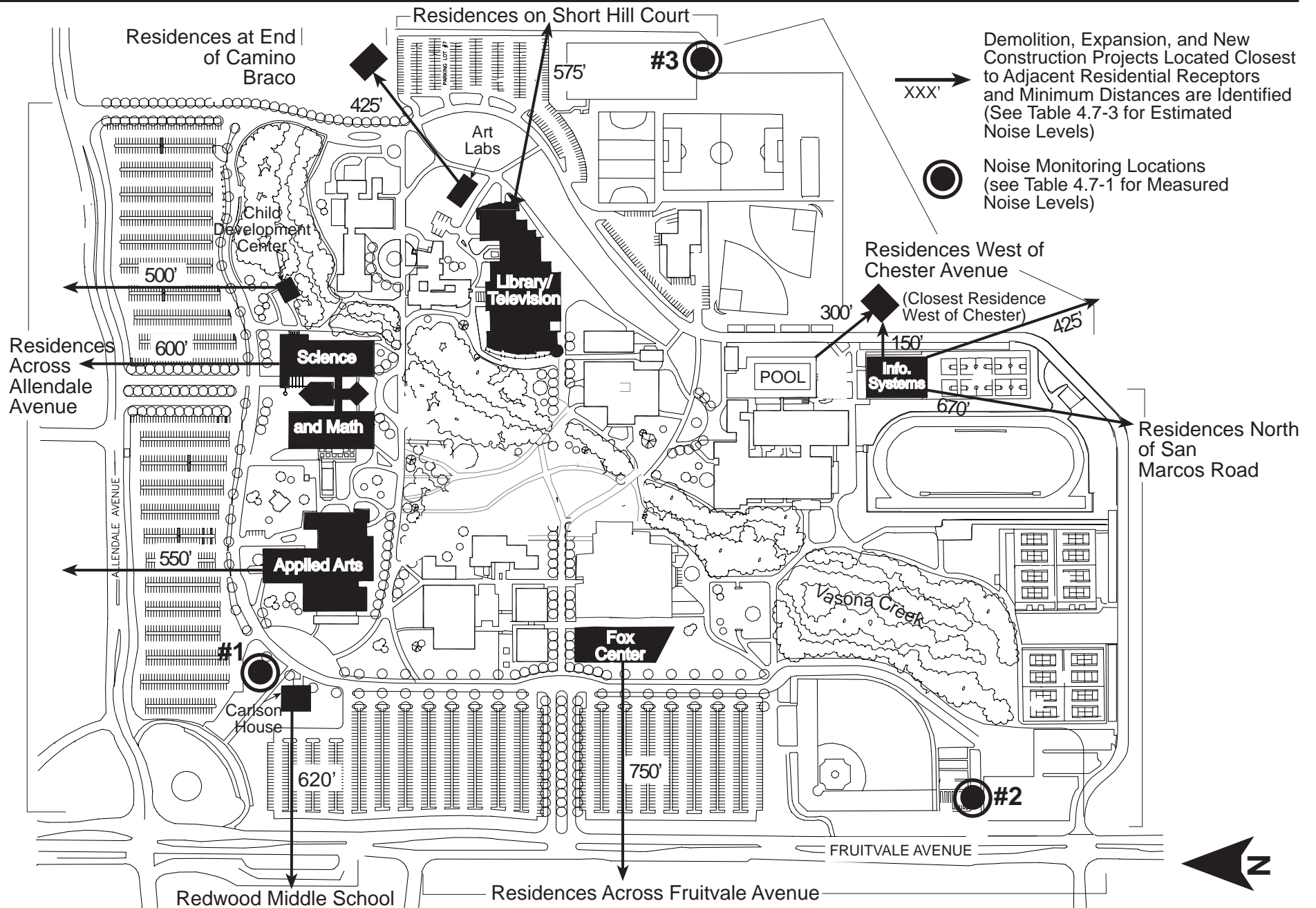
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<sup>1</sup> The decibel (dB) scale is used to quantify sound intensity. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called "A-weighting," written as "dBA." The continuous equivalent-energy level is that level of a steady noise having the same sound energy as a given time-varying noise. The Leq represents the decibel level of the time-averaged value of sound energy or sound pressure squared and is the descriptor used to calculate the Ldn or CNEL.

<sup>2</sup> CNEL is a 24-hour, time-weighted noise level that adds a 5-dB penalty during the evening hours (7 p.m. to 10 p.m.) and a 10-dB penalty during the night hours (10 p.m. to 7 a.m.) to account for increased sensitivity to nighttime noise in most communities.

# Noise Monitoring Locations and Projects Closest to Receptors

Figure 4.7-1



**Table 4.7-1**  
**Existing Noise Levels**

Recording Hour	Hourly Noise Measurement (Leq) in dBA					
	Location #1 Carlson House		Location #2 Archery Field		Location #3 Athletic Field	
	AM	PM	AM	PM	AM	PM
12:00-1:00	44.7	54.5	44.3	53.9	50.9	47.8
1:00-2:00	43.8	54.9	42.6	52.6	42.9	47.7
2:00-3:00	43.8	54.1	41.9	53.5	42.4	48.0
3:00-4:00	43.0	55.5	41.6	54.9	41.4	48.9
4:00-5:00	45.2	53.9	42.3	54.3	43.6	47.4
5:00-6:00	51.3	53.7	53.1	54.4	49.2	47.5
6:00-7:00	54.8	52.4	53.2	53.1	51.7	47.3
7:00-8:00	53.6	51.8	56.1	52.4	47.3	45.7
8:00-9:00	52.6	50.2	55.7	49.8	44.8	43.7
9:00-10:00	53.9	48.4	54.5	48.2	45.3	43.5
10:00-11:00	54.1	48.4	54.0	47.1	45.9	43.6
11:00-12:00	52.9	45.5	53.2	47.3	48.8	44.2
Day Leq (7 a.m. to 7 p.m.)	54		54		47	
Evening Leq (7 p.m. to 10 p.m.)	50		51		44	
Night Leq (10 p.m. to 7 a.m.)	49		48		47	
CNEL	57		56		54	

Notes: All measurements were taken from midnight on May 12, 2004 to midnight on May 13, 2004. Noise measurements were taken using Metrosonics db-308 noise meters. Measurement locations are indicated in Figure 4.7-1. Location #1, near Carlson House, was approximately 470 feet from the centerline of Allendale Avenue, 550 feet from the Fruitvale Avenue centerline, and 250 feet from the College's transit center. Location #2, adjacent to the Archery Field, was 125 feet from the Fruitvale Avenue centerline. Location #3 was located at the southeast corner of campus (adjacent to 14199 Shorthill Court), approximately 2,500 feet from the east of Fruitvale Avenue and 2,000 feet south of Allendale Avenue.

Source: Geier & Geier Consulting, Inc. 2005

the eastern and southern campus boundaries are single-family residences. Approximately 500 feet south of campus (south of San Marcos Road), residential uses are comprised of senior housing developments including the Saratoga Retirement Community, Fellowship Plaza, and Odd Fellows Home of California. Across Fruitvale Avenue, Redwood Middle School and single-family residences are located to the west. Single-family residences also are located to the north across Allendale Avenue.

## 4.7.2 Conformance with Local Plans and Policies

The complex legal principles regarding the extent to which West Valley College may be exempt from complying with the City's land use plans, policies, or ordinances are discussed at length in Chapter 4.1. However, it is the West Valley–Mission Community College District's policy to try to conform to local plans and ordinances whenever possible. Therefore, pertinent City policies and standards are outlined below.

### Saratoga General Plan

General Plan Policies	Project Analysis
<i>Noise Element</i>	
<i>1.2 The City shall control specific sources of noise either through abatement or through enforcement of noise standards, and shall discourage activities, practices, or land uses that create excessive noise.</i>	<i>Construction-related noise would comply with noise ordinance limits (see Impact 4.7-1) and additional measures are recommended to further reduce construction noise. Although programmed use of existing, renovated, and new campus buildings would be altered by the LRDP, campus activities are primarily indoors and within the central campus area. There would be no significant change in outdoor programmed uses. Therefore, no significant change in operational noise is anticipated (see Impact 4.7-3).</i>
<i>2.1 Changes in land uses and development should be reviewed for noise impacts to neighboring land uses.</i>	
<i>2.4 New development that generates noise shall utilize appropriate measures to reduce noise impacts.</i>	

The Noise Element also specifies acoustical standards for residential, public, park, and commercial uses. These standards are consistent with those listed under Section 7-30.040 of the Saratoga Noise Ordinance (see below).

### Saratoga Noise Ordinance

Article 7-30 of the Saratoga Municipal Code is the City's Noise Ordinance and is intended to protect Saratoga citizens from excessive, unnecessary, and unreasonable noise. Section 7-30-040 specifies the following ambient noise standards for the following uses in the City:

Land Use	Daytime	Evening	Nighttime
Residential Zoning Districts			
- Outdoor	60 dBA	50 dBA	45 dBA
- Indoor	45 dBA	35 dBA	30 dBA
Noise Sensitive Uses <sup>1</sup>			
- Outdoor	50 dBA	45 dBA	45 dBA
- Indoor	35 dBA	30 dBA	30 dBA

<sup>1</sup>The following uses are declared to be noise sensitive areas: (1) nursing, convalescent, and retirement homes; (2) schools (while in session); (3) places of worship (while services are being conducted); and (4) libraries (during hours of operation).

In addition, Section 7-30.050, a general noise restriction, restricts any single noise event in any residential zoning district to no more than 6 dBA above the ambient noise level at the location where the single event noise source is measured (which could be any off-site location). However, there are exceptions to this restriction and they include construction activities as specified in Section 7-30.060.

Under Section 7-30.060, no individual piece of construction equipment is allowed to produce noise levels over 83 dBA at 25 feet or 86 dBA at any point outside the property plane. As long as these noise limits are met, Section 7-30.060 allows residential construction noise to exceed the ambient noise standards listed above between 7:30 a.m. and 6:00 p.m., Monday through Friday, and between 9:00 a.m. and 5:00 p.m. on Saturday. Residential construction is prohibited on Sunday and weekday holidays except for specific activities specified in the ordinance.

### 4.7.3 Potential Impacts and Mitigation Measures

#### Significance Criteria

A significant noise increase is defined by comparing existing and projected noise levels with the following criteria:

- *Compliance with Noise Ordinance Standards.* Applicable limits from the Saratoga Noise Ordinance were used in this analysis to identify “substantial” increases in noise due to project construction and operation, even though the District, by a super-majority vote of the Board of Trustees, could choose not to comply with the Ordinance with respect to classroom facilities. Section 7-30.060 limits noise from construction equipment to 83 dBA at 25 feet or 86 dBA at any point outside the property plane. Noise levels up to this limit could be generated during the following hours: between 7:30 a.m. and 6:00 p.m., Monday through Friday, and between 9:00 a.m. and 5:00 p.m. on Saturday. Since Saratoga designates West Valley College in a residential zone, the EIR impact analysis has applied the residential construction requirements to this project. If construction occurs during any other hours, the residential noise limits outlined below would apply:

Land Use	Daytime	Evening	Nighttime
Residential Zoning Districts			
- Outdoor	60 dBA	50 dBA	45 dBA
- Indoor	45 dBA	35 dBA	30 dBA

The following daytime and evening noise limits are specified in Section 7-30.040 of the Saratoga Noise Ordinance for school uses and have been applied to determine the project’s noise compatibility:

Land Use	Daytime	Evening	Nighttime
School Uses			
- Outdoor	50 dBA	45 dBA	45 dBA
- Indoor	35 dBA	30 dBA	30 dBA

- *Speech Interference.* Speech interference is an indicator of impact on typical daytime and evening activities. A speech interference criterion, in the context of impact duration and time of day, is used to identify “substantial” increases in noise from temporary construction activities. Noise peaks generated by construction equipment could result in speech interference in adjacent buildings if the noise level in the interior of the building exceeds 45 to 60 dBA.<sup>3</sup> A typical building can reduce noise levels by 25 dBA with the windows closed (USEPA 1974). This noise reduction could be maintained only on a temporary basis in some cases, since it assumes windows must remain closed at all times. Assuming a 25-dBA reduction with the windows closed, an exterior noise level of 70 dBA at receptors would maintain an acceptable interior noise environment of 45 dBA. It should be noted that such noise levels would be sporadic rather than continuous in nature, because different types of construction equipment would be used throughout the construction process.
- *Noticeability of Traffic Noise Increases.* A determination of whether the incremental noise increase associated with project-related traffic increases would be noticeable. A 10-dBA incremental noise increase is perceived by most people to be a doubling in the loudness of a sound. A 5-dBA increase is readily noticeable, while a 3-dBA increase is barely noticeable to most people. Although the Noise Ordinance allows the generation of any noise event up to 6 dBA above the ambient in any residential zoning district, a threshold of more than 3 dBA (barely noticeable) will be considered a significant noise impact.

## Construction Noise

### **Impact 4.7-1: Project construction would result in temporary short-term noise increases due to the operation of heavy equipment. (Temporarily Significant)**

Development of the proposed project would result in short-term noise increases due to construction of planned projects. During project construction, temporary noise increases would result from the operation of heavy equipment. Construction noise levels would fluctuate depending on the construction phase, equipment type and duration of use, distance between noise source and receptor, and presence or absence of barriers between noise source and receptor. To estimate probable noise impacts, typical equipment and construction techniques are assumed.

Construction noise sources range from about 76 to 85 dBA (Leq) at 50 feet for most types of construction equipment, and levels of about 88 to 89 dBA for certain types of earthmoving equipment (scrapers, pavers) and impact equipment (jack hammers). Although the highest construction-related noise levels are typically generated by rock drills and pile drivers (which can generate noise peaks of approximately 98 and 101 dBA at 50 feet, respectively), such equipment would not be used for this project. The rate of attenuation is about 6 dBA for every doubling of distance from a point source. Typical noise levels at 50

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<sup>3</sup> For indoor noise environments, the highest noise level that permits relaxed conversation with 100% intelligibility throughout the room is 45 dBA. Speech interference is considered to become intolerable when normal conversation is precluded at 3 feet, which occurs when background noise levels exceed 60 dBA. For outdoor environments, the highest noise level that permits normal conversation at 3 feet with 95% sentence intelligibility is 66 dBA (USEPA, 1974).

and 100 feet from the noise source for several types of construction equipment that could be used for this project and potential noise attenuation with feasible noise controls are shown in Table 4.7-2.

Noise Ordinance Compliance. As indicated in Table 4.7-2, typical construction noise levels (without use of feasible noise controls) for most construction equipment exceed the City's Noise Ordinance 83-dBA noise limit at 25 feet (equivalent to 77 dBA at 50 feet). However, typical levels can be reduced to comply with the City's 83-dBA noise limit with implementation of feasible noise controls. The only exceptions are pile drivers, rock drills, and pneumatic tools. Use of pile drivers and rock drills is not proposed for construction/renovation of project buildings. Although pneumatic tools could be used, building construction setbacks from all adjacent/nearby residential receptors would be adequate (more than 100 feet) to meet the City's 86-dBA noise limit at campus boundaries.

Speech Interference Effects. While project-related construction activities could meet the City's Noise Ordinance requirement with implementation of feasible noise controls, noise impact can also be assessed by evaluating whether affected receptors can conduct normal daytime activities without significant disruption. In order to evaluate such an impact, the project's estimated maximum construction noise levels have been compared to a Speech Interference Criterion as described above. Since implementation of the LRDP would result in construction activities occurring at different locations on campus over the next ten years, the potential for noise impact would vary with the type and location of planned projects. Interior remodeling projects (planned in 12 campus buildings) would involve activities that occur primarily inside the buildings. Exterior noise would relate primarily to deliveries and any activities in designated outdoor staging areas, if they are necessary. Maintenance projects would involve interior and exterior work. Such work would be limited in scope (repairing exterior walls or roof systems) and generally would not involve use of heavy construction equipment, thereby minimizing the potential for noise disturbance. Projects involving building demolition and new construction would have the highest potential for noise impact. These projects would be longer in duration and involve operation of heavy equipment, thereby increasing the potential for noise disruption. In addition, these projects would have the potential to disrupt any nearby campus activities.

Demolition, demolition and rebuild, expansion, and new construction projects are located primarily in the central campus area except for the Information Systems Building as indicated in Figure 4.7-1. This figure shows that each project would have the potential to affect some residential receptors more than others due to its location. Therefore, receptors were separated by location and the distance between the closest receptor to the south, southeast, east, north, and west and the closest project to each of these receptors was determined. Estimated maximum construction noise levels at each of receptor location are presented in Table 4.7-3. These noise levels are considered worst-case and conservatively high since they do not include reductions that would occur from topography or noise barriers such as fencing or intervening buildings.

**Table 4.7-2**  
**Construction Equipment Noise Levels and Abatement Potential**

Equipment	Noise Level (Leq) at 50 Feet in dBA		Noise Level (Leq) at 100 Feet in dBA	
	Without Controls	With Controls	Without Controls	With Controls
<i>Earthmoving</i>				
Front Loaders	79	75	73	69
Backhoes	85	75	79	69
Dozers	80	75	74	69
Tractors	80	75	74	69
Graders	85	75	79	69
Trucks	91	75	85	69
<i>Materials Handling</i>				
Concrete Mixer	85	75	79	69
Concrete Pump	82	75	76	69
Crane	83	75	77	69
Derrick	88	75	82	69
<i>Stationary</i>				
Pumps	76	75	70	69
Generator	78	75	72	69
Compressors	81	75	75	69
<i>Impact</i>				
Pile Drivers	101	95	95	89
Rock Drills	98	80	92	74
Jack Hammers	88	75	82	69
Pneumatic Tools	86	80	80	74
<i>Other</i>				
Saws	78	75	72	69
Vibrators	76	75	70	69

<sup>1</sup> Estimated levels obtainable by selecting quieter procedures or machines and implementing noise-control features requiring no major redesign or extreme cost (e.g., improved mufflers, equipment redesign, use of silencers, shields, shrouds, ducts, and engine enclosures).

Source: USEPA 1971



**Table 4.7-3  
Maximum Construction Noise Levels at Closest Residential Receptors**

Receptor Location	Closest Construction Project	Maximum Noise Source	Ref. Hourly Leq in dBA @ 50 Feet	Minimum Source-Receptor Distance	Distance Adjustment	Adjusted Leq	Daytime Ambient	Exceeds Ambient?	With Feasible Controls	Mitigated Leq	Exceeds Ambient?	Exterior Speech Interference Criterion	Exceeds Criterion?
Residences to the South - North of San Marcos Rd.	Demolish Information Systems Building & Construct New Building to the South	Earthmoving Equipment	85	670	-23	62	55	Yes	-10	52	No	70	No
		Trucks	91	55	-1	90	55	Yes	-16	74	Yes	70	Yes
		Materials Handling	85	670	-23	62	55	Yes	-10	52	No	70	No
		Stationary Equipment	81	670	-23	58	55	Yes	-6	52	No	70	No
		Impact Equip.	88	670	-23	65	55	Yes	-8	57	Yes	70	No
Residences to the Southeast - West of Chester Ave. (Closest Residence 50 Feet from Campus Boundary)	Demolish Information Systems Building & Construct New Building to the South	Earthmoving Equipment	85	150	-10	75	54	Yes	-10	65	Yes	70	No
		Trucks	91	75	-4	87	54	Yes	-16	71	Yes	70	Yes
		Materials Handling	85	150	-10	75	54	Yes	-10	65	Yes	70	No
		Stationary Equipment	81	150	-10	71	54	Yes	-6	65	Yes	70	No
		Impact Equip.	88	150	-10	78	54	Yes	-8	70	Yes	70	No
Residences to the East - Along Short Hill Court	Remodel & Expand Library/Television	Earthmoving Equipment	85	575	-21	64	54	Yes	-10	54	No	70	No
		Trucks	91	275	-15	76	54	Yes	-16	60	Yes	70	No
		Materials Handling	85	575	-21	64	54	Yes	-10	54	No	70	No
		Stationary Equipment	81	575	-21	60	54	Yes	-6	54	No	70	No
		Impact Equip.	88	575	-21	67	54	Yes	-8	59	Yes	70	No
Residences to the East - West End of Camino Barco	Demolish & Rebuild Art Labs	Earthmoving Equipment	85	425	-19	66	54	Yes	-10	56	Yes	70	No
		Trucks	91	200	-12	79	54	Yes	-16	63	Yes	70	No
		Materials Handling	85	425	-19	66	54	Yes	-10	56	Yes	70	No
		Stationary Equipment	81	425	-19	62	54	Yes	-6	56	Yes	70	No
		Impact Equip.	88	425	-19	69	54	Yes	-8	61	Yes	70	No
Residences to the North - North of Allendale Ave.	Demolish & Rebuild Child Development Center	Earthmoving Equipment	85	500	-20	65	57	Yes	-10	55	No	70	No
		Trucks	91	75	-4	87	57	Yes	-16	71	Yes	70	Yes
		Materials Handling	85	500	-20	65	57	Yes	-10	55	No	70	No
		Stationary Equipment	81	500	-20	61	57	Yes	-6	55	No	70	No
		Impact Equip.	88	500	-20	68	57	Yes	-8	60	Yes	70	No

**Table 4.7-3 (Cont'd)**  
**Maximum Construction Noise Levels at Closest Residential Receptors**

Receptor Location	Closest Construction Project	Maximum Noise Source	Ref. Hourly Leq in dBA @ 50 Feet	Minimum Source-Receptor Distance	Distance Adjustment	Adjusted Leq	Daytime Ambient	Exceeds Ambient?	With Feasible Controls	Mitigated Leq	Exceeds Ambient?	Exterior Speech Interference Criterion	Exceeds Criterion?
Residences to the West - West of Fruitvale Ave.	Construct Fox Center	Earthmoving Equipment	85	750	-24	61	56	Yes	-10	51	No	70	No
		Trucks	91	185	-11	80	56	Yes	-16	64	Yes	70	No
		Materials Handling	85	750	-24	61	56	Yes	-10	51	No	70	No
		Stationary Equipment	81	750	-24	57	56	No	-6	51	No	70	No
		Impact Equip.	88	750	-24	64	56	Yes	-8	56	Yes	70	No
Redwood Middle School - West of Fruitvale Ave.	Demolish Carlson House	Earthmoving Equipment	85	620	-22	63	56	Yes	-10	53	No	70	No
		Trucks	91	185	-11	80	56	Yes	-16	64	Yes	70	No
		Materials Handling	85	620	-22	63	56	Yes	-10	53	No	70	No
		Stationary Equipment	81	620	-22	59	56	No	-6	53	No	70	No
		Impact Equip.	88	620	-22	66	56	Yes	-8	58	Yes	70	No
Residences to the North - North of Allendale Ave.	Reconfigure campus entries & develop new vehicle access to Theater Arts area.	Earthmoving Equipment	85	120	-8	77	56	Yes	-10	67	Yes	70	No
		Trucks	91	120	-8	83	56	Yes	-16	67	Yes	70	No
		Materials Handling	85	120	-8	77	56	Yes	-10	67	Yes	70	No
		Stationary Equipment	81	120	-8	73	56	Yes	-6	67	Yes	70	No
		Impact Equip.	88	120	-8	80	56	Yes	-8	72	Yes	70	Yes

Notes: Reference noise levels represent the highest noise level by equipment type (without controls) listed in Table 4.7-2 at 50 feet, while noise control adjustments represent the difference between the highest noise levels listed in Table 4.7-2 with controls versus without controls. The distances listed under "Distance Adjustment" represent the minimum distances between the closest receptors and the closest sides of buildings that are proposed to be demolished, renovated, expanded, or constructed.

SOURCE: Geier & Geier Consulting, Inc. 2005

As indicated in Table 4.7-3, operation of construction equipment at the various closest projects to the adjacent residential receptors would exceed daytime ambient noise levels at these residences, and it is likely that construction noise would be audible at these receptors. However, most construction noise would not exceed the Speech Interference Criterion at the closest residential receptors and therefore, would be less than significant with the exception of: (1) the Information Systems Building and P.E. Complex projects (including pool renovation); (2) truck operations along East/South College Circle and Allendale Avenues; and (3) access improvement projects along Allendale and Fruitvale avenues. With implementation of feasible noise controls at all projects (required to comply with the City Noise Ordinance), maximum construction noise levels could be reduced to below daytime ambient noise levels at all receptor locations except for the following:

- One Residence on Chester Avenue (east of new Information Systems Building and southeast of P.E. Complex and pool): With or without noise controls, this residence would be subject to noise levels that exceed daytime ambient noise levels when demolition and construction activities occur at the P.E. Complex and Information Systems Building. At this residence, maximum noise levels would be audible and would exceed the 70-dBA Speech Interference Criterion. Therefore, construction noise would be temporarily significant at this residence. However, implementation of feasible noise controls listed under Mitigation Measure 4.7-1 would reduce noise levels to less-than-significant levels; Table 4.7-3).
- Two Residences at the end of Camino Barco: With or without noise controls, these residences would be subject to noise levels that exceed daytime ambient noise levels when demolition and construction activities occur at the Child Development Center, Art Labs, Art Studios, and Library/Television Building. At these residences, maximum noise levels would be audible but would not exceed the 70-dBA Speech Interference Criterion, and therefore, would be less than significant.
- Trucks: Table 4.7-3 shows that that highest estimated noise levels at adjacent receptors would result primarily from use of trucks on South College Circle, East College Circle, Allendale Avenue and Fruitvale Avenue, which are located closer to residential receptors than project buildings. While noise levels for trucks listed in Table 4.7-3 represent noise from a single passing truck, the impact analysis must also consider the noise impacts associated with use of these access roads by numerous construction-related trucks throughout the day. In general, the effect of construction-related truck traffic would depend on the level of background noise already occurring at a particular receptor site and the frequency of truck passbys.

In quiet noise environments (Leq averaging 50 dBA), one truck per hour would be noticeable, even though such a low volume would not measurably increase noise levels. In slightly noisier environments (Leq averaging 60 dBA), the threshold level is higher, and it would take 10 trucks per hour to noticeably increase the noise exposure. In moderately noisy environments (Leq averaging 70 dBA), a noise increase would be perceptible with the addition of 100 trucks per hour. (Caltrans

1989). Since daytime ambient noise levels in the vicinity of residences located east of the campus is approximately 55 dBA or slightly higher and these residences are already subject to traffic noise on East/South College Circle), it is likely that campus construction projects could generate up to five trucks per hour on East/South College Circle and up to ten trucks per hour on Allendale or Fruitvale avenues without causing noise disturbance.<sup>4</sup> Heavy truck use would be associated primarily with hauling away demolition materials, equipment/materials deliveries, and concrete placement for foundations. Since it typically takes a minimum of 10 to 15 minutes to fill a haul truck or unload a concrete delivery truck, this average truck volume is not expected to be exceeded when a single project is considered; however, it is possible that higher truck volumes could be generated if multiple projects were to occur on campus simultaneously. Assuming average truck volumes on local roadways do not exceed these threshold levels, truck noise would have a less-than-significant impact on adjacent receptors. Therefore, if recommended noise controls and truck operation restrictions are implemented, construction noise could be mitigated to a less-than-significant level at all adjacent receptors.

- **Impact Equipment:** Besides truck noise, Table 4.7-3 indicates that the highest construction-related noise levels could be attributed to use of impact equipment such as pile drivers, rock drills, jackhammers, and pneumatic tools. As indicated above, the College anticipates that pile drivers or rock drills would not be required to complete demolition and construction projects. Use of jackhammers would be sporadic, typically occurring only during initial phases of construction, not the entire duration of construction. Assuming operation of jackhammers does not occur closer than 150 feet from any residential receptor, estimated maximum noise levels associated with building construction would not exceed the Speech Interference Criterion and therefore, would be less than significant. Implementation of recommended feasible noise controls on impact equipment (e.g., using hydraulically or electrical powered equipment to avoid the noise associated with compressed-air exhaust from pneumatically powered tools) would help minimize the potential for noise disruption at the closest receptors.
- **Driveway/Parking Lot Improvements.** Realignment of campus entries on Fruitvale and Allendale avenues and development of a new vehicle access to the Theater Arts area would occur along the northern and western project boundaries. Campus entry, parking lot, and vehicle access improvements occurring along the northern and western perimeters of the site and would have the potential to affect residences across Allendale and Fruitvale avenues. Residences along Allendale Avenue are located as close as 120 feet while residences along Fruitvale Avenue are located a minimum of 240 feet from the edge of the parking lots. At 120 feet, noise levels from heavy equipment operation (with controls) would exceed ambient noise levels and could exceed the 70-dBA

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<sup>4</sup> According to the Saratoga Noise Element (1988), noise levels exceed 60 dBA within 176 feet of the Fruitvale Avenue centerline and 26 feet of the Allendale Avenue centerline.

Speech Interference Criterion by 2 dBA when jackhammers or paving equipment are operated (Table 4.7-3). Although exceedance of the 70-dBA criterion could occur at the closest residential receptors on Allendale Avenue, this impact would be limited in duration and would only occur when jackhammers and paving equipment are operated along the street frontage. Since equipment noise would still comply with the Saratoga Noise Ordinance noise limits and would be limited in duration at affected receptors, the estimated 2-dBA exceedance is considered to be less than significant assuming feasible noise controls specified in Mitigation Measure 4.7-1 are implemented.

While Table 4.7-3 identifies the noise impacts of the closest demolition and construction projects to each receptor location, it should be noted that the other planned demolition and construction projects would have relatively less impacts. For residents to the south and southeast, the Information Systems Building project would be the closest project (425 to 670 feet away) and all other projects would be located more than 850 feet away so that construction noise levels could be maintained below daytime ambient noise levels with implementation of feasible noise controls. Similarly, the closest project to residents to the west would be the Fox Center project (750 feet away), and all other projects would be located over 900 feet away. The closest building to Redwood Middle School buildings is the Carlson House (620 feet away). For residents to the north, the Child Development Center demolition/construction project, Math and Science Building addition project, and Applied Arts and Sciences Building renovation project would be the closest projects and all other projects would be located approximately 1,000 feet or more away. The closest projects to residents to the east would be the Library/Television expansion project as well as the Art Labs and Art Studios demolition and rebuild projects (425 to 575 feet away). Except for two residences at the end of Camino Barco, all other projects would be located approximately 1,000 feet or more away.

The only other projects that could be located closer to adjacent residential receptors would be proposed reconfiguration of parking lots along the northern and western margins of the campus, resurfacing of the running track and improvement of irrigation and drainage on practice fields in the southern margin of the campus. Such improvements are anticipated to be shorter in duration and involve less heavy equipment than building demolition/construction projects. Therefore, these activities are not expected to significantly affect adjacent receptors, if construction activities comply with Noise Ordinance limits.

**Mitigation Measure 4.7-1:** The District will incorporate the following measures into specifications for all construction projects:

- a. Comply with the Saratoga Noise Ordinance including the following noise limits: 83 dBA at 25 feet or 86 dBA at any point outside the property plane. Use the best available noise control techniques (including mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) for all equipment and trucks in order to comply with these limits and ensure that maximum construction noise levels do not exceed the 70-dBA Speech Interference Criterion at the closest residential receptors.

- b. Limit construction activities (including haul and concrete truck operations) to the hours specified in the Noise Ordinance, which are as follows: between 7:30 a.m. and 6:00 p.m., Monday through Friday, and between 9:00 a.m. and 5:00 p.m. on Saturday. Do not allow construction on Sundays or weekday holidays. If construction occurs during any other hours, the residential noise limits outlined below should apply:

<b>Land Use</b>	<b>Daytime</b>	<b>Evening</b>	<b>Nighttime</b>
Residential Zoning Districts			
- Outdoor	60 dBA	50 dBA	45 dBA
- Indoor	45 dBA	35 dBA	30 dBA

- c. If impact equipment (e.g., jack hammers, pavement breakers, or rock drills if needed) is used during project construction, employ hydraulically or electrical powered equipment wherever possible to avoid the noise associated with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatically powered tools is unavoidable, use an exhaust muffler on the compressed-air exhaust (a muffler can lower noise levels from the exhaust by up to about 10 dBA). Use external jackets on the tools themselves, where feasible, which could achieve a reduction of 5 dBA. Use quieter procedures, such as drilling rather than impact equipment, whenever feasible.
- d. Locate stationary noise sources as far from sensitive receptors as possible. If they must be located near existing receptors, ensure adequate muffling (with enclosures) to meet the Saratoga Noise Ordinance limits.
- e. Locate material stockpiles as well as maintenance/equipment staging and parking areas as far as practicable from residential receptors.
- f. Designate a complaint coordinator responsible for responding to noise complaints received during construction of each planned project. Post the name and phone number of the complaint coordinator conspicuously at construction areas. This person will be responsible for taking steps to resolve complaints, including periodic noise monitoring, if necessary. If construction noise is found to exceed ordinance limits, require the contractor to change work procedures to reduce noise to acceptable levels.
- g. Avoid operation of haul and delivery trucks on East College Circle, South College Circle, Allendale Avenue, and Fruitvale Avenue to access construction site to the extent feasible. Trucks should be directed to stay in campus parking lots as long as possible before accessing public streets. Truck volumes from all construction projects occurring on campus at any given time shall not exceed an average of five trucks per hour on East/South College Circle and ten trucks per hour on Allendale and Fruitvale avenues.

**Impact Significance After Mitigation:** Less than significant.

### **Operational Noise**

**Impact 4.7-2: Traffic increases on local roadways due to projected increases in student enrollments and cumulative development would increase noise levels along these roads. (Less than Significant)**

The project would result in traffic and associated noise increases on local roadways serving the site. Using noise modeling techniques specified by the Federal Highway Administration (FHWA-RD-77-108 with updated California Vehicle Noise Emission [CALVENO] factors) and traffic volumes in this report, existing and future noise levels on local roadways were estimated and they are presented in Table 4.7-4. Traffic noise increases due to the project would be less than 1 dBA over existing and future levels. Such incremental increases would not be considered significant when compared to the Noticeability Significance Criterion outlined above.

**Mitigation Measure 4.7-2:** None required.

**Impact 4.7-3: Implementation of the LRDP would not significantly increase noise generated on campus except possibly at the Information Systems Building. (Potentially Significant)**

Implementation of the LRDP would result in relocation of some campus departments from one building to another. Except for the Information Systems Building, all existing and planned campus uses would be located in the central area of the campus away from adjacent residential receptors. In addition, project implementation would modify programmed use of campus buildings, which primarily involve indoor activities. Existing parking lots along the campus periphery would not be changed under the proposed LRDP. As part of the P.E. Complex remodel and expansion project, the existing pool would be renovated, the running track would be resurfaced, and irrigation/drainage would be improved on practice fields. Since programmed use of these fields is not expected to significantly change with implementation of the LRDP, there would be no significant in noise due to use of these fields.

The Information Systems Building is proposed to be demolished and relocated on the adjacent area to the south, which is currently developed with sand volleyball courts. Such relocation would increase proximity of campus buildings to adjacent residences located to the southeast and south. This building could be located as close as 150 feet from an existing residence located west of Chester Avenue and adjacent to the campus boundary. Heating, ventilation, and air conditioning systems can generate continuous noise levels of 60 to 75 dBA (Leq) at 50 feet, depending on the location, size of the unit as well as the baffling or screening incorporated into the design. At 150 feet, mechanical equipment associated with the building could generate noise levels of 50 to 65 dBA (Leq), which could exceed existing ambient noise levels and the Saratoga Noise Ordinance exterior noise standards (listed above). Provision of a noise barrier around this equipment could reduce equipment-related noise impacts on

**Table 4.7-4**  
**Traffic Noise Increases**

Road Link	Average Speed (mph)	Noise Level (Ldn) at 50 Feet from Roadway Centerline				
		Existing (2004)	Future (2015) - No Project	Change from Existing	Future (2015) + Project	Change from Existing
Allendale Ave. (East of Fruitvale)	35	62.6	62.9	0.3	63.3	0.7
Allendale Ave. (West of Quito)	35	62.2	62.5	0.3	62.8	0.6
Quito Road (South of Allendale)	30	64.9	65.3	0.4	65.4	0.5
<i>Campus Access Driveways</i>						
Allendale Ave. (West of Theater Way)	35	62.4	62.7	0.3	63.0	0.6
Allendale Ave. (East of Theater Way)	35	62.6	62.9	0.3	63.2	0.6
Theater Way (South of Allendale)	30	56.1	56.1	0.0	57.0	0.9
Allendale Ave. (West of Science Way)	35	63.2	63.5	0.3	63.8	0.6
Allendale Ave. (East of Science Way)	35	62.5	62.8	0.3	63.1	0.6
South College Circle (East of Fruitvale)	30	54.4	54.4	0.0	55.3	0.9
Noise Level (Ldn) at 100 Feet from Roadway Centerline						
Saratoga Road (East of Fruitvale)	40	65.7	66.1	0.4	66.3	0.6
Saratoga Road (East of Fruitvale)	40	63.6	64.1	0.5	64.1	0.5
Fruitvale Ave. (South of Saratoga)	35	62.4	62.7	0.3	63.0	0.6
Fruitvale Ave. (South of Allendale)	35	60.3	60.6	0.3	60.9	0.6
Fruitvale Ave. (North of Saratoga-Los Gatos Rd.)	35	57.2	57.5	0.3	57.8	0.6
<i>Campus Access Driveways</i>						
Fruitvale Ave. (North of Main Entrance)	35	60.3	60.6	0.3	61.0	0.7
Fruitvale Ave. (South of Main Entrance)	35	59.8	60.1	0.3	59.9	0.1
Fruitvale Ave. (North of S. College Circle)	35	59.2	59.5	0.3	59.7	0.5
Fruitvale Ave. (South of S. College Circle)	35	60.7	61.0	0.3	61.2	0.5

SOURCE: Geier & Geier Consulting, Inc. 2005



residences to the east and south to a less-than-significant level. Although this building currently has a diesel-powered emergency generator located on the east side of the building, noise impact potential would remain unchanged since this generator would remain at its current location.

Implementation of the LRDP would result in development of a new access on Allendale Avenue at the eastern campus boundary, consolidation of campus accesses on Allendale and Fruitvale from six to four driveways, and realignment of campus accesses would be consolidated and the campus entries on Allendale and Fruitvale as part of project implementation. These circulation changes would cause minor variations in turning movement patterns at campus driveway intersections, but noise levels along Fruitvale and Allendale avenues (adjacent to the campus) and on campus roadways (East/South College Circle) would change by less than 1 dBA. Such incremental increases would not be considered significant when compared to the Noticeability Significance Criterion outlined above. In addition, noise levels along Theater Way and East/South College Circle are estimated to reach 55 to 57 dBA (CNEL) at 50 feet, which would not exceed the City's outdoor noise standard equivalent of 58 dBA (CNEL) for residential uses.

The proposed realignment of the Theater Way access to the eastern campus boundary would increase proximity of college-related traffic on Theater Way to the adjacent church. Future noise levels along this street are estimated to reach 57 dBA (CNEL) at 50 feet, and no significant noise conflicts are anticipated since this level is lower than estimated noise levels along Allendale Avenue. In addition, since most college-related traffic occurs on weekdays and church activities occur primarily on weekends, the proposed access reconfiguration is not expected to cause noise disruption of church-related weekend activities.

**Mitigation Measure 4.7-3:** To minimize the potential for noise impacts on adjacent residences to the east and south, noise attenuation measures should be incorporated into the design of the proposed Information Systems Building to ensure that the building's mechanical equipment comply with noise limits specified in the Saratoga Noise Ordinance. Noise from this equipment could be reduced by either locating this equipment on the northwest side of the building, possibly into the cut slope that occurs between the existing and proposed locations (the building and cut slope would provide an effective noise barrier) or by providing a noise barrier around the equipment (e.g., incorporating a barrier into rooftop screening if equipment is located on the roof).

**Impact Significance After Mitigation:** Less than significant.

### **Noise Compatibility of Project Buildings**

**Impact 4.7-4: Existing and future noise levels on the West Valley College campus would be compatible with proposed campus buildings when compared to City Noise Standards and State Land Use Compatibility Guidelines for Noise. (Less than Significant)**

Table 4.7-1 indicates that existing noise levels on the West Valley College campus vary from 47 to 54 dBA (Leq) during the day (7 a.m. to 7 p.m.), 44 to 50 dBA (Leq) during the evening (7 p.m. to 10 p.m.), and 47 to 49 dBA (Leq) during the nighttime noise levels. It is estimated that noise levels on portions of the campus away from surrounding streets (where most campus buildings are located) are generally in the lower end of this range, while noise levels in areas of the campus near Fruitvale Avenue, Allendale Avenue, East/South College Circle, and campus parking lots are generally in the upper end of the measured range of noise levels. The lower end of the measured daytime and evening noise levels would be consistent with the City's outdoor noise standards of 50 dBA (day) and 45 dBA (evening) for schools. Since the school does not operate during the nighttime hours, consistency with this standard would not be pertinent.

State Land Use Compatibility Guidelines indicate that exterior noise levels of 60 dBA (CNEL) or less are considered normally acceptable for school uses and no noise mitigation is required. Measured noise levels on campus (54 to 57 dBA, CNEL) are normally acceptable for school uses and no noise mitigation is required.

**Mitigation Measure 4.7-4:** None required.

### Cumulative Impacts

**Impact 4.7-5: Cumulative construction noise impacts could result if planned construction projects occurred in the same vicinity at the same time. In addition, cumulative traffic increases on local roadways would increase noise levels along these roads. (Construction: Potentially Significant; Traffic: Less than Significant)**

Construction. Cumulative construction noise impacts could result if construction of more than one of the planned projects occurred in the same vicinity at the same time. If this occurred some residential receptors could be subject to noise from more than one construction project at the same time. Planned construction schedules for each project are listed in Table 3-1. Although most interior remodeling projects would occur in 2010 or 2012, no significant cumulative noise impacts are anticipated since most construction work would be confined to inside existing buildings, minimizing the potential for noise impacts at neighboring residential receptors. The projects with the most potential for noise impacts would be those requiring exterior construction activities such as building demolition, building additions, and new building construction.

Table 3-1 indicates that the following projects are planned to begin in 2005: demolition of the Health Care and Information Systems buildings, pool renovation, and construction of the new Information Systems Building. The Health Care building is located in the center of campus, away from neighboring residential receptors. The other three projects would occur in the same vicinity, but construction of the new Information Systems Building would have to occur first, while pool renovation and demolition of the existing Information Systems building would follow. Although these projects are proposed to occur

somewhat sequentially rather than simultaneously, there could be some overlap. If heavy equipment were operated simultaneously for more than one project in the same vicinity, estimated noise levels listed in Table 4.7-3 for residences to the southeast (west of Chester Avenue) and south (north of San Marcos Road) could increase by approximately 1 dBA. Such cumulative noise levels would not exceed the Speech Interference Criterion except if trucks or impact equipment were operated simultaneously at two of the sites. Mitigation Measure 4.7-1g would limit combined truck operations for all campus construction projects occurring simultaneously to ensure potential cumulative truck noise impacts would be maintained at a less-than-significant level. Simultaneous operation of impact equipment at any of these sites would exceed the Speech Interference Criterion by approximately 1 dBA, which would be potentially significant. It is unlikely that operation of impact equipment at these three projects would occur simultaneously because the new Information Systems Building must be complete before the pool renovation or demolition of the existing Information Systems Building could occur. Nevertheless, Mitigation Measure 4.7-5 will restrict any potential simultaneous operation of impact equipment to avoid significant cumulative noise impacts.

Table 3-1 specifies planned construction schedules for demolition, building additions and new building construction between 2006 and 2010. Construction of the Fox Center and the Math and Science Building addition and renovation are both planned for 2006, while the following projects are planned to begin in 2010: Campus Center expansion, P.E. expansion/remodel, demolition of the EOPS building, and campus entries realignment are planned for 2010. Since the Fox Center and Math and Science Building projects are located in different areas of the campus, each project would affect different receptors (e.g., the Fox Center is located closest to residences to the west on Fruitvale Avenue, while the Math and Science Building is located closest to residences to the north on Allendale Avenue), minimizing the potential for any significant cumulative noise impacts on any particular receptors. Similarly, in 2010, the Campus Center would affect primarily residential receptors to the west, the P.E. expansion project would affect residential receptors to the south and southeast, while the EOPS Building is in the center of campus.

All planned roadway construction projects (including realignment of campus entries) are scheduled to occur in 2010 or after. Campus entry and vehicle access improvements would occur along both campus' street frontages, potentially affecting residences across Allendale and Fruitvale avenues. Since these projects are located in different locations along the street frontages, each project would affect different receptors, minimizing the potential for any significant cumulative noise impacts on any particular receptors.

Table 3-1 indicates that there are four demolition and two new construction projects scheduled for 2012: demolition of the Child Care Center, Learning Services, Art Labs and Art Studios, construction of a new Child Development Center, and expansion of Library. Of these, three buildings are located in proximity to each other and also near residential receptors: the Art Labs, Art Studios, and Library. If heavy equipment were operated simultaneously at the Art Lab and Art Studios sites (420, 575, and 610 feet away from the closest receptors, respectively), projected noise levels listed in Table 4.7-3 for residences

at the west end of Camino Barco would increase by approximately 1 to 2 dBA. Such cumulative noise levels would not exceed the Speech Interference Criterion, and therefore, would be less than significant. Mitigation Measure 4.7-1 will require implementation of feasible noise controls, which will help minimize the potential for noise impacts on residents to the east.

Operation. When traffic noise increases from background growth (reflected in future baseline noise increases) is considered with project-related traffic noise increases, the cumulative noise increases would be less than 1 dBA over existing levels (Table 4.7-4). Such incremental increases would not be considered significant when compared to the Noticeability Significance Criterion outlined above.

**Mitigation Measure 4.7-5:** Since construction of the new Information Systems Building, renovation of the pool, and demolition of the existing Information Systems Building is planned for 2005, impact equipment shall be operated only at one of these sites at any given time to avoid cumulative noise impacts resulting from simultaneous operation of impact equipment.

**Impact Significance After Mitigation:** Less than significant.

## References - Noise

California Department of Transportation (Caltrans), 1989. Noise Technical Analysis Notes.

U.S. Environmental Protection Agency (USEPA), 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (Condensed Version)*. Washington D.C.

\_\_\_\_\_, 1971. *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*. Washington D.C.