Appendix 9.10
Noise Data

Noise Impact Study

GARDENA T.O.D. PROJECT

Prepared for:
Din/Cal 4, Inc.

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EXECUTIVE SUMMARY

This Noise Impact Study (Study) analyzes potential short-term and long-term environmental noise impacts associated with the proposed Gardena T.O.D., a multi-family residential development (Project), located in the City of Gardena (City), California. The proposed Project includes a development of up to 265 residential dwelling units on Crenshaw Boulevard (south of El Segundo Boulevard), as shown in Figure 1 (on page 7). This Study has been prepared in support of the Project's application with the City of Gardena and environmental clearance pursuant to the requirements of the California Environmental Quality Act (CEQA).

Findings

The key findings of the noise analysis are as follows:

Construction Noise Impacts

- The estimated noise levels from the Project on-site temporary construction activities would temporarily increase ambient noise levels in the immediate vicinity of the Project Site. As specified in the City of Gardena Municipal Code (GMC) Section 8.36.080, construction activities are exempt from the noise standards, provided that construction activities do not take place between the hours of 6:00 p.m. and 7:00 a.m. on weekdays, between 6:00 p.m. and 9:00 a.m. on Saturday or any time on Sunday and Federal holiday. Project construction would comply with the City allowable construction hours of 7:00 a.m. to 6:00 p.m. on Monday through Friday and 9:00 a.m. to 6:00 p.m. on Saturday. However, the estimated construction noise levels would exceed the City's exterior noise standard (presumed daytime ambient noise level) at the adjacent residences east of the Project Site, by up to 20.5 dBA. Noise mitigation measure MM-1, as described below, would be implemented to reduce the Project construction-related at the residences east of the Project Site. However, the construction noise levels would still exceed the ambient noise levels. Therefore, due to the increased in ambient noise levels, it is conservatively concluded that impacts associated with Project on-site construction activities would remain significant and unavoidable.

- Noise generated by construction trucks along the anticipated haul route (Crenshaw Boulevard, between the Project Site and the I-105 Freeway) would be approximately 55 dBA L_{eq}. The estimated noise from off-site construction trucks would be lower than the calculated existing ambient noise levels along Crenshaw Boulevard, based existing traffic volume. As such, significant noise impacts would not be expected from off-site construction traffic.

Construction Vibration Impacts

The Project would generate ground-borne vibration associated with heavy construction equipment. However, the estimated vibration velocity levels from construction equipment would be below the significance criteria at all off-site sensitive receptors (human annoyance) and at nearest off-site buildings (building damage). Therefore, the on-site vibration impacts, pursuant to the significance criteria for both human annoyance and building damage, during construction of the Project would be less than significant.

Operation Noise Impacts

- On-site stationary noise sources including, but not limited to, building mechanical equipment, parking facility, trash compactor, and outdoor uses, were evaluated against the City's exterior noise standard. The estimated noise levels from on-site stationary noise sources would be below the Project significance thresholds at all off-site noise sensitive uses. Therefore, noise impacts associated with the Project on-site stationary sources would be less than significant.

- Off-site roadway traffic noise impacts were also analyzed based on traffic volumes provided by the Project Traffic Consultant (Fehr & Peers). Traffic volume from the Project would result in a maximum noise increase of 0.1 dBA CNEL and 0.2 dBA CNEL along 4th Street (between Pacific Avenue and Pine Avenue), respectively. The estimated increases in noise levels due to the Project traffic volumes would be below the 3 dBA CNEL significance thresholds, as existing ambient noise levels are greater than 60 dBA CNEL. Therefore, off-site traffic noise impacts associated with the Project would be less than significant.

- A composite noise analysis was performed to evaluate the noise impacts from all Project-related on-site noise sources. The Project estimate composite noise levels would range from 41.0 dBA L_{eq} at receptor R3 to 46.6 dBA L_{eq} at receptor R2, which would be below the 50.0 dBA significance thresholds. Therefore, the composite noise level impacts due to Project operation would be less than significant.

In summary, the Project would not result in any significant noise and vibration impacts associated with the temporary construction and long-term operations. In addition, the cumulative construction and operation noise and vibration impacts from the Project and related projects in the vicinity of the Project Site would be less than significant.

1 INTRODUCTION

This Noise Impact Study (Study) has been prepared to evaluate potential noise impacts associated with the proposed Gardena T.O.D. project (Project), located in the City of Gardena (City), California. This Study has been prepared in support of the Project's application with the City of Gardena and environmental clearance pursuant to the requirements of the California Environmental Quality Act (CEQA).

1.1 Project Description

The proposed Project includes a development of up to 265 residential dwelling units located on Crenshaw Boulevard, approximately 120 feet south of El Segundo Boulevard, in the City of Gardena, as shown in Figure 1 (on page 7). The proposed Project would replace the existing commercial building and open parking lot.

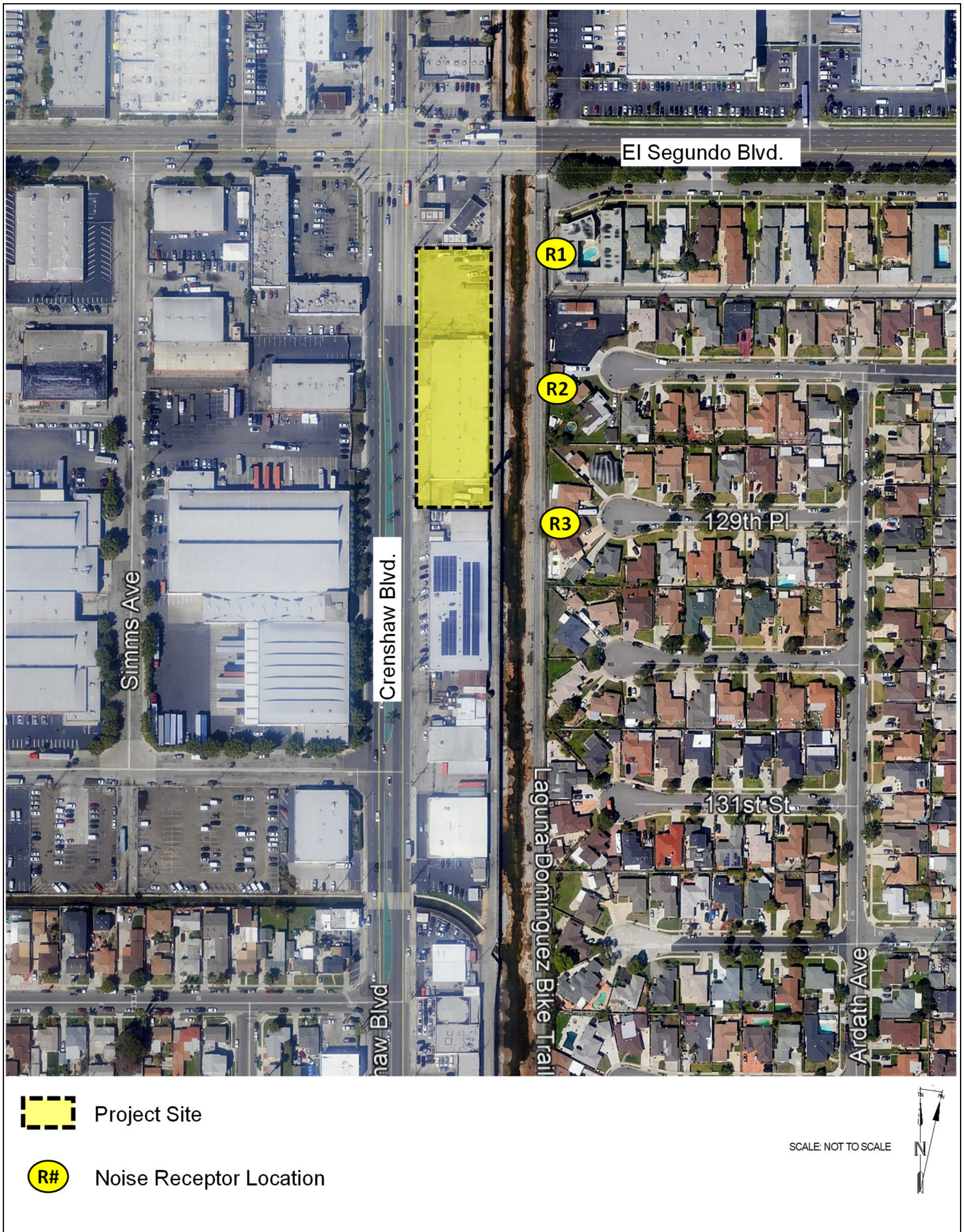
1.2 Purpose

The objectives of this noise study are to:

a) Evaluate the Project construction-related noise impacts on noise sensitive uses in the vicinity of the Project Site.

b) Determine potential Project operation-related on-site stationary sources (i.e., mechanical equipment, parking operation, trash compactor, and outdoor uses) and off-site mobile sources (auto traffic) noise impacts on existing off-site noise sensitive uses.

c) Evaluate noise mitigations measures to avoid or reduce the potential noise impacts to less than significant levels.



Source: Google Map, 2020

Figure 1. Project Site Map

2 ENVIRONMENTAL SETTING

2.1 Fundamentals of Sound and Environmental Noise

Noise is commonly defined as sound that is undesirable because it interferes with speech communication, and hearing, causes sleep disturbance, or is otherwise annoying (unwanted sound). The decibel (dB) is a conventional unit for measuring the amplitude of sound because it accounts for the large variations in sound pressure amplitude and reflects the way people perceive changes in sound amplitude.[1] The human hearing system is not equally sensitive to sound at all frequencies. Therefore, to approximate this human frequency-dependent response, the A-weighted filtering system is used to adjust measured sound levels (dBA). The term "A-weighted" refers to filtering the noise signal in a manner that corresponds to the way the human ear perceives sound. Examples of various sound levels in different environments are provided in Table 1 (on page 9).

Generally, people judge the relative magnitude of sound sensation by subjective terms such as "loudness" or "noisiness." To the normal hearing a change in sound level of 3 dB is considered "just perceptible," a change in sound level of 5 dB is considered "clearly noticeable," and a change (i.e., increase) of 10 dB is generally recognized as "twice as loud."[2]

2.1.1 Outdoor Sound Propagation

In an outdoor environment, sound levels attenuate (reduce) through the air as a function of distance. Such attenuation is commonly referred to as "distance loss" or "geometric spreading," and is based on the noise source configuration (e.g., point source, or line source). For a point source, such as a piece of mechanical/electrical/construction equipment (e.g., air conditioner, electrical transformer, or bull dozer) the rate of sound attenuation is about 6 dB per doubling of distance from the noise source. For example, an outdoor condenser fan that generates a sound level of 60 dBA at a distance of five feet would attenuate to 54 dBA at a distance of 10 feet. For a line source, such as a constant flow of traffic on a roadway, the rate of sound attenuation is about 3 dB per doubling of distance.[3]

In addition, structures (e.g., buildings and solid walls) and natural topography (e.g., hills) that obstruct the line-of-sight between a noise source and a receptor further reduce the noise level if the receptor is located within the "shadow" of the obstruction, such as behind a sound wall. This type of sound attenuation is known as "barrier insertion loss." If a receptor is located behind the wall but still has a view of the source (i.e., line-of-sight is not fully blocked), some barrier insertion loss would still occur, however to a lesser extent. Additionally, a receptor located on the same side of the wall as a noise source may actually experience an increase in

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[1] *All sound levels measured in decibel (dB) in this study are relative to $2x10^{-5}$ N/m^2.*

[2] *Caltrans, Technical Noise Supplement (TeNS), Table 2.10, 2013.*

[3] *Caltrans, Technical Noise Supplement (TeNS), Chapter 2.1.4.1, 2013.*

the perceived noise level as the wall reflects noise back to the receptor, thereby compounding the noise. Outdoor noise barriers can provide noise level reductions ranging from approximately 5 dBA (where a barrier just breaks the acoustic line-of-sight between the noise source and receiver) to an upper range of 20 dBA with a more substantial barrier.[4]

Table 1. Typical Noise Levels

Common Outdoor Activities	Noise Levels, dBA	Common Indoor Activities
	110	Rock Band
Jet Fly-over at 1000 feet		
	100	
Gas Lawn Mower at 3 feet		
	90	
Diesel Truck at 50 feet at 50 mph		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
Gas Lawn Mower at 100 feet	**70**	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	**60**	
		Large Business Office
Quiet Urban Daytime	**50**	Dishwasher Next Room
Quiet Urban Nighttime	**40**	Theater, Large Conference Room
Quiet Suburban Nighttime		(Background)
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall
	20	(Background)
		Broadcast/Recording Studio
	10	
	0	
Source: Caltrans, Technical Noise Supplement (TeNS), Table 2-5, 2013		

2.1.2 Environmental Noise Descriptors

Several rating scales have been developed to analyze the adverse effect of community noise on people. Since environmental noise fluctuates over time, these scales consider the total acoustical energy content, as well as the time and duration of occurrence. The most frequently used noise descriptors, including those used by the City, are summarized below.

[4] *Caltrans, Technical Noise Supplement (TeNS), Chapter 2.1.4.4, 2013.*

Equivalent Sound Level (L_{eq}). L_{eq} is a measurement of the acoustic energy content of noise averaged over a specified time period. Thus, the L_{eq} of a time-varying sound and that of a steady sound are the same if they deliver the same amount of energy to the receptor's ear during exposure. L_{eq} for one-hour periods, during the daytime or nighttime hours, and 24 hours are commonly used in environmental noise assessments. L_{eq} can be measured for any time period, but is typically measured for an increment of no less than 15 minutes for environmental studies. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during day or night.

Community Noise Equivalent Level (CNEL). CNEL is the time average of all A-weighted sound levels for a 24-hour day period with a 10 dBA adjustment (increase) added to the sound levels that occur in the nighttime hours (10:00 p.m. to 7:00 a.m.) and a 5 dBA adjustment (increase) added to the sound levels that occur in the evening hours (7:00 p.m. to 10:00 p.m.). These penalties attempt to account for increased human sensitivity to noise during the quieter nighttime periods, when the ambient background noise is less and where sleep is the most probable activity. In comparison, the 24-hour CNEL is approximately equal to the L_{eq} plus 7 dBA, for noise sources that is constant throughout the day, such as, mechanical equipment operating on a 24-hour basis. CNEL has been adopted by the State of California to define the community noise environment for development of the community noise element of a General Plan and is also used by the City of Gardena for land use planning.[5]

2.2 Ground-borne Vibration

Vibration is commonly defined as an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The peak particle velocity (PPV) or the root-mean square (RMS) velocity is usually used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak of the vibration signal and is typically used for evaluating potential building damage.[6] The RMS velocity is defined as the square-root of the average of the squared amplitude of the vibration signal and is used for evaluating human response to ground-borne vibration.[7] Ground-borne vibration generated by man-made activities (e.g., road traffic, construction operations) typically weakens with greater horizontal distance away from the source of the vibration. The vibration impact studies show in most circumstances common ground-induced vibrations related to roadway traffic and construction activities pose no threat to buildings or structures.[8,9]

[5] *State of California, General Plan Guidelines, 2017.*

[6] *Vibration levels described in this report are in terms peak particle velocity level in the unit of inches per second.*

[7] *FTA, "Transit Noise and Vibration Impact Assessment," Chapter 7, May 2006.*

[8] *FTA, "Transit Noise and Vibration Impact Assessment," Chapter 7, May 2006.*

[9] *Caltrans, "Transportation Related Earthborne Vibrations," February 2002.*

2.3 Applicable Noise Regulations

Various government agencies have established noise regulations and policies to protect citizens from potential hearing damage and other adverse effects associated with noise and ground-borne vibration. An overview of the State and City regulations and policies that are relevant to construction and operation of the Project is provided below. The City of Gardena has adopted a number of regulations and policies, which are based in part on federal and state regulations and are intended to control, minimize, or mitigate environmental noise effects. The Noise Element of the City of Gardena General Plan (General Plan) includes a number of goals, objectives, and policies for land use planning purposes. The City also has regulations to control unnecessary, excessive, and annoying noise, as set forth in the Gardena Municipal Code (GMC) Chapter 8.36.

2.3.1 City of Gardena General Plan Community Safety Element, Noise Plan

The City of Gardena General Plan, Noise Plan provides establishes goals, policies, and programs so that residents in the City will be protected from excessive noise.[10] The City has adopted noise compatibility guidelines for general land use planning. The types of land uses the acceptable noise categories for each land use are included in the City Noise Plan. The level of acceptability of the noise environment is dependent upon the activity associated with the particular land use. Table 2 (on page 12) provides the exterior noise standard associated with various land uses, as provided in the City Noise Plan. According to the City, an exterior noise environment up to 65 dBA CNEL is "conditionally acceptable" for single- and multi-family residential uses. In addition, noise levels up to 75 dBA CNEL are "normally unacceptable", while noise levels at 75 dBA CNEL and above are "clearly unacceptable" for residential.

[10] *City of Gardena, General Plan Noise Element, 2006.*

Table 2. City of Gardena Noise Land Use Compatibility

Land Use	Community Exposure Level, CNEL (dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential: Single-Family, Multi-family, Duplex	50 to 60	60 to 65	65 to 75	Above 75
Residential: Mobile Homes	50 to 60	60 to 65	65 to 75	Above 75
Transient Lodging: Motels, Hotels	50 to 60	60 to 70	70 to 80	Above 80
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 to 70	60 to 65	65 to 75	Above 75
Auditoriums, Concert Halls, Amphitheaters, Meeting Halls	NA	50 to 60	60 to 70	Above 70
Sports Arena, Outdoor Spectator Sports, Amusement Parks	50 to 65	65 to 75	NA	Above 75
Playgrounds, Neighborhood Parks	50 to 65	65 to 70	70 to 75	Above 75
Golf Courses, Riding Stables, Cemeteries	50 to 75	70 to 75	Above 75	NA
Office and Professional Buildings	50 to 65	65 to 75	75 to 80	Above 80
Commercial Retail, Banks, Restaurants, Theaters	50 to 70	70 to 80	Above 80	NA
Industrial, Manufacturing, Utilities, Wholesale, Service Station	50 to 70	Above 70	NA	NA
Agriculture	50 to 80	NA	NA	NA

Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings 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 and needed noise insulation features included in the design. 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: City of Gardena, General Plan Community Safety Element, Noise Plan, Figure N-1, 2006.

2.3.2 City of Gardena Municipal Code

GMC Chapter 8.36 establishes acceptable ambient sound levels to regulate intrusive noises and provides procedures and criteria for the measurement of the sound level of noise sources. The GMC provides exterior noise limits for various type of land uses. Table 3 (on page 13) provides the allowable exterior noise levels in terms of 15-minute average noise level ($L_{eq\text{-}15min}$) and maximum noise level (L_{max}).

Table 3. City of Gardena Exterior Noise Limits

Type of Land Use	15-minute Average Noise Level, dBA (L_{eq})		Maximum Noise Level, dBA (Lmax)	
	7 a.m. - 10 p.m.	10 p.m. - 7 a.m.	7 a.m. - 10 p.m.	10 p.m. - 7 a.m.
Residential	55	50	75	70
Residential portions of mixed-use	60	50	80	70
Commercial	65	60	85	80
Industrial or manufacturing	70	70	90	90
Source: GMC Section 8.36.040				

In accordance with the GMC Section 8.36.040.C, if the existing measured ambient level exceeds the noise standard, the ambient noise level shall become the noise standard.

GMC Section 8.36.080 Exemptions—The provisions of the City noise standard shall not apply to the following:

Item G - Noise associated with construction, repair, remodeling, grading or demolition of any real property, provided said activities do not take place between the hours of 6:00 p.m. and 7:00 a.m. on weekdays, between the hours of 6:00 p.m. and 9:00 a.m. on Saturdays or anytime on Sunday or Federal holiday.

Item H – Operation of refuse and recyclable collection vehicles, provided:

1. Collection of residential refuse/recyclables does not occur between the hours of 6:00 p.m. and 7:00 a.m. on weekdays, or at any time on weekend or holiday, except as provided below.
2. Collection from commercial premises, audible in residential areas, and which does not occur between the hours of 6:00 p.m. and 7:00 a.m. on weekdays, or at any time on a weekend or holiday, except as provided below.
3. When a collection day occurs on a holiday, alternative collections may be made on the following Saturday, between the hours of 7:00 a.m. and 6:00 p.m.

2.4 Applicable Vibration Standards

GMC Section 8.36.070 prohibits the operation of any device that creates vibration which is above the vibration perception threshold of an individual at or beyond the real property boundary of the source if on private property or at 150 feet from the source if on a public space or public right-of-way. The vibration perception threshold as defined by the GMC is 0.01 in/sec over the range of 1 to 100 Hz.

2.5 Existing Ambient Noise Levels

Some land uses are considered more sensitive to intrusive noise than others based on the types of activities typically involved at the receptor location. Typically, noise-sensitive uses include residences, transient lodgings, schools, libraries, churches, hospitals, nursing homes, auditoriums, concert halls, amphitheaters, playgrounds, and parks. Based on a review of the land uses in the Project area, the nearest noise sensitive receptors are the single- and multi-family residential uses located approximately 110 feet east of the Project Site. A total of three off-site noise receptor locations were selected to represent noise sensitive uses surrounding the Project area. The locations of the three off-site noise-sensitive receptors are described in Table 4 (below) and shown on Figure 1 (on page 7), as R1 through R3. The existing ambient noise environment at the off-site noise sensitive uses are based on the City established exterior noise standards for single- and multi-family residential uses, as ambient noise measurements are not available, due to the current shelter in place (from the Covid-19 conditions).

Table 4. Existing Ambient Noise Levels

Receptor Location	Approximate Distance to Project Site,[a] Feet	Ambient Noise Levels,[b] dBA L_{eq}	
		Daytime Hours (7 a.m. to 10 a.m.)	Nighttime Hours (10 p.m. to 7 a.m.)
R1 – Multi-family residential use located at 2936 El Segundo Boulevard, north east of the Project Site	120	55	50
R2 – Single-family residential use at the cul-de-sac of W 129th Street, east of the Project Site	100	55	50
R3 – Single-family residential use at the cul-de-sac of 129th Place, southeast of the Project Site	100	55	50

[a] *Distances are estimated based on Google Earth map and are referenced to the Project nearest boundary.*
[b] *Ambient noise levels are based on the City's exterior noise standard (see Table 3 on page 13).*
Source: AES, 2020

3 IMPACT ANALYSIS

3.1 Methodology

3.1.1 Temporary Construction Noise

Construction noise impacts due to on-site construction activities associated with the Project were evaluated by calculating the construction-related noise levels at representative sensitive receptor locations and comparing these estimated construction-related noise levels associated with construction of the Project to the existing ambient noise levels (i.e., noise levels without construction noise from the Project). Construction noise associated with the Project was analyzed based on the Project's potential construction equipment inventory, construction durations, and construction schedule. The construction equipment noise levels are based on the published noise data (equipment source levels) by Federal Highway Administration (FHWA) "Roadway Construction Noise Model (FHWA 2006)". The construction noise levels were then calculated for sensitive receptor locations based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance.

In addition, the construction-related off-site trucks noise impacts were analyzed using the FHWA's Traffic Noise Model (TNM). The TNM noise model calculates the hourly L_{eq} noise levels generated by construction-related trucks. Noise impacts were determined by comparing the predicted noise level with that of the existing ambient noise levels.

3.1.2 Temporary Construction Vibration

Ground-borne vibration impacts due to the Project's construction activities were evaluated by identifying potential vibration sources (i.e., construction equipment), estimating the vibration levels at the potentially affected receptors, and comparing the Project's activities to the applicable vibration significance thresholds, as described below.

3.1.3 Operation Noise

Off-site roadway noise was analyzed using the FHWA's TNM, based on the roadway traffic data provided in the Project's transportation study. The TNM is the current Caltrans standard computer noise model for traffic noise studies. The model allows for the input of roadway parameters, noise receivers, and sound barriers (if any). Roadway noise attributable to the project "existing plus project" was calculated and compared to "existing without project" noise levels to determine project noise impacts.

On-site stationary point-source noise impacts were evaluated by (1) identifying the noise levels that would be generated by the Project's stationary noise sources, such as rooftop mechanical equipment, outdoor activities (e.g., use of the outdoor courtyard), parking facilities, and trash compactor; (2) calculating the noise level from each noise source at surrounding sensitive receptor property line locations; and (3) comparing such noise levels to ambient noise levels to determine significance. The on-site stationary noise sources were calculated using the SoundPLAN, a 3-dimensional computer noise prediction model.

3.2 Thresholds of Significance

The Project thresholds of significance are based on the State CEQA Guidelines. In accordance with the State CEQA Guidelines Appendix G, the Project would have a significant impact related to noise if it would result in the:

Threshold (a): Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; or

Threshold (b): Generation of excessive groundborne vibration or groundborne noise levels; or

Threshold (c): For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

3.3 Project Design Feature

The Project outdoor pool/courtyard at Level 3 would include the use of amplified sound system. The following Project Design Features would be implemented as part of the Project to ensure the noise impacts associated with the use of amplified sound system would be less than significant.

Project Design Feature PDF-1: The amplified sound system at the Level 3 pool deck/courtyard shall be designed so as not to exceed a maximum noise level of 85 dBA (L_{eq}) at a distance of 25 feet from the amplified sound system.

3.4 Project Impacts

Threshold (a): Would the Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

3.4.1 Temporary Construction Noise

Noise impacts from Project construction activities would be a function of the noise generated by construction equipment, the location of the equipment, the timing and duration of the noise-generating construction activities, and the relative distance to noise-sensitive receptors. Construction activities for the Project would generally include demolition, site grading, building construction, and landscaping. Each stage of construction would involve the use of various types of construction equipment and would, therefore, have its own distinct noise characteristics. Demolition generally involves the use of backhoes, front-end loaders, and heavy-duty trucks. Grading and excavation typically require the use of earth-moving equipment, such as excavators, front-end loaders, and heavy-duty trucks. Building construction typically involves the use of forklifts, concrete trucks, concrete pumps, and delivery trucks. Noise from construction equipment would generate both steady-state and episodic noise that could be heard within and adjacent to the Project Site. Construction of the

Project is anticipated to take approximately 27 months, starting in July 2021, and completed in September 2023.

Individual pieces of construction equipment that would be used for construction produce maximum noise levels of 74 dBA to 81 dBA at a reference distance of 50 feet from the noise source, as shown in Table 5 (below). The construction equipment noise levels at 50 feet distance (Referenced Maximum Noise Levels) are based on the FHWA Roadway Construction Noise Model User's Guide (RCNM, 2006), which is a technical report containing actual measured noise data for construction equipment. These maximum noise levels would occur when equipment is operating under full power conditions (i.e., the equipment engine at maximum speed). However, equipment used on construction sites often operates under less than full power conditions, or part power. To more accurately characterize construction-period noise levels, the average (Hourly L_{eq}) noise level associated with each construction stage is calculated based on the quantity, type, and usage factors for each type of equipment that would be used during each construction stage.[11] These noise levels are typically associated with multiple pieces of equipment operating simultaneously.

Table 5. Construction Equipment Noise Emission Reference Levels and Usage Factors

Type of Equipment	Acoustical Usage Factor (%)	Reference Maximum Noise Levels at 50 Feet,[a] L_{max} (dBA)
Backhoe	40	78
Concrete Mixer Truck	40	79
Concrete Pump Truck	20	81
Forklift	20	75
Generator	50	81
Dump/Haul Truck	40	76
Excavator	40	81
Man Lift	20	75
Roller	20	80
Rubber Tired Loader	40	79
Delivery Truck	40	74
Welders	40	74

[a] Construction equipment noise levels are based on the FHWA RCNM.
Source: FHWA Roadway Construction Noise Model User's Guide, Table 1, 2006

Table 6 (on page 18) provides the estimated construction noise levels for various construction phases at the off-site noise sensitive receptors. To present a conservative impact analysis, the estimated noise levels were calculated for a scenario in which all pieces of construction

11 Pursuant to the FHWA Roadway Construction Noise Model User's Guide, 2005, the usage factor is the percentage of time during a construction noise operation that a piece of construction is operating at full power.

equipment were assumed to operate simultaneously and be located at the construction area nearest to the affected receptors. These assumptions represent the worst-case noise scenario because construction activities would typically be spread out throughout the Project Site, and, thus, some equipment would be farther away from the affected receptors. As specified in the GMC Section 8.36.080, construction activities are exempt from the noise standards, provided that construction activities do not take place between the hours of 6:00 p.m. and 7:00 a.m. on weekdays, between 6:00 p.m. and 9:00 a.m. on Saturday or any time on Sunday and Federal holiday. Project construction would comply with the City allowable construction hours of 7:00 a.m. to 6:00 p.m. on Monday through Friday and 9:00 a.m. to 6:00 p.m. on Saturday. As described above, the GMC does not have a quantitative construction noise limit (i.e., increase over ambient level). However, the estimated construction noise levels would exceed the City's exterior noise standard (presumed daytime ambient noise level) at the adjacent residences east of the Project Site, by up to 20.5 dBA. Noise mitigation measure MM-1, as described below, would provide approximately 10 dBA noise reduction, which is substantial noise reduction for the residences east of the Project Site. However, the construction noise levels would still exceed the ambient noise levels. Therefore, due to the increased in ambient noise levels, it is conservatively concluded that impacts associated with Project on-site construction activities would remain significant and unavoidable.

Table 6. Construction Noise Levels

	Estimated Noise Levels by Construction Phase,[a] dBA (L_{eq})					
Location	**Demolition**	**Grading**	**Foundation/ Slab**	**Podium/ Garage**	**Building Construction**	**Paving/ Landscape**
R1	72.6	74.5	72.3	71.4	63.4	60.4
R2	73.8	75.5	73.4	72.5	64.6	61.6
R3	73.4	75.2	73.1	72.1	64.2	61.2

[a] *Detailed calculation worksheets, are included in Appendix A.*
Source: AES, 2020

In addition to on-site construction noise sources, materials delivery, concrete mixing, and haul trucks (construction trucks), and construction worker vehicles would require access to the Project Site during the Project construction period. The major noise sources associated with off-site construction trucks would be from haul trucks during the site grading/excavation (for import and export), which would require approximately 24 daily truck trips (12 incoming trips and 12 outgoing trips). Construction-related trucks would be fewer during other construction phases with up to 10 delivery truck trips per day. Therefore, the noise analysis is based on the peak period (site grading phase) with a maximum of 24 truck trips per day. Based on an eight-hour haul period and a uniform distribution of trips, there would be 3 truck trips per hour. Haul trucks would generally access the Project Site via Crenshaw Boulevard to the I-105 Freeway.

The off-site construction trucks would generate noise levels of approximately 55 dBA L_{eq} along Crenshaw Boulevard between the Project Site and the I-105 Freeway. The estimated noise from off-site construction trucks would be lower than the existing ambient noise levels along Crenshaw Boulevard, based on existing traffic volume. As such, significant noise impacts would not be expected from off-site construction traffic.

3.4.2 Operation Noise

Noise associated with the Project operation would include: (a) on-site stationary noise sources, including outdoor mechanical equipment (e.g., HVAC equipment), activities within the proposed outdoor spaces (e.g., outdoor pool deck and courtyard), parking facilities, loading and trash compactor; and (b) off-site mobile (roadway traffic) noise sources.

3.4.2.1 Mechanical Equipment

The Project would include new mechanical equipment (e.g., air ventilation equipment), which would be located at the roof level and/or within the building structure. Project-related outdoor mechanical equipment would be designed to comply with the GMC, which limits the noise from the mechanical equipment to not exceed the City's exterior noise standards. Table 7 (below) presents the estimated on-site mechanical equipment noise levels at the off-site receptor locations. As shown on Table 7, the estimated noise levels from the mechanical equipment would range from 25.1 dBA (L_{eq}) at receptor location R1 to 26.6 dBA (L_{eq}) at receptor location R2, which would be below the Project significance thresholds. As such, noise impacts from the Project mechanical equipment would be less than significant.

Table 7. Mechanical Equipment Noise Levels

Receptor Location	Ambient Noise Levels,[a] dBA (L_{eq})	Estimated Noise from Project Mechanical Equipment,[b] dBA (L_{eq})	Significance Threshold,[c] dBA (L_{eq})	Exceed over Significance Threshold	Significant Impact?
R1	50.0	25.1	50.0	0.0	No
R2	50.0	26.6	50.0	0.0	No
R3	50.0	25.5	50.0	0.0	No

Notes:
[a] *Based on City nighttime exterior noise limits.*
[b] *Noise levels associated with the Project outdoor mechanical equipment were calculated based on manufacturer's published sound data for typical outdoor condenser units. Detailed calculation worksheets, are included in Appendix B.*
[c] *Significance thresholds are equivalent to the City's permissible exterior noise limits.*
Source: AES, 2020.

3.4.2.2 Outdoor Spaces

The Project would include several common outdoor spaces, including: an outdoor pool/courtyard at Level 3, and two small courtyards at Level 4. Noise sources associated with outdoor uses typically include noise from people gathering and conversing. For this operational noise analysis, reference noise levels of 65 dBA for a male and 62 dBA for a female speaking in a raised voice were used for analyzing potential noise impacts from people gathering at the outdoor spaces.[12] Another potential noise source associated with the outdoor spaces would be the possible use of an outdoor amplified sound system. The amplified sound system may be used for background music and intended to be heard by people in the immediate vicinity of the pool deck/courtyard. The amplified sound system would be designed so as not to exceed a maximum noise level of 85 dBA (L_{eq}) at a distance of 25 feet from the amplified sound system at the Level 3 pool deck/courtyard, thereby ensuring amplified sound would not exceed the significance threshold at any off-site noise-sensitive receptors. No amplified sound anticipated for the Level 4 courtyard. In addition, the hours of operation for use of the outdoor areas were assumed to be from 9:00 A.M. to 10:00 P.M.

Table 8 (below) presents the estimated noise levels at the off-site sensitive receptors, resulting from the use of outdoor areas. The estimated noise levels were calculated with the assumption that the outdoor spaces would be fully occupied and operating concurrently to represent a worst-case noise analysis. As presented in Table 8, the estimated noise levels from the outdoor spaces would range from 34.9 dBA (L_{eq}) at receptor location R3 to 43.0 dBA (L_{eq}) at receptor location R2, which would be below the Project significance thresholds. Therefore, noise impacts from the outdoor uses would be less than significant.

Table 8. Outdoor Uses Noise Levels

Receptor Location	Ambient Noise Levels,[a] dBA (L_{eq})	Estimated Noise from Outdoor Uses,[b] dBA (L_{eq})	Significance Threshold,[c] dBA (L_{eq})	Exceed over Significance Threshold	Significant Impact?
R1	50.0	40.0	50.0	0.0	No
R2	50.0	43.0	50.0	0.0	No
R3	50.0	34.9	50.0	0.0	No

Notes:
[a] *Based on City nighttime exterior noise limits.*
[b] *Detailed calculation worksheets, are included in Appendix B.*
[c] *Significance thresholds are equivalent to the City's permissible exterior noise limits.*
Source: AES, 2020.

3.4.2.3 Parking Facilities

Parking for the Project would be provided within three parking levels, with a total of approximately 267 parking spaces. The parking structure would be naturally ventilated along the east and west sides. The parking structure would include a 3-ft high parapet walls along

[12] *Cyril M. Harris, Handbook of Acoustical Measurements and Noise Control, Table 16.1, Third Edition, 1991.*

the east and west sides. Table 9 (below) presents the estimated noise levels from parking structure at the off-site receptor locations. As indicated in Table 9, the estimated noise levels from the Project parking garage would be well below the Project significance thresholds. Therefore, noise impacts from the parking garage would be less than significant.

Table 9. Parking Facilities Noise Levels

Receptor Location	Ambient Noise Levels,[a] dBA (L_{eq})	Estimated Noise from Project Parking,[b] dBA (L_{eq})	Significance Threshold,[c] dBA (L_{eq})	Exceed over Significance Threshold	Significant Impact?
R1	50.0	39.2	50.0	0.0	No
R2	50.0	44.0	50.0	0.0	No
R3	50.0	39.7	50.0	0.0	No

Notes:
[a] *Based on City nighttime exterior noise limits.*
[b] *Detailed calculation worksheets, are included in Appendix B.*
[c] *Significance thresholds are equivalent to the City's permissible exterior noise limits.*
Source: AES, 2020.

3.4.2.4 Trash Compactor

The Project trash compactor would be located within an enclosed room inside Level 1 parking. at the interior of the buildings by the loading areas. The noise levels from the trash compactor operation would be effectively shielded to the off-site sensitive receptor locations. Therefore, noise impacts from the trash compactor operations would be less than significant.

3.4.2.5 Off-Site Traffic

The Project is expected to generate a total of 1,370 net daily trips.[13] Project-generated traffic noise impacts were evaluated by comparing the increase in noise levels from the "existing" condition to the "existing plus project" condition with the Project's significance threshold. Traffic noise levels at the off-site noise sensitive receptors were calculated using FHWA's Traffic Noise Model and the Project's traffic volume data. The traffic noise impact analysis is based on the 24-hour CNEL noise descriptor.

Table 10 (on page 22) provides a summary of the off-site traffic noise analysis. As shown in Table 10, traffic from the Project would result in a maximum noise increase of 0.1 dBA CNEL and 0.2 dBA CNEL along El Segundo Boulevard (between Crenshaw Boulevard and Van Ness Avenue) and along Crenshaw Boulevard (between El Segundo Boulevard and W 135th Street). The estimated noise increases are considered negligible. Therefore, off-site traffic noise impacts associated with the Project would be less than significant.

[13] *Fehr & Peers Transportation Consultants, email dated 5/1/2020.*

Table 10. Off-Site Roadway Traffic Noise Impacts

Roadway Segment	Estimated Traffic Noise Levels,[a] CNEL		Increase in Noise Levels, CNEL	Significant Impact?
	Existing	Existing + Project		
Crenshaw Boulevard - Between El Segundo Blvd. and W 135th St.	69.8	70.0	0.2	No
El Segundo Boulevard - Between Crenshaw Blvd. and Van Ness Ave.	68.9	69.0	0.1	No
W 135th Street - Between Crenshaw Blvd. and Van Ness Ave.	67.3	67.3	0.0	No

[a] *Detailed calculation worksheets, are included in Appendix B.*
Source: AES, 2020.

3.4.2.6 Composite Noise Impacts from Project Operations

An evaluation of composite noise levels, including all Project related noise sources, was conducted to identify the potential maximum Project-related noise level increase that may occur at the Project noise-sensitive receptor locations. The overall sound environment at the areas surrounding the Project Site would include contributions from each on-site individual noise source associated with the typical daily operation of the Project. Principal on-site noise sources associated with the Project would include mechanical equipment, parking facility, and outdoor uses. Table 11 (below) presents the estimated composite noise levels from Project-related noise sources. As indicated in Table 11, the Project composite noise levels would range from 41.1 dBA at receptor R3 to 46.6 dBA at receptor R2, which would be below the 50.0 dBA significance thresholds. Therefore, the composite noise level impacts due to Project operation would be less than significant.

Table 11. Composite Noise Impacts

Receptor Location	Ambient Noise Levels,[a] dBA (L_{eq})	Calculated Project-Related Noise Levels, L_{eq} (dBA)			Project Composite Noise Levels, L_{eq} (dBA)	Significance Threshold,[c] dBA (L_{eq})	Significant Impact?
		Mechanical	Outdoor Uses	Parking			
R1	50.0	25.1	40.0	39.2	42.7	50.0	No
R2	50.0	26.6	43.0	44.0	46.6	50.0	No
R3	50.0	25.5	34.9	39.7	41.1	50.0	No

Notes:
[a] *Based on City nighttime exterior noise limits.*
[b] *Detailed calculation worksheets, are included in Appendix B.*
[c] *Significance thresholds are equivalent to the City's permissible exterior noise limits.*
Source: AES, 2020.

Threshold (b): Would the Project result in the exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?

3.4.3 Temporary Construction Vibration

Construction activities can generate varying degrees of ground vibration, depending on the construction procedures and the type of construction equipment used. The operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies, depending on soil type, ground strata, and construction characteristics of the receptor buildings.

The Project would generate ground-borne construction vibration forces during building demolition and site excavation/grading activities when heavy construction equipment, such as large bulldozer/excavator and loaded trucks, would be used. The FTA has published standard vibration velocities levels for various construction equipment operations.[14] It is noted that the Project construction would not use impact pile driving methods, therefore, impact pile driving vibration is not included in the on-site construction vibration analysis. Table 12 (below) provides the estimated vibration levels at the nearest off-site sensitive receptor locations. As indicated in Table 12, the estimated vibration velocity levels from all construction equipment would be below the significance criteria at all off-site sensitive receptors. Therefore, the on-site vibration impacts, pursuant to the significance criteria for human annoyance, during construction of the Project would be less than significant.

Table 12. Construction Vibration Impacts – Human Annoyance

Receptor Location	Estimated Vibration Velocity Levels at the Off-Site Sensitive Uses, VdB,[a]			Significance Threshold,[b] VdB	Sig. Impacts?
	Large Bulldozer	Loaded Trucks	Small Bulldozer		
FTA Reference Vibration Levels at 25 feet	87	86	58	--	--
R1	67	66	38	80	No
R2	68	67	39	80	No
R3	68	67	39	80	No

[a] *Vibration level calculated based on FTA reference vibration level at 25 foot distance.*
[b] *Significance threshold is based on City vibration limit of 0.01 in/sec converted to VdB, 20*log(0.01*1,000,000).*
Source: FTA, 2018; AES, 2020

In addition, vibration impacts associated with potential building damage were analyzed at buildings closest to the Project Site. The City currently does not have any adopted standards, guidelines, or thresholds relative to vibration impacts associated with building damage. Therefore, criteria from the Federal Transit Administration (FTA) are utilized as threshold to assess impacts associated with potential building damage.[15] Table 13 (on page 25) provides the estimated vibration levels at the nearest off-site buildings. As indicated in Table 13, the estimated vibration velocity levels from construction equipment would be below the significance criteria at the nearest off-site buildings. Therefore, the on-site vibration impacts, pursuant to the significance criteria for building damage, during construction of the Project would be less than significant.

[14] *FTA, "Transit Noise and Vibration Impact Assessment," September 2018.*

[15] *FTA, "Transit Noise and Vibration Impact Assessment," September 2018.*

Table 13. Construction Vibration Impacts – Building Damage

Receptor Location	Estimated Vibration Velocity Levels at the Off-Site Buildings, PPV,[a]			Significance Threshold, VdB	Sig. Impacts?
	Large Bulldozer	Loaded Trucks	Small Bulldozer		
FTA Reference Vibration Levels at 25 feet	0.089	0.076	0.003	--	--
Single-story building to the North	0.068	0.058	0.002	0.3[b]	No
Single-story commercial building to the South	0.089	0.076	0.003	0.3[b]	No
Single-story residential buildings to the East	0.010	0.009	<0.001	0.2[c]	No
Single-story commercial building to West	0.010	0.009	<0.001	0.3[b]	No

[a] *Vibration level calculated based on FTA reference vibration level at 25 foot distance.*
[b] *Significance threshold is based on FTA criteria for engineered concrete and masonry buildings.*
[c] *FTA criteria for non-engineered timber and masonry buildings*
Source: FTA, 2018; AES, 2020

Threshold (c): For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

3.4.4 Airport Noise

The nearest airport is the Hawthorne Municipal Airport located approximately 0.4 miles northwest of the Project Site. The Project site is outside of the airport 65 CNEL noise contour.[16] Since the Project would not be located within an airport land use plan and outside of the airport 65 CNEL noise contour, impacts with regard to airport-related noise would not occur. Therefore, noise impacts associated with airport or airstrip noise would be less than significant.

3.5 Cumulative Impacts

The cumulative impact analysis considers development of the Project in combination with ambient growth and other related projects in the vicinity of the Project Site. The potential for cumulative noise impacts to occur is specific to the distance between each related project and their stationary noise sources, as well as, the cumulative traffic that these projects would add to the surrounding roadway network.

[16] *Hawthorne Municipal Airport 14 CFR Part 150 Noise Compatibility Program, Figure 5B 2017 65 CNEL Noise Contour, June 2017*

3.5.1 Construction Noise

Noise from construction of development projects is typically localized and has the potential to affect noise-sensitive uses within 500 feet from the construction site, as construction noise would be attenuated by distance and intervening buildings, typical in an urban setting. Thus, noise from construction activities for two projects within 1,000 feet of each other can contribute to a cumulative noise impact for receptors located midway between the two construction sites.

There are total of 21 related projects identified in the vicinity of the Project Site, including: 17 related projects within the City of Gardena and 4 related projects within the City of Hawthorne. All 17 related projects within the City of Gardena are, at a minimum, 5,300 feet from the Project Site. Three of the four related projects within the City of Hawthorne are minimum 2,200 feet from the Project Site. Therefore, these related projects (over 2,200 feet from the Project Site) would not contribute to the cumulative construction noise impacts.

The related project at 12540 Crenshaw Boulevard is approximately 750 feet north of the Project Site. There are existing noise-sensitive uses, including residential uses along El Segundo Boulevard, approximately 680 feet from the related project. However, this related project is under construction and would likely be completed prior to the Project's construction. Therefore, this related project would not contribute to cumulative construction-related noise impacts. As such, cumulative construction noise impacts would be less than significant.

3.5.2 Construction Noise Vibration

Potential vibration impacts due to construction activities are generally limited to buildings/structures that are in close proximity to the construction site, as ground-borne vibration decreases rapidly with distance. That is, vibration impacts associated are typically limited to 15 feet as related to building damage and 50 feet as related to human annoyance. As discussed above, majority of the related projects are located minimum 2,200 feet from the Project Site, which would not contribute to the cumulative construction vibration impacts. The nearest related project is located approximately 750 feet from the Project Site and is currently under construction, which would not contribute to the cumulative construction vibration impacts. As such, cumulative construction vibration impacts would be less than significant.

3.5.3 Operation Noise

The Project along with overall development in the surrounding area would generate noise that would contribute to cumulative noise from a number of community noise sources including on-site mechanical/electrical equipment, parking facilities, loading/trash collections, and occupational activities (i.e., people and amplified sound); and off-site mobile sources (i.e., traffic). The related projects are of a residential, retail, or commercial nature, and these uses are not typically associated with excessive exterior noise levels. The potential cumulative noise impacts associated with on-site and off-site noise sources are addressed below.

Noise levels from stationary sources would be less than significant at the property line for each related project, as set forth in the City noise regulations that limit stationary noise sources. In addition, due to the distance attenuation and intervening structures (between the related projects and the Project) and the Project's on-site stationary noise sources (i.e., building mechanical equipment, parking facility, loading/trash compactor, and outdoor services) would result in less than significant impacts, stationary-source noise impacts attributable to cumulative development of the related projects and the Project would be less than significant.

Traffic noise level is dependent on the traffic volume. That is, doubling the traffic volume would result in a 3 dBA noise increase (Project significance threshold). As analyzed above, the Project would result in a maximum 0.2 dBA increase in off-site traffic noise along Crenshaw Boulevard, well below the 3 dBA significance. The traffic volume from the related projects would not double the existing traffic volume on Crenshaw Boulevard, based on the relative located of the related projects to Crenshaw Boulevard. As such, the cumulative traffic noise impact from the Project and the related projects would be less than significant.

4 MITIGATION MEASURES

As analyzed above, the Project would on-site construction activities would exceed the City's daytime exterior noise standards by up to 20.5 dBA at the adjacent residential uses, east of the Project Site. Therefore, the following mitigation measure is provided to reduce construction-related noise impacts:

Mitigation Measure MM-1: A temporary and impermeable sound barrier shall be provided along the Project eastern property line. The temporary sound barrier shall be minimum 8-foot high and shall have a minimum Sound Transmission Class rating of STC-25.

5 REFERENCES

California Department of Transportation (Caltrans), *Technical Noise Supplement (TeNS),* September 2013.

California Governor's Office of Planning and Research, *State of California General Plan Guidelines,* 2017.

City of Gardena, *Municipal Code, Chapter 8.36 - Noise*.

City of Gardena, *Gardena General Plan 2006, Community Safety Element, Noise Plan,* 2006.

Cyril M. Harris, *Handbook of Acoustical Measurements and Noise Control,* Third Edition, 1991.

Federal Highway Administration (FHWA), *FHWA Roadway Construction Noise Model User's Guide*, January 2006.

Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment*, September 2018.

Gardena T.O.D. Project
Noise Impact Analysis

Noise Calculations Worksheets

Provided by Acoustical Engineering Services

Appendix A – Construction Noise and Vibration Calculations

Appendix B – Operation Noise Calculations

Appendix A
Construction Noise & Vibration Calculations

AES
ACOUSTICAL ENGINEERING SERVICES

Project: Gardena T.O.D.

Construction Phase: ***Demolition***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Excavator	1	81	40%	120	0
Loader	1	79	40%	120	0
Dump Trucks	2	76	40%	140	0
	4				

Receptor: ***R1***

Results:

1-hour Leq: 72.6

Source for Ref. Noise Levels: FHWA RCNM, 2006

AES
ACOUSTICAL ENGINEERING SERVICES

Project: Gardena T.O.D.

Construction Phase: ***Grading***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Excavator	1	81	40%	120	0
Loader	1	79	40%	120	0
Backhoe	1	78	40%	140	0
Wacker/Roller	3	80	20%	140	0
Dump Trucks	2	76	40%	160	0
	8				

Receptor: ***R1***

Results:

1-hour Leq: 74.5

Source for Ref. Noise Levels: FHWA RCNM, 2006

A E S
ACOUSTICAL ENGINEERING SERVICES

Project: Gardena T.O.D.

Construction Phase: ***Foundation***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Loader	1	79	40%	120	0
Backhoe	1	78	40%	120	0
Concrete Truck	1	79	40%	140	0
Concrete Pump	1	81	20%	140	0
	4				

Receptor: ***R1***

Results:

1-hour Leq: 72.3

Source for Ref. Noise Levels: FHWA RCNM, 2006

AES
ACOUSTICAL ENGINEERING SERVICES

Project: Gardena T.O.D.

Construction Phase: ***Concrete***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Loader	1	79	40%	120	0
Fork Lift	1	75	20%	120	0
Concrete Truck	1	79	40%	140	0
Concrete Pump	1	81	20%	140	0

4

Receptor: ***R1***

Results:

1-hour Leq: 71.4

Source for Ref. Noise Levels: FHWA RCNM, 2006

A E S
ACOUSTICAL ENGINEERING SERVICES

Project: Gardena T.O.D.

Construction Phase: ***Building Construction***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Fork Lift	1	75	20%	120	0
Man Hoist Lift	1	75	20%	120	0
	2				

Receptor: ***R1***

Results:

1-hour Leq: 63.4

Source for Ref. Noise Levels: FHWA RCNM, 2006

Project: Gardena T.O.D.

Construction Phase: Paving/Landscaping

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Fork Lift	1	75	20%	120	0
	1				

Receptor: ***R1***

Results:

1-hour Leq: 60.4

Source for Ref. Noise Levels: FHWA RCNM, 2006

Project: Gardena T.O.D.

Construction Phase: ***Demolition***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Excavator	1	81	40%	105	0
Loader	1	79	40%	105	0
Dump Trucks	2	76	40%	125	0
	4				

Receptor: ***R2***

Results:

1-hour Leq: 73.8

Source for Ref. Noise Levels: FHWA RCNM, 2006

AES
ACOUSTICAL ENGINEERING SERVICES

Project: Gardena T.O.D.

Construction Phase: ***Grading***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Excavator	1	81	40%	105	0
Loader	1	79	40%	105	0
Backhoe	1	78	40%	125	0
Wacker/Roller	3	80	20%	125	0
Dump Trucks	2	76	40%	150	0
	8				

Receptor: ***R2***

Results:

1-hour Leq: 75.5

Source for Ref. Noise Levels: FHWA RCNM, 2006

AES
ACOUSTICAL ENGINEERING SERVICES

Project: Gardena T.O.D.

Construction Phase: ***Foundation***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Loader	1	79	40%	105	0
Backhoe	1	78	40%	105	0
Concrete Truck	1	79	40%	125	0
Concrete Pump	1	81	20%	125	0
	4				

Receptor: ***R2***

Results:

1-hour Leq: 73.4

Source for Ref. Noise Levels: FHWA RCNM, 2006

Project: Gardena T.O.D.

Construction Phase: ***Concrete***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Loader	1	79	40%	105	0
Fork Lift	1	75	20%	105	0
Concrete Truck	1	79	40%	125	0
Concrete Pump	1	81	20%	125	0
	4				

Receptor: ***R2***

Results:

1-hour Leq: 72.5

Source for Ref. Noise Levels: FHWA RCNM, 2006

AES
ACOUSTICAL ENGINEERING SERVICES

Project: Gardena T.O.D.

Construction Phase: ***Building Construction***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Fork Lift	1	75	20%	105	0
Man Hoist Lift	1	75	20%	105	0
	2				

Receptor: ***R2***

Results:

1-hour Leq: 64.6

Source for Ref. Noise Levels: FHWA RCNM, 2006

AES
Acoustical Engineering Services

Project: Gardena T.O.D.

Construction Phase: Paving/Landscaping

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Fork Lift	1	75	20%	105	0
	1				

Receptor: ***R2***

Results:

1-hour Leq: 61.6

Source for Ref. Noise Levels: FHWA RCNM, 2006

Project: Gardena T.O.D.

Construction Phase: ***Demolition***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Excavator	1	81	40%	110	0
Loader	1	79	40%	110	0
Dump Trucks	2	76	40%	130	0
	4				

Receptor: ***R3***

Results:

1-hour Leq: 73.4

Source for Ref. Noise Levels: FHWA RCNM, 2006

A E S
ACOUSTICAL ENGINEERING SERVICES

Project: Gardena T.O.D.

Construction Phase: ***Grading***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Excavator	1	81	40%	110	0
Loader	1	79	40%	110	0
Backhoe	1	78	40%	130	0
Wacker/Roller	3	80	20%	130	0
Dump Trucks	2	76	40%	150	0
	8				

Receptor: ***R3***

Results:

1-hour Leq: 75.2

Source for Ref. Noise Levels: FHWA RCNM, 2006

AES
ACOUSTICAL ENGINEERING SERVICES

Project: Gardena T.O.D.

Construction Phase: ***Foundation***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Loader	1	79	40%	110	0
Backhoe	1	78	40%	110	0
Concrete Truck	1	79	40%	130	0
Concrete Pump	1	81	20%	130	0
	4				

Receptor: ***R3***

Results:

1-hour Leq: 73.1

Source for Ref. Noise Levels: FHWA RCNM, 2006

Project: Gardena T.O.D.

Construction Phase: ***Concrete***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Loader	1	79	40%	110	0
Fork Lift	1	75	20%	110	0
Concrete Truck	1	79	40%	130	0
Concrete Pump	1	81	20%	130	0
	4				

Receptor: ***R3***

Results:

1-hour Leq: 72.1

Source for Ref. Noise Levels: FHWA RCNM, 2006

Project: Gardena T.O.D.

Construction Phase: ***Building Construction***

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Fork Lift	1	75	20%	110	0
Man Hoist Lift	1	75	20%	110	0

2

Receptor: ***R3***

Results:

1-hour Leq: 64.2

Source for Ref. Noise Levels: FHWA RCNM, 2006

AES
ACOUSTICAL ENGINEERING SERVICES

Project: Gardena T.O.D.

Construction Phase: Paving/Landscaping

Equipment

Description	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	Distance to Receptor, ft	Estimated Noise Shielding, dBA
Fork Lift	1	75	20%	110	0
	1				

Receptor: ***R3***

Results:

1-hour Leq: 61.2

Source for Ref. Noise Levels: FHWA RCNM, 2006

Din/Cal 4					**8 May 2020**							
Sean Bui					**TNM 2.5**							
INPUT: ROADWAYS							**Average pavement type shall be used unless**					
PROJECT/CONTRACT:	**Gardena T.O.D. Project**						**a State highway agency substantiates the use**					
RUN:	**Construction Trucks - Grading Phase**						**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	%			
Haul Route	12.0	point1	1	0.0	0.0	0.00	Signal	0.00	100	Average		
		point2	2	1,000.0	0.0	0.00						

Din/Cal 4 **8 May 2020**
Sean Bui **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **Gardena T.O.D. Project**
RUN: **Construction Trucks - Grading Phase**

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Haul Route	point1	1	0	0	0	0	3	35	0	0	0	0
	point2	2										

Din/Cal 4						8 May 2020						
Sean Bui						TNM 2.5						
INPUT: RECEIVERS												
PROJECT/CONTRACT:	Gardena T.O.D. Project											
RUN:	Construction Trucks - Grading Phase											
Receiver												
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**					**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**		**NR**		**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**	**Goal**		**Calc.**
			ft	ft	ft	ft	dBA	dBA	dB	dB		
At 40 feet from Roadway CL	1	1	500.0	50.0	0.00	4.92	0.00	71	5.0	0.0		Y

Din/Cal 4							**8 May 2020**						
Sean Bui							**TNM 2.5**						
							Calculated with TNM 2.5						
RESULTS: SOUND LEVELS													
PROJECT/CONTRACT:		**Gardena T.O.D. Project**											
RUN:		**Construction Trucks - Grading Phase**											
BARRIER DESIGN:		**INPUT HEIGHTS**						**Average pavement type shall be used unless**					
								a State highway agency substantiates the use					
ATMOSPHERICS:		**68 deg F, 50% RH**						**of a different type with approval of FHWA.**					
Receiver													
Name	**No.**	**#DUs**	**Existing**	**No Barrier**					**With Barrier**				
			LAeq1h	**LAeq1h**		**Increase over existing**		**Type**	**Calculated**	**Noise Reduction**			
				Calculated	**Crit'n**	**Calculated**	**Crit'n**	**Impact**	**LAeq1h**	**Calculated**	**Goal**	**Calculated**	
							Sub'l Inc					**minus**	
												Goal	
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	
At 40 feet from Roadway CL	1	1	0.0	54.7	71	54.7	5	----	54.7	0.0	0	0.0	

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	1	0.0	0.0	0.0

Project: Gardena T.O.D.

Construction Vibration Impacts

Reference Levels at 25 feet are based on FTA, 2006 (Transit Noise and Vibration Impact Assessment)
Calculations using FTA procedure with n= **1.5** (for receptors 25 feet or greater)
n= **1.1** (for receptors less than 25 feet, per Caltrans procedure)

ON-SITE CONSTRUCTION ACTIVITIES

Construction Equipment Vibration Levels (VdB) - Human Annoyance

Equipment	Reference Vibration Levels at 25 ft., VdB	Estimated Vibration Levels at Off-Site Receptors (distance in feet), VdB						
		R1	**R2**	**R3**				
		120	**105**	**110**				
Large Bulldozer	87	67	68	68				
Loaded Trucks	86	66	67	67				
Small bulldozer	58	38	39	39				
Significance Threshold, VdB		80	80	80				

Appendix B
Operation Noise Calculations

AES
ACOUSTICAL ENGINEERING SERVICES

Project Composite Noise Calculations (Leq)

Project: Gardena T.O.D.

		Estimated Noise Levels, Leq from SoundPLAN								
Receptor	Ambient	Mechanical	Outdoor	Parking		Project Composite	Threshold			
R1	50.0	25.1	40.0	39.2		42.7	50.0			
R2	50.0	26.6	43.0	44.0		46.6	50.0			
R3	50.0	25.5	34.9	39.7		41.1	50.0			

* Ambient noise is based on City's nighttime exterior noise standard for residential use.

Gardena T.O.D.
Source Levels in dB(A) - Mechanical

3

Name	Source type	Lw dB(A)	
Boiler 1	Point	75.0	
Boiler 2	Point	75.0	
Boiler 3	Point	75.0	
Boiler 4	Point	75.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
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Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	

Gardena T.O.D.
Source Levels in dB(A) - Mechanical

Name	Source type	Lw dB(A)	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
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Rooftop Condenser Unit	Point	65.0	

Gardena T.O.D.
Source Levels in dB(A) - Mechanical

Name	Source type	Lw dB(A)	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
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Rooftop Condenser Unit	Point	65.0	

Gardena T.O.D.
Source Levels in dB(A) - Mechanical

Name	Source type	Lw dB(A)	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
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Rooftop Condenser Unit	Point	65.0	

Gardena T.O.D.
Source Levels in dB(A) - Mechanical

Name	Source type	Lw dB(A)	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
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Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	

Gardena T.O.D.
Source Levels in dB(A) - Mechanical

Name	Source type	Lw dB(A)	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
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Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	

Gardena T.O.D.
Source Levels in dB(A) - Mechanical

Name	Source type	Lw dB(A)	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
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Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Rooftop Condenser Unit	Point	65.0	
Transformer 1	Point	75.3	
Transformer 2	Point	75.3	
Transformer 3	Point	75.3	

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Receiver R1 Leq,d 25.1 dB(A)		
Rooftop Condenser Unit	Point	-1.2
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.2
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.3
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	2.5
Rooftop Condenser Unit	Point	2.5
Rooftop Condenser Unit	Point	2.4
Rooftop Condenser Unit	Point	2.4
Rooftop Condenser Unit	Point	2.4
Rooftop Condenser Unit	Point	2.0
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.0
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	1.9
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	1.9
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	1.8

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	2.1
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	2.1
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	2.1
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	1.0
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	1.0
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	0.9
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	0.9
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	0.8
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	0.8
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	0.8
Rooftop Condenser Unit	Point	1.0
Rooftop Condenser Unit	Point	0.7
Rooftop Condenser Unit	Point	1.0
Rooftop Condenser Unit	Point	0.7
Rooftop Condenser Unit	Point	0.9
Rooftop Condenser Unit	Point	0.6
Rooftop Condenser Unit	Point	0.9
Rooftop Condenser Unit	Point	0.6
Rooftop Condenser Unit	Point	0.8

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	0.5
Rooftop Condenser Unit	Point	0.8
Rooftop Condenser Unit	Point	0.5
Rooftop Condenser Unit	Point	0.8
Rooftop Condenser Unit	Point	0.4
Rooftop Condenser Unit	Point	0.3
Rooftop Condenser Unit	Point	-0.1
Rooftop Condenser Unit	Point	0.2
Rooftop Condenser Unit	Point	-0.1
Rooftop Condenser Unit	Point	0.2
Rooftop Condenser Unit	Point	-0.1
Rooftop Condenser Unit	Point	0.1
Rooftop Condenser Unit	Point	-0.2
Rooftop Condenser Unit	Point	0.1
Rooftop Condenser Unit	Point	-0.2
Rooftop Condenser Unit	Point	0.0
Rooftop Condenser Unit	Point	-0.3
Rooftop Condenser Unit	Point	0.0
Rooftop Condenser Unit	Point	-0.3
Rooftop Condenser Unit	Point	0.0
Rooftop Condenser Unit	Point	-0.3
Rooftop Condenser Unit	Point	-0.1
Rooftop Condenser Unit	Point	-0.4
Rooftop Condenser Unit	Point	-0.1
Rooftop Condenser Unit	Point	-0.4
Rooftop Condenser Unit	Point	-0.1
Rooftop Condenser Unit	Point	-0.5
Rooftop Condenser Unit	Point	-0.2
Rooftop Condenser Unit	Point	-0.5
Rooftop Condenser Unit	Point	-0.2
Rooftop Condenser Unit	Point	-0.5
Rooftop Condenser Unit	Point	-0.3
Rooftop Condenser Unit	Point	-0.6
Rooftop Condenser Unit	Point	-0.3
Rooftop Condenser Unit	Point	-0.6
Rooftop Condenser Unit	Point	-0.3
Rooftop Condenser Unit	Point	-0.7
Rooftop Condenser Unit	Point	-0.4
Rooftop Condenser Unit	Point	-0.7
Rooftop Condenser Unit	Point	-0.4
Rooftop Condenser Unit	Point	-0.7

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	-0.4
Rooftop Condenser Unit	Point	-0.8
Rooftop Condenser Unit	Point	-0.8
Rooftop Condenser Unit	Point	-1.1
Rooftop Condenser Unit	Point	-0.9
Rooftop Condenser Unit	Point	-1.2
Rooftop Condenser Unit	Point	-0.9
Rooftop Condenser Unit	Point	-1.2
Rooftop Condenser Unit	Point	-0.9
Rooftop Condenser Unit	Point	-1.2
Rooftop Condenser Unit	Point	-1.0
Rooftop Condenser Unit	Point	-1.3
Rooftop Condenser Unit	Point	-1.0
Rooftop Condenser Unit	Point	-1.3
Rooftop Condenser Unit	Point	-1.0
Rooftop Condenser Unit	Point	-1.3
Rooftop Condenser Unit	Point	-1.1
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.1
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.1
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.2
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.2
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.2
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.3
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.3
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.3
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.3
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.4

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-2.1
Rooftop Condenser Unit	Point	-2.3
Rooftop Condenser Unit	Point	-2.5
Rooftop Condenser Unit	Point	-2.6
Rooftop Condenser Unit	Point	-2.0
Rooftop Condenser Unit	Point	-2.2
Rooftop Condenser Unit	Point	-2.2
Rooftop Condenser Unit	Point	-2.4
Rooftop Condenser Unit	Point	-2.5
Rooftop Condenser Unit	Point	-2.6
Rooftop Condenser Unit	Point	-2.7
Rooftop Condenser Unit	Point	-2.8
Rooftop Condenser Unit	Point	-2.9
Rooftop Condenser Unit	Point	-3.9
Rooftop Condenser Unit	Point	-3.8
Rooftop Condenser Unit	Point	-2.4
Rooftop Condenser Unit	Point	-2.4
Rooftop Condenser Unit	Point	-2.6
Rooftop Condenser Unit	Point	-2.6
Rooftop Condenser Unit	Point	-2.8
Rooftop Condenser Unit	Point	-2.8
Rooftop Condenser Unit	Point	-3.0
Rooftop Condenser Unit	Point	-3.0

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	-3.2
Rooftop Condenser Unit	Point	-3.1
Rooftop Condenser Unit	Point	-3.3
Rooftop Condenser Unit	Point	-3.3
Rooftop Condenser Unit	Point	-3.5
Rooftop Condenser Unit	Point	-3.5
Rooftop Condenser Unit	Point	-3.7
Rooftop Condenser Unit	Point	-3.6
Rooftop Condenser Unit	Point	-3.8
Rooftop Condenser Unit	Point	-3.8
Rooftop Condenser Unit	Point	-4.0
Rooftop Condenser Unit	Point	-3.9
Rooftop Condenser Unit	Point	-4.1
Rooftop Condenser Unit	Point	-4.1
Rooftop Condenser Unit	Point	0.0
Rooftop Condenser Unit	Point	0.0
Rooftop Condenser Unit	Point	-0.5
Rooftop Condenser Unit	Point	-0.4
Rooftop Condenser Unit	Point	-0.9
Rooftop Condenser Unit	Point	-0.8
Rooftop Condenser Unit	Point	-1.2
Rooftop Condenser Unit	Point	-1.2
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-2.2
Rooftop Condenser Unit	Point	-2.2
Rooftop Condenser Unit	Point	-2.5
Rooftop Condenser Unit	Point	-2.4
Rooftop Condenser Unit	Point	-2.7
Rooftop Condenser Unit	Point	-2.7
Rooftop Condenser Unit	Point	-3.0
Rooftop Condenser Unit	Point	-3.0
Rooftop Condenser Unit	Point	-3.2
Rooftop Condenser Unit	Point	-3.2
Rooftop Condenser Unit	Point	-3.4
Rooftop Condenser Unit	Point	-3.4
Rooftop Condenser Unit	Point	-3.6
Rooftop Condenser Unit	Point	-3.6
Rooftop Condenser Unit	Point	-3.8

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)	
Rooftop Condenser Unit	Point	-3.8	
Rooftop Condenser Unit	Point	-4.0	
Rooftop Condenser Unit	Point	-4.0	
Rooftop Condenser Unit	Point	-4.2	
Rooftop Condenser Unit	Point	-4.2	
Rooftop Condenser Unit	Point	-4.4	
Rooftop Condenser Unit	Point	-4.3	
Rooftop Condenser Unit	Point	-4.5	
Rooftop Condenser Unit	Point	-4.5	
Rooftop Condenser Unit	Point	-4.7	
Rooftop Condenser Unit	Point	-4.7	
Transformer 1	Point	6.5	
Transformer 2	Point	-1.2	
Transformer 3	Point	-1.3	
Boiler 1	Point	15.3	
Boiler 2	Point	14.1	
Boiler 3	Point	13.0	
Boiler 4	Point	12.2	
Receiver R2 Leq,d 26.6 dB(A)			
Rooftop Condenser Unit	Point	-3.0	
Rooftop Condenser Unit	Point	-3.2	
Rooftop Condenser Unit	Point	-3.0	
Rooftop Condenser Unit	Point	-3.2	
Rooftop Condenser Unit	Point	-3.0	
Rooftop Condenser Unit	Point	-3.1	
Rooftop Condenser Unit	Point	-2.9	
Rooftop Condenser Unit	Point	-3.1	
Rooftop Condenser Unit	Point	-2.9	
Rooftop Condenser Unit	Point	-3.0	
Rooftop Condenser Unit	Point	-2.9	
Rooftop Condenser Unit	Point	-3.0	
Rooftop Condenser Unit	Point	-2.8	
Rooftop Condenser Unit	Point	-2.9	
Rooftop Condenser Unit	Point	-2.8	
Rooftop Condenser Unit	Point	-2.9	
Rooftop Condenser Unit	Point	-2.7	
Rooftop Condenser Unit	Point	-2.9	
Rooftop Condenser Unit	Point	-2.7	
Rooftop Condenser Unit	Point	-2.8	
Rooftop Condenser Unit	Point	-2.6	
Rooftop Condenser Unit	Point	-2.8	

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	0.4
Rooftop Condenser Unit	Point	0.1
Rooftop Condenser Unit	Point	0.5
Rooftop Condenser Unit	Point	0.2
Rooftop Condenser Unit	Point	0.5
Rooftop Condenser Unit	Point	0.6
Rooftop Condenser Unit	Point	0.6
Rooftop Condenser Unit	Point	0.7
Rooftop Condenser Unit	Point	0.7
Rooftop Condenser Unit	Point	0.4
Rooftop Condenser Unit	Point	0.8
Rooftop Condenser Unit	Point	0.5
Rooftop Condenser Unit	Point	0.8
Rooftop Condenser Unit	Point	0.5
Rooftop Condenser Unit	Point	0.9
Rooftop Condenser Unit	Point	0.6
Rooftop Condenser Unit	Point	0.9
Rooftop Condenser Unit	Point	0.6
Rooftop Condenser Unit	Point	1.0
Rooftop Condenser Unit	Point	0.7
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	0.7
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	0.8
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.8

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.9
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.9
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	2.0
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	2.0
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	2.0
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	2.1
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	2.1
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	1.9
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	1.9
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	2.6
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.0
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	2.0
Rooftop Condenser Unit	Point	2.3
Rooftop Condenser Unit	Point	1.9
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	1.9
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	1.9
Rooftop Condenser Unit	Point	2.2
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	2.1
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	2.1
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	2.1
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	2.0
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	2.0

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	2.0
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	1.9
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	1.9
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	1.0
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	1.0
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	0.9
Rooftop Condenser Unit	Point	0.6
Rooftop Condenser Unit	Point	0.3
Rooftop Condenser Unit	Point	0.1
Rooftop Condenser Unit	Point	-0.1
Rooftop Condenser Unit	Point	-0.3
Rooftop Condenser Unit	Point	-0.5
Rooftop Condenser Unit	Point	-0.7
Rooftop Condenser Unit	Point	-0.9

Gardena T.O.D.
Assessed contribution level - Mechanical

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Source	Source type	Leq dB(A)	
Rooftop Condenser Unit	Point	-1.1	
Rooftop Condenser Unit	Point	-1.3	
Rooftop Condenser Unit	Point	-1.4	
Rooftop Condenser Unit	Point	-1.6	
Rooftop Condenser Unit	Point	-6.0	
Rooftop Condenser Unit	Point	-6.2	
Rooftop Condenser Unit	Point	-6.3	
Rooftop Condenser Unit	Point	-6.3	
Rooftop Condenser Unit	Point	-6.4	
Rooftop Condenser Unit	Point	-6.6	
Rooftop Condenser Unit	Point	0.5	
Rooftop Condenser Unit	Point	0.5	
Rooftop Condenser Unit	Point	0.3	
Rooftop Condenser Unit	Point	0.3	
Rooftop Condenser Unit	Point	0.1	
Rooftop Condenser Unit	Point	0.1	
Rooftop Condenser Unit	Point	-0.1	
Rooftop Condenser Unit	Point	-0.1	
Rooftop Condenser Unit	Point	-0.3	
Rooftop Condenser Unit	Point	-0.3	
Rooftop Condenser Unit	Point	-0.5	
Rooftop Condenser Unit	Point	-0.5	
Rooftop Condenser Unit	Point	-0.7	
Rooftop Condenser Unit	Point	-0.7	
Rooftop Condenser Unit	Point	-0.9	
Rooftop Condenser Unit	Point	-0.8	
Rooftop Condenser Unit	Point	-1.1	
Rooftop Condenser Unit	Point	-1.1	
Rooftop Condenser Unit	Point	-1.3	
Rooftop Condenser Unit	Point	-1.2	
Rooftop Condenser Unit	Point	-1.4	
Rooftop Condenser Unit	Point	-1.4	
Rooftop Condenser Unit	Point	2.9	
Rooftop Condenser Unit	Point	2.9	
Rooftop Condenser Unit	Point	2.4	
Rooftop Condenser Unit	Point	2.4	
Rooftop Condenser Unit	Point	1.9	
Rooftop Condenser Unit	Point	2.0	
Rooftop Condenser Unit	Point	1.5	
Rooftop Condenser Unit	Point	1.6	
Rooftop Condenser Unit	Point	1.1	

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)	
Rooftop Condenser Unit	Point	1.2	
Rooftop Condenser Unit	Point	0.8	
Rooftop Condenser Unit	Point	0.8	
Rooftop Condenser Unit	Point	0.5	
Rooftop Condenser Unit	Point	0.5	
Rooftop Condenser Unit	Point	0.2	
Rooftop Condenser Unit	Point	0.2	
Rooftop Condenser Unit	Point	-0.1	
Rooftop Condenser Unit	Point	-0.1	
Rooftop Condenser Unit	Point	-0.4	
Rooftop Condenser Unit	Point	-0.3	
Rooftop Condenser Unit	Point	-0.6	
Rooftop Condenser Unit	Point	-0.6	
Rooftop Condenser Unit	Point	-0.8	
Rooftop Condenser Unit	Point	-0.8	
Rooftop Condenser Unit	Point	-1.0	
Rooftop Condenser Unit	Point	-1.0	
Rooftop Condenser Unit	Point	-1.2	
Rooftop Condenser Unit	Point	-1.2	
Rooftop Condenser Unit	Point	-1.4	
Rooftop Condenser Unit	Point	-1.4	
Rooftop Condenser Unit	Point	-1.6	
Rooftop Condenser Unit	Point	-1.6	
Rooftop Condenser Unit	Point	-1.8	
Rooftop Condenser Unit	Point	-1.7	
Rooftop Condenser Unit	Point	-2.0	
Rooftop Condenser Unit	Point	-1.9	
Rooftop Condenser Unit	Point	-2.1	
Rooftop Condenser Unit	Point	-2.1	
Transformer 1	Point	-2.2	
Transformer 2	Point	5.6	
Transformer 3	Point	1.2	
Boiler 1	Point	14.7	
Boiler 2	Point	15.8	
Boiler 3	Point	15.7	
Boiler 4	Point	14.7	
Receiver R3 Leq,d 25.5 dB(A)			
Rooftop Condenser Unit	Point	-5.9	
Rooftop Condenser Unit	Point	-6.0	
Rooftop Condenser Unit	Point	-5.8	
Rooftop Condenser Unit	Point	-6.0	

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	-5.8
Rooftop Condenser Unit	Point	-6.0
Rooftop Condenser Unit	Point	-5.8
Rooftop Condenser Unit	Point	-10.4
Rooftop Condenser Unit	Point	-5.8
Rooftop Condenser Unit	Point	-10.4
Rooftop Condenser Unit	Point	-10.2
Rooftop Condenser Unit	Point	-10.4
Rooftop Condenser Unit	Point	-10.2
Rooftop Condenser Unit	Point	-10.4
Rooftop Condenser Unit	Point	-10.2
Rooftop Condenser Unit	Point	-10.4
Rooftop Condenser Unit	Point	-10.2
Rooftop Condenser Unit	Point	-10.4
Rooftop Condenser Unit	Point	-10.2
Rooftop Condenser Unit	Point	-10.4
Rooftop Condenser Unit	Point	-10.2
Rooftop Condenser Unit	Point	-10.4
Rooftop Condenser Unit	Point	-2.4
Rooftop Condenser Unit	Point	-2.7
Rooftop Condenser Unit	Point	-2.4
Rooftop Condenser Unit	Point	-2.7
Rooftop Condenser Unit	Point	-2.4
Rooftop Condenser Unit	Point	-2.3
Rooftop Condenser Unit	Point	-2.3
Rooftop Condenser Unit	Point	-2.3
Rooftop Condenser Unit	Point	-2.3
Rooftop Condenser Unit	Point	-2.6
Rooftop Condenser Unit	Point	-2.2
Rooftop Condenser Unit	Point	-2.5
Rooftop Condenser Unit	Point	-2.2
Rooftop Condenser Unit	Point	-2.5
Rooftop Condenser Unit	Point	-2.2
Rooftop Condenser Unit	Point	-2.5
Rooftop Condenser Unit	Point	-2.2
Rooftop Condenser Unit	Point	-2.5
Rooftop Condenser Unit	Point	-2.1
Rooftop Condenser Unit	Point	-2.4
Rooftop Condenser Unit	Point	-2.1
Rooftop Condenser Unit	Point	-2.4
Rooftop Condenser Unit	Point	-2.1

Gardena T.O.D.
Assessed contribution level - Mechanical

9

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	-2.4
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-2.2
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-2.2
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-2.2
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-2.1
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-2.1
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-2.1
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-2.0
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-2.0
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-2.0
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-1.6
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-1.5
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.4
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.3
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.3
Rooftop Condenser Unit	Point	-1.6

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	-0.9
Rooftop Condenser Unit	Point	-1.2
Rooftop Condenser Unit	Point	-0.8
Rooftop Condenser Unit	Point	-1.1
Rooftop Condenser Unit	Point	-0.8
Rooftop Condenser Unit	Point	-1.1
Rooftop Condenser Unit	Point	-0.8
Rooftop Condenser Unit	Point	-1.1
Rooftop Condenser Unit	Point	-0.7
Rooftop Condenser Unit	Point	-1.0
Rooftop Condenser Unit	Point	-0.7
Rooftop Condenser Unit	Point	-1.0
Rooftop Condenser Unit	Point	-0.6
Rooftop Condenser Unit	Point	-0.9
Rooftop Condenser Unit	Point	-0.6
Rooftop Condenser Unit	Point	-0.9
Rooftop Condenser Unit	Point	-0.6
Rooftop Condenser Unit	Point	-0.9
Rooftop Condenser Unit	Point	-0.5
Rooftop Condenser Unit	Point	-0.8
Rooftop Condenser Unit	Point	-0.5
Rooftop Condenser Unit	Point	-0.8
Rooftop Condenser Unit	Point	-0.4
Rooftop Condenser Unit	Point	-0.7
Rooftop Condenser Unit	Point	-0.4
Rooftop Condenser Unit	Point	-0.7
Rooftop Condenser Unit	Point	-0.3
Rooftop Condenser Unit	Point	-0.7
Rooftop Condenser Unit	Point	-0.3
Rooftop Condenser Unit	Point	-0.6
Rooftop Condenser Unit	Point	-0.3
Rooftop Condenser Unit	Point	-0.6
Rooftop Condenser Unit	Point	-0.2
Rooftop Condenser Unit	Point	-0.5
Rooftop Condenser Unit	Point	-0.2
Rooftop Condenser Unit	Point	-0.5
Rooftop Condenser Unit	Point	-0.1
Rooftop Condenser Unit	Point	-0.4
Rooftop Condenser Unit	Point	0.4
Rooftop Condenser Unit	Point	0.1
Rooftop Condenser Unit	Point	0.4

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	0.1
Rooftop Condenser Unit	Point	0.5
Rooftop Condenser Unit	Point	0.1
Rooftop Condenser Unit	Point	0.5
Rooftop Condenser Unit	Point	0.2
Rooftop Condenser Unit	Point	0.6
Rooftop Condenser Unit	Point	0.2
Rooftop Condenser Unit	Point	0.6
Rooftop Condenser Unit	Point	0.3
Rooftop Condenser Unit	Point	0.7
Rooftop Condenser Unit	Point	0.3
Rooftop Condenser Unit	Point	0.7
Rooftop Condenser Unit	Point	0.4
Rooftop Condenser Unit	Point	0.8
Rooftop Condenser Unit	Point	0.4
Rooftop Condenser Unit	Point	0.8
Rooftop Condenser Unit	Point	0.5
Rooftop Condenser Unit	Point	0.9
Rooftop Condenser Unit	Point	0.6
Rooftop Condenser Unit	Point	0.9
Rooftop Condenser Unit	Point	0.6
Rooftop Condenser Unit	Point	1.0
Rooftop Condenser Unit	Point	0.7
Rooftop Condenser Unit	Point	1.0
Rooftop Condenser Unit	Point	0.7
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	0.8
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	0.8
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	0.9
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	0.9
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	1.0
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	1.1
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.2

Gardena T.O.D.
Assessed contribution level - Mechanical

9

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	1.6
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	1.3
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	-2.7
Rooftop Condenser Unit	Point	-2.9
Rooftop Condenser Unit	Point	-2.9
Rooftop Condenser Unit	Point	-3.1
Rooftop Condenser Unit	Point	-2.9
Rooftop Condenser Unit	Point	-3.6
Rooftop Condenser Unit	Point	-8.2
Rooftop Condenser Unit	Point	-8.3
Rooftop Condenser Unit	Point	-8.5
Rooftop Condenser Unit	Point	-8.7
Rooftop Condenser Unit	Point	-8.8
Rooftop Condenser Unit	Point	-8.9
Rooftop Condenser Unit	Point	-9.1
Rooftop Condenser Unit	Point	-9.2
Rooftop Condenser Unit	Point	-9.3
Rooftop Condenser Unit	Point	-9.4
Rooftop Condenser Unit	Point	-9.5
Rooftop Condenser Unit	Point	-9.7
Rooftop Condenser Unit	Point	-1.7
Rooftop Condenser Unit	Point	-1.8
Rooftop Condenser Unit	Point	-1.9
Rooftop Condenser Unit	Point	-2.0
Rooftop Condenser Unit	Point	-2.1
Rooftop Condenser Unit	Point	-2.2
Rooftop Condenser Unit	Point	-2.3
Rooftop Condenser Unit	Point	-2.3
Rooftop Condenser Unit	Point	-2.5
Rooftop Condenser Unit	Point	-2.5
Rooftop Condenser Unit	Point	-2.6
Rooftop Condenser Unit	Point	-2.7
Rooftop Condenser Unit	Point	-2.8

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	-2.8
Rooftop Condenser Unit	Point	-2.9
Rooftop Condenser Unit	Point	-3.0
Rooftop Condenser Unit	Point	-3.1
Rooftop Condenser Unit	Point	-3.1
Rooftop Condenser Unit	Point	-3.2
Rooftop Condenser Unit	Point	-3.3
Rooftop Condenser Unit	Point	-3.3
Rooftop Condenser Unit	Point	-3.4
Rooftop Condenser Unit	Point	4.2
Rooftop Condenser Unit	Point	4.1
Rooftop Condenser Unit	Point	3.7
Rooftop Condenser Unit	Point	3.6
Rooftop Condenser Unit	Point	3.3
Rooftop Condenser Unit	Point	3.2
Rooftop Condenser Unit	Point	2.8
Rooftop Condenser Unit	Point	2.8
Rooftop Condenser Unit	Point	2.5
Rooftop Condenser Unit	Point	2.4
Rooftop Condenser Unit	Point	2.1
Rooftop Condenser Unit	Point	2.0
Rooftop Condenser Unit	Point	1.8
Rooftop Condenser Unit	Point	1.7
Rooftop Condenser Unit	Point	1.5
Rooftop Condenser Unit	Point	1.4
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	1.2
Rooftop Condenser Unit	Point	1.0
Rooftop Condenser Unit	Point	0.9
Rooftop Condenser Unit	Point	0.7
Rooftop Condenser Unit	Point	0.7
Rooftop Condenser Unit	Point	0.5
Rooftop Condenser Unit	Point	0.5
Rooftop Condenser Unit	Point	0.3
Rooftop Condenser Unit	Point	0.2
Rooftop Condenser Unit	Point	0.1
Rooftop Condenser Unit	Point	0.0
Rooftop Condenser Unit	Point	-0.1
Rooftop Condenser Unit	Point	-0.2
Rooftop Condenser Unit	Point	-0.3
Rooftop Condenser Unit	Point	-0.4

Gardena T.O.D.
Assessed contribution level - Mechanical

Source	Source type	Leq dB(A)
Rooftop Condenser Unit	Point	-0.5
Rooftop Condenser Unit	Point	-0.6
Rooftop Condenser Unit	Point	-0.7
Rooftop Condenser Unit	Point	-0.7
Rooftop Condenser Unit	Point	-0.8
Rooftop Condenser Unit	Point	-0.9
Transformer 1	Point	2.5
Transformer 2	Point	11.4
Transformer 3	Point	14.5
Boiler 1	Point	11.9
Boiler 2	Point	12.9
Boiler 3	Point	14.0
Boiler 4	Point	15.6

Gardena T.O.D.
Source Levels in dB(A) - People

Name	Source type	Lw dB(A)	
People - Level 3 Courtyard 1	Area	97.9	
People - Level 4 Courtyard 2	Area	80.8	
People - Level 4 Courtyard 3	Area	80.8	

Gardena T.O.D.
Assessed contribution level - People

Source	Source type	Leq dB(A)
Receiver R1 Leq,d 28.8 dB(A)		
People - Level 3 Courtyard 1	Area	28.7
People - Level 4 Courtyard 2	Area	9.7
People - Level 4 Courtyard 3	Area	8.5
Receiver R2 Leq,d 29.1 dB(A)		
People - Level 3 Courtyard 1	Area	28.9
People - Level 4 Courtyard 2	Area	11.7
People - Level 4 Courtyard 3	Area	11.0
Receiver R3 Leq,d 25.8 dB(A)		
People - Level 3 Courtyard 1	Area	25.6
People - Level 4 Courtyard 2	Area	9.0
People - Level 4 Courtyard 3	Area	10.6

Gardena T.O.D.
Source Levels in dB(A) - Speakers

3

Name	Source type	Lw dB(A)	
Speakers Level 3 deck - 1	Point	113.6	
Speakers Level 3 deck - 2	Point	113.6	
Speakers Level 3 deck - 3	Point	113.6	
Speakers Level 3 deck - 4	Point	113.6	
Speakers Level 3 deck - 5	Point	113.6	
Speakers Level 3 deck - 6	Point	113.6	
Speakers Level 3 deck - 7	Point	113.6	

Gardena T.O.D.
Assessed contribution level - Speakers

Source	Source type	Leq dB(A)	
Receiver R1 Leq,d 39.7 dB(A)			
Speakers Level 3 deck - 1	Point	35.4	
Speakers Level 3 deck - 2	Point	29.5	
Speakers Level 3 deck - 3	Point	34.1	
Speakers Level 3 deck - 4	Point	32.4	
Speakers Level 3 deck - 5	Point	24.6	
Speakers Level 3 deck - 6	Point	20.4	
Speakers Level 3 deck - 7	Point	23.0	
Receiver R2 Leq,d 42.8 dB(A)			
Speakers Level 3 deck - 1	Point	26.3	
Speakers Level 3 deck - 2	Point	22.9	
Speakers Level 3 deck - 3	Point	36.7	
Speakers Level 3 deck - 4	Point	38.3	
Speakers Level 3 deck - 5	Point	37.4	
Speakers Level 3 deck - 6	Point	21.2	
Speakers Level 3 deck - 7	Point	30.8	
Receiver R3 Leq,d 34.3 dB(A)			
Speakers Level 3 deck - 1	Point	18.3	
Speakers Level 3 deck - 2	Point	16.4	
Speakers Level 3 deck - 3	Point	29.1	
Speakers Level 3 deck - 4	Point	27.6	
Speakers Level 3 deck - 5	Point	17.6	
Speakers Level 3 deck - 6	Point	17.7	
Speakers Level 3 deck - 7	Point	30.4	

Gardena T.O.D.
Input data parking lots - Parking

Parking lot	PLT	# of Parking Spaces	
Parking Level 1	Housing estate	86	
Parking Level 2	Housing estate	108	
Parking Level 3	Housing estate	73	

Gardena T.O.D.
Assessed contribution level - Parking

Source	Source type	Leq dB(A)	
Receiver R1 Leq,d 39.2 dB(A)			
Parking Level 1	PLot	34.5	
Parking Level 2	PLot	36.5	
Parking Level 3	PLot	30.1	
Receiver R2 Leq,d 44.0 dB(A)			
Parking Level 1	PLot	40.2	
Parking Level 2	PLot	40.3	
Parking Level 3	PLot	35.9	
Receiver R3 Leq,d 39.7 dB(A)			
Parking Level 1	PLot	34.2	
Parking Level 2	PLot	36.3	
Parking Level 3	PLot	33.9	

AES
ACOUSTICAL ENGINEERING SERVICES

Off-Site Traffic Noise Calculations

Project: Gardena T.O.D. Project

Traffic Distribution as % of ADT				
Vehicle Type	**Day**	**Eve**	**Night**	**Sub total**
Auto	77.6%	9.7%	9.7%	97.0%
Medium Truck	1.6%	0.2%	0.2%	2.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

PHV to ADT factor
10%

EXISTING CONDITIONS

Roadway Segment	Roadway Width*, ft	Distance to Edge of Roadway, ft	Distance to Centerline, feet	Speed mph	Traffic Volume PHV	Traffic Volume ADT	PHV to ADT factor	Barrier Atten.	Site Adjust., dBA	24-Hour CNEL
Crenshaw Boulevard										
- Between El Segundo Blvd. and W 135th St.	80	10	50	35	3,510	35,100	10%	0	0	69.8
El Segundo Boulevard										
- Between Crenshaw Blvd. and Van Ness Ave.	80	10	50	35	2,850	28,500	10%	0	0	68.9
W 135th Street										
- Between Crenshaw Blvd. and Van Ness Ave.	60	10	40	35	1,560	15,600	10%	0	0	67.3

* Estimated based on Google Earth map.

** Calculated using FHWA's TNM Version 2.5 Computer Noise Model.

Date Printed: 5/8/2020

AES
ACOUSTICAL ENGINEERING SERVICES

Off-Site Traffic Noise Calculations

Project: Gardena T.O.D. Project

Traffic Distribution as % of ADT				
Vehicle Type	**Day**	**Eve**	**Night**	**Sub total**
Auto	77.6%	9.7%	9.7%	97.0%
Medium Truck	1.6%	0.2%	0.2%	2.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

PHV to ADT factor 10%

EXISTING + PROJECT CONDITIONS Roadway Segment	Roadway Width*, ft	Distance to Edge of Roadway, ft	Distance to Centerline, feet	Speed mph	Traffic Volume PHV	Traffic Volume ADT	PHV to ADT factor	Barrier Atten.	Site Adjust., dBA	24-Hour CNEL
Crenshaw Boulevard										
- Between El Segundo Blvd. and W 135th St.	80	10	50	35	3,647	36,470	10%	0	0	70.0
El Segundo Boulevard										
- Between Crenshaw Blvd. and Van Ness Ave.	80	10	50	35	2,912	29,117	10%	0	0	69.0
W 135th Street										
- Between Crenshaw Blvd. and Van Ness Ave.	60	10	40	35	1,567	15,669	10%	0	0	67.3

* Estimated based on Google Earth map.

** Calculated using FHWA's TNM Version 2.5 Computer Noise Model.

Date Printed: 5/8/2020

Kimley»Horn

TECHNICAL MEMORANDUM

To:	Ray Barragan and Lisa Kranitz, City of Gardena
From:	Ace Malisos and Rita Garcia
Date:	January 14, 2021
Subject:	**Gardena Transit Oriented Development Specific Plan, 12850 and 12900 Crenshaw Boulevard, Noise Impact Study Peer Review**

Kimley-Horn has conducted a follow-up third-party peer review of the Project's Noise Impact Study (Acoustical Engineering Services, Inc., August 2020) on behalf of the City of Gardena to verify that Kimley-Horn's July 27, 2020 third-party peer review Technical Memo (TM) recommendations have been incorporated. The revised August 2020 report addressed the third-party peer review comments and thus is in compliance with the TM recommendations. The analysis, as revised, meets the applicable provisions of CEQA and the State CEQA Guidelines and is adequate for inclusion in the Project EIR.

Please do not hesitate to contact Ace Malisos at 714.705.1380 or ace.malisos@kimley-horn.com with any questions.