

Appendix G: Noise Technical Memorandum and Peer Review

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SUBJECT Ohlone Parkway West Warehouse Project, Watsonville, CA
Noise Technical Memorandum

PROJECT NUMBER CVE-02

INTRODUCTION

This technical memorandum provides the noise impact assessment for the proposed warehouse project (Project) at 100 Manabe Ow Road in Watsonville, California. CA Ventures is proposing to develop a warehouse project at the intersection of Slough Road and Ohlone Parkway. The site is bounded by Manabe Ow Road to the north; Ohlone Parkway to the east; the 200 Manabe Ow Road property to the west; and industrial uses to the south. The Project would encompass approximately 13.41 acres, and the proposed building footprint would be 175,760 square feet. The Project would provide 100 parking spaces for autos and 99 truck trailer parking spaces. Figure 1 shows the Project area, and Figure 2 shows the proposed Project site plan. Fundamentals of acoustics, traffic noise modeling, and noise modeling outputs are included in Attachment A. Construction noise modeling inputs and outputs are contained in Attachment B, traffic noise modeling is contained in Attachment C, and stationary operational noise modeling is contained in Attachment D.

CITY OF WATSONVILLE NOISE STANDARDS

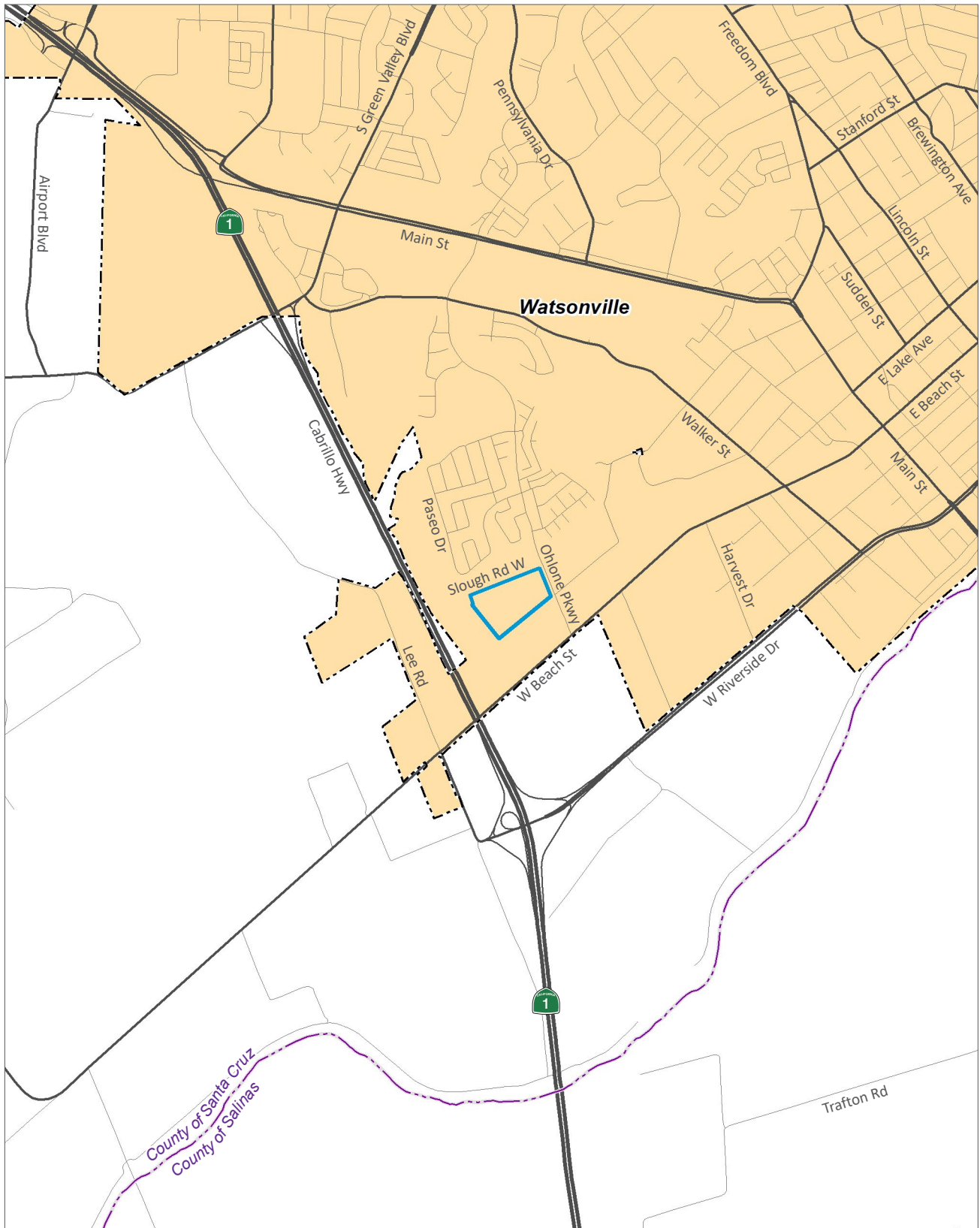
The following City of Watsonville Noise Standards from the Watsonville General Plan, Manabe-Ow Business Park Specific Plan, and Watsonville Municipal Code are relevant to the Project.

Watsonville General Plan

Chapter 12, Public Safety, of the Watsonville General Plan includes the following goals and policies relevant to the Project.

Goal 12.8, Noise Hazard Control: Evaluate new and existing land uses in the city for compatibility related to noise effects and require, as appropriate, mitigation where harmful effects can be identified, and measurable improvement will result.

» **Policy 12.M, Noise.** The City shall utilize land use regulations and enforcement to ensure that noise levels in developed areas are kept at acceptable levels, and that future noise-sensitive land uses are protected from noise that is harmful.



Source: ESRI, 2021

0 2,000
Scale (Feet)



Project Boundary

City Boundary

County Boundary

Note: Unincorporated county areas are shown in white.

Figure 1
Project Area

Figure 2
Site Plan

The Public Safety Element also identifies the City's noise compatibility guidelines for different land uses. According to Figure 12-6 of the General Plan, the normally acceptable noise limit for single-family residential land uses is 60 dBA CNEL and the conditionally acceptable noise limit is 75 dBA CNEL. For multifamily residential land uses, the General Plan sets 65 CNEL as the normally acceptable noise limit and 75 dBA CNEL as the conditionally acceptable noise limit. The normally and conditionally acceptable noise limits for an industrial land use are 80 and 85 dBA CNEL, respectively (City of Watsonville 2005, Figure 12-6).

Manabe-Ow Business Park Specific Plan

The Project is in the Manabe-Ow Business Park Specific Plan area and subject to the plans and policies in the Specific Plan. A Special Use Permit is required for construction of the Project.

Section 1.3 of the Manabe-Ow Business Park Specific Plan (Guiding Principles) states that buildings and associated improvements should be oriented on the site to minimize noise, light and glare, and visual impacts to adjacent residential neighborhoods.

Section 3.2.1 of the Manabe-Ow Business Park Specific Plan (Business Park District Development Standards) specifies that any type of land use in the plan's North Business Park Overlay District that could potentially create excessive noise (including warehouse/distribution uses) shall be required to submit a noise study demonstrating that exterior noises do not exceed 65 dB (CNEL); however, the Project site is not in plan's North Business Park Overlay District.

Section 3.8 of the Manabe-Ow Business Park Specific Plan (Site Plan Components Design Guidelines) specifies that landscaping should be provided in various locations around the perimeter of a project site for screening and noise-buffering.

Watsonville Municipal Code

The Watsonville Municipal Code (WMC), Title 5, Chapter 8, Noise, implements the City's noise policies in part. Municipal Code Section 5-8 prohibits specific types of noises, such as continuous or unusually loud noise that disturbs residential property or public ways in the city. Specifically, it is unlawful for any person to generate noise that either annoys, disturbs, injures, or endangers the comfort, repose, health, peace, or safety of others on residential property or public ways in the city, including, but not limited to:

- » The use of radios, music instruments, stereos, televisions, or other similar devices that disturb the peace and quiet of neighboring residential inhabitants, including the use of such devices between the hours of 7:00 PM and 7:00 AM that are plainly audible at a distance of 50 feet from the structure in which the device is located. (WMC Section 5-8.02(a))
- » Yelling, shouting, hooting, whistling, or singing originating from any residential property or upon any public way at any time so as to annoy or disturb the quiet comfort and repose of nearby persons. (WMC Section 5-8.02(c))

WMC Chapter 14-12 outlines procedures for zoning permits. Section 14-12.403(b) requires proposed development undergoing Design Review to be compatible with and preserve the character and integrity of adjacent development and neighborhoods and include improvements or modifications either on-site or within the public rights-of-way to mitigate development-related adverse impacts such as traffic, noise, odors, visual nuisances, or other similar adverse effects to adjacent development and neighborhoods. These improvements or modifications may include but shall not be limited to the placement or orientation of buildings and entryways, parking areas, buffer yards, and the addition of landscaping, walls, or both.

WMC Section 14-12.513 provides findings for applications for an Administrative or Special Use Permit. Section 14-12.513(b) states that the proposed use considered in the application for an Administrative or Special Use Permit shall be compatible with and preserve the character and integrity of adjacent development and neighborhoods and include improvements or modifications either on-site or within the public rights-of-way to mitigate development-related adverse impacts such as traffic, noise, odors, visual nuisances, or other similar adverse effects to adjacent development and neighborhoods. These improvements or modifications may include, but shall not be limited to, the placement or orientation of buildings and entryways, parking areas, buffer yards, and addition of landscaping, walls, or both, to mitigate such impacts.

The City has not adopted an ordinance regulating construction noise levels.

EXISTING NOISE ENVIRONMENT

The primary source of noise in the Project area is vehicular traffic on Ohlone Parkway. Industrial uses to the south also contribute to the existing noise environment. Ambient noise measurements were conducted by Salter in October of 2021 in the Project vicinity.¹ The results of noise monitoring indicate that ambient noise levels range from 58 to 61 dBA CNEL on Lighthouse Drive northwest of the Project. Average daytime noise levels ranged from 52 to 64 dBA L_{eq} , and maximum daytime noise levels ranged from 70 to 86 dBA L_{max} . Average nighttime noise levels ranged from 45 to 55 dBA L_{eq} . Though ambient noise levels are expected to be higher at residences north of the Project along Bree Lane due to proximity to Ohlone Parkway, for the purposes of this analysis, the ambient noise data collected by Salter is conservatively used as a baseline to assess Project impacts.

CONSTRUCTION NOISE

Construction vehicles such as worker vans and haul trucks used to transport equipment and haul off demolition debris may create momentary noise levels of up to 85 dBA L_{max} at 50 feet. Haul trips would occur when hauling demolition debris off-site. However, these occurrences would be generally infrequent and short-lived.

Noise generated during demolition and construction is based on the type of equipment used, the location of the equipment relative to sensitive receptors, and the timing and duration of the noise-generating activities. Each phase of construction involves the use of different kinds of construction equipment and therefore has its own distinct noise characteristics. Noise levels from construction activities are dominated by the loudest piece of construction equipment. The dominant noise source is typically the engine, although work piece noise (such as dropping of materials or buckets) can also be noticeable.

The noise produced at each construction stage is determined by combining the L_{eq} contributions from each piece of equipment used at a given time while accounting for the ongoing time variations of noise emissions (commonly referred to as the usage factor). Heavy equipment, such as a dozer or a loader, can have maximum, short-duration noise levels of 85 dBA at 50 feet.² However, overall noise emissions vary considerably, depending on the specific activity being performed at any given moment. Noise attenuation due to distance, the number and type of equipment, and the load and power requirements to accomplish tasks at each construction phase result in different noise levels from construction activities at a given receptor. Since noise from construction equipment is intermittent and diminishes at a rate of at least 6 dBA per doubling of distance (conservatively ignoring other attenuation effects from air absorption, ground

¹ City of Watsonville, 2022. 200 Manabe Ow Distribution Facility Initial Study/Mitigated Negative Declaration. October.

² Federal Highway Administration, 2006. Roadway Construction Noise Model (RCNM) User's Guide.

effects, and/or shielding/scattering effects), the average noise levels at noise-sensitive receptors could vary considerably because mobile construction equipment would move around the site with different loads and power requirements.

The edge of the proposed construction site is approximately 350 feet south of the nearest residences on Bree Lane. Based on a source level of 85 dBA L_{max} at 50 feet, construction noise would attenuate to at least 68 dBA L_{max} at the nearest residences. This would not exceed L_{max} noise levels of 70 dBA L_{max} and higher at residences to the north and northwest.

At times, multiple pieces of construction equipment would be active simultaneously. However, they would not all be located at the edge of the construction site. Noise levels were calculated at spatially averaged distances from the approximate center of the site (i.e., from the acoustical center) to the property line of the nearest receptors. This represents the L_{eq} (energy average) construction-related Project noise levels.

A reasonable scenario of multiple heavy-duty equipment that could be used simultaneously would be a bulldozer, scraper, and paver. These three pieces of equipment were entered into the FHWA RCNM model to estimate Project construction noise. The average noise produced during construction is determined by combining the L_{eq} contributions from the three loudest pieces of construction equipment while accounting for the ongoing time variations of noise emissions (the usage factor). At a distance of approximately 675 feet from the center of the construction site to the nearest residences on Bree Lane, average construction noise levels would be 60 dBA L_{eq} . Therefore, Project construction noise could, on average, exceed ambient noise levels at residences to the north and northwest by up to 8 dBA L_{eq} .

If uncontrolled, construction noise could be a nuisance to nearby residences. Therefore, the following noise reduction measures are recommended:

- » Restrict Work Hours. All construction-related work activities, including deliveries, shall follow more restrictive noise measures than those required in Watsonville Municipal Code. Construction activities shall not take place between the hours of 7:00 pm and 7:00 am on weekdays, nor prior to 8:00 am or after 5:00 pm on Saturday. No work shall occur on Sundays or holidays.
- » A sign shall be posted at a conspicuous location near the main entry to the site, prominently displaying these hour restrictions and identifying the phone number of the job superintendent.
- » Control Construction Traffic and Site Access. Construction traffic, including soil and debris hauling, shall follow City-designated truck routes and shall avoid routes that contain residential units to the maximum extent feasible given specific Project location and access needs.
- » Construction Equipment Selection, Use, and Noise Control Measures. The following measures shall apply to Project construction equipment:
 - Contractors shall use the smallest equipment capable of safely completing necessary work activities.
 - Construction staging shall occur as far away from residential and other noise-sensitive land uses as possible.
 - All stationary noise-generating equipment such as pumps, compressors, and welding machines shall be shielded and located as far from noise-sensitive land uses as practical. Shielding may consist of structures or three- or four-sided enclosures provided the structure/enclosure breaks the line of sight between the equipment and the noise-sensitive land use and provides for proper ventilation and equipment operation.

- Heavy equipment engines shall be equipped with standard noise suppression devices such as mufflers, engine covers, and engine/mechanical isolators, mounts, etc. Equipment shall be maintained in accordance with manufacturer's recommendations during active construction activities.
 - Pneumatic tools shall include a noise suppression device on the compressed air exhaust.
 - The Project shall connect to existing electrical service at the site to avoid the use of stationary power generators (if technically, logistically, and economically feasible and approved by the electrical-service provider).
 - No radios or other amplified sound devices shall be audible beyond the Project property line.
- » Prepare a Construction Noise Complaint Plan. The Construction Noise Complaint Plan shall:
- Identify the name and/or title and contact information (including phone number and email) for designated Project and City representatives responsible for addressing construction-related noise issues. The Project representative shall be the property owner or construction job superintendent. The City representative shall be the City Engineer or designee.
 - Include procedures describing how the designated Project representative will receive, respond, and resolve construction noise complaints. At a minimum, upon receipt of a noise complaint, the Project representative shall notify the City contact, identify the noise source generating the complaint, determine the cause of the complaint, and take steps to resolve the complaint.

TRAFFIC NOISE

The FHWA Highway Traffic Noise Prediction Model (FHWA-RD 77-108) was used to model traffic noise levels along roadway study segments. The model uses noise emission factors for automobiles, medium-duty trucks, and heavy-duty trucks, with consideration given to vehicle volume, speed, number of lanes, distance to the receiver, and the acoustical characteristics of the site. Traffic data representing average daily traffic (ADT) volumes and vehicle mix were obtained from Kimley-Horn for existing conditions and with Project implementation (see Attachment C). Table 1 summarizes the calculated traffic noise levels and the traffic noise increases along the study segments with implementation of the Project.

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas. Most people can detect changes in sound levels of approximately 3 dBA under normal, quiet conditions, and changes of 1 to 3 dBA are detectable under quiet, controlled conditions. Changes of less than 1 dBA are usually indiscernible. A change of 5 dBA is readily discernible to most people in an exterior environment. Note that a doubling of traffic flows (e.g., 10,000 vehicles per day to 20,000 per day) would be needed to create a 3 dBA CNEL increase in traffic-generated noise levels. Based on this, the following thresholds of significance—similar to those recommended by the Federal Aviation Administration—are used to assess traffic noise impacts at sensitive receptor locations. A significant impact would occur if traffic noise increases would exceed:

- » 1.5 dBA in ambient noise environments of 65 dBA CNEL and higher.
- » 3 dBA in ambient noise environments of 60 to 64 dBA CNEL.
- » 5 dBA in ambient noise environments of less than 60 dBA CNEL.

Table 1 summarizes the estimated Project and cumulative traffic noise increases based on ADT traffic volume provided by Kimley-Horn. As shown in Table 1, the maximum increase in traffic noise from the Project would be 1.3 dBA CNEL along Ohlone Pkwy from Lighthouse Drive to West Beach Street. This would not exceed the most stringent threshold of 1.5 dBA CNEL.

Table 1 Traffic Noise Increases

Roadway Segment	Traffic Volumes (ADT)		Traffic Noise Level at 50 Feet (dBA CNEL)		Traffic Volumes (ADT)		Traffic Noise Level at 50 feet (dBA CNEL)		Project Noise Increase (dBA CNEL)	Cumulative Increase (dBA CNEL)	Project Cumulative Contribution (dBA CNEL)
	Existing	Background + Project	Existing	Background + Project	Cumulative	Cumulative + Project	Cumulative	Cumulative + Project			
S Green Valley Rd from NB Hwy 1 to Main St	18,500	18,980	67.2	67.3	19,990	19,990	67.5	67.5	0.1	0.3	<0.1
Main Street from S Green Valley Rd to Ohlone Pkwy	24,790	26,450	71.8	72.2	31,520	31,570	72.9	72.9	0.4	1.0	<0.1
Main Street from Ohlone Pkwy to Riverside Dr	30,830	31,270	73.6	73.7	34,540	34,620	74.1	74.2	0.1	0.6	0.1
Ohlone Pkwy from Main Street to Loma Vista Dr	13,460	14,470	67.2	67.8	17,620	17,770	68.4	68.7	0.6	1.5	0.3
Ohlone Pkwy from Loma Vista Dr to Lighthouse Dr	6,000	6,980	63.7	64.7	10,940	11,090	66.3	66.7	0.9	2.9	0.3
Ohlone Pkwy from Lighthouse Dr to W Beach St	6,450	8,220	64.0	65.4	10,070	10,500	66.0	66.4	1.3	2.4	0.5
W Beach Street from Ohlone Pkwy to Walker St	10,300	11,040	71.1	71.4	13,500	13,660	72.2	72.3	0.3	1.3	0.1
Riverside Dr from SB Hwy 1 to NB Hwy 1	12,360	12,970	71.9	72.1	15,950	16,060	73.0	73.0	0.2	1.2	0.1
Riverside Dr from NB Hwy 1 to Main Street	21,090	21,940	74.2	74.4	23,640	23,710	74.7	74.7	0.2	0.5	0.1

Source: Traffic data provided by Kimley-Horn 2023, in Attachment C.

¹ Use of Background + Project ADT volumes—instead of Existing + Project ADT volumes—provides a more conservative assessment of project impacts.

STATIONARY SOURCES

Mechanical Equipment

Heating, ventilation, and air conditioning (HVAC) systems are anticipated to be on the building. Typical HVAC equipment generates noise levels up to 72 dBA at a distance of 3 feet. The nearest noise-sensitive receptors are residences approximately 370 feet north of the proposed building. At this distance, noise levels from HVAC noise would attenuate to approximately 30 dBA. This would not exceed nighttime noise levels of 45 dBA L_{eq} and higher at residences to the north and northwest. Attachment D includes operational stationary source calculations.

Truck-Loading Docks

The Project would generate operational noise associated with truck-loading-bay operations, such as truck movements, idling, and loading/unloading. Reference noise levels from a survey of truck-loading-dock operational noise were used to evaluate the impact. The sampling accounted for the major noise sources associated with one truck, such as airbrake discharge, king-pin coupling, back-up warning “beep,” and drive-off. Reference noise levels for a single truck are shown in Table 2 in several different noise metrics.

Operation of the Project would involve up to 53 daily trucks and associated loading activities (up to 105 one-way daily truck trips).³ To provide for a conservative assessment of Project operational noise impacts, it is assumed that the Project could operate 24 hours a day. This analysis conservatively assumes trucks operating simultaneously at each of the proposed 41 loading docks during a one-hour period in the daytime. The Project applicant estimates that evening truck loading would equal approximately 5 percent of daily loading and that nighttime truck loading would equal approximately 1 percent of daily loading. For a conservative assessment, it is assumed that evening loading could equal 10 percent of daily loading, or approximately 5 trucks, and that nighttime loading could equal 5 percent of daily loading, or approximately 3 trucks.

The single-truck reference levels were adjusted to include the maximum number of trucks at one time. The closest residential property line to the north on Bree Lane is approximately 625 feet from the nearest proposed loading dock. In addition, since the loading docks are proposed on the southern side of the building, the building itself would provide substantial shielding and an associated noise reduction of at least 10 dBA. Table 2 shows estimated daytime, evening, and nighttime truck loading noise at the nearest residences. When accounting for the 5 dBA penalty for evening noise levels and the 10 dBA penalty for nighttime noise levels, the estimated daily CNEL would be 24 dBA CNEL, which would not exceed the existing ambient of 58 dBA CNEL at residences to the north and northwest.

³ Kimley Horn, 2023. Manabe Ow Road East Parcel – Warehousing Use TIS. January.

Table 2 Warehouse-Related Truck Loading Noise

Noise Metric	Reference Level One Truck at 50 feet (dBA)	Daytime Noise Level at Residences to the North at 625 feet with Shielding (dBA)	Evening Noise Level at Residences to the North at 625 feet with Shielding (dBA)	Nighttime Noise Level at Residences to the North at 625 feet with Shielding (dBA)
L ₅₀	40	24	15	14
L ₂₅	42	26	17	15
L ₈	53	37	28	26
L ₂	54	38	29	27
L _{max}	75	43	43	43

Reference noise levels from PlaceWorks, 2012, City of Industry: Macy's Trucking Yard Noise Survey (Trailer Hook-up Simulation (typical)).

Notes: L_n is equal to the noise level that is exceeded for n percent of the measurement.

L₅₀ is equal to the noise level exceeded for 30 minutes in any hour

L₂₅ is equal to the noise level exceeded for 15 minutes in any hour

L₈ is equal to the noise level exceeded for 5 minutes in any hour

L₂ is equal to the noise level exceeded for 1 minute in any hour

L_{max} is the maximum peak level throughout any noise measurement

Detailed calculation results are in Attachment D.

Vehicle Movements

The FHWA-RD 77-108 model was used to estimate auto and truck vehicle movements along Manabe Ow Road accessing the Project site. Project trip generation representing the Project ADT volume and vehicle mix was obtained from Kimley-Horn⁴ and modeled at a distance of approximately 300 feet from residences to the north. The Project applicant estimates that evening truck trips would equal approximately 5 percent of daily truck trips and that nighttime truck trips would equal approximately 1 percent of daily truck trips. To provide for a conservative assessment, it is assumed that evening truck trips could equal 10 percent of daily truck trips, and that nighttime truck trips could equal 5 percent of daily truck trips. The results of modeling indicate that daily vehicle movements would result in a noise level of up to 45 dBA CNEL at residences to the north, which would not exceed the existing ambient of 58 dBA CNEL at residences to the north and northwest.

Combined Noise Levels

The combination of Project vehicle movements, truck loading activity, and mechanical equipment is anticipated to result in noise levels of up to 46 dBA CNEL, which would not exceed the existing ambient of 58 dBA CNEL at residences to the north and northwest.

Cumulative Impacts

The noise analysis for the adjacent 200 Manabe Ow Road project estimated that noise from that project would be up to 41 dBA CNEL at the nearest residential receptors.⁵ The cumulative noise level from both projects operating simultaneously would be up to 47 dBA CNEL, which would not exceed the existing ambient of 58 dBA CNEL at residences to the north and northwest. As shown in Table 1, the maximum increase in traffic noise would be 2.9 dBA CNEL under cumulative conditions along Ohlone Parkway

⁴ Kimley Horn, 2023. Manabe Ow Road East Parcel – Warehousing Use TIS. January.

⁵ City of Watsonville, 2022. 200 Manabe Ow Distribution Facility Initial Study/Mitigated Negative Declaration. October.

between Loma Vista Drive to Lighthouse Drive. This would not exceed the threshold of 3 dBA CNEL for existing ambient noise environments of 60 to 64 dBA CNEL. In addition, an increase of 1.5 dBA CNEL is calculated for Ohlone Pkwy between Main Street to Loma Vista Dr. This would not exceed the threshold of 1.5 dBA CNEL for existing ambient noise environments of 65 dBA CNEL and higher. The Project's contribution to a cumulative increase from traffic noise would be a maximum of 0.5 dBA CNEL along Ohlone Parkway between Lighthouse Drive and W Beach Street. This would be less than 1 dBA CNEL.

CONCLUSION

As discussed above, Project operational noise impacts from traffic and stationary sources would not exceed the existing ambient at residences to the north and northwest. Therefore, Project operational noise impacts would be less than significant, and no mitigation measures are needed. It was found that, if uncontrolled, construction noise could be a nuisance to nearby residences. Incorporation of the recommended construction noise reduction measures would ensure that construction noise is controlled and reduced to the degree feasible. Cumulative noise impacts would be less than significant. This concludes our noise impact findings for the subject Project.



Attachment A. Fundamentals of Acoustics, Traffic Noise Modeling, and Truck Loading Noise Modeling

Fundamentals of Acoustics

Noise is most often defined as unwanted sound; whether it is loud, unpleasant, unexpected, or otherwise undesirable. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as “noisiness” or “loudness.”

NOISE DESCRIPTORS

The following are brief definitions of terminology:

- » Sound. A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- » Noise. Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- » Decibel (dB). A unitless measure of sound, expressed on a logarithmic scale and with respect to a defined reference sound pressure. The standard reference pressure is 20 micropascals (20 μ Pa).
- » A-Weighted Decibel (dBA). An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- » Equivalent Continuous Noise Level (Leq); also called the Energy-Equivalent Noise Level. The value of an equivalent, steady sound level which, in a stated time period (often over an hour) and at a stated location, has the same A-weighted sound energy as the time-varying sound. Thus, the Leq metric is a single numerical value that represents the equivalent amount of variable sound energy received by a receptor over the specified duration.
- » Statistical Sound Level (Ln). The sound level that is exceeded “n” percent of time during a given sample period. For example, the L50 level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the “median sound level.” The L10 level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the “intrusive sound level.” The L90 is the sound level exceeded 90 percent of the time and is often considered the “effective background level” or “residual noise level.”
- » Day-Night Sound Level (Ldn or DNL). The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 PM to 7:00 AM.
- » Community Noise Equivalent Level (CNEL). The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added from 7:00 PM to 10:00 PM and 10 dB from 10:00 PM to 7:00 AM. NOTE: For general community/environmental noise, CNEL and Ldn values rarely differ by more than 1 dB (with the CNEL being only slightly more restrictive – that is, higher than the Ldn value). As a matter of practice, Ldn and CNEL values are interchangeable and are treated as equivalent in this assessment.

- » Sensitive Receptor. Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.

CHARACTERISTICS OF SOUND

When an object vibrates, it radiates part of its energy in the form of a pressure wave. Sound is that pressure wave transmitted through the air. Technically, airborne sound is a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure that creates sound waves.

Sound can be described in terms of amplitude (loudness), frequency (pitch), or duration (time). Loudness or amplitude is measured in dB, frequency or pitch is measured in Hertz [Hz] or cycles per second, and duration or time variations is measured in seconds or minutes.

Amplitude

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale. Because of the physical characteristics of noise transmission and perception, the relative loudness of sound does not closely match the actual amounts of sound energy. The table below presents the subjective effect of changes in sound pressure levels. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud). Changes of 1 to 3 dB are detectable under quiet, controlled conditions, and changes of less than 1 dB are usually not discernible (even under ideal conditions). A 3 dB change in noise levels is considered the minimum change that is detectable with human hearing in outside environments. A change of 5 dB is readily discernible to most people in an exterior environment, and a 10 dB change is perceived as a doubling (or halving) of the sound.

Table A1 Noise Perceptibility

Change in dB	Noise Level
± 3 dB	Threshold of human perceptibility
± 5 dB	Clearly noticeable change in noise level
± 10 dB	Half or twice as loud
± 20 dB	Much quieter or louder

Source: Bies, David A. and Colin H. Hansen. 2009. *Engineering Noise Control: Theory and Practice*. 4th ed. New York: Spon Press.

Frequency

The human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all, but are “felt” more as a vibration. Similarly, though people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz.

When describing sound and its effect on a human population, A-weighted (dBA) sound levels are typically used to approximate the response of the human ear. The A-weighted noise level has been found to correlate well with people’s judgments of the “noisiness” of different sounds and has been used for many years as a measure of community and industrial noise. Although the A-weighted scale and the energy-equivalent metric are commonly used to quantify the range of human response to individual events or general community sound levels, the degree of annoyance or other response also depends on several other perceptibility factors, including:

- » Ambient (background) sound level
- » General nature of the existing conditions (e.g., quiet rural or busy urban)
- » Difference between the magnitude of the sound event level and the ambient condition
- » Duration of the sound event
- » Number of event occurrences and their repetitiveness
- » Time of day that the event occurs

Duration

Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called L_{eq}), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time; half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L_2 , L_8 and L_{25} values represent the noise levels that are exceeded 2, 8, and 25 percent of the time or 1, 5, and 15 minutes per hour, respectively. These “n” values are typically used to demonstrate compliance for stationary noise sources with many cities’ noise ordinances. Other values typically noted during a noise survey are the L_{min} and L_{max} . These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period, respectively.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law and many local jurisdictions use an adjusted 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (L_{dn}). The CNEL descriptor requires that an artificial increment (or “penalty”) of 5 dBA be added to the actual noise level for the hours from 7:00 PM to 10:00 PM and 10 dBA for the hours from 10:00 PM to 7:00 AM. The L_{dn} descriptor uses the same methodology except that there is no artificial increment added to the hours between 7:00 PM and 10:00 PM. Both descriptors give roughly the same 24-hour level, with the CNEL being only slightly more restrictive (i.e., higher). The CNEL or L_{dn} metrics are commonly applied to the assessment of roadway and airport-related noise sources.

Sound Propagation

Sound dissipates exponentially with distance from the noise source. This phenomenon is known as “spreading loss.” For a single-point source, sound levels decrease by approximately 6 dB for each doubling of distance from the source (conservatively neglecting ground attenuation effects, air absorption factors, and barrier shielding). For example, if a backhoe at 50 feet generates 84 dBA, at 100 feet the noise level would be 79 dBA, and at 200 feet it would be 73 dBA. This drop-off rate is appropriate for noise generated by on-site operations from stationary equipment or activity at a project site. If noise is produced by a line source, such as highway traffic, the sound decreases by 3 dB for each doubling of distance over a reflective (“hard site”) surface such as concrete or asphalt. Line source noise in a relatively flat environment with ground-level absorptive vegetation decreases by an additional 1.5 dB for each doubling of distance.

Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. Extended periods of noise exposure above 90 dBA results in permanent cell damage, which is the

main driver for employee hearing protection regulations in the workplace. For community environments, the ambient or background noise problem is widespread, though generally worse in urban areas than in outlying, less-developed areas. Elevated ambient noise levels can result in noise interference (e.g., speech interruption/masking, sleep disturbance, disturbance of concentration) and cause annoyance. Since most people do not routinely work with decibels or A-weighted sound levels, it is often difficult to appreciate what a given sound pressure level number means. To help relate noise level values to common experience, the table below shows typical noise levels from familiar sources.

Table A2 Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Onset of physical discomfort	120+	
	110	Rock Band (near amplification system)
Jet Flyover at 1,000 feet		
	100	
Gas Lawn Mower at three feet		
	90	
Diesel Truck at 50 feet, at 50 mph		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: California Department of Transportation (Caltrans). 2013. Technical Noise Supplement ("TeNS").

Attachment B. Construction Noise Modeling

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 03/09/2023
Case Description: 100 Manabe Ow

**** Receptor #1 ****

Description	Land Use	Daytime	Baselines (dBA)	
			Evening	Night
-----	-----	-----	-----	-----
Constr	Residential	65.0	60.0	55.0

Description	Impact Device	Usage (%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Dozer	No	40		81.7	675.0	0.0
Scraper	No	40		83.6	675.0	0.0
Paver	No	50		77.2	675.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

[illegible]

Attachment C. Traffic Noise Modeling

Existing		NB ADT Volume	SB ADT Volume	EB ADT Volume	WB ADT Volume	Total ADT
1	S Green Valley Rd from NB Hwy 1 to Main St	9,020	9,480	-	-	18,500
2	Main Street from S Green Valley Rd to Ohlone Pkwy	-	-	13,820	10,970	24,790
3	Main Street from Ohlone Pkwy to Riverside Dr	-	-	14,110	16,720	30,830
4	Ohlone Pkwy from Main Street to Loma Vista Dr	7,410	6,050	-	-	13,460
5	Ohlone Pkwy from Loma Vista Dr to Lighthouse Dr	3,080	2,920	-	-	6,000
6	Ohlone Pkwy from Lighthouse Dr to W Beach St	3,570	2,880	-	-	6,450
7	W Beach Street from Ohlone Pkwy to Walker St	-	-	6,230	4,070	10,300
8	Riverside Dr from SB Hwy 1 to NB Hwy 1	-	-	7,650	4,710	12,360
9	Riverside Dr from NB Hwy 1 to Main Street	-	-	11,610	9,480	21,090

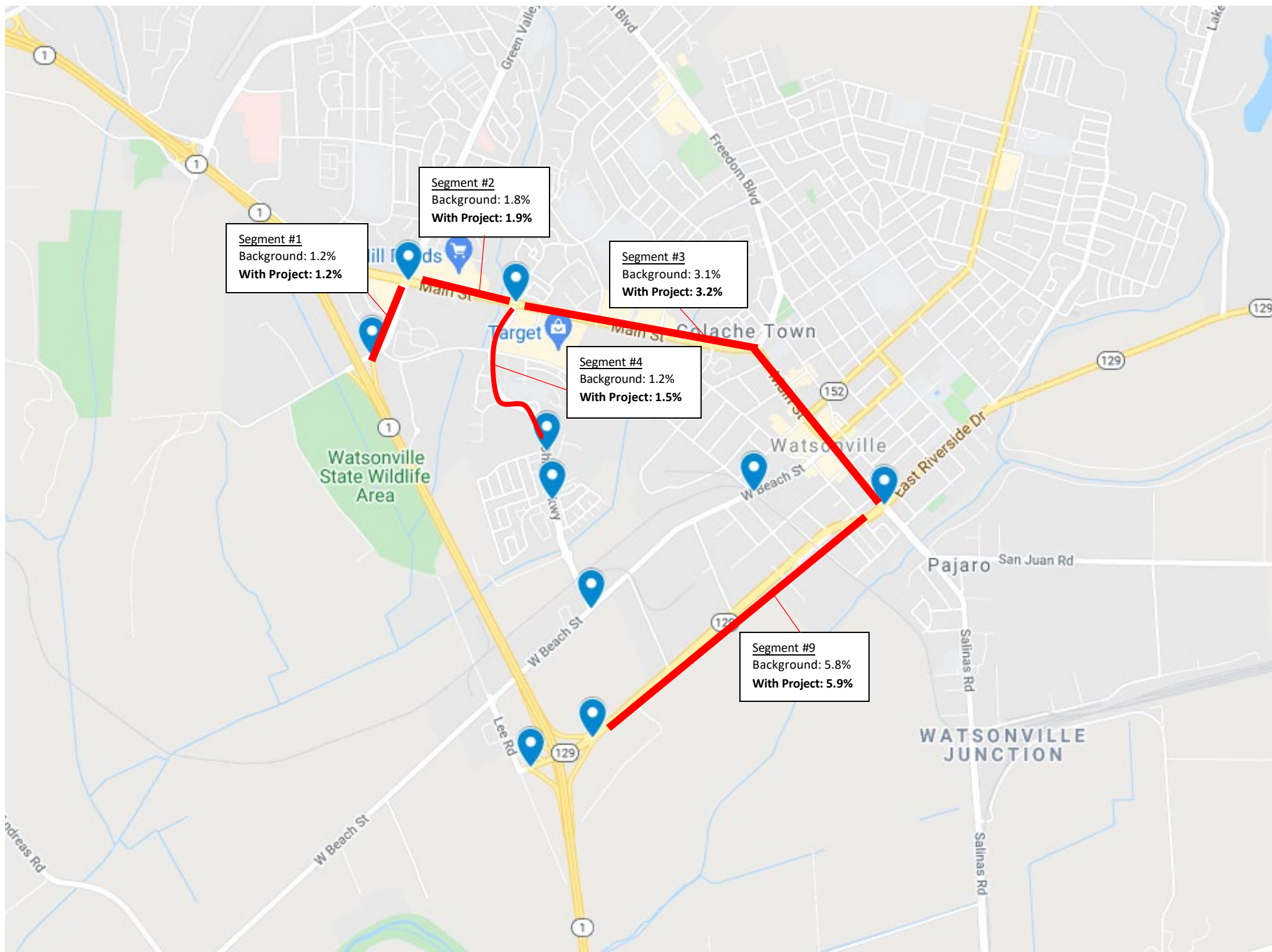
Background		NB ADT Volume	SB ADT Volume	EB ADT Volume	WB ADT Volume	Total ADT
1	S Green Valley Rd from NB Hwy 1 to Main St	9,240	9,740	-	-	18,980
2	Main Street from S Green Valley Rd to Ohlone Pkwy	-	-	14,560	11,840	26,400
3	Main Street from Ohlone Pkwy to Riverside Dr	-	-	14,260	16,930	31,190
4	Ohlone Pkwy from Main Street to Loma Vista Dr	7,840	6,480	-	-	14,320
5	Ohlone Pkwy from Loma Vista Dr to Lighthouse Dr	3,550	3,320	-	-	6,870
6	Ohlone Pkwy from Lighthouse Dr to W Beach St	4,240	3,730	-	-	7,970
7	W Beach Street from Ohlone Pkwy to Walker St	-	-	6,410	4,470	10,880
8	Riverside Dr from SB Hwy 1 to NB Hwy 1	-	-	7,740	5,100	12,840
9	Riverside Dr from NB Hwy 1 to Main Street	-	-	11,780	10,090	21,870

Background Plus Project		NB ADT Volume	SB ADT Volume	EB ADT Volume	WB ADT Volume	Total ADT
1	S Green Valley Rd from NB Hwy 1 to Main St	9,240	9,740	-	-	18,980
2	Main Street from S Green Valley Rd to Ohlone Pkwy	-	-	14,570	11,880	26,450
3	Main Street from Ohlone Pkwy to Riverside Dr	-	-	14,300	16,970	31,270
4	Ohlone Pkwy from Main Street to Loma Vista Dr	7,920	6,550	-	-	14,470
5	Ohlone Pkwy from Loma Vista Dr to Lighthouse Dr	3,590	3,390	-	-	6,980
6	Ohlone Pkwy from Lighthouse Dr to W Beach St	4,370	3,850	-	-	8,220
7	W Beach Street from Ohlone Pkwy to Walker St	-	-	6,490	4,550	11,040
8	Riverside Dr from SB Hwy 1 to NB Hwy 1	-	-	7,840	5,130	12,970
9	Riverside Dr from NB Hwy 1 to Main Street	-	-	11,840	10,100	21,940

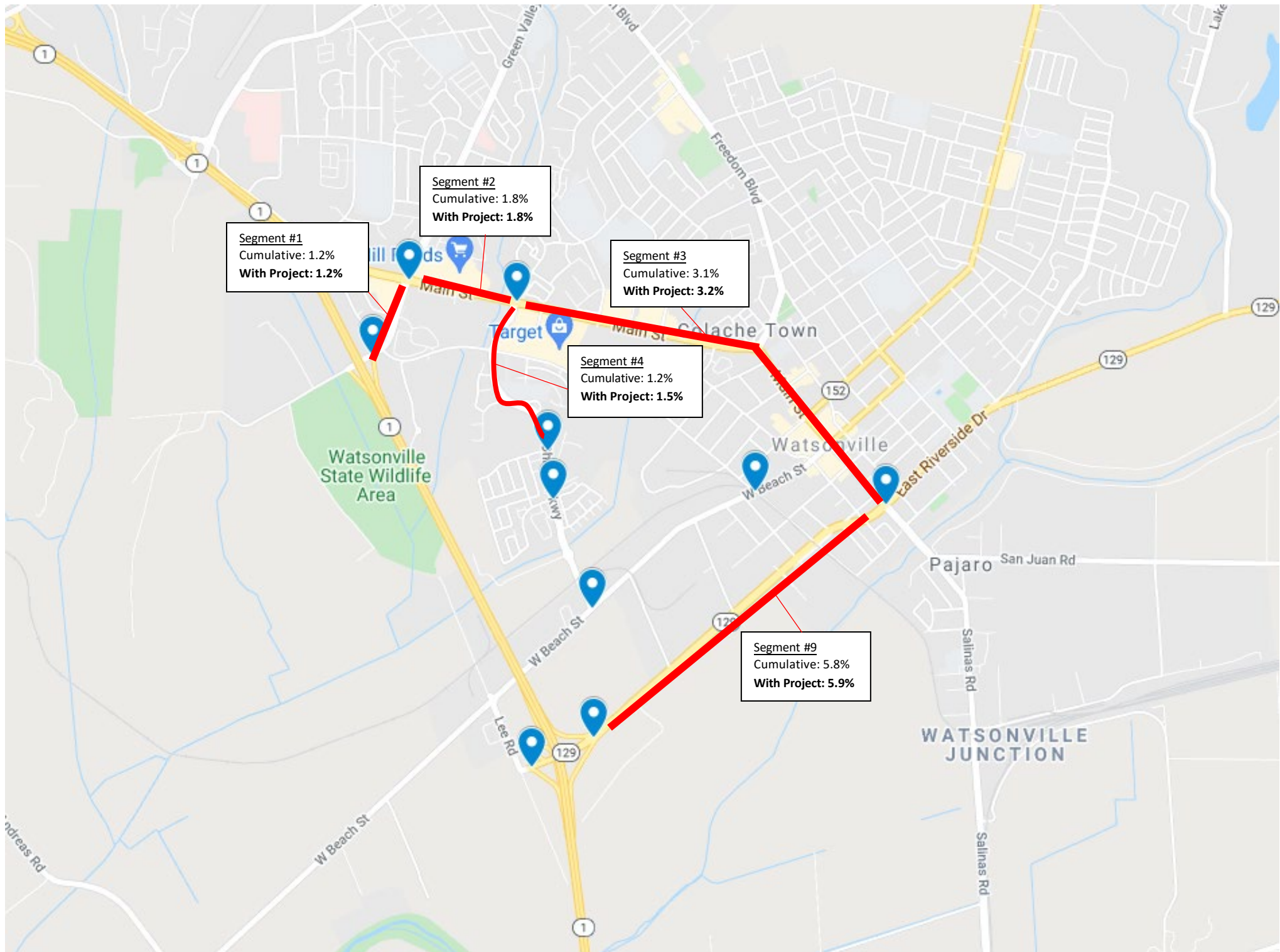
Cumulative		NB ADT Volume	SB ADT Volume	EB ADT Volume	WB ADT Volume	Total ADT
1	S Green Valley Rd from NB Hwy 1 to Main St	9,840	10,150	-	-	19,990
2	Main Street from S Green Valley Rd to Ohlone Pkwy	-	-	16,080	15,440	31,520
3	Main Street from Ohlone Pkwy to Riverside Dr	-	-	15,760	18,780	34,540
4	Ohlone Pkwy from Main Street to Loma Vista Dr	10,020	7,600	-	-	17,620
5	Ohlone Pkwy from Loma Vista Dr to Lighthouse Dr	5,570	5,370	-	-	10,940
6	Ohlone Pkwy from Lighthouse Dr to W Beach St	4,940	5,130	-	-	10,070
7	W Beach Street from Ohlone Pkwy to Walker St	-	-	8,110	5,390	13,500
8	Riverside Dr from SB Hwy 1 to NB Hwy 1	-	-	8,860	7,090	15,950
9	Riverside Dr from NB Hwy 1 to Main Street	-	-	12,750	10,890	23,640

Cumulative Plus Project		NB ADT Volume	SB ADT Volume	EB ADT Volume	WB ADT Volume	Total ADT
1	S Green Valley Rd from NB Hwy 1 to Main St	9,840	10,150	-	-	19,990
2	Main Street from S Green Valley Rd to Ohlone Pkwy	-	-	16,090	15,480	31,570
3	Main Street from Ohlone Pkwy to Riverside Dr	-	-	15,800	18,820	34,620
4	Ohlone Pkwy from Main Street to Loma Vista Dr	10,100	7,670	-	-	17,770
5	Ohlone Pkwy from Loma Vista Dr to Lighthouse Dr	5,680	5,410	-	-	11,090
6	Ohlone Pkwy from Lighthouse Dr to W Beach St	5,070	5,430	-	-	10,500
7	W Beach Street from Ohlone Pkwy to Walker St	-	-	8,190	5,470	13,660
8	Riverside Dr from SB Hwy 1 to NB Hwy 1	-	-	8,960	7,100	16,060
9	Riverside Dr from NB Hwy 1 to Main Street	-	-	12,810	10,900	23,710

Background and Background with Project Scenarios



Cumulative and Cumulative with Project Scenarios



Traffic Noise Calculator: FHWA 77-108				Project Title: Existing																				
Output				Inputs																Auto Inputs				
dBA at 50 feet				Distance to CNEL Contour																				
ID	L _{eq-24hr}	L _{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	Segment	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance		
1	63.1	66.8	67.2	26	83	261	S Green Valley Rd from NB Hwy 1 to Main		18,500	30	0.0%	98.8%	0.0%	1.2%	75.0%	10.0%	15.0%	4	Hard	50	0	44		
2	67.7	71.4	71.8	76	240	759	Main Street from S Green Valley Rd to Ohlone		24,790	40	0.0%	98.2%	0.0%	1.8%	75.0%	10.0%	15.0%	4	Hard	50	0	44		
3	69.5	73.2	73.6	114	361	1143	Main Street from Ohlone Pkwy to Riverside		30,830	40	0.0%	96.9%	0.0%	3.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44		
4	63.1	66.9	67.2	26	84	265	Ohlone Pkwy from Main Street to Loma Vista		13,460	35	0.0%	98.8%	0.0%	1.2%	75.0%	10.0%	15.0%	2	Hard	50	0	20		
5	59.6	63.3	63.7	12	37	118	Ohlone Pkwy from Loma Vista Dr to Lighthouse		6,000	35	0.0%	98.8%	0.0%	1.2%	75.0%	10.0%	15.0%	2	Hard	50	0	20		
6	60.0	63.7	64.0	13	40	127	Ohlone Pkwy from Lighthouse Dr to W Beach		6,450	35	0.0%	98.8%	0.0%	1.2%	75.0%	10.0%	15.0%	2	Hard	50	0	20		
7	67.0	70.7	71.1	64	203	640	W Beach Street from Ohlone Pkwy to Walkers		10,300	45	0.0%	94.2%	0.0%	5.8%	75.0%	10.0%	15.0%	4	Hard	50	0	44		
8	67.8	71.5	71.9	77	243	769	Riverside Dr from SB Hwy 1 to NB Hwy 1		12,360	45	0.0%	94.2%	0.0%	5.8%	75.0%	10.0%	15.0%	4	Hard	50	0	44		
9	70.1	73.8	74.2	131	415	1311	Riverside Dr from NB Hwy 1 to Main Street		21,090	45	0.0%	94.2%	0.0%	5.8%	75.0%	10.0%	15.0%	4	Hard	50	0	44		

Traffic Noise Calculator: FHWA 77-108

Project Title: Background + Project

	Output						Inputs													Auto Inputs		
	dBA at 50 feet			Distance to CNEL Contour																		
ID	L _{eq-24hr}	L _{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	Segment	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Receiver	Ground Absorption	Lane Distance
1	63.2	66.9	67.3	27	85	268	S Green Valley Rd from NB Hwy 1 to Main		18,980	30	0.0%	98.8%	0.0%	1.2%	75.0%	10.0%	15.0%	4	Hard	50	0	44
2	68.1	71.8	72.2	82	260	823	Main Street from S Green Valley Rd to Ohlone		26,450	40	0.0%	98.1%	0.0%	1.9%	75.0%	10.0%	15.0%	4	Hard	50	0	44
3	69.6	73.3	73.7	117	371	1175	Main Street from Ohlone Pkwy to Riverside		31,270	40	0.0%	96.8%	0.0%	3.2%	75.0%	10.0%	15.0%	4	Hard	50	0	44
4	63.7	67.5	67.8	30	96	304	Ohlone Pkwy from Main Street to Loma Vista		14,470	35	0.0%	98.5%	0.0%	1.5%	75.0%	10.0%	15.0%	2	Hard	50	0	20
5	60.6	64.3	64.7	15	46	146	Ohlone Pkwy from Loma Vista Dr to Lighthouse		6,980	35	0.0%	98.5%	0.0%	1.5%	75.0%	10.0%	15.0%	2	Hard	50	0	20
6	61.3	65.0	65.4	17	55	173	Ohlone Pkwy from Lighthouse Dr to W Beach		8,220	35	0.0%	98.5%	0.0%	1.5%	75.0%	10.0%	15.0%	2	Hard	50	0	20
7	67.3	71.0	71.4	69	219	692	W Beach Street from Ohlone Pkwy to Walkers		11,040	45	0.0%	94.1%	0.0%	5.9%	75.0%	10.0%	15.0%	4	Hard	50	0	44
8	68.0	71.7	72.1	81	257	814	Riverside Dr from SB Hwy 1 to NB Hwy 1		12,970	45	0.0%	94.1%	0.0%	5.9%	75.0%	10.0%	15.0%	4	Hard	50	0	44
9	70.3	74.0	74.4	138	435	1376	Riverside Dr from NB Hwy 1 to Main Street		21,940	45	0.0%	94.1%	0.0%	5.9%	75.0%	10.0%	15.0%	4	Hard	50	0	44

Traffic Noise Calculator: FHWA 77-108				Project Title: Cumulative																	
	Output			Inputs															Auto Inputs		
	dBA at 50 feet		Distance to CNEL Contour	Roadway	Segment	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Reciever	Ground Absorption	Lane Distance		
ID	L _{eq-24hr}	L _{dn}	CNEL																	70 dBA	65 dBA
1	63.4	67.1	67.5	28	89	282	S Green Valley Rd from NB Hwy 1 to Main	19,990	30	0.0%	98.8%	0.0%	1.2%	75.0%	10.0%	15.0%	4	Hard	50	0	44
2	68.8	72.5	72.9	96	305	965	Main Street from S Green Valley Rd to Ohlone	31,520	40	0.0%	98.2%	0.0%	1.8%	75.0%	10.0%	15.0%	4	Hard	50	0	44
3	70.0	73.7	74.1	128	405	1280	Main Street from Ohlone Pkwy to Riverside	34,540	40	0.0%	96.9%	0.0%	3.1%	75.0%	10.0%	15.0%	4	Hard	50	0	44
4	64.3	68.0	68.4	35	110	347	Ohlone Pkwy from Main Street to Loma Vista	17,620	35	0.0%	98.8%	0.0%	1.2%	75.0%	10.0%	15.0%	2	Hard	50	0	20
5	62.2	66.0	66.3	22	68	215	Ohlone Pkwy from Loma Vista Dr to Lighthouse	10,940	35	0.0%	98.8%	0.0%	1.2%	75.0%	10.0%	15.0%	2	Hard	50	0	20
6	61.9	65.6	66.0	20	63	198	Ohlone Pkwy from Lighthouse Dr to W Beach	10,070	35	0.0%	98.8%	0.0%	1.2%	75.0%	10.0%	15.0%	2	Hard	50	0	20
7	68.2	71.9	72.2	84	265	839	W Beach Street from Ohlone Pkwy to Walkers	13,500	45	0.0%	94.2%	0.0%	5.8%	75.0%	10.0%	15.0%	4	Hard	50	0	44
8	68.9	72.6	73.0	99	314	992	Riverside Dr from SB Hwy 1 to NB Hwy 1	15,950	45	0.0%	94.2%	0.0%	5.8%	75.0%	10.0%	15.0%	4	Hard	50	0	44
9	70.6	74.3	74.7	147	465	1470	Riverside Dr from NB Hwy 1 to Main Street	23,640	45	0.0%	94.2%	0.0%	5.8%	75.0%	10.0%	15.0%	4	Hard	50	0	44

Traffic Noise Calculator: FHWA 77-108

Project Title: Cumulative + Project

	Output						Inputs													Auto Inputs		
	dBA at 50 feet			Distance to CNEL Contour																		
ID	L _{eq-24hr}	L _{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	Segment	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Receiver	Ground Absorption	Lane Distance
1	63.4	67.1	67.5	28	89	282	S Green Valley Rd from NB Hwy 1 to Main		19,990	30	0.0%	98.8%	0.0%	1.2%	75.0%	10.0%	15.0%	4	Hard	50	0	44
2	68.8	72.5	72.9	97	306	966	Main Street from S Green Valley Rd to Ohlone		31,570	40	0.0%	98.2%	0.0%	1.8%	75.0%	10.0%	15.0%	4	Hard	50	0	44
3	70.1	73.8	74.2	130	411	1301	Main Street from Ohlone Pkwy to Riverside		34,620	40	0.0%	96.8%	0.0%	3.2%	75.0%	10.0%	15.0%	4	Hard	50	0	44
4	64.6	68.3	68.7	37	118	373	Ohlone Pkwy from Main Street to Loma Vista		17,770	35	0.0%	98.5%	0.0%	1.5%	75.0%	10.0%	15.0%	2	Hard	50	0	20
5	62.6	66.3	66.7	23	74	233	Ohlone Pkwy from Loma Vista Dr to Lighthouse		11,090	35	0.0%	98.5%	0.0%	1.5%	75.0%	10.0%	15.0%	2	Hard	50	0	20
6	62.3	66.1	66.4	22	70	220	Ohlone Pkwy from Lighthouse Dr to W Beach		10,500	35	0.0%	98.5%	0.0%	1.5%	75.0%	10.0%	15.0%	2	Hard	50	0	20
7	68.2	72.0	72.3	86	271	857	W Beach Street from Ohlone Pkwy to Walkers		13,660	45	0.0%	94.1%	0.0%	5.9%	75.0%	10.0%	15.0%	4	Hard	50	0	44
8	68.9	72.7	73.0	101	319	1007	Riverside Dr from SB Hwy 1 to NB Hwy 1		16,060	45	0.0%	94.1%	0.0%	5.9%	75.0%	10.0%	15.0%	4	Hard	50	0	44
9	70.6	74.4	74.7	149	470	1487	Riverside Dr from NB Hwy 1 to Main Street		23,710	45	0.0%	94.1%	0.0%	5.9%	75.0%	10.0%	15.0%	4	Hard	50	0	44



Attachment D. Stationary Operational Noise Modeling

Ohlone Parkway West

Loading Dock/Truck Noise Calculations

Receptor: Residences to the North					
		Distance Attenuation, ft		Barrier Attenuation	
Reference Adjusted (@ 50 ft)		41 docks		41 docks	
Metric	Ref @ 50 ft	41	625	-10 dB	Total (dBA)
L50	40.0	56.1	34.2	24.2	24.2
L25	42.0	58.1	36.2	26.2	26.2
L8	53.0	69.1	47.2	37.2	37.2
L25	54.0	70.1	48.2	38.2	38.2
Lmax	75.0	75.0	53.1	43.1	43.1

RCNM Appendix A: Practices for Calculating Estimated Shielding (fwha.dot.gov)

Atten (dB)	Instance
3	If a noise barrier or other obstruction (like a dirt mound) just barely breaks the line-of-sight between the noise source and the receptor
5	If the noise source is in a enclosure and/or barrier that has some gaps in it
5	If a noise source is enclosed or shielded with heavy vinyl noise curtain material (e.g., SoundSeal BBC-13-2" or equivalent)
8	If the noise source is completely enclosed OR completely shielded with a solid barrier located close to the source
10	If the noise source is completely enclosed AND completely shielded with a solid barrier located close to the source

References

1. Roadway Construction Noise Model User's Guide. Federal Highway Administration. FHWA-HEP-05-054. January 2006
2. Construction Noise Control Specification 721.560, Central Artery/Tunnel Project, Massachusetts Turnpike Authority, Boston, MA, 2002.
3. Thalheimer, Erich. "Construction Noise Control Program and Mitigation Strategy at the Central Artery/Tunnel Project". Noise Control Engineering Journal, Vol. 48, No. 5, pp 157-165, September - October 2000.
4. "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety", Environmental Protection Agency, ONAC 550/9-74-004. Washington, DC, March 1974.
5. "Power Plant Construction Noise Guide". Bolt, Beranek, and Newman Inc. and Empire State Electric Energy Research Corp., Report No. 3321. New York, NY May 1977.

Ohlone Parkway West

Loading Dock/Truck Noise Calculations

Receptor: Residences to the North					
		Distance Attenuation, ft		Barrier Attenuation	
Reference Adjusted (@ 50 ft)		5 docks		5 docks	
Metric	Ref @ 50 ft	5	625	-10 dB	Total (dBA)
L50	40.0	47.0	25.1	15.1	15.4
L25	42.0	49.0	27.1	17.1	17.3
L8	53.0	60.0	38.1	28.1	28.1
L25	54.0	61.0	39.1	29.1	29.1
Lmax	75.0	75.0	53.1	43.1	43.1

RCNM Appendix A: Practices for Calculating Estimated Shielding (fwha.dot.gov)

Atten (dB)	Instance
3	If a noise barrier or other obstruction (like a dirt mound) just barely breaks the line-of-sight between the noise source and the receptor
5	If the noise source is in a enclosure and/or barrier that has some gaps in it
5	If a noise source is enclosed or shielded with heavy vinyl noise curtain material (e.g., SoundSeal BBC-13-2" or equivalent)
8	If the noise source is completely enclosed OR completely shielded with a solid barrier located close to the source
10	If the noise source is completely enclosed AND completely shielded with a solid barrier located close to the source

References

1. Roadway Construction Noise Model User's Guide. Federal Highway Administration. FHWA-HEP-05-054. January 2006
2. Construction Noise Control Specification 721.560, Central Artery/Tunnel Project, Massachusetts Turnpike Authority, Boston, MA, 2002.
3. Thalheimer, Erich. "Construction Noise Control Program and Mitigation Strategy at the Central Artery/Tunnel Project". Noise Control Engineering Journal, Vol. 48, No. 5, pp 157-165, September - October 2000.
4. "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety", Environmental Protection Agency, ONAC 550/9-74-004. Washington, DC, March 1974.
5. "Power Plant Construction Noise Guide". Bolt, Beranek, and Newman Inc. and Empire State Electric Energy Research Corp., Report No. 3321. New York, NY May 1977.

Ohlone Parkway West

Loading Dock/Truck Noise Calculations

		Receptor: Residences to the North			
		Reference Adjusted (@ 50 ft)		Distance Attenuation, ft	
				Barrier Attenuation	
Metric	Ref @ 50 ft	3	3 docks	3 docks	Total (dBA)
			625	-10 dB	
L50	40.0	44.8	22.8	12.8	13.5
L25	42.0	46.8	24.8	14.8	15.2
L8	53.0	57.8	35.8	25.8	25.9
L25	54.0	58.8	36.8	26.8	26.9
Lmax	75.0	75.0	53.1	43.1	43.1

RCNM Appendix A: Practices for Calculating Estimated Shielding (fwha.dot.gov)

Atten (dB)	Instance
3	If a noise barrier or other obstruction (like a dirt mound) just barely breaks the line-of-sight between the noise source and the receptor
5	If the noise source is in a enclosure and/or barrier that has some gaps in it
5	If a noise source is enclosed or shielded with heavy vinyl noise curtain material (e.g., SoundSeal BBC-13-2" or equivalent)
8	If the noise source is completely enclosed OR completely shielded with a solid barrier located close to the source
10	If the noise source is completely enclosed AND completely shielded with a solid barrier located close to the source

References

1. Roadway Construction Noise Model User's Guide. Federal Highway Administration. FHWA-HEP-05-054. January 2006
2. Construction Noise Control Specification 721.560, Central Artery/Tunnel Project, Massachusetts Turnpike Authority, Boston, MA, 2002.
3. Thalheimer, Erich. "Construction Noise Control Program and Mitigation Strategy at the Central Artery/Tunnel Project". Noise Control Engineering Journal, Vol. 48, No. 5, pp 157-165, September - October 2000.
4. "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety", Environmental Protection Agency, ONAC 550/9-74-004. Washington, DC, March 1974.
5. "Power Plant Construction Noise Guide". Bolt, Beranek, and Newman Inc. and Empire State Electric Energy Research Corp., Report No. 3321. New York, NY May 1977.

HVAC

L1

Distance (ft) L2
72 3

Distance (ft)
30.17839061 370

Traffic Noise Calculator: FHWA 77-108							Project Title: Project																
Output							Inputs															Auto Inputs	
dBA at 50 feet			Distance to CNEL Contour																				
ID	L _{eq-24hr}	L _{dn}	CNEL	70 dBA	65 dBA	60 dBA	Roadway	Segment	ADT	Posted Speed Limit	Grade	% Autos	% Med Trucks	% Heavy Trucks	% Daytime	% Evening	% Night	Number of Lanes	Site Condition	Distance to Receiver	Ground Absorption	Lane Distance	
1	42.8	44.4	45.0	6	14	30	Manabe Ow Rd		316	25	0.0%	66.8%	0.0%	33.2%	85.0%	10.0%	5.0%	2	Soft	300	0.5	20	

100 Manabe Ow Rd

Day	Date	Time	Duration	Leq	Energy	Leq (hr)	Energy+Penalty	CNEL
								24-Hr CNEL 24
								Min => 14
								Max => 24

Loading

Day	10:00:00	01:00:00.0	24.0	251.1886	24	251.1886432
Day	11:00:00	01:00:00.0	24.0	251.1886	24	251.1886432
Day	12:00:00	01:00:00.0	24.0	251.1886	24	251.1886432
Day	13:00:00	01:00:00.0	24.0	251.1886	24	251.1886432
Day	14:00:00	01:00:00.0	24.0	251.1886	24	251.1886432
Day	15:00:00	01:00:00.0	24.0	251.1886	24	251.1886432
Day	16:00:00	01:00:00.0	24.0	251.1886	24	251.1886432
Day	17:00:00	01:00:00.0	24.0	251.1886	24	251.1886432
Day	18:00:00	01:00:00.0	24.0	251.1886	24	251.1886432
Day	19:00:00	01:00:00.0	15.0	31.62278	15	100
Day	20:00:00	01:00:00.0	15.0	31.62278	15	100
Day	21:00:00	01:00:00.0	15.0	31.62278	15	100
Day	22:00:00	01:00:00.0	14.0	25.11886	14	251.1886432
Day	23:00:00	01:00:00.0	14.0	25.11886	14	251.1886432
Day	00:00:00	01:00:00.0	14.0	25.11886	14	251.1886432
Day	01:00:00	01:00:00.0	14.0	25.11886	14	251.1886432
Day	02:00:00	01:00:00.0	14.0	25.11886	14	251.1886432
Day	03:00:00	01:00:00.0	14.0	25.11886	14	251.1886432
Day	04:00:00	01:00:00.0	14.0	25.11886	14	251.1886432
Day	05:00:00	01:00:00.0	14.0	25.11886	14	251.1886432
Day	06:00:00	01:00:00.0	14.0	25.11886	14	251.1886432
Day	07:00:00	01:00:00.0	24.0	251.1886	24	251.1886432
Day	08:00:00	01:00:00.0	24.0	251.1886	24	251.1886432
Day	09:00:00	01:00:00.0	24.0	251.1886	24	251.1886432

Loading and HVAC

	Source A	Source B	Source C	Total
daytime	24	30		30.9767
eve	15	30		30.13942
night	14	30		30.11198

Day	Date	Time	Duration	Leq	Energy	Leq (hr)	Energy+Penalty	CNEL
								24-Hr CNEL 37
								Min => 30
								Max => 31

Loading and HVAC

Day	10:00:00	01:00:00.0	31.0	1258.925	31	1258.925412
Day	11:00:00	01:00:00.0	31.0	1258.925	31	1258.925412
Day	12:00:00	01:00:00.0	31.0	1258.925	31	1258.925412
Day	13:00:00	01:00:00.0	31.0	1258.925	31	1258.925412
Day	14:00:00	01:00:00.0	31.0	1258.925	31	1258.925412
Day	15:00:00	01:00:00.0	31.0	1258.925	31	1258.925412
Day	16:00:00	01:00:00.0	31.0	1258.925	31	1258.925412
Day	17:00:00	01:00:00.0	31.0	1258.925	31	1258.925412
Day	18:00:00	01:00:00.0	31.0	1258.925	31	1258.925412
Day	19:00:00	01:00:00.0	30.0	1000	30	3162.27766
Day	20:00:00	01:00:00.0	30.0	1000	30	3162.27766
Day	21:00:00	01:00:00.0	30.0	1000	30	3162.27766
Day	22:00:00	01:00:00.0	30.0	1000	30	10000
Day	23:00:00	01:00:00.0	30.0	1000	30	10000
Day	00:00:00	01:00:00.0	30.0	1000	30	10000
Day	01:00:00	01:00:00.0	30.0	1000	30	10000
Day	02:00:00	01:00:00.0	30.0	1000	30	10000
Day	03:00:00	01:00:00.0	30.0	1000	30	10000
Day	04:00:00	01:00:00.0	30.0	1000	30	10000
Day	05:00:00	01:00:00.0	30.0	1000	30	10000
Day	06:00:00	01:00:00.0	30.0	1000	30	10000

Day	07:00:00	01:00:00.0	31.0	1258.925	31	1258.925412
Day	08:00:00	01:00:00.0	31.0	1258.925	31	1258.925412
Day	09:00:00	01:00:00.0	31.0	1258.925	31	1258.925412

Loading, HVAC, Veh. Move.	Source A	Source B	Source C	Total
	37	00:00:00		45.63904

100 Manabe + 200 Manabe	Source A	Source B	Source C	Total
	46	00:00:00		47.19339



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Peer Review

To: Matt Orbach, Principal Planner
CC: - - -
From: Phil Gleason and William Deeman
Date: March 15, 2023

Project: 100 Manabe Ow Road Warehouse Use Project

Subject: Final Peer Review of Applicant's Revised Noise Technical Memorandum

MIG, Inc. (MIG) has reviewed the revised Noise Technical Memorandum and response to comments letter for the proposed industrial project located at 100 Manabe Ow Road in the City of Watsonville (Placeworks 2023).

- All comments from MIG's peer review memorandum have been satisfactorily addressed in the revised report and response to comments document. MIG concurs with the revised report's findings that the proposed Project would not result in a significant noise or vibration impact.

References

The following references were used to prepare this memorandum:

MIG, Inc. 2022. *Peer Review of Applicant's Noise Technical Memorandum*. October 25, 2022.

Placeworks, 2023. *Ohlone Parkway West Warehouse Project, Watsonville, CA Noise Technical Memorandum*. March 10, 2023.

This peer review was performed by MIG under contract with the City of Watsonville. The comments provided herein reflect the expert opinion and independent judgment of the MIG review team.

Phil Gleason
Senior Environmental Analyst II

William Deeman
Environmental Analyst

Major Comments		
#	MIG Comment	Rincon Response
MAJ-1	The Project details, as described in the Memorandum, are inconsistent with the latest site plan. For example, whereas the Memorandum describes the Project as having 175,500 square feet of building space with 203 and 100 parking spaces for autos and truck trailers, respectively, the latest version of the site plan indicates the Project would have approximately 175,760 square feet of building space with 200 and 99 parking spaces for autos and truck trailers, respectively (Ware Malcomb 2022).	Revised.
MAJ-2	The Memorandum presents County of Santa Cruz noise standards; however, the proposed Project is located within the City of Watsonville and surrounded by other properties that are in the City of Watsonville. The County of Santa Cruz's noise standards are not applicable to the proposed Project. Recommendation MAJ-2: MIG recommends removing all references to the County of Santa Cruz's noise standards, as they are not applicable to the proposed Project, and revising the Memorandum such that the discussion focuses on Project consistency (or inconsistency) with City of Watsonville's noise standards. The Memorandum should include all applicable noise standards, including those contained in the Public Safety Element of the City's General Plan (e.g., Goal 12.8, Policy 12.M, and the noise compatibility guidelines) (Watsonville 1994). See also Comment MIN-1.	Revised.
MAJ-3	The second paragraph on page 3 of the Memorandum indicates that construction noise could be up to 68 dBA Lmax at nearby residences, which may pose a nuisance to affected receptors. The Memorandum does not, however, clearly identify a threshold to base recommended significance conclusions on.	The City has not established a quantified construction noise threshold and a quantified construction threshold was not used in the 200 Manabe Ow Distribution Facility IS/MND (City of Watsonville 2022). Construction noise is addressed qualitatively and mitigated through the use of feasible construction noise reduction measures.

	Recommendation MAJ-3: MIG recommends revising the Memorandum to clearly articulate what standard(s) Project construction noise is being compared to.	
MAJ-4	The first paragraph under “Traffic Noise” on page 5 of the Memorandum indicates that traffic data (i.e., average daily traffic (ADT) values) were obtained from Kimley-Horn. MIG notes that the Kimley-Horn Transportation Impact Study (TIS) was updated in September 2022, approximately 5 months after the preparation of the Memorandum. Recommendation MAJ-4: MIG recommends that the Memorandum preparer review the updated TIS and confirm the ADT values used in the Memorandum are consistent with the modeling results in the TIS. MIG notes that the updated TIS does not summarize ADT values like those that are presented in Table 1 of the Memorandum (Memorandum pg. 5).	Revised.
MAJ-5	The analysis contained in page 6 of the Memorandum discusses some stationary sources of noise associated with the project (e.g., truck-loading-bay operations). The Stationary Sources analysis does not contain, however, any reference or analysis of other, typical stationary sources of noise, such as heating, ventilation, and air conditioning (HVAC) equipment. Recommendation MAJ-5: The Memorandum should be revised to capture and analyze all operational noise sources associated with the Project.	HVAC analysis added.
MAJ-6	The Memorandum addresses operational noise levels from off-site traffic and on-site truck docking / operation. The Memorandum does not, however, include one detailed section that summarizes how the Project could change the ambient noise environment over the long-term. Recommendation MAJ-6: MIG recommends including an analysis of how all Project operations could change the ambient noise environment over the long-	Combined noise levels section added and a discussion of the change above existing ambient noise levels added.

	term. Sources such as the HVAC equipment (see Comment MAJ-5) should be included in this analysis. MIG recommends presenting the cumulative operational noise levels using the CNEL descriptor.	
MAJ-7	The land to the west of the Project site is also being proposed for development as a warehouse (i.e., at 200 Manabe Ow Road). The Memorandum does not, however, address how the Project's construction and operational noise levels could combine with those of the other project and what those combined noise levels mean for affected receptors. Recommendation MAJ-7: The Memorandum should be updated to address cumulative impacts.	A discussion of cumulative impacts was added which considers noise from the adjacent 200 Manabe Ow Road project.
Minor Comments		
#	MIG Comment	Rincon Response
MIN-1	The Memorandum does not include portions of the City's Municipal Code that may be applicable to the Project. For example, the Memorandum should consider whether Municipal Code Section 14-12.403 would be applicable to the proposed Project, and present other relevant portions of the Municipal Code (e.g., Municipal Code Section 5- 8.02(a) and 5-8.02(c)) (Watsonville, 2022a). Recommendation MIN-1: MIG recommends that the Memorandum be revised to identify potentially applicable portions of the City's Municipal Code, including Sections 5-8.02, 14- 12.403, and 14-12.513.	Revised.
MIN-2	Figure 1 on page 2 of the Memorandum presents the Project's location. The Project boundary, however, includes both 100 Manabe Ow Road (i.e., the Project site) and the adjacent property west of the site at 200 Manabe Ow Road. Recommendation MIN-2: MIG recommends updating Figure 1, so that the Project boundary only depicts the Project site.	Revised.

MIN-3	The second paragraph on page 3 of the Memorandum indicates that construction noise could be up to 68 dBA Lmax. While the Memorandum discusses that heavy equipment, such as a dozer or a loader, could generate short-term noise levels of 85 dBA at 50 feet, it is not clear what assumptions went into deriving the 68 dBA Lmax estimate. For example, what distance is this estimate based on? Does this estimate account for the operation of more than one piece of equipment at the Project site? MIG anticipates the 68 dBA Lmax estimate is based on the operation of one piece of equipment operating at the property boundary; however, this information should be disclosed in the Memorandum. Recommendation MIN-3: MIG recommends revising the Memorandum so that the assumptions on which Project noise level estimates are based on are more clearly described. It would also be beneficial for the Memorandum to incorporate the ambient noise measurements collected as part of the IS/MND for the 200 Manabe Ow Distribution Facility Project and compare Project noise levels against the existing ambient environment (Watsonville 2022b; pgs. 156 and 157 and Appendix E).	The Lmax noise level was based on one piece of equipment operating at the edge of the construction site, as described in the noise memo. An analysis of average construction noise levels was added and is based on 3 pieces of equipment operating at the center of the site.
MIN-4	The second paragraph on page 3 of the Memorandum indicates that construction noise could be up to 68 dBA Lmax at nearby residences. The memorandum then goes on to recommended noise reduction measures; however, these measures slightly differ from measures the City has applied to other projects, such as the 200 Manabe Ow Distribution Facility Project (Watsonville 2022b). Recommendation MIN-4: MIG recommends revising the recommended noise reduction measures to be consistent with other City CEQA documents.	Revised.
MIN-5	The first paragraph under "Traffic Noise" on page 5 of the Memorandum indicates that the FHWA Highway Traffic Noise	Since Caltrans is not the lead agency and the City has not established TNM as necessary for estimating traffic noise increases from local

	Prediction Model (FHWA-RD 77-108) was used to estimate traffic noise levels along roadway segments. The Memorandum does not describe if the National Reference Energy Mean Emission Levels were substituted with the California Vehicle Noise (Calveno) Emission Levels. It is also unclear why the Memorandum's analysis is based on the "108 Model" when the FHWA has released updated traffic noise models (TNM), such as TNM 2.5, TNM 3.0, and TNM 3.1. Recommendation MIN-5: MIG recommends revising the memorandum to explain why the 108 Model was utilized for the Project as opposed to a newer version of the FHWA TNM. If the 108 Model is retained for use, MIG recommends explaining if the model utilizes the Calveno Emission Levels.	projects, the use of the FHWA-RD 77-108 is appropriate for estimating Project traffic noise increases. No change was made aside from updating the modeling to include the latest traffic data from Kimley Horn 2023.
MIN-6	The off-site transportation noise level calculations contained in Appendix A (Memorandum PDF pgs. 19 through 23) include information on the number of autos, medium trucks, and heavy trucks per roadway segment modeled. It is unclear if these values were also obtained from Kimley-Horn or another source. Recommendation MIN-6: MIG recommends revising the Memorandum to clearly described where all modeling assumptions were obtained from / derived.	All traffic data was obtained from Kimley Horn. See Attachment B.