3I. Noise

INTRODUCTION

This chapter addresses noise impacts associated with the proposed project. It analyzes potential noise impacts caused by both the construction and operation of the Costco Commercial Complex on the surrounding noise environment. Background information on environmental acoustics, including definitions of terms commonly used in noise analysis, is provided below.

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale is used to quantify sound intensity. Because sound pressure can vary by over one trillion times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Since the human ear is not equally sensitive to all frequencies within the entire spectrum, noise measurements are weighted more heavily within those frequencies of maximum human sensitivity in a process called "A-weighting," written as dBA. Figure 3I-1 shows Public reactions to common Noise Levels.

A number of different types of metrics are used to characterize the time-varying nature of sound. These metrics include: the equivalent sound level (L_{eq}), the minimum and maximum sound levels (L_{min} and L_{max}), percentile-exceeded sound levels (L_{xx}), the day-night level (L_{dn}), and the community noise equivalent level (CNEL). The following are brief definitions of these metrics and other terminology used in this section:

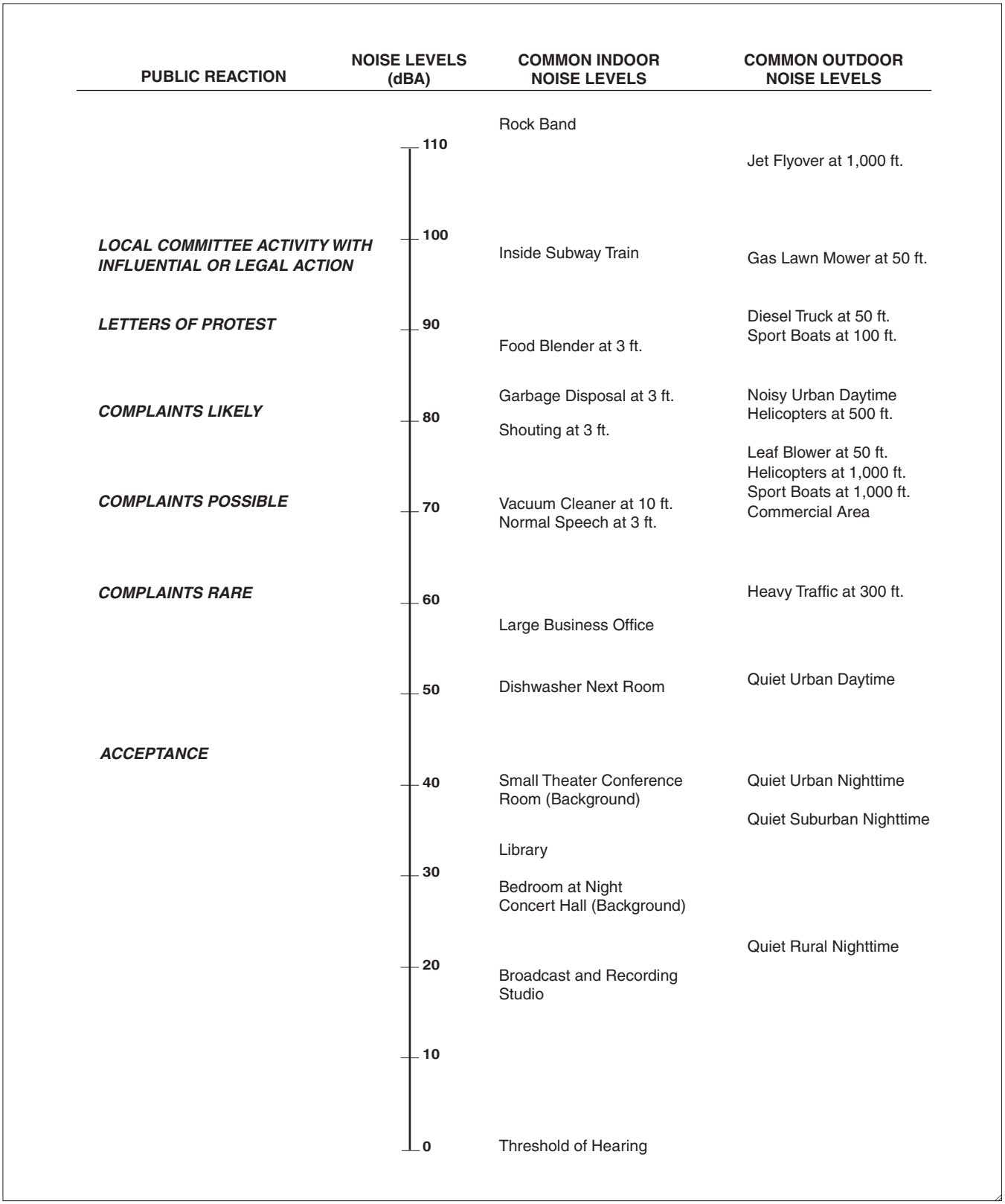
Sound. A vibratory disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.

Noise. Sound that is loud, unpleasant, unexpected, or otherwise undesirable.

Decibel (dB). A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.

A-Weighted Decibel (dBA). An overall frequency-weighted sound level in decibels which approximates the frequency response of the human ear.

Maximum Sound Level (L_{max}). The maximum sound level measured during the measurement period.



SOURCE: Caltrans Noise Manual California State Department of Transportation, March 1980.

Figure 3I-1
Common Noise Levels and Public Reactions

Minimum Sound Level (L_{min}). The minimum sound level measured during the measurement period.

Equivalent Sound Level (L_{eq}). The equivalent steady state sound level, which in a stated period of time would contain the same acoustical energy.

Percentile-Exceeded Sound Level (L_{xx}). The sound level exceeded x percent of a specific time period. L_{10} is the sound level exceeded 10 percent of the time.

Day-Night Level (L_{dn}). The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 PM to 7:00 AM to account for the increased sensitivity of some individuals to noise levels during nighttime hours.

Community Noise Equivalent Level (CNEL). The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 PM to 10:00 PM and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 PM to 7:00 AM. In general, CNEL is within 2 dBA of peak hour traffic noise levels as calculated utilizing the Federal Highway Traffic Noise Prediction Model.[1]

L_{dn} and CNEL values rarely differ by more than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment. In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving sound levels.

Effect of Noise on People

The effects of noise on people can be categorized as follows:

- Subjective effects such as annoyance, nuisance, dissatisfaction;
- Interference with activities such as speech, sleep, learning; and,
- Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience effects in the last category. There is no complete satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted; the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the

[1] CALTRANS Technical Noise Supplement, October 1998.

less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

> Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
>
> Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
>
> A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and,
>
> A 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion, hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA. Figure 3I-2 shows CNEL Noise and Land use compatibility Guidelines.

Noise Attenuation

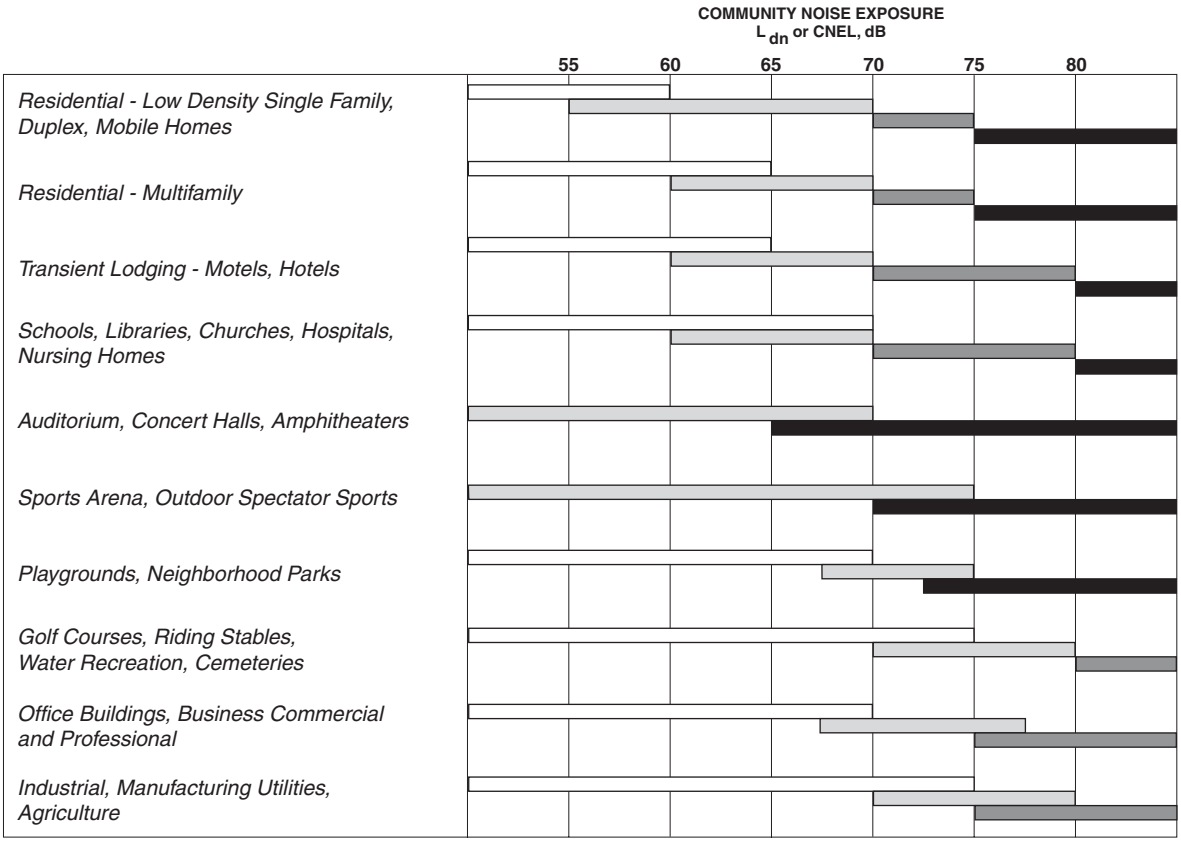
Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of 6 to 7.5 dBA per doubling of distance from the source, depending on environmental conditions (i.e., atmospheric conditions and noise barriers, either vegetative or manufactured, etc.). Widely distributed noise, such as a large industrial facility spread over many acres or a street with moving vehicles, would typically attenuate at a lower rate, approximately 4 to 6 dBA.

SETTING

Existing Noise Environment

The proposed project is located in the eastern portion of Los Angeles County in the City of San Dimas. The noise environment in the project area is dominated by noise from automobile traffic on freeways and local roads and trains along adjacent railroad tracks. Vehicle noise from Lone Hill Avenue and Gladstone Street, and train movements on the ATSF Rail Company right-of-way, which border the proposed project site, are the dominant noise source in the area.

Noise monitoring was conducted on the proposed project site on June 26, 2002 and June 3, 2003 to quantify existing conditions using a Metrosonics db-3080 sound level meter. Seven short-term measurements of 15-minute duration were conducted at different locations at the site. Table 3I-1 summarizes the noise monitoring results.



LEGEND:

NORMALLY ACCEPTABLE
Specified land use is satisfactory, based
upon the assumption that any building involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made.

Conventional construction, but with closed windows and
fresh air supply systems or air conditioning will normally suffice.

NORMALLY UNACCEPTABLE
New construction or development should
generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

SOURCE: California Department of Health. Guidelines for the Preparation and Content of Noise Elements of the General Plan. November 1990.

Figure 3I-2
Noise and Land Use Compatibility Matrix Guidelines

TABLE 3I-1: SUMMARY OF NOISE MONITORING

Position	Start Time	Duration (minutes)	Sound Level (dBA-Leq)	Sources
Lone Hill Avenue at Gladstone Street	10:30	15:00	64.5	Local traffic
West 5th Street at ATSF Rail Right-of-way	11:00	15:00	60.0	Local traffic
Center of Project Site	11:25	15:00	50.5	Train Horn, Dogs Barking
Lone Hill Avenue at West 5th Street	11:45	15:00	63.8	Local traffic
Lone Hill Avenue at Gladstone Street	12:05	15:00	66.7	Local traffic
Lone Hill Avenue at West 5th Street	12:30	15:00	66.5	Local traffic
West 5th Street at ATSF Rail Right-of-way	14:10	15:00	60.0	Local traffic

Source: Noise monitoring performed on June 26, 2002 and June 3, 2003 by ESA.

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residences, motels, hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, and parks and other outdoor recreation areas generally are more sensitive to noise than are commercial and industrial land uses.

There are a number of existing sensitive receptors located in close proximity to the proposed project site and along roadways providing access to and from the site. Sensitive receptors in the vicinity of the proposed project site include single-family residences located west, north, and east of the project site. The Gladstone Elementary School is located ¼-mile west of the proposed project site. No sensitive receptors are located south of the proposed project site. Figure 3H-1 in Chapter 3H shows the land use map of the project site area.

APPLICABLE REGULATIONS

Construction Impacts

The proposed project site is located within the City of San Dimas and is subject to the City of San Dimas Municipal Code and noise ordinances incorporated therein. Title 8, Chapter 8.36.100 of the San Dimas Code covers noise due to construction. It states that it is unlawful for any person to perform construction work within 500 feet of a residential zone between the hours of 8:00 p.m. and 7:00 a.m. or at any time on Sunday or any public holiday without obtaining a permit from the City.

Operational Impacts

The City of San Dimas Municipal Code Title 8 Chapter 8.36.040 outlines guidelines for noise/land use compatibility for development and planning purposes. A brief summary of the Noise Control ordinance is presented in Table 3I-2.

TABLE 3I-2: GUIDELINES FOR NOISE COMPATIBLE LAND USE

Day-Night Average Exterior Sound Level (CNEL dBA)

Designated Noise Zone Land Use	Time Interval	Exterior Noise Level
Noise-Sensitive Area	Anytime	45 dBA
Residential Properties	6:00 p.m. to 10:00 p.m.	45 dBA
	Night	40 dBA
	7:00 a.m. to 6:00 p.m.	50 dBA
Commercial Properties	6:00 p.m. to 10:00 p.m.	55 dBA
	Night	50 dBA
	7:00 a.m. to 6:00 p.m.	60 dBA
Industrial Properties	6:00 p.m. to 10:00 p.m.	60 dBA
	Night	55 dBA
	7:00 a.m. to 6:00 p.m.	70 dBA

Source: City of San Dimas Municipal Code, Title 8, Chapter 8.36, Section 8.36.040.

IMPACTS AND MITIGATION

Criteria for Determining Significance

The proposed project may result in a significant noise impact if it would:

- Expose existing receptors to or generate noise levels resulting from the project in excess of health standards established by the City noise ordinance;

- Expose future visitors to the proposed site to existing or projected noise levels in excess of established standards and thresholds (if existing noise levels currently exceed criteria, incremental changes in noise levels in excess of 3 dBA above existing noise would be considered significant);

- Result in excessive noise levels when measured at a distance of 50 feet from the noise source during construction activity occurring within 500 feet of a school zone or other sensitive noise receptor; or,

- Expose persons to or generate excessive groundborne vibration or groundborne noise levels.

Project Impacts

Impact 3I1: The proposed project would not expose persons to, or generate, noise levels in excess of standards established in the City Noise Ordinance.

Operational activities associated with the proposed project could generate noise. Operational noise sources include parking and traffic, restaurant and Costco operations, loading dock operation, and noise associated with the tire changing facility. The primary noise concern for siting a commercial operation in proximity to residences is noise associated with commercial support activities which include delivery truck operations, delivery truck unloading utilizing forklifts, backing alarms, and maintenance operations including parking lot sweeping, and trash pickup.

Noise measurements of diesel truck activity behind shopping centers has shown an average noise level of 65 dBA at 30 feet from a loading dock.[2] The closest sensitive receptor, located along Gladstone Street, would be located approximately 700 feet from the loading dock. Due to noise attenuation with distance, noise from loading dock operations would not be detectable over the ambient noise environment at the closest sensitive receptor. Due to the location of the loading dock, residences located along Lone Hill Avenue would be shielded from loading dock noise.

The tire center at the Costco store represents a potential noise source, especially during lug wrench operation. Tire service will be performed in an open door bay with the opening directed westward toward residences located on Lone Hill Avenue. Average noise measurements taken at a similar Costco tire changing facility in Tustin California recorded noise measurements of 59 dBA at 60 feet.[3] Due to the distance to local receptors, over 700 feet, and the intervening structures, noise from tire changing would not be discernable over the existing ambient noise environment at the closest sensitive receptors.

[2] Giroux & Associates, Noise Impact Analysis, Costco Store and Gas Station City of La Habra, August 20, 2002.
[3] *Ibid.*

Noise from cars utilizing parking facilities may be audible at nearby residences. Parking lot noise could include occasional car alarm noise, vehicle horns, vehicle doors/trunks opening and closing and people talking. Noise from parking lot activities would be attenuated primarily by distance from nearby residences. The closest residences are located approximately 200 feet west of the proposed parking lots. Assuming normal speech is measured at 60 dBA at 50 feet[4], which is equivalent to typical parking lot noise, a residence located 200 feet away would be exposed to 48 dBA (6 dBA reduction for every doubling of distance). A sound level Leq of 50.5 dBA was measured on the site on June 3, 2003. The calculated increase in noise level at this sensitive receptor would be less than 1 dBA, which is below the threshold of human perception.

Noises associated with restaurant operations include Heating Ventilation and Air Conditioning (HVAC) units, delivery trucks and general cooking noises. Restaurant operations are not anticipated to raise outdoor ambient noise levels significantly because they are primarily conducted indoors, and therefore, are at levels below the threshold of human perception.

In addition to operational activities, project-related traffic would increase ambient noise levels in the proposed project area. A project would have a significant impact on noise levels if it caused ambient noise levels at the property line to increase by 3 dBA in CNEL if existing ambient noise levels are 50 dBA or higher. If existing ambient noise levels are 50 dBA or lower, an increase of 5 dBA would be considered a significant impact.[5] As shown in Table 3I-3, calculated traffic noise levels on adjacent streets will not increase enough to constitute a significant impact. This analysis utilized the Federal Highway Administration Noise Prediction Model. The calculations include the project's contribution as well as ambient growth as calculated in Chapter 3K Transportation/Traffic. Noise calculations are included in Appendix D. Noise impacts from project-related traffic would not be considered significant.

TABLE 3I-3: COMPARISON OF AMBIENT NOISE LEVELS

Location			Existing P.M. Peak	Ambient Growth P.M. Peak	Ambient Growth plus Project P.M. Peak
Gladstone Street	Valley Center Ave	Lone Hill Ave	71.6 dBA	73.9 dBA	74.1 dBA
Lone Hill Ave	Arrow Highway	Gladstone Street	67.8 dBA	69.0 dBA	69.8 dBA
Gladstone Street	Crenshaw Blvd	North Amelia Ave	71.3 dBA	72.5 dBA	72.8 dBA

Source: Federal Highway Traffic Noise Prediction Model, December 1978

[4] Sound Levels and Human Response, U.S. EPA July 1973.
[5] Draft L.A. CEQA Thresholds Guide, City of Los Angeles, May 14, 1998.

Operations at the proposed project would not significantly affect the local ambient noise environment. However, implementation of the following mitigation measure would ensure a less than significant impact.

Mitigation Measures

M-3I.1 *Parking lot sweeping at the proposed Costco Commercial Complex shall not occur from 9:00 p.m. to 7:00 a.m.*

Residual Impacts

Less than significant with mitigation incorporated.

Impact 3I2: The proposed project would not result in excessive noise levels during construction activity occurring within 500 feet of a school zone or residence.

The proposed project may result in an increase in noise levels during construction that could affect sensitive noise receptors. Construction activities (including demolition) associated with the proposed project could intermittently generate noise levels from 90 dBA to 50 dBA on, and adjacent to, construction sites. Construction activities associated with the proposed project include grading and earthmoving activities, hauling materials, and building structures. Construction activity noise levels at and near the proposed project site would fluctuate depending on the particular type, number, and duration of uses of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes. In addition, certain types of construction equipment generate impulsive noises, which can be particularly annoying. Existing residences and other nearby noise-sensitive uses that could be exposed to construction noise are the single-family residences located within 200 feet to the north, east and west of the proposed project site.

Table 3I-4 summarizes typical noise levels during different construction stages. Table 3I-5 shows typical noise levels produced by equipment commonly used in construction projects. As indicated, equipment involved in construction is expected to generate noise levels ranging from 70 dBA–90 dBA at a distance of 50 feet. Noise produced by construction equipment would be reduced at a rate of about 6 decibels per doubling of distance. Measured background sound levels at the proposed project site are in the range of 50-65 dBA.

The City of San Dimas Municipal Code allows construction to occur between the hours of 7:00 a.m. and 8:00 p.m. Monday through Saturday. No work is to be done on Sundays and holidays. The proposed project will abide by these restrictions, and therefore, would have a less than significant impact. Implementation of the following mitigation measures would further reduce this impact.

Mitigation Measures

M-3I.2 *During construction, the contractor shall ensure that all construction be performed in accordance with the City of San Dimas noise standards. No noise intensive*

TABLE 3I-4: TYPICAL CONSTRUCTION NOISE LEVELS

Construction Phase	Noise Level (dBA, Leq[a])
Ground Clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89

a Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

Source: Bolt, Baranek, and Newman, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, 1971.

TABLE 3I-5: NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level (dBA, Leq at 50 feet)
Dump Truck	88
Portable Air Compressor	81
Concrete Mixer (Truck)	85
Scraper	89
Jack Hammer	88
Dozer	87
Paver	89
Generator	76
Pneumatic Tools	85
Concrete Pump	82
Backhoe	85

Source: Cunniff, *Environmental Noise Pollution*, 1977 and Federal Transit Administration, 1995.

construction or repair work shall be performed between the hours of 8:00 PM and 7:00 AM on any weekday or Saturday or at any time on Sundays or holidays.

M-3I.3 *During construction activities, the contractor shall locate portable equipment as far as possible from the adjacent residents.*

M-3I.4 *During construction phases, the contractor shall store and maintain equipment as far as possible from the adjacent residents.*

M-3I.5 *The contractor shall be restricted from playing loud music in the open construction area.*

M-3I.6 *During construction activities the construction manager shall serve as the contact person in the event that noise levels become disruptive to local residents. A sign will be posted at the proposed project site with the contact phone number.*

Residual Impacts

Impacts would be less than significant.

Impact 3I3: The proposed project would not expose persons to, or generate, excessive groundborne vibration or groundborne noise levels.

Construction activities such as excavation and grading have the potential to generate groundborne noise in the area of the proposed project site. However, the groundborne noise levels would be temporary in nature and would only occur during specified construction phases. This would be a less than significant impact.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

Impact 3I4: Together with other area projects the proposed project would not have cumulative noise impacts.

This analysis is based on the Cumulative Projects List provided in Chapter 2, Table 2-2 and the ambient growth analysis provided in Chapter 3K Transportation/Traffic. The listed projects include commercial/mixed-use and residential projects located within two miles of the project site that are currently under construction, approved but not built, or proposed for development.

Noise impacts from the construction and operation of the proposed project and other area projects would be localized and affect the immediate vicinity surrounding each project. Traffic noise would extend out from the proposed project and combine with the traffic from other projects to increase the local ambient noise environment. Utilizing ambient growth predictions, cumulative traffic noise was calculated to increase by 2.5 dBA over existing conditions. A 2.5 dBA increase is below the human threshold of perception in an uncontrolled environment. This would be considered a less than significant impact.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would not be cumulatively significant.