# Winchester Road and Newport Road Project

# Noise Impact Analysis

County of Riverside, CA

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Date: 8/30/2021
Revised 12/7/2021

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# *1.0 Introduction*

## 1.1 Purpose of Analysis and Study Objectives

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

The following is provided in this report:

- A description of the study area and the proposed project
- Information regarding the fundamentals of noise
- A description of the local noise guidelines and standards
- An analysis of traffic noise impacts from the project site
- An analysis of stationary noise impacts from the project site
- An analysis of construction noise impacts

## 1.2 Site Location and Study Area

The project site is located west of Winchester Road (SR-79) and south of Newport Road, in the County of Riverside, California, as shown in Exhibit A. The site's land use is currently classified as Commercial Retail (CR) Rural Commercial District. The project is surrounded by medium density residential uses to the west, with open space to the north and rural mountainous/medium density residential uses to the south and commercial tourist uses to the east.

## 1.3 Proposed Project Description

The project proposes to be developed with a 16 fueling-position, 6,380 square foot gas station/convenience market/car wash, a 40-space parking lot and 81,432 square feet of self-storage/mini-warehouse land use. The self-storage hours will be 9:30 am to 6:30 pm with customer access available via keypad from 5:00 pm to 10:00 pm. Exhibit B demonstrates the site plan for the project.

Construction activities within the Project area are expected to start no sooner than April 2022 and last approximately 11 months. Construction will consist of site preparation, grading, building, paving, and architectural coating.

## 1.4 Sensitive Receptors

The State of California defines sensitive receptors as those land uses that require serenity or are otherwise adversely affected by noise events or conditions. Schools, libraries, churches, hospitals, single and multiple-family residential, including transient lodging, motels and hotel uses make up the majority of these areas. Sensitive land uses that may be affected by project noise include the residential uses

located approximately 203 feet (62 meters) west of the project site. Other noise sensitive land uses are located further from the project site and would experience lower impacts.

## 1.5 Executive Summary of Findings

*Construction Impacts*

Modeled unmitigated construction noise levels could reach up to 68.3 dBA $L_{eq}$ at the façade of the nearest residential receptor located west of the project site, which would not exceed the FTA daytime noise threshold of 80 dBA $L_{eq}$ averaged over an 8-hour period ($L_{eq\ (8\text{-}hr)}$.

Proposed project construction is expected to comply with County of Riverside Ordinance 847 which limits the hours of operation for construction. Applicable noise thresholds would not be exceeded. Construction noise would not be significant. No mitigation is required; however, best practices to reduce construction-related noise emissions are presented in Section 8.3 of this report.

*Noise Impacts to Off-Site Receptors Due to Project Generated Trips*

Project generated vehicle noise along affected roadways was modeled utilizing a computer program that replicates the FHWA Traffic Noise Prediction Model FHWA-RD-77-108. Project generated vehicle trips are anticipated to increase noise levels between approximately 0.0 and 0.3 dB along roadways within the project vicinity, and would not result in significant increases in ambient noise levels. The impact would be less than significant. No mitigation is required.

*Noise Impacts to Off-Site Receptors Due to On-Site Operational Noise*

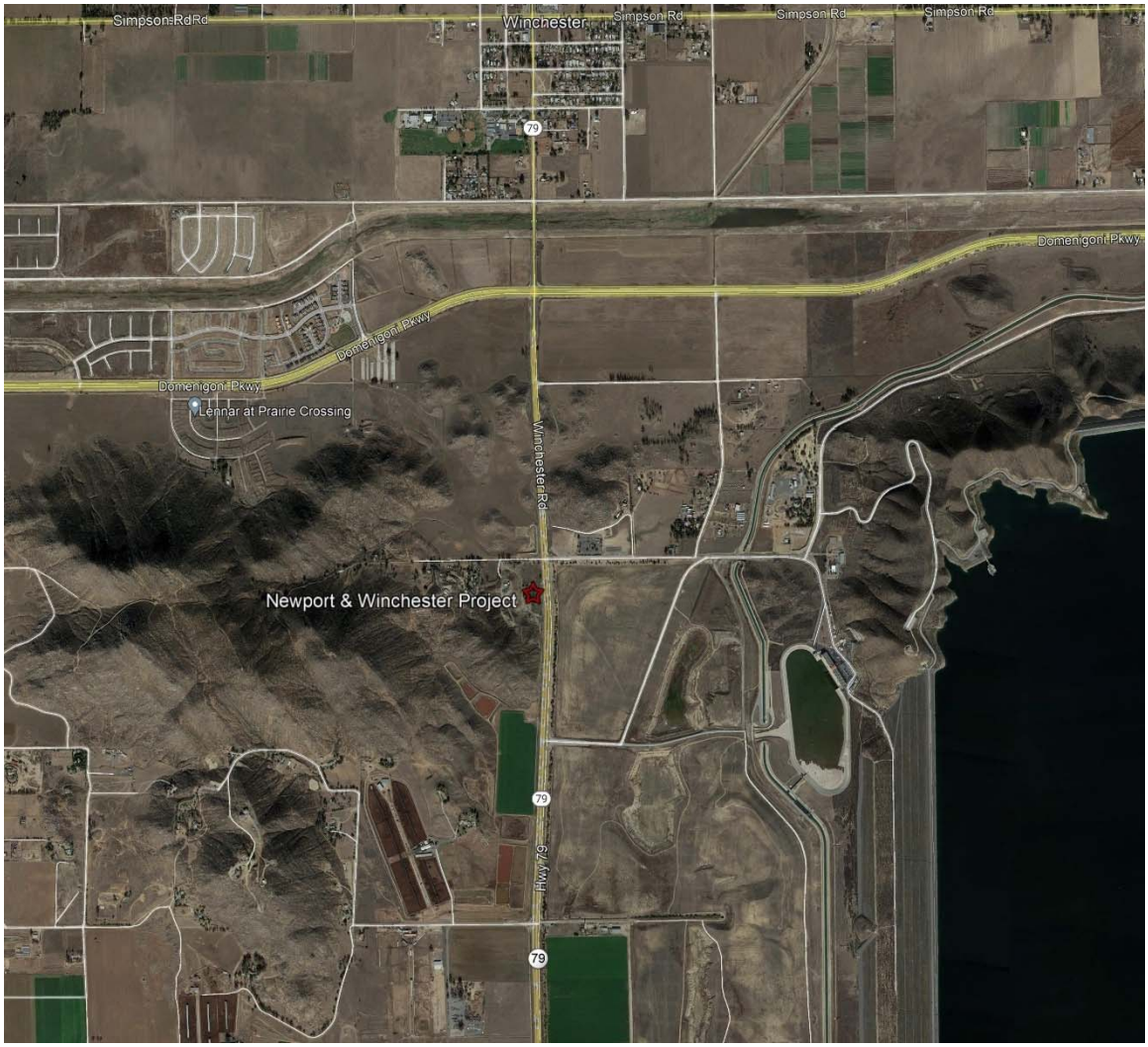
Operational noise levels at the nearest sensitive receptor are not expected to exceed the County's exterior daytime noise threshold of 65 dBA $L_{eq}$ nor the nighttime noise threshold of 45 dBA $L_{eq}$. Project operational noise levels would be considered less than significant. No mitigation is required.

*Groundborne Vibration Impacts*

Construction equipment is anticipated to be active at a distance of at least 203 feet or more from any sensitive receptor. Temporary vibration levels associated with project construction would not exceed architectural damage or annoyance standards and would therefore be less than significant. No mitigation is required.

*Airport-Related Impacts*

The closest airport to the project site is Hemet Ryan airport located approximately 5 miles northeast to the site. Therefore, the project will not be impacted by airport-related noise. No mitigation is required.

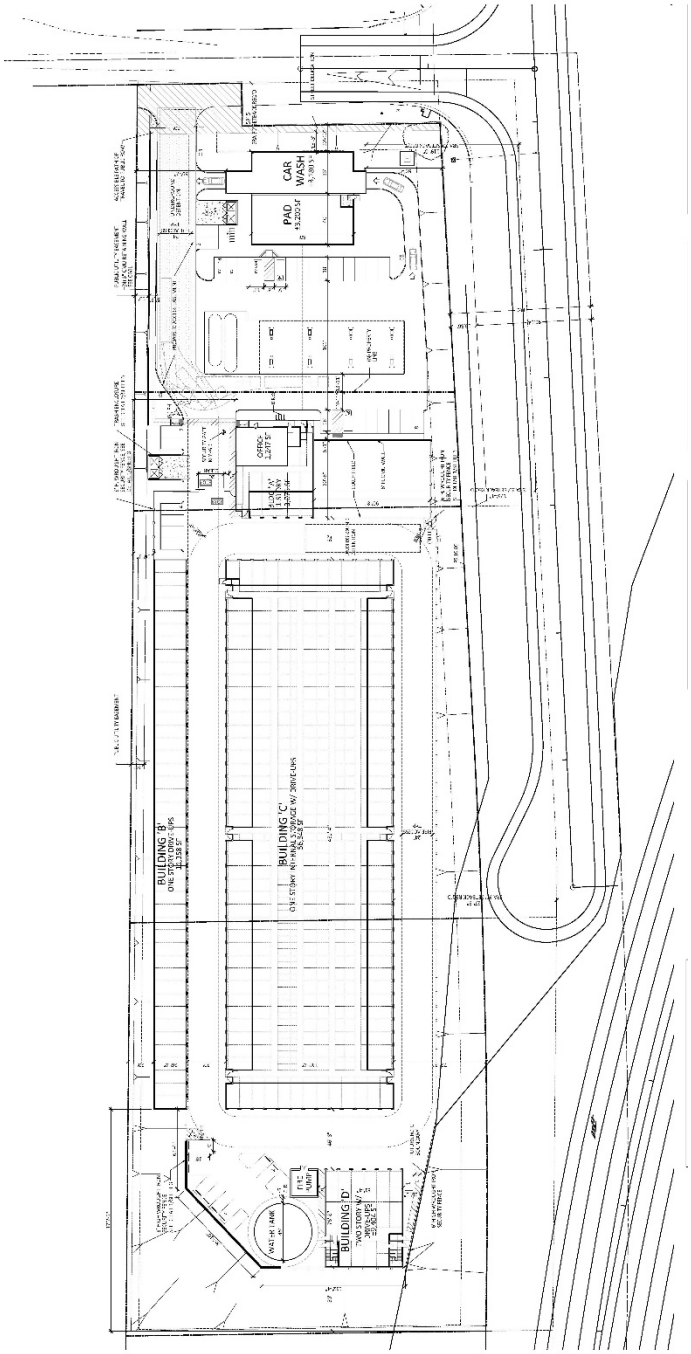




# Exhibit A
# Location Map

Winchester Road & Newport Road Project
Noise Analysis

Source: Google Earth, 2021




# Exhibit B
# Site Plan

Winchester Road & Newport Road Project
Noise Analysis

# *2.0 Fundamentals of Noise*

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

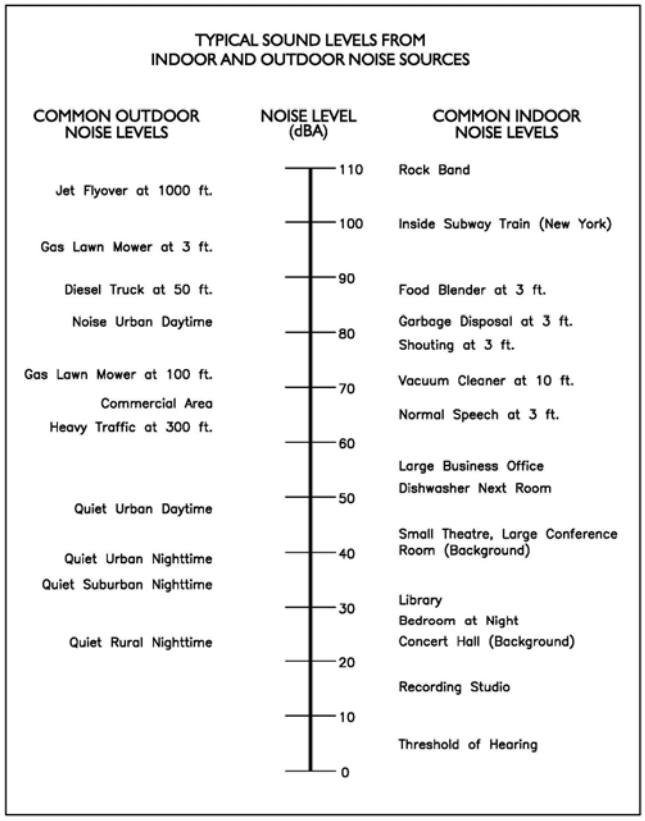
## 2.1 Sound, Noise and Acoustics

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

## 2.2 Frequency and Hertz

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

**Exhibit C: Typical A-Weighted Noise Levels**




## 2.3 Sound Pressure Levels and Decibels

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

## 2.4 Addition of Decibels

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

## 2.5 Human Response to Changes in Noise Levels

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

| Changes in Intensity Level, dBA | Changes in Apparent Loudness |
|---|---|
| 1 | Not perceptible |
| 3 | Just perceptible |
| 5 | Clearly noticeable |
| 10 | Twice (or half) as loud |

https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

## 2.6 Noise Descriptors

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

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

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

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

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

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

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

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

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

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

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

***Percent Noise Levels:*** See L(n).

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

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

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

## 2.7 Traffic Noise Prediction

Noise levels associated with traffic depends on a variety of factors: (1) volume of traffic, (2) speed of traffic, (3) auto, medium truck (2–3 axle) and heavy truck percentage (4 axle and greater), and sound propagation. The greater the volume of traffic, higher speeds and truck percentages equate to a louder

volume in noise. A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; reasons for this are discussed in the sections above.

## 2.8 Sound Propagation

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

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

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

# *3.0 Ground-Borne Vibration Fundamentals*

## 3.1 Vibration Descriptors

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

Several different methods are used to quantify vibration amplitude.

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

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

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

## 3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Outdoor sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration. To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts.

The background vibration velocity level in residential areas is usually around 50 VdB.[1] The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings, such as the operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible. According to the FTA, fragile buildings can be exposed to ground-borne vibration levels of 0.3 inches per second without experiencing structural damage.

[1] FTA, Transit Noise and Vibration Impact Assessment Manual, September 2018.

## 3.3 Vibration Perception

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

# *4.0 Regulatory Setting*

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

## 4.1 Federal Regulations

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

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

The Federal Office of Noise Abatement and Control (ONAC) originally was tasked with implementing the Noise Control Act. However, it was eventually eliminated leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) is responsible to regulate noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible to regulate noise from the interstate highway system. The Occupational Safety and Health Administration (OSHA) is responsible for the prohibition of excessive noise exposure to workers.

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

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

## 4.2 State Regulations

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

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

The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable. The County of Riverside have adopted their own version of this compatibility matrix, as illustrated in Exhibit D.

## 4.3 County of Riverside Noise Regulations

The County of Riverside outlines their noise regulations and standards within the Public Safety Element from the General Plan and the Noise Ordinance from the Municipal Code.

**County of Riverside General Plan**

Applicable policies and standards governing environmental noise in the County are set forth in the General Public Safety Element. The County has outlined goals, policies and actions to reduce potential noise impacts and are presented below:

**Goals, Policies, and Actions**

Policies, goals and actions from the Public Safety Element include the following.

Policy N 1.1: Protect noise-sensitive land uses from high levels of noise by restricting noise-producing land uses from these areas. If the noise-producing land use cannot be relocated, then noise buffers such as setbacks, landscaping, or block walls shall be used.

Policy N 1.5: Prevent and mitigate the adverse impacts of excessive noise exposure on the residents, employees, visitors, and noise-sensitive uses of Riverside County.

Policy N 1.6: Minimize noise spillover or encroachment from commercial and industrial land uses into adjoining residential neighborhoods or noise sensitive uses.

Policy N 2.3: Mitigate exterior and interior noises to the levels listed in Table 4, to the extent feasible, for stationary sources.

Policy N 4.1: Prohibit facility-related noise, received by any sensitive use, from exceeding the following worst-case noise levels:

a. 45 dBA-10-minute $L_{eq}$ between 10:00 PM and 7:00 AM [nighttime standard].

b. 65 dBA-10-minute $L_{eq}$ between 7:00 AM and 10:00 PM [daytime standard].

Policy N 4.3: Ensure any use determined to be a potential generator of significant stationary noise impacts be properly analyzed and ensure that the recommended mitigation measures are implemented.

## Exhibit D: Riverside County Land Use Compatibility Guidelines

Policy N 4.5: Encourage major stationary noise-generating sources throughout the County of Riverside to install additional noise buffering or reduction mechanisms within their facilities to reduce noise generation levels to the lowest extent practicable prior to the renewal of conditional use permits or business licenses or prior to the approval and/or issuance of new conditional use permits for said facilities.

Policy N 4.8: Require that the parking structures, terminals, and loading docks of commercial or industrial land uses be designed to minimize the potential noise impacts of vehicles on the site as well as on adjacent land uses.

Policy N 9.3: Require development that generates increased traffic and subsequent increases in the ambient noise level adjacent to noise-sensitive land uses to provide for appropriate mitigation measures.

Policy N 8.6: Require that all future exterior noise forecasts use Level of Service C, and be based on designed road capacity or 20-year projection of development (whichever is less) for future noise forecasts.

Policy N 13.1: Minimize the impacts of construction noise on adjacent uses within acceptable practices.

Policy N 13.2: Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse noise impacts on surrounding areas.

Policy N 13.3: Condition subdivision approval adjacent to developed/occupied noise-sensitive land uses (see policy N 1.3) by requiring the developer to submit a construction-related noise mitigation plan to the County for review and approval prior to issuance of a grading permit. The plan must depict the location of construction equipment and how the noise from this equipment will be mitigated during construction of this project, through the use of such methods as:

a. Temporary noise attenuation fences;
b. Preferential location of equipment; and
c. Use of current noise suppression technology and equipment.

Policy N 13.4: Require that all construction equipment utilizes noise reduction features (e.g., mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer.

Policy N 16.2: Consider the following land uses sensitive to vibration: hospitals, residential areas, concert halls, libraries, sensitive research operations, schools, and offices.

**Table 1*:* County of Riverside Stationary Source Land Use Noise Standards**

| Residentials Land Use | Interior Standards | Exterior Standards |
|---|---|---|
| 10:00 PM to 7:00 AM | 40 Leq (10 minute) | 45 Leq (10 minute) |
| 7:00 AM to 10:00 PM | 55 Leq (10 minute) | 65 Leq (10 minute) |

1. Source: County of Riverside General Plan Noise Element.
2. These are only preferred standards; final decision will be made by the Riverside County Planning Department and Office of Public Health.

**County of Riverside – Municipal Code**

Ordinance 847 exempts construction noise from County noise standards as long as long as it is limited to the hours of 6:00 AM to 6:00 PM during the months of June through September and between the hours of 6:00 AM and 7:00 PM during the months of October through May (Sec 2.i.1,2).

*Thresholds of Significance*

The California Environmental Quality Act Guidelines (Appendix G) establishes thresholds for noise impact analysis. This noise study includes analysis of noise and vibration impacts necessary to assess the project in light of the following Appendix G Checklist Thresholds.

*Would the project result in:*

*a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

*b) Generate excessive groundborne vibration or groundborne noise levels?*

*c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*

**Construction Noise** - Construction noise sources are regulated within the County of Riverside Ordinance 847 which prohibits construction activities other than between the hours of 6:00 AM to 6:00 PM during the months of June through September and between the hours of 7:00 AM and 6:00 PM during the months of October through May.

Although construction activity may be exempt from the noise standards in the County's Code, CEQA requires that potential noise impacts still be evaluated for significance.

The County of Riverside has not adopted a numerical threshold that identifies what a substantial increase would be. For purposes of this analysis, the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018) criteria will be used to establish significance thresholds. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction. For residential uses, the daytime noise threshold is 80 dBA $L_{eq}$ averaged over an 8-hour period ($L_{eq\ (8\text{-}hr)}$; and the nighttime noise threshold is 70 dBA $L_{eq\ (8\text{-}hr)}$. For commercial uses, the daytime and nighttime noise threshold is 85 dBA $L_{eq\ (8\text{-}hr)}$. In compliance with the County's Code, it is assumed that construction would not occur during the noise-sensitive nighttime hours.

**Traffic Noise** - For off-site project generated noise, increases in ambient noise along affected roadways due to project generated vehicle traffic is considered substantial if they result in an increase of at least 5 dBA CNEL and: (1) the existing noise levels already exceed the applicable land use compatibility standard for the affected sensitive receptors set forth in the Noise Element of the County's General Plan; or (2) the project increases noise levels by at least 5 dBA CNEL and raises the ambient noise level from below the applicable standard to above the applicable standard.

**Stationary Noise** - For on-site generated noise, Policy N 2.3 of the County of Riverside General Plan applies. This policy establishes that the project may not cause exterior noise levels at residential land uses to exceed 65 dBA Leq (10-minute) and interior noise levels to exceed 55 dBA Leq (10-minute) during the hours of 7:00 AM to 10:00 PM. Further, exterior noise levels may not exceed 45 dBA Leq (10-minute) and interior noise levels may not exceed 40 dBA Leq (10-minute) during the hours of 10:00 PM to 7:00 AM (see Table 1).

**Vibration** - The County currently does not have any adopted standards, guidelines, or thresholds relative to ground-borne vibration. Ground-borne noise refers to the noise generated by ground-borne vibration. Ground-borne noise that accompanies the building vibration is usually perceptible only inside buildings and typically is only an issue at locations with subway or tunnel operations where there is no airborne noise path or for buildings with substantial sound insulation such as a recording studio. As such, available guidelines from the California Department of Transportation (Caltrans) are utilized to assess impacts due to ground-borne vibration.

Caltrans has adopted vibration standards that are used to evaluate potential building damage impacts related to construction activities. As shown in Table 2, the threshold at which there is a risk to "architectural" damage to historic and some older buildings is a peak particle velocity (PPV) of 0.25 in/sec, at older residential structures a PPV of 0.3 in/sec, and at new residential structures and modern commercial/industrial buildings a PPV of 0.5 in/sec. In addition, Caltrans has adopted standards associated with human annoyance for groundborne vibration impacts. As shown in Table 3, vibration is considered to be strongly perceptible at a PPV of 0.1 in/sec.

Therefore, impacts would be significant if construction activities result in groundborne vibration of 0.3 PPV or higher at residential structures and/or a PPV of 0.5 or higher at commercial structures.

## Table 2: Guideline Vibration Damage Potential Threshold Criteria

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

Notes:
Source: California Department of Transportation. Transportation and Construction Vibration Guidance Manual, Chapter 7 Table 19, April 2020.

(1) Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

## Table 3: Guideline Vibration Annoyance Potential Criteria

| Human Response | Maximum PPV (in/sec) | |
|---|---|---|
| | Transient Sources | Continuous/Frequent Intermittent Sources |
| Barely perceptible | 0.04 | 0.01 |
| Distinctly perceptible | 0.25 | 0.04 |
| Strongly perceptible | 0.9 | 0.10 |
| Severe | 2.0 | 0.4 |

Notes:
Source: California Department of Transportation. Transportation and Construction Vibration Guidance Manual, Chapter 7 Table 20, April 2020.

(1) Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

# *5.0 Study Method and Procedure*

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

## 5.1 Noise Measurement Procedure and Criteria

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

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

KWAQN conducted the sound level measurements in accordance to Caltrans technical noise specifications. All measurements equipment meets American National Standards Institute (ANSI) specifications for sound level meters (11.16.020 identified in Chapter 11.16 Noise Control). The following gives a brief description of the Caltrans Technical Noise Supplement procedures for sound level measurements:

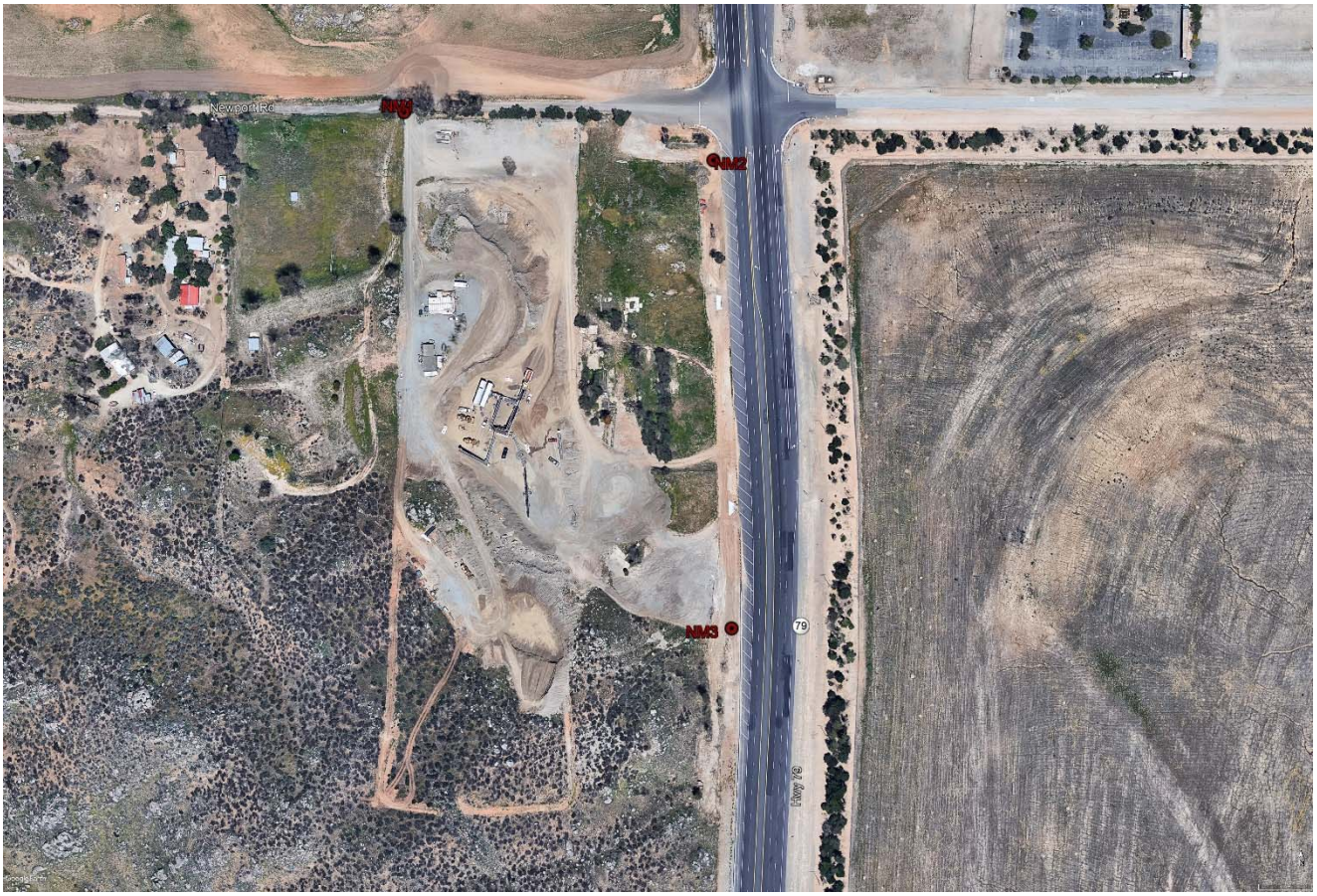
- Microphones for sound level meters were placed 5-feet above the ground for all measurements
- Sound level meters were calibrated (Larson Davis CAL 250) before and after each measurement
- Following the calibration of equipment, a wind screen was placed over the microphone
- Frequency weighting was set on “A” and slow response
- Results of the long-term noise measurements were recorded on field data sheets
- During any short-term noise measurements any noise contaminations such as barking dogs, local traffic, lawn mowers, or aircraft fly-overs were noted
- Temperature and sky conditions were observed and documented

## 5.2 Short-Term Noise Measurement Locations

The short-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient noise levels surrounding the Project Site. Both Caltrans and the Federal Transit Administration (FTA) recognize that it is not reasonable to collect noise level measurements that can fully represent any part of a private yard, patio, deck or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources. Further, FTA guidance states, it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community.

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before- and after-Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

Appendix A includes photos, field sheet, and measured noise data. Exhibit E (on the next page) illustrates the location of the short-term, ambient noise measurements.




# Exhibit E
# Measurement Locations

Winchester Road & Newport Road Project
Noise Analysis

## 5.3 FHWA Traffic Noise Prediction Model

Traffic noise impacts related to vehicular traffic were modeled using a version of the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA-RD-77-108), as modified for CNEL and the "Calveno" energy curves. Site-specific information is entered, such as roadway traffic volumes, roadway active width, source-to-receiver distances, travel speed, noise source and receiver heights, and the percentages of automobiles, medium trucks, and heavy trucks that the traffic is made up of throughout the day, amongst other variables.

The FHWA Traffic Noise Prediction Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Adjustments are then made to the REMEL to account for: total average daily traffic volumes, roadway classification, width, speed and truck mix, roadway grade and site conditions (hard or soft ground surface). All modeled roadways were assumed to have a "hard site" to predict worst-case, conservative noise levels. A hard site, such as pavement, is highly reflective and does not attenuate noise as quickly as grass or other soft sites. Any reductions in noise levels due to intervening topography and buildings were not accounted for in this analysis. The Riverside County traffic mix was used in the calculations (see Appendix B).

Existing and Existing Plus Project average daily traffic (ADT) were obtained from the Project-specific Traffic Impact Analysis (TIA) (Kunzman Associates, 2021). Roadway parameters utilized to model future traffic noise levels to the Project include location, traffic volume, speed and vehicle mix (autos, medium trucks, and heavy trucks). The various scenarios that are described above were modeled to determine project-specific increases in noise levels at an arbitrary distance of 50 feet from roadway centerline. The uniform distance allows for direct comparisons of potential increases or decreases in noise levels based upon various traffic scenarios; however, at this distance, no specific noise standard necessarily applies. Therefore, the change in a noise level between scenarios is the focus of this portion of the analysis, rather than the resulting independent noise level for any one segment.

## 5.4 FHWA Roadway Construction Noise Model

The construction noise analysis utilizes the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RNCM), together with several key construction parameters. Key inputs include distance to the sensitive receiver, equipment usage, percentage usage factor, and baseline parameters for the project site.

The project was analyzed based on the different construction phases. Construction noise is expected to be loudest during the site preparation and grading phases of construction. The construction noise calculation output worksheet is located in Appendix B.

# *6.0 Existing Noise Environment*

Three (3) short-term noise measurements were taken on July 22, 2021 between the hours of 11:50 am and 1:13 pm at, and around the site. See Exhibit E for noise measurement locations. Each noise measurement was performed over a 15-minute duration. The noise measurements were taken to determine the existing baseline noise conditions.

## 6.1 Short-Term Noise Measurement Results

The results of the short-term noise data are presented in Table 4.

**Table 4: Short-Term Noise Measurement Data (dBA leq)**

| Site Location | Time Started | Leq | Lmax | Lmin |
|---|---|---|---|---|
| NM1 | 11:50 AM | 50.5 | 71.6 | 38.3 |
| NM2 | 12:22 PM | 71.2 | 83.2 | 43.2 |
| NM3 | 12:58 PM | 70.5 | 80.8 | 37.7 |

Noise data indicates the average ambient noise levels ranged between 50.5 dBA to 71.24 dBA leq near and at the project site. Maximum levels reach 83.2 dBA at NM2. The quietest noise level measured 37.7 dBA at NM3. Additional field notes and photographs are provided in Appendix A. Per the field notes contained in Appendix A, the main sources of noise in the project vicinity are traffic along Winchester Road, Newport Road, and other surrounding roads Other noise sources include wild bird song, backyard birds (chickens/roosters), and occasional propeller/jet aircraft at altitude or helicopters. The ambient noise readings are anticipated to reflect typical conditions.

## 6.2 Existing Traffic Noise

The Existing traffic noise levels were modeled utilizing the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108 at an arbitrary distance of 50 feet from roadway centerline. The uniform distance allows for direct comparisons of potential increases or decreases in noise levels based upon various traffic scenarios; however, at this distance, no specific noise standard necessarily applies. Therefore, the change in a noise level between scenarios is the focus of this portion of the analysis, rather than the resulting independent noise level for any one segment. The modeling is theoretical and does not take into account any existing barriers, structures, and/or topographical features that may further reduce noise levels. Therefore, the levels are shown for comparative purposes only to show the difference in with and without project conditions. Roadway input parameters are based on average daily traffic volumes (ADTs), speeds, and vehicle distribution data.

Existing refers to existing year 2021 traffic noise conditions. The existing scenario is demonstrated in Table 5, Existing Traffic Noise. As shown in Table 5, existing traffic noise levels can reach up to 73.7 dBA CNEL at the segment of Domenigoni Parkway east of Winchester Road.

## Table 5, Existing Traffic Noise

| Road Segments | Existing | |
|---|---|---|
| | ADT | dB CNEL |
| **Route 74** | | |
| w/o Winchester Road | 29,500 | 72.4 |
| e/o Winchester Road | 33,500 | 73.0 |
| **Simpson Road** | | |
| w/o Winchester Road | 7,400 | 66.4 |
| e/o Winchester Road | 7,500 | 66.5 |
| **Domenigoni Parkway** | | |
| w/o Winchester Road | 26,500 | 71.9 |
| e/o Winchester Road | 40,200 | 73.7 |
| **Newport Road** | | |
| e/o Winchester Road | 200 | 50.7 |
| **Scott Road/Washington Street** | | |
| w/o Winchester Road | 8,300 | 66.9 |
| e/o Winchester Road | 7,000 | 66.2 |
| **Whisper Heights/Pourroy Road** | | |
| w/o Winchester Road | 1,300 | 58.8 |
| e/o Winchester Road | 7,000 | 66.2 |
| **Winchester Road** | | |
| n/o Route 74 | 1,300 | 58.8 |
| s/o Route 74 | 16,500 | 69.9 |
| n/o Simpson Road | 16,000 | 69.7 |
| s/o Simpson Road | 15,900 | 69.7 |
| s/o Domenigoni Pkwy | 31,800 | 72.7 |
| s/o Newport Road | 31,800 | 72.7 |
| n/o Scott Road | 33,500 | 73.0 |
| s/o Scott Road | 25,700 | 71.8 |
| n/o Whisper Heights | 28,500 | 72.2 |

# *7.0 Future Noise Environment Impacts and Mitigation*

This assessment analyzes future noise impacts to and from the project compares the results to the County's Noise Standards. The analysis details the estimated exterior noise levels associated with traffic from adjacent roadways and from on-site stationary noise sources.

As mentioned previously, for off-site project generated noise, increases in ambient noise along affected roadways due to project generated vehicle traffic is considered substantial if they result in an increase of at least 5 dBA CNEL and: (1) the existing noise levels already exceed the applicable land use compatibility standard for the affected sensitive receptors set forth in the Noise Element of the County's General Plan; or (2) the project increases noise levels by at least 5 dBA CNEL and raises the ambient noise level from below the applicable standard to above the applicable standard.

For on-site generated noise, Policy N 2.3 of the County of Riverside General Plan applies. This policy establishes that the project may not cause exterior noise levels at residential land uses to exceed 65 dBA Leq (10-minute) and interior noise levels to exceed 55 dBA Leq (10-minute) during the hours of 7:00 AM to 10:00 PM. Further, exterior noise levels may not exceed 45 dBA Leq (10-minute) and interior noise levels may not exceed 40 dBA Leq (10-minute) during the hours of 10:00 PM to 7:00 AM (see Table 1)

## 7.1 Future Exterior Noise

The following outlines the exterior noise levels associated with the proposed project.

### 7.1.1 Noise Impacts to Off-Site Receptors Due to Project-Generated Traffic

Existing (without project for year 2021) and Existing Plus Project (2023) with project noise conditions. For comparison purposes, both scenarios are demonstrated in Table 5, Project Traffic Noise Contributions to Opening Year (2022) Scenario.

**Table 5: Project Traffic Noise Contributions to Existing Scenario**

| Road Segments | Existing | | Existing Plus Project | | | Is the Increase Significant? |
|---|---|---|---|---|---|---|
| | ADT | dB CNEL | ADT | Total | Project-Specific Increase | |
| **Route 74** | | | | | | |
| w/o Winchester Road | 29,500 | 72.4 | 29,900 | 72.5 | 0.1 | **No** |
| e/o Winchester Road | 33,500 | 73.0 | 33,800 | 73.0 | 0.0 | **No** |
| **Simpson Road** | | | | | | |
| w/o Winchester Road | 7,400 | 66.4 | 7,700 | 66.6 | 0.2 | **No** |
| e/o Winchester Road | 7,500 | 66.5 | 7,600 | 66.5 | 0.0 | **No** |
| **Domenigoni Parkway** | | | | | | |
| w/o Winchester Road | 26,500 | 71.9 | 26,800 | 72.0 | 0.1 | **No** |
| e/o Winchester Road | 40,200 | 73.7 | 40,500 | 73.8 | 0.1 | **No** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Newport Road** | | | | | | |
| e/o Winchester Road | 200 | 50.7 | 200 | 50.7 | 0.0 | **No** |
| **Scott Road/Washington Street** | | | | | | |
| w/o Winchester Road | 8,300 | 66.9 | 8,400 | 66.9 | 0.0 | **No** |
| e/o Winchester Road | 7,000 | 66.2 | 7,100 | 66.2 | 0.0 | **No** |
| **Whisper Heights/Pourroy Road** | | | | | | |
| w/o Winchester Road | 1,300 | 58.8 | 1,300 | 58.8 | 0.0 | **No** |
| e/o Winchester Road | 7,000 | 66.2 | 7,400 | 66.4 | 0.2 | **No** |
| **Winchester Road** | | | | | | |
| n/o Route 74 | 1,300 | 58.8 | 1,300 | 58.8 | 0.0 | **No** |
| s/o Route 74 | 16,500 | 69.9 | 17,200 | 70.1 | 0.2 | **No** |
| n/o Simpson Road | 16,000 | 69.7 | 16,700 | 69.9 | 0.2 | **No** |
| s/o Simpson Road | 15,900 | 69.7 | 17,000 | 70.0 | 0.3 | **No** |
| s/o Domenigoni Pkwy | 31,800 | 72.7 | 33,500 | 73.0 | 0.3 | **No** |
| s/o Newport Road | 31,800 | 72.7 | 32,900 | 72.9 | 0.2 | **No** |
| n/o Scott Road | 33,500 | 73.0 | 34,600 | 73.1 | 0.1 | **No** |
| s/o Scott Road | 25,700 | 71.8 | 26,500 | 71.9 | 0.1 | **No** |
| n/o Whisper Heights | 28,500 | 72.2 | 29,300 | 72.4 | 0.2 | **No** |

*The uniform distance of 50 feet from centerline allows for direct comparisons of potential increases or decreases in noise levels based upon various traffic scenarios; however, at this distance, no specific noise standard necessarily applies

The calculated noise levels in Table 5 shows that the project would contribute a maximum increase of 0.3 dBA to the road segments of Winchester Road south of Simpson Road and south of Domenigoni Parkway. As the project-related increase in traffic noise would not exceed 5 dBA, the project would not contribute to a substantial permanent increase in ambient noise levels in the project vicinity. Impacts from project-related traffic noise are considered to be less than significant.

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

As stated previously, sensitive receptors that may be affected by project operational noise include the residential uses located approximately 203 feet (62 meters) west of the project site. Other noise sensitive land uses are located further from the project site and would experience lower impacts.

*Parking Noise*

Traffic in parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 44 to 63 dBA at a distance of 50 feet[2] and may be an annoyance to adjacent noise-sensitive receptors. Conversations in

[2] Source: Gordon Bricken & Associates, 1996. Estimates are based on actual noise measurements taken at various parking lots.

parking areas may also be an annoyance to adjacent sensitive receptors. Sound levels of speech typically range from 33 dBA at 50 feet for normal speech to 50 dBA at 50 feet for very loud speech. It should be noted that parking lot noises are instantaneous noise levels compared to noise standards in the hourly Leq metric, which are averaged over the entire duration of a time period.

Actual noise levels over time resulting from parking lot activities would be far lower than the reference levels identified above. Parking lot noise would occur at the few parking spaces for the storage facility (located approximately 250 feet from the closest receptor to the west of the site) and at the small parking lot adjacent to the convenience mart/gas station (located approximately 385 feet[3] from the closest receptor to the west of the site). At these distances, the noise levels from parking lot activities would be approximately 49 dBA and 45 dBA respectively; not accounting for any attenuation from vegetation or barriers (such as fences or retaining walls). Furthermore, the closest receptor is elevated approximately 45 feet above the level of the proposed parking lot area and the edge of the berm that the receptor is located on will partially block the line-of-sight between the proposed parking area and the receptor. Parking lot noise would be intermittent in nature, consistent with the existing noise in the vicinity of the closest receptor (50.5 dB Leq and 71.6 dB Lmax) and would also be partially masked by background noise from traffic along Newport Road and Winchester Road. Access to the storage facility will be from 9:30 am to 6:30 pm, with customer access available from 5:00 pm to 10:00 pm via a coded keypad, so there would not be any nighttime activities at the closest parking lot location. Noise associated with parking lot activities is not anticipated to exceed the County's residential daytime noise standard of 65 dBA hourly leq, 45 dBA hourly Leq at night, at the closest receptor location during operation. Therefore, noise impacts from parking lots would be less than significant.

*Stationary Noise Sources*

Rooftop Heating, Ventilation, And Air Conditioning (HVAC)

As part of the Project, it is anticipated that new HVAC units would be installed. This equipment typically has noise shielding cabinets, is placed on the roof or within mechanical equipment rooms and is not usually a significant source of noise.

In order to determine the noise created by a rooftop heating, ventilation, and air conditioning (HVAC) unit, a reference noise measurement of 59.5 dBA Leq at 10 feet was utilized.[4] The closest sensitive receptor is located west of the site, approximately 220 feet from the closest on-site building. At that distance, the noise level from an HVAC unit would be approximately 32.7 dBA. Therefore, as the noise level would not exceed either the Riverside County daytime (65 dBA) or nighttime (45 dBA) residential noise standards. Impacts are considered to be less than significant and no mitigation is required.

[3] Measured from the middle of the parking lot.
[4] Michael Brandman Associates, Noise Impact Analysis Majestic Chino Gateway Project, January 23, 2013.

Carwash

Per the project site plan (dated 05.02.21), other than the entrance and exit ways, the car wash will be completely enclosed. No specifics were available on the type of equipment proposed for the car wash-portion of the project. Therefore, reference noise levels were used to estimate the operational noise levels at the closest receptor location. The car wash drying system is by far the loudest noise source associated with the car wash tunnel and would be located closest to the exit way to the carwash. Although the exact type of equipment to be used is unknown, as the tenant is unknown at this time, the equipment is anticipated to be similar in design and noise level to that commonly used at many express car wash facilities and the blower is anticipated to generate a noise level of approximately 75 dBA at a distance of 10 feet from the blowers.[5] The closest sensitive receptor, the residential use to the west of the site, is located approximately 360 feet from the exit tunnel of the carwash. At this distance, the noise level from the blowers would be approximately 43.9 dBA. Therefore, the noise generated by the intermittent use of the carwash by patrons will not exceed the 65 dBA Leq daytime or 45 dBA leq nighttime thresholds at the closest receptor location.

## 7.2 Mitigation Measures

No mitigation measures are required.

# *8.0 Construction Noise Impacts*

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

## 8.1 Construction Noise

The Environmental Protection Agency (EPA) has compiled data regarding the noise generated characteristics of typical construction activities. The data is presented in Table 6.

[5] Source: Totally Tommy Blower System Noise Study. https://assets.lawrenceks.org/agendas/cc/2018/03-20-18/pl_sup-17-00690_noise_study.pdf

**Table 6: Typical Construction Noise Levels[1]**

**Equipment Powered by Internal Combustion Engines**

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

**Impact Equipment**

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

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

Construction noise is considered a short-term impact and would be considered significant if construction activities are taken outside the allowable times as described in the County of Riverside Ordinance 847, which prohibits construction activities other than between the hours of 6:00 AM to 6:00 PM during the months of June through September and between the hours of 6:00 AM and 7:00 PM during the months of October through May. Construction noise will have a temporary or periodic increase in the ambient noise level above the existing within the project vicinity. Furthermore, noise reduction measures are provided in Section 8.3 of this report to further reduce construction noise. The impact is considered less than significant; however, in the interest of disclosure and completeness, construction noise level projections at the closest sensitive receptor located west of site are provided below.

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels will be loudest during the site preparation phase. A likely worst-case construction noise scenario during site preparation assumes the use of three (3) rubber-tired dozers and four (4) tractor/loader/backhoes

operating at an average of 360 feet from the façade of nearest sensitive receptor.[6] Construction noise associated with the project was calculated utilizing methodology presented in the FTA Transit Noise and Vibration Impact Assessment Manual (2018) together with several key construction parameters including: distance to each sensitive receiver, equipment usage, percent usage factor, and baseline parameters for the project site. Distances to receptors were based on the acoustical center of the proposed construction activity. Construction noise levels were calculated for each phase. To be conservative, the noise generated by each piece of equipment was added together for each phase of construction; however, it is unlikely (and unrealistic) that every piece of equipment will be used at the same time, at the same distance from the receptor, for each phase of construction.

Assuming a usage factor of 40 percent for each of the rubber-tired dozers and tractor/loader/backhoes, unmitigated noise levels at 360 feet have the potential to reach 68.3 dBA $L_{eq}$ at the nearest sensitive receptors during site preparation. Noise levels for the other construction phases would be lower and range between 56.9 to 67.8 dBA Leq (please see the worksheet in Appendix B). As the highest construction noise level does not exceed the FTA threshold of 80 dBA Leq for an 8-hour period at the closest residential use, and will not occur outside of permissible hours; impacts from construction-related noise are less than significant.

## 8.2 Construction Vibration

Construction activities can produce vibration that may be felt by adjacent land uses. The primary effect of perceptible vibration is often a concern. However, secondary effects, such as the rattling of a china cabinet, can also occur, even when vibration levels are well below perception. Any effect (primary perceptible vibration, secondary effects, or a combination of the two) can lead to annoyance. The degree to which a person is annoyed depends on the activity in which they are participating at the time of the disturbance. For example, someone sleeping or reading will be more sensitive than someone who is running on a treadmill. Reoccurring primary and secondary vibration effects often lead people to believe that the vibration is damaging their home, although vibration levels are well below minimum thresholds for damage potential. (California Department of Transportation, 2020).

The construction of the proposed project would not require the use of equipment such as pile drivers, which are known to generate substantial construction vibration levels.

Table 7 (below) gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions. The primary vibration source during construction would be from a vibratory roller and a bull dozer. A vibratory roller has a vibration impact of 0.21 inches per second peak particle velocity (PPV) at 25 feet which is perceptible, but below any risk to architectural damage. A large bull dozer has a vibration impact of 0.089 inches per second peak

[6] Construction noise projected from the center of the project site to the structural façade of the nearest sensitive use.

particle velocity (PPV) at 25 feet which is also perceptible, but also below any risk to architectural damage.

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

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

*Where: $PPV_{ref}$ = reference PPV at 100ft.*
*$D_{rec}$ = distance from equipment to receiver in ft.*
*n = 1.5 (the value related to the attenuation rate through ground)*

**Table 7: Vibration Source Levels for Construction Equipment[1]**

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

[1] Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration. September, 2018.

The thresholds from the Caltrans Transportation and Construction Vibration Guidance Manual, shown previously in Table 2, provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts. Table 3 identifies a PPV level of 0.3 in/sec as the threshold at which there is a risk of "architectural" damage to older residential buildings and a PPV level of 0.5 in/sec to commercial buildings.
At a distance of approximately 203 feet to the closest building façade, a residential use (manufactured home) west of the site, a vibratory roller would yield a worst-case vibration level of 0.009 PPV (in/sec), which is well below the threshold of 0.3 PPV (in/sec) for any risk of damage.

As shown in Table 3, vibration becomes strongly perceptible to sensitive receptors at a level of 0.1 in/sec PPV. The closest building to the project site is the residential use located 203 feet to the west of the project property line. As construction vibration would be at a level of approximately 0.009 PPV (in/sec)

at the closest receptor, impacts from vibration-related annoyance would be less than significant. Vibration worksheets are provided in Appendix B.

Therefore, the impact from construction-related vibration is considered to be less than significant and no mitigation is required.

## 8.3 Construction Noise Reduction Measures

Construction operations must follow the County's General Plan and the Noise Ordinance, which states that construction, repair or excavation work performed must occur within the permissible hours. To further ensure that construction activities do not disrupt the adjacent land uses, the following measures should be taken:

1. Construction should occur during the permissible hours as defined in County of Riverside Ordinance 847.

2. During construction, the contactor shall ensure all construction equipment is equipped with appropriate noise attenuating devices.

3. The contractor should locate equipment staging areas that will create the greatest distance between construction-related noise/vibration sources and sensitive receptors nearest the project site during all project construction.

4. Idling equipment should be turned off when not in use.

5. Equipment shall be maintained so that vehicles and their loads are secured from rattling and banging.

## 8.4 Airport Noise

This impact discussion analyzes the potential for nearby airports or private airstrips to expose people residing or working in the project area to excessive noise levels.

The nearest airport is Hemet Ryan airport, located approximately 5 miles northeast of the project site. The project site falls well outside the 65 dBA noise contour[7] and is not considered as a source that contributes to the ambient noise levels on the project site. Impacts are considered to be less than significant.

[7]Source: http://www.rcaluc.org/Portals/13/16%20-%20Vol.%201%20Hemet-Ryan%202017%20Final.pdf?ver=2017-03-21-131317-620

# *9.0 References*

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Kunzman Associates, Diamon Traffic Impact Analysis, August 12, 2021

U.S. Department of Transportation. 2006. FHWA Roadway Construction Noise Model User's Guide. January.

# Appendix A:

Field Measurement Data

**KWAQN**

**Office**
7404 Kingsley Way,
Riverside, CA

# 15-Minute Noise Measurement Datasheet

**Project:** SWC Winchester Rd & Newport Rd, Winchester.
**Site Address/Location:** 30093 Winchester Rd, Winchester, CA 92596
**Date:** 7/22/2021
**Field Tech/Engineer:** Ian Edward Gallagher

**General Location:** 30093 Winchester Rd, Winchester, CA 92596
**Sound Meter:** Larson Davis Sound Track LxT2 **SN:** 1152
**Settings:** A-weighted, slow, 1-min, 15-minute interval
**Meteorological Con.:** 90 deg F, 10 mph wind, 32% humidity, <25% cloud, filtered sunshine.
**Site ID:** NM-1 2 & 3

**Site Observations:** Main noise sources are from vehicular traffic travelling along Winchester Rd, Newport Rd & other surrounding roads . Rural site area & surroundings, open, somewhat rocky land with vegetation, grasses & trees. Other noise sources include bird song, distant ravens. Occasional propeller/jet aircraft at altitude or chopper. Some resedential ambiance from low density ranch style residences, chicken run, hens & cockerel crowing. Leaf rustle due to 10 mph breeze.

**Site Topo:** Ruralscape, residential /open land w/ large constructed lake 1 mile E .
**Ground Type:** Rural site conditions, acoustically refractive, absorptive & reflective.

**NM locations, lat , long :**

NM1 Meter: 33°41'7.60"N 117° 5'11.45"W
NM2 Meter: 33°41'6.72"N 117° 5'4.67"W
NM3 Meter: 33°40'57.85"N 117° 5'4.40"W

**Figure 1: Monitoring Locations**

**KWAQN**

**Office**
7404 Kingsley Way,
Riverside, CA

## 15-Minute Noise Measurement Datasheet - Cont.

**Project:** SWC Winchester Rd & Newport Rd, Winchester.
**Site Address/Location:** 30093 Winchester Rd, Winchester, CA 92596
**Site ID:** NM-1 2 & 3

**Figure 2: NM1 Photo**

NM1 looking SSE from Newport Rd down driveway to residence 32901 Newport Rd, Winchester on the left & entry way to property 32855 Newport Rd, Winchester on the right. A total of 2 vehicles passed microphone, travelling along Newport Rd ( dirt road ) during 15 minute noise measurement.

**Figure 3: NM2 Photo**


NM2 looking NE across Winchester Rd & Newport Rd intersection. A total of 432 vehicles passed microphone travelling along Winchester Rd during 15 minute noise measuremnt.

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7404 Kingsley Way,
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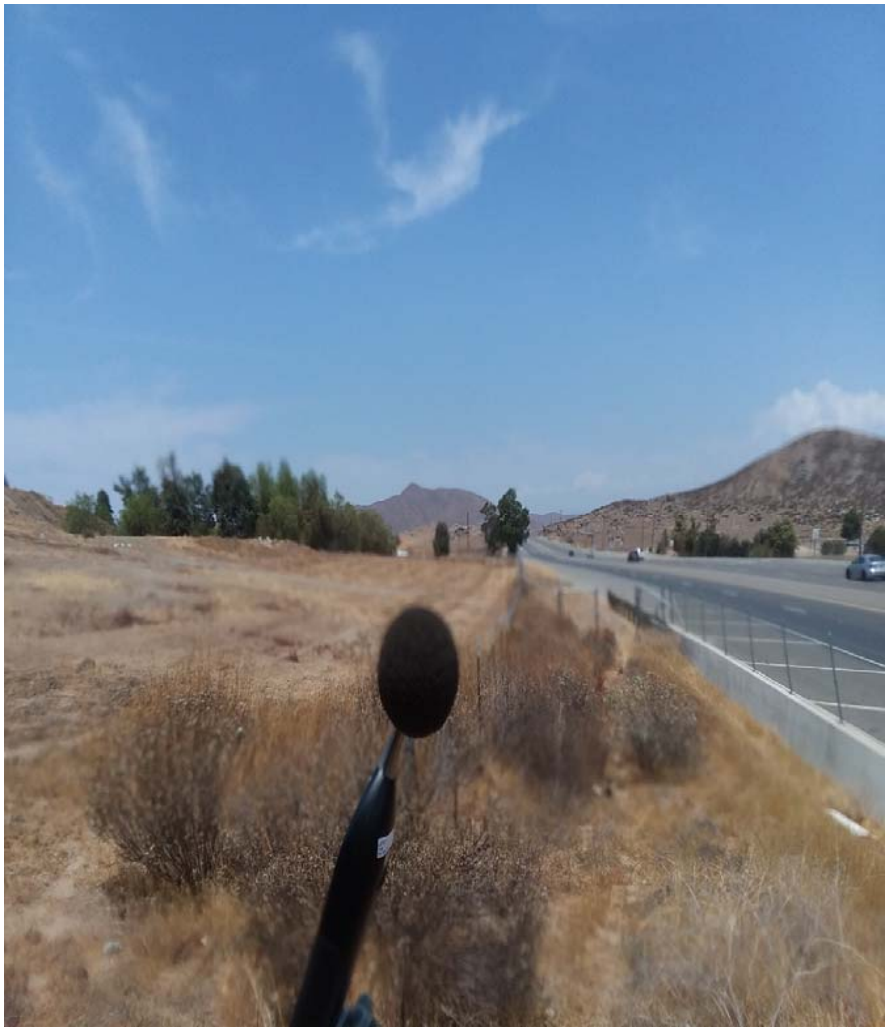
## 15-Minute Noise Measurement Datasheet - Cont.

**Project:** SWC Winchester Rd & Newport Rd, Winchester.
**Site Address/Location:** 30093 Winchester Rd, Winchester, CA 92596
**Site ID:** NM-1 2 & 3

**Figure 4: NM3 Photo looking East**

**NM3 looking ESE across Winchester Rd towards one of the dams to the Diamond Valley Lake ( 1 mile ). A total 0f 391 vehicles passed microphone travelling along Winchester Rd during 15 minute noise measuremnt.**

**Figure 5: NM3 Photo looking North**



**NM3 looking North up Winchester Rd towards Newport Rd intersection ( 300 yards ).**

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## 15-Minute Noise Measurement Datasheet - Cont.

**Project:** SWC Winchester Rd & Newport Rd, Winchester.
**Site Address/Location:** 30093 Winchester Rd, Winchester, CA 92596
**Site ID:** NM-1 2 & 3

**Table 1: Noise Measurement Summary**

| Location | Start | Stop | Leq/ dB | Lmax/ dB | Lmin/ dB | L2/ dB | L8/ dB | L25/ dB | L50/ dB | L90/ dB |
|---|---|---|---|---|---|---|---|---|---|---|
| NM 1 | 11:50 AM | 12:05 PM | 50.5 | 71.6 | 38.3 | 55.5 | 52.0 | 49.6 | 47.0 | 42.9 |
| NM 2 | 12:22 PM | 12:37 PM | 71.2 | 83.2 | 43.2 | 78.3 | 75.5 | 72.6 | 68.6 | 57.3 |
| NM 3 | 12:58 PM | 1:13 PM | 70.5 | 80.8 | 37.7 | 76.8 | 74.3 | 71.9 | 69.2 | 52.2 |

# Appendix B:

Construction Noise, Vibration and FHWA Traffic Noise Calculation Worksheets

## Construction Noise by Phase - Receptor West of the Project Site (NM1)

| A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|
| Equipment Type | # of Equipment | Equipment Lmax at 50 feet, dBA[1, 2] | Distance to Receptor[3] | Equipment Usage Percent | Usage Factor | Dist. Correction dB | Usage Adj. dB | Noise Level Leq (dBA) at Receptor |
| **Site Preparation** | | | | | | | | |
| Rubber Tired Dozers | 3 | 82 | 360 | 40 | 1.20 | -17.1 | 0.8 | 65.6 |
| Tractors/Loaders/Backhoes | 4 | 80 | 360 | 40 | 1.60 | -17.1 | 2.0 | 64.9 |
| | | | | | | | Log Sum | 68.3 |
| **Grading** | | | | | | | | |
| Excavators | 1 | 81 | 360 | 40 | 0.40 | -17.1 | -4.0 | 59.9 |
| Graders | 1 | 85 | 360 | 40 | 0.40 | -17.1 | -4.0 | 63.9 |
| Rubber Tired Dozers | 1 | 82 | 360 | 40 | 0.40 | -17.1 | -4.0 | 60.9 |
| Tractors/Loaders/Backhoes | 3 | 80 | 360 | 25 | 0.75 | -17.1 | -1.2 | 61.6 |
| | | | | | | | Log Sum | 67.8 |
| **Building Construction** | | | | | | | | |
| Cranes | 1 | 81 | 360 | 16 | 0.16 | -17.1 | -8.0 | 55.9 |
| Forklifts[3] | 3 | 64 | 360 | 50 | 1.50 | -17.1 | 1.8 | 48.6 |
| Generator Sets | 1 | 81 | 360 | 40 | 0.40 | -17.1 | -4.0 | 59.9 |
| Welders | 1 | 73 | 360 | 40 | 0.40 | -17.1 | -4.0 | 51.9 |
| Tractors/Loaders/Backhoes | 3 | 80 | 360 | 25 | 0.75 | -17.1 | -1.2 | 61.6 |
| | | | | | | | Log Sum | 64.8 |
| **Paving** | | | | | | | | |
| Pavers | 2 | 77 | 360 | 50 | 1.00 | -17.1 | 0.0 | 59.9 |
| Paving Equipment | 2 | 85 | 360 | 20 | 0.40 | -17.1 | -4.0 | 63.9 |
| Rollers | 2 | 80 | 360 | 20 | 0.40 | -17.1 | -4.0 | 58.9 |
| | | | | | | | Log Sum | 66.2 |
| **Architectural Coating** | | | | | | | | |
| Air Compressors | 1 | 78 | 360 | 40 | 0.40 | -17.1 | -4.0 | 56.9 |
| | | | | | | | Log Sum | 56.9 |

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018).

(2) Source: https://www.google.com/url?q=http://www.noisetesting.info/blog/warehouse-forklift-workplace-noise-levels/&sa=D&source=hangouts&ust=1545259247311000&usg=AFQjCNHFcKKoEKUjv5VZMOtw_KO977Em1A

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to the structural façade of the nearest sensitive use.

| GROUNDBORNE VIBRATION ANALYSIS | | | |
|---|---|---|---|
| Project: | Winchester & Newport | | Date: 8/30/21 |
| Source: | Roller | | |
| Scenario: | Unmitigated | | |
| Location: | Project Site | | |
| Address: | Residential use 203 feet west | | |
| PPV = PPVref(25/D)^n (in/sec) | | | |
| **INPUT** | | | |
| Equipment = Type | 1 | Vibratory Roller | INPUT SECTION IN GREEN |
| PPVref = | 0.21 | Reference PPV (in/sec) at 25 ft. | |
| D = | 203.00 | Distance from Equipment to Receiver (ft) | |
| n = | 1.50 | Vibration attenuation rate through the ground | |
| Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2013, pgs 35-40. | | | |
| **RESULTS** | | | |
| PPV = | 0.009 | IN/SEC | OUTPUT IN BLUE |

## GROUNDBORNE VIBRATION ANALYSIS

| | | | |
|---|---|---|---|
| Project: | Winchester & Newport | Date: | 8/30/21 |
| Source: | Large Bulldozer | | |
| Scenario: | Unmitigated | | |
| Location: | Project Site | | |
| Address: | Residential use 203 feet west | | |

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

### INPUT

| | | | |
|---|---|---|---|
| Equipment = Type | 2 | Large Bulldozer | INPUT SECTION IN GREEN |
| PPVref = | 0.089 | Reference PPV (in/sec) at 25 ft. | |
| D = | 203.00 | Distance from Equipment to Receiver (ft) | |
| n = | 1.50 | Vibration attenuation rate through the ground | |

Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2013, pgs 35-40.

### RESULTS

| | | | |
|---|---|---|---|
| PPV = | 0.004 | IN/SEC | OUTPUT IN BLUE |

## Project Traffic Noise Contributions to Existing Scenario

| Road Segments | Existing | | Existing Plus Project | | | Is the Increase Significant? |
|---|---|---|---|---|---|---|
| | ADT | dB CNEL | ADT | Total | Project-Specific Increase | |
| **Route 74** | | | | | | |
| w/o Winchester Road | 29,500 | 72.4 | 29,900 | 72.5 | 0.1 | **No** |
| e/o Winchester Road | 33,500 | 73.0 | 33,800 | 73.0 | 0.0 | **No** |
| **Simpson Road** | | | | | | |
| w/o Winchester Road | 7,400 | 66.4 | 7,700 | 66.6 | 0.2 | **No** |
| e/o Winchester Road | 7,500 | 66.5 | 7,600 | 66.5 | 0.0 | **No** |
| **Domenigoni Parkway** | | | | | | |
| w/o Winchester Road | 26,500 | 71.9 | 26,800 | 72.0 | 0.1 | **No** |
| e/o Winchester Road | 40,200 | 73.7 | 40,500 | 73.8 | 0.1 | **No** |
| **Newport Road** | | | | | | |
| e/o Winchester Road | 200 | 50.7 | 200 | 50.7 | 0.0 | **No** |
| **Scott Road/Washington Street** | | | | | | |
| w/o Winchester Road | 8,300 | 66.9 | 8,400 | 66.9 | 0.0 | **No** |
| e/o Winchester Road | 7,000 | 66.2 | 7,100 | 66.2 | 0.0 | **No** |
| **Whisper Heights/Pourroy Road** | | | | | | |
| w/o Winchester Road | 1,300 | 58.8 | 1,300 | 58.8 | 0.0 | **No** |
| e/o Winchester Road | 7,000 | 66.2 | 7,400 | 66.4 | 0.2 | **No** |
| **Winchester Road** | | | | | | |
| n/o Route 74 | 1,300 | 58.8 | 1,300 | 58.8 | 0.0 | **No** |
| s/o Route 74 | 16,500 | 69.9 | 17,200 | 70.1 | 0.2 | **No** |
| n/o Simpson Road | 16,000 | 69.7 | 16,700 | 69.9 | 0.2 | **No** |
| s/o Simpson Road | 15,900 | 69.7 | 17,000 | 70.0 | 0.3 | **No** |
| s/o Domenigoni Pkwy | 31,800 | 72.7 | 33,500 | 73.0 | 0.3 | **No** |
| s/o Newport Road | 31,800 | 72.7 | 32,900 | 72.9 | 0.2 | **No** |
| n/o Scott Road | 33,500 | 73.0 | 34,600 | 73.1 | 0.1 | **No** |
| s/o Scott Road | 25,700 | 71.8 | 26,500 | 71.9 | 0.1 | **No** |
| n/o Whisper Heights | 28,500 | 72.2 | 29,300 | 72.4 | 0.2 | **No** |
| s/o Whisper Heights | 28,200 | 72.2 | 28,600 | 72.3 | 0.1 | **No** |

*The uniform distance of 50 feet from centerline allows for direct comparisons of potential increases or decreases in noise levels based upon various traffic scenarios; however, at this distance, no specific noise standard necessarily applies