Noise Technical Report

501 Ocean Bluff Way Project

City of Encinitas, California

OCTOBER 2024

Prepared for:

RINCON CAPTIAL INC.
5315 Avenida Encinas, Suite 200
Carlsbad, CA 92008
Contact: Cameron St. Clair

Prepared by:

DUDEK

605 Third Street
Encinitas, California 92024
Contact: Connor Burke, INCE

Printed on 30% post-consumer recycled material.

Table of Contents

SECTION **PAGE NO.**

TABLES

FIGURES

APPENDICES

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Encinitas
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
FTA	Federal Transit Administration
ips	inches per second
L_{dn}	day–night average noise level
L_{eq}	equivalent noise level
L_{max}	maximum sound level
L_{min}	minimum sound level
proposed project	501 Ocean Bluff
PPV	peak particle velocity
RCNM	Roadway Construction Noise Model
SLM	Sound level meter
SPL	Sound pressure level
ST	Short-term
VdB	Velocity Decibel

INTENTIONALLY LEFT BLANK

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 501 Ocean Bluff Way (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 10.26-acre Project site is located on Assessor Parcel Numbers 258-141-27, -28, 258-140-23, -24, -25, and -26. The project site is located at 501 Ocean Bluff Way between Camino De Orchidia and Camino El Dorado, south of Encinitas Boulevard in the City of Encinitas, California. The project site is set in a mostly residential area of the City, with residential housing developments to the south and north of the subject site in all directions.

1.3 Project Description

The Project site is a vacant 10.26-acre site located at 501 Ocean Bluff Way in the City of Encinitas, California (Figure 1, Project Location). The proposed Project involves the subdivision and development of up to 27 single-family homes on 7.18 acres of currently vacant property The project will increase available housing stock in the City of Encinitas and conforms with the City's existing land use and zoning designations, as well as the surrounding residential uses. See Figure 2 Site Plan for details.

1.4 Fundamentals of Noise and Vibration

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

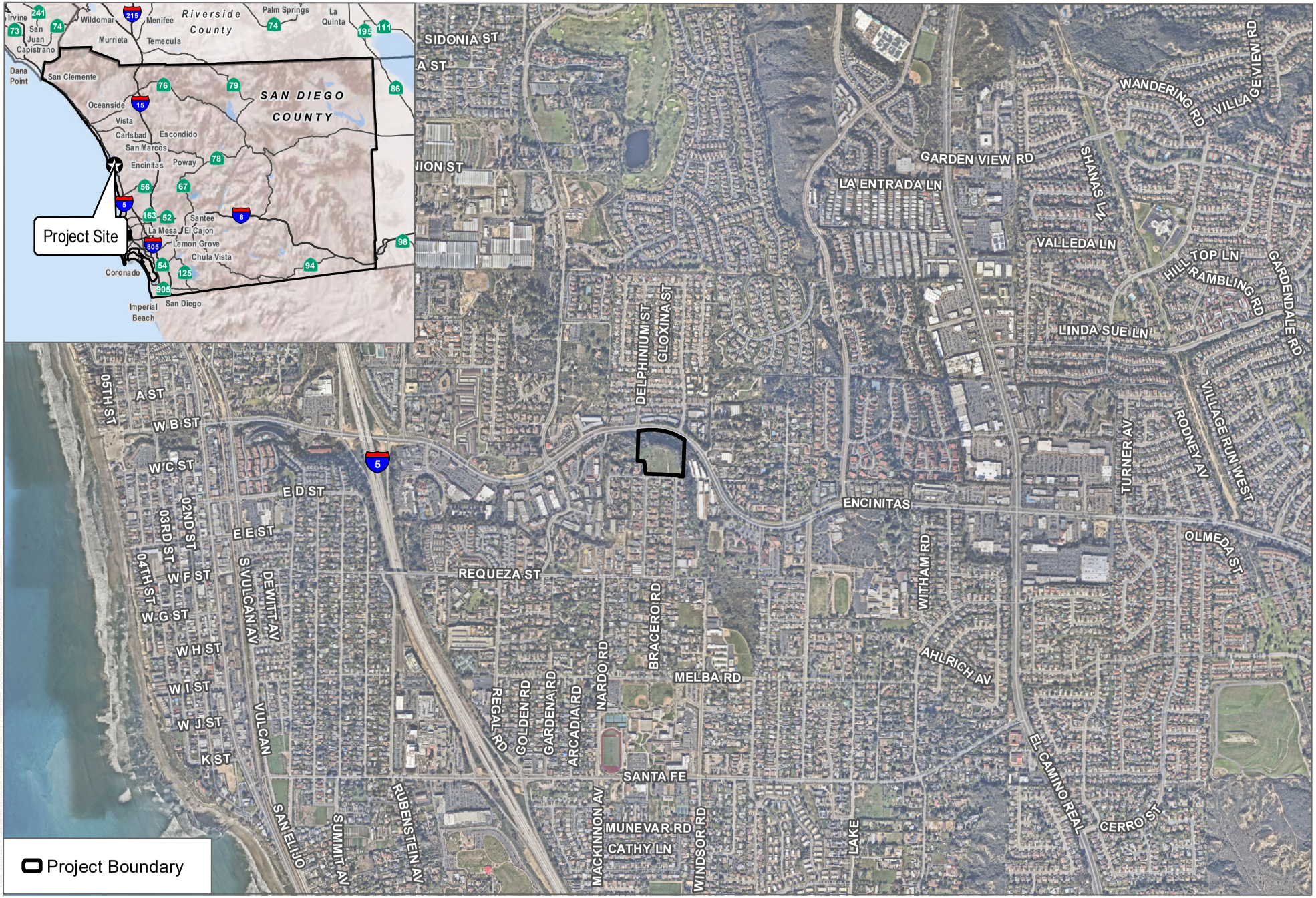
1.4.1 Sound, Noise, and Acoustics

Sound is actually a process that consists of three components: the sound source, sound path, and sound receiver. 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 determines its loudness. Loudness of sound increases with increasing amplitude. Sound pressure amplitude is measured in units of micronewton per square meter, also called micropascal. 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 micropascal would be very cumbersome, 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).



SOURCE: San Diego Public Imagery 2019

DUDEK

FIGURE 1

Project Location

Ocean Bluff Project

INTENTIONALLY LEFT BLANK

SOURCE: San Diego Public Imagery 2019

DUDEK

0 65 130 Feet

FIGURE 2

Site Plan

Ocean Bluff Project

INTENTIONALLY LEFT BLANK

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, D-scale), but these scales are rarely used in conjunction with most environmental noise. 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 1.

Table 1. Typical Sound Levels in the Environment and Industry

Common Outdoor Activities	Noise Level (dB)	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 2013.

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 levels of 1 dBA when exposed to steady, single-frequency signals in the mid-frequency range. 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. 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.

1.4.5 Noise Descriptors

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 the City "general sound level limits".

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.

1.4.6 Sound Propagation

Sound propagation (i.e., the traverse of sound from a noise emission source position to a receiver 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 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 receiver 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 Groundborne Vibration Fundamentals

Groundborne vibration is fluctuating or oscillatory motion transmitted through the ground mass (i.e., soils, clays, and rock strata). The strength of groundborne 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) include peak particle velocity (PPV) that is in units of inches per second (ips). 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 receiver

INTENTIONALLY LEFT BLANK

2 Regulatory Setting

2.1 Federal

In its Transit Noise and Vibration Impact Assessment guidance manual, the Federal Transit Administration (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.

2.2 State

2.2.1 California Code of Regulations, Title 24

Title 24 of the California Code of Regulations sets standards that new development 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: 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 unit noise-sensitive land uses.

2.2.3 California Department of Transportation

In its Transportation and Construction Vibration Guidance Manual (Caltrans 2013), 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 groundborne vibration. For transient vibration events, such as blasting, the damage risk threshold would be 1.0 ips PPV (Caltrans 2013) 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 groundborne vibration above 0.2 ips PPV would find it “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 Encinitas General Plan

The City of Encinitas General Plan (1991) is the primary source of long-range planning and policy direction used to guide growth and preserve the quality of life in Encinitas. The Encinitas General Plan states that a goal of the City is to analyze proposed land uses to ensure that the designations would contribute to a proper balance of land uses within the community. The relevant goals and policies for the project include:

GOAL 1: Provide an acceptable noise environment for existing and future residents of the City of Encinitas.

Policy 1.7: Apply Title 24 of the California Administrative Code, associated with noise insulation standards, to single-family dwellings.

GOAL 2: Require that new development be designed to provide acceptable indoor and outdoor noise environments.

Policy 2.1: The Noise and Land Use Compatibility Guidelines and the accompanying discussion set forth the criteria for siting new development in the City of Encinitas. Any project which would be located in a normally unacceptable noise exposure area, based on the Land Use Compatibility Guidelines, shall require an acoustical analysis. Noise mitigation in the future shall be incorporated in the project as needed. As a condition of approval of a project, the City may require post-construction noise monitoring and sign off by an acoustician to ensure that City requirements have been met.

GOAL 3: Ensure that residents are protected from harmful and irritating noise sources to the greatest extent possible.

Policy 3.1: The City will adopt and enforce a quantitative noise ordinance to resolve neighborhood conflicts and to control unnecessary noise in the City of Encinitas. Examples of the types of noise sources that can be controlled through the use of a quantitative noise ordinance are barking dogs, noisy mechanical equipment such as swimming pool and hot tub pumps, amplified music in commercial establishments, etc.

GOAL 4: Provide for measures to reduce noise impacts from stationary noise sources.

Policy 4.1: Ensure inclusion of noise mitigation measures in the design and operation of new and existing development.

In addition, the Noise Element addresses nuisance noise and states that it should be unlawful for any person to make or continue any loud, unnecessary noise that causes annoyance to any reasonable person of normal sensitivity.

2.3.2 City of Encinitas Municipal Code

The City's Municipal Code establishes noise criteria to prevent noise and vibration that may jeopardize the health or welfare of the City's citizens or degrade their quality of life. Chapter 9.32, Noise Abatement and Control, and Chapter 30.40, Performance Standards, establish property line noise level limits. These limits apply to existing uses but will also apply to future uses and are used for evaluating potential impacts of future on-site generated noise levels. Chapter 9.32.410 states that it shall be "unlawful for any person, including the City, to operate construction equipment at any construction site on Sundays, and days appointed by the President, Governor, or the City Council for a public fast, thanksgiving, or holiday. Notwithstanding the above, a person may operate construction equipment on the above specified days between the hours of 10:00 a.m. and 5:00 p.m. No such equipment, or combination of equipment regardless of age or date of acquisition, shall be operated so as to cause noise at a level in excess of 75 decibels for more than eight hours during any 24-hour period when measured at or within the property lines of any property which is developed and used either in part or in whole for residential purposes."

The property line noise limits are summarized in Table 2, City of Encinitas Exterior Noise Limits. As stated in Section 30.40.10, "Every use shall be so operated that the noise generated does not exceed the following levels at or beyond the lot line and does not exceed the limits of any adjacent zone."

Table 2. City of Encinitas Exterior Noise Limits

Adjacent Zone	Noise Level (dBA)	
	7:00 a.m. to 10:00 p.m.	10:00 p.m. to 7:00 a.m.
Rural Residential (RR), Rural Residential-1 RR-1), Rural Residential-2 (RR-2), Residential-3 (R-3), Residential-5 (R-5), Residential-8 (R-8)	50	45
Residential-11 (R-11), Residential Single Family-11 (RS-11), Residential-15 (R15), Residential-20 (R-20), Residential-25 (R-25), Mobile Home Park (MHP)	55	50
Office Professional (OP), Limited Local Commercial (LLC), Local Commercial (LC), General Commercial (GC), Limited Visitor Serving Commercial (L-VSC), Visitor Serving Commercial (VSC)	60	55
Light Industrial (L-I), Business Park (BP)	60	55

SOURCE: CITY OF ENCINITAS MUNICIPAL CODE 30.40.010(A)

INTENTIONALLY LEFT BLANK

3 Existing Conditions

Field measurements of sound pressure level (SPL) were conducted near the proposed project site on April 5, 2023, to quantify and characterize the existing outdoor ambient sound levels. Table 3 provides the location, date, and time period at which these baseline noise level measurements were performed by an attending Dudek field investigator using a Rion-branded Model NL-52 sound level meter (SLM) equipped with a 0.5-inch, pre-polarized condenser microphone with pre- amplifier. The SLM meets the current American National Standards Institute standard for a Type 1 (Precision Grade) sound level meter. The accuracy of the SLM was verified using a field calibrator before and after the measurements, and the measurements were conducted with the microphone positioned approximately 5 feet above the ground.

Three (3) short-term (ST) noise level measurement locations (ST1–ST3) that represent existing noise-sensitive receivers were selected on and near the proposed project site. These locations are depicted as receivers ST1–ST3 on Figure 3, Noise Measurement Locations. The measured L_{eq} and L_{max} noise levels are provided in Table 3. The primary noise sources at the sites identified in Table 3 consisted of traffic along adjacent roadways, Aircraft and helicopter noise, the sounds of leaves rustling, and birdsong. As shown in Table 3, the measured SPL ranged from approximately 49.8 dBA L_{eq} at ST1 to 69.6 dBA L_{eq} at ST3. Beyond the summarized information presented in Table 3, detailed noise measurement data is included in Appendix A, Baseline Noise Measurement Field Data.

Table 3. Measured Baseline Outdoor Ambient Noise Levels

Site	Location/Address	Date/Time	L_{eq} (dBA)	L_{max} (dBA)
ST1	Adjacent Project site, south of Ocean Bluff Way	2023-04-05, 10:25 AM to 10:35 AM	49.8	62.3
ST2	Western Project boundary	2023-04-05, 10:40 AM to 10:50 AM	54.1	59.7
ST3	Intersection of Encinitas Boulevard and Delphinium Street	2023-04-05, 11:00 AM to 11:10 AM	69.6	77.9

Source: Appendix A.
Notes: L_{eq} = equivalent continuous sound level (time-averaged sound level); L_{max} = maximum sound level during the measurement interval; dBA = A-weighted decibels; ST = short-term noise measurement locations.

Generally, the measured samples of the daytime outdoor ambient sound environment agree with expectations: at ST1 and ST2, L_{eq} values are below 60 dBA due largely to not being within close proximity to a major roadway, which results in a substantially lower sampled L_{eq} value. ST3 is located right at the intersection a major roadway and thus had a higher L_{eq} value near 70 dBA.

INTENTIONALLY LEFT BLANK

SOURCE: San Diego Public Imagery 2019

DUDEK

0 75 150 Feet

FIGURE 3

Noise Measurement Locations

Ocean Bluff Project

INTENTIONALLY LEFT BLANK

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 groundborne vibration or groundborne noise levels.
- Expose 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 Encinitas Municipal Code in Chapter 9.32.410 outlined requirements for construction work hours and noise levels. The Encinitas Noise Ordinance states that no construction work shall be performed before 7:00 a.m. or after 7:00 p.m. on Monday through Saturday, and it is prohibited on Sundays and City holidays. Construction activity must not cause an hourly average sound level greater than 75 decibels over an 8-hour period on property zoned or used for residential purposes. An exception is made for individuals performing construction work on their own property for non-commercial purposes, allowing such activities between 10:00 a.m. and 5:00 p.m. on Sundays and City holidays.

  In accordance with the Encinitas Noise Ordinance, this analysis will use 75 dBA as the construction noise impact criterion over an hourly average during permitted daytime hours.

- Off-site project-attributed transportation noise – For purposes for 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 for this analysis, a noise impact would be considered significant if noise from typical operation of heating, ventilation, and air conditioning and other electro-mechanical systems associated with the proposed project exceeded 50 dBA hourly L_{eq} at the property line from 7:00 a.m. to 9:59 p.m., and 45 dBA hourly L_{eq} from 10:00 p.m. to 6:59 a.m.
- 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 2020). 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 to an older residential structure.

For purposes of disclosure, since 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 Encinitas exterior and interior noise standards of 65 dBA CNEL and 45 dBA CNEL, respectively.

INTENTIONALLY LEFT BLANK

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

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 4. Note that the equipment noise levels presented in Table 4 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 4. Typical Construction Equipment Maximum Noise Levels

Equipment Type	Typical Equipment (L_{max}, dBA at 50 Feet)
All Other Equipment > 5 HP	85
Backhoe	78
Concrete Saw	90
Compressor (air)	78
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 two evaluation distances to the nearest existing noise-sensitive receptor: 1) from the nearest position of the construction site boundary and 2) from the geographic center of the construction site, which serves as the time-averaged location or geographic *acoustical centroid* of active construction equipment for the phase under study. The intent of the former distance is to help evaluate anticipated construction noise from a limited quantity of equipment or vehicle activity expected to be at the boundary for some period of time, which would be most appropriate for phases such as site preparation, grading, and paving. The latter distance is used in a manner similar to the general assessment technique as described in the FTA guidance for construction noise assessment, when the location of individual equipment for a given construction phase is uncertain over some extent of (or the entirety of) the construction site area. In this studied scenario, because of the equipment location uncertainty, all the equipment for a construction phase is assumed to operate—on average—from the acoustical centroid position. Table 5 summarizes these two distances to the apparent closest noise-sensitive receptor for each of the six sequential construction phases. At the site boundary, this analysis assumes that up to only one piece of equipment of each listed type per phase will be involved in the construction activity for a limited portion of the 8-hour period. In other words, at such proximity, the operating equipment cannot "stack" or crowd the vicinity and still operate. For the acoustical centroid case, which intends to be a geographic average position for all equipment during the indicated phase, this analysis assumes that the equipment may be operating up to all 8 hours per day.

Table 5. Estimated Distances between Construction Activities and the Nearest Noise-sensitive Receptors

Construction Phase (and Equipment Types Involved)	Distance from Nearest Noise-Sensitive Receptor to Construction Site Boundary (Feet)	Distance from Nearest Noise-Sensitive Receptor to Acoustical Centroid of Site (Feet)
Demolition (concrete saw, excavator, dozer)	20	100
Site Preparation (dozer, backhoe)	20	100
Grading (excavator, grader, dozer, scraper, backhoe)	20	100
Building construction (crane, man-lift, generator, backhoe, welder)	20	100
Paving (paver, roller, concrete mixer truck)	20	100
Architectural Coating (compressor)	20	100

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 "acoustical usage factor" (AUF) 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 4), and the distance from the noise-sensitive receiver. The predictive model also considers how many hours that equipment may be on site and operating (or idling) within an established work shift. The RCNM has default AUF values for various pieces of construction equipment and vehicles, which were derived from an extensive study of typical construction activity patterns. Those default AUF values were used for this noise analysis, which is detailed in Appendix B, Construction Noise Modeling Input and Output, and produce the predicted results displayed in Table 6.

Based on the current construction equipment roster provided to Dudek that informs these model input parameters, predicted noise levels are expected to exceed the hourly L_{eq} 75 dBA over an 8-hour period. Because of this, an additional mitigated scenario was modeled, which assumes that there will be an 8-foot-tall barrier at the southern and western project property line, as described in Section 6 of this report.

Table 6. Predicted Construction Noise Levels per Activity Phase

Construction Phase (and Equipment Types Involved)	8-Hour L_{eq} at Nearest Noise-Sensitive Receptor to Construction Site Boundary (dBA)		8-Hour L_{eq} at Nearest Noise-Sensitive Receptor to Acoustical Centroid of Site (dBA)	
	No Mitigation	With Mitigation	No Mitigation	With Mitigation
Demolition (concrete saw, excavator, dozer)	88	75	77	66
Site Preparation (dozer, backhoe)	86	73	76	65
Grading (excavator, grader, dozer, scraper, backhoe)	88	75	79	68
Building construction (crane, man-lift, generator, backhoe, welder)	85	71	73	61
Paving (paver, roller, concrete mixer truck)	85	72	73	61
Architectural Coating (compressor)	79	66	65	53

Notes: L_{eq} = equivalent noise level; dBA = A-weighted decibels.

As presented in Table 6, the estimated non-mitigated construction noise levels are predicted to be as high as 88 dBA L_{eq} over an 8-hour period at the nearest existing residences (as close as 20 feet away) when grading activities take place near the western and southern project boundaries. Note that these estimated noise levels at a source-to-receiver distance of 20 feet would occur when the loudest pieces of heavy equipment would each operate for a cumulative period of up to three (3) hours a day, while the remaining phase equipment operate at the acoustical centroid. By way of example, a grader might make multiple passes on site that are this close to a receiver; but, for the remaining time during the day, the grader is sufficiently farther away, performing work at a more distant location, or simply not operating. On an average construction workday, heavy equipment will be operating sporadically throughout the project site and more frequently away from the western edge. At more typical distances closer to the center of the project site (approximately 100 feet from the nearest existing residence), construction noise levels are estimated to

range from approximately 65 dBA L_{eq} to 77 dBA L_{eq} at the nearest existing residence. For these instances when operation of construction equipment and processes are sufficiently proximate to cause activity noise levels to exceed 75 dBA L_{eq}, which the City of Encinitas requires as a daytime threshold for construction noise exposure over an 8-hour period at a residential receptor, mitigation measure **MM-NOI-1** shall be implemented as indicated site conditions may warrant. Proper application of administrative controls, engineering controls, and temporary noise barriers or comparable sound abatement due to implementation of **MM-NOI-1** has the ability to reduce noise levels by up to 13 dB, which would correspondingly reduce the predicted 88 dBA 8-hour L_{eq} for the grading phase to 75 dBA L_{eq}, which would make the level compliant with the 75 dBA L_{eq} threshold. Thus, temporary construction-related noise impacts would be considered potentially significant unless mitigated. With implementation of **MM-NOI-1**, impacts would be reduced to **less than significant with mitigation**.

Long-Term Operational

Off-Site Traffic Noise Exposure

According to the Local Transportation Analysis (LOS Engineering 2024), the proposed project would result in the creation of additional vehicle trips on local arterial roadways (i.e., Westlake Street and Requeza Street), which could result in increased traffic noise levels at adjacent noise-sensitive land uses. Appendix C, Traffic Noise Modeling Input and Output, contains a spreadsheet with traffic volume data (average daily traffic) for Westlake Street. In particular, the proposed project would create additional traffic along Westlake Street and Requeza Street, which according to the Local Transportation Analysis prepared for the proposed project (LOS Engineering 2024) would add 270 total average daily trips to adjacent to the project site.

Potential noise effects from vehicular traffic were assessed using the Federal Highway Administration's Traffic Noise Model version 2.5 (FHWA 2004). Information used in the model included the roadway geometry, existing (year 2023) and existing plus project traffic volumes and posted traffic speeds. Noise levels were modeled at representative noise-sensitive receivers ST1, ST2, and ST3 as shown in Figure 3. The receivers were modeled to be 5 feet above the local ground elevation. The noise model results are summarized in Table 7. Based on results of the model, implementation of the proposed project would not result in readily perceptible increases in traffic noise.

Table 7. Roadway Traffic Noise Modeling Results

Modeled Receiver No.	Existing (2022) Noise Level	Existing with Project Noise Level	Maximum Project-Related Noise Level Increase
	(dBA CNEL)	(dBA CNEL)	(dB)
ST1	43.3	43.3	0.0
ST2	48.1	48.1	0.0
ST3	69.2	69.2	0.0

Source: Appendix C.
Notes: dBA = A-weighted decibel; CNEL = community noise equivalent level; dB = decibel.

Table 7 shows that at all three listed representative receivers, the addition of proposed project traffic to the roadway network would result in an increase in the CNEL of less than 3 dB, which is below the discernible level of change for the average healthy human ear. Thus, a less-than-significant impact is

expected for proposed project-related off-site traffic noise increases affecting existing residences in the vicinity.

On-site Traffic Interior Noise Exposure

Aside from exposure to aviation traffic noise, current CEQA noise-related guidelines at the state level do not require an assessment of exterior-to-interior noise intrusion, environmental noise exposure to occupants of newly-created project residences, or environmental noise exposure to exterior non-residential uses attributed to the development of the proposed project. Nevertheless, the City's General Plan and the California Building Code requires that interior background noise levels not exceed a CNEL of 45 dB within habitable rooms. Hence, the following predictive analysis of traffic noise exposure at the exteriors of occupied residences and outdoor living areas is provided below.

In addition to the prediction results presented in Table 7, the FHWA TNM software was also used to predict the existing-with-project scenario traffic noise levels at multiple on-site exterior areas, as listed in Table 8. These on-site modeled receptor locations, which appear in Appendix C, include representative positions for the exteriors of positions of five of the proposed project building facades. Predicted exterior sound levels presented in Table 8 that are higher than 60 dBA CNEL indicate locations where an exterior-to-interior noise analysis should be performed for the proximate occupied residential unit. Individual modeling locations appear in Appendix C.

Table 8. Future Ambient Noise Levels at Residential Facades

Modeled Receptor	Noise Level (A-weighted CNEL)	
	First Floor	Second Floor
M1	44.5	52.8
M2	45.9	55.6
M3	46.8	57.3
M4	46.7	57.3
M5	46.7	56.4

According to the proposed project site plan, there will be no habitable residential units having exterior noise exposures that exceed 60 dBA CNEL at the proposed project. Typically, with the windows open, building shells provide approximately 15 dB (i.e., an average of 12-18 dB [OPR 2017]) of exterior-to-interior noise reduction; while with windows closed residential construction generally provides a minimum of 25 dB attenuation (FHWA 2011). Therefore, rooms exposed to an exterior CNEL not greater than 60 dB would result in an interior background CNEL of 45 dB or less, even with open fenestration. In other words, the arithmetic difference of an exterior noise level less than 60 dBA CNEL and an exposed building façade that provides 15 dB of sound insulation results in an interior background sound level less than 45 dBA CNEL. Table 8 shows that all residential facades will be well below 60 dB CNEL and thus will not exceed a CNEL of 45 dB within habitable rooms.

Stationary Noise Sources

The incorporation of new single-family homes and a mix of open space uses attributed to development of the proposed project will add a variety of noise-producing electro-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. Using a Microsoft Excel–based outdoor sound propagation prediction model, project-attributed operational noise at nearby community receptors was predicted using several assumptions:

- Treatment of exposed at-grade air-cooled condensing units as point-type sound emission sources; and,
- Point-source sound propagation (i.e., 6 dB per doubling of distance) that conservatively ignores acoustical absorption from atmospheric and ground surface effects.
- Installation of a 6-foot-high solid privacy fence along the adjoining project property line with the nearest receptor to the west

Please see Appendix D for quantitative details of the inputs and outputs that form the basis of the following assessment presentations.

Residential Unit Heating, Ventilation, and Air Conditioning Noise

For purposes of this analysis, each of the new occupied residential units would be expected to feature a split-system type air-conditioning unit, with an air-cooled refrigeration (3-ton capacity) condenser unit. Assuming each condenser unit has an SPL of 68 dBA at 3 feet based on available data from a likely manufacturer (Carrier 2012), and the units would generally be installed at grade. Therefore, the closest existing noise-sensitive residential receptor to the west of the proposed project's western unit would be as close as 40 horizontal feet to the nearest of these condenser units. The predicted sound emission level from the combination of all operating condenser units as received by this offsite single-family home would be 45 dBA L_{eq} and thus be compliant with the City's nighttime threshold of 45 dBA hourly L_{eq}. Under such conditions, the operation of residential air-conditioning units would result in a **less-than-significant noise impact**.

b) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact. Construction activities may expose persons to excessive groundborne vibration or groundborne noise, causing a potentially significant impact. Caltrans has collected groundborne 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).

Groundborne vibration attenuates rapidly, even over short distances. The attenuation of groundborne 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., 20 feet from the nearest occupied property) the estimated vibration velocity level would be 0.12 ips per the equation as follows (FTA 2006):

$PPV_{rcvr} = PPV_{ref} * (25/D)^{1.5} = 0.12 = 0.089 * (25/20)^{1.5}$

In the above equation, PPV_{rcvr} is the predicted vibration velocity at the receiver 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 receiver. Therefore, at this predicted PPV that is less than the 0.2 ips PPV guidance-based limit, 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 levels of 0.12 ips, which do not surpass the guidance limit of 0.3 ips PPV for building damage risk to older residential structures (Caltrans 2020). Because the predicted vibration level at 20 feet is less than this guidance limit, 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 groundborne 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 project site is the McClellan Palomar Airport approximately 5.5 miles north of the site; the project site is not located within the boundaries of the land use plan adopted for this airport. **No impacts** from aviation overflight noise exposure would occur.

INTENTIONALLY LEFT BLANK

6 Mitigation Measures

The following mitigation measure, introduced in Section 5, Impact Discussion, would apply during construction activities.

MM-NOI-1 - Temporary Construction Noise

The proposed project applicant or its contractor will implement the following for onsite noise control and sound abatement means that, in aggregate, would yield a minimum of approximately 13 dBA of construction noise reduction during the grading phase of the Project.

- *Administrative controls* (e.g., reduce operating time of equipment and/or prohibit usage of equipment type[s] within certain distances to a nearest receiving occupied off-site property).
- *Engineering controls* (change equipment operating parameters [speed, capacity, etc.], or install features or elements that otherwise reduce equipment noise emission [e.g., upgrade engine exhaust mufflers]).
- *Implement temporary 8-foot high noise abatement* on the site boundary fencing (or within, as practical and appropriate) in the form of flexible sound blankets or comparable solid barriers (e.g., rigid plywood sheeting) to occlude construction noise emission between the site (or specific equipment operation as the situation may define) and the noise-sensitive receptor(s) of concern. Such temporary barriers should demonstrate a sound transmission class (STC) rating of at least 20, and installed in a manner that eliminates air gaps between adjoining element edges and the ground surface.

7 Summary of Findings

This noise report was conducted to predictively quantify construction and operation noise and vibration attributed to the proposed project. The results indicate that potential impacts during construction grading activities would be less than significant with mitigation **MM-NOI-1** successfully applied.

INTENTIONALLY LEFT BLANK

8 References Cited

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.

Carrier. 2012. CA16NA 018-061 Single-Stage Air Conditioner w/ Puron Refrigerant. Catalog No: CA16NA-06PD. https://resource.carrierenterprise.com/is/content/Watscocom/carrier_ca16na03600g_article_1404816230548_en_ss?_ga=2.123164302.489492439.1570570581-792571132.1570570581

City of Encinitas.1994. General Plan. https://encinitasca.gov/Government/General-Plan

City of Encinitas. 2021. Municipal Code. Retrieved May 31, 2023, from https://library.qcode.us/lib/encinitas_ca/pub/municipal_code

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. August 2006.

FHWA (Federal Highway Administration). 2004. FHWA Traffic Noise Model Version 2.5.

FHWA. 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. December 8, 2008.

FHWA. 2011. Highway Traffic Noise: Analysis and Abatement Guidance. FHWA-HEP-10-025. December. https://www.codot.gov/programs/environmental/noise/guidelines-policies/fhwa-noise-guidance-dec-2011

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

LOS Engineering, Inc. 2024. Multi-006443-2023 (27 Single Family homes) (*Local Transportation Analysis.*

OPR (Governor's Office of Planning and Research). 2017. *State of California General Plan Guidelines*. http://www.opr.ca.gov/planning/general-plan/guidelines.html

INTENTIONALLY LEFT BLANK

Appendix A

Baseline Noise Measurement Field Data

FORMS DUDEK FIELD DATA REPORT

Field Noise Measurement Data

Record: 1598	
Project Name	*Ocean Bluff*
Project #	*15198*
Observer(s)	*Connor Burke*
Date	*2023-04-05*

Meteorological Conditions

Instrument and Calibrator Information

Instrument Name List	*(ENC) Rion NL-52*
Instrument Name	*(ENC) Rion NL-52*
Instrument Name Lookup Key	*(ENC) Rion NL-52*
Manufacturer	*Rion*
Model	*NL-52*
Serial Number	*553896*
Calibration Date	
Calibrator Name	*(ENC) LD CAL150*
Calibrator Name	*(ENC) LD CAL150*
Calibrator Name Lookup Key	*(ENC) LD CAL150*
Calibrator Manufacturer	*Larson Davis*

Calibrator Model	*LD CAL150*
Calibrator Serial #	*5152*
Pre-Test (dBA SPL)	*94*
Post-Test (dBA SPL)	*93.9*
Windscreen	*Yes*
Weighting?	*A-WTD*
Slow/Fast?	*Slow*
ANSI?	*Yes*

Monitoring	
Record #	*1*
Site ID	*ST1*
Site Location Lat/Long	*33.046972, -117.274972*
Begin (Time)	*10:25:00*
End (Time)	*10:35:00*
Leq	*49.8*
Lmax	*62.3*
Lmin	*44.3*
Other Lx?	*L90, L50, L10*
L90	*45.5*
L50	*47.2*
L10	*52.4*
Other Lx (Specify Metric)	*L*

Primary Noise Source	*Distant traffic*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Conversations / Yelling, Distant Traffic*
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	*4*
Lane Width (feet)	*10*
Roadway Width (feet)	*40*
Roadway Width (m)	*12.2*
Distance to Roadway (feet)	*0*
Distance to Roadway (m)	*0*
Estimated Vehicle Speed (MPH)	*0*

Description / Photos

Site Photos	

Photo	
Comments / Description	*Facing north towards project.*

Site Photos

Photo	
Comments / Description	*Facing south towards resident.*

Monitoring	
Record #	*2*
Site ID	*ST2*
Site Location Lat/Long	*33.047695, -117.275399*

Begin (Time)	*10:40:00*
End (Time)	*10:50:00*
Leq	*54.1*
Lmax	*59.7*
Lmin	*49.7*
Other Lx?	*L90, L50, L10*
L90	*51.7*
L50	*53.8*
L10	*55.8*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Distant traffic*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Rustling Leaves*
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	*Facing northwest*

Monitoring	
Record #	*3*
Site ID	*ST3*
Site Location Lat/Long	*33.049006, -117.275717*

Begin (Time)	*11:00:00*
End (Time)	*11:10:00*
Leq	*69.6*
Lmax	*77.9*
Lmin	*47.9*
Other Lx?	*L90, L50, L10*
L90	*55.3*
L50	*66.8*
L10	*73.9*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
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	*4*
Lane Width (feet)	*10*
Roadway Width (feet)	*40*
Roadway Width (m)	*12.2*
Distance to Roadway (feet)	*20*
Distance to Roadway (m)	*6.1*
Distance Measured to Centerline or Edge of Pavement?	*Edge of Pavement*

Estimated Vehicle Speed (MPH)	*45*
Speeds Estimated by:	*Driving the Pace*
Posted Speed Limit Sign (MPH)	*45*

Traffic Counts	
Vehicle Count Summary	*A 286, MT 6, HT 2, B 0, MC 0*
Select Method for Recording Count Duration	*Enter Manually*
Counting Both Directions?	*Yes*
Count Duration (minutes)	*10*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*286*
Number of Vehicles - Medium Trucks	*6*
Number of Vehicles - Heavy Trucks	*2*
Number of Vehicles - Buses	*0*
Number of Vehicles - Motorcyles	*0*

Description / Photos

Site Photos

Photo	
Comments / Description	*Facing Encinitas blvd*

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 San Diego County (36.409) = 75
allowable hours over which Leq is to be averaged (example: 8 per SD County 36.409) = 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
Demolition	Concrete Saw	1	20	90	Noise Shroud	20	14.8	5.0	78.1	3	180	67	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	Excavator	1	40	81		20	14.8		74.1	8	480	70	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	Dozer	1	40	82		20	14.8		75.1	8	480	71	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	Concrete Saw	1	20	90		100	11.4		70.3	8	480	63	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
									Total for Demolition Phase:			**74.8**													
Site Preparation	Dozer	1	40	82		20	14.8		75.1	8	480	71	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	Backhoe	1	40	78		20	14.8		71.1	8	480	67	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
									Total for Site Preparation Phase:			**72.6**													
Grading	Excavator	1	40	81		20	14.8		74.1	3	180	66	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	Grader	1	40	85		20	14.8		78.1	3	180	70	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	dozer	1	40	82		20	14.8		75.1	3	180	67	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	scraper	1	40	84		20	14.8		77.1	3	180	69	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	backhoe	1	40	78		20	14.8		71.1	3	180	63	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	Excavator	1	40	81		100	11.4		61.3	5	300	55	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	Grader	1	40	85		100	11.4		65.3	5	300	59	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	dozer	1	40	82		100	11.4		62.3	5	300	56	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	scraper	1	40	84		100	11.4		64.3	5	300	58	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	backhoe	1	40	78		100	11.4		58.3	5	300	52	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	Excavator	1	40	81		100	11.4		61.3	8	480	57	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	scraper	1	40	84		100	11.4		64.3	8	480	60	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	backhoe	1	40	78		100	11.4		58.3	8	480	54	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
									Total for Grading Phase:			**75.1**													
Building Construction	Crane	1	16	81		20	14.8		74.1	7	420	66	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	Man lift	1	20	75		20	14.8		68.1	8	480	61	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	Generator	1	50	72		20	14.8		65.1	8	480	62	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	backhoe	1	40	78		20	14.8		71.1	7	420	67	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	Welder / Torch	1	40	73		20	14.8	5.0	68.1	8	480	62	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
									Total for Building Construction Phase:			**71.0**													
Paving	Paver	1	50	77		20	14.8		70.1	8	480	67	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	Roller	1	20	80		20	14.8		73.1	8	480	66	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
	Concrete Mixer Truck	1	40	79		20	14.8		72.1	8	480	68	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
									Total for Paving Phase:			**72.0**													
Architectural Coating	Compressor (air)	1	40	78		20	14.8		71.1	6	360	66	5	5	8	5	15	20	5.8	15.3	20.0	1.13	13.5	14.8	
									Total for Architectural Coating Phase:			**65.9**													

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

noise level limit for construction phase at occupied building, per San Diego County (36.409) = 75
allowable hours over which Leq is to be averaged (example: 8 per SD County 36.409) = 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
Demolition	Concrete Saw	1	20	90	Shroud	100	11.4	5.0	65.3	8	480	58	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	Excavator	3	40	81		100	11.4		61.3	8	480	62	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	Dozer	2	40	82		100	11.4		62.3	8	480	61	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
									Total for Demolition Phase:			**65.7**													
Site Preparation	Dozer	3	40	82		100	11.4		62.3	8	480	63	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	Backhoe	4	40	78		100	11.4		58.3	8	480	60	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
									Total for Site Preparation Phase:			**65.0**													
Grading	Excavator	2	40	81		100	11.4		61.3	8	480	60	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	Grader	1	40	85		100	11.4		65.3	8	480	61	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	dozer	1	40	82		100	11.4		62.3	8	480	58	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	scraper	2	40	84		100	11.4		64.3	8	480	63	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	backhoe	2	40	78		100	11.4		58.3	8	480	57	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
									Total for Grading Phase:			**67.7**													
Building Construction	Crane	1	16	81		100	11.4		61.3	7	420	53	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	Man lift	3	20	75		100	11.4		55.3	8	480	53	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	Generator	1	50	72		100	11.4		52.3	8	480	49	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	backhoe	3	40	78		100	11.4		58.3	7	420	59	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	Welder / Torch	1	40	73		100	11.4		53.3	8	480	49	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
									Total for Building Construction Phase:			**61.1**													
Paving	Paver	2	50	77		100	11.4		57.3	8	480	57	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	Roller	2	20	80		100	11.4		60.3	8	480	56	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
	Concrete Mixer Truck	1	40	79		100	11.4		59.3	8	480	55	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
									Total for Paving Phase:			**61.2**													
Architectural Coating	Compressor (air)	1	40	78		100	11.4		58.3	6	360	53	5	5	8	5	95	100	5.8	95.0	100.0	0.88	12.4	11.4	
									Total for Architectural Coating Phase:			**53.1**													

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

noise level limit for construction phase at occupied building, per San Diego County (36.409) = 75
allowable hours over which Leq is to be averaged (example: 8 per SD County 36.409) = 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
Demolition	Concrete Saw	1	20	90	Noise Shroud	20	1.4	5.0	91.6	3	180	80	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	Excavator	1	40	81		20	1.4		87.6	8	480	84	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	Dozer	1	40	82		20	1.4		88.6	8	480	85	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	Concrete Saw	1	20	90		100	0.0		81.8	8	480	75	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
									Total for Demolition Phase:			88.1													
Site Preparation	Dozer	1	40	82		20	1.4		88.6	8	480	85	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	Backhoe	1	40	78		20	1.4		84.6	8	480	81	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
									Total for Site Preparation Phase:			86.0													
Grading	Excavator	1	40	81		20	1.4		87.6	3	180	79	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	Grader	1	40	85		20	1.4		91.6	3	180	83	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	dozer	1	40	82		20	1.4		88.6	3	180	80	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	scraper	1	40	84		20	1.4		90.6	3	180	82	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	backhoe	1	40	78		20	1.4		84.6	3	180	76	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	Excavator	1	40	81		100	0.0		72.8	5	300	67	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	Grader	1	40	85		100	0.0		76.8	5	300	71	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	dozer	1	40	82		100	0.0		73.8	5	300	68	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	scraper	1	40	84		100	0.0		75.8	5	300	70	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	backhoe	1	40	78		100	0.0		69.8	5	300	64	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	Excavator	1	40	81		100	0.0		72.8	8	480	69	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	scraper	1	40	84		100	0.0		75.8	8	480	72	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	backhoe	1	40	78		100	0.0		69.8	8	480	66	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
									Total for Grading Phase:			88.3													
Building Construction	Crane	1	16	81		20	1.4		87.6	7	420	79	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	Man lift	1	20	75		20	1.4		81.6	8	480	75	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	Generator	1	50	72		20	1.4		78.6	8	480	76	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	backhoe	1	40	78		20	1.4		84.6	7	420	80	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	Welder / Torch	1	40	73		20	1.4	5.0	79.6	8	480	76	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
									Total for Building Construction Phase:			84.5													
Paving	Paver	1	50	77		20	1.4		83.6	8	480	81	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	Roller	1	20	80		20	1.4		86.6	8	480	80	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
	Concrete Mixer Truck	1	40	79		20	1.4		85.6	8	480	82	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
									Total for Paving Phase:			85.4													
Architectural Coating	Compressor (air)	1	40	78		20	1.4		84.6	6	360	79	5	5	0	5	15	20	7.1	15.8	20.0	0.00	0.1	1.4	
									Total for Architectural Coating Phase:			79.3													

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

noise level limit for construction phase at occupied building, per San Diego County (36.409) = 75
allowable hours over which Leq is to be averaged (example: 8 per SD County 36.409) = 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
Demolition	Concrete Saw	1	20	90	Shroud	100	0.0	5.0	76.8	8	480	70	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	Excavator	3	40	81		100	0.0		72.8	8	480	74	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	Dozer	2	40	82		100	0.0		73.8	8	480	73	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
									Total for Demolition Phase:			**77.1**													
Site Preparation	Dozer	3	40	82		100	0.0		73.8	8	480	75	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	Backhoe	4	40	78		100	0.0		69.8	8	480	72	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
									Total for Site Preparation Phase:			**76.4**													
Grading	Excavator	2	40	81		100	0.0		72.8	8	480	72	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	Grader	1	40	85		100	0.0		76.8	8	480	73	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	dozer	1	40	82		100	0.0		73.8	8	480	70	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	scraper	2	40	84		100	0.0		75.8	8	480	75	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	backhoe	2	40	78		100	0.0		69.8	8	480	69	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
									Total for Grading Phase:			**79.1**													
Building Construction	Crane	1	16	81		100	0.0		72.8	7	420	64	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	Man lift	3	20	75		100	0.0		66.8	8	480	65	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	Generator	1	50	72		100	0.0		63.8	8	480	61	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	backhoe	3	40	78		100	0.0		69.8	7	420	70	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	Welder / Torch	1	40	73		100	0.0		64.8	8	480	61	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
									Total for Building Construction Phase:			**72.5**													
Paving	Paver	2	50	77		100	0.0		68.8	8	480	69	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	Roller	2	20	80		100	0.0		71.8	8	480	68	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
	Concrete Mixer Truck	1	40	79		100	0.0		70.8	8	480	67	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
									Total for Paving Phase:			**72.6**													
Architectural Coating	Compressor (air)	1	40	78		100	0.0		69.8	6	360	65	5	5	0	5	95	100	7.1	95.1	100.0	0.00	0.1	0.0	
									Total for Architectural Coating Phase:			**64.5**													

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Lesser of or available Lmax	Spec. 721 Lmax	Measured L_{max} @50ft (dBA, slow)
All Other Equipment > 5 HP	No	50	85	85	-- N/A --
Auger Drill Rig	No	20	84	85	84
Backhoe	No	40	78	80	78
Bar Bender	No	20	80	80	-- N/A --
Blasting	Yes	-- N/A --	94	94	-- N/A --
Boring Jack Power Unit	No	50	80	80	83
Chain Saw	No	20	84	85	84
Clam Shovel (dropping)	Yes	20	87	93	87
Compactor (ground)	No	20	80	80	83
Compressor (air)	No	40	78	80	78
Concrete Batch Plant	No	15	83	83	-- N/A --
Concrete Mixer Truck	No	40	79	85	79
Concrete Pump Truck	No	20	81	82	81
Concrete Saw	No	20	90	90	90
Crane	No	16	81	85	81
Dozer	No	40	82	85	82
Drill Rig Truck	No	20	79	84	79
Drum Mixer	No	50	80	80	80
Dump Truck	No	40	76	84	76
Excavator	No	40	81	85	81
Flat Bed Truck	No	40	74	84	74
Front End Loader	No	40	79	80	79
Generator	No	50	72	72	81
Generator (<25KVA, VMS signs)	No	50	70	70	73
Gradall	No	40	83	85	83
Grader	No	40	85	85	-- N/A --
Grapple (on backhoe)	No	40	85	85	87
Horizontal Boring Hydr. Jack	No	25	80	80	82
Hydra Break Ram	Yes	10	90	90	-- N/A --
Impact Pile Driver	Yes	20	95	95	101
Jackhammer	Yes	20	85	85	89
Man Lift	No	20	75	85	75
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	90
Pavement Scarafier	No	20	85	85	90
Paver	No	50	77	85	77
Pickup Truck	No	40	55	55	75
Pneumatic Tools	No	50	85	85	85
Pumps	No	50	77	77	81
Refrigerator Unit	No	100	73	82	73
Rivit Buster/chipping gun	Yes	20	79	85	79
Rock Drill	No	20	81	85	81
Roller	No	20	80	85	80
Sand Blasting (Single Nozzle)	No	20	85	85	96
Scraper	No	40	84	85	84
Shears (on backhoe)	No	40	85	85	96
Slurry Plant	No	100	78	78	78
Slurry Trenching Machine	No	50	80	82	80
Soil Mix Drill Rig	No	50	80	80	-- N/A --
Tractor	No	40	84	84	-- N/A --
Vacuum Excavator (Vac-truck)	No	40	85	85	85
Vacuum Street Sweeper	No	10	80	80	82
Ventilation Fan	No	100	79	85	79
Vibrating Hopper	No	50	85	85	87
Vibratory Concrete Mixer	No	20	80	80	80
Vibratory Pile Driver	No	20	95	95	101
Warning Horn	No	5	83	85	83
Welder / Torch	No	40	73	73	74

Appendix C

Traffic Noise Modeling Input and Output

Dudek 1 June 2023
CB TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Ocean Bluff
RUN: Existing

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Roadway1	12.0	point1	1	6,246,725.5	1,962,820.1	0.00				Average	
		point2	2	6,246,895.5	1,962,890.5	0.00				Average	
		point3	3	6,247,055.5	1,962,917.6	0.00				Average	
		point4	4	6,247,307.5	1,962,934.0	0.00				Average	
		point5	5	6,247,449.0	1,962,947.0	0.00				Average	
		point6	6	6,247,651.0	1,962,942.8	0.00				Average	
		point7	7	6,247,766.0	1,962,919.1	0.00				Average	
		point8	8	6,247,893.5	1,962,874.2	0.00				Average	
		point9	9	6,247,985.5	1,962,823.6	0.00				Average	
		point10	10	6,248,055.5	1,962,778.4	0.00				Average	
		point11	11	6,248,133.0	1,962,704.6	0.00				Average	
		point12	12	6,248,187.0	1,962,644.6	0.00				Average	
		point13	13	6,248,254.5	1,962,543.4	0.00				Average	
		point14	14	6,248,303.0	1,962,451.2	0.00				Average	
		point15	15	6,248,369.5	1,962,302.2	0.00				Average	
		point16	16	6,248,417.5	1,962,200.0	0.00				Average	
		point17	17	6,248,496.0	1,962,044.4	0.00					
Roadway2	12.0	point18	18	6,248,451.5	1,962,039.8	0.00				Average	
		point19	19	6,248,411.5	1,962,123.5	0.00				Average	
		point20	20	6,248,365.5	1,962,225.5	0.00				Average	
		point21	21	6,248,306.5	1,962,347.4	0.00				Average	
		point22	22	6,248,253.5	1,962,470.6	0.00				Average	
		point23	23	6,248,195.5	1,962,567.6	0.00				Average	
		point24	24	6,248,135.0	1,962,644.8	0.00				Average	
		point25	25	6,248,080.0	1,962,705.0	0.00				Average	

		point26	26	6,248,005.0	1,962,763.6	0.00				Average	
		point27	27	6,247,920.5	1,962,814.4	0.00				Average	
		point28	28	6,247,843.5	1,962,854.2	0.00				Average	
		point29	29	6,247,775.0	1,962,878.0	0.00				Average	
		point30	30	6,247,690.5	1,962,897.6	0.00				Average	
		point31	31	6,247,613.5	1,962,908.1	0.00				Average	
		point32	32	6,247,477.5	1,962,905.2	0.00				Average	
		point33	33	6,247,319.5	1,962,897.8	0.00				Average	
		point34	34	6,247,218.5	1,962,894.5	0.00				Average	
		point35	35	6,247,094.0	1,962,885.4	0.00				Average	
		point36	36	6,246,995.5	1,962,871.2	0.00				Average	
		point37	37	6,246,866.5	1,962,833.2	0.00				Average	
		point38	38	6,246,765.0	1,962,787.9	0.00				Average	
		point39	39	6,246,670.5	1,962,728.0	0.00				Average	
		point40	40	6,246,499.5	1,962,608.6	0.00				Average	
		point41	41	6,246,295.5	1,962,448.1	0.00					
Roadway3	12.0	point42	42	6,246,270.5	1,962,422.8	0.00				Average	
		point43	43	6,246,351.5	1,962,313.9	0.00				Average	
		point44	44	6,246,399.5	1,962,181.9	0.00				Average	
		point45	45	6,246,452.0	1,962,028.2	0.00				Average	
		point46	46	6,246,483.0	1,961,926.2	0.00				Average	
		point47	47	6,246,465.5	1,961,851.0	0.00				Average	
		point48	48	6,246,421.0	1,961,817.4	0.00				Average	
		point49	49	6,246,348.0	1,961,779.1	0.00				Average	
		point50	50	6,246,298.0	1,961,746.8	0.00				Average	
		point51	51	6,246,251.5	1,961,680.5	0.00				Average	
		point52	52	6,246,227.5	1,961,575.9	0.00				Average	
		point53	53	6,246,237.5	1,961,447.0	0.00				Average	
		point54	54	6,246,246.5	1,961,297.9	0.00				Average	
		point55	55	6,246,214.5	1,961,180.8	0.00				Average	
		point56	56	6,246,168.0	1,961,100.5	0.00				Average	
		point57	57	6,246,145.5	1,961,027.1	0.00					
Roadway4	12.0	point58	58	6,247,870.5	1,962,037.2	90.00				Average	
		point59	59	6,247,879.0	1,962,185.1	90.00				Average	
		point60	60	6,247,874.0	1,962,242.8	90.00				Average	
		point61	61	6,247,854.0	1,962,261.2	90.00				Average	
		point62	62	6,247,803.5	1,962,270.4	90.00				Average	
		point63	63	6,247,678.5	1,962,277.5	90.00				Average	
		point64	64	6,247,512.0	1,962,279.1	90.00				Average	

		point65	65	6,247,366.0	1,962,286.4	90.00				Average	
		point66	66	6,247,102.5	1,962,294.5	90.00				Average	
		point67	67	6,247,034.5	1,962,297.0	90.00				Average	
		point68	68	6,247,002.0	1,962,276.2	90.00				Average	
		point69	69	6,246,989.0	1,962,136.6	90.00				Average	
		point70	70	6,247,000.5	1,961,977.1	90.00					

Dudek 1 June 2023
CB TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Ocean Bluff
RUN: Existing

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Roadway1	point1	1	1123	45	23	45	11	45	0	0	0	0
	point2	2	1123	45	23	45	11	45	0	0	0	0
	point3	3	1123	45	23	45	11	45	0	0	0	0
	point4	4	1123	45	23	45	11	45	0	0	0	0
	point5	5	1123	45	23	45	11	45	0	0	0	0
	point6	6	1123	45	23	45	11	45	0	0	0	0
	point7	7	1123	45	23	45	11	45	0	0	0	0
	point8	8	1123	45	23	45	11	45	0	0	0	0
	point9	9	1123	45	23	45	11	45	0	0	0	0
	point10	10	1123	45	23	45	11	45	0	0	0	0
	point11	11	1123	45	23	45	11	45	0	0	0	0
	point12	12	1123	45	23	45	11	45	0	0	0	0
	point13	13	1123	45	23	45	11	45	0	0	0	0
	point14	14	1123	45	23	45	11	45	0	0	0	0
	point15	15	1123	45	23	45	11	45	0	0	0	0
	point16	16	1123	45	23	45	11	45	0	0	0	0
	point17	17										
Roadway2	point18	18	1123	45	23	45	11	45	0	0	0	0
	point19	19	1123	45	23	45	11	45	0	0	0	0
	point20	20	1123	45	23	45	11	45	0	0	0	0
	point21	21	1123	45	23	45	11	45	0	0	0	0
	point22	22	1123	45	23	45	11	45	0	0	0	0
	point23	23	1123	45	23	45	11	45	0	0	0	0

	point24	24	1123	45	23	45	11	45	0	0	0	0
	point25	25	1123	45	23	45	11	45	0	0	0	0
	point26	26	1123	45	23	45	11	45	0	0	0	0
	point27	27	1123	45	23	45	11	45	0	0	0	0
	point28	28	1123	45	23	45	11	45	0	0	0	0
	point29	29	1123	45	23	45	11	45	0	0	0	0
	point30	30	1123	45	23	45	11	45	0	0	0	0
	point31	31	1123	45	23	45	11	45	0	0	0	0
	point32	32	1123	45	23	45	11	45	0	0	0	0
	point33	33	1123	45	23	45	11	45	0	0	0	0
	point34	34	1123	45	23	45	11	45	0	0	0	0
	point35	35	1123	45	23	45	11	45	0	0	0	0
	point36	36	1123	45	23	45	11	45	0	0	0	0
	point37	37	1123	45	23	45	11	45	0	0	0	0
	point38	38	1123	45	23	45	11	45	0	0	0	0
	point39	39	1123	45	23	45	11	45	0	0	0	0
	point40	40	1123	45	23	45	11	45	0	0	0	0
	point41	41										
Roadway3	point42	42	853	25	17	25	8	25	0	0	0	0
	point43	43	853	25	17	25	8	25	0	0	0	0
	point44	44	853	25	17	25	8	25	0	0	0	0
	point45	45	853	25	17	25	8	25	0	0	0	0
	point46	46	853	25	17	25	8	25	0	0	0	0
	point47	47	853	25	17	25	8	25	0	0	0	0
	point48	48	853	25	17	25	8	25	0	0	0	0
	point49	49	853	25	17	25	8	25	0	0	0	0
	point50	50	853	25	17	25	8	25	0	0	0	0
	point51	51	853	25	17	25	8	25	0	0	0	0
	point52	52	853	25	17	25	8	25	0	0	0	0
	point53	53	853	25	17	25	8	25	0	0	0	0
	point54	54	853	25	17	25	8	25	0	0	0	0
	point55	55	853	25	17	25	8	25	0	0	0	0
	point56	56	853	25	17	25	8	25	0	0	0	0
	point57	57										
Roadway4	point58	58	0	0	0	0	0	0	0	0	0	0
	point59	59	0	0	0	0	0	0	0	0	0	0

	point60	60	0	0	0	0	0	0	0	0	0	0
	point61	61	0	0	0	0	0	0	0	0	0	0
	point62	62	0	0	0	0	0	0	0	0	0	0
	point63	63	0	0	0	0	0	0	0	0	0	0
	point64	64	0	0	0	0	0	0	0	0	0	0
	point65	65	0	0	0	0	0	0	0	0	0	0
	point66	66	0	0	0	0	0	0	0	0	0	0
	point67	67	0	0	0	0	0	0	0	0	0	0
	point68	68	0	0	0	0	0	0	0	0	0	0
	point69	69	0	0	0	0	0	0	0	0	0	0
	point70	70										

Dudek
CB

1 June 2023
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Ocean Bluff
RUN: Existing

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	6,247,474.0	1,962,273.4	90.00	4.92	49.80	66	10.0	8.0	Y
ST3	2	1	6,247,225.0	1,962,976.9	0.00	4.92	69.60	66	10.0	8.0	Y
ST2	3	1	6,247,380.0	1,962,488.0	90.00	4.92	54.10	66	10.0	8.0	Y

Dudek 1 June 2023
CB TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: Ocean Bluff
RUN: Existing

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per	$ per	Top	Run:Rise	$ per			X	Y	Z	at	Seg Ht	Perturbs		On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	6,247,485.5	1,962,585.9	90.00	20.00	0.00	0	0		
									point2	2	6,247,486.0	1,962,594.8	90.00	20.00	0.00	0	0		
									point3	3	6,247,491.5	1,962,595.1	90.00	20.00	0.00	0	0		
									point4	4	6,247,493.5	1,962,615.2	90.00	20.00	0.00	0	0		
									point5	5	6,247,433.5	1,962,616.2	90.00	20.00	0.00	0	0		
									point6	6	6,247,433.5	1,962,576.1	90.00	20.00	0.00	0	0		
									point7	7	6,247,487.0	1,962,575.6	90.00	20.00					
Barrier2	W	0.00	99.99	0.00				0.00	point8	8	6,247,551.0	1,962,611.1	90.00	20.00	0.00	0	0		
									point9	9	6,247,559.5	1,962,610.6	90.00	20.00	0.00	0	0		
									point10	10	6,247,561.0	1,962,605.5	90.00	20.00	0.00	0	0		
									point11	11	6,247,579.0	1,962,605.4	90.00	20.00	0.00	0	0		
									point12	12	6,247,581.0	1,962,666.0	90.00	20.00	0.00	0	0		
									point13	13	6,247,543.0	1,962,666.9	90.00	20.00	0.00	0	0		
									point14	14	6,247,541.5	1,962,611.8	90.00	20.00					
Barrier3	W	0.00	99.99	0.00				0.00	point15	15	6,247,598.5	1,962,604.1	90.00	20.00	0.00	0	0		
									point16	16	6,247,608.5	1,962,604.0	90.00	20.00	0.00	0	0		
									point17	17	6,247,608.5	1,962,609.6	90.00	20.00	0.00	0	0		
									point18	18	6,247,629.0	1,962,608.9	90.00	20.00	0.00	0	0		
									point19	19	6,247,627.5	1,962,664.6	90.00	20.00	0.00	0	0		
									point20	20	6,247,589.0	1,962,666.5	90.00	20.00	0.00	0	0		
									point21	21	6,247,590.0	1,962,605.2	90.00	20.00					
Barrier4	W	0.00	99.99	0.00				0.00	point22	22	6,247,744.0	1,962,600.6	90.00	20.00	0.00	0	0		
									point23	23	6,247,754.0	1,962,602.6	90.00	20.00	0.00	0	0		
									point24	24	6,247,753.5	1,962,607.1	90.00	20.00	0.00	0	0		
									point25	25	6,247,772.5	1,962,606.0	90.00	20.00	0.00	0	0		
									point26	26	6,247,772.5	1,962,661.1	90.00	20.00	0.00	0	0		
									point27	27	6,247,754.5	1,962,661.8	90.00	20.00	0.00	0	0		
									point28	28	6,247,755.0	1,962,674.0	90.00	20.00	0.00	0	0		
									point29	29	6,247,736.5	1,962,672.6	90.00	20.00	0.00	0	0		
									point30	30	6,247,733.5	1,962,601.8	90.00	20.00					
Barrier5	W	0.00	99.99	0.00				0.00	point31	31	6,247,794.5	1,962,601.6	90.00	20.00	0.00	0	0		
									point32	32	6,247,794.0	1,962,588.5	90.00	20.00	0.00	0	0		
									point33	33	6,247,799.5	1,962,588.5	90.00	20.00	0.00	0	0		
									point34	34	6,247,798.0	1,962,569.2	90.00	20.00	0.00	0	0		
									point35	35	6,247,837.0	1,962,568.9	90.00	20.00	0.00	0	0		

									point36	36	6,247,853.5	1,962,569.2	90.00	20.00	0.00	0	0		
									point37	37	6,247,854.5	1,962,607.1	90.00	20.00	0.00	0	0		
									point38	38	6,247,795.5	1,962,609.2	90.00	20.00					

Dudek			**1 June 2023**	
CB			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**Ocean Bluff**			
RUN:	**Existing**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line1	1	6,246,961.0	1,962,485.2	0.00
	2	6,246,959.0	1,962,591.5	0.00
	3	6,246,940.5	1,962,664.5	0.00
	4	6,246,967.0	1,962,778.6	0.00
	5	6,246,997.0	1,962,841.2	0.00
	6	6,247,133.0	1,962,863.4	0.00
	7	6,247,190.5	1,962,868.0	0.00
	8	6,247,358.0	1,962,876.9	0.00
	9	6,247,494.0	1,962,888.2	0.00
	10	6,247,586.0	1,962,885.1	0.00
	11	6,247,695.0	1,962,870.4	0.00
	12	6,247,813.0	1,962,834.9	0.00
	13	6,247,876.5	1,962,808.2	0.00
	14	6,247,951.0	1,962,768.6	0.00
	15	6,248,018.5	1,962,721.5	0.00
	16	6,248,102.0	1,962,643.0	0.00
	17	6,248,199.0	1,962,507.4	0.00
	18	6,248,280.5	1,962,342.0	0.00
Terrain Line2	19	6,247,355.0	1,962,509.2	90.00
	20	6,247,359.5	1,962,592.8	90.00
	21	6,247,376.5	1,962,642.5	90.00
	22	6,247,460.5	1,962,656.9	90.00
	23	6,247,515.5	1,962,707.9	90.00
	24	6,247,557.5	1,962,706.0	90.00

	25	6,247,690.0	1,962,702.6	90.00
	26	6,247,772.0	1,962,675.4	90.00
	27	6,247,879.5	1,962,638.2	90.00
	28	6,247,890.0	1,962,608.5	90.00
	29	6,247,920.0	1,962,506.5	90.00
	30	6,247,967.0	1,962,315.5	90.00

Dudek
CB
1 June 2023
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Ocean Bluff
RUN: Existing
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	49.8	43.3	66	-6.5	10	----	43.3	0.0	8	-8.0
ST3	2	1	69.6	69.2	66	-0.4	10	Snd Lvl	69.2	0.0	8	-8.0
ST2	3	1	54.1	48.1	66	-6.0	10	----	48.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	3	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 1 June 2023
CB TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Ocean Bluff
RUN: Existing + Project

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Roadway1	12.0	point1	1	6,246,725.5	1,962,820.1	0.00				Average	
		point2	2	6,246,895.5	1,962,890.5	0.00				Average	
		point3	3	6,247,055.5	1,962,917.6	0.00				Average	
		point4	4	6,247,307.5	1,962,934.0	0.00				Average	
		point5	5	6,247,449.0	1,962,947.0	0.00				Average	
		point6	6	6,247,651.0	1,962,942.8	0.00				Average	
		point7	7	6,247,766.0	1,962,919.1	0.00				Average	
		point8	8	6,247,893.5	1,962,874.2	0.00				Average	
		point9	9	6,247,985.5	1,962,823.6	0.00				Average	
		point10	10	6,248,055.5	1,962,778.4	0.00				Average	
		point11	11	6,248,133.0	1,962,704.6	0.00				Average	
		point12	12	6,248,187.0	1,962,644.6	0.00				Average	
		point13	13	6,248,254.5	1,962,543.4	0.00				Average	
		point14	14	6,248,303.0	1,962,451.2	0.00				Average	
		point15	15	6,248,369.5	1,962,302.2	0.00				Average	
		point16	16	6,248,417.5	1,962,200.0	0.00				Average	
		point17	17	6,248,496.0	1,962,044.4	0.00					
Roadway2	12.0	point18	18	6,248,451.5	1,962,039.8	0.00				Average	
		point19	19	6,248,411.5	1,962,123.5	0.00				Average	
		point20	20	6,248,365.5	1,962,225.5	0.00				Average	
		point21	21	6,248,306.5	1,962,347.4	0.00				Average	
		point22	22	6,248,253.5	1,962,470.6	0.00				Average	
		point23	23	6,248,195.5	1,962,567.6	0.00				Average	
		point24	24	6,248,135.0	1,962,644.8	0.00				Average	
		point25	25	6,248,080.0	1,962,705.0	0.00				Average	

		point26	26	6,248,005.0	1,962,763.6	0.00				Average	
		point27	27	6,247,920.5	1,962,814.4	0.00				Average	
		point28	28	6,247,843.5	1,962,854.2	0.00				Average	
		point29	29	6,247,775.0	1,962,878.0	0.00				Average	
		point30	30	6,247,690.5	1,962,897.6	0.00				Average	
		point31	31	6,247,613.5	1,962,908.1	0.00				Average	
		point32	32	6,247,477.5	1,962,905.2	0.00				Average	
		point33	33	6,247,319.5	1,962,897.8	0.00				Average	
		point34	34	6,247,218.5	1,962,894.5	0.00				Average	
		point35	35	6,247,094.0	1,962,885.4	0.00				Average	
		point36	36	6,246,995.5	1,962,871.2	0.00				Average	
		point37	37	6,246,866.5	1,962,833.2	0.00				Average	
		point38	38	6,246,765.0	1,962,787.9	0.00				Average	
		point39	39	6,246,670.5	1,962,728.0	0.00				Average	
		point40	40	6,246,499.5	1,962,608.6	0.00				Average	
		point41	41	6,246,295.5	1,962,448.1	0.00					
Roadway3	12.0	point42	42	6,246,270.5	1,962,422.8	0.00				Average	
		point43	43	6,246,351.5	1,962,313.9	0.00				Average	
		point44	44	6,246,399.5	1,962,181.9	0.00				Average	
		point45	45	6,246,452.0	1,962,028.2	0.00				Average	
		point46	46	6,246,483.0	1,961,926.2	0.00				Average	
		point47	47	6,246,465.5	1,961,851.0	0.00				Average	
		point48	48	6,246,421.0	1,961,817.4	0.00				Average	
		point49	49	6,246,348.0	1,961,779.1	0.00				Average	
		point50	50	6,246,298.0	1,961,746.8	0.00				Average	
		point51	51	6,246,251.5	1,961,680.5	0.00				Average	
		point52	52	6,246,227.5	1,961,575.9	0.00				Average	
		point53	53	6,246,237.5	1,961,447.0	0.00				Average	
		point54	54	6,246,246.5	1,961,297.9	0.00				Average	
		point55	55	6,246,214.5	1,961,180.8	0.00				Average	
		point56	56	6,246,168.0	1,961,100.5	0.00				Average	
		point57	57	6,246,145.5	1,961,027.1	0.00					
Roadway4	12.0	point58	58	6,247,870.5	1,962,037.2	90.00				Average	
		point59	59	6,247,879.0	1,962,185.1	90.00				Average	
		point60	60	6,247,874.0	1,962,242.8	90.00				Average	
		point61	61	6,247,854.0	1,962,261.2	90.00				Average	
		point62	62	6,247,803.5	1,962,270.4	90.00				Average	
		point63	63	6,247,678.5	1,962,277.5	90.00				Average	
		point64	64	6,247,512.0	1,962,279.1	90.00				Average	

		point65	65	6,247,366.0	1,962,286.4	90.00				Average	
		point66	66	6,247,102.5	1,962,294.5	90.00				Average	
		point67	67	6,247,034.5	1,962,297.0	90.00				Average	
		point68	68	6,247,002.0	1,962,276.2	90.00				Average	
		point69	69	6,246,989.0	1,962,136.6	90.00				Average	
		point70	70	6,247,000.5	1,961,977.1	90.00					

Dudek 1 June 2023
CB TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Ocean Bluff
RUN: Existing + Project

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Roadway1	point1	1	1126	45	23	45	11	45	0	0	0	0
	point2	2	1126	45	23	45	11	45	0	0	0	0
	point3	3	1126	45	23	45	11	45	0	0	0	0
	point4	4	1126	45	23	45	11	45	0	0	0	0
	point5	5	1126	45	23	45	11	45	0	0	0	0
	point6	6	1126	45	23	45	11	45	0	0	0	0
	point7	7	1126	45	23	45	11	45	0	0	0	0
	point8	8	1126	45	23	45	11	45	0	0	0	0
	point9	9	1126	45	23	45	11	45	0	0	0	0
	point10	10	1126	45	23	45	11	45	0	0	0	0
	point11	11	1126	45	23	45	11	45	0	0	0	0
	point12	12	1126	45	23	45	11	45	0	0	0	0
	point13	13	1126	45	23	45	11	45	0	0	0	0
	point14	14	1126	45	23	45	11	45	0	0	0	0
	point15	15	1126	45	23	45	11	45	0	0	0	0
	point16	16	1126	45	23	45	11	45	0	0	0	0
	point17	17										
Roadway2	point18	18	1126	45	23	45	11	45	0	0	0	0
	point19	19	1126	45	23	45	11	45	0	0	0	0
	point20	20	1126	45	23	45	11	45	0	0	0	0
	point21	21	1126	45	23	45	11	45	0	0	0	0
	point22	22	1126	45	23	45	11	45	0	0	0	0
	point23	23	1126	45	23	45	11	45	0	0	0	0

	point24	24	1126	45	23	45	11	45	0	0	0	0
	point25	25	1126	45	23	45	11	45	0	0	0	0
	point26	26	1126	45	23	45	11	45	0	0	0	0
	point27	27	1126	45	23	45	11	45	0	0	0	0
	point28	28	1126	45	23	45	11	45	0	0	0	0
	point29	29	1126	45	23	45	11	45	0	0	0	0
	point30	30	1126	45	23	45	11	45	0	0	0	0
	point31	31	1126	45	23	45	11	45	0	0	0	0
	point32	32	1126	45	23	45	11	45	0	0	0	0
	point33	33	1126	45	23	45	11	45	0	0	0	0
	point34	34	1126	45	23	45	11	45	0	0	0	0
	point35	35	1126	45	23	45	11	45	0	0	0	0
	point36	36	1126	45	23	45	11	45	0	0	0	0
	point37	37	1126	45	23	45	11	45	0	0	0	0
	point38	38	1126	45	23	45	11	45	0	0	0	0
	point39	39	1126	45	23	45	11	45	0	0	0	0
	point40	40	1126	45	23	45	11	45	0	0	0	0
	point41	41										
Roadway3	point42	42	867	25	17	25	8	25	0	0	0	0
	point43	43	867	25	17	25	8	25	0	0	0	0
	point44	44	867	25	17	25	8	25	0	0	0	0
	point45	45	867	25	17	25	8	25	0	0	0	0
	point46	46	867	25	17	25	8	25	0	0	0	0
	point47	47	867	25	17	25	8	25	0	0	0	0
	point48	48	867	25	17	25	8	25	0	0	0	0
	point49	49	867	25	17	25	8	25	0	0	0	0
	point50	50	867	25	17	25	8	25	0	0	0	0
	point51	51	867	25	17	25	8	25	0	0	0	0
	point52	52	867	25	17	25	8	25	0	0	0	0
	point53	53	867	25	17	25	8	25	0	0	0	0
	point54	54	867	25	17	25	8	25	0	0	0	0
	point55	55	867	25	17	25	8	25	0	0	0	0
	point56	56	867	25	17	25	8	25	0	0	0	0
	point57	57										
Roadway4	point58	58	0	0	0	0	0	0	0	0	0	0
	point59	59	0	0	0	0	0	0	0	0	0	0

	point60	60	0	0	0	0	0	0	0	0	0	0
	point61	61	0	0	0	0	0	0	0	0	0	0
	point62	62	0	0	0	0	0	0	0	0	0	0
	point63	63	0	0	0	0	0	0	0	0	0	0
	point64	64	0	0	0	0	0	0	0	0	0	0
	point65	65	0	0	0	0	0	0	0	0	0	0
	point66	66	0	0	0	0	0	0	0	0	0	0
	point67	67	0	0	0	0	0	0	0	0	0	0
	point68	68	0	0	0	0	0	0	0	0	0	0
	point69	69	0	0	0	0	0	0	0	0	0	0
	point70	70										

Dudek
CB

1 June 2023
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Ocean Bluff
RUN: Existing + Project

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	6,247,474.0	1,962,273.4	90.00	4.92	49.80	66	10.0	8.0	Y
ST3	2	1	6,247,225.0	1,962,976.9	0.00	4.92	69.60	66	10.0	8.0	Y
ST2	3	1	6,247,380.0	1,962,488.0	90.00	4.92	54.10	66	10.0	8.0	Y
M1-1	5	1	6,247,427.5	1,962,597.9	90.00	4.92	0.00	66	10.0	8.0	Y
M1-2	6	1	6,247,427.5	1,962,597.9	90.00	14.92	0.00	66	10.0	8.0	Y
M2-1	7	1	6,247,465.0	1,962,620.9	90.00	4.92	0.00	66	10.0	8.0	Y
M2-2	8	1	6,247,465.0	1,962,620.9	90.00	14.92	0.00	66	10.0	8.0	Y
M3-1	9	1	6,247,564.0	1,962,670.4	90.00	4.92	0.00	66	10.0	8.0	Y
M3-2	10	1	6,247,564.0	1,962,670.4	90.00	14.92	0.00	66	10.0	8.0	Y
M4-1	11	1	6,247,609.0	1,962,670.4	90.00	4.92	0.00	66	10.0	8.0	Y
M4-2	12	1	6,247,609.0	1,962,670.4	90.00	14.92	0.00	66	10.0	8.0	Y
M5-1	13	1	6,247,858.5	1,962,587.9	90.00	4.92	0.00	66	10.0	8.0	Y
M5-2	14	1	6,247,858.5	1,962,587.9	90.00	14.92	0.00	66	10.0	8.0	Y

Dudek 1 June 2023
CB TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: Ocean Bluff
RUN: Existing + Project

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per	$ per	Top	Run:Rise	$ per			X	Y	Z	at	Seg Ht Perturbs			On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	6,247,485.5	1,962,585.9	90.00	20.00	0.00	0	0		
									point2	2	6,247,486.0	1,962,594.8	90.00	20.00	0.00	0	0		
									point3	3	6,247,491.5	1,962,595.1	90.00	20.00	0.00	0	0		
									point4	4	6,247,493.5	1,962,615.2	90.00	20.00	0.00	0	0		
									point5	5	6,247,433.5	1,962,616.2	90.00	20.00	0.00	0	0		
									point6	6	6,247,433.5	1,962,576.1	90.00	20.00	0.00	0	0		
									point7	7	6,247,487.0	1,962,575.6	90.00	20.00					
Barrier2	W	0.00	99.99	0.00				0.00	point8	8	6,247,551.0	1,962,611.1	90.00	20.00	0.00	0	0		
									point9	9	6,247,559.5	1,962,610.6	90.00	20.00	0.00	0	0		
									point10	10	6,247,561.0	1,962,605.5	90.00	20.00	0.00	0	0		
									point11	11	6,247,579.0	1,962,605.4	90.00	20.00	0.00	0	0		
									point12	12	6,247,581.0	1,962,666.0	90.00	20.00	0.00	0	0		
									point13	13	6,247,543.0	1,962,666.9	90.00	20.00	0.00	0	0		
									point14	14	6,247,541.5	1,962,611.8	90.00	20.00					
Barrier3	W	0.00	99.99	0.00				0.00	point15	15	6,247,598.5	1,962,604.1	90.00	20.00	0.00	0	0		
									point16	16	6,247,608.5	1,962,604.0	90.00	20.00	0.00	0	0		
									point17	17	6,247,608.5	1,962,609.6	90.00	20.00	0.00	0	0		
									point18	18	6,247,629.0	1,962,608.9	90.00	20.00	0.00	0	0		
									point19	19	6,247,627.5	1,962,664.6	90.00	20.00	0.00	0	0		
									point20	20	6,247,589.0	1,962,666.5	90.00	20.00	0.00	0	0		
									point21	21	6,247,590.0	1,962,605.2	90.00	20.00					
Barrier4	W	0.00	99.99	0.00				0.00	point22	22	6,247,744.0	1,962,600.6	90.00	20.00	0.00	0	0		
									point23	23	6,247,754.0	1,962,602.6	90.00	20.00	0.00	0	0		
									point24	24	6,247,753.5	1,962,607.1	90.00	20.00	0.00	0	0		
									point25	25	6,247,772.5	1,962,606.0	90.00	20.00	0.00	0	0		
									point26	26	6,247,772.5	1,962,661.1	90.00	20.00	0.00	0	0		
									point27	27	6,247,754.5	1,962,661.8	90.00	20.00	0.00	0	0		
									point28	28	6,247,755.0	1,962,674.0	90.00	20.00	0.00	0	0		
									point29	29	6,247,736.5	1,962,672.6	90.00	20.00	0.00	0	0		
									point30	30	6,247,733.5	1,962,601.8	90.00	20.00					
Barrier5	W	0.00	99.99	0.00				0.00	point31	31	6,247,794.5	1,962,601.6	90.00	20.00	0.00	0	0		
									point32	32	6,247,794.0	1,962,588.5	90.00	20.00	0.00	0	0		
									point33	33	6,247,799.5	1,962,588.5	90.00	20.00	0.00	0	0		
									point34	34	6,247,798.0	1,962,569.2	90.00	20.00	0.00	0	0		
									point35	35	6,247,837.0	1,962,568.9	90.00	20.00	0.00	0	0		

									point36	36	6,247,853.5	1,962,569.2	90.00	20.00	0.00	0	0		
									point37	37	6,247,854.5	1,962,607.1	90.00	20.00	0.00	0	0		
									point38	38	6,247,795.5	1,962,609.2	90.00	20.00					

Dudek			**1 June 2023**	
CB			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**Ocean Bluff**			
RUN:	**Existing + Project**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line1	1	6,246,961.0	1,962,485.2	0.00
	2	6,246,959.0	1,962,591.5	0.00
	3	6,246,940.5	1,962,664.5	0.00
	4	6,246,967.0	1,962,778.6	0.00
	5	6,246,997.0	1,962,841.2	0.00
	6	6,247,133.0	1,962,863.4	0.00
	7	6,247,190.5	1,962,868.0	0.00
	8	6,247,358.0	1,962,876.9	0.00
	9	6,247,494.0	1,962,888.2	0.00
	10	6,247,586.0	1,962,885.1	0.00
	11	6,247,695.0	1,962,870.4	0.00
	12	6,247,813.0	1,962,834.9	0.00
	13	6,247,876.5	1,962,808.2	0.00
	14	6,247,951.0	1,962,768.6	0.00
	15	6,248,018.5	1,962,721.5	0.00
	16	6,248,102.0	1,962,643.0	0.00
	17	6,248,199.0	1,962,507.4	0.00
	18	6,248,280.5	1,962,342.0	0.00
Terrain Line2	19	6,247,355.0	1,962,509.2	90.00
	20	6,247,359.5	1,962,592.8	90.00
	21	6,247,376.5	1,962,642.5	90.00
	22	6,247,460.5	1,962,656.9	90.00
	23	6,247,515.5	1,962,707.9	90.00
	24	6,247,557.5	1,962,706.0	90.00

	25	6,247,690.0	1,962,702.6	90.00
	26	6,247,772.0	1,962,675.4	90.00
	27	6,247,879.5	1,962,638.2	90.00
	28	6,247,890.0	1,962,608.5	90.00
	29	6,247,920.0	1,962,506.5	90.00
	30	6,247,967.0	1,962,315.5	90.00

Dudek
CB

1 June 2023
TNM 2.5
Calculated with TNM 2.5

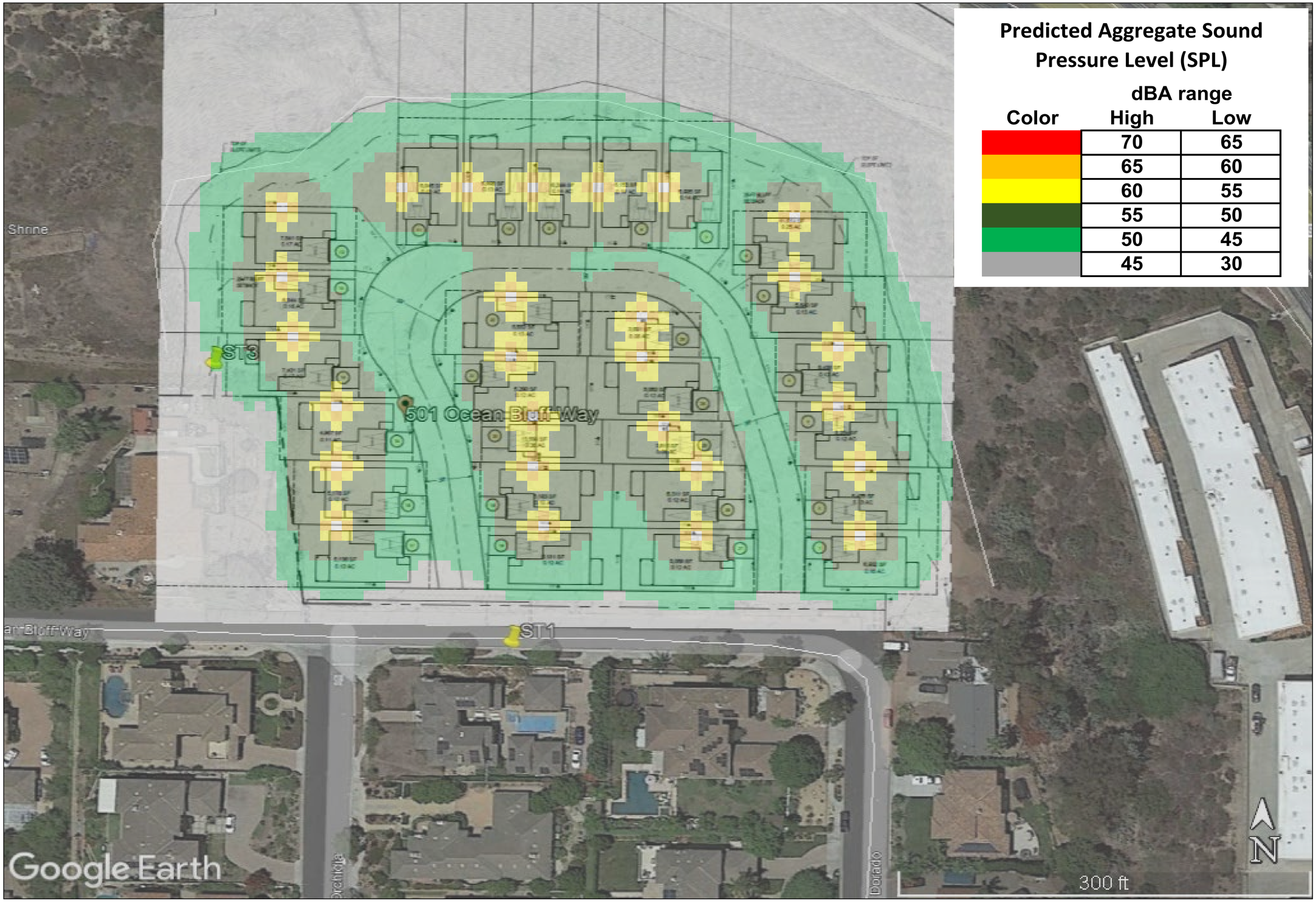
RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Ocean Bluff
RUN: Existing + Project
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	With Barrier Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	49.8	43.3	66	-6.5	10	----	43.3	0.0	8	-8.0
ST3	2	1	69.6	69.2	66	-0.4	10	Snd Lvl	69.2	0.0	8	-8.0
ST2	3	1	54.1	48.1	66	-6.0	10	----	48.1	0.0	8	-8.0
M1-1	5	1	0.0	44.5	66	44.5	10	----	44.5	0.0	8	-8.0
M1-2	6	1	0.0	52.8	66	52.8	10	----	52.8	0.0	8	-8.0
M2-1	7	1	0.0	45.9	66	45.9	10	----	45.9	0.0	8	-8.0
M2-2	8	1	0.0	55.6	66	55.6	10	----	55.6	0.0	8	-8.0
M3-1	9	1	0.0	46.8	66	46.8	10	----	46.8	0.0	8	-8.0
M3-2	10	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
M4-1	11	1	0.0	46.7	66	46.7	10	----	46.7	0.0	8	-8.0
M4-2	12	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
M5-1	13	1	0.0	46.7	66	46.7	10	----	46.7	0.0	8	-8.0
M5-2	14	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	13	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Appendix D
HVAC Noise Prediction



SOURCE: Dudek 2023

DUDEK

0 79 158 Feet

FIGURE D-1

Predicted Project HVAC Noise Levels

Ocean Bluff