Polaris Place Residential Project
Noise Impact Study

City of Aliso Viejo, California
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RK ENGINEERING GROUP INC.

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1.0 Introduction

1.1 Purpose of Report & Study Objectives

The purpose of this report is to evaluate the potential noise impacts from the proposed Polaris Place Residential Project (hereinafter referred to as "project") and provide recommendations, if necessary, to minimize any project noise impacts.

The assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.) and the standards and methodology follow the City of Aliso Viejo Municipal Code and General Plan requirements.

The following is provided in this report:

- A description of the study area and the proposed project;
- Information regarding the fundamentals of noise;
- Identification of the regulatory setting and applicable noise standards;
- Establishment of the existing ambient noise environment at the project site;
- Analysis of the project's construction and operational noise impact to adjacent receptors;
- Analysis of the project's noise/land use compatibility; and
- Summary of recommended project design features to reduce noise level impacts.

1.2 Site Location & Project Description

The proposed project site is generally located south of Aliso Viejo Parkway, between California State Route 73 (SR-73) and Aliso Creek Road, in the City of Aliso Viejo. The project site is approximately 22.5 acres and is currently occupied by existing general office buildings and associated parking lots. **Exhibit A** shows the location map of the proposed project.

The proposed project consists of demolition of the existing buildings and associated parking areas and redevelopment of the site with 405 single-family attached residential dwelling units at a density of approximately 18 dwelling units per acre. Ancillary residential amenities would include a recreational swimming pool and an associated pool building for use by project residents.

Exhibit B shows the proposed site plan used for this analysis.

1.3 Sensitive Receptors

Sensitive receptors are considered land uses or other types of population groups that are more sensitive to noise exposure. There are several sensitive land uses adjacent to the project site, including the following.

Receptor-1 Existing residential land uses located to the northeast of the project site. The nearest residential homes located at Receptor-1 (marked as circle "1" on **Exhibit A**) are located directly adjacent to the northeastern boundary of the project site.

Receptor-2 Existing residential land uses located to the southeast of the project site. The nearest point of Receptor-2 (marked as circle "2" on **Exhibit A**) is located directly adjacent to the southeastern boundary of the project site.

1.4 Summary of Analysis Results

Table 1-1 provides a summary of the noise analysis results, per the CEQA impact criteria checklist.

Table 1-1 | CEQA Noise Impact Criteria

Noise Impact Criteria	Potentially Significant	Potentially Significant Unless Mitigated	Less Than Significant	No Impact
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?			**X**	
b) Generation of excessive groundborne vibration or groundborne noise levels?			**X**	
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?				**X**



Legend

① = Sensitive Receptor Locations

= Project Site Boundary

Exhibit A

Location Map



Exhibit B

Site Plan

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2827-2025-09

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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.

2.3 Sound Pressure Levels and Decibels

The amplitude of a sound determines its loudness. The loudness of sound increases or decreases, as the amplitude increases or decreases. Sound pressure amplitude is measured 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 and abbreviated dB.

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 (2) sounds of 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 (2) 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.

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. The following are the most commonly used noise descriptors along with brief definitions.

- **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.

- **dBA.** 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 is the sound level exceeded 10 percent of the sample time. Similarly, L50, L90 and L99, etc.

- **Noise.** Any 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.

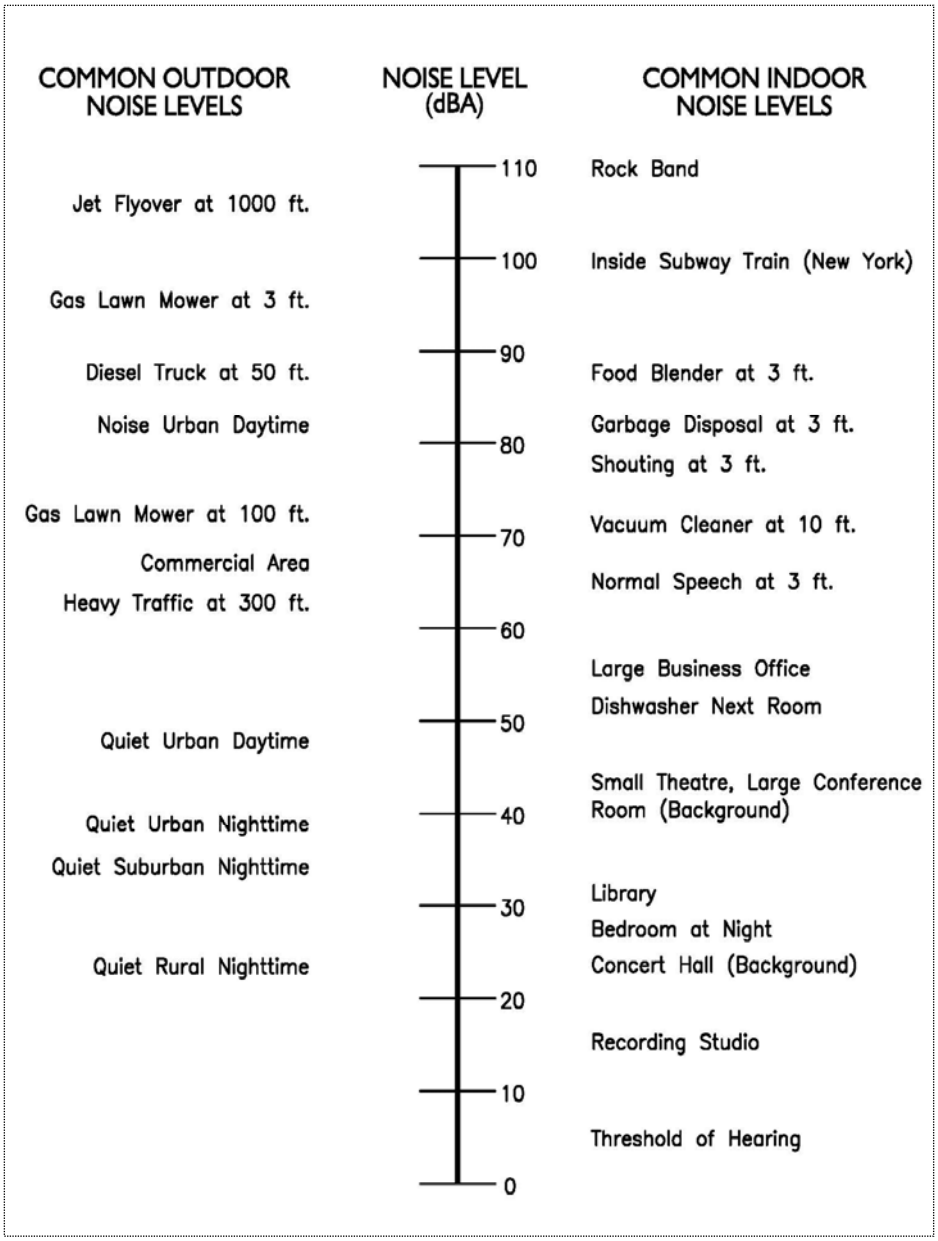
- **Single Event Noise Exposure Level (SENEL).** The dBA level which, if it lasted for one (1) second, would produce the same A-weighted sound energy as the actual event.

2.7 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 an additional 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 3 dB per doubling of distance for a line source and 6.0 dB per doubling of distance for a point source.

Figure 1-1 | Typical Sound Levels from Indoor and Outdoor Noise Sources[1]



[1] Source: AASHSTO. 1993. Guide on Evaluation and Abatement of Traffic Noise

2.8 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 that 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 the 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.

2.9 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.

2.10 Vibration Propagation

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 wavefront, 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 wavefront. 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 wavefront. 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.

2.11 Construction-Related Vibration Level Prediction[2]

Operational activities are separated into two different categories. The vibration can be transient or continuous in nature. Each category can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the project area site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. The thresholds from Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, in the table below provide general guidelines as to the maximum vibration limits for when vibration becomes potentially damaging to structures.

The Caltrans Transportation and Construction Vibration Guidance Manual, April 2020 provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts. **Table 2-1** provides general vibration damage potential thresholds.

Table 2-1 | Vibration Damage Potential Threshold Criteria

Structure and Condition	PPV (in./sec.)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

Soil conditions have an impact on how vibration propagates through the ground. The Caltrans Transportation and Construction Vibration Guidance Manual, April 2020 provides suggested "n" values based on soil class. **Table 2-2** outlines the manual's suggested values and description.

[2] Source: Caltrans Transportation and Construction Vibration Guidance Manual, April 2020.

Table 2-2 | Suggested "n" Values Based on Soil Classes

Soil Class	Description of Soil Material	Suggested Value of "n"
I	Weak or soft soils: loose soils, dry or partially saturated peat and muck, mud, loose beach sand, and dune sand.	1.4
II	Most sands, sandy clays, silty clays, gravel, silts, and weathered rock.	1.3
III	Hard soils: densely compacted sand, dry consolidated clay, consolidated glacial till, and some exposed rock.	1.1
IV	Hard, component rock: bedrock, freshly exposed hard rock.	1.0

3.0 Regulatory Setting

The proposed project is located in the City of Aliso Viejo, and the agencies responsible for regulating noise are discussed below.

3.1 State Regulations

The State of California has established noise insulation standards as outlined in Title 24 of the Building Standards Code which in some cases requires acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold.

Noise insulation design standards for residential dwellings are established in the 2022 California Building Code, Title 24, Part 2, Volume 1, Section 1206 Sound Transmission. The City is required by the State Housing Law to adopt these State codes as minimum performance standards. The City may enact stricter noise standards throughout the city or on a case-by-case basis if deemed necessary. In brief, the Title 24 noise standards require the following for allowable interior noise levels:

1. Interior noise levels due to exterior sources must not exceed a community noise equivalent level (CNEL) or a day-night level (LDN) of 45 dBA, in any habitable room.

2. Party wall and floor-ceiling assembly designs must provide a minimum STC of 50, based on lab tests. Field tested assemblies must provide a minimum noise isolation class (NIC) of 45.

3. Floor-ceiling assembly designs must provide for a minimum impact insulation class (IIC) of 50, based on lab tests. Field tested assemblies must provide a minimum FIIC of 45.

4. Penetrations or openings in sound rated assemblies must be treated to maintain required ratings.

3.2 City of Aliso Viejo Noise Regulations

The proposed project is located in the City of Aliso Viejo and is subject to the standards and regulations established by the City of Aliso Viejo General Plan Noise Element and Municipal Code Chapter 8.12 – Noise Control, as discussed below.

A copy of the City of Aliso Viejo General Plan and Municipal Code standards are provided in **Appendix A**.

3.2.1 General Plan Noise Standards

3.2.1.1 Noise/Land Use Compatibility

The City of Aliso Viejo General Plan establishes planning criteria for determining a development's noise/land use compatibility based on the community noise equivalent level (CNEL). CNEL noise levels are typically used to evaluate mobile noise source impacts such as those from roadways.

Table 3-1 shows the City of Aliso Viejo noise/land use compatibility standards for the land uses on and adjacent to the proposed project site, as prescribed in the General Plan.

Table 3-1 | City of Aliso Viejo Land Use Compatibility Guidelines[1]

Land Use Category	Community Noise Exposure (dBA CNEL)[2]			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential	60 and below	60 – 70	70 – 75	75 and above

[1] Source: City of Aliso Viejo General Plan Noise Element, Table N-2: Noise/Land Use Compatibility Matrix.

[2] Notes:

Normally Acceptable:	Specified land use is satisfactory, based upon the assumption that any buildings involved meet conventional Title 24 construction standards. No special noise insulation requirements.
Conditionally Acceptable:	New construction or development shall be undertaken only after a detailed noise analysis is made and noise reduction measures are identified and included in the project design.
Normally Unacceptable:	New construction or development is discouraged. If new construction is proposed, a detailed analysis is required, noise reduction measures must be identified, and noise insulation features included in the design.
Clearly Unacceptable:	New construction or development clearly should not be undertaken.

3.2.1.2 Stationary Noise Standards

In addition to the above noise/land use compatibility guidelines, the General Plan has established the following stationary noise standards. Stationary noise standards represent the maximum acceptable noise levels as measured from any residential property in the City. Accordingly, it is unlawful to cause the noise level on any residential property to exceed the exterior noise standards listed in **Table 3-2**:

1. For a cumulative period of more than 30 minutes in any hour;
2. Plus five (5) dBA for a cumulative period of more than 15 minutes in any hour;
3. Plus ten (10) dBA for a cumulative period of more than five (5) minutes in any hour; or
4. Plus 20 dBA for any period of time.

In addition, it is unlawful to cause the noise level on any residential property to exceed the interior noise standards listed in **Table 3-2**:

1. For a cumulative period of more than five (5) minutes in any hour;
2. Plus five (5) dBA for a cumulative period of more than one (1) minute in any hour; or
3. Plus ten (10) dBA for any period of time.

Table 3-2 | City of Aliso Viejo General Plan Noise Standards - Residential[1]

Location	Allowable Noise Level (dBA Leq)	
	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Interior	55.0	45.0
Exterior	55.0	50.0

[1] Source: City of Aliso Viejo General Plan Noise Element, Table N-1: Orange County Residential Noise Standards.

For the purposes of this analysis, the noise levels listed in **Table 3-1** are used to evaluate the project's noise/land use compatibility, and the noise levels listed in **Table 3-2** are used to evaluate the project's consistency with established plans, policies, and programs for noise control within the City.

It should be noted that the City's General Plan Noise Element also places the following provisions on multifamily land uses within the City:

> *"The City of Aliso Viejo will continue to enforce the provisions of the California Energy Code. Energy Code standards specify that combined indoor noise for multi-family living spaces shall not exceed 45 dBA CNEL and must be implemented when the outdoor noise level exceeds 60 dBA CNEL. The Noise Policy Map (Figure N-1) can be used to determine when and where it is appropriate to implement this standard. This standard must be applied to all new hotels, motels, and multifamily residential development."*

3.2.2 Municipal Code Noise Standards

3.2.2.1 Noise Standards

Table 3-3 shows the exterior noise standards established in Chapter 8.12 of the City of Aliso Viejo Municipal Code.

Table 3-3 | City of Aliso Viejo Municipal Code Noise Standards[1]

Location	Exterior Noise Level Thresholds (dBA Leq)	
	Daytime (7:00 a.m. – 10:00 p.m.)	Nighttime (10:00 p.m. – 7:00 a.m.)
Residential – Density of less than 10 DU/AC	50.0	45.0
Residential – Density of 10 DU/AC or more	55.0	50.0
Commercial	65.0	60.0

[1] Source: City of Aliso Viejo Municipal Code Chapter 8.12 – Noise Control.

Per the Municipal Code, it is unlawful for any person at any location within the City to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by the person, when the foregoing causes the noise level, when measured on any other parcel, to exceed:

1. The noise standard for a cumulative period of more than 30 minutes in any hour;
2. The noise standard plus five (5) dBA for a cumulative period of more than 15 minutes in any hour;
3. The noise standard plus ten (10) dBA for a cumulative period of more than five (5) minutes in any hour;
4. The noise standard plus 15 dBA for a cumulative period of more than one (1) minute in any hour; or
5. The noise standard plus 20 dBA for any period of time.

3.2.2.2 Construction Noise Standards

Per the Municipal Code, noise sources associated with construction, repair, remodeling, or grading of any real property shall be exempted from the provisions of Chapter 8.12, provided said activities do not take place between the hours of eight p.m. and seven a.m. on weekdays, eight p.m. and eight a.m. on Saturday, or at any time on Sunday or a federal holiday.

4.0 Study Method and Procedures

The following section describes the noise measurement procedures and locations, noise modeling procedures, and assumptions used in this analysis.

4.1 Noise Measurement Procedures 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 the nearest houses to the project site;
- Locations that are acoustically representative and equivalent to the area of concern;
- Human land usage; and
- Sites clear of major obstructions and contamination.

RK conducted the sound level measurements in accordance with Caltrans technical noise specifications. All measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (ANSI S1.4: Specification for Sound Level Meter, 1983).

Piccolo-II Type 2 integrating-averaging level meters were used to conduct noise measurements at the project site and property boundaries.

The Leq, Lmin, Lmax, L2, L8, L25, and L50 statistical data were recorded over the measurement time intervals and the information was utilized to define the noise characteristics for the project. The following gives a brief description of the procedures for sound level measurements:

- Microphones for sound level meters were placed five (5) feet above the ground;
- Sound level meters were calibrated before each measurement;
- Following the calibration of equipment, a windscreen was placed over the microphone;
- Frequency weighting was set on “A” and slow response; and
- Temperature and sky conditions were observed and documented.

Appendix B includes photographs, field sheets, and measured noise data.

4.2 Stationary Noise Source Modeling

Stationary noise generated by the project was modeled using a computer program that replicates the FHWA Noise Prediction Model (FHWA-RD-77-108). The FHWA model arrives at a predicted noise level through a series of adjustments to the reference energy noise level. For stationary sources, the following noise levels were applied to the model. The model outputs the projected noise level based on the following key parameters:

- Referenced noise level (i.e., how loud a source is at a specific distance);
- Vertical and horizontal distances of sensitive receptor from the noise source;
- Vertical and horizontal distances of noise barriers from the noise source and receptor;
- Typical noise source spectra; and
- Topography.

The primary sources of onsite noise generated by the proposed project would be the operation of HVAC equipment and activity at the proposed recreational pool area. Potential HVAC/condenser equipment noise is modeled assuming that equipment would be located at ground level, without the inclusion of any noise barrier walls/enclosures. It is assumed that the project will include one HVAC unit per dwelling unit. To model HVAC noise, reference noise levels for typical residential HVAC units are used.

The proposed onsite swimming pool would be located near the center of the site. Potential pool noise is modeled using reference noise levels obtained from the SoundPLAN™ emission spectra library. Specifically, the referenced noise level "Open-air swimming pools, adults' pool" has been used to determine the project's outdoor pool noise levels. It is assumed that the pool will not operate during nighttime hours (10:00 p.m. to 7:00 a.m.). Hence, pool noise is modeled during daytime hours only (7:00 a.m. to 10:00 p.m.).

Table 4-1 indicates the referenced noise levels used in this analysis.

Table 4-1 | Referenced Stationary Noise Levels

Noise Source	Distance from Source (Feet)	Noise Levels (dBA Leq and Lmax)
HVAC[1]	3.28	65.0
Recreational Pool Area[2]	1.00>	65.0

[1] Noise level is representative of a single unit.
[2] Noise level per square meter of pool area.

4.3 Traffic Noise Modeling

Existing and future traffic noise from vehicular traffic was projected using a version of the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA model arrives at the predicted noise level through a series of adjustments to the key input parameters. The following outlines the key adjustments made to the computer model for the roadway inputs:

- Roadway classification (e.g., freeway, major arterial, arterial, secondary, etc.);
- Roadway active width (i.e., distance between the center of the outermost travel lanes on each side of the roadway);
- Average daily traffic (ADT) volumes, travel speeds, and percentages of automobiles, medium trucks, and heavy trucks;
- Roadway grade and angle of view;
- Site conditions (e.g., soft vs. hard); and
- Percentage of total ADT which flows each hour throughout a 24-hour period.

The following outlines key adjustments to the computer model for the project site parameter inputs:

- Vertical and horizontal distance of sensitive receptor from noise source;
- Vertical and horizontal distance of noise barrier from noise source and receptor;
- Traffic noise source spectra; and
- Topography.

Table 4-2 indicates the roadway parameters used for this study. **Table 4-3** shows the traffic volume data used.

Table 4-2 | Roadway Parameters

Roadway		Segment	Speed (MPH)	Site Conditions
1.	Aliso Viejo Pkwy.	Moulton Pkwy. to Aliso Creek Rd. N	50	Hard
2.	Aliso Viejo Pkwy.	Aliso Creek Rd. N to Enterprise	50	Hard
3.	Aliso Viejo Pkwy.	Enterprise to Aliso Creek Rd. S	50	Hard
4.	Aliso Creek Rd.	North of Glenwood Dr.	50	Hard
5.	Aliso Creek Rd.	Glenwood Dr. to Pacific Park Dr.	50	Hard
6.	Aliso Creek Rd.	South of Pacific Park Dr.	50	Hard

Table 4-3 | Traffic Volume Data

Roadway		Segment	Project ADT[1, 2]	Existing Without Project ADT[3]	Existing With Project ADT
1.	Aliso Viejo Pkwy.	Moulton Pkwy. to Aliso Creek Rd. N	2,661	22,989	25,650
2.	Aliso Viejo Pkwy.	Aliso Creek Rd. N to Enterprise		12,948	15,609
3.	Aliso Viejo Pkwy.	Enterprise to Aliso Creek Rd. S		15,897	18,558
4.	Aliso Creek Rd.	North of Glenwood Dr.		25,150	27,811
5.	Aliso Creek Rd.	Glenwood Dr. to Pacific Park Dr.		18,726	21,387
6.	Aliso Creek Rd.	South of Pacific Park Dr.		21,939	24,600

[1] Source: RK Engineering Group, Inc. (RK). *Polaris Place Residential Project Traffic Impact Study Scoping Agreement*. April 7, 2026.

[2] Total project ADT is applied to all study roadway segments for a conservative, worst-case assessment of impacts.

[3] Source: RK Engineering Group, Inc. (RK). *Engineering & Traffic Survey (E&TS) for Speed Limits, City of Aliso Viejo, California*. April 10, 2026.

Table 4-4 indicates the vehicle distributions and truck mixes used for the roadways analyzed in this study.

Table 4-4 | Vehicle Distribution (Truck Mix) for Arterial Roadways[1]

Vehicle Type	Daytime % (7a.m. – 7p.m.)	Evening % (7 p.m. – 10 p.m.)	Night % (10 p.m. – 7 a.m.)	Total % of Traffic Flow
Automobiles	69.55	12.88	9.57	92.00
Medium Trucks	1.44	0.06	1.50	3.00
Heavy Trucks	2.40	0.10	2.50	5.00

[1] Vehicle percentages are based on a County of Riverside Department of Environmental Health memo regarding requirements for determining and mitigating traffic noise impacts to residential structures.

4.4 Construction Noise Modeling

The construction noise assessment is based on the General Assessment methodology set forth by the FTA's Transit Noise and Vibration Impact Assessment Manual, Section 7 – Noise and Vibration during Construction. This analysis utilizes the Federal Highway Administration (FHWA) Roadway Construction Noise Model, together with several key construction parameters, to estimate future construction noise levels during each phase of construction. Consistent with the FTA General Assessment methodology, the following assumptions have been utilized in the construction noise model:

- Noise emission level ($L_{emission}$) – Determine the emission level at 50 feet according to noise from typical construction equipment.
- Usage factor (Adj_{Usage}) – Assume a usage factor of one (1). This assumes a time period of one-hour with full power operation.
- Distance (D) – Assume that all equipment operates at the center of the project, or centerline for guideway or highway construction projects.
- Ground effect (G) – G equals zero (0) assuming free-field conditions and ignoring ground effects.
- The $L_{eq.equip}$ is determined only for the two noisiest pieces of equipment expected to be used in each phase of construction. The equipment noise levels are summed for each phase of construction using decibel addition.

Noise levels were projected from the center of the project site to the adjacent sensitive receptor property lines. Although some construction activity may occur closer to the adjacent receptors than the center of the project site, noise levels are based on an average distance from the center of the site per FTA General Assessment recommendations.

4.5 Construction Vibration Modeling

The construction vibration assessment is based on the methodology set forth within the Caltrans Transportation and Construction Induced Vibration Guidance Manual. The vibration impacts from bulldozers, heavy truck loading, vibratory rollers and compactors, and caisson drilling activity are analyzed. All vibratory activity is analyzed as a continuous and/or frequent event and is required to comply with the applicable guidance threshold criteria. It is expected that vibration levels will be highest during the paving phase. No impact pile driving is expected as part of this project.

Vibratory impacts were calculated from the nearest expected location of on-site construction to the nearest sensitive receptors and structures using the reference vibration levels, soil conditions, and the reference equation PPV= PPV ref (25/D)^n (in/sec) (from Caltrans Manual) where:

- PPV = reference measurement at 25 feet from the vibration source;
- D = distance from equipment to property line; and
- n = vibration attenuation rate through ground (n = 1.1 was utilized for this study).

5.0 Existing Noise Environment

The existing noise environment for the project site and surrounding areas has been established based on noise measurement data collected by RK. The existing project setting is residential and commercial, and the primary sources of environmental noise impacting the project site are onsite commercial activity, residential activity, and roadway activity along SR-73 and Aliso Viejo Parkway.

5.1 Noise Measurement Results

To determine the existing noise level environment, RK conducted two (2) 24-hour noise measurements at the project site and receptors.

Noise levels were measured on April 15, 2026, using Piccolo-II Type 2 integrating-averaging sound level meters. The information was utilized to establish the noise characteristics of the existing ambient environment.

The noise monitoring locations were selected based on the proximity and location of adjacent sensitive receptors. **Exhibit C** graphically illustrates the location of the noise measurements.

- Noise Monitoring Location 1 (L-1) was located near the northeastern corner of the proposed project site, approximately 80 feet south-southeast of the centerline of Aliso Viejo Parkway and approximately 1,265 feet northeast of the centerline of SR-73.
- Noise Monitoring Location 2 (L-2) was located near the southwestern corner of the proposed project site, approximately 1,305 feet southeast of the centerline of Aliso Viejo Parkway and approximately 215 feet northeast of the centerline of SR-73.

Noise measurements were conducted at the above-selected locations to determine the existing ambient noise environment at the project site and nearby sensitive receptors.

Results of the ambient noise measurements are shown in **Tables 5-1** and **5-2**. **Appendix B** includes photographs, field sheets, and measured noise data.

Table 5-1 | 24-Hour Noise Measurement Results – L-1[1]

Time	dBA Leq	Time	dBA Leq
12:00 AM	54.3	12:00 PM	62.7
1:00 AM	50.9	1:00 PM	63.6
2:00 AM	52.2	2:00 PM	64.8
3:00 AM	53.1	3:00 PM	64.9
4:00 AM	57.4	4:00 PM	65.3
5:00 AM	62.2	5:00 PM	67.0
6:00 AM	64.6	6:00 PM	65.8
7:00 AM	68.1	7:00 PM	63.6
8:00 AM	67.5	8:00 PM	63.8
9:00 AM	64.8	9:00 PM	60.7
10:00 AM	63.3	10:00 PM	60.5
11:00 AM	63.8	11:00 PM	57.3
24-Hour CNEL			**67.5**

[1] L-1 was measured on April 15, 2026.

Table 5-2 | 24-Hour Noise Measurement Results – L-2[1]

Time	dBA Leq	Time	dBA Leq
12:00 AM	56.0	12:00 PM	69.0
1:00 AM	54.2	1:00 PM	68.8
2:00 AM	51.7	2:00 PM	69.5
3:00 AM	54.6	3:00 PM	71.1
4:00 AM	60.8	4:00 PM	72.4
5:00 AM	65.4	5:00 PM	72.0
6:00 AM	69.8	6:00 PM	69.1
7:00 AM	73.3	7:00 PM	66.8
8:00 AM	72.6	8:00 PM	65.3
9:00 AM	70.5	9:00 PM	63.4
10:00 AM	68.8	10:00 PM	62.8
11:00 AM	68.5	11:00 PM	59.9
24-Hour CNEL			**71.7**

[1] L-2 was measured on April 15, 2026.

As shown in **Table 5-1** and **Table 5-2**, the existing ambient noise levels at the proposed project site range from approximately 67.5 dBA CNEL to 71.7 dBA CNEL.



Legend

① = Noise Monitoring Location

= Project Site Boundary

Exhibit C

Noise Monitoring Locations

6.0 Operational Noise Impacts

The following noise impact analysis has been performed to determine whether the proposed project would result in a substantial increase in ambient noise levels in the vicinity of the site. Additionally, the noise analysis examines whether the project can meet the City of Aliso Viejo and State of California requirements for residential exterior and interior noise exposure.

6.1 Stationary Noise Source Impacts

The proposed project consists of constructing and operating 405 single-family attached dwelling units. The primary sources of potential on-site noise would be the operation of HVAC equipment and activity at the proposed recreational pool area.

These types of on-site stationary noises would not typically be categorized as loud, unnecessary, or unusual noise that disturbs the peace or quiet of any neighborhood, or that causes discomfort or annoyance to any person of normal sensitiveness. In particular, pool activity, social activities, and vehicle-related noise are generally substantially less during the noise sensitive nighttime hours.

To help ensure onsite noise levels do not exceed the City of Aliso Viejo General Plan and Municipal Code noise standards, the following stationary noise impact analysis has been prepared. The analysis assumes that onsite HVAC equipment and pool activity will be operating continuously during daytime hours (7:00 a.m. to 10:00 p.m.). It is assumed that the pool will not operate during nighttime hours (10:00 p.m. to 7:00 a.m.). Hence, pool noise is modeled during daytime hours only (7:00 a.m. to 10:00 p.m.).

The HVAC noise source level used in the analysis is representative of a typical residential unit at the source location. HVAC equipment was modeled at ground level without the benefit of noise barriers or enclosures. HVAC noise was conservatively modeled assuming the continuous, simultaneous operation of five units within the line of sight of the nearest residential receptors. The closest potential HVAC location to adjacent residential receptors would be near the eastern project boundary, approximately 50 feet from Receptor-1 and Receptor-2.

Pool-related noise was modeled using reference noise levels from the SoundPLAN™ emission spectra library. The proposed pool would be located near the center of the project site, approximately 480 feet from the nearest residential receptors. Although the proposed pool area would be screened from adjacent residential receptors by onsite residential structures, pool noise was conservatively modeled without accounting for attenuation from shielding or barriers.

To estimate noise level impacts at the adjacent receptors, the referenced noise levels are input into the FHWA model and projected from the nearest potential HVAC locations to the nearest receptor property lines. The model projections take into account the noise attenuation effects from distance, local topography, and ground effects.

Tables 6-1 and **6-2** show the projected noise levels during daytime and nighttime hours, respectively, at the nearest adjacent residential receptors. Stationary noise calculation worksheets are provided in **Appendix C**.

Table 6-1 | Stationary Noise Impacts – Daytime Hours

Noise Source	Receptor Distance from Noise Source (feet)	Noise Level at Receptor (dBA Leq / dBA Lmax)
HVAC[1]	50.0	48.3 / 48.3
Recreational Pool Area	480.0	19.3 / 19.3
Total Combined Noise Level		**48.3 / 48.3**
Noise Level Threshold		55.0 / 75.0
Noise Level Exceeds Threshold?		**No / No**

[1] Noise level is indicative of the simultaneous operation of five units.

Table 6-2 | Stationary Noise Impacts – Nighttime Hours

Noise Source	Receptor Distance from Noise Source (feet)	Noise Level at Receptor (dBA Leq / dBA Lmax)
HVAC[1]	50.0	48.3 / 48.3
Noise Level Threshold		50.0 / 70.0
Noise Level Exceeds Threshold?		**No / No**

[1] Noise level is indicative of the simultaneous operation of five units.

As shown in the tables above, noise levels generated by the project are not expected to exceed the City's daytime or nighttime noise standards at any of the adjacent sensitive receptor locations.

As a result, the project will not generate stationary noise levels in excess of the noise standards established by the City, and **the impact is considered less than significant**.

6.2 Mobile Source Noise Impacts

6.2.1 Roadway Noise

A roadway noise impact analysis has been prepared to determine whether the project would cause a substantial permanent increase in ambient noise levels at each sensitive receptor location due to increased traffic volumes.

The roadway noise analysis utilizes projected volumes based on the *Polaris Place Residential Project Traffic Impact Study Scoping Agreement*, prepared by RK in April 2026.

Per the City of Aliso Viejo General Plan, exterior noise levels of 60 dBA CNEL or lower are considered Normally Acceptable for residential land uses.

For the purposes of this analysis, a significant impact would occur if noise levels exceed 60.0 dBA CNEL and the project results in an increase of 3.0 dBA or more above "Without Project" conditions. It is assumed that all homes in the vicinity of the project site are equipped with fresh air supply or air conditioning systems and thus a windows closed condition is applicable. Additionally, a change of 3 dBA is considered barely perceptible by a human ear of average health[3].

Table 6-3 shows the roadway noise levels with and without the proposed project. Operational roadway noise calculation sheets are provided in **Appendix D**.

[3] Caltrans Technical Noise Supplement to the Traffic Noise Analysis Protocol (Tens Manual). September 2013. Section 2.2.1.1 Human Response to Changes in Noise Levels.

Table 6-3 | Opening Year Roadway Noise Levels (dBA CNEL)

Affected Roadway			Distance from Centerline (feet)	Opening Year Noise Levels (dBA CNEL)			Significant Impact (?)
				Without Project	With Project	Change as a result of Project	
1.	Aliso Viejo Pkwy.	Moulton Pkwy. to Aliso Creek Rd. N	100	74.5	75.0	0.5	**No**
2.	Aliso Viejo Pkwy.	Aliso Creek Rd. N to Enterprise		72.0	72.9	0.8	**No**
3.	Aliso Viejo Pkwy.	Enterprise to Aliso Creek Rd. S		72.9	73.6	0.7	**No**
4.	Aliso Creek Rd.	North of Glenwood Dr.		74.8	75.2	0.4	**No**
5.	Aliso Creek Rd.	Glenwood Dr. to Pacific Park Dr.		73.5	74.0	0.6	**No**
6.	Aliso Creek Rd.	South of Pacific Park Dr.		74.3	74.8	0.5	**No**

[1] A significant impact would occur if "With Project" noise levels exceed 60.0 dBA CNEL and the change as a result of the project exceeds 3.0 dBA CNEL.

As shown in **Table 6-3**, the proposed project will not result in a significant permanent increase in roadway noise levels along adjacent roadways.

6.2.2 Airport Noise

John Wayne Airport, located in Santa Ana, California, is the nearest airport to the proposed project site at a distance of approximately 10 miles. The project site is not located within the John Wayne Airport, or any other airport's, area of influence.

Furthermore, as described above, the proposed project is not expected to expose people residing or working in the project area to excessive noise levels. **Therefore, the project will have no impact on airport-adjacent land uses**.

6.3 Noise/Land Use Compatibility

The project proposes to site new single-family attached dwelling units located to the south of Aliso Viejo Parkway, between SR-73 and Aliso Creek Road. Traffic noise from these roadways will be the primary source of noise impacting the project site and may expose future residents to noise levels above the City of Aliso Viejo exterior noise thresholds for residential uses.

6.3.1 Exterior Noise/Land Use Compatibility

A noise/land use compatibility assessment has been prepared to help determine whether existing exterior noise levels affecting the project site exceed the City's noise/land use compatibility threshold

for residential land uses. Exterior ambient noise levels are assessed at the first-row residential building façades of each dwelling unit facing SR-73 and Aliso Viejo Parkway.

Future exterior noise levels are estimated based on the existing ambient noise level measurements collected by RK. To account for future increases in roadway volumes, a three-decibel increase has been applied to the measured noise levels. This is a conservative estimate, as a doubling of traffic volume along a roadway would be required to increase ambient noise levels by 3 dBA or more[4].

Table 6-4 shows the anticipated exterior noise levels at the first-row residential building façades.

Table 6-4 | Exterior Noise/Land Use Compatibility (dBA CNEL)

Receptor Location	Noise Monitoring Location	Estimated Future Exterior Noise Levels
First-row building façades facing SR-73	L-2	74.7
First-row building façades facing Aliso Viejo Parkway	L-1	70.5

As shown in **Table 6-4**, future exterior ambient noise levels are expected to range from approximately 70.5 dBA CNEL to 74.7 dBA CNEL.

[4] Source: Technical Noise Supplement to the Traffic Noise Analysis Protocol, California Department of Transportation (Caltrans), September 2013.

7.0 Construction Noise and Vibration Impacts

Temporary construction noise and vibration impacts have been assessed from the project site to the surrounding adjacent land uses. The degree of construction noise and vibration will vary depending on the type of construction activity taking place and the location of the activity relative to the surrounding properties.

During the construction period, the contractors will be required to comply with the City of Aliso Viejo Municipal Code Chapter 8.12. Per the Municipal Code, noise sources associated with construction, repair, remodeling, or grading of any real property shall be exempted from the provisions of Chapter 8.12, provided said activities do not take place between the hours of eight p.m. and seven a.m. on weekdays, eight p.m. and eight a.m. on Saturday, or at any time on Sunday or a federal holiday. The Municipal Code does not include specific noise level limits for construction activities.

Because the City of Aliso Viejo does not establish quantitative thresholds for construction-related noise, the proposed project's potential construction noise impacts have been evaluated using the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (2006) criteria. The FTA provides criteria for assessing construction noise impacts based on the potential for adverse community reaction. For residential uses, the daytime noise threshold is 90 dBA Leq for a 1-hour period. It is assumed that no project-related construction would occur during the noise-sensitive nighttime hours.

Construction phasing and equipment usage assumptions are referenced from the *Polaris Place Residential Project Air Quality, Greenhouse Gas, and Energy Study, City of Aliso Viejo*, prepared by RK.

7.1 Typical Construction Noise Levels

Table 7-1 shows typical construction noise levels compiled by the Environmental Protection Agency (EPA) for common-type construction equipment. Typical construction noise levels are used to estimate potential project construction noise levels at the adjacent sensitive receptors.

Table 7-1 | Typical Construction Noise Levels (dBA Leq)[1]

Equipment Type	Noise Level 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	
Pneumatic Wrenches	82 - 87
Jack Hammers, Rock Drills	80 - 99
Pile Drivers (Peak)	95-105
Other	
Vibrators	68 - 82
Saws	71 - 82

[1] Referenced noise levels from the Environmental Protection Agency (EPA).

7.2 Construction Noise Impact Analysis

This assessment analyzes potential noise impacts of the two noisiest pieces of equipment during all expected phases of construction, including demolition, site preparation, grading, building construction, paving, and architectural coating. Noise levels are calculated based on an average distance of equipment over a 1-hour period to the nearest adjacent residential receptors. The project's estimated construction noise levels have been calculated using the Federal Highway Administration Roadway Construction Noise Model Version 1.1.

Table 7-2 shows the noise level impacts from the center of the project site to the nearest receptor property line. Construction noise calculation worksheets are provided in **Appendix E**.

Table 7-2 | Project Construction Noise Levels

Phase	Equipment	Quantity	Equipment Noise Level at 340 ft. (dBA Leq)	Combined Noise Level (dBA Leq)
Demolition	Concrete/Industrial Saws	1	72.9	73.6
	Rubber Tired Dozers	1	65.0	
Site Preparation	Rubber Tired Dozers	1	65.0	69.4
	Tractors/Loaders/Backhoes	1	67.3	
Grading	Graders	2	68.3	71.4
Building Construction	Tractors/Loaders/Backhoes	2	67.3	70.4
Paving	Rollers	2	63.3	66.4
Architectural Coating	Air Compressors	1	61.0	65.9
	Pumps	1	64.2	
Worst-Case Construction Phase Noise Level (dBA Leq)				**73.6**
FTA Daytime General Assessment Construction Noise Criteria (dBA Leq)[1]				90.0
Noise level exceeds criteria?				**No**

[1] Source: Federal Transit Administration (FTA). *Transit Noise and Vibration Impact Assessment Manual, Section 7: Noise and Vibration During Construction.*

As shown in **Table 7-2**, the project is not expected to generate noise levels which exceed the FTA General Assessment construction noise threshold for residential land uses.

It should be noted that several construction phases are expected to overlap. As discussed in **Section 4.4**, the FTA General Assessment Methodology used for this analysis evaluates the two loudest pieces

of construction equipment expected to operate during a given construction scenario. Of the anticipated overlapping construction phases, the Demolition and Building Construction overlap represents the worst-case construction noise scenario. Under this scenario, the two loudest pieces of equipment would consist of the concrete/industrial saw (72.9 dBA Leq at 340 feet) and the tractor/loader/backhoe (67.3 dBA Leq at 340 feet), resulting in a combined construction noise level of approximately 74.0 dBA Leq. This noise level remains below the FTA General Assessment construction noise criterion of 90 dBA Leq for residential land uses.

Therefore, construction noise associated with both the individual and overlapping construction phases would remain below the applicable significance threshold, and impacts would be less than significant.

7.3 Construction Vibration

To determine the vibratory impacts during construction, reference construction equipment vibration levels were utilized and then extrapolated to the façade of the nearest adjacent structures.

The nearest structures to the project site are the existing residential homes located at Receptor-1 and Receptor-2. These structures are considered "new residential homes" and are located a minimum of approximately 45 feet from the nearest expected areas of onsite construction activity.

The construction of the proposed project is not expected to require the use of substantial vibration-inducing equipment or activities, such as pile drivers or blasting. The main source of vibration impacts during the construction of the project would be the operation of equipment such as bulldozer activity during site preparation, loading trucks during grading and excavation, and vibratory rollers during paving.

The construction vibration assessment utilizes the referenced vibration levels and methodology set forth within the Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, September 2018. **Table 7-3** shows the FTA-referenced vibration levels.

Table 7-3 | Typical Construction Vibration Levels[1]

Equipment	Peak Particle Velocity (PPV) at 25 Feet (in./sec.)	Approximate Vibration Level (LV) at 25 feet
Piledriver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Piledriver (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	0.210	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: Federal Transit Administration (FTA). *Transit Noise and Vibration Impact Assessment Manual, Section 7: Noise and Vibration During Construction.*

Table 7-4 shows the project's construction-related vibration analysis at the nearest adjacent structures to the project construction area. Construction vibration calculation worksheets are provided in **Appendix E**.

Table 7-4 | Construction Vibration Impact Analysis

Construction Activity	Distance to Nearest Structure (Feet)	Duration	Calculated Vibration Level (PPV) (in./sec.)
Large Bulldozer	45	Continuous/Frequent	0.047
Loaded Trucks		Continuous/Frequent	0.040
Vibratory Rollers		Continuous/Frequent	0.110
Worst-Case Construction Vibration Level			**0.110**
Vibration Damage Potential Threshold[1]			0.500
Vibration level exceeds threshold?			**No**

[1] Source: Caltrans Transportation and Construction Vibration Guidance Manual (April 2020) vibration damage potential threshold for "new residential structures".

Based on the tables above, project-related construction activity is not expected to cause any potential damage to the nearest structures. **Hence, the impact from construction-related vibration will be less than significant.**

Appendices

Appendix A

City of Aliso Viejo General Plan Noise Element and Municipal Code Chapter 8.12 – Noise Control

The dB(A) descriptor only reports noise from a single source or combination of sources at a point in time. To allow a more comprehensive description of the noise environment, Federal and State agencies have established noise and land use compatibility guidelines that use averaging approaches to noise measurement. Two measurement scales commonly used in California are the Community Noise Equivalent Level (CNEL) and the day-night level (Ldn). To account for increased human sensitivity at night, the CNEL level includes a 5-decibel penalty on noise during the 7:00 a.m. to 10:00 p.m. time period and a 10-decibel penalty on noise during the 10:00 p.m. to 7:00 a.m. time period. The Ldn level includes only the 10 decibel weighting for late-night noise. These values are nearly identical for all but unusual noise sources.

Noise Standards and Land Use Compatibility

Table N-1 summarizes County of Orange residential noise standards adopted by the City of Aliso Viejo. The standards represent the maximum acceptable noise levels as measured from any residential property in the City. Accordingly, it is unlawful to cause the noise level on any residential property to exceed the exterior noise standards: 1) for a cumulative period of more than thirty minutes in any hour; 2) plus five dB(A) for a cumulative period of more than 15 minutes in any hour; 3) plus 10 dB(A) for a cumulative period of more than five minutes in any hour; 4) plus 15 dB(A) for a cumulative period of more than one minute in any hour; or 5) plus 20 dB(A) for any period of time. In addition, any noise that exceeds the interior noise standards established for residential uses: 1) for a cumulative period of more than five minutes in any hour; 2) plus five dB(A) for a cumulative period of more than one minute in any hour; or 3) plus 10 dB(A) for any period of time, is unlawful.

Table N-1
Orange County Residential Noise Standards

	Daytime Noise Standards (7am to 10pm)	Nighttime Noise Standards (10pm to 7am)
Interior Noise Standards	55 dB(A)	45 dB(A)
Exterior Noise Standards	55 dB(A)	50 dB(A)

Source: County of Orange Code of Ordinances, 2003.
Note: Standards are based on measurements taken from any residential property in the City.

Table N-2
Noise/Land Use Compatibility Matrix

Land Use	Community Noise Exposure (Ldn or CNEL) 50	55	60	65	70	75	80	85
Residential	A	A	B	B	C	D	D	D
Transient Lodging – Motel, Hotel	A	A	B	B	B	C	D	D
Schools, Libraries, Churches, Hospitals, Nursing Homes	A	A	B	B	C	C	D	D
Auditoriums, Concert Halls, Amphitheaters	B	B	B	B	D	D	D	D
Sports Arena, Outdoor Spectator Sports	B	B	B	B	B	D	D	D
Playgrounds, Parks	A	A	A	A	C	D	D	D
Golf Course, Riding Stables, Water Recreation, Cemeteries	A	A	A	A	C	C	D	D
Office Buildings, Business Commercial, and Professional	A	A	B	B	B	C	C	C
Industrial, Manufacturing, Utilities, Agriculture	A	A	A	A	B	B	C	C

Source: Modified by CBA from 1998 State of California General Plan Guidelines.

ZONE A - Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved meet conventional Title 24 construction standards. No special noise insulation requirements.

ZONE B - Conditionally Acceptable: New construction or development shall be undertaken only after a detailed noise analysis is made and noise reduction measures are identified and included in the project design.

ZONE C- Normally Unacceptable: New construction or development is discouraged. If new construction is proposed, a detailed analysis is required, noise reduction measures must be identified, and noise insulation features included in the design.

ZONE D- Clearly Unacceptable: New construction or development clearly should not be undertaken.

Chapter 8.12
NOISE CONTROL[1]

Sections:

8.12.010 Purpose.

8.12.020 Declaration of policy.

8.12.030 Definitions.

8.12.040 Noise level measurement criteria.

8.12.050 Exterior noise standards.

8.12.060 Interior noise standards.

8.12.070 Exemptions.

8.12.080 Schools, hospitals and churches – Special provisions.

8.12.090 Manner of enforcement.

8.12.100 Violations.

Prior legislation: Ord. 2002-033.

8.12.010 Purpose.

The purpose of this chapter is to establish noise standards and to protect the health, safety, welfare, and living/working environments in the city. [Ord. 2010-126 § 1 (Exh. A)].

8.12.020 Declaration of policy.

A. It is hereby declared to be the policy of the city to control unnecessary, excessive, and annoying sounds from all sources as specified in this chapter.

B. It is determined that certain sound levels are detrimental to the public health, welfare, and safety, and contrary to public interest. [Ord. 2010-126 § 1 (Exh. A)].

8.12.030 Definitions.

The following definitions apply to the use of these terms for the purposes of this chapter:

“Ambient noise level” means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

“Cumulative period” means an additive period of time composed of individual time segments which may be continuous or interrupted.

“Decibel (dB)” means a unit which denotes the ratio between two quantities which are proportional to power: the number of decibels corresponding to the ratio of two amounts of power to 10 times the logarithm to the base 10 of this ratio.

“Density” means the number of dwelling units per gross acre of land as established in AVMC Title 15.

“Dwelling unit” means a single unit providing complete, independent living facilities for one or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

“Emergency machinery, vehicle, or work” means any machinery, vehicle, or work used, employed, or performed in an effort to protect, provide, or restore safe conditions in the community or for the citizenry, or work by private or public utilities when restoring utility service.

“Fixed noise source” means a stationary device which creates sounds while fixed or motionless, including but not limited to industrial and commercial machinery and equipment, pumps, fans, compressors, generators, air conditioners, leaf blowers, public address systems and refrigeration equipment.

“Grading” means any excavating or filling of earth material, or any combination thereof, conducted at a site to prepare the site for construction or other improvements thereon.

“Impact noise source” means the noise produced by the collision of one mass in motion with a second mass which may be either in motion or at rest.

“Mobile noise source” means any noise source other than a fixed noise source.

“Noise level” means the “A” weighted sound pressure level in decibels obtained by using a sound level meter at slow response with a reference pressure of 20 micronewtons per square meter. The unit of measurement shall be designated as dB(A).

“Nonresidential property” means any parcel of real property other than residential property.

“Residential property” means a parcel of real property which is developed and used either in part or in whole for residential purposes, other than transient uses such as hotels and motels.

“Simple tone noise” means a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

“Sound level meter” means an instrument meeting American National Standard Institute’s Standard S1.4-1971 for Type 1 or Type 2 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.

“Sound pressure level, in decibels” means 20 times the logarithm to the base 10 of the ratio of the pressure of the sound to a reference pressure, which reference pressure shall be explicitly stated. [Ord. 2010-126 § 1 (Exh. A)].

Cross-reference: definitions generally, AVMC 1.02.010.

8.12.040 Noise level measurement criteria.

Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter. Exterior noise levels shall be measured at any point on the affected property. Interior noise levels shall be measured within the affected dwelling unit at a point at least four feet from the wall, ceiling, or floor nearest the alleged noise source with the windows of the affected dwelling unit closed. [Ord. 2010-126 § 1 (Exh. A)].

8.12.050 Exterior noise standards.

A. The following exterior noise standards, unless otherwise specifically indicated, shall apply to all residential property within the city:

Residential Exterior Noise Standards		
	Noise Level	**Time Period**
Density of less than 10 DU/acre	50 dB(A)	7:00 a.m. – 10:00 p.m.
	45 dB(A)	10:00 p.m. – 7:00 a.m.
Density of 10 DU/acre or more	55 dB(A)	7:00 a.m. – 10:00 p.m.
	50 dB(A)	10:00 p.m. – 7:00 a.m.

In the event the noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five dB(A).

B. The following exterior noise standards, unless otherwise specifically indicated, shall apply to all nonresidential property within the city. If a noise affects both residential and nonresidential property, then the applicable noise standard shall be the arithmetic mean of the applicable standards that apply to residential and nonresidential property.

Nonresidential Exterior Noise Standards		
	Noise Level	**Time Period**
Commercial	65 dB(A)	7:00 a.m. – 10:00 p.m.
	60 dB(A)	10:00 p.m. – 7:00 a.m.
Manufacturing/Industrial	70 dB(A)	24 hours per day

In the event the noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five dB(A).

C. It shall be unlawful for any person at any location within the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by the person, when the foregoing causes the noise level, when measured on any other parcel, to exceed:

1. The noise standard for a cumulative period of more than 30 minutes in any hour.

2. The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour.

3. The noise standard plus 10 dB(A) for a cumulative period of more than five minutes in any hour.

4. The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.

5. The noise standard plus 20 dB(A) for any period of time.

6. In the event the ambient noise level exceeds any of the applicable standards when the source of the noise is not operating, the ambient noise level shall become the standard. [Ord. 2013-151 § 3 (Exh. A); Ord. 2013-149 § 1; Ord. 2010-126 § 1 (Exh. A)].

8.12.060 Interior noise standards.

A. The following interior noise standards, unless otherwise specifically indicated, shall apply to all residential property within the city:

Residential Interior Noise Standards	
Noise Level	**Time Period**
55 dB(A)	7:00 a.m. – 10:00 p.m.
45 dB(A)	10:00 p.m. – 7:00 a.m.

In the event the noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five dB(A).

B. It shall be unlawful for any person at any location within the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by the person, when the foregoing causes the noise level, when measured within the interior of any other dwelling unit on any residential parcel within the city to exceed:

1. The interior noise standard for a cumulative period of more than five minutes in any hour.

2. The interior noise standard plus five dB(A) for a cumulative period of more than one minute in any hour.

3. The interior noise standard plus 10 dB(A) for any period of time.

C. In the event the ambient noise level exceeds either of the first two noise level categories above, the cumulative period applicable to the category shall be increased to reflect the ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under that category shall be increased to reflect the maximum ambient noise level. [Ord. 2010-126 § 1 (Exh. A)].

8.12.070 Exemptions.

The following activities shall be exempt from the provisions of this chapter:

A. Activities conducted on the grounds of any public or private nursery, elementary, intermediate or secondary school or college, or day care home.

B. “Special events” as defined in AVMC 11.05.020 provided said events are conducted pursuant to a special events permit issued pursuant to Chapter 11.05 AVMC.

C. Outdoor gatherings, public dances and shows, provided the events are conducted pursuant to a permit issued by the city.

D. Any mechanical device, apparatus, or equipment used, related to or connected with emergency machinery, vehicle or work.

E. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided the activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, 8:00 p.m. and 8:00 a.m. on Saturday, or at any time on Sunday or a federal holiday.

F. Noise sources associated with the maintenance of real property, provided the activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except Sunday or a federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a federal holiday.

G. Any activity to the extent regulation thereof has been preempted by state or federal law.

H. Noise sources associated with solid waste collection and removal, provided such activities take place between 7:00 a.m. and 6:00 p.m. Monday through Friday where audible in residential areas; or between 7:00 a.m. and 6:00 p.m. on Saturdays where audible in residential areas; or between 5:00 a.m. and 9:00 p.m. any day where such activity is not audible in residential areas; or as otherwise provided in an approved franchise agreement between a waste hauler and the city. [Ord. 2010-126 § 1 (Exh. A)].

8.12.080 Schools, hospitals and churches – Special provisions.

It shall be unlawful for any person to create any noise which causes the noise level at any school, hospital or church while the same is in use for its intended purpose to exceed the noise limits as specified in AVMC 8.12.050(A) or which causes the noise level to unreasonably interfere with the use of such institutions for their intended purpose or which unreasonably disturbs or annoys students, patients, or attendees in such institutions, provided conspicuous signs are displayed in three separate locations within one-tenth of a mile of the institution indicating the presence of a school, church or hospital. [Ord. 2010-126 § 1 (Exh. A)].

8.12.090 Manner of enforcement.

A. The chief of police services, or designee, is directed to enforce the provisions of this chapter.

B. No person shall interfere with, oppose, or resist any authorized person charged with the enforcement of this chapter while the person is engaged in the performance of his/her duty. [Ord. 2010-126 § 1 (Exh. A)].

Cross-reference: interference with public officers prohibited, AVMC 8.20.040.

8.12.100 Violations.

Any person violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor and/or such violation shall constitute a public nuisance. [Ord. 2010-126 § 1 (Exh. A)].

Cross-reference: violations and penalties generally, Chapter 1.06 AVMC.

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[1] **Cross-references:** animal noise nuisances, AVMC 6.04.030; solid waste collection vehicles, AVMC 7.05.150; disturbances in residential areas during sleeping hours, Chapter 8.10 AVMC.

Appendix B
Photographs, Field Sheets, and Measured Noise Data

RK ENGINEERING GROUP INC.

Field Sheet

Project:	Polaris Place Residential Project	**Engineer:** B. Morrison	**Date:** 04/14/2026
			JN: 2827-2025-09
Measurement Address:	South of Aliso Viejo Pkwy., between SR-73 and Aliso Creek Rd.	**City:**	Aliso Viejo, CA

Sound Level Meter:
Piccolo II
Serial #: P0222082204
P0222082205

Calibrator:
BSWA
Serial #: 500732

Calibration Record:

Meter	Input (dB)	Time
1	94	2: 34 p.m.
2	94	2:43 p.m.
3	--	--
4	--	--

Conditions (4/15/2026):

Temperature (°F):	H: 72, L: 56
Windspeed (m.p.h.):	Max: 12
Wind Direction:	Varies
Skies:	Partly Cloudy

Meter Settings:

☑ A-Weighted	☐ Linear	☑ Slow	☐ 1/1 Octave	☑ _60_ Minute Intervals
☐ C-Weighted	☐ Impulse	☐ Fast	☐ 1/3 Octave	☑ L(n) Percentile Values

Notes:
Noise measurements were taken at 1-hour intervals for a period of 24 hours. The primary sources of ambient noise during the measurement period were roadway activity along SR-73 and onsite parking and circulation.

Measurement Type:
☑ Long-term (24-hour)
☐ Short-term



1 = Noise Monitoring Location

RK ENGINEERING GROUP INC.

Field Photos - Noise Monitoring Location 1 (L-1)

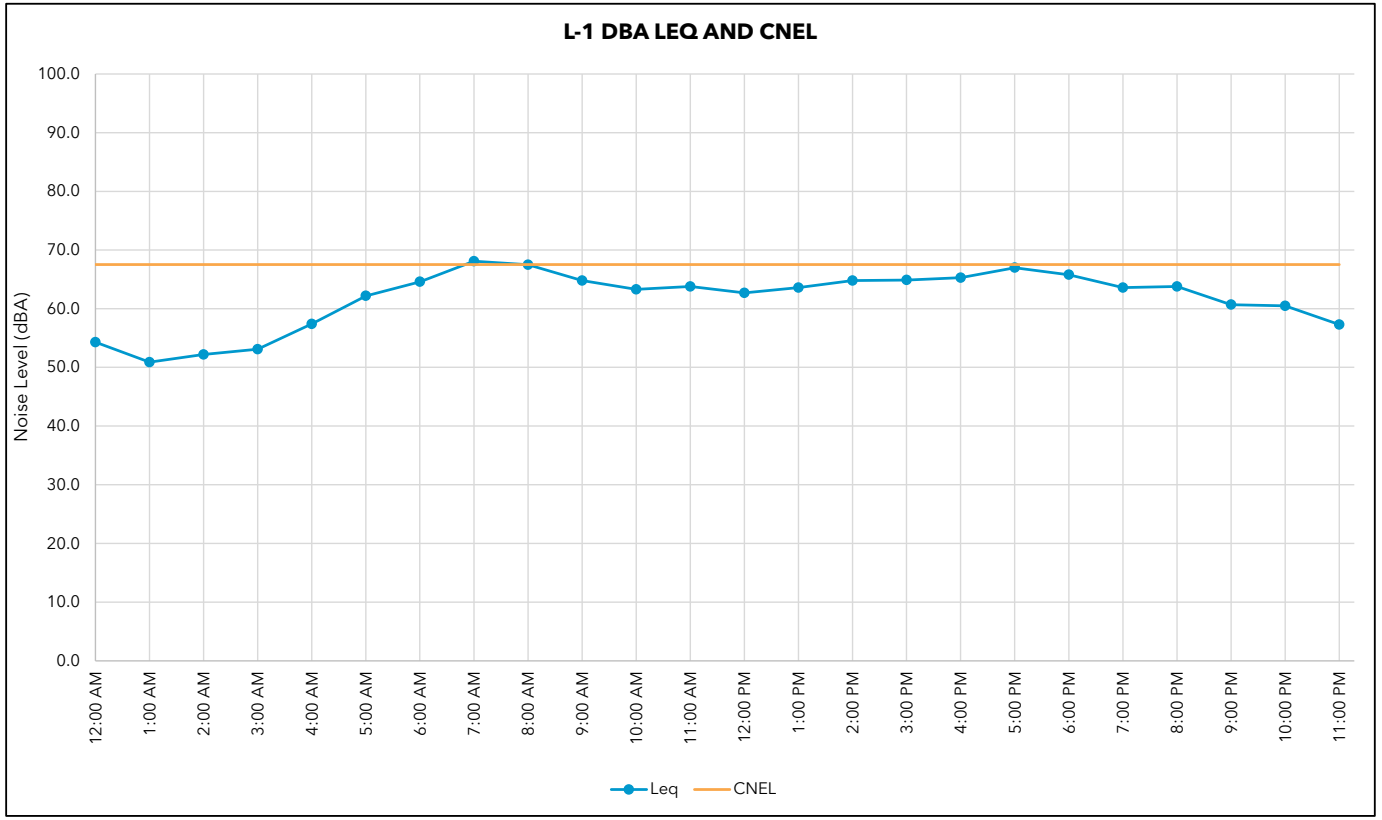
Project: Polaris Place Residential Project		**Engineer:** B. Morrison	**Date:** 04/14/2026 **JN:** 2827-2025-09
Measurement Address: South of Aliso Viejo Pkwy., between SR-73 and Aliso Creek Rd.		**City:** Aliso Viejo, CA	
Notes:	Noise Monitoring Location 1 (L-1) was located near the northeastern corner of the proposed project site, approximately 80 feet south-southeast of the centerline of Aliso Viejo Pkwy. and approximately 1,265 feet northeast of the centerline of SR-73.		



Noise Monitoring Location 1 Noise Monitoring Results (dBA Leq and CNEL)

Time	Leq	CNEL
12:00 AM	54.3	67.5
1:00 AM	50.9	67.5
2:00 AM	52.2	67.5
3:00 AM	53.1	67.5
4:00 AM	57.4	67.5
5:00 AM	62.2	67.5
6:00 AM	64.6	67.5
7:00 AM	68.1	67.5
8:00 AM	67.5	67.5
9:00 AM	64.8	67.5
10:00 AM	63.3	67.5
11:00 AM	63.8	67.5
12:00 PM	62.7	67.5
1:00 PM	63.6	67.5
2:00 PM	64.8	67.5
3:00 PM	64.9	67.5
4:00 PM	65.3	67.5
5:00 PM	67.0	67.5
6:00 PM	65.8	67.5
7:00 PM	63.6	67.5
8:00 PM	63.8	67.5
9:00 PM	60.7	67.5
10:00 PM	60.5	67.5
11:00 PM	57.3	67.5

Day Min:	60.7
Night Min	50.9



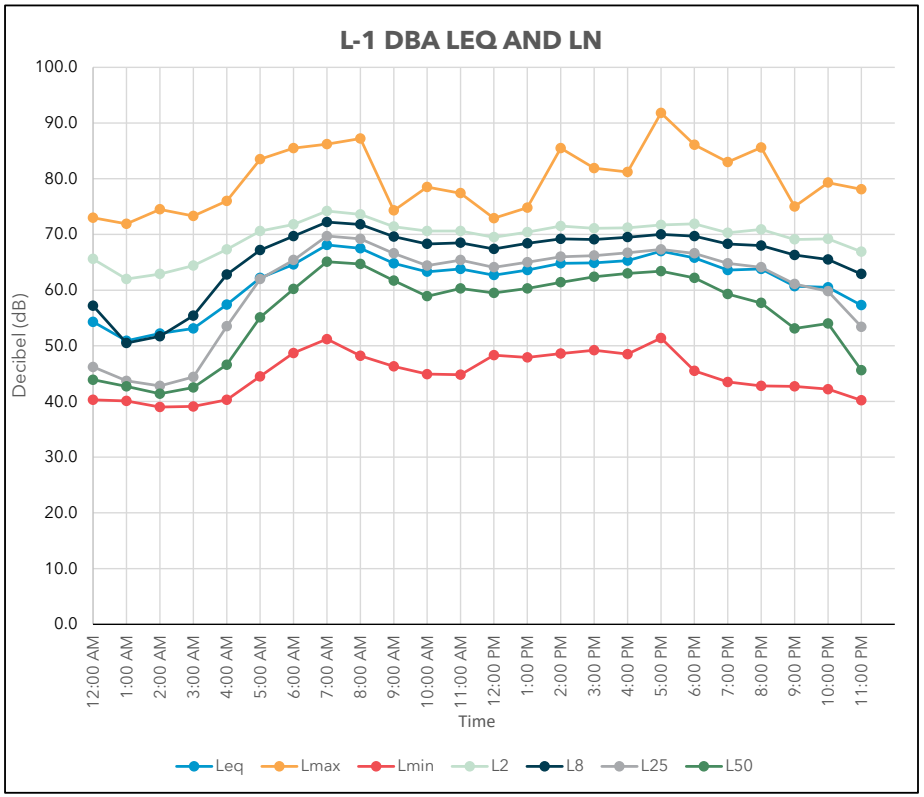
RK ENGINEERING GROUP INC.

Noise Monitoring Location 1 Noise Monitoring Results (dBA Leq and Ln)

PROJECT:	Polaris Place Residential Project	**JOB #:**	2827-2025-09
NOISE METER:	Piccolo II SLM, 24-Hour Measurement	**DATE:**	15-Apr-26
LOCATION:	1	**BY:**	B. Morrison

Time	Leq	Lmax	Lmin	L2	L8	L25	L50
12:00 AM	54.3	73.0	40.3	65.6	57.2	46.2	43.9
1:00 AM	50.9	71.9	40.1	62.0	50.5	43.7	42.7
2:00 AM	52.2	74.5	39.0	62.9	51.7	42.8	41.4
3:00 AM	53.1	73.3	39.1	64.4	55.4	44.4	42.5
4:00 AM	57.4	76.0	40.3	67.3	62.8	53.5	46.6
5:00 AM	62.2	83.5	44.5	70.6	67.2	62.0	55.1
6:00 AM	64.6	85.5	48.7	71.8	69.7	65.4	60.2
7:00 AM	68.1	86.2	51.2	74.2	72.2	69.7	65.1
8:00 AM	67.5	87.2	48.2	73.6	71.8	69.2	64.7
9:00 AM	64.8	74.3	46.3	71.4	69.6	66.6	61.7
10:00 AM	63.3	78.5	44.9	70.6	68.3	64.4	58.9
11:00 AM	63.8	77.4	44.8	70.6	68.5	65.4	60.3
12:00 PM	62.7	72.9	48.3	69.5	67.4	64.1	59.5
1:00 PM	63.6	74.8	47.9	70.4	68.4	65.0	60.3
2:00 PM	64.8	85.5	48.6	71.5	69.2	66.0	61.4
3:00 PM	64.9	81.9	49.2	71.1	69.1	66.2	62.4
4:00 PM	65.3	81.2	48.5	71.2	69.5	66.7	63.0
5:00 PM	67.0	91.8	51.4	71.7	70.0	67.3	63.4
6:00 PM	65.8	86.1	45.5	71.9	69.7	66.6	62.2
7:00 PM	63.6	83.0	43.5	70.3	68.3	64.8	59.3
8:00 PM	63.8	85.6	42.8	70.9	68.0	64.1	57.7
9:00 PM	60.7	75.0	42.7	69.1	66.3	61.1	53.1
10:00 PM	60.5	79.3	42.2	69.2	65.5	59.8	54.0
11:00 PM	57.3	78.1	40.2	66.9	62.9	53.4	45.6

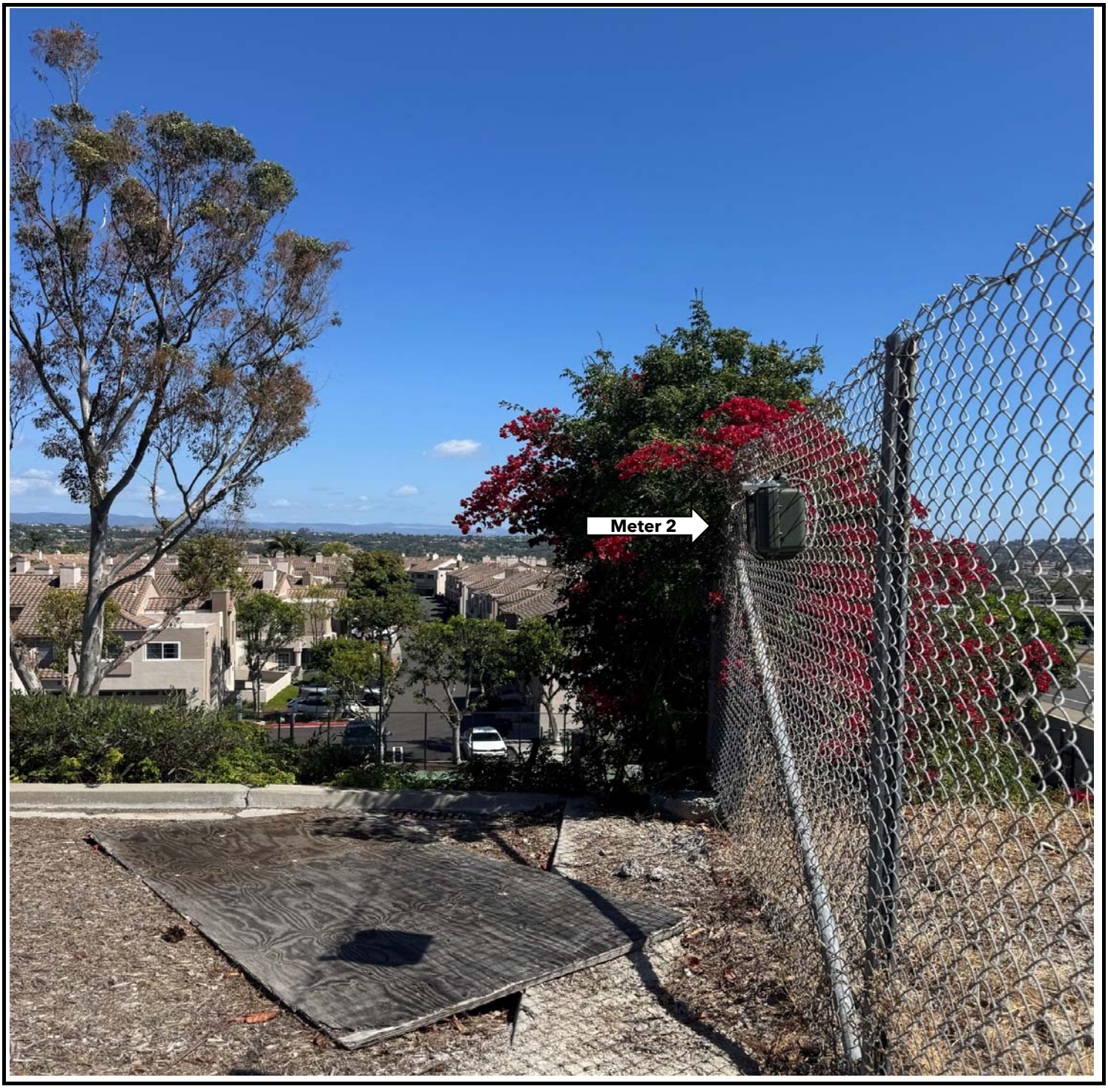
Daytime	64.9	91.8	42.2	71.3	69.2	66.1	61.4
Nighttime	59.0	85.5	39.0	67.7	63.9	58.5	52.8



RK ENGINEERING GROUP INC.

Field Photos - Noise Monitoring Location 2 (L-2)

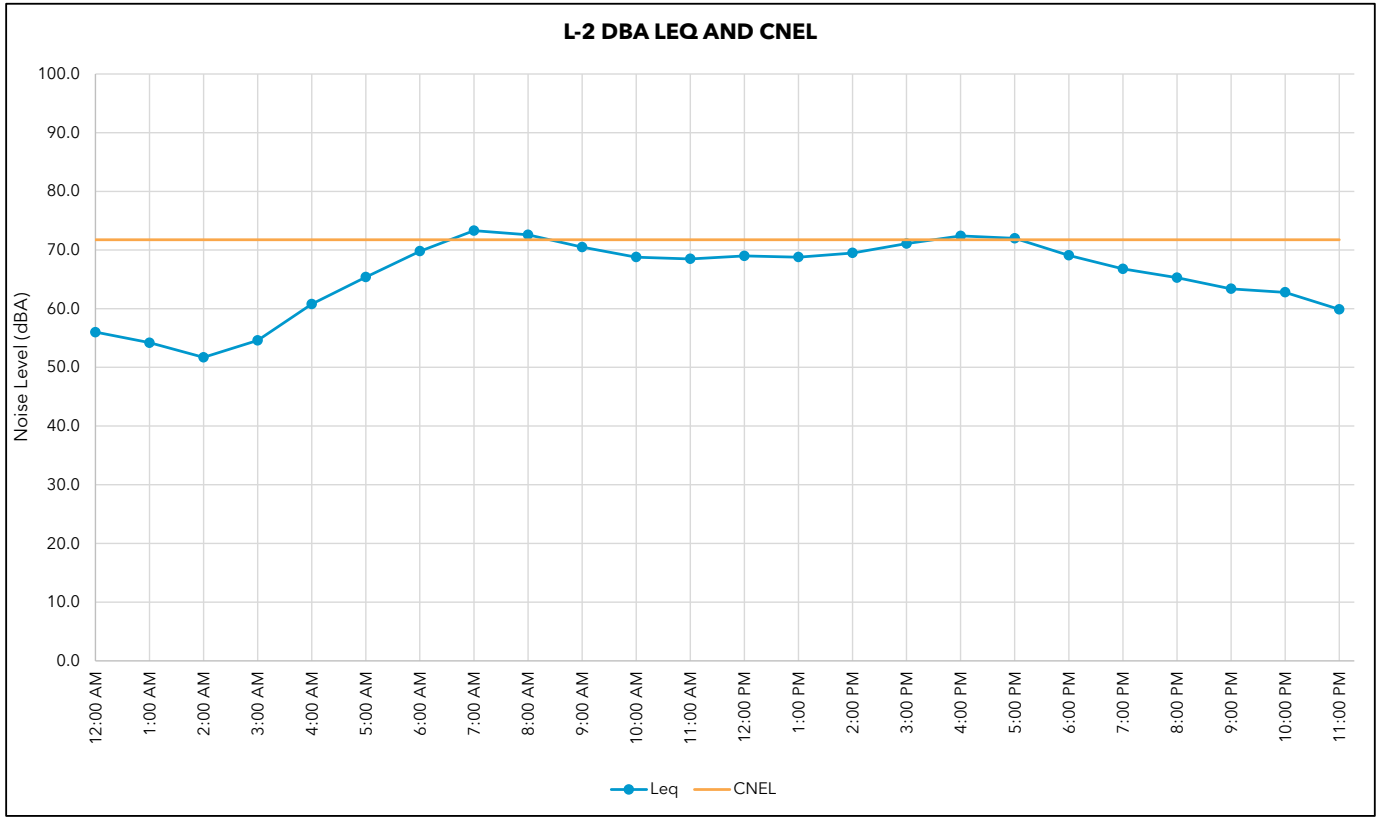
Project: Polaris Place Residential Project		**Engineer:** B. Morrison	**Date:** 04/14/2026 **JN:** 2827-2025-09
Measurement Address: South of Aliso Viejo Pkwy., between SR-73 and Aliso Creek Rd.		**City:** Aliso Viejo, CA	
Notes:	Noise Monitoring Location 2 (L-2) was located near the southwestern corner of the proposed project site, approximately 1,305 feet southeast of the centerline of Aliso Viejo Pkwy. and approximately 215 feet northeast of the centerline of SR-73.		



Noise Monitoring Location 2 Noise Monitoring Results (dBA Leq and CNEL)

Time	Leq	CNEL
12:00 AM	56.0	71.7
1:00 AM	54.2	71.7
2:00 AM	51.7	71.7
3:00 AM	54.6	71.7
4:00 AM	60.8	71.7
5:00 AM	65.4	71.7
6:00 AM	69.8	71.7
7:00 AM	73.3	71.7
8:00 AM	72.6	71.7
9:00 AM	70.5	71.7
10:00 AM	68.8	71.7
11:00 AM	68.5	71.7
12:00 PM	69.0	71.7
1:00 PM	68.8	71.7
2:00 PM	69.5	71.7
3:00 PM	71.1	71.7
4:00 PM	72.4	71.7
5:00 PM	72.0	71.7
6:00 PM	69.1	71.7
7:00 PM	66.8	71.7
8:00 PM	65.3	71.7
9:00 PM	63.4	71.7
10:00 PM	62.8	71.7
11:00 PM	59.9	71.7

Day Min:	63.4
Night Min	51.7



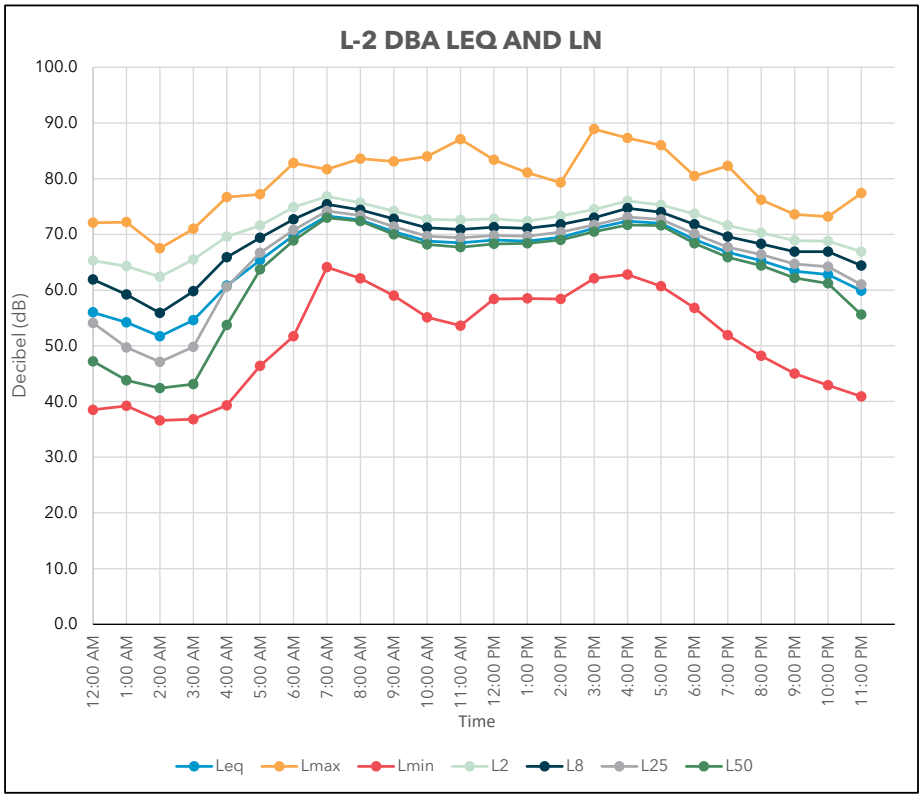
RK ENGINEERING GROUP INC.

Noise Monitoring Location 2 Noise Monitoring Results (dBA Leq and Ln)

PROJECT:	Polaris Place Residential Project	**JOB #:**	2827-2025-09
NOISE METER:	Piccolo II SLM, 24-Hour Measurement	**DATE:**	15-Apr-26
LOCATION:	2	**BY:**	B. Morrison

Time	Leq	Lmax	Lmin	L2	L8	L25	L50
12:00 AM	56.0	72.1	38.5	65.3	61.9	54.1	47.2
1:00 AM	54.2	72.2	39.2	64.3	59.2	49.7	43.8
2:00 AM	51.7	67.5	36.6	62.4	55.9	47.1	42.4
3:00 AM	54.6	71.0	36.8	65.5	59.8	49.8	43.1
4:00 AM	60.8	76.7	39.3	69.6	65.9	60.6	53.7
5:00 AM	65.4	77.2	46.4	71.6	69.4	66.7	63.7
6:00 AM	69.8	82.8	51.7	74.9	72.7	70.8	68.9
7:00 AM	73.3	81.7	64.1	76.8	75.4	74.2	73.0
8:00 AM	72.6	83.6	62.1	75.7	74.4	73.4	72.4
9:00 AM	70.5	83.1	59.0	74.2	72.8	71.4	70.0
10:00 AM	68.8	84.0	55.1	72.7	71.2	69.7	68.2
11:00 AM	68.5	87.1	53.6	72.6	70.9	69.4	67.7
12:00 PM	69.0	83.4	58.4	72.8	71.3	69.8	68.3
1:00 PM	68.8	81.1	58.5	72.4	71.1	69.7	68.4
2:00 PM	69.5	79.3	58.4	73.3	71.8	70.4	69.0
3:00 PM	71.1	88.9	62.1	74.5	73.0	71.7	70.5
4:00 PM	72.4	87.3	62.8	76.0	74.7	73.1	71.7
5:00 PM	72.0	86.0	60.7	75.3	74.0	72.7	71.6
6:00 PM	69.1	80.5	56.8	73.7	71.8	70.1	68.4
7:00 PM	66.8	82.3	51.9	71.6	69.6	67.7	65.9
8:00 PM	65.3	76.2	48.2	70.3	68.3	66.4	64.4
9:00 PM	63.4	73.6	45.0	68.9	66.9	64.7	62.2
10:00 PM	62.8	73.2	42.9	68.8	66.9	64.2	61.2
11:00 PM	59.9	77.4	40.9	66.9	64.4	61.0	55.6

Daytime	69.9	88.9	42.9	73.7	72.2	70.7	69.4
Nighttime	63.1	82.8	36.6	69.5	66.7	63.9	61.3



Appendix C
Stationary Noise Calculation Worksheets

RK ENGINEERING GROUP INC.

Stationary Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/22/2026
		JN:	2827-2025-09
Noise Source:	HVAC (Single Unit)	**Engineer:**	B. Morrison
Location:	Nearest adjacent receptors		

Noise Input Data				
OBS DIST=	50.0			
DT WALL=	0.0			
DT W/OB=	50.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	4.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	0.0		NOISE HTH EL=	4.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		

Noise Output Data (dBA)							
	Distance (ft.)	**Leq**	**Lmax**	**L2**	**L8**	**L25**	**L50**
REF LEVEL	3.28	65.0	65.0	65.0	65.0	65.0	65.0
PROJ LEVEL	50	41.3	41.3	41.3	41.3	41.3	41.3
SHIELDING	50	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	**50**	***41.3***	***41.3***	***41.3***	***41.3***	***41.3***	***41.3***
NOISE LEVEL REDUCTION DUE TO DISTANCE =							-23.66192321

RK ENGINEERING GROUP INC.

Stationary Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	6/9/2026
		JN:	2827-2025-09
Noise Source:	Pool Area	**Engineer:**	B. Morrison
Location:	Nearest adjacent receptors		

Noise Input Data				
OBS DIST=	480.0			
DT WALL=	0.0			
DT W/OB=	480.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	5.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	0.0		NOISE HTH EL=	5.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		

Noise Output Data (dBA)							
	Distance (ft.)	**Leq**	**Lmax**	**L2**	**L8**	**L25**	**L50**
REF LEVEL	0.1	92.9	92.9	92.9	92.9	92.9	92.9
PROJ LEVEL	480	19.3	19.3	19.3	19.3	19.3	19.3
SHIELDING	480	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	**480**	***19.3***	***19.3***	***19.3***	***19.3***	***19.3***	***19.3***
NOISE LEVEL REDUCTION DUE TO DISTANCE =							-73.62482475

RK ENGINEERING GROUP INC.

dB Adder

Project:	Polaris Place Residential Project	**Date:**	6/9/2026
		JN:	2827-2025-09
Noise Source:	Combined Noise Sources - Daytime	**Engineer:**	B. Morrison
Location:	Nearest adjacent receptors		

Noise Levels (dBA)						
Noise Source	**Leq**	**Lmax**	**L2**	**L8**	**L25**	**L50**
HVAC (1)	41.3	41.3				
HVAC (2)	41.3	41.3				
HVAC (3)	41.3	41.3				
HVAC (4)	41.3	41.3				
HVAC (5)	41.3	41.3				
Pool	19.3	19.3				
Total	***48.3***	***48.3***	**--**	**--**	**--**	**--**

RK ENGINEERING GROUP INC.

dB Adder

Project:	Polaris Place Residential Project	**Date:**	6/9/2026
		JN:	2827-2025-09
Noise Source:	Combined Noise Sources - Nighttime	**Engineer:**	B. Morrison
Location:	Nearest adjacent receptors		

Noise Levels (dBA)						
Noise Source	**Leq**	**Lmax**	**L2**	**L8**	**L25**	**L50**
HVAC (1)	41.3	41.3				
HVAC (2)	41.3	41.3				
HVAC (3)	41.3	41.3				
HVAC (4)	41.3	41.3				
HVAC (5)	41.3	41.3				
Total	***48.3***	***48.3***	**--**	**--**	**--**	**--**

Appendix D
Operational Roadway Noise Calculation Worksheets

RK ENGINEERING GROUP INC.

Roadway Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/9/2026
Roadway:	1. Aliso Viejo Parkway (Existing Conditions)	**JN:**	2827-2025-09
Location:	Moulton Parkway to Aliso Creek Road N	**Engineer:**	B. Morrison

Noise Input Data

Roadway Conditions

ADT	22,989	
SPEED	50	
PK HR %	10	
NEAR LANE/FAR LANE DIST	75	
ROAD ELEVATION	0.0	
GRADE	0.0	%
PK HR VOL	2,299	

Receiver Input Data

RECEIVER DISTANCE	100
DIST C/L TO WALL	0
RECEIVER HEIGHT	5.0
WALL DISTANCE FROM RECEIVER	100
PAD ELEVATION	0.0
ROADWAY VIEW:	
LF ANGLE	-90
RT ANGLE	90
DF ANGLE	180

Site Conditions

AUTOMOBILES	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS	10	
HEAVY TRUCKS	10	

Wall Information

HTH WALL	0.0	
AMBIENT	0.0	
BARRIER	0	(0 = WALL, 1= BERM)

Vehicle Mix Data

Vehicle Type	Day	Evening	Night	Daily
AUTOMOBILES	0.756	0.140	0.104	0.9200
MEDIUM TRUCKS	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

Misc. Vehicle Info

Vehicle Type	Height	SLE Distance	Grade Adjustment
AUTOMOBILES	2.0	92.75	- -
MEDIUM TRUCKS	4.0	92.71	- -
HEAVY TRUCKS	8.0	92.75	0.00

Noise Output Data

Noise Impacts (Without Topo or Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	69.3	67.3	66.0	60.0	68.4	69.0
MEDIUM TRUCKS	62.1	58.2	50.4	59.6	65.7	65.8
HEAVY TRUCKS	68.6	64.6	56.8	66.0	72.2	72.2
COMBINED NOISE LEVEL	***72.4***	***69.5***	***66.6***	***67.7***	***74.3***	***74.5***

Noise Impacts (With Topo and Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	69.3	67.3	66.0	60.0	68.4	69.0
MEDIUM TRUCKS	62.1	58.2	50.4	59.6	65.7	65.8
HEAVY TRUCKS	68.6	64.6	56.8	66.0	72.2	72.2
COMBINED NOISE LEVEL	***72.4***	***69.5***	***66.6***	***67.7***	***74.3***	***74.5***

Noise Contour (Feet)

Noise Levels	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	284	898	2841	8984
LDN	272	859	2717	8592

RK ENGINEERING GROUP INC.

Roadway Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/9/2026
Roadway:	2. Aliso Viejo Parkway (Existing Conditions)	**JN:**	2827-2025-09
Location:	Aliso Creek Road N to Enterprise	**Engineer:**	B. Morrison

Noise Input Data

Roadway Conditions

ADT	12,948	
SPEED	50	
PK HR %	10	
NEAR LANE/FAR LANE DIST	75	
ROAD ELEVATION	0.0	
GRADE	0.0	%
PK HR VOL	1,295	

Receiver Input Data

RECEIVER DISTANCE	100
DIST C/L TO WALL	0
RECEIVER HEIGHT	5.0
WALL DISTANCE FROM RECEIVER	100
PAD ELEVATION	0.0
ROADWAY VIEW:	
LF ANGLE	-90
RT ANGLE	90
DF ANGLE	180

Site Conditions

AUTOMOBILES	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS	10	
HEAVY TRUCKS	10	

Wall Information

HTH WALL	0.0	
AMBIENT	0.0	
BARRIER	0	(0 = WALL, 1= BERM)

Vehicle Mix Data

Vehicle Type	Day	Evening	Night	Daily
AUTOMOBILES	0.756	0.140	0.104	0.9200
MEDIUM TRUCKS	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

Misc. Vehicle Info

Vehicle Type	Height	SLE Distance	Grade Adjustment
AUTOMOBILES	2.0	92.75	- -
MEDIUM TRUCKS	4.0	92.71	- -
HEAVY TRUCKS	8.0	92.75	0.00

Noise Output Data

Noise Impacts (Without Topo or Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	66.8	64.8	63.5	57.5	65.9	66.5
MEDIUM TRUCKS	59.6	55.7	47.9	57.1	63.2	63.3
HEAVY TRUCKS	66.1	62.1	54.3	63.5	69.7	69.7
COMBINED NOISE LEVEL	***69.9***	***67.0***	***64.1***	***65.2***	***71.8***	***72.0***

Noise Impacts (With Topo and Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	66.8	64.8	63.5	57.5	65.9	66.5
MEDIUM TRUCKS	59.6	55.7	47.9	57.1	63.2	63.3
HEAVY TRUCKS	66.1	62.1	54.3	63.5	69.7	69.7
COMBINED NOISE LEVEL	***69.9***	***67.0***	***64.1***	***65.2***	***71.8***	***72.0***

Noise Contour (Feet)

Noise Levels	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	160	506	1600	5060
LDN	153	484	1530	4839

RK ENGINEERING GROUP INC.

Roadway Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/9/2026
Roadway:	3. Aliso Viejo Parkway (Existing Conditions)	**JN:**	2827-2025-09
Location:	Enterprise to Aliso Creek Road S	**Engineer:**	B. Morrison

Noise Input Data

Roadway Conditions

ADT	15,897	
SPEED	50	
PK HR %	10	
NEAR LANE/FAR LANE DIST	75	
ROAD ELEVATION	0.0	
GRADE	0.0	%
PK HR VOL	1,590	

Receiver Input Data

RECEIVER DISTANCE	100
DIST C/L TO WALL	0
RECEIVER HEIGHT	5.0
WALL DISTANCE FROM RECEIVER	100
PAD ELEVATION	0.0
ROADWAY VIEW:	
LF ANGLE	-90
RT ANGLE	90
DF ANGLE	180

Site Conditions

AUTOMOBILES	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS	10	
HEAVY TRUCKS	10	

Wall Information

HTH WALL	0.0	
AMBIENT	0.0	
BARRIER	0	(0 = WALL, 1= BERM)

Vehicle Mix Data

Vehicle Type	Day	Evening	Night	Daily
AUTOMOBILES	0.756	0.140	0.104	0.9200
MEDIUM TRUCKS	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

Misc. Vehicle Info

Vehicle Type	Height	SLE Distance	Grade Adjustment
AUTOMOBILES	2.0	92.75	- -
MEDIUM TRUCKS	4.0	92.71	- -
HEAVY TRUCKS	8.0	92.75	0.00

Noise Output Data

Noise Impacts (Without Topo or Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	67.7	65.7	64.4	58.4	66.8	67.4
MEDIUM TRUCKS	60.5	56.6	48.8	58.0	64.1	64.2
HEAVY TRUCKS	67.0	63.0	55.2	64.4	70.6	70.6
COMBINED NOISE LEVEL	***70.8***	***67.9***	***65.0***	***66.1***	***72.7***	***72.9***

Noise Impacts (With Topo and Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	67.7	65.7	64.4	58.4	66.8	67.4
MEDIUM TRUCKS	60.5	56.6	48.8	58.0	64.1	64.2
HEAVY TRUCKS	67.0	63.0	55.2	64.4	70.6	70.6
COMBINED NOISE LEVEL	***70.8***	***67.9***	***65.0***	***66.1***	***72.7***	***72.9***

Noise Contour (Feet)

Noise Levels	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	196	621	1964	6212
LDN	188	594	1879	5941

RK ENGINEERING GROUP INC.

Roadway Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/9/2026
Roadway:	4. Aliso Creek Road (Existing Conditions)	**JN:**	2827-2025-09
Location:	North of Glenwood Drive	**Engineer:**	B. Morrison

Noise Input Data

Roadway Conditions

ADT	25,150	
SPEED	50	
PK HR %	10	
NEAR LANE/FAR LANE DIST	55	
ROAD ELEVATION	0.0	
GRADE	0.0	%
PK HR VOL	2,515	

Receiver Input Data

RECEIVER DISTANCE	100
DIST C/L TO WALL	0
RECEIVER HEIGHT	5.0
WALL DISTANCE FROM RECEIVER	100
PAD ELEVATION	0.0
ROADWAY VIEW:	
LF ANGLE	-90
RT ANGLE	90
DF ANGLE	180

Site Conditions

AUTOMOBILES	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS	10	
HEAVY TRUCKS	10	

Wall Information

HTH WALL	0.0	
AMBIENT	0.0	
BARRIER	0	(0 = WALL, 1= BERM)

Vehicle Mix Data

Vehicle Type	Day	Evening	Night	Daily
AUTOMOBILES	0.756	0.140	0.104	0.9200
MEDIUM TRUCKS	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

Misc. Vehicle Info

Vehicle Type	Height	SLE Distance	Grade Adjustment
AUTOMOBILES	2.0	96.19	- -
MEDIUM TRUCKS	4.0	96.15	- -
HEAVY TRUCKS	8.0	96.19	0.00

Noise Output Data

Noise Impacts (Without Topo or Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	69.6	67.6	66.2	60.2	68.6	69.3
MEDIUM TRUCKS	62.4	58.4	50.6	59.8	66.0	66.0
HEAVY TRUCKS	68.8	64.8	57.0	66.3	72.4	72.4
COMBINED NOISE LEVEL	***72.6***	***69.7***	***66.8***	***67.9***	***74.6***	***74.8***

Noise Impacts (With Topo and Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	69.6	67.6	66.2	60.2	68.6	69.3
MEDIUM TRUCKS	62.4	58.4	50.6	59.8	66.0	66.0
HEAVY TRUCKS	68.8	64.8	57.0	66.3	72.4	72.4
COMBINED NOISE LEVEL	***72.6***	***69.7***	***66.8***	***67.9***	***74.6***	***74.8***

Noise Contour (Feet)

Noise Levels	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	300	948	2997	9476
LDN	287	906	2866	9063

RK ENGINEERING GROUP INC.

Roadway Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/9/2026
Roadway:	5. Aliso Creek Road (Existing Conditions)	**JN:**	2827-2025-09
Location:	Glenwood Drive to Pacific Park Drive	**Engineer:**	B. Morrison

Noise Input Data

Roadway Conditions

ADT	18,726	
SPEED	50	
PK HR %	10	
NEAR LANE/FAR LANE DIST	50	
ROAD ELEVATION	0.0	
GRADE	0.0	%
PK HR VOL	1,873	

Receiver Input Data

RECEIVER DISTANCE	100
DIST C/L TO WALL	0
RECEIVER HEIGHT	5.0
WALL DISTANCE FROM RECEIVER	100
PAD ELEVATION	0.0
ROADWAY VIEW:	
LF ANGLE	-90
RT ANGLE	90
DF ANGLE	180

Site Conditions

AUTOMOBILES	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS	10	
HEAVY TRUCKS	10	

Wall Information

HTH WALL	0.0	
AMBIENT	0.0	
BARRIER	0	(0 = WALL, 1= BERM)

Vehicle Mix Data

Vehicle Type	Day	Evening	Night	Daily
AUTOMOBILES	0.756	0.140	0.104	0.9200
MEDIUM TRUCKS	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

Misc. Vehicle Info

Vehicle Type	Height	SLE Distance	Grade Adjustment
AUTOMOBILES	2.0	96.87	- -
MEDIUM TRUCKS	4.0	96.83	- -
HEAVY TRUCKS	8.0	96.87	0.00

Noise Output Data

Noise Impacts (Without Topo or Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	68.2	66.2	64.9	58.9	67.3	67.9
MEDIUM TRUCKS	61.1	57.1	49.3	58.5	64.7	64.7
HEAVY TRUCKS	67.5	63.5	55.7	64.9	71.1	71.1
COMBINED NOISE LEVEL	***71.3***	***68.4***	***65.5***	***66.6***	***73.3***	***73.5***

Noise Impacts (With Topo and Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	68.2	66.2	64.9	58.9	67.3	67.9
MEDIUM TRUCKS	61.1	57.1	49.3	58.5	64.7	64.7
HEAVY TRUCKS	67.5	63.5	55.7	64.9	71.1	71.1
COMBINED NOISE LEVEL	***71.3***	***68.4***	***65.5***	***66.6***	***73.3***	***73.5***

Noise Contour (Feet)

Noise Levels	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	222	701	2216	7006
LDN	212	670	2119	6701

RK ENGINEERING GROUP INC.

Roadway Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/9/2026
Roadway:	6. Aliso Creek Road (Existing Conditions)	**JN:**	2827-2025-09
Location:	South of Pacific Park Drive	**Engineer:**	B. Morrison

Noise Input Data

Roadway Conditions

ADT	21,939	
SPEED	50	
PK HR %	10	
NEAR LANE/FAR LANE DIST	75	
ROAD ELEVATION	0.0	
GRADE	0.0	%
PK HR VOL	2,194	

Receiver Input Data

RECEIVER DISTANCE	100
DIST C/L TO WALL	0
RECEIVER HEIGHT	5.0
WALL DISTANCE FROM RECEIVER	100
PAD ELEVATION	0.0
ROADWAY VIEW:	
LF ANGLE	-90
RT ANGLE	90
DF ANGLE	180

Site Conditions

AUTOMOBILES	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS	10	
HEAVY TRUCKS	10	

Wall Information

HTH WALL	0.0	
AMBIENT	0.0	
BARRIER	0	(0 = WALL, 1= BERM)

Vehicle Mix Data

Vehicle Type	Day	Evening	Night	Daily
AUTOMOBILES	0.756	0.140	0.104	0.9200
MEDIUM TRUCKS	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

Misc. Vehicle Info

Vehicle Type	Height	SLE Distance	Grade Adjustment
AUTOMOBILES	2.0	92.75	- -
MEDIUM TRUCKS	4.0	92.71	- -
HEAVY TRUCKS	8.0	92.75	0.00

Noise Output Data

Noise Impacts (Without Topo or Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	69.1	67.1	65.8	59.8	68.2	68.8
MEDIUM TRUCKS	61.9	58.0	50.2	59.4	65.5	65.6
HEAVY TRUCKS	68.4	64.4	56.6	65.8	72.0	72.0
COMBINED NOISE LEVEL	***72.2***	***69.3***	***66.4***	***67.5***	***74.1***	***74.3***

Noise Impacts (With Topo and Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	69.1	67.1	65.8	59.8	68.2	68.8
MEDIUM TRUCKS	61.9	58.0	50.2	59.4	65.5	65.6
HEAVY TRUCKS	68.4	64.4	56.6	65.8	72.0	72.0
COMBINED NOISE LEVEL	***72.2***	***69.3***	***66.4***	***67.5***	***74.1***	***74.3***

Noise Contour (Feet)

Noise Levels	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	271	857	2711	8573
LDN	259	820	2593	8199

RK ENGINEERING GROUP INC.

Roadway Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/10/2026
Roadway:	1. Aliso Viejo Parkway (Existing Plus Project Conditions)	**JN:**	2827-2025-09
Location:	Moulton Parkway to Aliso Creek Road N	**Engineer:**	B. Morrison

Noise Input Data

Roadway Conditions

ADT	25,650	
SPEED	50	
PK HR %	10	
NEAR LANE/FAR LANE DIST	75	
ROAD ELEVATION	0.0	
GRADE	0.0	%
PK HR VOL	2,565	

Receiver Input Data

RECEIVER DISTANCE	100
DIST C/L TO WALL	0
RECEIVER HEIGHT	5.0
WALL DISTANCE FROM RECEIVER	100
PAD ELEVATION	0.0
ROADWAY VIEW:	
LF ANGLE	-90
RT ANGLE	90
DF ANGLE	180

Site Conditions

AUTOMOBILES	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS	10	
HEAVY TRUCKS	10	

Wall Information

HTH WALL	0.0	
AMBIENT	0.0	
BARRIER	0	(0 = WALL, 1= BERM)

Vehicle Mix Data

Vehicle Type	Day	Evening	Night	Daily
AUTOMOBILES	0.756	0.140	0.104	0.9200
MEDIUM TRUCKS	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

Misc. Vehicle Info

Vehicle Type	Height	SLE Distance	Grade Adjustment
AUTOMOBILES	2.0	92.75	- -
MEDIUM TRUCKS	4.0	92.71	- -
HEAVY TRUCKS	8.0	92.75	0.00

Noise Output Data

Noise Impacts (Without Topo or Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	69.8	67.8	66.5	60.4	68.9	69.5
MEDIUM TRUCKS	62.6	58.6	50.8	60.1	66.2	66.2
HEAVY TRUCKS	69.1	65.1	57.3	66.5	72.7	72.7
COMBINED NOISE LEVEL	***72.9***	***70.0***	***67.1***	***68.2***	***74.8***	***75.0***

Noise Impacts (With Topo and Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	69.8	67.8	66.5	60.4	68.9	69.5
MEDIUM TRUCKS	62.6	58.6	50.8	60.1	66.2	66.2
HEAVY TRUCKS	69.1	65.1	57.3	66.5	72.7	72.7
COMBINED NOISE LEVEL	***72.9***	***70.0***	***67.1***	***68.2***	***74.8***	***75.0***

Noise Contour (Feet)

Noise Levels	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	317	1002	3170	10023
LDN	303	959	3031	9586

RK ENGINEERING GROUP INC.

Roadway Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/9/2026
Roadway:	2. Aliso Viejo Parkway (Existing Plus Project Conditions)	**JN:**	2827-2025-09
Location:	Aliso Creek Road N to Enterprise	**Engineer:**	B. Morrison

Noise Input Data

Roadway Conditions

ADT	15,609	
SPEED	50	
PK HR %	10	
NEAR LANE/FAR LANE DIST	75	
ROAD ELEVATION	0.0	
GRADE	0.0	%
PK HR VOL	1,561	

Receiver Input Data

RECEIVER DISTANCE	100
DIST C/L TO WALL	0
RECEIVER HEIGHT	5.0
WALL DISTANCE FROM RECEIVER	100
PAD ELEVATION	0.0
ROADWAY VIEW:	
LF ANGLE	-90
RT ANGLE	90
DF ANGLE	180

Site Conditions

AUTOMOBILES	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS	10	
HEAVY TRUCKS	10	

Wall Information

HTH WALL	0.0	
AMBIENT	0.0	
BARRIER	0	(0 = WALL, 1= BERM)

Vehicle Mix Data

Vehicle Type	Day	Evening	Night	Daily
AUTOMOBILES	0.756	0.140	0.104	0.9200
MEDIUM TRUCKS	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

Misc. Vehicle Info

Vehicle Type	Height	SLE Distance	Grade Adjustment
AUTOMOBILES	2.0	92.75	- -
MEDIUM TRUCKS	4.0	92.71	- -
HEAVY TRUCKS	8.0	92.75	0.00

Noise Output Data

Noise Impacts (Without Topo or Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	67.6	65.6	64.3	58.3	66.7	67.3
MEDIUM TRUCKS	60.5	56.5	48.7	57.9	64.1	64.1
HEAVY TRUCKS	66.9	62.9	55.1	64.3	70.5	70.5
COMBINED NOISE LEVEL	***70.7***	***67.8***	***64.9***	***66.0***	***72.7***	***72.9***

Noise Impacts (With Topo and Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	67.6	65.6	64.3	58.3	66.7	67.3
MEDIUM TRUCKS	60.5	56.5	48.7	57.9	64.1	64.1
HEAVY TRUCKS	66.9	62.9	55.1	64.3	70.5	70.5
COMBINED NOISE LEVEL	***70.7***	***67.8***	***64.9***	***66.0***	***72.7***	***72.9***

Noise Contour (Feet)

Noise Levels	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	193	610	1929	6100
LDN	184	583	1845	5834

RK ENGINEERING GROUP INC.

Roadway Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/9/2026
Roadway:	3. Aliso Viejo Parkway (Existing Plus Project Conditions)	**JN:**	2827-2025-09
Location:	Enterprise to Aliso Creek Road S	**Engineer:**	B. Morrison

Noise Input Data

Roadway Conditions

ADT	18,558	
SPEED	50	
PK HR %	10	
NEAR LANE/FAR LANE DIST	75	
ROAD ELEVATION	0.0	
GRADE	0.0	%
PK HR VOL	1,856	

Receiver Input Data

RECEIVER DISTANCE	100
DIST C/L TO WALL	0
RECEIVER HEIGHT	5.0
WALL DISTANCE FROM RECEIVER	100
PAD ELEVATION	0.0
ROADWAY VIEW:	
LF ANGLE	-90
RT ANGLE	90
DF ANGLE	180

Site Conditions

AUTOMOBILES	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS	10	
HEAVY TRUCKS	10	

Wall Information

HTH WALL	0.0	
AMBIENT	0.0	
BARRIER	0	(0 = WALL, 1= BERM)

Vehicle Mix Data

Vehicle Type	Day	Evening	Night	Daily
AUTOMOBILES	0.756	0.140	0.104	0.9200
MEDIUM TRUCKS	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

Misc. Vehicle Info

Vehicle Type	Height	SLE Distance	Grade Adjustment
AUTOMOBILES	2.0	92.75	- -
MEDIUM TRUCKS	4.0	92.71	- -
HEAVY TRUCKS	8.0	92.75	0.00

Noise Output Data

Noise Impacts (Without Topo or Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	68.4	66.4	65.1	59.0	67.5	68.1
MEDIUM TRUCKS	61.2	57.2	49.4	58.7	64.8	64.8
HEAVY TRUCKS	67.6	63.7	55.9	65.1	71.2	71.3
COMBINED NOISE LEVEL	***71.5***	***68.6***	***65.7***	***66.8***	***73.4***	***73.6***

Noise Impacts (With Topo and Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	68.4	66.4	65.1	59.0	67.5	68.1
MEDIUM TRUCKS	61.2	57.2	49.4	58.7	64.8	64.8
HEAVY TRUCKS	67.6	63.7	55.9	65.1	71.2	71.3
COMBINED NOISE LEVEL	***71.5***	***68.6***	***65.7***	***66.8***	***73.4***	***73.6***

Noise Contour (Feet)

Noise Levels	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	229	725	2293	7252
LDN	219	694	2193	6936

RK ENGINEERING GROUP INC.

Roadway Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/9/2026
Roadway:	4. Aliso Creek Road (Existing Plus Project Conditions)	**JN:**	2827-2025-09
Location:	North of Glenwood Drive	**Engineer:**	B. Morrison

Noise Input Data

Roadway Conditions

ADT	27,811	
SPEED	50	
PK HR %	10	
NEAR LANE/FAR LANE DIST	55	
ROAD ELEVATION	0.0	
GRADE	0.0	%
PK HR VOL	2,781	

Receiver Input Data

RECEIVER DISTANCE	100
DIST C/L TO WALL	0
RECEIVER HEIGHT	5.0
WALL DISTANCE FROM RECEIVER	100
PAD ELEVATION	0.0
ROADWAY VIEW:	
LF ANGLE	-90
RT ANGLE	90
DF ANGLE	180

Site Conditions

AUTOMOBILES	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS	10	
HEAVY TRUCKS	10	

Wall Information

HTH WALL	0.0	
AMBIENT	0.0	
BARRIER	0	(0 = WALL, 1= BERM)

Vehicle Mix Data

Vehicle Type	Day	Evening	Night	Daily
AUTOMOBILES	0.756	0.140	0.104	0.9200
MEDIUM TRUCKS	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

Misc. Vehicle Info

Vehicle Type	Height	SLE Distance	Grade Adjustment
AUTOMOBILES	2.0	96.19	- -
MEDIUM TRUCKS	4.0	96.15	- -
HEAVY TRUCKS	8.0	96.19	0.00

Noise Output Data

Noise Impacts (Without Topo or Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	70.0	68.0	66.7	60.6	69.1	69.7
MEDIUM TRUCKS	62.8	58.8	51.0	60.3	66.4	66.4
HEAVY TRUCKS	69.2	65.3	57.5	66.7	72.8	72.9
COMBINED NOISE LEVEL	***73.1***	***70.2***	***67.3***	***68.4***	***75.0***	***75.2***

Noise Impacts (With Topo and Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	70.0	68.0	66.7	60.6	69.1	69.7
MEDIUM TRUCKS	62.8	58.8	51.0	60.3	66.4	66.4
HEAVY TRUCKS	69.2	65.3	57.5	66.7	72.8	72.9
COMBINED NOISE LEVEL	***73.1***	***70.2***	***67.3***	***68.4***	***75.0***	***75.2***

Noise Contour (Feet)

Noise Levels	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	331	1048	3314	10479
LDN	317	1002	3169	10022

RK ENGINEERING GROUP INC.

Roadway Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/9/2026
Roadway:	5. Aliso Creek Road (Existing Plus Project Conditions)	**JN:**	2827-2025-09
Location:	Glenwood Drive to Pacific Park Drive	**Engineer:**	B. Morrison

Noise Input Data

Roadway Conditions

ADT	21,387	
SPEED	50	
PK HR %	10	
NEAR LANE/FAR LANE DIST	50	
ROAD ELEVATION	0.0	
GRADE	0.0	%
PK HR VOL	2,139	

Receiver Input Data

RECEIVER DISTANCE	100
DIST C/L TO WALL	0
RECEIVER HEIGHT	5.0
WALL DISTANCE FROM RECEIVER	100
PAD ELEVATION	0.0
ROADWAY VIEW:	
LF ANGLE	-90
RT ANGLE	90
DF ANGLE	180

Site Conditions

AUTOMOBILES	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS	10	
HEAVY TRUCKS	10	

Wall Information

HTH WALL	0.0	
AMBIENT	0.0	
BARRIER	0	(0 = WALL, 1= BERM)

Vehicle Mix Data

Vehicle Type	Day	Evening	Night	Daily
AUTOMOBILES	0.756	0.140	0.104	0.9200
MEDIUM TRUCKS	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

Misc. Vehicle Info

Vehicle Type	Height	SLE Distance	Grade Adjustment
AUTOMOBILES	2.0	96.87	- -
MEDIUM TRUCKS	4.0	96.83	- -
HEAVY TRUCKS	8.0	96.87	0.00

Noise Output Data

Noise Impacts (Without Topo or Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	68.8	66.8	65.5	59.5	67.9	68.5
MEDIUM TRUCKS	61.6	57.7	49.9	59.1	65.2	65.3
HEAVY TRUCKS	68.1	64.1	56.3	65.5	71.7	71.7
COMBINED NOISE LEVEL	***71.9***	***69.0***	***66.1***	***67.2***	***73.8***	***74.0***

Noise Impacts (With Topo and Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	68.8	66.8	65.5	59.5	67.9	68.5
MEDIUM TRUCKS	61.6	57.7	49.9	59.1	65.2	65.3
HEAVY TRUCKS	68.1	64.1	56.3	65.5	71.7	71.7
COMBINED NOISE LEVEL	***71.9***	***69.0***	***66.1***	***67.2***	***73.8***	***74.0***

Noise Contour (Feet)

Noise Levels	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	253	800	2530	8002
LDN	242	765	2420	7653

RK ENGINEERING GROUP INC.

Roadway Noise Calculations - Based on FHWA-RD-77-108

Project:	Polaris Place Residential Project	**Date:**	4/9/2026
Roadway:	6. Aliso Creek Road (Existing Plus Project Conditions)	**JN:**	2827-2025-09
Location:	South of Pacific Park Drive	**Engineer:**	B. Morrison

Noise Input Data

Roadway Conditions

ADT	24,600	
SPEED	50	
PK HR %	10	
NEAR LANE/FAR LANE DIST	75	
ROAD ELEVATION	0.0	
GRADE	0.0	%
PK HR VOL	2,460	

Receiver Input Data

RECEIVER DISTANCE	100
DIST C/L TO WALL	0
RECEIVER HEIGHT	5.0
WALL DISTANCE FROM RECEIVER	100
PAD ELEVATION	0.0
ROADWAY VIEW:	
LF ANGLE	-90
RT ANGLE	90
DF ANGLE	180

Site Conditions

AUTOMOBILES	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS	10	
HEAVY TRUCKS	10	

Wall Information

HTH WALL	0.0	
AMBIENT	0.0	
BARRIER	0	(0 = WALL, 1= BERM)

Vehicle Mix Data

Vehicle Type	Day	Evening	Night	Daily
AUTOMOBILES	0.756	0.140	0.104	0.9200
MEDIUM TRUCKS	0.480	0.020	0.500	0.0300
HEAVY TRUCKS	0.480	0.020	0.500	0.0500

Misc. Vehicle Info

Vehicle Type	Height	SLE Distance	Grade Adjustment
AUTOMOBILES	2.0	92.75	- -
MEDIUM TRUCKS	4.0	92.71	- -
HEAVY TRUCKS	8.0	92.75	0.00

Noise Output Data

Noise Impacts (Without Topo or Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	69.6	67.6	66.3	60.2	68.7	69.3
MEDIUM TRUCKS	62.4	58.4	50.7	59.9	66.0	66.1
HEAVY TRUCKS	68.9	64.9	57.1	66.3	72.5	72.5
COMBINED NOISE LEVEL	***72.7***	***69.8***	***66.9***	***68.0***	***74.6***	***74.8***

Noise Impacts (With Topo and Barrier Shielding, dBA)

Vehicle Type	Peak Hour Leq	Day Leq	Evening Leq	Night Leq	LDN	CNEL
AUTOMOBILES	69.6	67.6	66.3	60.2	68.7	69.3
MEDIUM TRUCKS	62.4	58.4	50.7	59.9	66.0	66.1
HEAVY TRUCKS	68.9	64.9	57.1	66.3	72.5	72.5
COMBINED NOISE LEVEL	***72.7***	***69.8***	***66.9***	***68.0***	***74.6***	***74.8***

Noise Contour (Feet)

Noise Levels	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	304	961	3040	9613
LDN	291	919	2907	9194

Appendix E
Construction Noise and Vibration Calculation Worksheets

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/10/2026
Case Description: Polaris Place Residential Project

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Demolition	Residential	65	65	65

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	100		89.6	340	0
Dozer	No	100		81.7	340	0

Results
Calculated (dBA)

Equipment		*Lmax	Leq
Concrete Saw		72.9	72.9
Dozer		65	65
	Total	72.9	73.6

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/10/2026
Case Description: Polaris Place Residential Project

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Site Preparation	Residential	65	65	65

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	100		81.7	340	0
Tractor	No	100	84		340	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Dozer		65	65
Tractor		67.3	67.3
	Total	67.3	69.4

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/10/2026
Case Description: Polaris Place Residential Project

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Grading	Residential	65	65	65

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	100	85		340	0
Grader	No	100	85		340	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Grader		68.3	68.3
Grader		68.3	68.3
	Total	68.3	71.4

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/10/2026
Case Description: Polaris Place Residential Project

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Building Construction	Residential	65	65	65

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)
Tractor	No	100	84		340
Tractor	No	100	84		340

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Tractor		67.3	67.3
Tractor		67.3	67.3
	Total	67.3	70.4

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/10/2026
Case Description: Polaris Place Residential Project

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Paving	Residential	65	65	65

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Roller	No	100		80	340	0
Roller	No	100		80	340	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Roller		63.3	63.3
Roller		63.3	63.3
	Total	63.3	66.4

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/10/2026
Case Description: Polaris Place Residential Project

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Architectural Coating	Residential	65	65	65

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air) 1	No	100		77.7	340	0
Pumps 1	No	100		80.9	340	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Compressor (air) 1		61	61
Pumps 1		64.2	64.2
	Total	64.2	65.9

*Calculated Lmax is the Loudest value.

RK ENGINEERING GROUP INC.

Vibration Impact Analysis

Project:	Polaris Place Residential Project	**Date:**	4/14/2026
Activity:	Construction Vibration	**JN:**	2827-2025-09
Location:	Nearest adjacent structures (~45 ft.)	**Engineer:**	B. Morrison

Vibration Input/Output Data

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

PPV =	**0.047 in/sec**

Equipment Type =	2	Large Bulldozer
PPV_{ref} =	0.089	Reference PPV at 25 ft.
D =	45.00	Distance from Equipment to receiver in ft.
n =	1.10	Vibration attenuation rate through the ground

Equipment PPV Reference Levels

Type	Equipment	Reference PPV
1	Vibratory Roller	0.210
2	Large Bulldozer	0.089
3	Caisson Drilling	0.089
4	Loaded Trucks	0.076
5	Jackhammer	0.035
6	Small Bulldozer	0.003
7	Crack and Seat	2.400

RK ENGINEERING GROUP INC.

Vibration Impact Analysis

Project:	Polaris Place Residential Project	**Date:**	4/14/2026
Activity:	Construction Vibration	**JN:**	2827-2025-09
Location:	Nearest adjacent structures (~45 ft.)	**Engineer:**	B. Morrison

Vibration Input/Output Data

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

PPV = **0.040 in/sec**

Equipment Type =	4	Loaded Trucks
PPV_{ref} =	0.076	Reference PPV at 25 ft.
D =	45.00	Distance from Equipment to receiver in ft.
n =	1.10	Vibration attenuation rate through the ground

Equipment PPV Reference Levels

Type	Equipment	Reference PPV
1	Vibratory Roller	0.210
2	Large Bulldozer	0.089
3	Caisson Drilling	0.089
4	Loaded Trucks	0.076
5	Jackhammer	0.035
6	Small Bulldozer	0.003
7	Crack and Seat	2.400

RK ENGINEERING GROUP INC.

Vibration Impact Analysis

Project:	Polaris Place Residential Project	**Date:**	4/14/2026
Activity:	Construction Vibration	**JN:**	2827-2025-09
Location:	Nearest adjacent structures (~45 ft.)	**Engineer:**	B. Morrison

Vibration Input/Output Data

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

PPV =	**0.110 in/sec**

Equipment Type =	1	Vibratory Roller
PPV_{ref} =	0.210	Reference PPV at 25 ft.
D =	45.00	Distance from Equipment to receiver in ft.
n =	1.10	Vibration attenuation rate through the ground

Equipment PPV Reference Levels

Type	Equipment	Reference PPV
1	Vibratory Roller	0.210
2	Large Bulldozer	0.089
3	Caisson Drilling	0.089
4	Loaded Trucks	0.076
5	Jackhammer	0.035
6	Small Bulldozer	0.003
7	Crack and Seat	2.400