Appendix B
Noise Impact Study

Grevillea & Imperial Hotel

Noise Impact Study

City of Hawthorne, CA

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1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

This noise assessment was prepared to evaluate the potential noise impacts for the project study area and to recommend noise mitigation measures, if necessary, to minimize the potential noise impacts. The assessment was conducted and compared to the noise standards set forth by the Federal, State, and Local agencies. Consistent with the City's Noise Guidelines, the project must demonstrate compliance to the applicable noise criterion as outlined within the City of Hawthorne General Plan and Municipal Code.

The following is provided in this report:

- A description of the study area and the proposed project;
- Information regarding the fundamentals of noise;
- A description of the local noise guidelines and standards;
- An analysis of traffic noise impacts to the sensitive receptors and the project site; and
- An analysis of construction noise and vibration impacts to the sensitive receptors.

1.2 Site Location and Study Area

The project site is located at 4756 Imperial Highway in the City of Hawthorne, CA. See Exhibit A for the location. The property's current land use designation is Hospitality Commercial. Existing land uses surrounding the project site include hospitality commercial to the north, south, and east, commercial to the west, and residential to the southwest. Imperial Highway is to the north of the project site, and Grevillea Avenue is to the west.

1.3 Proposed Project Description

The project proposes to develop a 43,051 square-foot hotel with 78 guest rooms, including 12,070 square-feet of hotel amenities, including an open pool deck). The hotel will be five floors and there will be 80 parking spaces with Level 1 and Level 2 parking. The site plan is shown in Exhibit B.

1.4 Executive Summary of Findings and Mitigation Measures

The following is a summary of the analysis results:

Traffic Noise Levels
The project falls within the conditionally acceptable compatibility range at 70 dBA. The project will not increase the noise levels of Imperial Highway. The traffic noise impacts are therefore less than significant.

Operational Noise Levels
At the analyzed receptors, project-only noise levels are expected to be between 44 to 50 dBA Leq at residential receptors and 52 to 55 dBA Leq at commercial receptors. Project plus ambient noise levels are expected to be 52 to 58 dBA Leq. The levels comply with the city noise limits and will not result in a significant increase to the surrounding areas. The impact is therefore less than significant.

Mitigation Measures

A. Traffic Measures

No traffic mitigation required.

B. Operational Measures

No operational mitigation required.

C. Construction Measures

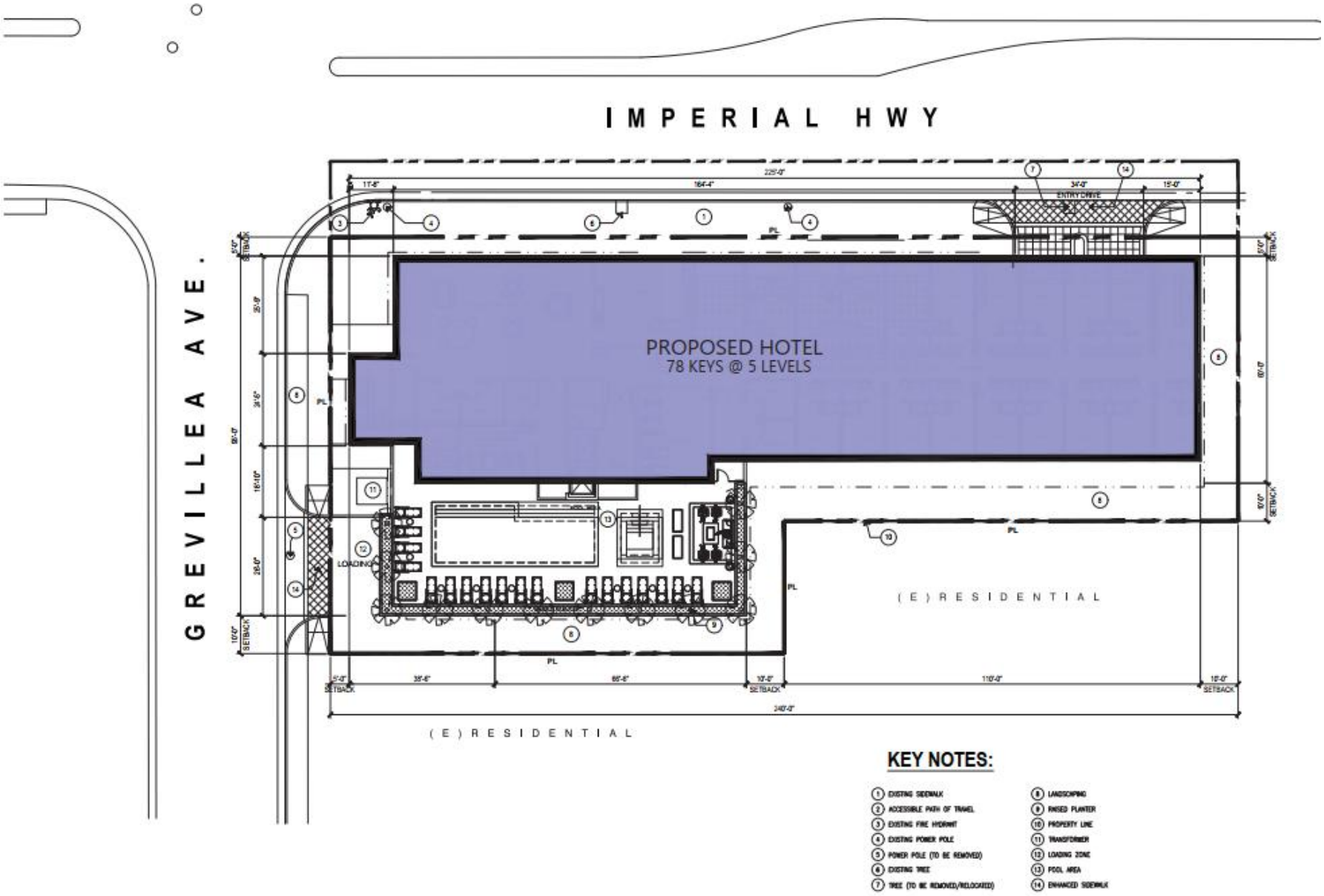
No construction mitigation required.

Exhibit A

Location Map

Exhibit B

Site Plan



2.0 Fundamentals of Noise

This section of the report provides basic information about noise and presents some of the terms used within the report.

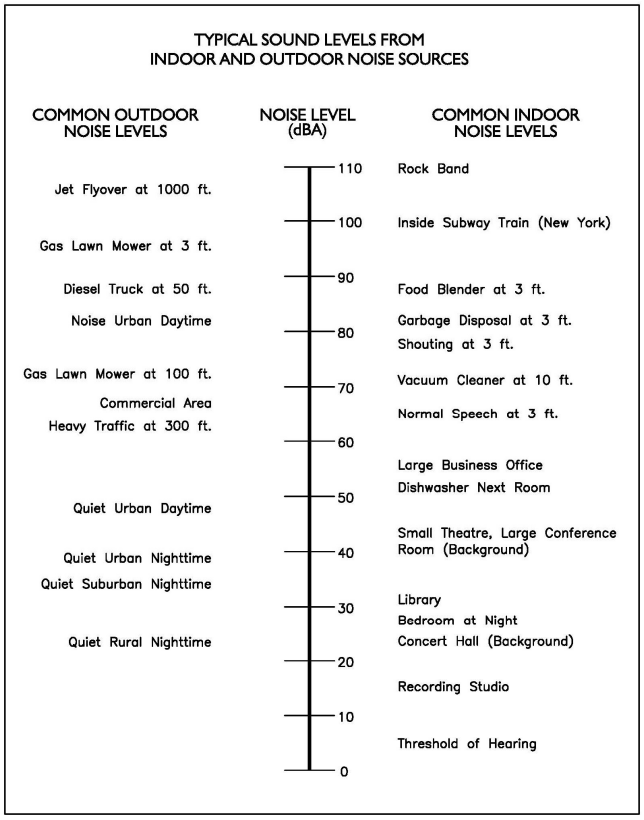
2.1 Sound, Noise, and Acoustics

Sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. Sound may be thought of as mechanical energy of a moving object transmitted by pressure waves through a medium to a human ear. For traffic or stationary noise, the medium of concern is air. *Noise* is defined as sound that is loud, unpleasant, unexpected, or unwanted.

2.2 Frequency and Hertz

A continuous sound is described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch (bass sounding) and high-frequency sounds are high in pitch (squeak). These oscillations per second (cycles) are commonly referred to as Hertz (Hz). The human ear can hear from the bass pitch starting at 20 Hz to the high pitch of 20,000 Hz.

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines its loudness. The loudness of sound increases or decreases as the amplitude increases or decreases. Sound pressure amplitude is measure in units of micro-Newton per square inch meter (N/m2), also called micro-Pascal (µPa). One µPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or L_p) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called decibels abbreviated dB. Exhibit C illustrates references sound levels for different noise sources.

2.4 Addition of Decibels

Because decibels are on a logarithmic scale, sound pressure levels cannot be added or subtracted by simple plus or minus addition. When two sounds or equal SPL are combined, they will produce an SPL 3 dB greater than the original single SPL. In other words, sound energy must be doubled to produce a 3 dB increase. If two sounds differ by approximately 10 dB, the higher sound level is the predominant sound.

2.5 Sensitive Receptors

Noise-sensitive land uses include residential (single and multi-family dwellings, mobile home parks, dormitories, and similar uses); transient lodging (including hotels, motels, and similar uses); hospitals, nursing homes, convalescent hospitals, and other facilities for long-term medical care; public or private educational facilities, libraries, churches, and places of public assembly.

2.6 Human Response to Changes in Noise Levels

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, (A-weighted scale) and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, the A-scale weighting is typically reported in terms of A-weighted decibel (dBA). Typically, the human ear can barely perceive a change in noise level of 3 dB. A change in 5 dB is readily perceptible, and a change in 10 dB is perceived as being twice or half as loud. As previously discussed, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g. doubling the volume of traffic on a highway) would result in a barely perceptible change in sound level.

Table 1: Decibel Changes and Loudness

Changes in Intensity Level, dBA	Changes in Apparent Loudness
1	Not perceptible
3	Just perceptible
5	Clearly noticeable
10	Twice (or half) as loud
Source: https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm	

2.7 Noise Descriptors

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns, others are random. Some noise levels are constant while others are sporadic. Noise descriptors were created to describe the different time-varying noise levels.

A-Weighted Sound Level: The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

Ambient Noise Level: The composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Community Noise Equivalent Level (CNEL): The average equivalent A-weighted sound level during a 24-hour day, obtained after the addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

Decibel (dB): A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A): A-weighted sound level (see definition above).

Equivalent Sound Level (LEQ): The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time-varying noise level. The energy average noise level during the sample period.

Habitable Room: Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking, or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms, and similar spaces.

L(n): The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 in the sound level exceeded 10 percent of the sample time. Similarly, L50, L90, and L99, etc.

Noise: *A*ny unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

Outdoor Living Area: Outdoor spaces that are associated with residential land uses typically used for passive recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, jacuzzi areas, etc. associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and, outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).

Percent Noise Levels: See L(n).

Sound Level (Noise Level): The weighted sound pressure level obtained by use of a sound level meter having a standard frequency filter for attenuating part of the sound spectrum.

Sound Level Meter: An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Single Event Noise Exposure Level (SENEL): The dB(A) level which, if it lasted for one second, would produce the same A-weighted sound energy as the actual event.

2.8 Traffic Noise Prediction

Noise levels associated with traffic depends on a variety of factors: volume of traffic; the speed of traffic; auto, medium truck (2-axle), and heavy truck percentage (3-axle and greater); and sound propagation. Higher traffic volume, speeds, and truck percentages equate to a louder volume in noise. A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; reasons for this are discussed in the sections above.

2.9 Sound Propagation

As sound propagates from a source it spreads geometrically. Sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates at a rate of 6 dB per doubling of distance. The movement of vehicles down a roadway makes the source of the sound appear to propagate from a line (i.e., line source) rather than a point source. This line source results in the noise propagating from a roadway in a cylindrical spreading versus a spherical spreading that results from a point source. The sound level attenuates for a line source at a rate of 3 dB per doubling of distance.

As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt, or landscaping attenuate noise at a rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 7.5 dB per doubling of distance for a point source.

Research has demonstrated that atmospheric conditions can have a significant effect on noise levels when noise receivers are located 200 feet from a noise source. Wind, temperature, air humidity, and turbulence can further impact have far sound can travel.

3.0 Ground-Borne Vibration Fundamentals

3.1 Vibration Descriptors

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude.

PPV – Known as the peak particle velocity (PPV) which is the maximum instantaneous peak in vibration velocity, typically given in inches per second.

RMS – Known as root mean squared (RMS) can be used to denote vibration amplitude

VdB – A commonly used abbreviation to describe the vibration level (VdB) for a vibration source.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Outdoor sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration. To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts. According to the FTA, fragile buildings can be exposed to ground-borne vibration levels of 0.3 inches per second without experiencing structural damage.

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wavefront, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wavefront. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wavefront. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation. As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 Regulatory Setting

The proposed project is located in the City of Hawthorne, California, and noise regulations are addressed through the efforts of various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Publicize noise emission standards for interstate commerce
- Assist state and local abatement efforts
- Promote noise education and research

The Federal Office of Noise Abatement and Control (ONAC) originally was tasked with implementing the Noise Control Act. However, it was eventually eliminated leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) is responsible for regulating noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible for regulating noise from the interstate highway system. The Occupational Safety and Health Administration (OSHA) is responsible for the prohibition of excessive noise exposure to workers. The Housing and Urban Development (HUD) is responsible for establishing noise regulations as it relates to exterior/interior noise levels for new HUD-assisted housing developments near high noise areas.

The federal government advocates that local jurisdictions use their land use regulatory authority to arrange new developments in such a way that "noise sensitive" uses are either prohibited from being constructed adjacent to a highway or that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation source, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

4.2 State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix." The matrix allows the local jurisdiction to delineate the compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 and the Uniform Building Code (UBC) which in some cases requires acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold. The State mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan.

The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable as illustrated in Exhibit D.

4.3 City of Hawthorne Noise Regulations

The City of Hawthorne outlines their noise regulations and standards within the Noise Element from the General Plan and the Noise Ordinance from the Municipal Code.

City of Hawthorne General Plan

Applicable policies and standards governing environmental noise in the City are set forth in the General Plan Noise Element. Table 1 (Exhibit D of this report) of the City's Noise Element outlines the exterior noise standards for community noise environments.

Exhibit D: Land Use Compatibility Guidelines

LAND USE CATEGORIES		COMMUNITY NOISE EQUIVALENT LEVEL (CNEL)						
CATEGORIES	USES	<55	60	65	70	75	80>	
RESIDENTIAL	Single Family, Duplex, Multiple Family	A	A	B	B	C	D	D
RESIDENTIAL	Mobile Home	A	A	B	C	C	D	D
COMMERCIAL (Regional, District)	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
COMMERCIAL (Regional, Village, District, Special)	Commercial Retail, Bank, Restaurant, Movie Theater	A	A	A	A	B	B	C
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Office Building, Research and Development, Professional Offices, City Office Building	A	A	A	B	B	C	D
COMMERCIAL (Recreation) INSTITUTIONAL (Civic Center)	Amphitheater, Concert Hall Auditorium, Meeting Hall	B	B	C	C	D	D	D
COMMERCIAL (Recreation)	Children's Amusement Park, Miniature Golf Course, Go-Cart Track, Equestrian Center, Sports Club	A	A	A	B	B	D	D
COMMERCIAL (General, Special) INDUSTRIAL, INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
INSTITUTIONAL (General)	Hospital, Church, Library, School Classroom	A	A	B	C	C	D	D
OPEN SPACE	Parks	A	A	A	B	C	D	D
OPEN SPACE	Golf Course, Cemetery, Nature Center, Wildlife Reserve, Wildlife Habitat	A	A	A	A	B	C	C
AGRICULTURE	Agriculture	A	A	A	A	A	A	A

INTERPRETATION

ZONE A CLEARLY COMPATIBLE	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
ZONE B NORMALLY COMPATIBLE	New construction or development should be undertaken only after detailed analysis of noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
ZONE C NORMALLY INCOMPATIBLE	New construction or development should generally be discouraged. If new construction or development does not proceed, a details analysis of noise reduction requirements must be made and needed noise insulation features included in the design.
ZONE D CLEARLY INCOMPATIBLE	New construction or development should generally not be undertaken.

The City also outlines interior and exterior noise standards for community noise environments, as shown in Table 2.

Table 2: Interior and Exterior Noise Standards

Land Use Categories		Energy Average CNEL	
Categories	**Uses**	**Interior[1]**	**Exterior[2]**
Residential	Single family, duplex, multiple family	45[3]	65
	Mobile home	--	65[4]
Commercial Industrial Institutional	Hotel, motel, transient lodging	45	65[5]
	Commercial retail, bank, restaurant	55	--
	Office building, research and development, professional offices, city office building	50	--
	Amphitheater, concert hall, auditorium, meeting hall	45	--
	Gymnasium (multipurpose)	50	--
	Sports club	55	--
	Manufacturing, warehousing, wholesale, utilities	65	--
	Movie theaters	45	--
Institutional	Hospital, nursing home, school, religious institution, library	45	65
	Church, library	45	--
Open Space	Parks	--	65

Notes:
1. Indoor environment excluding: bathrooms, toilets, closets, corridors
2. Outdoor environment limited to: Private yard of single family, multi-family private patio or balcony served by a means of exit from inside, mobile home park, hospital patio, park picnic area, school playground, hotel and motel recreation area
3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of UBC.
4. Exterior noise level should be such that interior noise level will not exceed 45 CNEL.
5. Except those areas affected by aircraft noise.

In addition to these standards, the City has outlined goals and policies to reduce potential noise impacts and are presented below:

Goals, Policies, and Implementation Measures

Policies, goals and implementation program measures from the Policy Plan that would mitigate potential impacts on noise include the following.

Goal 1.0: Provide for the reduction of noise where the noise environment is unacceptable.

Policy 1.1: Provide for measures to reduce noise impacts from transportation noise sources. These measures include:

- Construct barriers to mitigate sound emissions where necessary or where feasible. Actively participate in the development of noise abatement plans for freeways and rapid transit.
- Ensure the inclusion of noise mitigation measures in the design of new roadway projects in Hawthorne.
- Reduce transportation noise through proper design and coordination of routing.
- Ensure the effective enforcement of City, State and Federal noise levels by all appropriate city
- divisions.
- Mitigate potential impacts for existing or proposed helicopter operations.
- Explore noise control programs as part of the Hawthorne Municipal Airport Master Plan to minimize noise levels from these operations.
- To help minimize noise impacts from Los Angeles International Airport, actively support the FAA Part 150 Noise Compatibility Program as described in the "Noise Control and Land Use Compatibility Study, Los Angeles International Airport," (March 1984).
- The City of Hawthorne completed a 14 CFR Part 150 (Part 150) Noise Compatibility Study in 1990; the Part 150 Study was updated in 2016. A complete study update is needed periodically to respond to changing conditions in the local area and in the aviation industry. The Hawthorne Municipal Airport Part 150 study should be updated every 7 to 10 years or as noise conditions warrant.

Goal 2.0: Protect and maintain those areas having acceptable noise environments.

Policy 2.1: Incorporate noise considerations into land use planning decisions. These measures will be achieved through the following programs:

- Establish acceptable limits of noise for various land uses throughout the community. Zoning changes should be consistent with the compatibility of the projected noise environment
- Ensure acceptable noise levels near schools, hospitals, convalescent homes, and other noise sensitive areas.
- Establish standards for all types of noise not already governed by local ordinances or permitted by state or federal law.
- Encourage acoustical design in new construction.

Goal 3.0: Provide sufficient information concerning the community noise levels so that noise can be objectively considered in land use planning decisions.

Policy 3.1: The City shall develop measures to control non-transportation noise impacts.

Policy 3.2: The City shall establish a new Community Noise Ordinance to mitigate noise conflicts.

Policy 3.3: The City shall evaluate noise generated by construction activities.

Policy 3.4: Establish and maintain coordination among the city agencies involved in noise abatement.

Policy 3.5: The City shall evaluate the development of noise-sensitive uses within the vicinity of the Hawthorne Municipal Airport using noise exposure contours developed as part of the Airport's 14 CFR Part 150 study and the compatibility criteria presented in the land use compatibility guidelines contained in Table 3.

City of Hawthorne Municipal Code

Chapter 9.34 of the City's Municipal Code outlines the City's noise ordinance.

Section 9.34.030 –Exterior Noise Standards

Except as provided for in this chapter, no person shall, at any location within the city, create any noise or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the energy-equivalent noise level (Leq, dBA) to exceed the noise standards established in subsection A of this section for the receiving land use type where the measurement is taken.

A. The maximum permissible sound levels by receiving land use shall apply as shown in Table N-1 (Table 3 in this report):

Table 3: Noise Level Permissible by Receiving Land Use

Land Use Type[2,3]	Time Interval	Allowable Noise Level, Leq (dBA)[1]	
		15-minute continuous measurement period	5-minute continuous measurement period
Residential	7:00 a.m. to 10:00 p.m.	60	65
	10:00 p.m. to 7:00 a.m.	50	55
Commercial	7:00 a.m. to 10:00 p.m.	65	70
	10:00 p.m. to 7:00 a.m.	60	65
Manufacturing or Industrial	Anytime	70	75

Notes:
1. If the measured ambient noise level at the time of a complaint investigation exceeds the identified permissible noise level for that zone, the allowable noise standard shall be the ambient noise level.
2. For each land use type, the allowable exterior equivalent noise level shall be reduced by five dB for impulsive or simple tone noise, or for noises consisting of speech or music.
3. For situations where the source land use type differs than the receptor land use type, then the maximum allowable exterior equivalent noise level for the entire receiving parcel shall be the average of the noise standards of the two land use types.

Section 9.34.040 –Interior Noise Standards

Except as provided for in this chapter, no person shall at any location within the city create any noise or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the energy-equivalent noise level (Leq, dBA) to exceed the noise standards established in subsection A of this section for the receiving land use type where the measurement is taken.

A. The interior noise standards for residential dwelling units within residential zones or areas for noise generated by sources outside the dwelling unit are presented in Table N-2 (Table 4 in this report).

Table 4: Interior Noise Standards

Land Use Type[2]	Time Interval	Allowable Noise Level, Leq (dBA)[1]; 5-minute continuous measurement period
Residential (single- or multi-family)	7:00 a.m. to 10:00 p.m.	45
	10:00 p.m. to 7:00 a.m.	40

Notes:
1. If the measured ambient noise level at the time of a complaint investigation exceeds the identified permissible noise level for that zone, the allowable noise standard shall be the ambient noise level.
2. The allowable exterior equivalent noise level shall be reduced by five dB for impulsive or simple tone noise, or for noises consisting of speech or music.

Section 9.34.060 –Demolition and construction

A. General Restriction. Using the standards established in Section 9.34.020 as a baseline, noise created by demolition, excavation, grading, spray painting, construction, maintenance, and/or repair of buildings shall be subject to the following additional regulations.

B. Allowable Hours of Construction Activity. Construction and demolition activities are allowed only during the times specified in Table N-3 (Table 5 in this report).

Table 5: Time Limits for Noise Associated with Construction Activities

Day of Week	Time Frame
Monday–Friday	7:00 a.m. to 6:00 p.m.
Saturday	8:00 a.m. to 5:00 p.m.
Sunday, Federal Holidays	Not allowed
Note: should demolition, excavation, grading, spray painting, construction, maintenance, and/or repair of buildings be conducted outside of the above-defined hours, the applicable noise level limits will revert to those specified in Sections 9.34.030 and 9.34.040.	

C. Allowable Noise Level Limits for Construction Activity. The noise created by construction activity shall not cause:

1. The energy-average A-weighted, slow-response sound pressure level (Leq dBA) to exceed the numerical standards specified in Table N-1 of this chapter, for the land use where the measurement is taken, plus twenty dB; or

2. The maximum A-weighted, slow-response sound pressure level (Lmax dBA) to exceed the numerical standards specified in Table N-1 of this chapter, for the land use where the measurement is taken, plus forty dB.

D. Construction Near Residential Zones. Prior to the issuance of a building permit, all private development projects located within five hundred feet of any residential development or noise-sensitive land use must submit a list of equipment and activities required during construction. In particular, this list shall include the following:

1. Construction equipment to be used, such as pile drivers, jackhammers, pavement breakers, vibratory rollers, or similar equipment.

2. Construction activities such as twenty-four-hour pumping, excavation, drilling, and/or demolition.

3. A list of measures that will be implemented to minimize noise impacts on nearby residential or noise-sensitive uses. Such measures may include, but not be limited to:

a. Considering the installation of temporary sound barriers for construction activities immediately adjacent to occupied dwellings or noise-sensitive structures.

b. Equipping construction equipment with mufflers.

c. Restricting haul routes and construction-related traffic.

d. Reducing non-essential idling of construction equipment to no more than five minutes per hour.

E. Exceptions for Construction Activities. Construction or demolition activity during the times otherwise prohibited by this section may be allowed as described in this subsection if it is found to be in the public interest.

1. A request for such allowance shall be in writing and shall set forth in detail facts showing that the public interest will be served by the grant of such allowance.

2. If the allowance is being requested in connection with construction or demolition activities to be undertaken in connection with a land division, use permit, or other discretionary entitlement, the request shall be submitted as part of the application for such entitlement and shall acted upon by the official or decision-making body taking action on such application, after considering the recommendation of the noise control officer.

3. If the allowance is being requested in connection with a building permit, demolition permit, or grading permit and is not in connection with a discretionary entitlement, the request shall be considered and acted on by the noise control officer after the construction or demolition permit has been issued.

F. Home Repair and Maintenance. Time restrictions on construction and demolition activities do not include the use of home power tools or yard maintenance equipment used by the owner or a resident of the premises if used between the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday, or between the hours of 8:00 a.m. and 6:00 p.m. Saturday and Sunday.

5.0 Study Method and Procedure

The following section describes the noise modeling procedures and assumptions used for this assessment.

5.1 Noise Measurement Procedure and Criteria

Noise measurements are taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts, such as the first row of houses
- Locations that are acoustically representative and equivalent of the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

All measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA). MD noise measurement procedures are presented below:

- The sound level meter was calibrated (Piccolo-II) before and after the measurement
- Following the calibration of equipment, a windscreen was placed over the microphone
- Frequency weighting was set on “A” and slow response
- Results of the noise measurements were recorded on field data sheets
- Temperature and sky conditions were observed and documented

5.2 Noise Measurement Locations

The noise monitoring locations were selected to obtain a baseline of the existing noise environment. Two short-term noise measurements were conducted at the Project site. Appendix A includes photos, the field sheet, and measured noise data. Exhibit E illustrates the locations of the measurements.

5.3 SoundPLAN Noise Model (Operational Noise)

SoundPLAN (SP) acoustical modeling software was utilized to model future worst-case stationary noise impacts to the adjacent land uses. SP is capable of evaluating multiple stationary noise source impacts at various receiver locations. SP’s software utilizes algorithms (based on the inverse square law and reference equipment noise level data) to calculate noise level projections. The software allows the user to input specific noise sources, spectral content, sound barriers, building placement, topography, and sensitive receptor locations.

The future worst-case daytime noise level projections were modeled using referenced sound level data for the various stationary on-site sources (parking spaces, HVAC units, pool activity, loading and unloading). The model assumes that the site has 80 total parking spaces, a line of idling cars at the valet, 60 people at the pool area, and one (1) loading truck at the loading dock with a backup beeper. The

model also assumes there are 75 total rooftop condensing units on the proposed buildings (1 for each hotel unit).

Measured and referenced sound level data was utilized to model the various stationary on-site noise sources associated with project operation (vehicle movements, idling cars, crowd noise, HVAC, loading vehicle, and backup beepers).

Parking was modeled with a reference noise level of 0.57 vehicles per hour coming or going from the parking spots. According to the trip generation, the peak hour for the 80 parking spaces will be 46 movements, therefore, 0.57 vehicle movements per hour represents the loudest hour. The valet drop-off area was modeled as a line source with cars 6' apart. The pool and hot tub was modeled as an area source and assumes that there are 60 guests total, with half of the guests making noise at a time. The 75 rooftop units were modeled as six (6) point sources each representing 13 units. Each unit is assumed to have a sound power level of 73 dBA, thus, each point source has a sound power level of 84 dBA. One (1) loading truck was assumed to be located at the loading dock throughout the hour, and the backup beeper was assumed to be making noise for 1 minute total during the hour. Reference data is provided in Appendix C.

5.4 Traffic Noise Prediction Modeling

The FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) was utilized to model future traffic noise levels on the project site and existing and existing plus project traffic noise volumes along roadways affected by project generated vehicle traffic. The FHWA model arrives at the predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL).

Project-generated vehicle traffic will result in an incremental increase in ambient noise levels. To determine the project's noise impact to the surrounding land uses, MD generated noise contours for existing and existing plus project conditions. Existing traffic volumes were obtained from the city's Engineering and Traffic Survey for Speed Limits 2021 and the trip generation was obtained from the project's traffic assessment prepared by LLG Engineers. Table 6 indicates the roadway parameters and vehicle distribution utilized for the modeling.

Noise contours are used to provide a characterization of sound levels experienced at a set distance from the centerline of a subject roadway. They are intended to represent a worst-case scenario and do not take into account structures, sound walls, topography, and/or other sound attenuating features that may further reduce the actual noise level. Noise contours are developed for comparative purposes and are used to demonstrate potential increases/decreases along subject roadways as a result of a project. The referenced traffic data and traffic noise calculation worksheets outputs are located in Appendix C.

- Roadway classification – (e.g., freeway, major arterial, arterial, secondary, collector, etc.),
- Roadway Active Width – (distance between the center of the outermost travel lanes on each side of the roadway)
- Average Daily Traffic Volumes (ADT), Speeds, Percentages of autos, medium and heavy trucks

- Roadway grade and angle of view
- Site Conditions (e.g., soft vs. hard)
- Percentage of total ADT which flows each hour throughout a 24-hour period

Table 6: Roadway Parameters and Vehicle Distribution

Roadway	Existing ADT[1]	Existing + Project ADT[2]	Speed (MPH)	Site Conditions
Imperial Highway	22,900	23,523	35	Hard
Freeway Motor-Vehicle Type[3]		**Total % of Traffic Flow**		
Automobiles		94.1		
Medium Trucks		3.72		
Heavy Trucks		2.18		

Notes:
[1] Existing volumes obtained from City of Hawthorne's Engineering and Traffic Survey for Speed Limits 2021.
[2] Project trip generation was provided in the traffic study prepared for the Project.

6.0 Existing Noise Environment

Two (2) 15-minute noise measurements were conducted at the project site to document the existing noise environment. The measurements include the 15-minute Leq, Lmin, Lmax, and other statistical data (e.g. L2, L8). The results of the noise measurements are presented in Table 7. Noise measurement field sheets are provided in Appendix A.

Table 7: Short-Term Noise Measurement Data (dBA)[1]

Location	Start Time	Stop Time	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)	L(90)
NM1	11:53 AM	12:08 PM	54.0	66.6	45.5	60.4	57.5	54.9	51.5	47.8
NM2	11:34 AM	11:49 AM	51.4	68.1	43.8	57.3	54.0	51.5	49.6	46.3

Notes:
1. Short-term noise monitoring locations are illustrated in Exhibit E.

The data presented in Table 7 and the field notes provided in Appendix A, indicate that ambient noise levels in the project vicinity were up to 54 dBA Leq, and the field data indicates that the dominant noise source is traffic along Imperial Highway.

Exhibit E
Measurement Locations

= Short-Term Monitoring Location

7.0 Future Noise Environment Impacts and Mitigation

This assessment analyzes future noise impacts to sensitive receptors and the project and compares the results to the City's Noise Standards. The analysis details the estimated exterior noise levels associated with traffic from adjacent roadway sources. The City has established different significance thresholds for different types of noise impacts.

7.1 Future Off-site Exterior Noise Impact

The exterior noise level off-site of the project will be impacted by transportation-related sources and stationary sources from the site. The following outlines the impacts associated with exterior noise levels.

7.1.1 Off-Site Traffic Noise Impact

The potential off-site noise impacts caused by the increase in vehicular traffic as a result of the project were calculated at a distance of 80 feet from affected road segments. The noise levels at 80 feet both with and without project-generated vehicle traffic were compared and the increase was calculated. The distance to the 55, 60, 65, and 70 dBA CNEL noise contours are also provided for reference (Appendix C). The noise level at 80 feet is representative of approximate distances to the nearest existing residential uses close to the subject roadway impacted by the project. Noise contours were calculated for the following scenarios and conditions:

- Existing Condition: This scenario refers to the existing year traffic noise condition and is demonstrated in Table 8.

- Existing + Project Condition: This scenario refers to the existing plus project traffic noise condition and is demonstrated in Table 8.

As shown in Table 8, the addition of project-generated vehicle traffic along Imperial Highway would result in a 0.1 dBA increase in ambient noise levels. It takes a change of 3 dB or more for the human ear to perceive a difference. Thus, the noise impact due to project-generated traffic is less than significant.

Table 8: Change in Existing Noise Levels as a Result of Project Generated Traffic

Roadway	Segment	Modeled Noise Levels (dBA CNEL) at 80 feet from the Centerline			
		Existing without Project	Existing with Project	Change in Noise Level	Increase of 3 dB or more[2]
Imperial Highway	Inglewood Avenue to Hawthorn Boulevard	60.8	60.9	0.1	No

Notes:
[1] FHWA roadway noise modeling worksheets are provided in Appendix C.
[2] Typical CEQA significance threshold

7.1.2 Noise Impacts to Off-Site Receptors Due to Stationary Noise Sources

Sensitive receptors near the project site include existing residences to the south. Worst-case operational noise was modeled using SoundPLAN acoustical modeling software. Four (4) receptors representative of adjacent commercial and residential sites were modeled using the SoundPLAN noise model to evaluate the proposed project's operational impact. A receptor is denoted by a yellow dot, as shown in Exhibit F. All yellow dots represent a property line on contiguous parcels. Receptors 1 and 2 represent the residential uses to the south, and receptors 3 and 4 represent the commercial uses to the west. The results are in Table 9.

Table 9: Operational Noise Levels (dBA, Leq)

Receptor[1]	Existing Ambient Noise Level[2] (dBA Leq)	Project Noise Level[3] (dBA Leq)	Total Combined Noise Level (dBA Leq)	Daytime Exterior Noise Limit (dBA, L25)	Change in Noise Level as Result of Project (dB)
1	54	50	56	**60**	2
2	51	44	52	**60**	1
3	54	55	58	**65**	4
4	54	52	56	**65**	1

Notes:
1. Receptors 1-4 are located along the property lines.
2. See Table 7 for existing ambient level.
3. See Exhibit F for the operational noise level projections at said receptors.

Project Operational Noise Levels

Worst-case "project-only" exterior daytime operational noise is presented in Exhibit F. Daytime operations include parking movements, HVAC units, pool activity, and loading and unloading at the loading dock. Operational noise levels are expected to be 44 to 50 dBA Leq at residential receptors and 52 to 55 dBA Leq at commercial receptors. The City's hourly noise standard is an L25 standard (i.e., the limit applies to 15 minutes of the hour). However, because the SoundPLAN model assumes all noise sources are continuous throughout the hour, the Leq will be the same as the L25. Thus, the project-only noise levels meet the daytime exterior noise limit of 60 dBA L25 for residential uses and 65 dBA L25 for commercial uses (see Section 4.3).

Nighttime operations will likely consist of fewer active noise sources. However, the daytime operational noise levels meet the nighttime noise standard of 50 dBA L25 for residential uses and 60 dBA L25 for commercial uses.

Project Plus Ambient Operational Noise Levels

Existing ambient plus project noise level projections are anticipated to range from 56 to 58 dBA Leq, and the ambient plus project noise levels will meet the City's noise standards for residential and commercial uses. The project will increase the ambient noise level by 1 to 2 dB at residential uses and by 1 to 4 dB

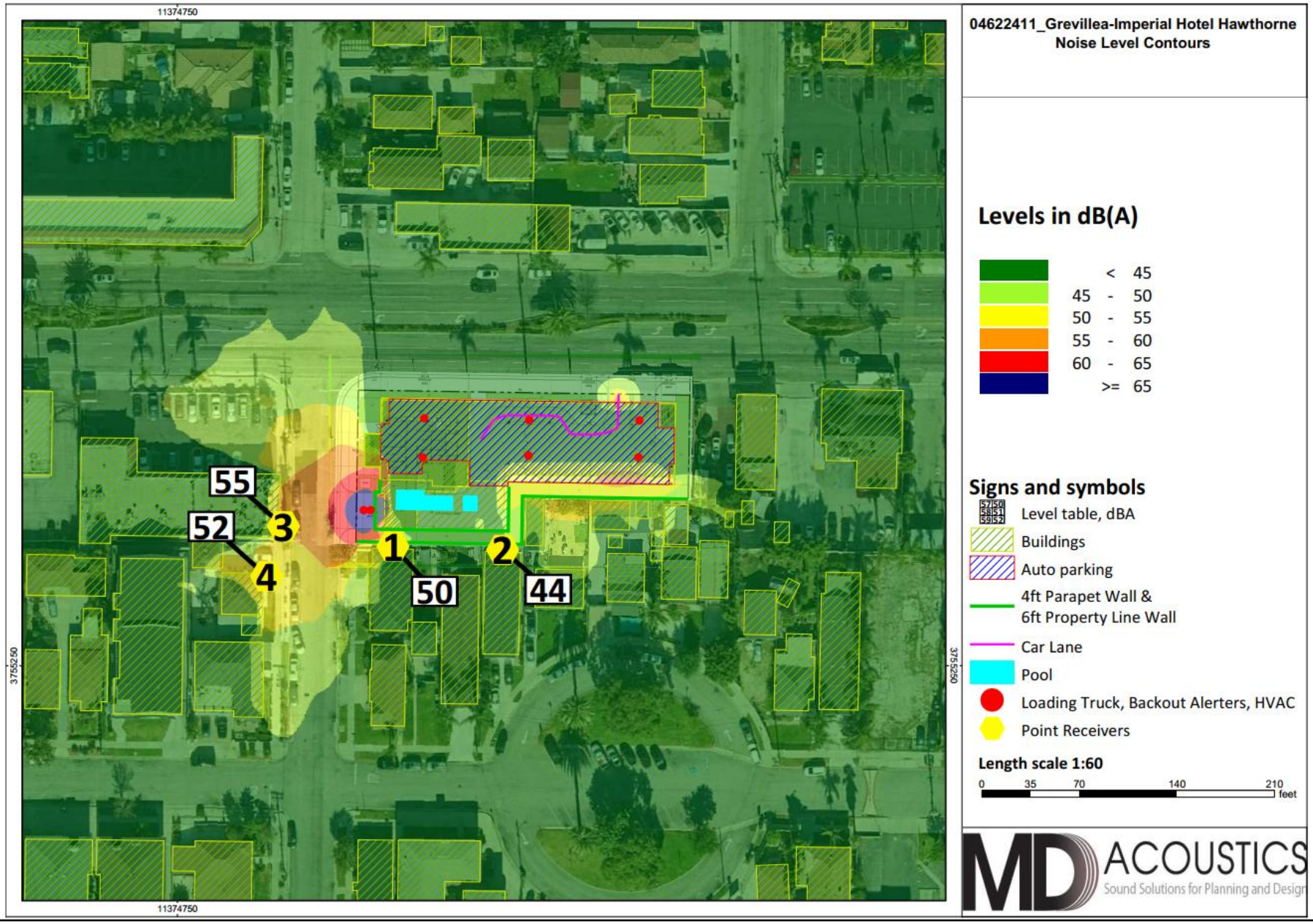
at commercial uses. As shown in Table 1, it takes a change of 3 dB or more to perceive a change in loudness. Thus, the change in noise level at residential receptors will not be perceptible, and the change in noise level at commercial receptors will be just perceptible. The project meets the City's code, and the impact is less than significant.

7.2 On-Site Traffic Noise Impact

Future noise levels associated with traffic were modeled using the FHWA Traffic Noise Model calculations in order to evaluate the project in light of the City's exterior standards presented in Exhibit D of this report as they apply to future traffic noise impacts to the proposed project. Traffic along Imperial Highway is the prominent source of noise impacting the project site. The noise level due to traffic along Imperial Highway will be 69.8 dBA CNEL at the northern edge of the project site. Thus, the project is currently within the normally compatible range of 70 dBA CNEL.

Exhibit F

Operational Noise Levels Contours Leq(h)



8.0 Construction Noise Impact

The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. Noise levels associated with the construction will vary with the different phases of construction.

8.1 Construction Noise

The Environmental Protection Agency (EPA) has compiled data regarding the noise-generated characteristics of typical construction activities. The data is presented in Table 10.

Table 10: Typical Construction Noise Levels[1]

Equipment Powered by Internal Combustion Engines

Type	Noise Levels (dBA) at 50 Feet
Earth Moving	
Compactors (Rollers)	73 - 76
Front Loaders	73 - 84
Backhoes	73 - 92
Tractors	75 - 95
Scrapers, Graders	78 - 92
Pavers	85 - 87
Trucks	81 - 94
Materials Handling	
Concrete Mixers	72 - 87
Concrete Pumps	81 - 83
Cranes (Movable)	72 - 86
Cranes (Derrick)	85 - 87
Stationary	
Pumps	68 - 71
Generators	71 - 83
Compressors	75 - 86

Impact Equipment

Type	Noise Levels (dBA) at 50 Feet
Saws	71 - 82
Vibrators	68 - 82

Notes:
[1] Referenced Noise Levels from the Environmental Protection Agency (EPA)

Construction noise is considered a short-term impact and would be considered significant if construction activities are taken outside the allowable times or if construction activities exceed the noise levels as described in the City's Municipal Code (9.34.060). Construction is anticipated to occur during the permissible hours (7 a.m. to 6 p.m. on weekdays, 8 a.m. to 5 p.m. on Saturdays and never on Sundays or holidays) according to the City's Municipal Code.

Section 9.34.060(D) of the City's Municipal Code states that when a project is within 500 feet of residential uses, prior to the issuance of a building permit, a list of equipment and a list of measures

implemented to minimize noise impacts from the construction will be required. Such measures may include the installation of temporary sound barriers, equipping construction equipment with mufflers, restricting haul routes and construction-related traffic, and reducing non-essential idling of construction equipment to no more than five minutes per hour. The project site is within 500 feet of residential uses, thus, the construction contractor will comply with Section 9.34.060(D) of the City's Municipal Code.

Typical operating cycles for the types of construction equipment (listed in Table 10) may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels will be loudest during the grading phase. A likely worst-case construction noise scenario during grading assumes the use of one (1) excavator, one (1) grader, one (1) bulldozer, three (3) front end loaders, four (4) scrapers, five (5) tractors and two (2) trenching machines operating at an average of 70 feet and as near as 10 feet from the nearest sensitive receptor (south residence).

Assuming a usage factor of 50 percent for the trenching machine and 40 percent for the other pieces of equipment, and including the use of 15 dBA mufflers (per Section 9.34.060(D)), noise levels at 70 feet have the potential to reach 73 dBA L_{eq} at the nearest sensitive receptors during site preparation. Noise levels for the other construction phases would be lower and range between 56 to 70 dBA. Construction noise will meet the Municipal Code limit of 80 dBA Leq and 100 dBA Lmax (20 dBA Leq and 40 dBA Lmax above 60 dBA). Construction for this project will only occur during the permissible hours (7 a.m. to 6 p.m. on weekdays and 8 a.m. to 5 p.m. on Saturdays), thus, the impact will be considered less than significant. See Appendix D.

8.2 Construction Vibration

Construction activities can produce vibration that may be felt by adjacent land uses. The construction of the proposed project would not require the use of equipment such as pile drivers, which are known to generate substantial construction vibration levels. The primary vibration source during construction may be from a bulldozer. A large bulldozer has a vibration impact of 0.089 inches per second peak particle velocity (PPV) at 25 feet which is perceptible but below any risk to architectural damage.

The fundamental equation used to calculate vibration propagation through average soil conditions and distance is as follows:

$$PPV_{equipment} = PPV_{ref} (100/D_{rec})^{n}$$

Where: PPV_{ref} *= reference PPV at 100ft.*
D_{rec} *= distance from equipment to receiver in ft.*
n = 1.1 (the value related to the attenuation rate through ground)

The thresholds from the Caltrans Transportation and Construction Induced Vibration Guidance Manual in Table 11 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

<Table 11, next page>

Table 11: Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Table 19, Transportation and Construction Vibration Guidance Manual, Caltrans, Sept. 2013.
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 12 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 12: Vibration Source Levels for Construction Equipment[1]

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level LV (dVB) at 25 feet
Pile driver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Pile driver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(slurry wall)	0.017 in rock	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

[1] Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.

The residential buildings to the south would be classified as older residential structures and thus the threshold of damage would be0.3 PPV (in/sec). At a distance of 10 feet, a large bulldozer would yield a worst-case 0.24 PPV (in/sec) which is likely perceptible, but below any risk of damage. The impact is less than significant and no mitigation is required.

9.0 References

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

City of Hawthorne: General Plan Noise Element. 1989.

City of Hawthorne: Chapter 9.34 - Noise Ordinance of the Municipal Code.

Caltrans Traffic Volumes 2020

Cactus Club Hotel Trip Generation – TJW Engineering Inc.

SoundPLAN Essential 8.1 Manual - SoundPLAN International, LLC

Appendix A:

Field Measurement Data

15-Minute Continuous Noise Measurement Datasheet - NM1, NM2

Project Name:	Grevillea Imperial Hotel
Project: #/Name:	0462-2024-011
Site Address/Location:	4756 Imperial Highway
Date:	09/11/2024
Field Tech/Engineer:	Jason Schuyler / Rachel Edelman

Site Observations:

The primary noise source is traffic, also noteworthy was that the 2 auto repair centers make inconsistent noise levels. Temps in the low 70'sF winds 0-2MPH Sunny and clear skies

Sound Meter:	XL2, NTI	**SN:**	A2A-08562-E0
Settings:	A-weighted, slow, 1-sec, 15-minute interval		
Site Id:	NM1, NM2		

MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont. - NM1, NM2

Project Name:	Grevillea Imperial Hotel	**Calibrator:**	
Site Address/Location:	4756 Imperial Highway	**Cal Check: Pre-test:**	**Post Test:**
Site Id:	NM1, NM2		

Figure 1: NM1

Figure 2: NM1

Figure 3: NM2

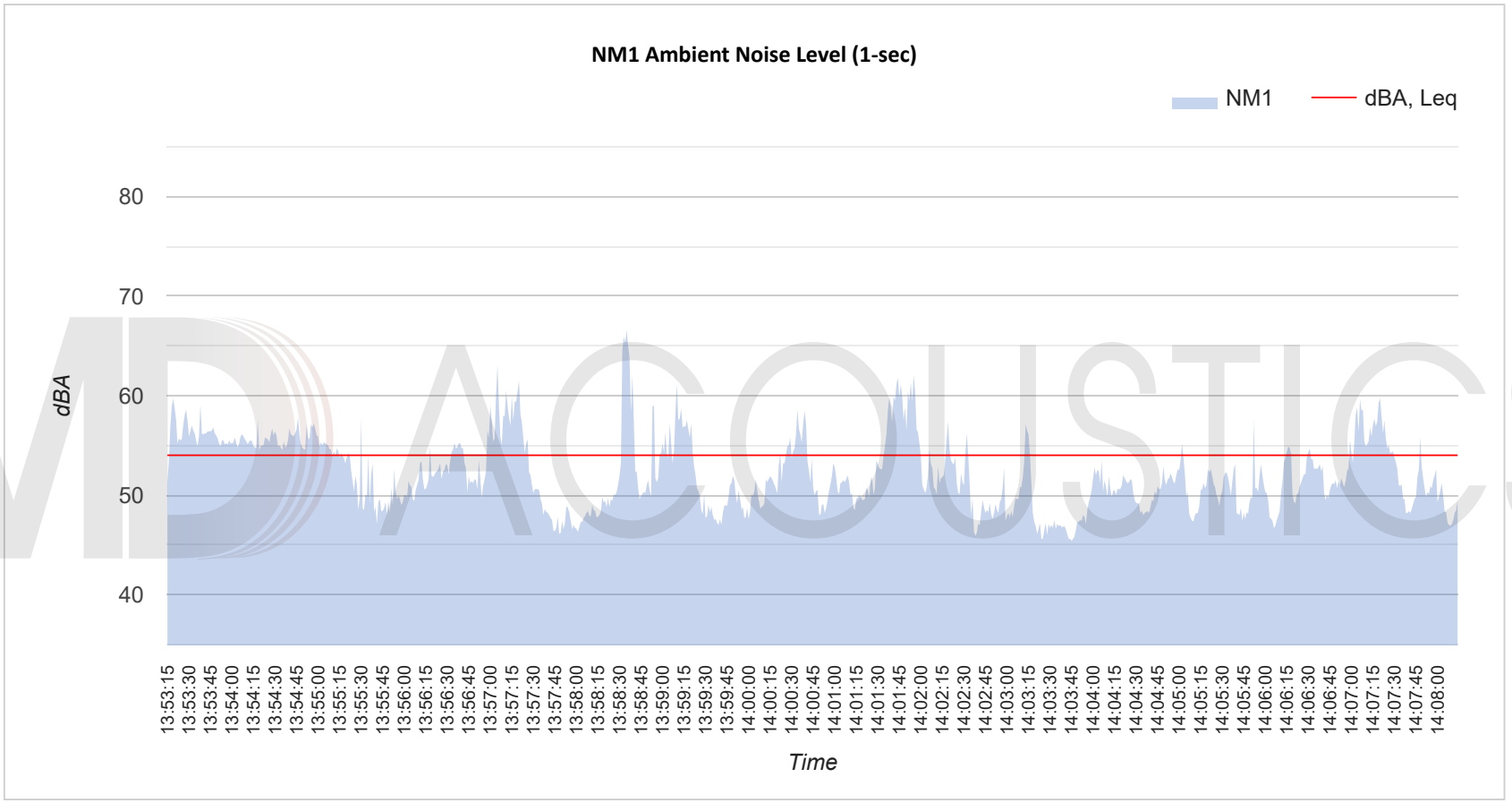
Table 1: Baseline Noise Measurement Summary

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
NM1	1:53 PM	2:08 PM	54	66.6	45.5	60.4	57.5	54.9	51.5	47.8
NM2	1:34 PM	1:49 PM	51.4	68.1	43.8	57.3	54	51.5	49.6	46.3

MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont. - NM1

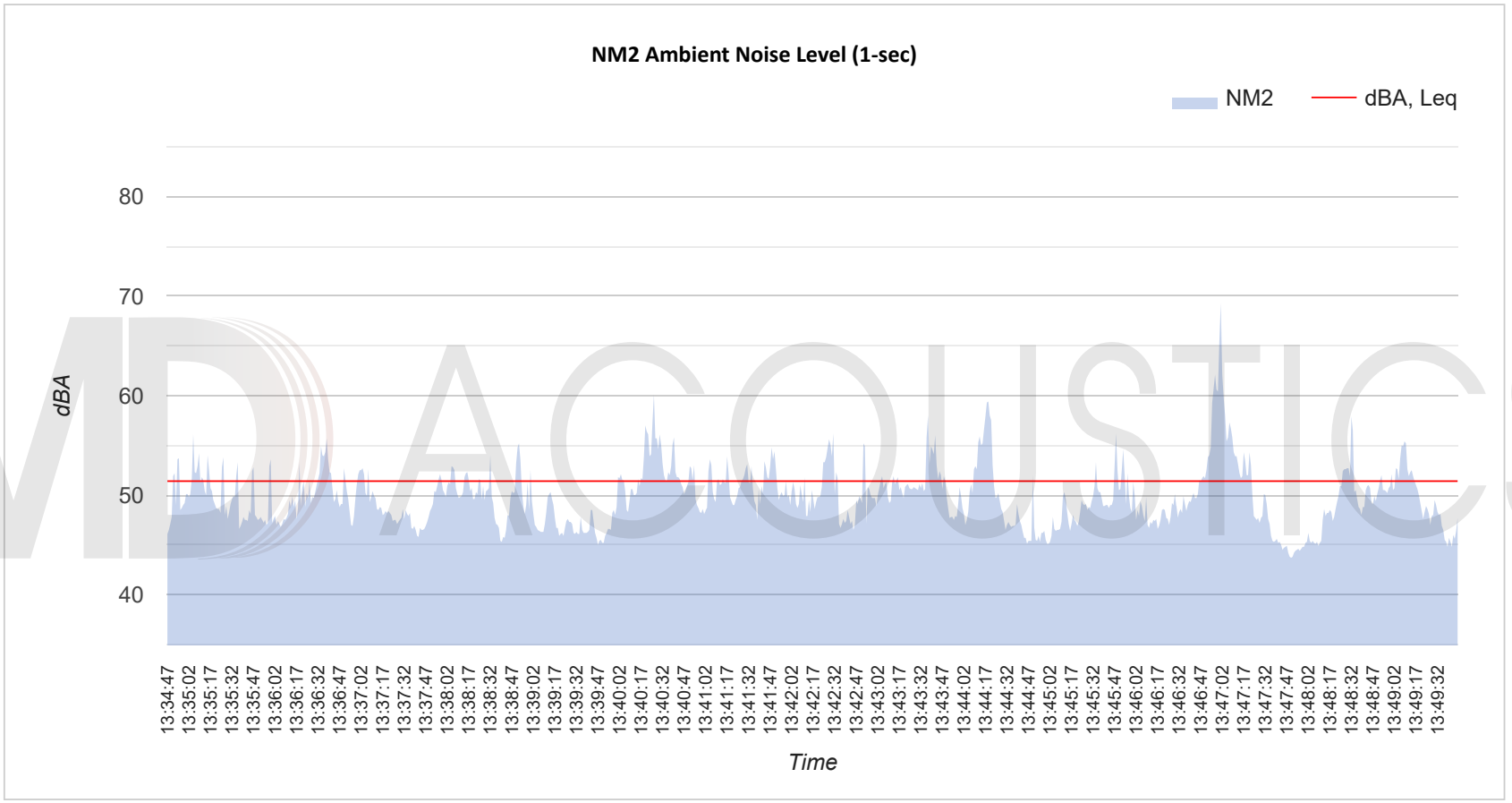
Project Name:	Grevillea Imperial Hotel	**Site Topo:**	Buildings 1-2 stories tall	**Noise Source(s) w/ Distance:**	
Site Address/Location:	4756 Imperial Highway	**Meteorological Cond.:**	72F Winds 0-5mph		Road and commercial noise
Site Id:	NM1	**Ground Type:**	buildings and asphalt		



MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont. - NM2

Project Name:	Grevillea Imperial Hotel	**Site Topo:**	Buildings 1-2 stories tall	**Noise Source(s) w/ Distance:**	
Site Address/Location:	4756 Imperial Highway	**Meteorological Cond.:**	72F Winds 0-5mph		Road and commercial noise
Site Id:	NM2	**Ground Type:**	buildings and asphalt		



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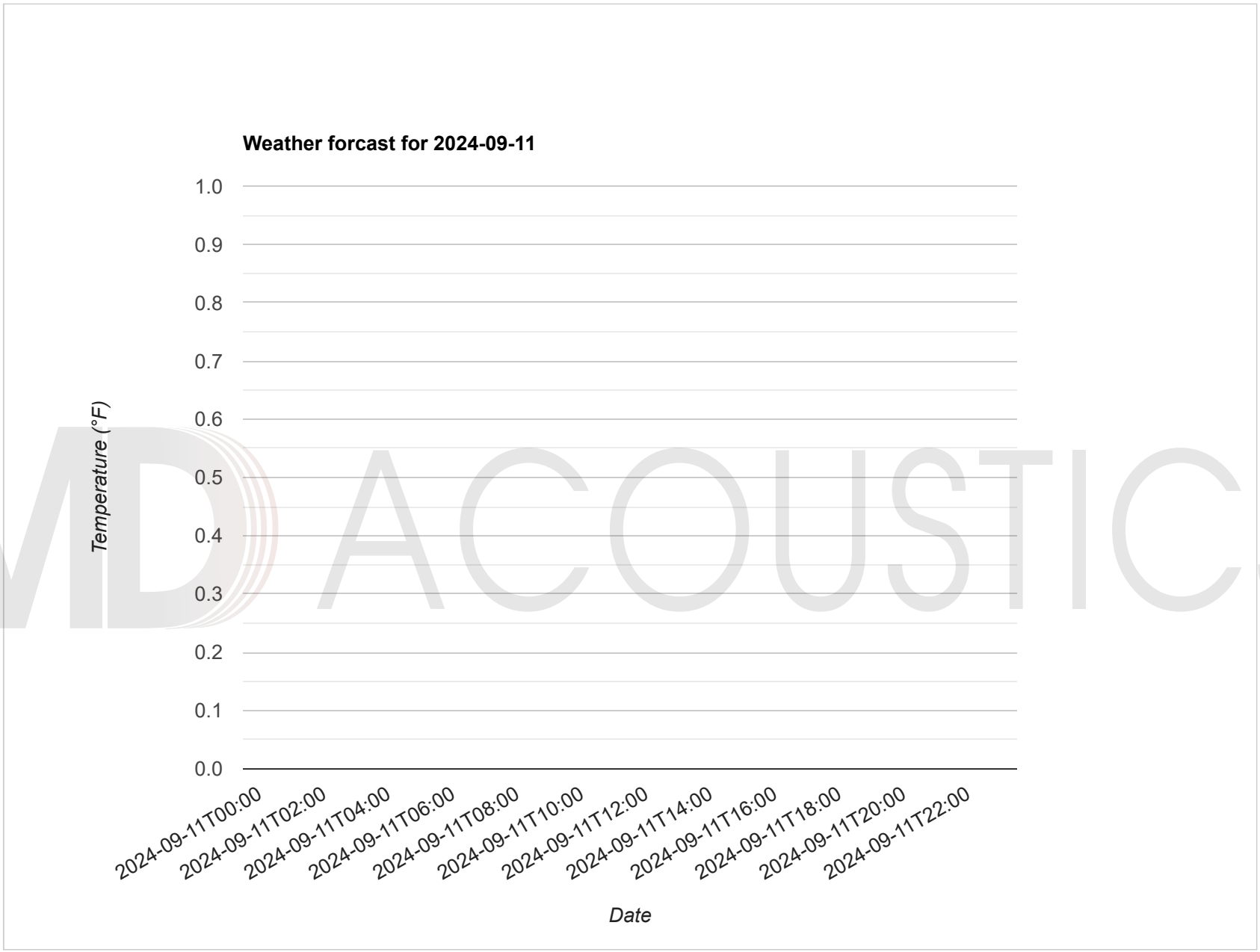

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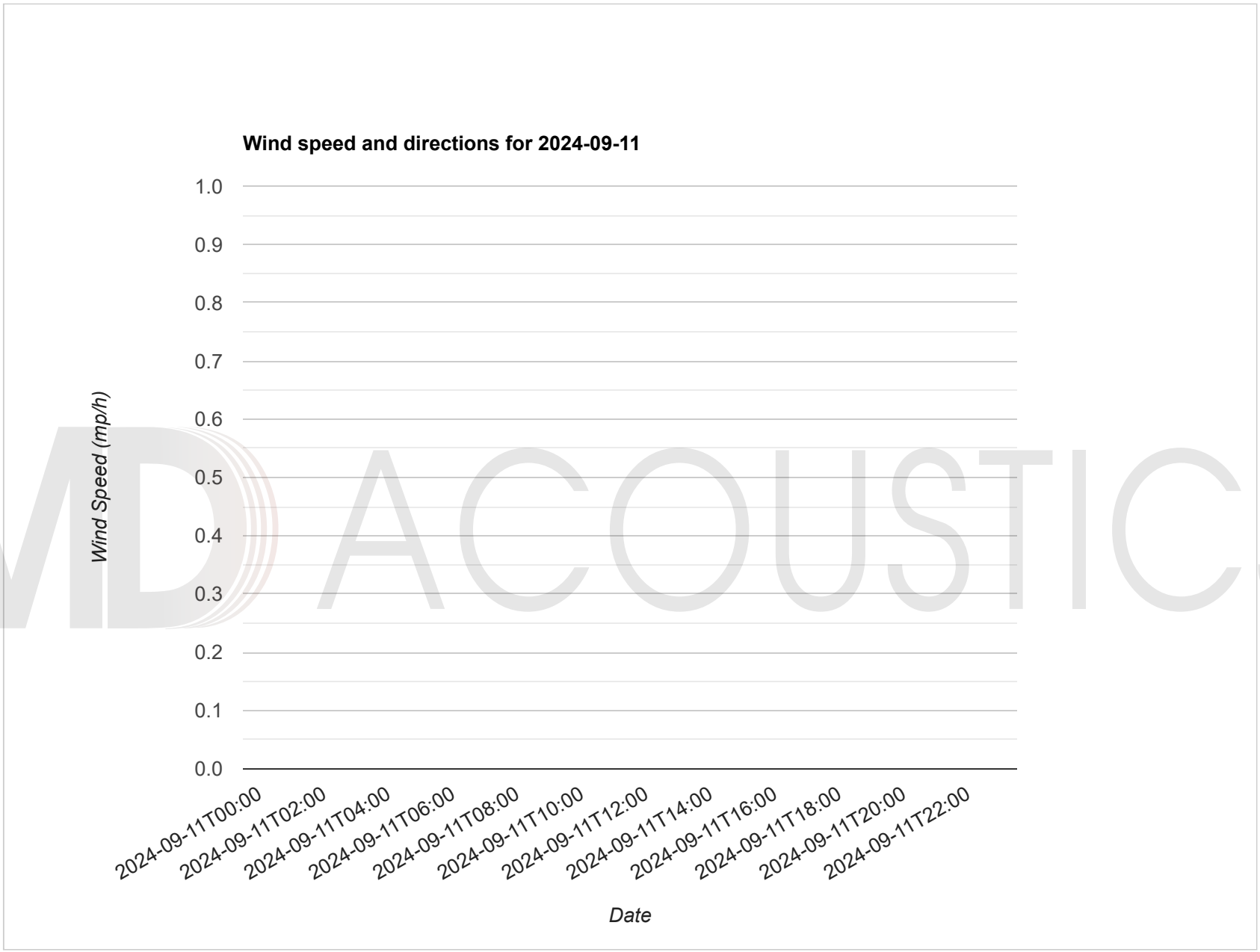

MD ACOUSTICS

Source: Global Forecast System (GFS) weather forcast model

Appendix B:

SoundPLAN Noise Modeling Data

Grevillea-Imperial Hotel Hawthorne
Contribution spectra - 001 - Grevillea-Imperial Hotel Hawthorne: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Receiver 11374797,3755276 Fl G Lr,lim dB(A) Leq,d 49.8 dB(A)																															
Auto Parking	Leq,d	30.4					21.4			26.9			15.1			20.0			21.0			21.2			17.5			8.6			-11.1
Backout Alerter	Leq,d	49.2					13.0			24.0			32.1			38.8			44.2			44.1			42.2			36.7			
Car Lane	Leq,d	14.4	0.4	-17.2	-12.0	1.9	1.7	2.4	-2.7	-0.2	-4.7	-1.4	-6.9	-4.9	-0.9	-1.0	3.0	1.7	1.6	2.5	1.3	4.2	5.0	1.6	-0.8	-4.6	-8.7	-12.4	-17.8	-23.1	-29.4
Hot Tub	Leq,d	25.8														25.8															
HVAC	Leq,d	17.0	-21.3	-16.2	-13.3	0.6	4.3	-3.0	4.8	5.4	3.0	2.3	1.2	2.0	2.0	2.1	5.6	7.8	3.6	5.4	6.4	4.1	4.8	1.3	1.6	-1.5	-3.2	-10.8	-19.4	-26.5	-37.3
HVAC	Leq,d	22.6	-18.0	-12.6	-9.4	2.8	6.8	-0.2	9.8	10.8	8.7	8.3	7.4	8.4	8.5	8.6	11.7	13.6	9.3	11.1	12.1	9.8	10.5	6.9	7.2	4.2	2.6	-4.8	-13.3	-20.1	-30.5
HVAC	Leq,d	22.9	-14.3	-9.1	-6.0	6.0	9.9	2.8	11.0	11.6	9.2	8.4	7.0	7.6	7.7	7.7	11.5	13.3	9.2	11.1	12.1	10.0	10.8	7.5	8.2	5.6	4.7	-1.6	-8.6	-13.2	-20.7
HVAC	Leq,d	25.7	-11.4	-6.1	-2.9	9.2	13.2	6.1	14.3	15.0	12.5	12.0	10.6	11.2	11.2	11.0	14.0	15.6	11.4	13.4	14.4	12.2	13.1	9.9	10.6	8.1	7.4	1.4	-5.1	-9.2	-15.9
HVAC	Leq,d	20.4	-16.5	-11.3	-8.2	3.8	7.7	0.5	8.5	9.1	6.6	5.8	4.4	5.1	5.0	5.1	8.8	10.9	6.7	8.6	9.6	7.4	8.2	4.8	5.3	2.6	1.4	-5.4	-12.9	-18.5	-27.2
HVAC	Leq,d	22.0	-14.5	-9.2	-6.1	5.9	9.8	2.6	10.6	11.1	8.6	7.9	6.6	7.2	7.4	7.2	10.5	12.3	8.0	9.9	10.8	8.6	9.4	6.0	6.6	3.9	2.8	-3.8	-11.1	-16.2	-24.4
Loading Dock	Leq,d	38.0					7.7			13.3			19.2			24.9			32.4			33.3			32.0			26.2			
Pool	Leq,d	34.9														34.9															
Receiver 11374821,3755275 Fl G Lr,lim dB(A) Leq,d 44.1 dB(A)																															
Auto Parking	Leq,d	40.8					27.1			36.0			27.1			31.5			32.6			33.5			30.8			23.1			5.8
Backout Alerter	Leq,d	35.2					1.4			7.1			18.7			25.1			29.0			30.0			29.8			22.0			
Car Lane	Leq,d	20.7	3.8	-14.0	-9.0	5.1	5.0	6.0	1.2	4.8	0.8	5.1	0.1	2.0	6.0	6.0	10.0	8.7	8.7	9.7	8.3	11.2	12.1	8.8	6.4	2.9	-1.0	-4.4	-9.3	-14.0	-19.5
Hot Tub	Leq,d	28.1														28.1															
HVAC	Leq,d	28.6	-14.1	-8.4	-4.9	7.6	12.0	5.4	14.0	17.1	15.3	15.3	14.5	15.6	15.8	16.0	19.0	20.3	15.3	16.3	16.4	13.9	14.7	11.3	11.8	9.1	7.8	1.0	-6.7	-12.3	-21.2
HVAC	Leq,d	32.2	-13.1	-5.5	-1.9	10.6	15.1	8.4	16.9	20.4	18.6	18.6	18.0	19.2	19.6	19.9	23.0	24.4	19.5	20.6	20.8	17.7	17.6	13.4	13.0	9.3	7.2	-0.1	-7.8	-13.2	-21.7
HVAC	Leq,d	21.8	-15.4	-10.2	-7.0	5.1	9.1	2.0	10.1	10.8	8.3	7.5	6.1	6.7	6.6	6.5	10.2	12.1	8.0	9.9	11.0	8.8	9.7	6.4	7.0	4.3	3.3	-3.2	-10.3	-15.3	-23.3
HVAC	Leq,d	24.0	-13.0	-7.7	-4.5	7.7	11.7	4.6	12.8	13.4	10.9	10.2	8.8	9.4	9.5	9.3	12.2	13.9	9.8	11.7	12.7	10.5	11.4	8.1	8.8	6.3	5.4	-0.8	-7.6	-12.1	-19.4
HVAC	Leq,d	26.3	-14.6	-9.4	-6.2	5.8	9.8	2.6	10.8	11.4	13.1	12.8	11.9	12.9	13.2	13.4	16.6	18.1	13.4	14.8	15.3	12.7	13.1	9.7	10.3	7.7	6.7	0.3	-6.8	-11.6	-19.4
HVAC	Leq,d	35.4	-9.9	-4.3	-0.7	11.9	16.4	9.9	18.8	22.1	20.6	20.9	20.5	21.9	22.7	23.1	26.4	27.7	23.0	24.2	24.6	21.8	22.0	18.1	18.2	15.0	13.8	7.4	0.5	-3.8	-10.9
Loading Dock	Leq,d	29.9					-4.2			1.5			13.5			19.9			23.7			24.7			24.5			16.8			
Pool	Leq,d	32.6														32.6															
Receiver R3 Fl G Lr,lim dB(A) Leq,d 55.2 dB(A)																															
Auto Parking	Leq,d	29.7					20.5			26.4			15.4			19.1			20.3			20.6			16.8			7.0			-15.4
Backout Alerter	Leq,d	54.0					23.2			31.4			36.5			43.2			47.6			48.7			48.2			44.4			

Grevillea-Imperial Hotel Hawthorne
Contribution spectra - 001 - Grevillea-Imperial Hotel Hawthorne: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Car Lane	Leq,d	14.5	0.1	-17.7	-12.6	1.5	1.5	2.4	-2.6	0.3	-3.9	-0.2	-6.2	-4.7	-1.0	-1.0	3.3	1.8	1.8	2.8	1.7	4.4	5.1	1.6	-1.2	-5.3	-9.9	-14.4	-20.8	-27.5	-35.7
Hot Tub	Leq,d	23.2														23.2															
HVAC	Leq,d	16.8	-19.8	-14.4	-11.1	1.1	5.2	-1.8	6.3	7.1	4.7	4.1	2.7	3.4	3.2	3.0	5.8	7.0	1.9	3.0	3.9	1.6	2.1	-1.6	-1.5	-5.0	-7.3	-15.6	-25.5	-34.3	-47.3
HVAC	Leq,d	17.0	-19.2	-14.0	-10.9	1.0	4.8	-2.4	5.5	6.3	4.1	3.5	2.5	3.4	3.6	3.6	6.5	7.8	2.7	3.8	4.6	2.2	2.7	-1.0	-1.0	-4.5	-6.8	-15.1	-24.8	-33.5	-46.3
HVAC	Leq,d	27.2	-13.2	-7.7	-4.2	8.2	12.6	5.9	14.6	15.8	13.9	13.8	13.0	14.0	14.3	14.4	17.4	18.6	13.5	14.5	14.9	12.6	13.4	10.1	10.6	7.9	6.7	0.0	-7.4	-12.8	-21.4
HVAC	Leq,d	29.9	-11.8	-6.1	-2.5	10.0	14.5	8.0	16.8	18.1	16.4	16.3	15.6	16.8	17.3	17.5	20.5	21.7	16.7	17.7	17.9	14.8	14.7	11.2	11.7	9.1	8.0	1.5	-5.7	-10.7	-18.8
HVAC	Leq,d	24.4	-17.0	-11.6	-8.2	4.1	8.3	1.6	10.1	11.2	9.3	9.2	8.3	9.4	9.5	9.5	12.5	13.9	8.8	14.7	15.7	13.4	14.0	10.3	10.2	6.5	4.0	-4.3	-13.5	-20.8	-31.5
HVAC	Leq,d	21.2	-16.1	-10.6	-7.2	5.2	9.4	2.5	10.7	11.5	9.2	8.6	7.3	8.0	7.7	7.6	10.4	11.6	6.5	7.4	7.5	4.9	5.6	2.1	2.4	-0.7	-2.3	-9.7	-18.1	-24.8	-35.2
Loading Dock	Leq,d	48.6					16.0			25.1			31.0			37.7			42.2			43.3			42.8			38.9			
Pool	Leq,d	32.8														32.8															
Receiver R4	Fl G	Lr,lim dB(A)		Leq,d 52.4 dB(A)																											
Auto Parking	Leq,d	27.3					18.8			24.3			13.0			16.0			17.6			17.7			13.5			2.7			-22.2
Backout Alerter	Leq,d	51.1					16.7			26.4			33.0			39.9			44.9			46.0			45.4			40.8			
Car Lane	Leq,d	11.1	-0.9	-18.8	-13.7	0.2	0.1	0.9	-4.3	-1.7	-6.2	-2.7	-9.1	-8.4	-5.2	-5.2	-1.3	-2.7	-2.8	-1.9	-2.9	-0.2	0.5	-3.1	-5.9	-10.1	-15.0	-19.8	-26.8	-34.2	-43.4
Hot Tub	Leq,d	23.1														23.1															
HVAC	Leq,d	16.7	-20.4	-14.9	-11.6	0.7	4.7	-2.3	5.7	6.4	4.2	3.8	2.7	3.6	3.5	3.5	6.4	7.6	2.5	3.4	3.6	0.6	1.2	-2.6	-2.6	-6.1	-8.6	-17.2	-27.5	-36.8	-50.6
HVAC	Leq,d	22.7	-19.4	-13.6	-9.9	2.7	7.3	0.8	9.5	10.9	9.2	9.4	8.7	10.0	10.1	10.3	13.4	14.7	9.7	10.7	10.9	7.7	7.3	2.7	2.7	-0.8	-3.1	-11.6	-21.7	-30.8	-44.2
HVAC	Leq,d	25.7	-16.1	-10.4	-6.8	5.7	10.3	3.8	12.5	13.9	12.2	12.3	11.6	12.8	13.1	13.3	16.3	17.8	12.8	13.8	14.0	10.8	10.7	6.3	6.2	3.3	1.9	-5.2	-13.2	-19.3	-28.8
HVAC	Leq,d	31.9	-12.6	-6.8	-3.0	9.7	14.4	8.2	17.2	18.8	17.3	17.6	17.2	18.6	19.1	19.5	22.8	24.2	19.4	20.6	20.8	17.8	17.7	13.5	13.1	9.3	7.1	-0.7	-8.8	-14.5	-23.5
HVAC	Leq,d	20.9	-17.5	-11.9	-8.3	4.2	8.6	1.9	10.2	11.2	9.0	8.5	7.3	8.0	7.7	7.6	10.4	11.6	6.5	7.4	7.5	4.2	4.0	0.2	0.5	-2.7	-4.6	-12.4	-21.4	-29.0	-40.5
HVAC	Leq,d	21.9	-16.4	-10.8	-7.3	5.2	9.4	2.6	10.9	11.7	9.5	9.0	7.9	8.8	8.8	8.8	11.7	13.0	7.9	8.8	9.0	5.8	5.5	1.5	1.6	-1.6	-3.5	-11.2	-20.1	-27.4	-38.5
Loading Dock	Leq,d	45.8					11.2			20.6			27.6			34.5			39.6			40.7			40.0			35.5			
Pool	Leq,d	33.3														33.3															

Source	Source type	Leq,d dB(A)	
Receiver 11374797,3755276 Fl G Lr,lim dB(A) Leq,d 49.8 dB(A)			
Backout Alerter	Point	49.2	
Loading Dock	Point	38.0	
Pool	Area	34.9	
Auto Parking	PLot	30.4	
Hot Tub	Area	25.8	
HVAC	Point	25.7	
HVAC	Point	22.9	
HVAC	Point	22.6	
HVAC	Point	22.0	
HVAC	Point	20.4	
HVAC	Point	17.0	
Car Lane	Line	14.4	
Receiver 11374821,3755275 Fl G Lr,lim dB(A) Leq,d 44.1 dB(A)			
Auto Parking	PLot	40.8	
HVAC	Point	35.4	
Backout Alerter	Point	35.2	
Pool	Area	32.6	
HVAC	Point	32.2	
Loading Dock	Point	29.9	
HVAC	Point	28.6	
Hot Tub	Area	28.1	
HVAC	Point	26.3	
HVAC	Point	24.0	
HVAC	Point	21.8	
Car Lane	Line	20.7	
Receiver R3 Fl G Lr,lim dB(A) Leq,d 55.2 dB(A)			
Backout Alerter	Point	54.0	
Loading Dock	Point	48.6	
Pool	Area	32.8	
HVAC	Point	29.9	
Auto Parking	PLot	29.7	
HVAC	Point	27.2	
HVAC	Point	24.4	
Hot Tub	Area	23.2	
HVAC	Point	21.2	
HVAC	Point	17.0	
HVAC	Point	16.8	
Car Lane	Line	14.5	
Receiver R4 Fl G Lr,lim dB(A) Leq,d 52.4 dB(A)			
Backout Alerter	Point	51.1	
Loading Dock	Point	45.8	
Pool	Area	33.3	
HVAC	Point	31.9	

Source	Source type	Leq,d dB(A)	
Auto Parking	PLot	27.3	
HVAC	Point	25.7	
Hot Tub	Area	23.1	
HVAC	Point	22.7	
HVAC	Point	21.9	
HVAC	Point	20.9	
HVAC	Point	16.7	
Car Lane	Line	11.1	

Grevillea-Imperial Hotel Hawthorne
Octave spectra of the sources in dB(A) - 001 - Grevillea-Imperial Hotel Hawthorne: Outdoor SP

Name	Source type	I or A	Li	Rw	L'w	Lw	KI	KT	DO-Wall	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Auto Parking	PLot	1047.10			60.8	91.0	0.0	0.0	0	Typical spectrum	74.3	85.9	78.4	82.9	83.0	83.4	80.7	74.5	61.7
Backout Alerter	Point				103.0	103.0	0.0	0.0	0	Truck: backout alerter Lmax	70.0	80.0	87.1	93.1	96.0	97.0	97.1	95.0	
Car Lane	Line	41.76			62.8	79.0	0.0	0.0	0	Drive-Thru - Idiling Car @ 6ft	62.7	64.2	67.0	71.9	72.5	73.8	70.3	62.3	55.7
Hot Tub	Area	10.34			66.0	76.1	0.0	0.0	0	Beer garden, normal				76.1					
HVAC	Point				84.0	84.0	0.0	0.0	0	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	60.3	69.1	71.9	76.7	78.4	78.2	75.2	70.8	59.1
HVAC	Point				84.0	84.0	0.0	0.0	0	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	60.3	69.1	71.9	76.7	78.4	78.2	75.2	70.8	59.1
HVAC	Point				84.0	84.0	0.0	0.0	0	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	60.3	69.1	71.9	76.7	78.4	78.2	75.2	70.8	59.1
HVAC	Point				84.0	84.0	0.0	0.0	0	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	60.3	69.1	71.9	76.7	78.4	78.2	75.2	70.8	59.1
HVAC	Point				84.0	84.0	0.0	0.0	0	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	60.3	69.1	71.9	76.7	78.4	78.2	75.2	70.8	59.1
HVAC	Point				84.0	84.0	0.0	0.0	0	HVAC: 67.7dB @ 3ft - Carrier 50TFQ0006 -	60.3	69.1	71.9	76.7	78.4	78.2	75.2	70.8	59.1
Loading Dock	Point				80.0	80.0	0.0	0.0	0	Truck: loading general cargo	47.0	57.0	64.1	70.1	73.0	74.0	74.1	72.0	
Pool	Area	49.31			66.0	82.9	0.0	0.0	0	Beer garden, normal				82.9					

Appendix C:

FHWA Roadway Noise Modeling Worksheets

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	GREVILLEA HOTEL	JOB #:	0462-24-11
ROADWAY:	IMPERIAL HIGHWAY	DATE:	8-Jan-25
LOCATION:	INGLEWOOD AVENUE TO HAWTHORNE BOULEVARD	ENGINEER:	S Ostergaard

IMPERIAL HIGHWAY (EXISTING)

ROADWAY CONDITIONS

ADT =	22,900	
SPEED =	35	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	60	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	2,290	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		80
DIST C/L TO WALL =		75
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		5
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL:	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	73.98	- -
MEDIUM TRUCKS	4.0	73.88	- -
HEAVY TRUCKS	8.0	73.85	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	66.1	64.2	62.4	56.4	65.0	65.6
MEDIUM TRUCKS	58.6	57.1	50.7	49.1	57.6	57.8
HEAVY TRUCKS	59.8	58.4	49.4	50.6	59.0	59.1
NOISE LEVELS (dBA)	67.6	65.8	62.9	58.0	66.5	67.0

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	59.7	57.8	56.0	50.0	58.6	59.2
MEDIUM TRUCKS	52.4	50.9	44.5	43.0	51.5	51.7
HEAVY TRUCKS	54.1	52.7	43.7	44.9	53.3	53.4
NOISE LEVELS (dBA)	61.3	59.6	56.6	51.7	60.3	60.8

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	40	128	403	1275
LDN	36	114	361	1142

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	GREVILLEA HOTEL	JOB #:	0462-24-11
ROADWAY:	IMPERIAL HIGHWAY	DATE:	8-Jan-25
LOCATION:	INGLEWOOD AVENUE TO HAWTHORNE BOULEVARD	ENGINEER:	S Ostergaard

IMPERIAL HIGHWAY (EXISTING + PROJECT)

ROADWAY CONDITIONS

ADT =	23,523	
SPEED =	35	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	60	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	2,352	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		80
DIST C/L TO WALL =		75
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		5
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL:	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	73.98	- -
MEDIUM TRUCKS	4.0	73.88	- -
HEAVY TRUCKS	8.0	73.85	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	66.2	64.3	62.5	56.5	65.1	65.7
MEDIUM TRUCKS	58.7	57.2	50.8	49.3	57.7	58.0
HEAVY TRUCKS	59.9	58.5	49.5	50.7	59.1	59.2
NOISE LEVELS (dBA)	67.7	65.9	63.0	58.1	66.7	67.1

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	59.8	57.9	56.1	50.1	58.7	59.3
MEDIUM TRUCKS	52.5	51.0	44.7	43.1	51.6	51.8
HEAVY TRUCKS	54.2	52.8	43.8	45.0	53.4	53.5
NOISE LEVELS (dBA)	61.4	59.7	56.8	51.9	60.4	60.9

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	41	131	414	1310
LDN	37	117	371	1173

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	GREVILLEA HOTEL	JOB #:	0462-24-11
ROADWAY:	IMPERIAL HIGHWAY	DATE:	8-Jan-25
LOCATION:	INGLEWOOD AVENUE TO HAWTHORNE BOULEVARD	ENGINEER:	S Ostergaard

IMPERIAL HIGHWAY (EXISTING + PROJECT)

ROADWAY CONDITIONS

ADT =	23,523	
SPEED =	35	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	60	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	2,352	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		50
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL:	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	40.15	- -
MEDIUM TRUCKS	4.0	40.03	- -
HEAVY TRUCKS	8.0	40.08	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	68.8	66.9	65.2	59.1	67.8	68.4
MEDIUM TRUCKS	61.3	59.8	53.5	51.9	60.4	60.6
HEAVY TRUCKS	62.6	61.2	52.1	53.4	61.7	61.9
NOISE LEVELS (dBA)	70.4	68.6	65.7	60.8	69.3	69.8

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	68.8	66.9	65.2	59.1	67.8	68.4
MEDIUM TRUCKS	61.3	59.8	53.5	51.9	60.4	60.6
HEAVY TRUCKS	62.6	61.2	52.1	53.4	61.7	61.9
NOISE LEVELS (dBA)	70.4	68.6	65.7	60.8	69.3	69.8

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	48	151	477	1509
LDN	43	135	427	1351

Appendix D:

Construction Noise Modeling Output

VIBRATION LEVEL IMPACT

Project:	Grevillea Hotel	Date: 1/8/25
Source:	Large Bulldozer	
Scenario:	Unmitigated	
Location:	Adjacent residences to the south	
Address:	4756 Imperial Highway	

PPV = PPVref(25/D)^n (in/sec)

DATA INPUT

Equipment = Type	2	Large Bulldozer	INPUT SECTION IN BLUE
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	10.00	Distance from Equipment to Receiver (ft)	
n =	1.10	Vibration attenuation rate through the ground	

Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.

DATA OUT RESULTS

PPV =	**0.24**	IN/SEC	OUTPUT IN RED