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WHITEWOOD APARTMENT PROJECT INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

SECTION 3.13 NOISE – APPENDIX G

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The information provided herein is intended to provide supporting detail for the Whitewood Apartment Project (Project) noise and vibration impact assessment section as appearing in the Initial Study / Mitigated Negative Declaration, and arranged as follows:

- Acoustical Fundamentals
- Applicable Noise Regulations, Standards, and Guidance
- Existing Noise Conditions
- Short-term Construction Noise
- Project-generated Off-site Traffic Noise
- Project-generated Off-site Operation Noise

ACOUSTICAL FUNDAMENTALS

Noise Characteristics and Descriptors

Sound is mechanical energy transmitted by pressure waves in a compressible medium, such as air. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired. The sound-pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The unit of measurement of sound pressure is a decibel (dB). Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern changes in sound levels of one dB when exposed to steady, single-frequency signals in the mid-frequency range. Outside such controlled conditions, the trained ear can detect changes of two dB in normal environmental noise. It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of three dB. A change of five dB is readily perceptible, and a change of 10 dB is perceived as twice or half as loud. A doubling of sound energy results in a three dB increase in sound, which means that a doubling of sound energy (e.g., doubling the number of daily trips along a given road) would result in a barely perceptible change in sound level.

Sound may be described in terms of level or amplitude (measured in dB), frequency or pitch (measured in hertz or cycles per second), and duration (measured in seconds or minutes). Because the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale is used to relate noise to human sensitivity. The A-weighted decibel (dBA) scale performs this compensation by discriminating against low and very high frequencies in a manner approximating the sensitivity of the human ear.

Several descriptors of noise (noise metrics) exist to help predict average community reactions to the adverse effects of environmental noise, including traffic-generated noise. These descriptors include the equivalent noise level over a given period (L_{eq}), the day–night average noise level (L_{dn}), and the community noise equivalent level (CNEL). Each of these descriptors uses units of dBA.

L_{eq} is a decibel quantity that represents the constant or energy-averaged value equivalent to the amount of variable sound energy received by a receptor during a time interval. For example, a one hour L_{eq} measurement of 60 dBA would represent the average amount of energy contained in all the noise that occurred in that hour. L_{eq} is an effective noise descriptor because of its ability to assess the total time-varying effects of noise on sensitive receptors, which can then be compared to an established L_{eq} standard or threshold of the same duration. Another descriptor is maximum sound level (L_{max}), which is the greatest sound level measured during a designated time interval or event. The minimum sound level (L_{min}) is often called the floor of a measurement period.

Unlike the L_{eq}, L_{max}, and L_{min} metrics, L_{dn} and CNEL descriptors always represent 24-hour periods and differ from a 24-hour L_{eq} value because they apply a time-weighted factor designed to emphasize noise events that occur during the non-daytime hours (when speech and sleep disturbance is of more concern). Time weighted refers to the fact that L_{dn} and CNEL penalize noise that occurs during certain sensitive periods. In the case of CNEL, noise occurring during the daytime (7:00 a.m. to 7:00 p.m.) receives no penalty. Noise during the evening (7:00 p.m. to 10:00 p.m.) is penalized by adding five dB, and nighttime (10:00 p.m. to 7:00 a.m.) noise is penalized by adding 10 dB. L_{dn} differs from CNEL in that the daytime period is longer (defined instead as 7:00 a.m. to 10:00 p.m.), thus eliminating the dB adjustment for the evening period. L_{dn} and CNEL are the predominant criteria used to measure roadway noise affecting residential receptors. These two metrics generally differ from one another by no more than 0.5 to one dB, and are often considered or actually defined as being essentially equivalent by many jurisdictions.

Vibration Characteristics and Descriptors

Vibration is oscillatory movement of mass (typically a solid) over time. It is described in terms of frequency and amplitude and, unlike sound, can be expressed as displacement, velocity, or acceleration. For environmental studies, vibration is often studied as a velocity that, akin to the discussion of sound pressure levels, can also be expressed in dB as a way to cast a large range of quantities into a more convenient scale. Vibration impacts to buildings are generally discussed in terms of inches per second (ips) peak particle velocity (PPV), which will be used herein to discuss vibration levels for ease of reading and comparison with relevant standards. Vibration can also be annoying and thereby impact occupants of structures, and vibration of sufficient amplitude can disrupt sensitive equipment and processes, such as those involving the use of electron microscopes and lithography equipment. Common sources of vibration within communities include construction activities and railroads. Groundborne vibration generated by construction projects is usually

highest during pile driving, rock blasting, soil compacting, jack hammering, and demolition-related activities where sudden releases of subterranean energy or powerful impacts of tools on hard materials occur. Depending on their distances to a sensitive receptor, operation of large bulldozers, graders, loaded dump trucks, or other heavy construction equipment and vehicles on a construction site also have the potential to cause high vibration amplitudes. The maximum vibration level standard used by the California Department of Transportation (Caltrans) for the prevention of structural damage to typical older residential buildings is 0.2 ips PPV. This limit is with respect to continuous or otherwise frequent vibration events, and where the receiving structure has foundation walls and floors in concrete, masonry walls, and wooden ceilings. The same limit is associated with an "annoyed" human reaction to perceived vibration within an occupied structure (Caltrans 2020).

APPLICABLE NOISE REGULATIONS, STANDARDS, AND GUIDANCE

State

Government Code Section 65302(g)

California Government Code Section 65302(g) requires the preparation of a Noise Element in a community general plan, which shall identify and appraise the noise problems for the community. The Noise Element shall recognize the guidelines adopted by the Office of Noise Control in the State Department of Health Services and shall quantify, to the extent practicable, current and projected noise levels for major noise sources such as highways and freeways, primary arterials and major local streets, rail lines, airports and industrial plants.

California General Plan Guidelines

The California General Plan Guidelines, published by the Governor's Office of Planning and Research (OPR), provides guidance for the acceptability of specific land use types within areas of specific noise exposure. OPR guidelines are advisory in nature. Local jurisdictions, including the City, have the responsibility to set specific noise standards based on local conditions.

Local

City of Murrieta Noise Ordinance

The City's Noise Ordinance (Section 16.30 of the City's Municipal Code) sets interior and exterior noise standards for specific land uses (Sections 16.30.090 and 16.30.100). The City's Noise Ordinance also has general noise regulations (Section 16.30.130) that regulate noise from construction activities. Construction noise deemed to be disturbing is prohibited from 7:00 p.m. to 7:00 a.m. Monday through Friday, or at any time on Sundays or holidays. Construction activities must be conducted in a manner that the maximum noise levels at the affected structures will not exceed those listed in Table 1.

Table 1. City of Murrieta Construction Noise Standards

Equipment Type	Single-Family Residential	Multi-Family Residential	Commercial
Mobile Equipment			
Daily, except Sundays and holidays, 7:00 a.m. to 8:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, except Sundays and holidays, 8:00 p.m. to 7:00 a.m.	60 dBA	64 dBA	70 dBA
Stationary Equipment			
Daily, except Sundays and holidays, 7:00 a.m. to 8:00 p.m.	60 dBA	65 dBA	70 dBA
Daily, except Sundays and holidays, 8:00 p.m. to 7:00 a.m.	50 dBA	55 dBA	60 dBA

Source: City of Murrieta 1997.
Note: dBA = A-weighted decibel scale.

Operational noise generated between two properties within the City is regulated by the standards contained in Section 16.30.090 of the City's Noise Ordinance. The City's exterior noise level limits between properties are presented in Table 2. Pursuant to Section 16.30.090(C), if the location in question is on a boundary property between two zoning districts (as is the case for this project), the exterior noise standard is the arithmetic mean of the exterior noise levels. For example, the exterior noise standard between the commercial zone of the project site and the residential area to the east would be 50 dBA from 10:00 p.m. to 7:00 a.m., and 55 dBA from 7:00 a.m. to 10:00 p.m.

Table 2. City of Murrieta Exterior and Interior Noise Limits

Noise Zone	Land Use (Receptor Property)	Time Period	Allowed Noise Level (dBA)
Exterior Noise Limits			
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 p.m. to 7:00 a.m.	45
		7:00 a.m. to 10:00 p.m.	50
	Residential properties within 500 feet of a kennel(s)	7:00 a.m. to 10:00 p.m.	70
III	Commercial properties	10:00 p.m. to 7:00 a.m.	55
		7:00 a.m. to 10:00 p.m.	60
IV	Industrial properties	Anytime	70
Interior Noise Limits			
All noise zones	Multi-family residential	10:00 p.m. to 7:00 a.m.	40
		7:00 a.m. to 10:00 p.m.	45

Source: City of Murrieta 1997.
Note: dBA = A-weighted decibel scale.

Vibration Standards

The City's Noise Ordinance Section 16.30.130(K) prohibits the operation of any device that creates vibration above the City's established perception threshold of 0.01 inches per second (in/sec) over the range of 1 to 100 hertz.

Murrieta General Plan 2035

The project site is located within the City of Murrieta, as are the existing residences and other noise-sensitive land uses in the surrounding area. The noise criteria identified in the Noise Element of the Murrieta General Plan are guidelines to evaluate the land use compatibility of outdoor environmental noise levels. The land use compatibility guidelines indicate that low-density and multi-family residential land uses are considered *normally acceptable* with noise levels below 60 dBA CNEL and *conditionally acceptable* with noise levels below 70 dBA CNEL.

Furthermore, the Noise Element of the Murrieta General Plan establishes the City's Noise Ordinance and Vibration standards, as listed above.

Federal Interagency Committee on Noise (FICON)

Neither the City's General Plan Noise Element nor the Municipal Code have quantified levels of increase in noise above ambient that are considered "substantial." Some guidance regarding the determination of a substantial permanent increase in ambient noise levels in the project vicinity above existing levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The FICON recommendations are based on studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a qualitative measure of the adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment (FICON 1992).

The rationale for the FICON recommendations is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of L_{dn} (and by extension, CNEL). The changes in noise exposure that are shown in Table 3 are expected to result in equal changes in annoyance at sensitive land uses. Although the FICON recommendations were specifically developed to address aircraft noise impacts, they are used in this analysis to define a substantial increase in community noise levels related to all transportation noise sources.

Table 3. Measures of Substantial Increase for Community Noise Levels

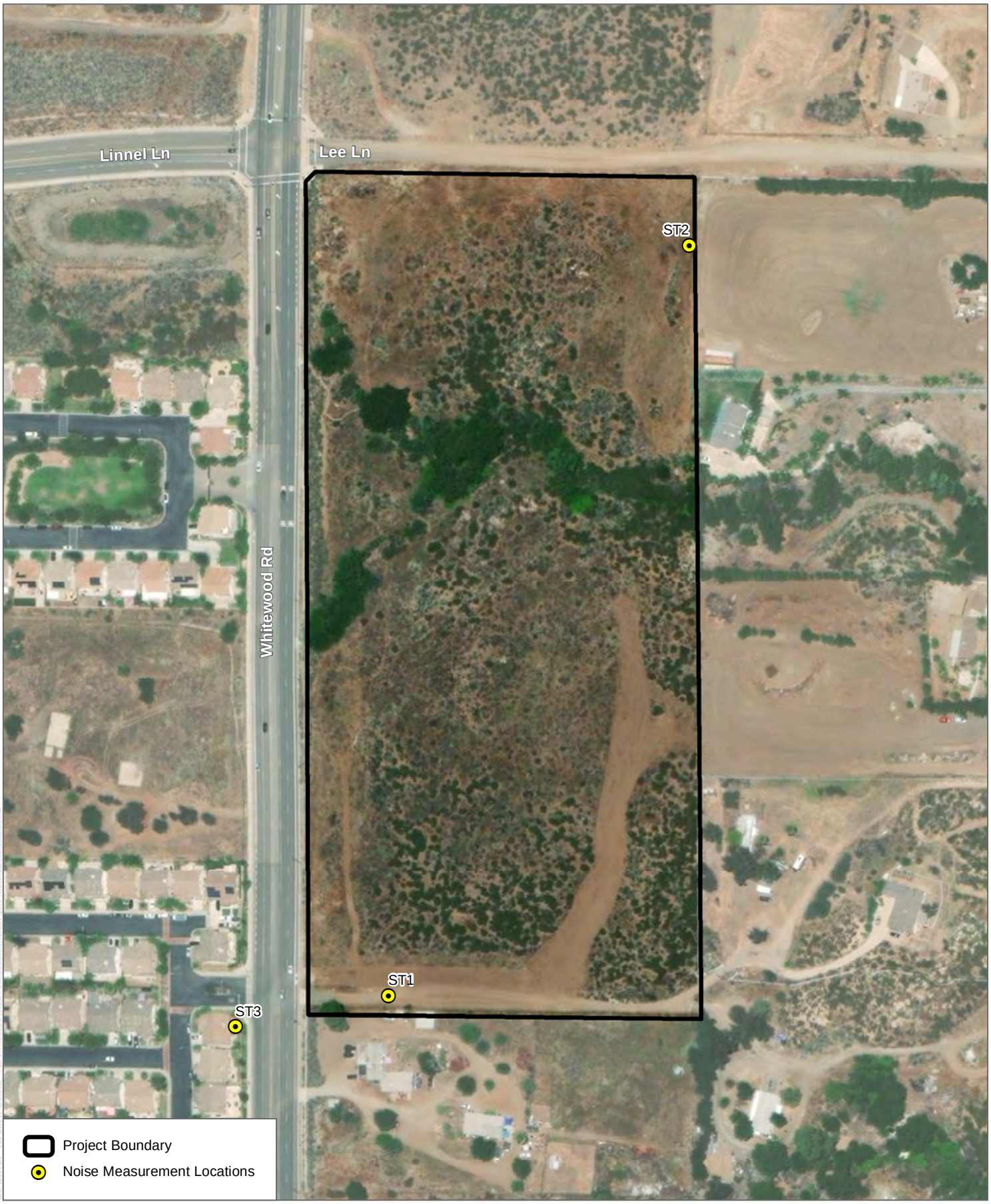
Ambient Noise Level Without Project (L_{dn})	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels by Amount Listed
<60 dBA	+ 5 dB or more
60–65 dBA	+ 3 dB or more
>65 dBA	+ 2 dB or more

Note: L_{dn} = day-night average noise level; dBA = A-weighted decibel scale; dB = decibel.

EXISTING NOISE CONDITIONS

Noise level measurements were conducted in the vicinity of the project site on November 9, 2021 to quantify and help characterize the existing (a.k.a., baseline) outdoor ambient sound environment. The noise measurements were taken using a SoftdB Piccolo sound level meter equipped with a 0.5-inch, pre-polarized condenser microphone with pre-amplifier. The sound level meter meets the current American National Standards Institute standard for a Type 2 (General Grade) sound level meter. The accuracy of the sound level meter 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.

Figure 1 shows the attended, short-term (ST) baseline noise measurement locations. Field data sheets are provided for each ST location (i.e., ST1 – ST3).



SOURCE: ESRI Imagery 2021, Riverside County 2021, Open Street Map 2020

DUDEK

0 100 200 Feet

FIGURE 1

Noise Measurement Locations

Murrieta Whitewood Apartments

FORMS DUDEK FIELD DATA REPORT

Field Noise Measurement Data

Record: 1390	
Project Name	*Whitewood*
Observer(s)	*Connor Burke*
Date	*2021-11-09*

Meteorological Conditions	
Temp (F)	*64*
Humidity % (R.H.)	*56*
Wind	*Calm*
Wind Speed (MPH)	*0*
Sky	*Sunny*

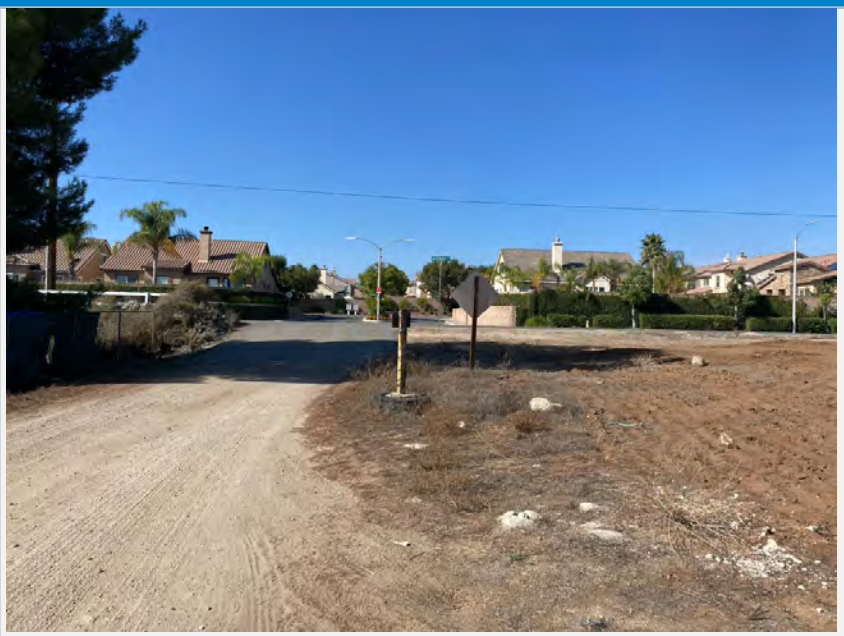
Instrument and Calibrator Information	
Instrument Name List	*(ENC) Rion NL-52*
Instrument Name	*(ENC) Rion NL-52*
Instrument Name Lookup Key	*(ENC) Rion NL-52*
Manufacturer	*Rion*
Model	*NL-52*
Serial Number	*553896*
Calibrator Name	*(ENC) LD CAL150*
Calibrator Name	*(ENC) LD CAL150*
Calibrator Name 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)	*94*
Windscreen	*Yes*
Weighting?	*A-WTD*
Slow/Fast?	*Slow*
ANSI?	*Yes*

Monitoring	
Record #	*1*
Site ID	*ST1*
Site Location Lat/Long	*33.601508, -117.162385*
Begin (Time)	*10:20:00*
End (Time)	*10:30:00*
Leq	*54.4*
Lmax	*61.3*
Lmin	*49*
Other Lx?	*L90, L50, L10*
L90	*50.2*
L50	*53.2*
L10	*56.8*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Distant Traffic*
Other Noise Sources Additional Description	*New home construction*
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



Site Photos

Photo

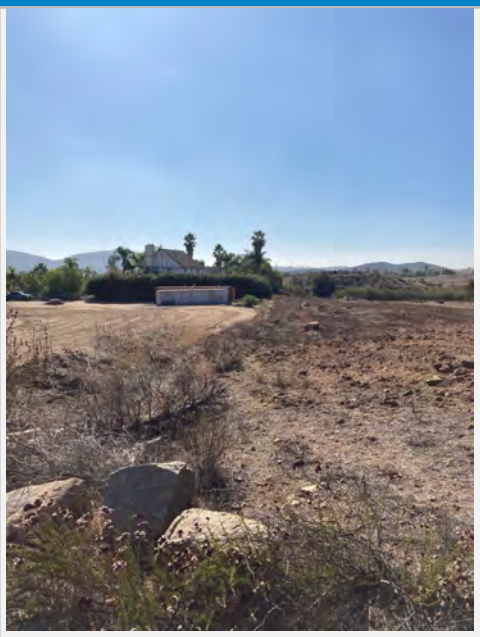
Monitoring

Record #	*2*
Site ID	*ST2*
Site Location Lat/Long	*33.604994, -117.160770*
Begin (Time)	*10:40:00*
End (Time)	*10:50:00*
Leq	*40.8*
Lmax	*51.9*
Lmin	*37.3*
Other Lx?	*L90, L50, L10*
L90	*38.2*
L50	*39*
L10	*42.1*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Birds*
Other Noise Sources (Background)	*Birds, Distant Dog Barking, Distant Traffic, Rustling Leaves*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

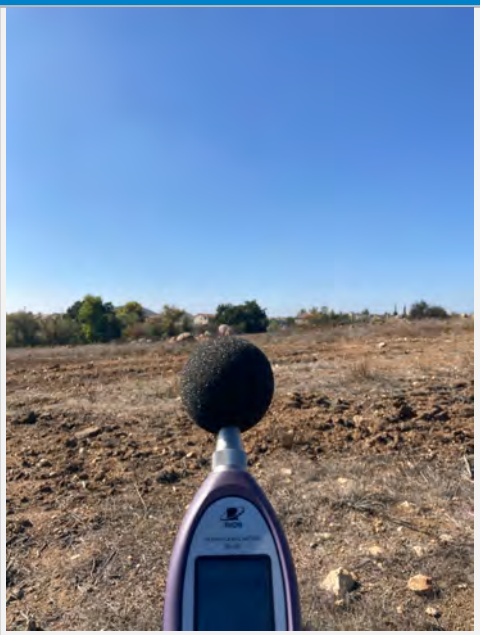
Description / Photos

Site Photos

Photo



Site Photos

Photo	
	

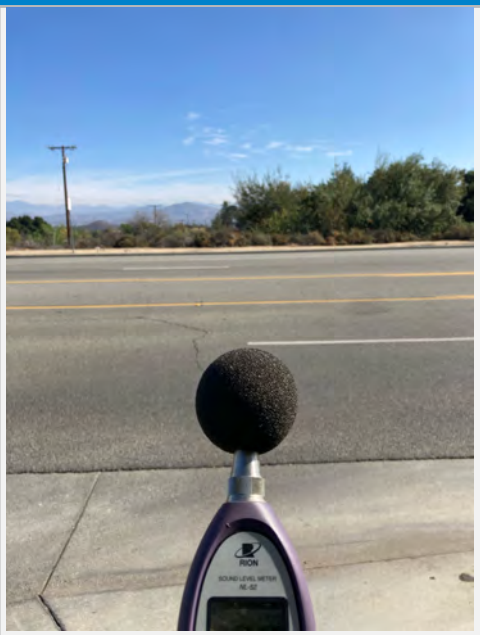
Monitoring

Record #	*3*
Site ID	*ST3*
Site Location Lat/Long	*33.599588, -117.162972*
Begin (Time)	*11:10:00*
End (Time)	*11:20:00*
Leq	*72.5*
Lmax	*82*
Lmin	*48.4*
Other Lx?	*L90, L50, L10*
L90	*54.6*
L50	*67.40*
L10	*77.7*
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*

Description / Photos

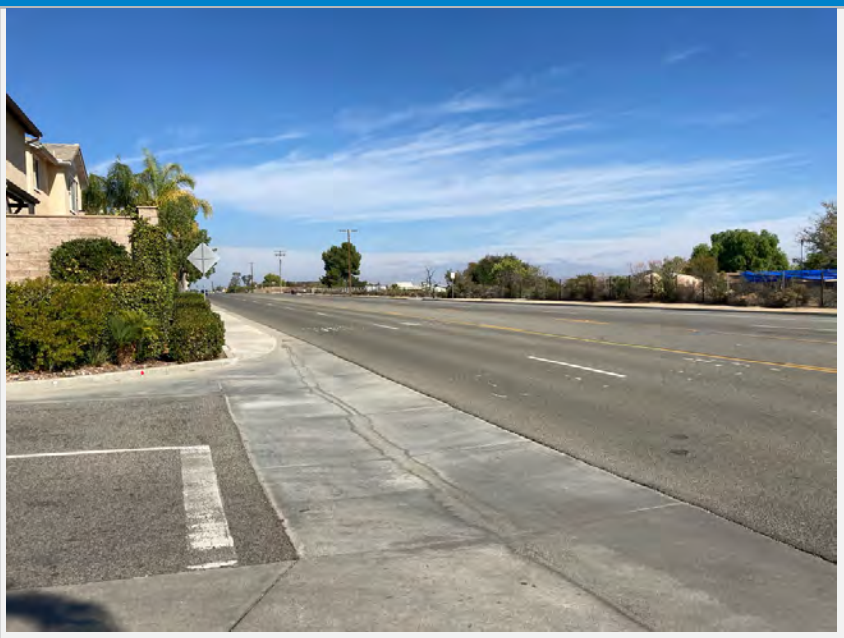
Site Photos

Photo



Site Photos

Photo



SHORT-TERM CONSTRUCTION NOISE

Worksheets from the Dudek-developed prediction tool that emulates the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) appear as follows and show the complete input and output data for the construction noise analysis. Both the mitigated and unmitigated construction noise scenarios for the anticipated site preparation and grading phases were analyzed.

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

noise level limit for construction phase at occupied building, per City of Murrieta (16.30.130) = 75
allowable hours over which Leq is to be averaged = 1

Barrier height added below for mitigation

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 1-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)
Site Preparation	Grader	1	40	85		50	12.1		72.9	1	60	69	5	5	8	44	6	50	44.1	6.7	50.0	0.81	12.1	12.1
	Dozer	1	40	82		50	12.1		69.9	1	60	66	5	5	8	44	6	50	44.1	6.7	50.0	0.81	12.1	12.1
									Total for Site Preparation Phase:			**70.6**												
Grading	excavator	1	40	81		50	12.1		68.9	1	60	65	5	5	8	44	6	50	44.1	6.7	50.0	0.81	12.1	12.1
	grader	1	40	85		50	12.1		72.9	1	60	69	5	5	8	44	6	50	44.1	6.7	50.0	0.81	12.1	12.1
	dozer	1	40	82		50	12.1		69.9	1	60	66	5	5	8	44	6	50	44.1	6.7	50.0	0.81	12.1	12.1
	scraper	1	40	84		50	12.1		71.9	1	60	68	5	5	8	44	6	50	44.1	6.7	50.0	0.81	12.1	12.1
	tractor	1	40	84		50	12.1		71.9	1	60	68	5	5	8	44	6	50	44.1	6.7	50.0	0.81	12.1	12.1
									Total for Grading Phase:			**74.3**												
Building Construction	Crane	1	16	81		85	0.0		74.9	1	60	67	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Man Lift	1	20	75		85	0.0		68.9	1	60	62	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Generator	1	50	72		85	0.0		65.9	1	60	63	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Backhoe	1	40	78		85	0.0		71.9	1	60	68	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Front End Loader	1	40	79		85	0.0		72.9	1	60	69	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Welder / Torch	1	40	73		85	0.0		66.9	1	60	63	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
									Total for Building Construction Phase:			**73.8**												
Architectural Coating	Compressor (air)	1	40	78		85	0.0		71.9	1	60	68	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
									Total for Architectural Coating Phase:			**67.9**												
Paving	Concrete Mixer Truck	1	40	79		85	0.0		72.9	1	60	69	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Paver	1	50	77		85	0.0		70.9	1	60	68	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Roller	1	20	80		85	0.0		73.9	1	60	67	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
									Total for Paving Phase:			**72.7**												

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

noise level limit for construction phase at occupied building, per City of Murrieta (16.30.130) = 75
allowable hours over which Leq is to be averaged = 1

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 1-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)
Site Preparation	Grader	1	40	85		50	0.1		84.9	1	60	81	5	5	0	44	6	50	44.3	7.8	50.0	0.00	0.1	0.1
	Dozer	1	40	82		50	0.1		81.9	1	60	78	5	5	0	44	6	50	44.3	7.8	50.0	0.00	0.1	0.1
									Total for Site Preparation Phase:			82.7												
Grading	excavator	1	40	81		50	0.1		80.9	1	60	77	5	5	0	44	6	50	44.3	7.8	50.0	0.00	0.1	0.1
	grader	1	40	85		50	0.1		84.9	1	60	81	5	5	0	44	6	50	44.3	7.8	50.0	0.00	0.1	0.1
	dozer	1	40	82		50	0.1		81.9	1	60	78	5	5	0	44	6	50	44.3	7.8	50.0	0.00	0.1	0.1
	scraper	1	40	84		50	0.1		83.9	1	60	80	5	5	0	44	6	50	44.3	7.8	50.0	0.00	0.1	0.1
	tractor	1	40	84		50	0.1		83.9	1	60	80	5	5	0	44	6	50	44.3	7.8	50.0	0.00	0.1	0.1
									Total for Grading Phase:			86.3												
Building Construction	Crane	1	16	81		85	0.0		74.9	1	60	67	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Man Lift	1	20	75		85	0.0		68.9	1	60	62	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Generator	1	50	72		85	0.0		65.9	1	60	63	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Backhoe	1	40	78		85	0.0		71.9	1	60	68	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Front End Loader	1	40	79		85	0.0		72.9	1	60	69	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Welder / Torch	1	40	73		85	0.0		66.9	1	60	63	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
									Total for Building Construction Phase:			73.8												
Architectural Coating	Compressor (air)	1	40	78		85	0.0		71.9	1	60	68	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
									Total for Architectural Coating Phase:			67.9												
Paving	Concrete Mixer Truck	1	40	79		85	0.0		72.9	1	60	69	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Paver	1	50	77		85	0.0		70.9	1	60	68	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
	Roller	1	20	80		85	0.0		73.9	1	60	67	5	5	0	79	6	85	79.2	7.8	85.0	0.00	0.1	0.0
									Total for Paving Phase:			72.7												

PROJECT-GENERATED OFF-SITE TRAFFIC NOISE

The FHWA Traffic Noise Model (TNM, version 2.5) worksheets appear as follows and show the complete input and output entries for the project-generated off-site traffic noise analysis. Scenarios analyzed include existing, existing plus project, 2023 cumulative and 2023 cumulative plus project.

Dudek 19 November 2021
CB TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Whitewood Murrieta
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	%		
Roadway2	40.0	point10	10	6,816,582.0	1,680,379.2	0.00				Average	
		point11	11	6,816,576.5	1,680,168.5	0.00				Average	
		point12	12	6,816,572.5	1,679,888.8	0.00				Average	
		point13	13	6,816,568.5	1,679,694.4	0.00				Average	
		point14	14	6,816,577.0	1,679,405.8	0.00				Average	
		point15	15	6,816,578.5	1,678,955.0	0.00				Average	
		point16	16	6,816,586.0	1,678,638.9	0.00				Average	
		point17	17	6,816,589.5	1,678,306.0	0.00				Average	
		point18	18	6,816,592.5	1,677,978.0	0.00				Average	
		point19	19	6,816,597.5	1,677,685.9	0.00				Average	
		point20	20	6,816,597.5	1,677,397.4	0.00				Average	
		point21	21	6,816,602.0	1,677,161.6	0.00					
Roadway4	12.0	point26	26	6,817,771.0	1,679,721.5	0.00				Average	
		point27	27	6,817,525.5	1,679,724.6	0.00				Average	
		point28	28	6,817,138.0	1,679,724.4	0.00				Average	
		point29	29	6,816,649.0	1,679,721.1	0.00					
Roadway5	12.0	point30	30	6,816,655.0	1,678,386.2	0.00				Average	
		point31	31	6,817,260.5	1,678,393.9	0.00					
Roadway1-Roadway3	40.0	point1	1	6,816,634.5	1,677,151.8	0.00				Average	
		point2	2	6,816,633.0	1,677,243.8	0.00				Average	
		point3	3	6,816,630.0	1,677,666.9	0.00				Average	
		point4	4	6,816,626.0	1,678,080.4	0.00				Average	
		point5	5	6,816,623.5	1,678,430.0	0.00				Average	
		point6	6	6,816,621.0	1,678,697.4	0.00				Average	
		point7	7	6,816,619.0	1,678,911.4	0.00				Average	

		point8	8	6,816,611.0	1,679,171.0	0.00				Average	
		point9	9	6,816,608.0	1,679,701.8	0.00				Average	
		point25	25	6,816,607.0	1,679,768.0	0.00				Average	
		point24	24	6,816,614.0	1,679,992.9	0.00				Average	
		point23	23	6,816,619.5	1,680,224.6	0.00				Average	
		point22	22	6,816,627.0	1,680,369.6	0.00					

Dudek **19 November 2021**
CB **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **Whitewood Murrieta**
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
Roadway2	point10	10	833	45	17	45	8	45	0	0	0	0
	point11	11	833	45	17	45	8	45	0	0	0	0
	point12	12	833	45	17	45	8	45	0	0	0	0
	point13	13	833	45	17	45	8	45	0	0	0	0
	point14	14	833	45	17	45	8	45	0	0	0	0
	point15	15	833	45	17	45	8	45	0	0	0	0
	point16	16	833	45	17	45	8	45	0	0	0	0
	point17	17	833	45	17	45	8	45	0	0	0	0
	point18	18	833	45	17	45	8	45	0	0	0	0
	point19	19	833	45	17	45	8	45	0	0	0	0
	point20	20	833	45	17	45	8	45	0	0	0	0
	point21	21										
Roadway4	point26	26	0	0	0	0	0	0	0	0	0	0
	point27	27	0	0	0	0	0	0	0	0	0	0
	point28	28	0	0	0	0	0	0	0	0	0	0
	point29	29										
Roadway5	point30	30	0	0	0	0	0	0	0	0	0	0
	point31	31										
Roadway1-Roadway3	point1	1	833	45	17	45	8	45	0	0	0	0
	point2	2	833	45	17	45	8	45	0	0	0	0
	point3	3	833	45	17	45	8	45	0	0	0	0
	point4	4	833	45	17	45	8	45	0	0	0	0
	point5	5	833	45	17	45	8	45	0	0	0	0

	point6	6	833	45	17	45	8	45	0	0	0	0
	point7	7	833	45	17	45	8	45	0	0	0	0
	point8	8	833	45	17	45	8	45	0	0	0	0
	point9	9	833	45	17	45	8	45	0	0	0	0
	point25	25	833	45	17	45	8	45	0	0	0	0
	point24	24	833	45	17	45	8	45	0	0	0	0
	point23	23	833	45	17	45	8	45	0	0	0	0
	point22	22										

Dudek 19 November 2021
CB TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Whitewood Murrieta
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	6,817,026.5	1,678,426.0	0.00	4.92	54.40	66	10.0	8.0	Y
ST2	2	1	6,817,273.0	1,679,586.2	0.00	4.92	40.80	66	10.0	8.0	Y
ST3	3	1	6,816,541.0	1,678,347.0	0.00	4.92	72.50	66	10.0	8.0	Y

Dudek
CB

19 November 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Whitewood Murrieta
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	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	54.4	52.3	66	-2.1	10	----	52.3	0.0	8	-8.0
ST2	2	1	40.8	47.1	66	6.3	10	----	47.1	0.0	8	-8.0
ST3	3	1	72.5	68.6	66	-3.9	10	Snd Lvl	68.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	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 19 November 2021
CB TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Whitewood Murrieta
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 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	%		
Roadway2	40.0	point10	10	6,816,582.0	1,680,379.2	0.00				Average	
		point11	11	6,816,576.5	1,680,168.5	0.00				Average	
		point12	12	6,816,572.5	1,679,888.8	0.00				Average	
		point13	13	6,816,568.5	1,679,694.4	0.00				Average	
		point14	14	6,816,577.0	1,679,405.8	0.00				Average	
		point15	15	6,816,578.5	1,678,955.0	0.00				Average	
		point16	16	6,816,586.0	1,678,638.9	0.00				Average	
		point17	17	6,816,589.5	1,678,306.0	0.00				Average	
		point18	18	6,816,592.5	1,677,978.0	0.00				Average	
		point19	19	6,816,597.5	1,677,685.9	0.00				Average	
		point20	20	6,816,597.5	1,677,397.4	0.00				Average	
		point21	21	6,816,602.0	1,677,161.6	0.00					
Roadway4	12.0	point26	26	6,817,771.0	1,679,721.5	0.00				Average	
		point27	27	6,817,525.5	1,679,724.6	0.00				Average	
		point28	28	6,817,138.0	1,679,724.4	0.00				Average	
		point29	29	6,816,649.0	1,679,721.1	0.00					
Roadway5	12.0	point30	30	6,816,655.0	1,678,386.2	0.00				Average	
		point31	31	6,817,260.5	1,678,393.9	0.00					
Roadway1-Roadway3	40.0	point1	1	6,816,634.5	1,677,151.8	0.00				Average	
		point2	2	6,816,633.0	1,677,243.8	0.00				Average	
		point3	3	6,816,630.0	1,677,666.9	0.00				Average	
		point4	4	6,816,626.0	1,678,080.4	0.00				Average	
		point5	5	6,816,623.5	1,678,430.0	0.00				Average	
		point6	6	6,816,621.0	1,678,697.4	0.00				Average	
		point7	7	6,816,619.0	1,678,911.4	0.00				Average	

		point8	8	6,816,611.0	1,679,171.0	0.00				Average	
		point9	9	6,816,608.0	1,679,701.8	0.00				Average	
		point25	25	6,816,607.0	1,679,768.0	0.00				Average	
		point24	24	6,816,614.0	1,679,992.9	0.00				Average	
		point23	23	6,816,619.5	1,680,224.6	0.00				Average	
		point22	22	6,816,627.0	1,680,369.6	0.00					

Dudek **19 November 2021**
CB **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **Whitewood Murrieta**
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
Roadway2	point10	10	896	45	18	45	9	45	0	0	0	0
	point11	11	896	45	18	45	9	45	0	0	0	0
	point12	12	896	45	18	45	9	45	0	0	0	0
	point13	13	896	45	18	45	9	45	0	0	0	0
	point14	14	896	45	18	45	9	45	0	0	0	0
	point15	15	896	45	18	45	9	45	0	0	0	0
	point16	16	896	45	18	45	9	45	0	0	0	0
	point17	17	896	45	18	45	9	45	0	0	0	0
	point18	18	896	45	18	45	9	45	0	0	0	0
	point19	19	896	45	18	45	9	45	0	0	0	0
	point20	20	896	45	18	45	9	45	0	0	0	0
	point21	21										
Roadway4	point26	26	0	0	0	0	0	0	0	0	0	0
	point27	27	0	0	0	0	0	0	0	0	0	0
	point28	28	0	0	0	0	0	0	0	0	0	0
	point29	29										
Roadway5	point30	30	0	0	0	0	0	0	0	0	0	0
	point31	31										
Roadway1-Roadway3	point1	1	896	45	18	45	9	45	0	0	0	0
	point2	2	896	45	18	45	9	45	0	0	0	0
	point3	3	896	45	18	45	9	45	0	0	0	0
	point4	4	896	45	18	45	9	45	0	0	0	0
	point5	5	896	45	18	45	9	45	0	0	0	0

	point6	6	896	45	18	45	9	45	0	0	0	0
	point7	7	896	45	18	45	9	45	0	0	0	0
	point8	8	896	45	18	45	9	45	0	0	0	0
	point9	9	896	45	18	45	9	45	0	0	0	0
	point25	25	896	45	18	45	9	45	0	0	0	0
	point24	24	896	45	18	45	9	45	0	0	0	0
	point23	23	896	45	18	45	9	45	0	0	0	0
	point22	22										

Dudek						**19 November 2021**					
CB						**TNM 2.5**					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	**Whitewood Murrieta**										
RUN:	**Existing + Project**										
Receiver											
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**				**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**		**NR**	**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**	**Goal**	**Calc.**
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	6,817,026.5	1,678,426.0	0.00	4.92	54.40	66	10.0	8.0	Y
ST2	2	1	6,817,273.0	1,679,586.2	0.00	4.92	40.80	66	10.0	8.0	Y
ST3	3	1	6,816,541.0	1,678,347.0	0.00	4.92	72.50	66	10.0	8.0	Y

Dudek
CB

19 November 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Whitewood Murrieta
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	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	54.4	52.6	66	-1.8	10	----	52.6	0.0	8	-8.0
ST2	2	1	40.8	47.5	66	6.7	10	----	47.5	0.0	8	-8.0
ST3	3	1	72.5	69.0	66	-3.5	10	Snd Lvl	69.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	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 19 November 2021
CB TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Whitewood Murrieta
RUN: 2023 Cumulative

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	%		
Roadway2	40.0	point10	10	6,816,582.0	1,680,379.2	0.00				Average	
		point11	11	6,816,576.5	1,680,168.5	0.00				Average	
		point12	12	6,816,572.5	1,679,888.8	0.00				Average	
		point13	13	6,816,568.5	1,679,694.4	0.00				Average	
		point14	14	6,816,577.0	1,679,405.8	0.00				Average	
		point15	15	6,816,578.5	1,678,955.0	0.00				Average	
		point16	16	6,816,586.0	1,678,638.9	0.00				Average	
		point17	17	6,816,589.5	1,678,306.0	0.00				Average	
		point18	18	6,816,592.5	1,677,978.0	0.00				Average	
		point19	19	6,816,597.5	1,677,685.9	0.00				Average	
		point20	20	6,816,597.5	1,677,397.4	0.00				Average	
		point21	21	6,816,602.0	1,677,161.6	0.00					
Roadway4	12.0	point26	26	6,817,771.0	1,679,721.5	0.00				Average	
		point27	27	6,817,525.5	1,679,724.6	0.00				Average	
		point28	28	6,817,138.0	1,679,724.4	0.00				Average	
		point29	29	6,816,649.0	1,679,721.1	0.00					
Roadway5	12.0	point30	30	6,816,655.0	1,678,386.2	0.00				Average	
		point31	31	6,817,260.5	1,678,393.9	0.00					
Roadway1-Roadway3	40.0	point1	1	6,816,634.5	1,677,151.8	0.00				Average	
		point2	2	6,816,633.0	1,677,243.8	0.00				Average	
		point3	3	6,816,630.0	1,677,666.9	0.00				Average	
		point4	4	6,816,626.0	1,678,080.4	0.00				Average	
		point5	5	6,816,623.5	1,678,430.0	0.00				Average	
		point6	6	6,816,621.0	1,678,697.4	0.00				Average	
		point7	7	6,816,619.0	1,678,911.4	0.00				Average	

		point8	8	6,816,611.0	1,679,171.0	0.00				Average	
		point9	9	6,816,608.0	1,679,701.8	0.00				Average	
		point25	25	6,816,607.0	1,679,768.0	0.00				Average	
		point24	24	6,816,614.0	1,679,992.9	0.00				Average	
		point23	23	6,816,619.5	1,680,224.6	0.00				Average	
		point22	22	6,816,627.0	1,680,369.6	0.00					

Dudek				**19 November 2021**								
CB				**TNM 2.5**								
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	**Whitewood Murrieta**											
RUN:	**2023 Cumulative**											
Roadway	**Points**											
Name	**Name**	**No.**	**Segment**									
			Autos		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**	
			V	**S**	**V**	**S**	**V**	**S**	**V**	**S**	**V**	**S**
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Roadway2	point10	10	1104	45	22	45	11	45	0	0	0	0
	point11	11	1104	45	22	45	11	45	0	0	0	0
	point12	12	1104	45	22	45	11	45	0	0	0	0
	point13	13	1104	45	22	45	11	45	0	0	0	0
	point14	14	1104	45	22	45	11	45	0	0	0	0
	point15	15	1104	45	22	45	11	45	0	0	0	0
	point16	16	1104	45	22	45	11	45	0	0	0	0
	point17	17	1104	45	22	45	11	45	0	0	0	0
	point18	18	1104	45	22	45	11	45	0	0	0	0
	point19	19	1104	45	22	45	11	45	0	0	0	0
	point20	20	1104	45	22	45	11	45	0	0	0	0
	point21	21										
Roadway4	point26	26	0	0	0	0	0	0	0	0	0	0
	point27	27	0	0	0	0	0	0	0	0	0	0
	point28	28	0	0	0	0	0	0	0	0	0	0
	point29	29										
Roadway5	point30	30	0	0	0	0	0	0	0	0	0	0
	point31	31										
Roadway1-Roadway3	point1	1	896	45	18	45	9	45	0	0	0	0
	point2	2	896	45	18	45	9	45	0	0	0	0
	point3	3	896	45	18	45	9	45	0	0	0	0
	point4	4	896	45	18	45	9	45	0	0	0	0
	point5	5	896	45	18	45	9	45	0	0	0	0

	point6	6	896	45	18	45	9	45	0	0	0	0
	point7	7	896	45	18	45	9	45	0	0	0	0
	point8	8	896	45	18	45	9	45	0	2	0	0
	point9	9	896	45	18	45	9	45	0	0	0	0
	point25	25	896	45	18	45	9	45	0	0	0	0
	point24	24	896	45	18	45	9	45	0	0	0	0
	point23	23	896	45	18	45	9	45	0	0	0	0
	point22	22										

Dudek 19 November 2021
CB TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Whitewood Murrieta
RUN: 2023 Cumulative

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	6,817,026.5	1,678,426.0	0.00	4.92	54.40	66	10.0	8.0	Y
ST2	2	1	6,817,273.0	1,679,586.2	0.00	4.92	40.80	66	10.0	8.0	Y
ST3	3	1	6,816,541.0	1,678,347.0	0.00	4.92	72.50	66	10.0	8.0	Y

Dudek
CB

19 November 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Whitewood Murrieta
RUN: 2023 Cumulative
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	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	54.4	53.1	66	-1.3	10	----	53.1	0.0	8	-8.0
ST2	2	1	40.8	48.0	66	7.2	10	----	48.0	0.0	8	-8.0
ST3	3	1	72.5	69.6	66	-2.9	10	Snd Lvl	69.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	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 19 November 2021
CB TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Whitewood Murrieta
RUN: 2023 Cumulative + 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 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	%		
Roadway2	40.0	point10	10	6,816,582.0	1,680,379.2	0.00				Average	
		point11	11	6,816,576.5	1,680,168.5	0.00				Average	
		point12	12	6,816,572.5	1,679,888.8	0.00				Average	
		point13	13	6,816,568.5	1,679,694.4	0.00				Average	
		point14	14	6,816,577.0	1,679,405.8	0.00				Average	
		point15	15	6,816,578.5	1,678,955.0	0.00				Average	
		point16	16	6,816,586.0	1,678,638.9	0.00				Average	
		point17	17	6,816,589.5	1,678,306.0	0.00				Average	
		point18	18	6,816,592.5	1,677,978.0	0.00				Average	
		point19	19	6,816,597.5	1,677,685.9	0.00				Average	
		point20	20	6,816,597.5	1,677,397.4	0.00				Average	
		point21	21	6,816,602.0	1,677,161.6	0.00					
Roadway4	12.0	point26	26	6,817,771.0	1,679,721.5	0.00				Average	
		point27	27	6,817,525.5	1,679,724.6	0.00				Average	
		point28	28	6,817,138.0	1,679,724.4	0.00				Average	
		point29	29	6,816,649.0	1,679,721.1	0.00					
Roadway5	12.0	point30	30	6,816,655.0	1,678,386.2	0.00				Average	
		point31	31	6,817,260.5	1,678,393.9	0.00					
Roadway1-Roadway3	40.0	point1	1	6,816,634.5	1,677,151.8	0.00				Average	
		point2	2	6,816,633.0	1,677,243.8	0.00				Average	
		point3	3	6,816,630.0	1,677,666.9	0.00				Average	
		point4	4	6,816,626.0	1,678,080.4	0.00				Average	
		point5	5	6,816,623.5	1,678,430.0	0.00				Average	
		point6	6	6,816,621.0	1,678,697.4	0.00				Average	
		point7	7	6,816,619.0	1,678,911.4	0.00				Average	

		point8	8	6,816,611.0	1,679,171.0	0.00				Average	
		point9	9	6,816,608.0	1,679,701.8	0.00				Average	
		point25	25	6,816,607.0	1,679,768.0	0.00				Average	
		point24	24	6,816,614.0	1,679,992.9	0.00				Average	
		point23	23	6,816,619.5	1,680,224.6	0.00				Average	
		point22	22	6,816,627.0	1,680,369.6	0.00					

Dudek				**19 November 2021**								
CB				**TNM 2.5**								
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	**Whitewood Murrieta**											
RUN:	**2023 Cumulative + Project**											
Roadway	**Points**											
Name	**Name**	**No.**	**Segment**									
			Autos		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**	
			V	**S**	**V**	**S**	**V**	**S**	**V**	**S**	**V**	**S**
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Roadway2	point10	10	1168	45	24	45	12	45	0	0	0	0
	point11	11	1168	45	24	45	12	45	0	0	0	0
	point12	12	1168	45	24	45	12	45	0	0	0	0
	point13	13	1168	45	24	45	12	45	0	0	0	0
	point14	14	1168	45	24	45	12	45	0	0	0	0
	point15	15	1168	45	24	45	12	45	0	0	0	0
	point16	16	1168	45	24	45	12	45	0	0	0	0
	point17	17	1168	45	24	45	12	45	0	0	0	0
	point18	18	1168	45	24	45	12	45	0	0	0	0
	point19	19	1168	45	24	45	12	45	0	0	0	0
	point20	20	1168	45	24	45	12	45	0	0	0	0
	point21	21										
Roadway4	point26	26	0	0	0	0	0	0	0	0	0	0
	point27	27	0	0	0	0	0	0	0	0	0	0
	point28	28	0	0	0	0	0	0	0	0	0	0
	point29	29										
Roadway5	point30	30	0	0	0	0	0	0	0	0	0	0
	point31	31										
Roadway1-Roadway3	point1	1	1168	45	24	45	12	45	0	0	0	0
	point2	2	1168	45	24	45	12	45	0	0	0	0
	point3	3	1168	45	24	45	12	45	0	0	0	0
	point4	4	1168	45	24	45	12	45	0	0	0	0
	point5	5	1168	45	24	45	12	45	0	0	0	0

	point6	6	1168	45	24	45	12	45	0	0	0	0
	point7	7	1168	45	24	45	12	45	0	0	0	0
	point8	8	1168	45	24	45	12	45	0	0	0	0
	point9	9	1168	45	24	45	12	45	0	2	0	0
	point25	25	1168	45	24	45	12	45	0	0	0	0
	point24	24	1168	45	24	45	12	45	0	0	0	0
	point23	23	1168	45	24	45	12	45	0	0	0	0
	point22	22										

Dudek 19 November 2021
CB TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Whitewood Murrieta
RUN: 2023 Cumulative + 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	6,817,026.5	1,678,426.0	0.00	4.92	54.40	66	10.0	8.0	Y
ST2	2	1	6,817,273.0	1,679,586.2	0.00	4.92	40.80	66	10.0	8.0	Y
ST3	3	1	6,816,541.0	1,678,347.0	0.00	4.92	72.50	66	10.0	8.0	Y

Dudek
CB

19 November 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Whitewood Murrieta
RUN: 2023 Cumulative + 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	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	54.4	53.8	66	-0.6	10	----	53.8	0.0	8	-8.0
ST2	2	1	40.8	48.7	66	7.9	10	----	48.7	0.0	8	-8.0
ST3	3	1	72.5	70.1	66	-2.4	10	Snd Lvl	70.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	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

PROJECT-GENERATED OFF-SITE OPERATION NOISE

Methodology

Prediction of post-construction operation noise attributed to operating onsite project equipment utilized an Excel-based tool that has algorithms based on the International Organization of Standardization (ISO) Standard 9613-2, "Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation" (ISO 1996). Source sound levels for the project were assumed to reflect the following conditions and parameters:

- Architect elevation renderings suggest project equipment would be located on the rooftop in wells between or surrounded by gables; hence, the model assumes quantities of rooftop-mounted air-cooled chillers (ACCs or packaged HVAC units) are clustered within these defined areas or zones.
- Each occupied residential unit is assumed to require about two (2) tons of refrigeration, on the basis of an average residential unit having 900 to 1,200 square feet of usable space and applying a customary cooling load check figure (Loren Cook 1999).
- Using a base 4-ton capacity ACC unit for an individual reference noise level of 70 dBA sound pressure level at 1 meter (Carrier Corporation 2012), the unit counts for each building type (A, B, C, D) on the site plan notes dictated the number of sources in each presumed building rooftop well. A total of eighty (80) ACC units were distributed across 16 type "A" buildings, A total of sixty (60) ACC units were distributed across 6 type "B" buildings, a total of seven (7) ACC units were distributed across 7 type "C" buildings, and a total of fifteen (15) ACC units were distributed across 15 type "D" buildings. There are also two (2) such 4-ton ACC units for each onsite project clubhouse.
- Noise from one dog park is in the model, with a reference noise level of 58.4 dBA L_{eq} (thirty minutes) at a distance of 25 feet (Kunzman Associates 2013).
- Default ground absorption coefficient yields noise reduction that can be estimated with Equation 10 from ISO 9613-2.
- Atmospheric absorption is approximated by -1 dBA per thousand feet of distance traveled.
- No acoustical reflection.
- Climate conditions are 68 degrees Fahrenheit, 50% relative humidity.

Additionally, potential noise path occlusion due to intervening structural features is not accounted for, so the output results appearing in Figure 2 are conservative. In actuality, the geometries of the aforementioned rooftop wells would block visual sightlines and thus direct sound paths; thus, it would be reasonable to apply a 3 dB reduction to the predicted aggregate sound levels displayed in Figure 2.

SOURCE: Dudek 2021

DUDEK

0 48 96 Feet

FIGURE 2
Aggregate Stationary Sources Operational Noise Level Prediction
Murrietta - Whitewood

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