Appendix J

Noise Report

Noise Technical Report

Rohr Wohl Specific Plan Project

AUGUST 2024

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
ACC	Air-cooled condensers
ADT	Average Daily Traffic
BPF	Business Park Flex
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Chula Vista
CNEL	Community Noise Equivalent Level
CO	Commercial Office
County	San Diego County
CV	Commercial Visitor
CVMC	Chula Vista Municipal Code
dB	decibel
dBA	A-weighted decibel
DOT	Department of Transportation
FICON	Federal Interagency Committee on Noise
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	Heating, ventilation, and air conditioning
ips	inches per second
ISO	International Organization of Standardization
LACDPW	Los Angeles County Department of Public Works
L_{dn}	day–night average noise level
L_{eq}	equivalent noise level
LI	Light Industrial
L_{max}	maximum sound level
L_{min}	minimum sound level
LT	Long-term
OBCF	Octave-band center frequency
OPR	Governor’s Office of Planning and Research
Rohr Wohl Specific Plan	proposed project
PPV	peak particle velocity
PWL	Sound power level
RCNM	Roadway Construction Noise Model
RTP	Regional Technology Park
SLM	Sound level meter
SPL	Sound pressure level
ST	Short-term
VdB	Velocity Decibel

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1 Introduction

1.1 Report Purpose and Scope

The purpose of this technical report is to assess the potential noise impacts associated with construction and operation of the Rohr Wohl Specific Plan project (project). This analysis uses the significance thresholds in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.).

1.2 Regional and Local Setting

The project site is 44.78 acres located in the City of Chula Vista, California (City). The site is in the northwest portion of the City, directly adjacent to the City of San Diego. More specifically, the project site is located west of Interstate (I) 5, north of H Street, south of G Street, and east of Marina Parkway (Figure 1, Project Location). The site Assessor's Parcel Numbers are 571-330-35, 36, 37, 38, 39, 40, 41, 42, 43, 44, and 45.

1.3 Project Description

The proposed project involves the preparation of a Specific Plan that would govern future development within the three Planning Areas (A, B-1, and B-2) at the project site (see Figure 2). Specific plans are a mechanism to ensure that projects develop in an organized and a cohesive manner. Specific plans incorporate a development framework for detailed land use, circulation, infrastructure including drainage, sewer, and water facilities, and urban design and landscape plans. A comprehensive set of design guidelines and development regulations are included to guide and regulate site planning, landscape, and architectural character within the Specific Plan area ensuring that excellence in design is achieved during project development. The Rohr Wohl Specific Plan establishes the procedures and requirements to approve new development within the Specific Plan area.

A General Plan and Land Use Plan Amendment is proposed to be processed concurrently with Specific Plan adoption, which would change the existing I-G (General Industrial) zoning designation to three new zoning designations: PA-1 (for Planning Area A), PA-2 (for Planning Area B-1), and PA-3 (for Planning Area B-2). These new designations would provide for permitted, conditionally permitted, and prohibited uses within six land use categories: Commercial Retail (CR), Commercial Visitor (CV), Commercial Office (CO), Light Industrial (LI), Regional Technology Park (RTP), and Business Park Flex (BPF). The existing zoning designation of I-G would be amended to complement the Collins Aerospace Campus to allow a flexible combination of light industrial, office, commercial and visitor-oriented uses to complement both the overall Chula Vista Bayfront area and the western part of Chula Vista. California Government Code (Title 7, Division 1, Chapter 3, Article 8, Sections 65450–65457) permits adoption and administration of specific plans as an implementation tool for the local general plan. Specific plans must demonstrate consistency in regulations, guidelines, and programs with the goals and policies set forth in the general plan. The Rohr Wohl Specific Plan would be prepared in conformance with the goals and policies of the City of Chula Vista General Plan as amended, in providing a commercial/light Industrial use on an underutilized property, creating new employment opportunities, and providing regulations that support the success of an employment area of the City.

The project site is divided into three separate planning areas. The eastern portion of the project site, closest to I-5 (between G Street and H Street), is designated as Planning Area A and is 9.29 acres. The largest planning area is

Planning Area B-1, which is 26.13 acres. The last planning area is Planning Area B-2, which is located south of B-1 and is 9.36 acres (Figure 2, Site Plan).

Planning Areas A, B-1, and B-2 of the project site are located within the Chula Vista Bayfront Local Coastal Program and currently lie within the General Industrial (I) Zoning and Industrial (I) General Plan land use designations. Land uses in the vicinity of the project site include vacant properties, Collins Aerospace, and Seven Mile Casino to the north; Marina, Chula Vista Harbor, and future development as part of the Chula Vista Bayfront Master Plan to the south; Bay Boulevard and I-5 to the east; and Chula Vista RV Resort and future development site for the Gaylord Pacific Resort Hotel and Convention Center to the west.

The land uses shown in Table 1 represent proposed land uses for each of the three Planning Areas.

Table 1. Proposed Land Uses

Land Use Category	Allowed Services
Commercial Retail (CR)	Designates areas for general commercial activities and services of a more intensive nature, including but not limited to shopping facilities, major service-oriented uses, food uses, and other retail uses that are designed to serve the city or the region as a whole and are typically located primarily along major transportation routes.
Commercial Visitor (CV)	Designates areas for large-scale commercial development that serves both local and regional needs. The regulations of this zone are designed to encourage the provision of lodging, restaurants, service stations, and other activities providing for the convenience, welfare, or entertainment of the traveler. Sites are easily accessible from freeways and may contain a variety of goods and services, such as eating and drinking establishments, hotels, and motels.
Commercial Office (CO)	Designates areas for activities that cater to business support and personal services. Uses typically include medical and health care clinics, travel agencies, insurance agencies, copy centers, and other similar land uses.
Light Industrial (LI)	Designates areas for industrial firms seeking an attractive and pleasant working environment and a location which has prestige value. The district allows light industrial uses, office and administration facilities, research and development laboratories, and limited types of warehousing, as well as support businesses and commercial service uses.
Regional Technology Park (RTP)	Designates areas reserved for manufacturing, processing, warehousing and storage, e-commerce distribution, light industrial research parks, retail uses to complement the primary use; supportive amenities and services; and convenient transit access, and a broad range of similar clean industrial practices and processes that typically generate less truck traffic and noise.
Business Park Flex (BPF)	Designates areas to support a complementary mix of uses such as research and development, e-commerce, light and custom manufacturing, engineering and design services, breweries, and maker spaces, as well as accessory office, retail uses to compliment the primary use; supportive amenities and services; and convenient transit access. This zoning district encourages light industrial activities with low environmental impacts and supports the growth of creative industries, incubator businesses, and innovative design and

Table 1. Proposed Land Uses

Land Use Category	Allowed Services
	manufacturing. The zoning district can allow for small scale, context sensitive warehousing, distribution, and manufacturing to support small business development.

The purpose and intent of the land uses proposed is to provide for commercial/light industrial uses on the underutilized project site, creating new employment opportunities and successfully restoring what was a major job center for the City. The Planning Areas would each include the land uses shown in Table 2.

Table 2. Proposed Land Uses for Planning Areas

Planning Area	Specific Plan Land Use	Acreage
A	Industrial/Business Park Flex	9.29
B-1	Regional Technology Park/Light Industrial/Commercial Office	26.13
B-2	Resort Hotel/Quality Restaurant	9.36

1.4 Fundamentals of Noise and Vibration

The following is a brief discussion of fundamental noise concepts and terminology.

1.4.1 Sound, Noise, and Acoustics

Sound is actually a process that consists of three components: the sound source, sound path, and sound receptor. All three components must be present for sound to exist. Without a source to produce sound, there is no sound. Similarly, without a medium to transmit sound pressure waves, there is no sound. Finally, sound must be received; a hearing organ, sensor, or object must be present to perceive, register, or be affected by sound or noise. In most situations, there are many different sound sources, paths, and receptors rather than just one of each. Acoustics is the field of science that deals with the production, propagation, reception, effects, and control of sound. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired.

1.4.2 Sound Pressure Levels and Decibels

The amplitude of a sound wave determines its loudness. Loudness of sound increases with increasing amplitude. Sound pressure amplitude is measured in units of micronewtons per square meter, also called micropascals. One micropascal is approximately one-hundred billionth (0.00000000001) of normal atmospheric pressure. The pressure of a very loud sound may be 200 million micropascals, or 10 million times the pressure of the weakest audible sound. Because expressing sound levels in terms of micropascals would be very cumbersome and the sensitivity of human hearing to changes in micropascals is rather coarse (e.g., a doubling of micropascals is just audible to most people), sound pressure level in logarithmic units is used instead to describe the ratio of actual sound pressure to a reference pressure squared. These units are called Bels. To provide a finer resolution, a Bel is subdivided into 10 decibels (dB).

1.4.3 A-Weighted Sound Level

Sound pressure level alone is not a reliable indicator of loudness. The frequency, or pitch, of a sound also has a substantial effect on how humans will respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness, or human response, is determined by the characteristics of the human ear.

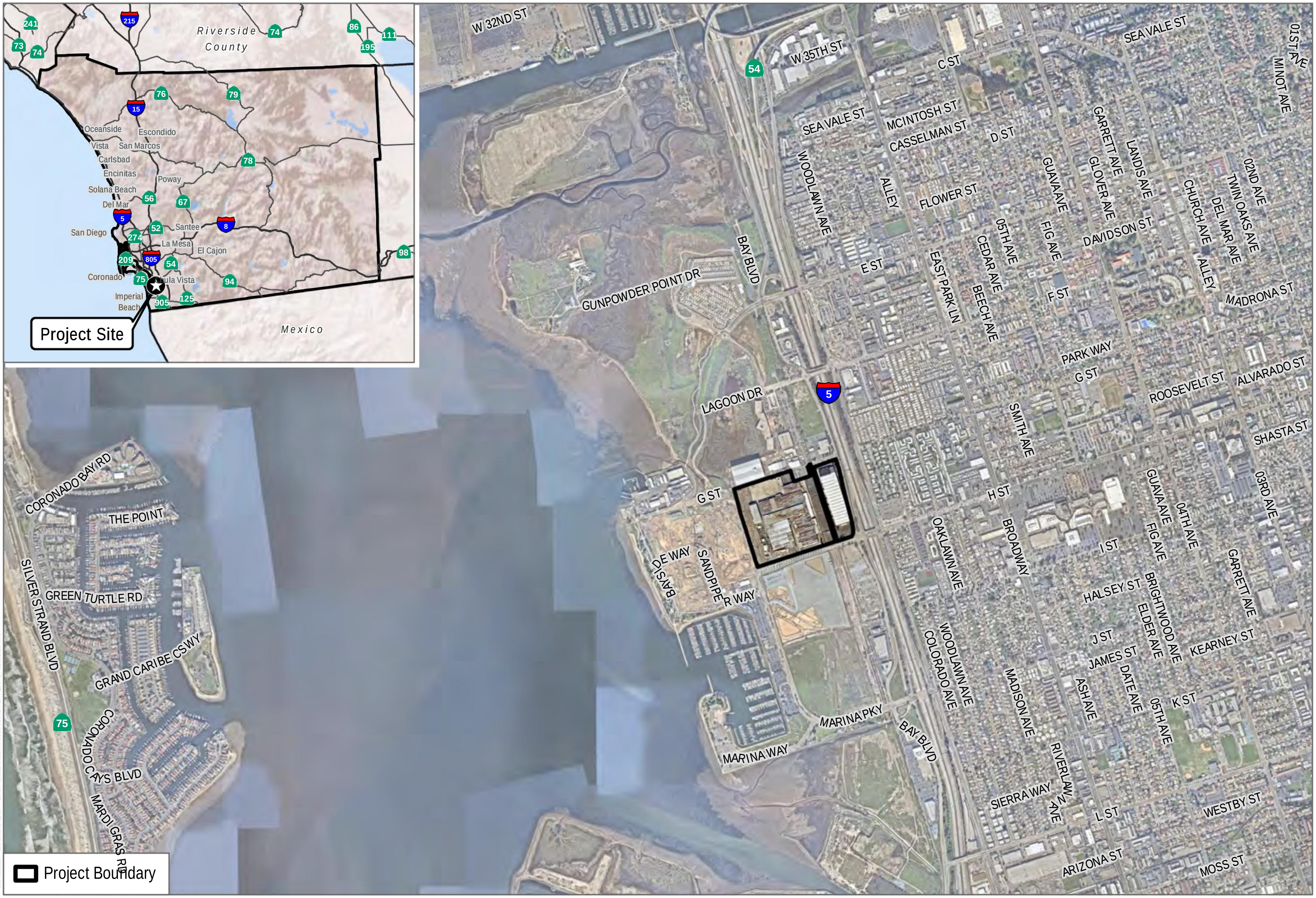
Human hearing is limited not only in the range of audible frequencies, but also in the way it perceives the sound in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 and 5,000 hertz, and it perceives a sound within that range as more intense than a sound of higher or lower frequency with the same magnitude. To approximate the frequency response of the human ear, a series of sound level adjustments is usually applied to the sound measured by a sound level meter. The adjustments (referred to as a weighting network) are frequency-dependent.

The A-scale weighting network approximates the frequency response of the average young ear when listening to ordinary sounds. When people make judgments about the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special situations (e.g., B-scale, C-scale, and D-scale), but these scales are rarely used in conjunction with most environmental noise evaluations. Noise levels are typically reported in terms of A-weighted sound levels. All sound levels discussed in this report are A-weighted decibels (dBA). Examples of typical noise levels for common indoor and outdoor activities are depicted in Table 3.

Table 3. Typical Sound Levels in the Environment and Industry

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
—	110	Rock band
Jet fly over at 300 meters (1,000 feet)	100	—
Gas lawn mower at 1 meter (3 feet)	90	—
Diesel truck at 15 meters (50 feet), at 80 kilometers per hour (50 miles per hour)	80	Food blender at 1 meter (3 feet); garbage disposal at 1 meter (3 feet)
Noisy urban area, daytime; gas lawn mower at 30 meters (100 feet)	70	Vacuum cleaner at 3 meters (10 feet)
Commercial area; heavy traffic at 90 meters (300 feet)	60	Normal speech at 1 meter (3 feet)
Quiet urban, daytime	50	Large business office; dishwasher next room
Quiet urban, nighttime	40	Theater; large conference room (background)
Quiet suburban, nighttime	30	Library
Quiet rural, nighttime	20	Bedroom at night; concert hall (background)
—	10	Broadcast/Recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 2020.



SOURCE: SANGIS 2023

DUDEK

0 1,000 2,000 Feet

FIGURE 1

Project Location

Rohr Wohl Specific Plan

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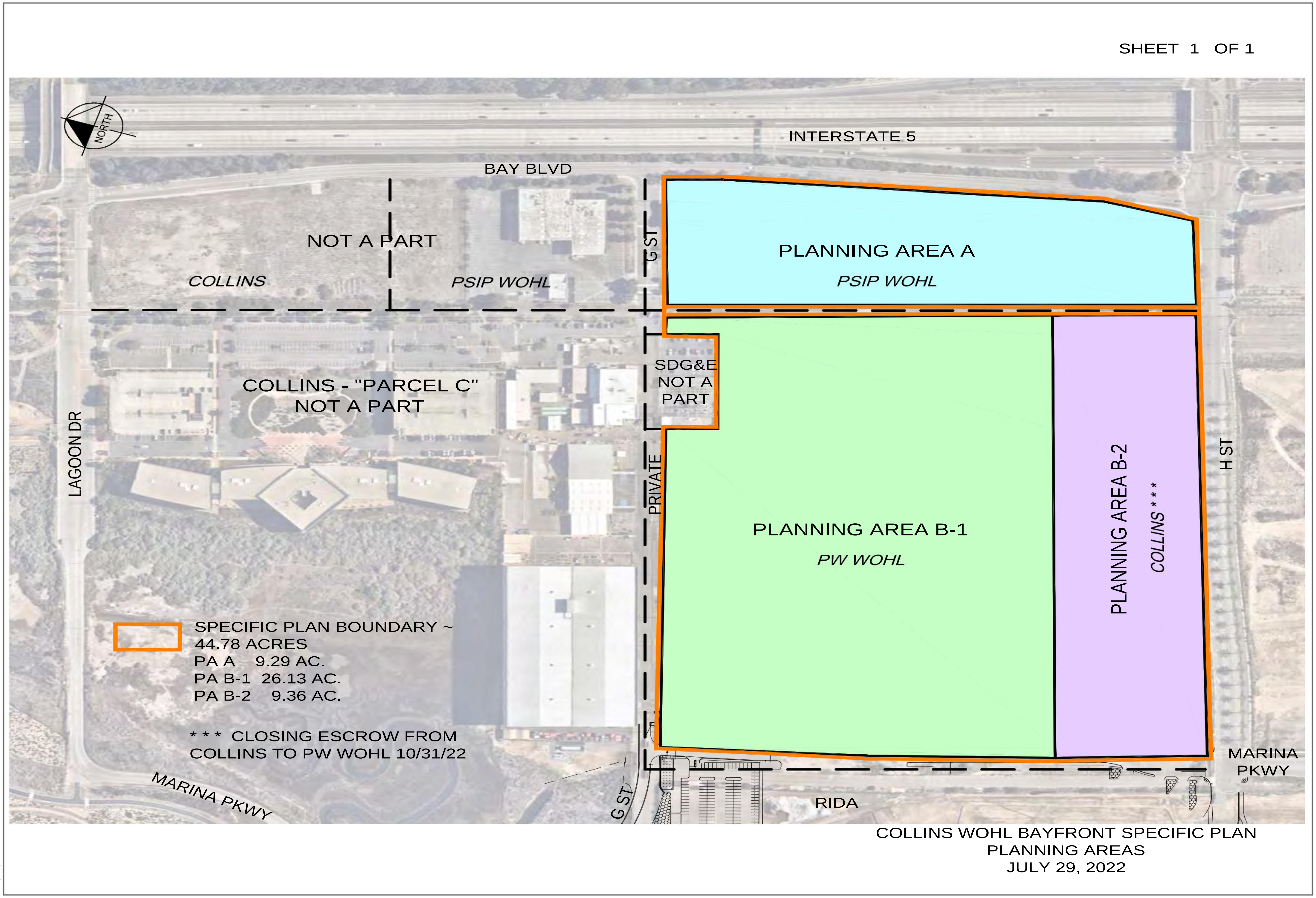

SOURCE: COLLINS WOHL BAYFRONT SPECIFIC PLAN, 2022

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FIGURE 2

Site Plan

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1.4.4 Human Response to Changes in Noise Levels

Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern changes in sound pressure levels of 1 dBA when exposed to steady, single-frequency signals in the mid-frequency range. Outside such controlled conditions, the trained ear can detect changes of 2 dBA in normal environmental noise. It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dBA. A change of 5 dBA is readily perceptible, and a change of 10 dBA is perceived as twice (if a gain) or half (if a loss) as loud. A doubling of sound energy results in a 3 dBA increase in sound, which means that a doubling of sound energy (e.g., doubling the volume of traffic on a road) would result in a barely perceptible change in sound level.

1.4.5 Noise Descriptors

Additional units of measure have been developed to evaluate the long-term characteristics of sound. The energy-equivalent sound level (L_{eq}) is also referred to as the time-average sound level. It is the equivalent steady-state or constant sound level that in a stated period of time would contain the same acoustical energy as the time-varying sound level during the same time period. For instance, the 1-hour A-weighted equivalent sound level, $L_{eq(h)}$, is the energy average of the A-weighted sound levels occurring during a 1-hour period, and is the basis for most of the City of Chula Vista Noise Ordinance standards.

People are generally more sensitive to and thus potentially more annoyed by noise occurring during the evening and nighttime hours. Hence, another noise descriptor used in community noise assessments—the community noise equivalent level (CNEL)—represents a time-weighted, 24-hour average noise level based on the A-weighted sound level. However, unlike an unmodified 24-hour L_{eq} value, the CNEL descriptor accounts for increased noise sensitivity during the evening (7 p.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) by adding 5 dBA and 10 dBA, respectively, to the average sound levels occurring during these defined hours within a 24-hour period. Whereas CNEL is used mostly in California, the L_{dn} descriptor (day-night average noise level, which is the same as CNEL with the only exception of not including the 5 dBA evening correction) is used more often for environmental noise evaluations for federal projects.

1.4.6 Sound Propagation

Sound propagation (i.e., the traverse of sound from a noise emission source position to a receptor location) is influenced by multiple factors that include geometric spreading, ground absorption, atmospheric effects, and occlusion by natural terrain and/or features of the built environment.

Sound levels attenuate (or diminish) geometrically at a rate of approximately 6 dBA per doubling of distance from an outdoor stationary point-type source due to the spherical spreading of sound energy with increasing distance travelled. The effects of atmospheric conditions such as humidity, temperature, and wind gradients are typically distance-dependent and can also temporarily either increase or decrease sound levels measured or perceived at a receptor location. In general, the greater the distance the receptor is from the source of sound emission, the greater the potential for variation in sound levels at the receptor due to these atmospheric effects. Additional attenuation can result from sound path occlusion and diffraction due to intervention of natural (ridgelines, dense forests, etc.) and built features (such as solid walls, buildings, and other structures).

1.4.7 Ground-borne Vibration Fundamentals

Ground-borne vibration is fluctuating or oscillatory motion transmitted through the ground mass (i.e., soils, clays, and rock strata). The strength of ground-borne vibration attenuates rapidly over distance. Some soil types transmit vibration quite efficiently; other types (primarily sandy soils) do not. Several basic measurement units are commonly used to describe the intensity of ground vibration. The descriptors used by the Federal Transit Administration (FTA) are peak particle velocity (PPV), in units of inches per second (ips), and velocity decibel (VdB) that is based on a root-mean square (RMS) of the vibration signal magnitude. The calculation to determine PPV at a given distance is as follows:

$$PPV_{distance} = PPV_{ref}*(25/D)^{1.5}$$

Where:

$PPV_{distance}$ = the peak particle velocity in inches per second of the equipment adjusted for distance

PPV_{ref} = the reference vibration level in inches per second at 25 feet

D = the distance from the equipment to the receptor

2 Regulatory Setting

2.1 Federal

2.1.1 Federal Transit Administration

In its Transit Noise and Vibration Impact Assessment guidance manual, the FTA recommends a daytime construction noise level threshold of 80 dBA L_{eq} over an 8-hour period (FTA 2018) when detailed construction noise assessments are performed to evaluate potential impacts to community residences surrounding a project. Although this FTA guidance is not a regulation, it can serve as a quantified standard in the absence of such noise limits at the state and local jurisdictional levels.

2.1.2 Federal Interagency Committee on Noise

Some guidance regarding the determination of a substantial permanent increase in ambient noise levels in the project vicinity above existing levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON 1992), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The FICON recommendations are based upon studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a qualitative measure of the adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment.

The rationale for the FICON recommendations is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of L_{dn}. The changes in noise exposure that are shown below are expected to result in equal changes in annoyance at sensitive land uses. Although the FICON recommendations were specifically developed to address aircraft noise impacts, they are used in this analysis to define a substantial increase in community noise levels related to all transportation noise sources and permanent non-transportation noise sources.

- Outdoor ambient sound level without the project is less than 60 dBA L_{dn}, then a project-attributed increase of 5 dBA or more would be considered significant;
- Outdoor ambient sound level without the project is between 60 and 65 dBA L_{dn}, project-attributed increase of 3 dBA or more would be considered significant; and
- Outdoor ambient sound level without the project is greater than 65 dBA L_{dn}, then project-attributed increase of 2 dBA or more would be considered significant.

2.2 State

2.2.1 California Code of Regulations, Title 24

Title 24 of the California Code of Regulations sets standards that new developments in California must meet. According to Title 24, interior noise levels are not to exceed 45 dBA CNEL in any habitable room (ICC 2019).

2.2.2 California Department of Health Services Guidelines

The California Department of Health Services has developed guidelines of community noise acceptability for use by local agencies (OPR 2017). Selected relevant levels are listed here:

- Below 60 dBA CNEL: normally acceptable for low-density residential use
- 50 to 70 dBA CNEL: conditionally acceptable for low-density residential use
- Below 65 dBA CNEL: normally acceptable for high-density residential use and transient lodging
- 60 to 70 dBA CNEL: conditionally acceptable for high-density residential, transient lodging, churches, educational, and medical facilities

The normally acceptable exterior noise level for high-density residential use is up to 65 dBA CNEL. Additionally, this exterior noise level limit is consistent with the City of Chula Vista General Plan Noise Element, which considers multi-family units to be noise-sensitive land uses.

2.2.3 California Department of Transportation

In its Transportation and Construction Vibration Guidance Manual (Caltrans 2020), the California Department of Transportation (Caltrans) recommends 0.5 ips PPV as a threshold for the avoidance of structural damage to typical newer residential buildings exposed to continuous or frequent intermittent sources of ground-borne vibration. For transient vibration events, such as blasting, the damage risk threshold would be 1.0 ips PPV (Caltrans 2020) at the same type of newer residential structures. For older structures, these guidance thresholds would be more stringent: 0.3 ips PPV for continuous/intermittent vibration sources, and 0.5 ips PPV for transient vibration events. With respect to human annoyance, Caltrans guidance indicates that building occupants exposed to continuous ground-borne vibration in the range of 0.2-0.6 ips PPV would find it “unpleasant or “annoying” and thus a likely significant impact. Although these Caltrans guidance thresholds are not regulations, they can serve as quantified standards in the absence of such limits at the local jurisdictional level.

2.3 Local

2.3.1 City of Chula Vista Noise Level Compatibility Standards

The City of Chula Vista Noise Ordinance (Chula Vista Municipal Code [CVMC] Section 19.68) (City of Chula Vista 2022) contains regulations restricting land use related noise-generating activities and operations, so as to avoid noise nuisance in the community. Section 19.68.030 of the CVMC establishes the maximum allowable exterior noise limits, based upon the classification of the receiving land use. These standards typically apply to stationary sources such as noise from mechanical equipment (including mechanical ventilation and air conditioning noise, pool pump noise, etc.) or event noise, as opposed to traffic noise. For instance, a school, commercial enterprise, or industrial operation must not generate noise that exceeds a certain specified noise level at any property boundary where an adjacent residential use exists. The property-line noise standards are presented in Table 4.

Table 4. City of Chula Vista Exterior Property-Line Noise Limits

Receiving Land Use Category	Noise Level (dB(A))	
	10 p.m. to 7 a.m. (Weekdays)	7 a.m. to 10 p.m. (Weekdays)
	10 p.m. to 8 a.m. (Weekends)	8 a.m. to 10 p.m. (Weekends)
All residential (except multiple dwelling)	45	55
Multiple-dwelling residential	50	60
Commercial	60	65
Light industry – I-R and I-L zone	70	70
Heavy industry – I zone	80	80

Source: City of Chula Vista Municipal Code Section 19.68.030, Table III (2022)
Note: dBA = A-weighted decibels

Title 17 of the CVMC (Environmental Quality), Chapter 24, addresses managing noisy and disorderly conduct. Section 17.24.040.C.8 specifically addresses restrictions against generation of construction noise in overnight periods. The use of any tools, power machinery, or equipment, or the conduct of construction and building work in residential zones so as to cause noises disturbing to the peace, comfort, and quiet enjoyment of property of any person residing or working in the vicinity, shall be prohibited between the hours of 10:00 p.m. and 7:00 a.m., Monday–Friday, and between the hours of 10:00 p.m. and 8:00 a.m., Saturday and Sunday, except when the work is necessary for emergency repairs required for the health and safety of any member of the community (City of Chula Vista 2022).

Although the City does not set specific numerical limits for noise associated with temporary construction activities, it can be perceived as a nuisance; thus the City restricts the times of day when construction may occur (7:00 a.m.–10:00 p.m., Monday–Friday, and 8:00 a.m.–10:00 p.m., Saturday and Sunday).

2.3.2 Transportation-Related Noise Standards

The City's Noise Element establishes a policy for exterior sensitive areas to be protected from high traffic noise levels. The Noise Element sets 65 dBA CNEL for exterior noise levels and 45 dBA CNEL for interior noise levels as the "normally acceptable" level.

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3 Existing Conditions

3.1 Sensitive Receptors

Noise- and vibration-sensitive land uses are typically considered locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, and hospitals are usual examples, with others depending on what the local jurisdiction may have defined or established. Based on context from the City's Noise Ordinance and General Plan Noise Element, sensitive receptors include residences, schools, hospitals, hotels and motels, places of worship, and open space/recreation uses. Future planned hotel land uses currently under construction approximately 130 feet to the west are the nearest noise-sensitive receptors in the vicinity of the Project site. Other sensitive receptors exist further afield and east of highway I-5, where they are dominated by traffic noise from the highway. These existing sensitive receptors represent the nearest land uses with the potential to be impacted by construction and operation of the Project, including noise levels associated with the addition of Project-related traffic on the local roadway network.

3.2 Noise Measurements

A sound pressure level (SPL) measurement survey was conducted at five (5) representative positions in the vicinity of the Project site on September 6, 2023, and September 7, 2023, to characterize the existing outdoor ambient noise levels. The noise measurement locations are shown in Figure 3.

Table 5 provides a summary of the noise measurement results as well as the location, date, and time that an individual noise level measurement was performed. As shown in Table 5, the short-term (15-minute duration) measured L_{eq} noise levels ranged from 65.6 dBA at ST1 to 75.2 dBA at ST3, while long-term (over 24 hours) measured noise levels averaged to 73.5 dBA.

The short-term measurements were conducted by an attending Dudek investigator with a SoftdB "Piccolo" model sound level meter equipped with a windscreen-protected, 0.5-inch diameter pre-polarized condenser microphone with pre-amplifier. The sound level meter meets the current American National Standards Institute (ANSI) standard for a Type 2 (General Use) sound level meter.

The unattended long-term SPL monitor deployed and retrieved by the Dudek investigator was a SoftdB "Piccolo" model sound level meter equipped with a windscreen-protected, 0.5-inch diameter pre-polarized condenser microphone with pre-amplifier. The sound level meter meets the current American National Standards Institute (ANSI) standard for a Type 2 (General Use) sound level meter.

The accuracy of both sound level meters was verified using a field calibrator before and after the measurements, and the measurements were conducted with the microphone positioned approximately five feet above the ground. Appendix A provides sample digital photographs of the field noise level survey locations, followed by Dudek investigator field notes.

Table 5. Measured Baseline Outdoor Ambient Noise Levels

Site	Location (and investigator observed/perceived sounds)	Date	Time	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)
ST1	Southwest corner of Sandpiper Bkwy. And Marina Pkwy. (construction at nearby hotel, distant aircraft, conversations, yelling, distant traffic, military helicopter flyovers, construction traffic)	9/6/23	1: 21 PM to 1:36 PM	65.6	78.3	55.8
ST2	Northwest corner of the I-5 Southbound offramp to H St. (traffic, distant aircraft, distant industrial, nearby construction)	9/6/23	1:54 PM to 2:09 PM	68.6	78.2	63.8
ST3	West of Bay Blvd., between G St. and H St. (traffic, distant aircraft, distant construction)	9/6/23	2:15 PM to 2:30 PM	75.2	83.3	70.9
ST4	Northwest corner of G St. and Bay Blvd. (traffic, construction traffic)	9/6/23	2:33 PM to 2:48 PM	73.7	83.3	69.2
LT1	West of Bay Blvd., between G St. and H St. (traffic, distant aircraft, distant construction)	9/6/23 to 9/7/23	1:05 PM to 1:05 PM	73.5	101.9	52.0

Source: Appendix A.
Notes: L_{eq} = equivalent continuous sound level (time-averaged sound level); dBA = A-weighted decibels; L_{max} = maximum sound level during the measurement interval; L_{min} = minimum sound level during the measurement interval. ST = short-term measurement location. LT = long-term measurement location. See Figure 3 for measurement locations.

SOURCE: Google 2023; Dudek 2023

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0 225 450 Feet

FIGURE 3

Project Site and Noise Measurement Locations

Rohr Wohl Specific Plan Project

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4 Thresholds of Significance

The following significance criteria are based on Appendix G of the California Environmental Quality Act Guidelines (14 CCR 15000 et seq.) and will be used to determine the significance of potential noise and vibration impacts. Impacts associated with noise and vibration would be significant if the proposed project would 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.
- Generation of excessive ground-borne vibration or ground-borne noise levels.
- Exposing people residing or working in the project area to excessive noise levels (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 2 miles of a public airport or public use airport).

In light of these above significance criteria, this analysis uses the following standards to evaluate potential noise and vibration impacts.

- **Construction noise** –The proximity of planned hotel land uses to the west of the project suggests that source-to-receptor distances are a minimum of approximately 130 feet. Additionally, most construction equipment and vehicles on a project site do not operate continuously. Therefore, consistent with the FTA guidance mentioned in Section 2 (Regulatory Setting), this analysis will use 80 dBA L_{eq} over an 8-hour period as the construction noise impact criterion during daytime hours (7:00 a.m. to 7:00 p.m.).
- **Off-site project-attributed transportation noise** – For purposes of this analysis, a direct roadway noise impact would be considered significant if increases in roadway traffic noise levels attributed to the proposed project were greater than 3 dBA CNEL at an existing noise-sensitive land use.
- **Off-site project-attributed stationary noise** – For purposes of this analysis, a noise impact would be considered significant if noise from typical operation of heating, ventilation, and air conditioning (HVAC), other electro-mechanical systems, and loading docks associated with the proposed project exceeded 50 dBA L_{eq} at the property line of the nearby hotel during nighttime hours. Note that these are the City's thresholds for the multi-family residential land uses that characterize the sensitive receptors adjacent to the proposed project site. Although the nearby future hotel land uses 130 feet to the west of the project site are not considered to be multi-family land uses, the multi-family land use threshold was used in absence of a City-provided threshold.
- **Construction vibration** – Guidance from Caltrans indicates that a vibration velocity level of 0.2 ips PPV received at a structure would be considered annoying by occupants within (Caltrans 2013). As for the receiving structure itself, aforementioned Caltrans guidance from Section 2 recommends that a vibration level of 0.3 ips PPV would represent the threshold for building damage risk.

For purposes of disclosure, since the current CEQA noise criteria listed above do not consider it, this analysis also evaluates compatibility of on-site noise exposure levels (e.g., from roadway traffic) with the City of Chula Vista exterior and interior noise standards of 65 dBA CNEL and 45 dBA CNEL, respectively.

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5 Impact Discussion

Potential noise and vibration impacts attributed to project construction and operation are studied in the following subsections that are categorized by the CEQA Guidelines Appendix G significance for noise.

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?***

Short-Term Construction

Less Than Significant. Construction noise and vibration are temporary phenomena, with emission levels varying from hour to hour and day to day, depending on the equipment in use, the operations performed, and the distance between the source and receptor. Equipment that would be in use during construction would include, in part, graders, backhoes, rubber-tired dozers, loaders, cranes, forklifts, pavers, rollers, and air compressors. The typical maximum noise levels at a distance of 50 feet from various pieces of construction equipment and activities anticipated for use on the proposed project site are presented in Table 6. Note that the equipment noise levels presented in Table 6 are maximum noise levels. Usually, construction equipment operates in alternating cycles of full power and low power, producing average noise levels over time that are less than the maximum noise level. The average sound level of construction activity also depends on the amount of time that the equipment operates and the intensity of construction activities during that time.

Table 6. Typical Construction Equipment Maximum Noise Levels

Equipment Type	Typical Equipment (L_{max}, dBA at 50 Feet)
All Other Equipment > 5 HP	85
Backhoe	78
Compressor (air)	78
Concrete Saw	90
Crane	81
Dozer	82
Excavator	81
Flat Bed Truck	74
Front End Loader	79
Generator	72
Grader	85
Man Lift	75
Paver	77
Roller	80
Scraper	84
Welder / Torch	73

Source: DOT 2006.
Note: L_{max} = maximum sound level; dBA = A-weighted decibels.

Aggregate noise emission from proposed project construction activities, broken down by sequential phase, was predicted at the nearest existing noise-sensitive receptor boundary (the hotel under construction to the west of the project site) to the nearest position of the construction site boundary for each planning area. In this studied scenario, because of the equipment location uncertainty, all the equipment for a construction phase is assumed to operate at the planning area construction site boundary and would therefore be considered a worst-case construction noise scenario. Table 7 summarizes these distances to the apparent closest noise-sensitive receptor (the future hotel land use approximately 130 feet to the west of the project site) for each of the four sequential construction phases at the nearest planning area site boundary. At each planning area site boundary, this analysis assumes that all equipment of each listed type per phase will be involved in the construction activity for up to the full 8-hour period.

Table 7. Estimated Distances between Construction Activities and the Nearest Noise-sensitive Receptors

Construction Phase (and Equipment Types Involved)	Distance from Nearest Receptor Boundary to PA-A Site Boundary (Feet)	Distance from Nearest Receptor Boundary to PA-B1 Site Boundary (Feet)	Distance from Nearest Receptor Boundary to PA-B2 Site Boundary (Feet)
Grading (excavator, grader, dozer, backhoe)	1,400	130	130
Building construction (crane, man-lift, generator, backhoe, welder)	1,400	130	130
Paving (paver, roller, other equipment)	1,400	130	130
Architectural Coating (air compressor)	1,400	130	130

Source: Google Earth 2023

A Microsoft Excel–based noise prediction model emulating and using reference data from the Federal Highway Administration Roadway Construction Noise Model (RCNM) (FHWA 2008) was used to estimate construction noise levels at the nearest occupied noise-sensitive land use. Although the RCNM was funded and promulgated by the Federal Highway Administration, it is often used for non-roadway projects, because the same types of construction equipment used for roadway projects are often used for other types of construction. Input variables for the predictive modeling consist of the equipment type and number of each (e.g., two graders, a loader, a tractor), the duty cycle for each piece of equipment (e.g., percentage of time within a specific time period, such as an hour, when the equipment is expected to operate at full power or capacity and thus make noise at a level comparable to what is presented in Table 6), and the distance from the noise-sensitive receptor. The predictive model also considers how many hours that equipment may be on-site and operating (or idling) within an established work shift. Conservatively, no topographical or structural shielding was assumed in the modeling. The RCNM has default duty-cycle values for the various pieces of equipment, which were derived from an extensive study of typical construction activity patterns. Those default duty-cycle values were used for this noise analysis, which is detailed in Appendix B, and produced the predicted results displayed in Tables 8 through 11.

Table 8. Predicted Construction Noise Levels per Activity Phase

Construction Phase (and Equipment Types Involved)	8-Hour L_{eq} at Nearest Receptor Boundary to PA-A Site Boundary (dBA)	8-Hour L_{eq} at Nearest Receptor Boundary to PA-B1 Site Boundary (dBA)	8-Hour L_{eq} at Nearest Receptor Boundary to PA-B2 Site Boundary (dBA)
Site Preparation (dozer, backhoe)	49.6	73.3	73.3
Grading[1] (excavator, grader, dozer, backhoe)	52.6	76.0	76.0
Building construction (crane, man-lift, generator, backhoe, welder)	45.7	69.4	69.4
Paving (paver, roller, other equipment)	49.6	73.7	73.7
Architectural Coating (air compressor)	37.8	61.4	61.4

Source: Appendix B.
Notes: Leq = equivalent noise level; dBA = A-weighted decibels.
1 Noise levels presented in Table 8 are from the Initial Site Development Phase. See Appendix B for predicted Grading levels during Planning Area construction, which are predicted to be lower than the presented levels in Table 8 and were thus omitted.

As presented in Table 8, the highest estimated construction noise levels are predicted to stay at or below 76 dBA L_{eq} over an 8-hour period at the nearest existing noise-sensitive land use (the hotel under construction approximately 130 feet to the west of the project site) when grading activities take place near the project site boundary. As a result, short-term construction noise is predicted to be well below the FTA guidance of 80 dBA L_{eq} over an 8-hour period, and therefore is less than significant.

Best Practices for Limiting Construction Noise

Despite the construction noise analysis above showing that the impact to noise-sensitive receptors would be less than significant, the following is a list of best practices for limiting construction noise that could be implemented by the contractor:

- The project contractor will, to the extent feasible, schedule construction activities to avoid concurrent operation of several pieces of construction equipment proximate to an offsite noise-sensitive receptor.
- All construction equipment, fixed or mobile, will be equipped with properly operating and maintained mufflers.
- Construction noise reduction methods such as shutting off idling equipment, maximizing the distance between construction equipment staging areas and adjacent residences, and use of electric air compressors and similar power tools, rather than diesel equipment, will be used where feasible.
- Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow surrounding property owners to contact the job superintendent if necessary. In the event the City receives a complaint, appropriate corrective actions will be implemented and a report of the action provided to the reporting party.

Off-Site Construction Activities

The project would result in local, short-term increases in roadway noise as a result of construction traffic. Based on information developed as part of the project's air quality analysis, project-related traffic would include workers commuting to and from the project site as well as vendor and haul trucks bringing or removing materials. The highest number of average daily worker trips would be 292 one-way trips, occurring during the building construction phase of Planning Area B-2 The highest number of average daily vendor truck trips would be 150 one-way trips, also occurring during the building construction phase of Planning Area B-2. The highest number of daily haul truck trips is yet to be determined.

Based upon available data from the project's Transportation Technical Memorandum, H Street in the project vicinity carries approximately 12,070 daily trips (peak hour multiplied by a k-factor of 10) in the project vicinity. Comparing the maximum number of daily construction-related trips (292 worker trips, 150 vendor trips and to-be-determined haul truck trips) to the average daily traffic volume, the additional vehicle trips would amount to an increase of approximately 4%[1]. Based upon the fundamentals of acoustics, a doubling (i.e., a 100% increase) would be needed to result in a 3-dB increase in noise levels, which is the level corresponding to an audible change to the typical human listener. Additionally, although the number of daily haul trucks is yet to be determined, it is unlikely that the number of haul trucks would double the number of trips on nearby roadways. Therefore, traffic related to construction activities would not result in 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. Impacts from project-related construction traffic noise would be **less than significant.** No mitigation measures are required.

Long-Term Operational

Off-Site Traffic Noise Exposure

The project is expected to generate a subtotal of 7,520 average daily trips to the roadway system, as shown in Table 1 of the project's Transportation Technical Memorandum. During the afternoon (PM) peak-hour (the highest of the AM and PM peak hours), approximately 903 passenger car equivalent vehicles for the project-level analysis and 767 passenger car equivalent vehicles for the programmatic-level analysis are estimated to enter or exit the project site. Utilizing this information as well as additional traffic data provided in Appendix C of this technical report, the FHWA's Highway Traffic Noise Prediction Model RD-77-108 was used to estimate potential noise impacts at adjacent noise-sensitive uses. Information used in the model included Average Daily Traffic (ADT), posted traffic speeds, truck mix percentage, and day/evening/night mix percentage. Consistent with Caltrans guidance (Caltrans 2013), this analysis assumes 80% of the ADT occurs during daytime hours (7:00 a.m. to 7:00 p.m.), 5% during the evening (7:00 p.m. to 10:00 p.m.), and 15% during the nighttime (10:00 p.m. to 7:00 a.m.).

The future modeled traffic speed was assumed to be the anticipated speed limit for the studied future roads, which is 35 miles per hour (mph) for Bay Boulevard, F Street, G Street, H Street, and Marina Parkway. The truck percentages used in the noise model were 2.0% medium trucks and 1.0% heavy trucks. This truck mix is based on vehicle surveys conducted for a number of similar roads in San Diego County that allow truck traffic.

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1 It is noted that the estimated percentage of trucks in the project's construction traffic mix is greater than a typical urban arterial, which may result in a greater temporary change than the 4% increase would represent; however, the project site is located in an industrial/commercial area with high percentages of trucks as well. Thus, the estimated temporary increase would be less than 3 dB as stated, and less than significant.

The change in roadway noise levels was predicted for opening year 2026 and opening year 2026 plus project. Traffic noise levels were calculated for roadway segments bounded by intersections within the project area and are listed as follows:

- Bay Boulevard – From F Street to G Street;
- Bay Boulevard – From G Street to H Street;
- Bay Boulevard – From H Street to J Street;
- F Street – From Bay Boulevard to Woodlawn Avenue;
- G Street – From Marina Parkway to Bay Boulevard;
- H Street – From Marina Parkway Bay Boulevard;
- H Street – From Bay Boulevard to I-5 Southbound Ramps;
- H Street – From I-5 Southbound Ramps to I-5 Northbound Ramps;
- H Street – From I-5 Northbound Ramps to Woodlawn Avenue;
- Marina Parkway – From G Street to H Street;
- Marina Parkway – From H Street to Street C;
- Marina Parkway – From Street C to Marina Way;
- Marina Parkway – From Marina Way to Street A; and
- Marina Parkway – From Street A to Bay Boulevard.

Based upon the FICON thresholds presented in Section 2.1.2 above, an increase of less than 5 dBA when the ambient sound level is less than 60 dBA L_{dn}/CNEL, less than 3 dBA when the ambient sound level is between 60 and 65 dBA L_{dn}/CNEL, or less than 2 dBA when the ambient sound level is greater than 65 dBA L_{dn}/CNEL would not be substantial. Table 9 shows that the highest predicted change in traffic noise level (G Street – From Marina Parkway to Bay Boulevard) combined with the roadways surrounding the immediate project site are predicted to experience a traffic noise level of 64.7 dBA at 50 feet for the opening year 2026 with project condition and a predicted increase of approximately 4.8 dBA due to the project contribution which is less than 5 dBA over the predicted "without project" noise level of 59.9 dBA. Therefore, potential impacts at existing off-site noise-sensitive land uses along roadway segments identified in Table 9 and with respect to project-generated changes to future traffic noise would be **less than significant.**

Table 9. Predicted Traffic Noise Levels

Modeled Roadway Segment	From	To	Opening Year 2026 (dBA CNEL)	Opening Year 2026 Plus Project (dBA CNEL)	Delta (dBA)
Bay Boulevard	F Street	G Street	64.1	64.6	0.5
Bay Boulevard	G Street	H Street	64.3	66.3	2.0
Bay Boulevard	H Street	J Street	61.5	64.0	2.5
F Street	Bay Boulevard	Woodlawn Avenue	63.0	63.4	0.3
G Street	Marina Parkway	Bay Boulevard	59.9	64.7	4.8
H Street	Marina Parkway	Bay Boulevard	65.7	66.2	0.5
H Street	Bay Boulevard	I-5SB Ramps	66.8	68.0	1.2
H Street	I-58SB Ramps	I-5NB Ramps	66.8	67.6	0.9
H Street	I-58NB Ramps	Woodlawn Avenue	67.9	68.2	0.3
Marina Parkway	G Street	H Street	63.0	63.3	0.3
Marina Parkway	H Street	Street C	62.2	62.8	0.7
Marina Parkway	Street C	Marina Way	64.5	64.5	0.0
Marina Parkway	Marina Way	Street A	64.8	65.2	0.4
Marina Parkway	Street A	Bay Boulevard	66.4	66.7	0.3

Source: Appendix C.

Project Sound Sources

On-site Outdoor Mechanical Equipment

The completion of the Planning Area B-1 project buildings will add a variety of noise-producing mechanical equipment that include those presented and discussed in the following paragraphs. Most of these noise-producing equipment or sound sources would be considered stationary or limited in mobility to a defined area.

Prediction Method and Parameters

The aggregate noise emission from outdoor-exposed sound sources has been predicted with the Datakustik CadnaA sound propagation program. CadnaA is a commercially available software program for the calculation, presentation, assessment, and prediction of environmental noise based on algorithms and reference data per International Organization of Standardization (ISO) Standard 9613-2, "Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation" (ISO 1996). The CadnaA computer software allows one to position sources of sound emission in a simulated three-dimensional (3-D) space having heights and footprints consistent with project architectural plans and elevations. In addition to the above-mentioned sound source inputs and building-block structures that define the three-dimensional sound propagation model space, the following assumptions and parameters are included in this CadnaA-supported stationary noise source assessment:

- Ground effect acoustical absorption coefficient equal to 0.5, which intends to represent an average or blending of ground covers that are characterized largely by hard reflective pavements and existing building surfaces across the project site and the surroundings;
- Reflection order of 1, which allows for a single reflection of sound paths on encountered structural surfaces such as the modeled building masses;
- Off-site residential structures and buildings have not been rendered in the model;
- Calm meteorological conditions (i.e., no wind) with 68 degrees Fahrenheit and 50% relative humidity; and
- All of the modeled noise sources are operating concurrently and continuously for a minimum period of 1 hour.

Based on the available plans and other design information, the Planning Area B-1 project buildings would be served by roof-mounted air-conditioning equipment that includes outdoor-exposed packaged air-handling units and air-cooled condensers (ACC) that provide the expected cooling demand (expressed as refrigeration "tonnage") for a building. The following are descriptions of modeled sound sources, with Table 10 exhibiting modeled sound power level (PWL) data at octave-band center frequency (OBCF) resolution. Detailed information supporting these summary descriptions and quantities appear in Appendix D.

Table 10. Modeled Sound Power Levels (PWL) for Stationary Sources (HVAC)

Building	Sound Source	Overall L_{eq} (dBA)	A-Weighted dB at Octave Band Center Frequency (OBCF, Hz)								
			32.5	63	125	250	500	1000	2000	4000	8000
1	Air Handling	86	67.5	67.5	79.5	80.5	81.5	78.5	71.5	65.5	60.5
	Air Conditioning	96	68.0	68.0	81.0	85.0	92.0	89.0	87.0	85.0	78.0
2	Air Handling	88	68.6	68.6	80.6	81.6	82.6	79.6	72.6	66.6	61.6

Table 10. Modeled Sound Power Levels (PWL) for Stationary Sources (HVAC)

Building	Sound Source	Overall L_{eq} (dBA)	A-Weighted dB at Octave Band Center Frequency (OBCF, Hz)								
			32.5	63	125	250	500	1000	2000	4000	8000
	Air Conditioning	96	68.0	68.0	81.0	85.0	92.0	89.0	87.0	85.0	78.0
3	Air Handling	88	68.8	68.8	80.8	81.8	82.8	79.8	72.8	66.8	61.8
	Air Conditioning	96	68.0	68.0	81.0	85.0	92.0	89.0	87.0	85.0	78.0
4	Air Handling	90	70.8	70.8	82.8	83.8	84.8	81.8	74.8	68.8	63.8
	Air Conditioning	98	74.0	74.0	81.0	88.0	92.0	91.0	91.0	89.0	80.0

Source: Appendix D.
Note: Building number and layout can be viewed in Figures 4 and 5.

The HVAC reference sound levels were calculated from a combination of inputs that include square footage values for the proposed project's proposed office spaces, project applicant response to data requests, and manufacturer sound power level data. For the analysis of noise from HVAC equipment operation, eight air conditioning units were modeled on the rooves of each project building.

Other Stationary Noise Sources

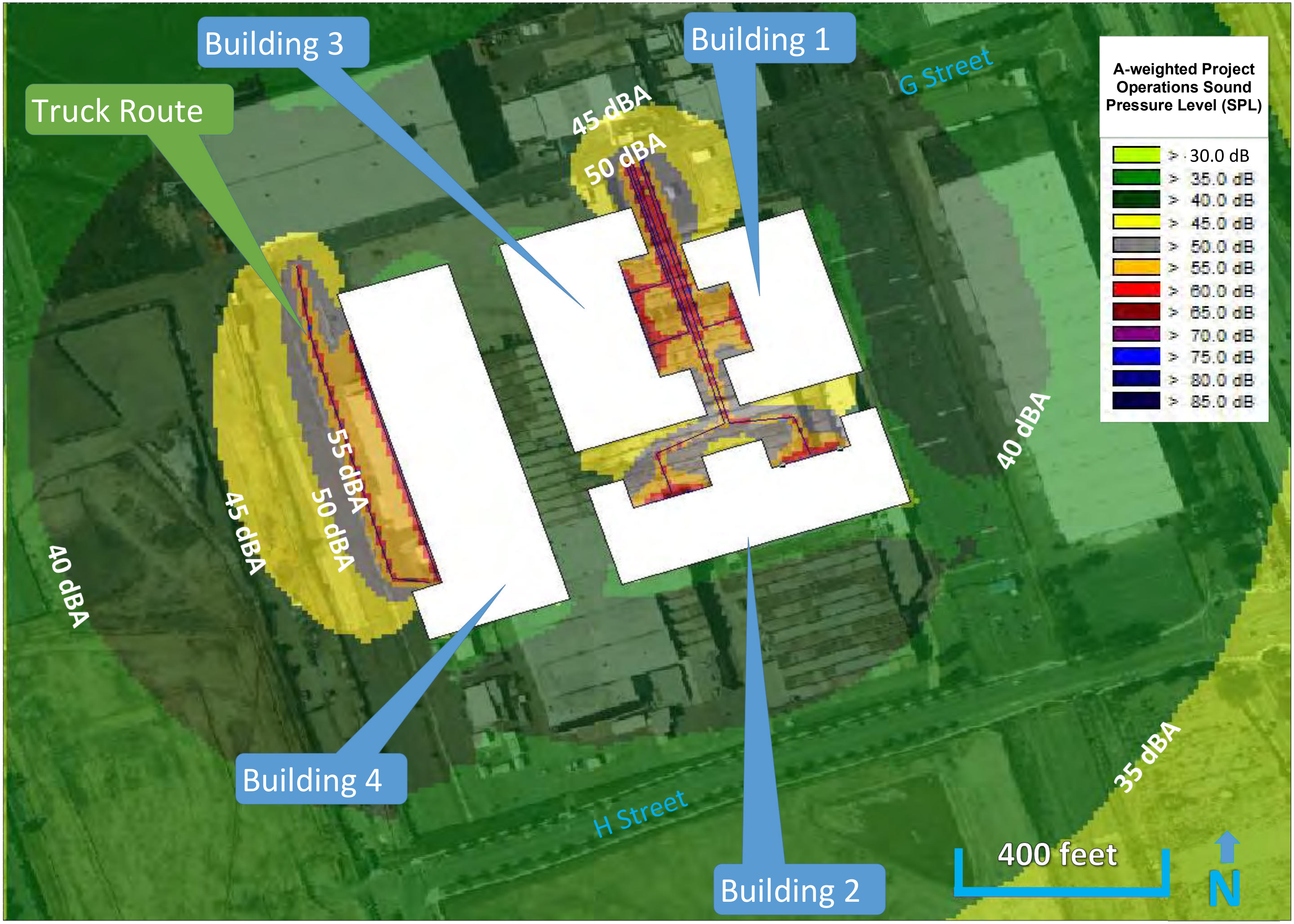
The proposed project buildings may feature other noise emitters, but their contributions would tend to be sporadic or otherwise occur infrequently and thus be expected to have no greater acoustic contribution to an hourly L_{eq} than the continuous-type HVAC noise studied herein.

Loading Dock Noise Sources

The proposed project buildings also feature loading dock areas for the loading and unloading of heavy trucks. On-site loading dock noise was calculated for a single heavy truck pass by (Salter 2014) and extrapolated based upon the number of heavy trucks entering or exiting the facility during the peak hour. Loading dock data were subsequently entered into the CadnaA model for the prediction of stationary operations noise levels. Detailed information supporting the calculation of peak hour heavy truck trips for the loading dock calculations can be found in Appendix D.

Prediction Results

An operational scenario of the proposed project was modeled that assumes all the HVAC equipment is operating simultaneously for a minimum period of one hour along with peak hour truck movements in the loading dock areas. Figure 4, Predicted Daytime Onsite Operations Noise Contours, displays the predicted noise contours associated with aggregate sound propagation from operating HVAC and peak daytime loading dock sound sources. An additional operational scenario of the proposed project was modeled to predict a hypothetical nighttime scenario, where all the HVAC equipment is operating simultaneously for a minimum period of one hour, but the peak hour truck movement is reduced to a single truck for each docking area. Figure 5, Predicted Nighttime Onsite Operations Noise Contours, displays the predicted noise contours associated with aggregate sound propagation from operating HVAC and nighttime loading dock sound sources.



SOURCE: Microsoft 2023; Dudek 2023

DUDEK

0 119 238 Feet

FIGURE 4

Predicted Daytime Onsite Operations Noise Contours

Rohr Wohl Specific Plan Project

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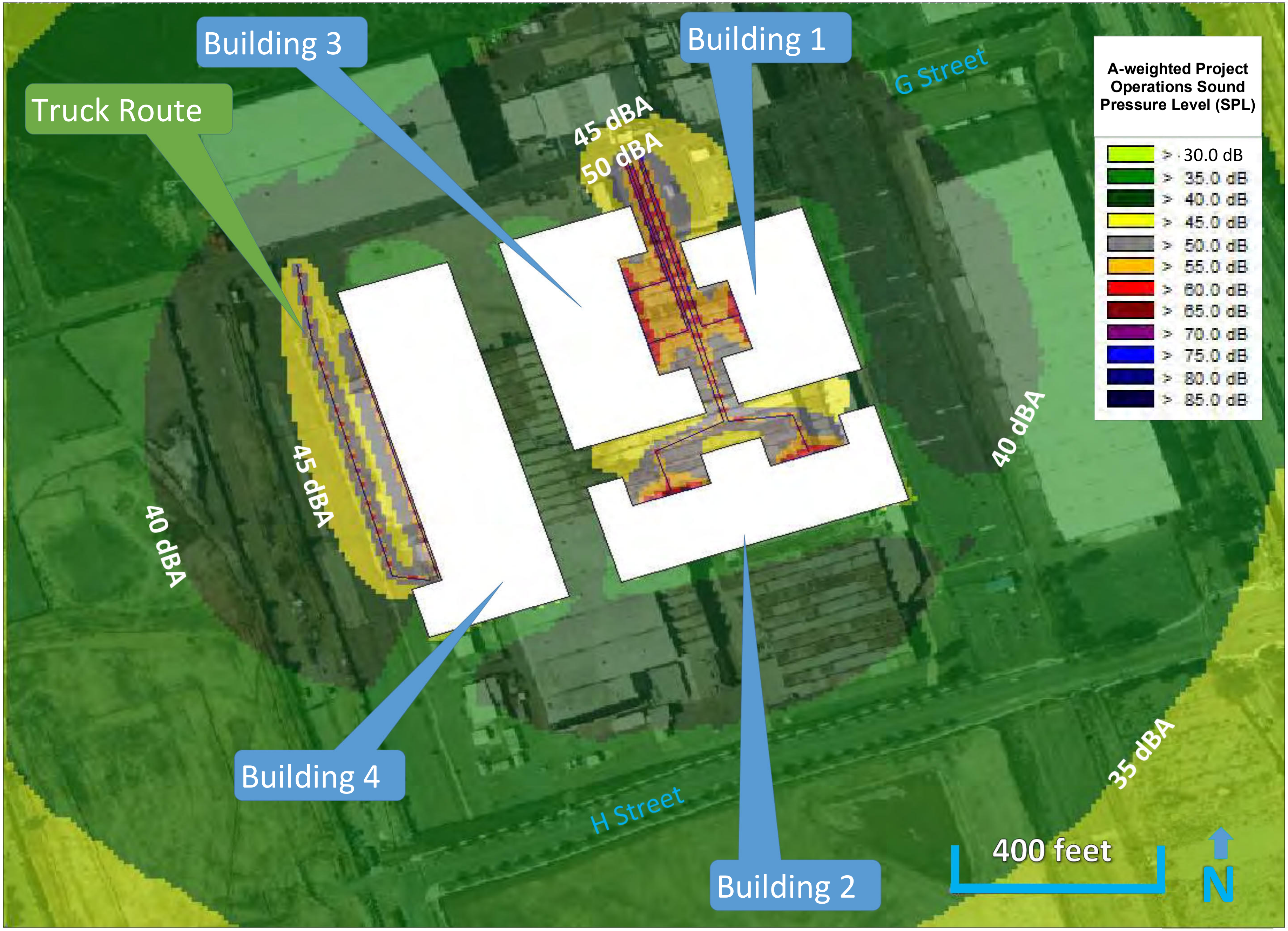

SOURCE: Microsoft 2023; Dudek 2023

DUDEK

0 119 238 Feet

FIGURE 5

Predicted Nighttime Onsite Operations Noise Contours

Rohr Wohl Specific Plan Project

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Figures 4 and 5 illustrate predicted aggregate SPL propagation solely from operation of the proposed project sound sources as described above. The color-coded annular bands of SPL are calculated across a field parallel with and five (5) feet above local grade.

Based on the noise level contours appearing in Figures 4 and 5, the proposed project Planning Area B-1 is predicted to be up to 45 dBA L_{eq} in the daytime and 42 dBA L_{eq} in the nighttime for a calculated L_{dn} of 49 dBA at the nearby future hotel land use and is therefore expected to be lower than and thus comply with the City's 60 dBA L_{eq} daytime threshold and 50 dBA L_{eq} nighttime threshold for multi-family residential land uses.

Planning Area B-2 is programmed for future portions of the project site. Planning Area A contains warehouse uses, which has similar loading dock and HVAC noise as the analyzed portion for Planning Area B-1. However, land uses adjacent to Planning Areas A and B-2 appear to be industrial land uses or vacant at the present time. Because the expected uses for Planning Area B-2 are similar to the Planning Area B-1 uses or are expected to be uses that are generally less noisy than a warehouse use with active loading docks (e.g. residential or commercial uses), and because the surrounding land uses are industrial land uses, it is assumed that the noise levels and contours predicted for Planning Area B-1 would be applicable to the programmed Planning Area B-2. Thus, noise generated by the Planning Area B-2 are expected to be below the City's 70 dBA L_{eq} threshold for industrial land uses.

Planning Area B-2 is expected to contain a hotel and restaurant, which may have exterior areas subject to lower City thresholds. Further analysis may be necessary to determine on-site impacts from loading dock and HVAC noise sources associated with other areas of the project. However, and as shown in Figure 4, impacts from Planning Area B-1 are likely due to project building orientation. With additional consideration for building orientation, warehouse and loading dock noise may be reduced at future hotel uses associated with Planning Area B-2. Thus, noise generated by the Planning Areas A, B-1, and B-2 are expected to be below the City's 50 dBA L_{eq} nighttime threshold for multi-family residential land uses. Note that the multi-family residential land use threshold is applied to this analysis due to an absence of City thresholds for hotel land uses.

Therefore, impacts associated with stationary operations noise would be **less than significant.**

On-site Parking Lot Activity

Less Than Significant Impact. A comprehensive study of noise levels associated with surface parking lots was published in the Journal of Environmental Engineering and Landscape Management (Baltrënas et al. 2004). The study found that average noise levels for parking lots of similar size during the peak period of use of the parking lot (generally in the morning with arrival of commuters, and in the evening with the departure of commuters), was 47 dBA L_{eq} at 1 meter (3.28 feet) from the outside boundary of the parking lot. The parking areas would function as point sources for noise, which means that noise would attenuate at a rate of 6 dBA with each doubling of distance. Employee parking lots are proposed to be distributed throughout the project site adjacent to the warehouse/office buildings, no closer than 180 feet from the edge of the parking lot to the future hotel to the west. At a distance of 180 feet, parking lot noise levels would not be audible to the human ear at the future hotel receptor locations. The combination of the parking lot noise (~12 dBA L_{eq}) and the loading dock equipment level (45 dBA L_{eq} during the daytime and 42 dBA L_{eq} during the nighttime at the nearest receptor) would be 45 dBA L_{eq}[2], during the daytime and 42 dBA L_{eq} during the nighttime which is below the applicable limits (i.e. 60 dBA L_{eq} during daytime hours and 50 dBA L_{eq} during nighttime hours for multi-family residential land uses). Note that the multi-family residential land use

2 Because noise levels are summed in the energy (that is, the logarithmic) domain, a noise level that is 10 decibels or more lower than another noise level becomes negligible, because the sound energy from the higher noise source is completely dominant.

threshold is applied to this analysis due to an absence of City thresholds for hotel land uses. Therefore, impacts associated with parking lot noise would be **less than significant**.

b) Would the project result in generation of excessive ground-borne vibration or ground-borne noise levels?

Less Than Significant Impact. Construction activities may expose persons to excessive ground-borne vibration or ground-borne noise, causing a potentially significant impact. Caltrans has collected ground-borne vibration information related to construction activities (Caltrans 2020). Information from Caltrans indicates that continuous vibrations with a PPV of approximately 0.2 ips is considered annoying. For context, heavier pieces of construction equipment, such as a bulldozer that may be expected on the project site, have peak particle velocities of approximately 0.089 ips or less at a reference distance of 25 feet (DOT 2006).

Ground-borne vibration attenuates rapidly, even over short distances. The attenuation of ground-borne vibration as it propagates from source to receptor through intervening soils and rock strata can be estimated with expressions found in FTA and Caltrans guidance. By way of example, for a bulldozer operating on-site and as close as the northern project boundary (i.e., ~70 feet from the nearest occupied property), the estimated vibration velocity would be 0.018 ips per the equation as follows (FTA 2018):

$$PPV_{rcvr} = PPV_{ref} * (25/D)^{1.5} = 0.018 = 0.089 * (25/70)^{1.5}$$

In the above equation, PPV_{rcvr} is the predicted vibration velocity at the receptor position, PPV_{ref} is the reference value at 25 feet from the vibration source (the bulldozer), and D is the actual horizontal distance to the receptor. Therefore, at this predicted PPV, the impact of vibration-induced annoyance to occupants of nearby existing homes would be less than significant.

Construction vibration, at sufficiently high levels, can also present a building damage risk. However, anticipated construction vibration associated with the proposed project would yield a maximum amplitude of 0.018 ips, which does not surpass the guidance limit of 0.2 to 0.3 ips PPV for preventing damage to residential structures (Caltrans 2020). Because the predicted vibration level at 70 feet is less than this guidance limit and because there are no residential structures adjacent to the project, the risk of vibration damage to nearby structures is considered less than significant.

Once operational, the proposed project would not be expected to feature major producers of ground-borne vibration. Anticipated mechanical systems like heating, ventilation, and air-conditioning units are designed and manufactured to feature rotating (fans, motors) and reciprocating (compressors) components that are well-balanced with isolated vibration within or external to the equipment casings. On this basis, potential vibration impacts due to proposed project operation would be **less than significant.**

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?

There are no private airstrips within the vicinity of the project site. The closest airport to the proposed project site is the Imperial Beach Airport approximately 4 miles south of the project boundary. Therefore, airport noise impacts would be **less than significant.**

6 Summary of Findings

This noise report was conducted for the proposed project. The results indicate that potential impacts during construction would **be less than significant**; nevertheless, best practices that incorporate construction noise reduction techniques would be incorporated into the project construction process. Noise impacts due to operation of the proposed project (including traffic noise) would be **less than significant.** No noise and vibration mitigation measures are anticipated at this time.

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7 References Cited

Baltrënas, P., D. Kazlauskas, & E. Petraitis. 2004. Testing on noise level prevailing at motor vehicle parking lots and numeral simulation of its dispersion. Journal of Environmental Engineering and Landscape Management, 12:2, 63-70

Caltrans (California Department of Transportation). 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. September.

Caltrans. 2020. *Transportation and Construction Vibration Guidance Manual*. Division of Environmental Analysis, Environmental Engineering, Hazardous Waste, Air, Noise, Paleontology Office. Sacramento, California. April.

City of Chula Vista. 2022. *Municipal Code*. https://chulavista.municipal.codes/CVMC/19.68.

City of Chula Vista. 2005. "Noise Element." Chapter 9 in City of Chula Vista General Plan. December 13, *2005*. https://www.chulavistaca.gov/home/showdocument?id=9339.

DOT (U.S. Department of Transportation). 2006. *FHWA Roadway Construction Noise Model: User's Guide*. Final Report. FHWA-HEP-06-015. DOT-VNTSC-FHWA-06-02. Cambridge, Massachusetts: DOT, Research and Innovative Technology Administration. Final Report. August.

FHWA. December 8, 2008. *Roadway Construction Noise Model (RCNM), Software Version 1.1*. U.S. Department of Transportation, Research and Innovative Technology Administration, John A. Volpe National Transportation Systems Center, Environmental Measurement and Modeling Division. Washington, D.C.

FTA (Federal Transit Administration). 2018. *Transit Noise and Vibration Impact Assessment*. FTA Report No. 0123. September.

FICON. 1992. Federal Agency Review of Selected Airport Noise Analysis Issues. Federal Interagency Committee on Noise. August 1992.

International Organization of Standardization (ISO). 1996. Standard 9613-2 (Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation). Geneva.

OPR (Governor's Office of Planning and Research). 2017 *State of California General Plan Guidelines*. July 2017.

Salter, Charles. March 2014. *Midpoint at 237: Loading Dock Noise Study*. San Jose, California.

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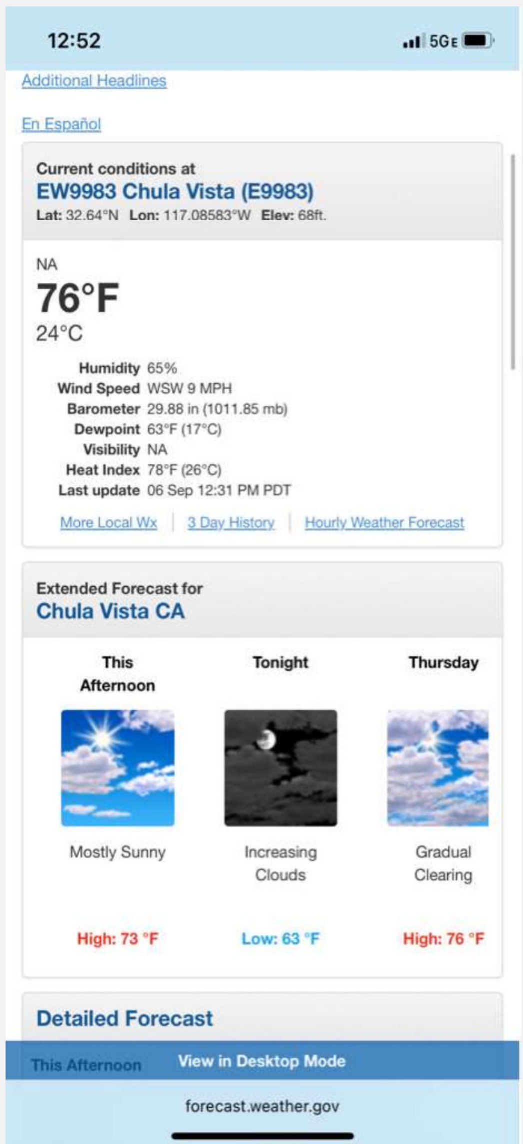
Appendix A

Baseline Noise Measurement Field Data

FORMS FIELD DATA REPORT

Field Noise Measurement Data

Record: 1713	
Project Name	*Rohr Wohl Bayfront SP*
Project #	*14541*
Date	*2023-09-06*

Meteorological Conditions	
Upload NOAA Forecast	

Temp (F)	*76*
Humidity % (R.H.)	*65*
Wind	*Gusty*
Wind Speed (MPH)	*9*
Wind Direction	*West*
Sky	*Clear*

Instrument and Calibrator Information	
Instrument Name List	*(ENC) Piccolo #7046*
Instrument Name	*(ENC) Piccolo #7046*
Instrument Name Lookup Key	*(ENC) Piccolo #7046*
Manufacturer	*Soft dB*
Model	*Piccolo*
Serial Number	*PN0223020805*
Calibration Date	*09/06/2023*
Calibrator Name	*(SAC) Rion NC-74*
Calibrator Name	*(SAC) Rion NC-74*
Calibrator Name Lookup Key	*(SAC) Rion NC-74*
Calibrator Manufacturer	*Rion*
Calibrator Model	*NC-74*
Calibrator Serial #	*34167529*
Pre-Test (dBA SPL)	*93.8*
Post-Test (dBA SPL)	*94*

Windscreen	Yes
Weighting?	A-WTD
Slow/Fast?	Slow
ANSI?	Yes

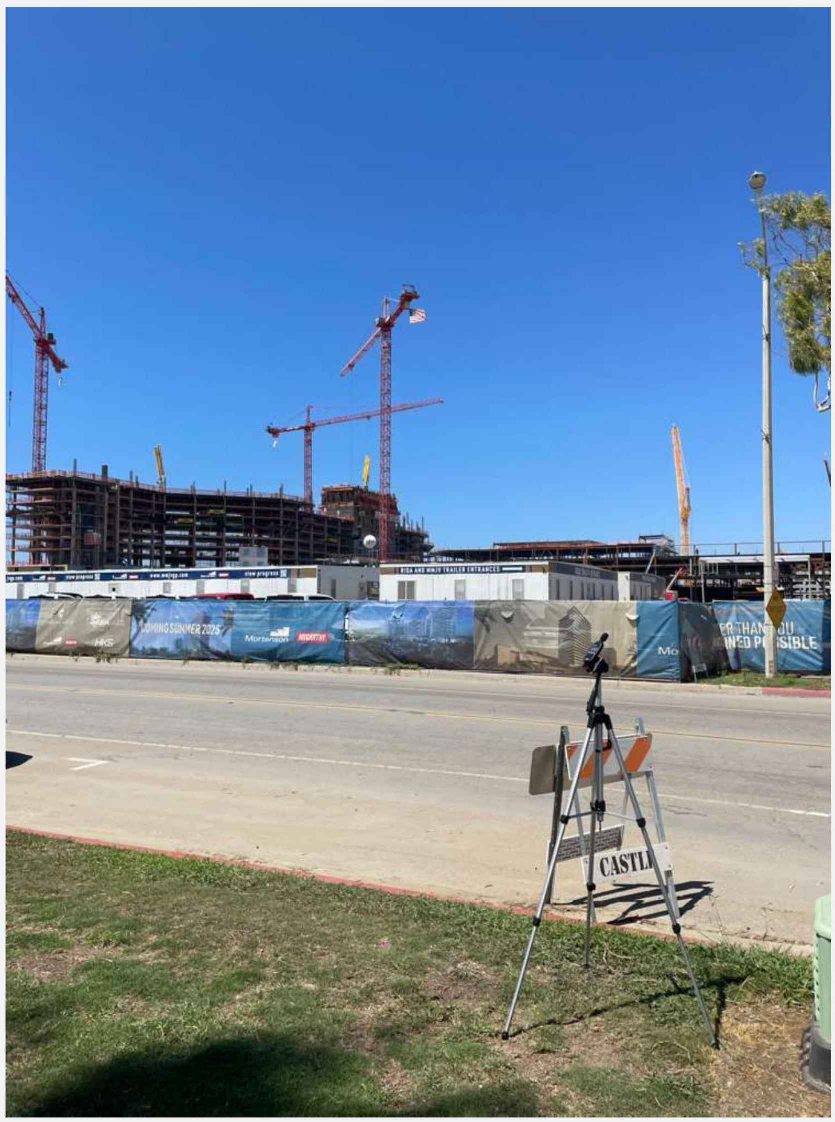
Monitoring	
Record #	1
Site ID	ST1
Site Location Lat/Long	32.626510, -117.101655
Begin (Time)	13:21:00
End (Time)	13:36:00
Leq	65.6
Lmax	78.3
Lmin	55.8
Other Lx?	L90, L50, L10
L90	58.1
L50	61.9
L10	68.9
Other Lx (Specify Metric)	L
Primary Noise Source	Construction of nearby hotel
Other Noise Sources (Background)	Distant Aircraft, Distant Conversations / Yelling, Distant Traffic
Other Noise Sources Additional Description	Military helicopter flyovers, lots of construction traffic

Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Description / Photos

Site Photos

Photo



FORMS DUDEK FIELD DATA REPORT

Site Photos	
Photo	

Site Photos	

FORMS FIELD DATA REPORT

Photo	

Monitoring	
Record #	*2*
Site ID	*ST2*
Site Location Lat/Long	*32.629285, -117.096485*
Begin (Time)	*13:54:00*

End (Time)	*14:09:00*
Leq	*68.6*
Lmax	*78.2*
Lmin	*63.8*
Other Lx?	*L90, L50, L10*
L90	*65.5*
L50	*67.6*
L10	*70.6*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Distant Aircraft, Distant Industrial*
Other Noise Sources Additional Description	*Nearby construction*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Source Info and Traffic Counts	
Number of Lanes	*8*
Lane Width (feet)	*10*
Roadway Width (feet)	*80*
Roadway Width (m)	*24.4*
Distance to Roadway (feet)	*100*
Distance to Roadway (m)	*30.5*

Distance Measured to Centerline or Edge of Pavement?	*Edge of Pavement*
Roadway Type	*Highway*
Estimated Vehicle Speed (MPH)	*65*
Posted Speed Limit Sign (MPH)	*65*

Traffic Counts	
Vehicle Count Summary	*A 1206, MT 29, HT 11, B 7, MC 13*
Select Method for Recording Count Duration	*Enter Manually*
Counting Both Directions?	*No*
Count Duration (minutes)	*15*
Direction	*NB*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*1206*
Number of Vehicles - Medium Trucks	*29*
Number of Vehicles - Heavy Trucks	*11*
Number of Vehicles - Buses	*7*
Number of Vehicles - Motorcyles	*13*

FORMS FIELD DATA REPORT

Traffic Counts

Vehicle Count Summary	*A 1343, MT 42, HT 10, B 2, MC 17*
Select Method for Recording Count Duration	*Enter Manually*
Counting Both Directions?	*No*
Count Duration (minutes)	*15*
Direction	*SB*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*1343*
Number of Vehicles - Medium Trucks	*42*
Number of Vehicles - Heavy Trucks	*10*
Number of Vehicles - Buses	*2*
Number of Vehicles - Motorcyles	*17*

Description / Photos

Site Photos

FIELD DATA REPORT

Photo	

Site Photos

Photo	
Comments / Description	*I-5 NB/SB*

Monitoring	
Record #	*3*
Site ID	*ST3*
Site Location Lat/Long	*32.631185, -117.097286*

FORMS FIELD DATA REPORT

Begin (Time)	*14:15:00*
End (Time)	*14:30:00*
Leq	*75.2*
Lmax	*83.3*
Lmin	*70.9*
Other Lx?	*L90, L50, L10*
L90	*72.7*
L50	*74.2*
L10	*77.3*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Distant Aircraft*
Other Noise Sources Additional Description	*Distant construction, I-5 main noise source, motorcycle drive by*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Description / Photos

Site Photos

Photo	
Comments / Description	*Blocked view of I-5*

Site Photos	

Photo	
Comments / Description	*LT1 hidden in tree in background*

Monitoring	
Record #	*4*
Site ID	*ST4*
Site Location Lat/Long	*32.632629, -117.097817*

FORMS FIELD DATA REPORT

Begin (Time)	14:33:00
End (Time)	14:48:00
Leq	73.7
Lmax	83.3
Lmin	69.2
Other Lx?	L90, L50, L10
L90	71.2
L50	72.7
L10	75.8
Other Lx (Specify Metric)	L
Primary Noise Source	Traffic
Other Noise Sources Additional Description	Construction traffic, motorcycle drive by on I-5
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

Source Info and Traffic Counts	
Number of Lanes	9
Lane Width (feet)	10
Roadway Width (feet)	90
Roadway Width (m)	27.4
Distance to Roadway (feet)	100
Distance to Roadway (m)	30.5

Distance Measured to Centerline or Edge of Pavement?	*Edge of Pavement*
Roadway Type	*Highway*
Estimated Vehicle Speed (MPH)	*65*
Posted Speed Limit Sign (MPH)	*65*

Traffic Counts	
Vehicle Count Summary	*A 1510, MT 24, HT 11, B 5, MC 20*
Select Method for Recording Count Duration	*Enter Manually*
Counting Both Directions?	*No*
Count Duration (minutes)	*15*
Direction	*NB*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*1510*
Number of Vehicles - Medium Trucks	*24*
Number of Vehicles - Heavy Trucks	*11*
Number of Vehicles - Buses	*5*
Number of Vehicles - Motorcyles	*20*

FIELD DATA REPORT

Traffic Counts

Vehicle Count Summary	*A 1867, MT 36, HT 14, B 1, MC 43*
Select Method for Recording Count Duration	*Enter Manually*
Counting Both Directions?	*No*
Count Duration (minutes)	*15*
Direction	*SB*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*1867*
Number of Vehicles - Medium Trucks	*36*
Number of Vehicles - Heavy Trucks	*14*
Number of Vehicles - Buses	*1*
Number of Vehicles - Motorcyles	*43*

Description / Photos

Site Photos

Photo	

Site Photos	

FORMS FIELD DATA REPORT

Photo	

Appendix B

Construction Noise Modeling Input and Output

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase at occupied building, per FTA guidance = 80
allowable hours over which Leq is to be averaged = 8

Construction Activity	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	ILbarr (dB)	Notes
Site Preparation	dozer	3	40	82	Rubber Tired Dozers	130	0.0		70.7	8	480	71	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
	backhoe	4	40	78	Tractors/Loaders/Backhoes	130	0.0		66.7	8	480	69	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
									Total for Site Preparation Phase:			**73.3**													
Grading	excavator	2	40	81	Excavators	130	0.0		69.7	8	480	69	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
	grader	1	40	85	Graders	130	0.0		73.7	8	480	70	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
	dozer	1	40	82	Rubber Tired Dozers	130	0.0		70.7	8	480	67	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
	scraper	2	40	84	Scrapers	130	0.0		72.7	8	480	72	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
	backhoe	2	40	78	Tractors/Loaders/Backhoes	130	0.0		66.7	8	480	66	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
										Total for Grading Phase:		**76.0**													

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase at occupied building, per FTA guidance = 80
allowable hours over which Leq is to be averaged = 8

Construction Activity	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Site Preparation	dozer	3	40	82	Rubber Tired Dozers	1400	0.0		47.0	8	480	48
	backhoe	4	40	78	Tractors/Loaders/Backhoes	1400	0.0		43.0	8	480	45
									Total for Site Preparation Phase:			**49.6**
Grading	excavator	2	40	81	Excavators	1400	0.0		46.0	8	480	45
	grader	1	40	85	Graders	1400	0.0		50.0	8	480	46
	dozer	1	40	82	Rubber Tired Dozers	1400	0.0		47.0	8	480	43
	scraper	2	40	84	Scrapers	1400	0.0		49.0	8	480	48
	backhoe	2	40	78	Tractors/Loaders/Backhoes	1400	0.0		43.0	8	480	42
									Total for Grading Phase:			**52.3**

Construction Activity	Equipment	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	ILbarr (dB)	Notes
Site Preparation	dozer	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	backhoe	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
Grading	excavator	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	grader	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	dozer	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	scraper	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	backhoe	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase at occupied building, per FTA guidance = 80
allowable hours over which Leq is to be averaged = 8

Construction Activity	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Grading	excavator	1	40	81	Excavators	1400	0.0		46.0	8	480	42
	grader	1	40	85	Graders	1400	0.0		50.0	8	480	46
	dozer	1	40	82	Rubber Tired Dozers	1400	0.0		47.0	8	480	43
	backhoe	3	40	78	Tractors/Loaders/Backhoes	1400	0.0		43.0	8	480	44
									Total for Grading Phase:			**50.0**
Building Construction	Crane	1	16	81	Cranes	1400	0.0		46.0	7	420	37
	Man lift	3	20	75	Forklifts	1400	0.0		40.0	8	480	38
	Generator	1	50	72	Generator Sets	1400	0.0		37.0	8	480	34
	backhoe	3	40	78	Tractors/Loaders/Backhoes	1400	0.0		43.0	7	420	43
	Welder / Torch	1	40	73	Welders	1400	0.0		38.0	8	480	34
									Total for Building Construction Phase:			**45.7**
Paving	paver	1	50	77	Pavers	1400	0.0		42.0	8	480	39
	All Other Equipment > 5 HP	2	50	85	Paving Equipment	1400	0.0		50.0	6	360	49
	roller	2	20	80	Rollers	1400	0.0		45.0	6	360	40
									Total for Paving Phase:			**49.6**
Architectural Coating	compressor (air)	1	40	78	Air compressor	1400	0.0		43.0	6	360	38
									Total for Architectural Coating Phase:			**37.8**

Construction Activity	Equipment	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	ILbarr (dB)	Notes
Grading	excavator	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	grader	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	dozer	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	backhoe	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
Building Construction	Crane	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	Man lift	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	Generator	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	backhoe	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	Welder / Torch	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
Paving	paver	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	All Other Equipment > 5 HP	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
	roller	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	
Architectural Coating	compressor (air)	5	5	0	5	1395	1400	7.1	1395.0	1400.0	0.00	0.1	0.0	

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase at occupied building, per FTA guidance = 80
allowable hours over which Leq is to be averaged = 8

Construction Activity	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Grading	excavator	2	40	81	Excavators	130	0.0		69.7	8	480	69
	grader	1	40	85	Graders	130	0.0		73.7	8	480	70
	dozer	1	40	82	Rubber Tired Dozers	130	0.0		70.7	8	480	67
	scraper	2	40	84	Scrapers	130	0.0		72.7	8	480	72
	backhoe	2	40	78	Tractors/Loaders/Backhoes	130	0.0		66.7	8	480	66
									Total for Grading Phase:			**76.0**
Building Construction	Crane	1	16	81	Cranes	130	0.0		69.7	7	420	61
	Man lift	3	20	75	Forklifts	130	0.0		63.7	8	480	61
	Generator	1	50	72	Generator Sets	130	0.0		60.7	8	480	58
	backhoe	3	40	78	Tractors/Loaders/Backhoes	130	0.0		66.7	7	420	67
	Welder / Torch	1	40	73	Welders	130	0.0		61.7	8	480	58
									Total for Building Construction Phase:			**69.4**
Paving	paver	2	50	77	Pavers	130	0.0		65.7	8	480	66
	All Other Equipment > 5 HP	2	50	85	Paving Equipment	130	0.0		73.7	6	360	72
	roller	2	20	80	Rollers	130	0.0		68.7	6	360	63
									Total for Paving Phase:			**73.7**
Architectural Coating	compressor (air)	1	40	78	Air compressor	130	0.0		66.7	6	360	61
									Total for Architectural Coating Phase:			**61.4**

Equipment	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	ILbarr (dB)	Notes
excavator	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
grader	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
dozer	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
scraper	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
backhoe	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
Crane	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
Man lift	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
Generator	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
backhoe	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
Welder / Torch	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
paver	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
All Other Equipment > 5 HP	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
roller	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
compressor (air)	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase at occupied building, per FTA guidance = 80

allowable hours over which Leq is to be averaged = 8

Construction Activity	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Grading	excavator	1	40	81	Excavators	130	0.0		69.7	8	480	66
	grader	1	40	85	Graders	130	0.0		73.7	8	480	70
	dozer	1	40	82	Rubber Tired Dozers	130	0.0		70.7	8	480	67
	backhoe	3	40	78	Tractors/Loaders/Backhoes	130	0.0		66.7	8	480	67
									Total for Grading Phase:			**73.7**
Building Construction	Crane	1	16	81	Cranes	130	0.0		69.7	7	420	61
	Man lift	3	20	75	Forklifts	130	0.0		63.7	8	480	61
	Generator	1	50	72	Generator Sets	130	0.0		60.7	8	480	58
	backhoe	3	40	78	Tractors/Loaders/Backhoes	130	0.0		66.7	7	420	67
	Welder / Torch	1	40	73	Welders	130	0.0		61.7	8	480	58
									Total for Building Construction Phase:			**69.4**
Paving	paver	2	50	77	Pavers	130	0.0		65.7	8	480	66
	All Other Equipment > 5 HP	2	50	85	Paving Equipment	130	0.0		73.7	6	360	72
	roller	2	20	80	Rollers	130	0.0		68.7	6	360	63
									Total for Paving Phase:			**73.7**
Architectural Coating	compressor (air)	1	40	78	Air compressor	130	0.0		66.7	6	360	61
									Total for Architectural Coating Phase:			**61.4**

Equipment	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	ILbarr (dB)	Notes
excavator	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
grader	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
dozer	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
backhoe	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
Crane	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
Man lift	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
Generator	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
backhoe	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
Welder / Torch	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
paver	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
All Other Equipment > 5 HP	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
roller	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	
compressor (air)	5	5	0	5	125	130	7.1	125.1	130.0	0.00	0.1	0.0	

Appendix C
Traffic Noise Modeling Input and Output

Appendix C

Traffic Noise Modeling Calculations - Summary

Project: 14541 Rohr Wohl Specific Plan

Number	Name	From	To	Opening Year 2026	Opening Year 2026 with Project	Δ Opening Year 2026 – Opening Year 2026 with Project
	Segment Description and Location					
Summary of Net Changes						
1	Bay Boulevard	F Street	G Street	64.1	64.6	0.5
2	Bay Boulevard	G Street	H Street	64.3	66.3	2.0
3	Bay Boulevard	H Street	J Street	61.5	64.0	2.5
4	F Street	Bay Boulevard	Woodlawn Avenue	63.0	63.4	0.3
5	G Street	Marina Parkway	Bay Boulevard	59.9	64.7	4.8
6	H Street	Marina Parkway	Bay Boulevard	65.7	66.2	0.5
7	H Street	Bay Boulevard	I-5SB Ramps	66.8	68.0	1.2
8	H Street	I-5SB Ramps	I-5NB Ramps	66.8	67.6	0.9
9	H Street	I-5NB Ramps	Woodlawn Avenue	67.9	68.2	0.3
10	Marina Parkway	G Street	H Street	63.0	63.3	0.3
11	Marina Parkway	H Street	Street C	62.2	62.8	0.7
12	Marina Parkway	Street C	Marina Way	64.5	64.5	0.0
13	Marina Parkway	Marina Way	Street A	64.8	65.2	0.4
14	Marina Parkway	Street A	Bay Boulevard	66.4	66.7	0.3

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Appendix C
Traffic Noise Model Calculations

Project: 14541 Rohr Wohl Specific Plan

Noise Level Descriptor:	CNEL
Site Conditions:	Soft
Traffic Input:	Peak
Traffic K-Factor:	10

Segment Description and Location				Input										Output				
				Peak Hour Volume	Speed (mph)	Distance to Directional Centerline, (feet)[4]		Traffic Distribution Characteristics						CNEL, (dBA)[5,6,7]	Distance to Contour, (feet)[3]			
Number	Name	From	To			Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night		70 dBA	65 dBA	60 dBA	55 dBA
Opening Year 2026 Conditions																		
1	Bay Boulevard	F Street	G Street	831	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	64.1	20	43	94	202
2	Bay Boulevard	G Street	H Street	880	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	64.3	21	45	97	210
3	Bay Boulevard	H Street	J Street	462	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	61.5	14	29	63	136
4	F Street	Bay Boulevard	Woodlawn Avenue	650	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	63.0	17	37	80	171
5	G Street	Marina Parkway	Bay Boulevard	317	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	59.9	11	23	49	106
6	H Street	Marina Parkway	Bay Boulevard	1,207	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	65.7	26	56	120	259
7	H Street	Bay Boulevard	I-5SB Ramps	1,552	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	66.8	31	66	142	306
8	H Street	I-5SB Ramps	I-5NB Ramps	1,544	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	66.8	31	66	142	305
9	H Street	I-5NB Ramps	Woodlawn Avenue	2,007	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	67.9	36	78	169	363
10	Marina Parkway	G Street	H Street	644	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	63.0	17	37	79	170
11	Marina Parkway	H Street	Street C	534	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	62.2	15	32	70	150
12	Marina Parkway	Street C	Marina Way	912	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	64.5	21	46	100	215
13	Marina Parkway	Marina Way	Street A	985	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	64.8	23	49	105	226
14	Marina Parkway	Street A	Bay Boulevard	1,408	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	66.4	29	62	133	287

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Appendix C

Traffic Noise Model Calculations

Project: 14541 Rohr Wohl Specific Plan

Noise Level Descriptor: CNEL
Site Conditions: Soft
Traffic Input: Peak
Traffic K-Factor: 10

Number	Name	From	To	Peak Hour Volume	Speed (mph)	Distance to Directional Centerline, (feet)4 Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night	CNEL, (dBA)5,6,7	70 dBA	65 dBA	60 dBA	55 dBA
	Segment Description and Location			Input				Traffic Distribution Characteristics						Output	Distance to Contour, (feet)3			
Opening Year 2026 with Project Conditions																		
1	Bay Boulevard	F Street	G Street	939	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	64.6	22	47	102	219
2	Bay Boulevard	G Street	H Street	1,395	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	66.3	29	61	132	285
3	Bay Boulevard	H Street	J Street	814	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	64.0	20	43	92	199
4	F Street	Bay Boulevard	Woodlawn Avenue	704	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	63.4	18	39	84	181
5	G Street	Marina Parkway	Bay Boulevard	950	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	64.7	22	48	102	221
6	H Street	Marina Parkway	Bay Boulevard	1,342	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	66.2	28	60	129	278
7	H Street	Bay Boulevard	I-5SB Ramps	2,048	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	68.0	37	79	171	368
8	H Street	I-5SB Ramps	I-5NB Ramps	1,885	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	67.6	35	75	162	349
9	H Street	I-5NB Ramps	Woodlawn Avenue	2,133	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	68.2	38	82	176	378
10	Marina Parkway	G Street	H Street	689	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	63.3	18	38	83	178
11	Marina Parkway	H Street	Street C	624	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	62.8	17	36	77	167
12	Marina Parkway	Street C	Marina Way	912	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	64.5	21	46	100	215
13	Marina Parkway	Marina Way	Street A	1,075	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	65.2	24	52	111	240
14	Marina Parkway	Street A	Bay Boulevard	1,498	35	50	50	97.0%	2.0%	1.0%	80.0%	5.0%	15.0%	66.7	30	64	139	299

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Appendix D
Project Sound Source Calculation Data

AHUs (plenum-type return fan only, no condenser units [see separate worksheet]):

Building Minimum Ventilation

		63	125	250	500	1000	2000	4000	8000
	A-weighting adjustments	26	13	9	3	0	-1	-1	1
average of values for the two fan diameter ranges, per Guyer (Table 12)	plug	40	40	38	34	29	23	19	16
average of values for the two fan diameter ranges, per Guyer (Table 12)	tube	47	44	46	47	44	45	38	35
per Guyer (Table 12, presumed based on Bies & Hansen ENC)	prop	46	48	55	53	52	48	43	38

percent GSF actually occupied (and need ventilation): 95

Tag	Building	GSF	Avail. SF	Height (ft)	Avg. minutes to change air*	Volume (ft3)	CFM	m^2	comparable facility function	Pressure (iwg)	Pressure (Pa)	Q (m^3/s)	fantype = plug, tube, or prop	A-weighted PWL (for CadnaA inputs) 63	125	250	500	1000	2000	4000	8000	OA dB
return air fans in building rooftop AHUs:																						
Bldg1	Industrial	79820	75829	32	20	2426528	121326.4	7048	office space	2.5	625	57	plug	67.5	79.5	80.5	81.5	78.5	71.5	65.5	60.5	**86**
Bldg2	Industrial	102730	97594	32	20	3122992	156149.6	9071	office space	2.5	625	74	plug	68.6	80.6	81.6	82.6	79.6	72.6	66.6	61.6	**88**
Bldg3	Industrial	108400	102980	32	20	3295360	164768	9572	office space	2.5	625	78	plug	68.8	80.8	81.8	82.8	79.8	72.8	66.8	61.8	**88**
Bldg4	Industrial	172800	164160	32	20	5253120	262656	15259	office space	2.5	625	124	plug	70.8	82.8	83.8	84.8	81.8	74.8	68.8	63.8	**90**

	63	125	250	500	1000	2000	4000	8000
fan or AHU cabinet liner/interior attenuation (excludes inlet/outlet PWL split, already in calcs above:	2	3	4	5	6	8	10	10

ACCs (air-cooled chillers on rooftops):

Building Interior Comfort

with or without sound insulation? (enter Y/N): y

Model	tons	LWA	unweighted PWL (dB) per OCBF (Hz) at full load (100%) 63	125	250	500	1000	2000	4000	8000
Bryant BH16-018 (no sound blanket)	1.5	67	66.2	66.2	63.9	63.8	62.3	58.4	56.4	50.3
Bryant BH16-024 (no sound blanket)	2	71	65	65	63.7	63.4	68.5	64.7	58.7	52.8
Bryant BH16-036 (no sound blanket)	3	71	68.2	68.2	66.4	67.5	68.4	59.6	58.2	52.4
Bryant BH16-048 (no sound blanket)	4	71	68.4	68.4	67.7	69.7	67.6	59.4	56.4	50
Bryant BH16-060 (no sound blanket)	5	69	63.7	63.7	65.4	67.3	64.9	58.3	56.2	51.9
Daikin AGZ-E 30 (w/out sound insulation)	30	85	84	84	83	84	77	75	74	70
Daikin AGZ-E 40 (w/out sound insulation)	40	85	84	84	83	84	77	75	74	70
Daikin AGZ-E 50 (w/out sound insulation)	50	87	85	85	85	86	80	77	75	70
Daikin AGZ-E 60 (w/out sound insulation)	60	87	85	85	85	86	80	77	75	70
Daikin AGZ-E 70 (w/out sound insulation)	70	87	85	85	85	86	80	77	75	70
Daikin AGZ-E 80 (w/out sound insulation)	80	88	88	85	87	86	81	81	77	71
Daikin AGZ-E 90 (w/out sound insulation)	90	88	88	87	87	86	83	80	77	71
Daikin AGZ-E 120 (w/out sound insulation)	120	89	91	85	88	86	82	81	79	72
Daikin AGZ-E 240 (w/out sound insulation)	241	94	94	88	91	90	91	84	82	75

data for models "without sound insulation" or no "sound blankets"

Model	LWA	63	125	250	500	1000	2000	4000	8000
Bryant BH16-018 (no sound blanket)	68	*66.2*	66.2	63.8	64.1	64.6	59.9	57.7	53.6
Bryant BH16-024 (no sound blanket)	72	*63.4*	63.4	63.3	63.3	70.4	64.5	59.3	55.5
Bryant BH16-036 (no sound blanket)	72	*67.7*	67.7	66.8	68.1	69.9	62.8	60.3	55.2
Bryant BH16-048 (no sound blanket)	73	*67.5*	67.5	67.8	70.1	70.6	63.1	58.5	53.3
Bryant BH16-060 (no sound blanket)	70	*61.7*	61.7	65.6	68.1	65.8	59.8	58.4	56.1
Daikin AGZ-E 30 (w/out sound insulation)	88	92	91	88	87	83	78	73	68
Daikin AGZ-E 40 (w/out sound insulation)	89	92	91	90	88	84	79	74	69
Daikin AGZ-E 50 (w/out sound insulation)	90	93	93	91	89	85	79	74	69
Daikin AGZ-E 60 (w/out sound insulation)	91	94	93	94	89	86	81	76	71
Daikin AGZ-E 70 (w/out sound insulation)	92	95	95	94	89	87	81	76	71
Daikin AGZ-E 80 (w/out sound insulation)	92	95	95	95	89	87	81	76	71
Daikin AGZ-E 90 (w/out sound insulation)	93	94	95	92	91	89	83	81	81
Daikin AGZ-E 120 (w/out sound insulation)	95	93	96	92	92	90	84	84	82
Daikin AGZ-E 240 (w/out sound insulation)	100	98	98	98	95	96	90	90	86

data for models "with sound insulation" or "sound blankets"

Model	LWA	63	125	250	500	1000	2000	4000	8000
Bryant BH16-018 (no sound blanket)	67	*66.2*	66.2	63.9	63.8	62.3	58.4	56.4	50.3
Bryant BH16-024 (no sound blanket)	71	*65*	65	63.7	63.4	68.5	64.7	58.7	52.8
Bryant BH16-036 (no sound blanket)	71	*68.2*	68.2	66.4	67.5	68.4	59.6	58.2	52.4
Bryant BH16-048 (no sound blanket)	71	*68.4*	68.4	67.7	69.7	67.6	59.4	56.4	50
Bryant BH16-060 (no sound blanket)	69	*63.7*	63.7	65.4	67.3	64.9	58.3	56.2	51.9
Daikin AGZ-E 30 (w/out sound insulation)	85	84	84	83	84	77	75	74	70
Daikin AGZ-E 40 (w/out sound insulation)	85	84	84	83	84	77	75	74	70
Daikin AGZ-E 50 (w/out sound insulation)	87	85	85	85	86	80	77	75	70
Daikin AGZ-E 60 (w/out sound insulation)	87	85	85	85	86	80	77	75	70
Daikin AGZ-E 70 (w/out sound insulation)	87	85	85	85	86	80	77	75	70
Daikin AGZ-E 80 (w/out sound insulation)	88	88	85	87	86	81	81	77	71
Daikin AGZ-E 90 (w/out sound insulation)	88	88	87	87	86	83	80	77	71
Daikin AGZ-E 120 (w/out sound insulation)	89	91	85	88	86	82	81	79	72
Daikin AGZ-E 240 (w/out sound insulation)	94	94	88	91	90	91	84	82	75

actual percent of GSF occupied: 95

Phase	Building Tag	GSF	Avail. SF	comparable facility function	Avg. GSF per ton*	tons of refrig.	Approx. Qty. of ACCs	tons per ACC	Approx. Total PWL (dBA)	unweighted PWL (dB) per OCBF (Hz) at full load (100%) 63	125	250	500	1000	2000	4000	8000
Bldg1	Industrial	79820	75829	Factories, assembly areas - avg of low and high	165	459.6	8	57	**96**	94	94	94	95	89	86	84	79
Bldg2	Industrial	102730	97594	Factories, assembly areas - avg of low and high	165	591.5	8	74	**96**	94	94	94	95	89	86	84	79
Bldg3	Industrial	108400	102980	Factories, assembly areas - avg of low and high	165	624.1	8	78	**96**	94	94	94	95	89	86	84	79
Bldg4	Industrial	172800	164160	Factories, assembly areas - avg of low and high	165	994.9	8	124	**98**	100	94	97	95	91	90	88	81

*based upon "lo" value per Loren Cook's "Engineering Cookbook", 1999 edition, pp. 59-60

		63	125	250	500	1000	2000	4000	8000
a weighting adj		26	13	9	3	0	-1	-1	1
	96	68.0	81.0	85.0	92.0	89.0	87.0	85.0	78.0
	96	68.0	81.0	85.0	92.0	89.0	87.0	85.0	78.0
	96	68.0	81.0	85.0	92.0	89.0	87.0	85.0	78.0
	98	74.0	81.0	88.0	92.0	91.0	91.0	89.0	80.0

from CMS "Midpoint at 237" March 27, 2014 noise study	dBA	dist (feet)	at 50'	Dudek time estimate minutes per hour	hourly Leq	source	PWL
truck passby	68	30	63.6	2	48.8	**traveling on lot**	**83.5**
truck airbrakes	72	25	66.0	0.05	35.2	at dock	69.8
truck backup alarm	79	30	74.6	0.05	43.8	at dock	78.4
idle before shutoff	70	25	64.0	1	46.2	at dock	80.9
truck engine ignition + airbrakes	71	25	65.0	0.05	34.2	at dock	68.8
truck accelerating from stop	74	25	68.0	0.05	37.2	at dock	71.8
						total at dock	**83.5**

dock door quantities from siteplan		peak hour trips*	split**	log add***
Building 1	docks	1		
	8		NA	0.0
Building 2	docks	2		
	23		NA	3.0
Building 3	docks	2		
	14		NA	3.0
Building 4	docks	4		
	32		NA	6.0

*(3 and 4-axle trucks)
**(based on dock ratio for the building)
***(to single truck noise levels)

assume this is the *daytime* operations scenario, when peak-hour truck trips would occur.

For this project, I assumed that the peak hour trips would be approximately 12% of the total; this was derived by taking the total daily trips and dividing it by the peak hour trips

from CMS "Midpoint at 237" March 27, 2014 noise study				Dudek time estimate			
	dBA	dist (feet)	at 50'	minutes per hour	hourly Leq	source	PWL
truck passby	68	30	63.6	2	48.8	**traveling on lot**	**83.5**
truck airbrakes	72	25	66.0	0.05	35.2	at dock	69.8
truck backup alarm	79	30	74.6	0.05	43.8	at dock	78.4
idle before shutoff	70	25	64.0	1	46.2	at dock	80.9
truck engine ignition + airbrakes	71	25	65.0	0.05	34.2	at dock	68.8
truck accelerating from stop	74	25	68.0	0.05	37.2	at dock	71.8
						total at dock	**83.5**

dock door quantities from siteplan		peak hour trips*	split**	log add***
Building 1	docks	0.25		
	8		NA	0.0
Building 2	docks	0.5		
	23		NA	0.0
Building 3	docks	0.5		
	14		NA	0.0
Building 4	docks	1.00		
	32		NA	0.0

*(3 and 4-axle trucks)
**(based on dock ratio for the building)
***(to single truck noise levels)

assume this is the *nighttime* operations scenario, when only up to 25% peak-hour truck trips would occur.