

APPENDIX M

Environmental Noise Assessment

DRAFT

ENVIRONMENTAL NOISE ASSESSMENT
for the
North River Farms Project
City of Oceanside, California

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MAY 2018

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EXECUTIVE SUMMARY

The purpose of this technical report is to assess the potential noise and vibration impacts associated with the implementation of the proposed North River Farms Project (Project). This assessment utilizes the significance thresholds in Appendix G of the California Environmental Quality Act (CEQA) Guidelines.

The Project is a mixed use development proposed along North River Road in Oceanside, California. Noise levels from traffic along the major roadway that bisects the project site were analyzed to determine traffic noise exposure levels for on-site noise-sensitive uses. The resultant exterior noise levels are in the “conditionally acceptable” range. Mitigation options are presented to address these elevated exterior future noise levels, in order to ensure compliance with the interior noise level criterion inside future residences. Unshielded outdoor areas between the residential buildings and North River Road are generally acceptable for outdoors use. Careful design of the commercial areas should be considered to avoid outdoor use areas near the North River Road where noise levels are higher.

Noise associated with short-term (construction) activities is expected to be less than significant at existing noise sensitive receptors in the vicinity of the Project.

A small regional airport exists approximately 4.5 miles west of the project vicinity. We have reviewed the Airport noise contours, which indicate the project site is not impacted by noise levels associated with the airport.

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1 INTRODUCTION

1.1 Purpose

The purpose of this report is to evaluate the potential noise and vibration impacts associated with implementation of the North River Farms Project (Project) relative to the City of Oceanside significance thresholds. The report includes a quantitative analysis of Project-related noise and vibration for construction and operational traffic.

1.2 Regional and Local Setting

The proposed Project site is located in the City of Oceanside, along North River Road and is situated directly north of State Route 76 (SR-76). The Project site consists of approximately 176.7 acres. Figures 1 and 2, Regional Map and Vicinity Map, show the Proposed Project location within the County of San Diego and the City. Regionally, the City is situated within the northeastern portion of San Diego County, about 46 miles north of Downtown San Diego via Interstate 5 (I-5). The project site is generally bisected into northern and southern sections by the existing North River Road alignment. The northern portion of the project site is bordered on the east by Wilshire Road. The Proposed Project is approximately 7.7 miles to the east of I-5, and about 0.32 mile north of SR-76. The Proposed Project is adjacent to the San Luis Rey River.

The parcel is currently used for agriculture, and has been subject to an extended history of related agricultural activities. A number of residential and agricultural structures are scattered throughout the property, and surrounding land is occupied with a mix of agriculture and residential uses. Elevation ranges from 90 to 240 feet above mean sea level (amsl).

1.3 Proposed Project Description

Integral Communities is proposing to develop an agriculture-based community consisting of an approximately 176.6-acre site with 309 single-family residential dwelling units and 380 medium density residential dwelling units, as well as approximately 13.1 acres for roadway and circulation right-of-way. 31.6 acres would be dedicated for community agriculture, and another 16.0 acres would be dedicated to park and open space features. The potential land uses envisioned for the Village Core include mixed-use residential, a boutique hotel, maker spaces, retail shops, a farmers market, collaborative work space, and the Village Square Park. The ultimate buildout of the Village Core would be determined by future development plans. However, for the purposes of this analysis a conservative assumption of 30,000 square feet of commercial space (including 5,000 square feet of restaurant space) and a 100-room hotel was used.

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2 FUNDAMENTALS OF NOISE AND VIBRATION

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

2.1 Sound, Noise, and Acoustics

Sound propagation is a process that consists of three components: the sound source, the sound path, and the sound receiver. All three components must be present for sound to propagate. Without a source to produce sound, there is no sound. Similarly, without a medium to transmit sound pressure waves, there is no sound transmitted. Finally, sound must reach a receiver; a hearing organ, sensor, or object must be present to perceive, register, or be affected by sound or noise. In most situations, there are many different sound sources, paths, and receptors. Acoustics is the field of science that deals with the production, propagation, reception, effects, and control of sound. Noise is defined as sound that is unpleasant, unexpected, or undesired.

2.2 Sound Pressure Levels and Decibels

Loudness of sound increases with increasing amplitude. Sound pressure amplitude is measured in units of micro-newton per square meter, also called a micropascal. One micropascal is approximately one-hundred billionth (0.0000000001) of normal atmospheric pressure. The pressure of a very loud sound may be 200 million micropascals, or 10 million times the pressure of the weakest audible sound. Because expressing sound levels in terms of micropascal would be very cumbersome, sound pressure level in logarithmic units is used instead to describe the ratio of actual sound pressure to a reference pressure squared. These units are called Bels. To provide a finer resolution, a Bel is subdivided into 10 decibels (dB).

2.3 A-Weighted Sound Level

Sound pressure level alone is not a reliable indicator of loudness. The frequency, or pitch, of a sound also has a substantial effect on how humans will respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness, or human response, is determined by the characteristics of the human ear.

Human hearing is limited not only in the range of audible frequencies, but also in the way it perceives the sound in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 and 5,000 hertz, and it perceives a sound within that range as more intense than a sound of higher or lower frequency with the same magnitude. To approximate the frequency response of the human ear, a series of sound level adjustments is usually applied to the sound measured by a sound level meter. The adjustments (referred to as a weighting network) are frequency-dependent.

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The A-scale weighting network approximates the frequency response of the average young ear when listening to ordinary sounds. When people make judgments about the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Noise levels are typically reported in terms of A-weighted sound levels. All sound levels discussed in this report are A-weighted decibels (dBA), unless otherwise stated. Examples of typical noise levels for common indoor and outdoor activities are depicted in Table 1.

Table 1
Typical Sound Levels in the Environment and Industry

| Common Outdoor Activities | Noise Level (dB) | Common Indoor Activities |
|--|------------------|--|
| — | 110 | Rock band |
| Jet fly over at 300 meters (1,000 feet) | 100 | — |
| Gas lawn mower at 1 meter (3 feet) | 90 | — |
| Diesel truck at 15 meters (50 feet), at 80 kilometers per hour (50 miles per hour) | 80 | Food blender at 1 meter (3 feet); garbage disposal at 1 meter (3 feet) |
| Noisy urban area, daytime; gas lawn mower at 30 meters (100 feet) | 70 | Vacuum cleaner at 3 meters (10 feet) |
| Commercial area; heavy traffic at 90 meters (300 feet) | 60 | Normal speech at 1 meter (3 feet) |
| Quite urban, daytime | 50 | Large business office; dishwasher next room |
| Quite urban, nighttime | 40 | Theater; large conference room (background) |
| Quite suburban, nighttime | 30 | Library |
| Quite rural, nighttime | 20 | Bedroom at night; concert hall (background) |
| — | 10 | Broadcast/recording studio |
| Lowest threshold of human hearing | 0 | Lowest threshold of human hearing |

Source: Caltrans 2013

2.4 Human Response to Changes in Noise Levels

“It is generally accepted that the average healthy ear...can barely perceive a noise level change of 3 dB” (Caltrans 2013). A change of 5 dBA is readily perceptible, and a change of 10 dBA is perceived as twice or half as loud. A doubling of sound energy results in a 3 dBA increase in sound, which means that a doubling of sound energy (e.g., doubling the average daily numbers of traffic on a road) would result in a barely perceptible change in sound level.

2.5 Noise Descriptors

Additional units of measure have been developed to evaluate the long-term characteristics of sound. The equivalent sound level (L_{eq}) is also referred to as the time-average sound level. It is the equivalent steady-state sound level that in a stated period of time would contain the same acoustical energy as the time-varying sound level during the same time period. The 1-hour A-weighted equivalent sound level, $L_{eq}(h)$, is the energy average of the A-weighted sound levels occurring during a 1-hour period.

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People are generally more sensitive and annoyed by noise occurring during the evening and nighttime hours. Thus, another noise descriptor used in community noise assessments—the community noise equivalent level (CNEL)—was introduced. The CNEL scale represents a time-weighted, 24-hour average noise level based on the A-weighted sound level. The CNEL accounts for the increased noise sensitivity during the evening hours (7 p.m. to 10 p.m.) and nighttime hours (10 p.m. to 7 a.m.) by adding 5 dBA and 10 dBA, respectively, to the average sound levels occurring during the evening and nighttime hours. Similar to CNEL, the Day Night Level (L_{dn} ¹) is the basis for the City’s standards for land use compatibility for community noise (See Table 2 in Section 3).

2.6 Sound Propagation

Sound propagation (i.e., the passage of sound from a noise source to a receiver) is influenced by geometric spreading, ground absorption, atmospheric effects, and shielding by natural and/or built features. Sound levels attenuate (or diminish) at a rate of approximately 6 dBA per doubling of distance from an outdoor point source due to the geometric spreading of the sound waves. For a line source, such as vehicle traffic along a roadway, sound levels attenuate at a rate of approximately 3 dBA per doubling of distance. Atmospheric conditions such as humidity, temperature, and wind gradients can also temporarily alter sound levels. In general, the greater the distance the receiver is from the source, the greater the potential for variation in sound levels due to atmospheric effects. Additional sound attenuation can result from built features such as intervening walls and buildings, and by natural features such as hills and dense woods.

2.7 Fundamentals of Groundborne Vibration

Vibration is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration. The response of humans to vibration is very complex. However, it is generally accepted that human response is best approximated by the vibration velocity level associated with the vibration occurrence.

Heavy equipment operation, including stationary equipment that produces substantial oscillation or construction equipment that causes percussive action against the ground surface, may be perceived by building occupants as perceptible vibration. It is also common for groundborne vibration to cause windows, pictures on walls, or items on shelves to rattle. Although the perceived vibration from such equipment operation can be intrusive to building occupants, the vibration is seldom of sufficient magnitude to cause even minor cosmetic damage to buildings unless the receptors are in proximity to heavy equipment.

¹ L_{dn} (also known as DNL) is comparable to CNEL, except that there is no evening component: the period from 7 a.m. to 10 p.m. is classified as daytime, and no adjustment to the noise levels is made during these hours; the period from 10 p.m. to 7 a.m. is classified as nighttime and 10 decibels is added to the hourly L_{eqs} occurring during these hours.

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When evaluating human response, groundborne vibration is usually expressed in terms of root mean square vibration velocity. Root mean square is defined as the average of the squared amplitude of the vibration signal. As for sound, it is common to express vibration amplitudes in terms of dB defined as:

$$L_v = 20 \log \left(\frac{v_{rms}}{v_{ref}} \right)$$

where v_{rms} is the root mean square vibration velocity amplitude in inches/second, and v_{ref} is the dB reference of 1×10^{-6} inches/second.

To avoid confusion with sound dB, the abbreviation VdB is used for vibration dB. The vibration threshold of perception for most people is approximately 65 VdB. Vibration levels in the 70 to 75 VdB range are often noticeable but generally deemed acceptable, and levels in excess of 80 VdB are often considered unacceptable (FTA 2006).

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3 REGULATORY SETTING

3.1 State

California Code of Regulations, Title 24

Title 24 of the California Code of Regulations (CCR) sets standards which new development in California must meet. According to Title 24, interior noise levels are not to exceed 45 dB community noise equivalent level (CNEL) for new multi-family residences, hotels and other attached residences. Title 24 does not apply to single-family homes. However, as a matter of practice the many communities apply the same 45 dB CNEL standard to single-family homes.

Title 24 also requires that an interior acoustical study demonstrating that interior noise levels due to exterior sources will be less than or equal to 45 CNEL be performed for affected multi-family structures that are exposed to exterior noise levels in excess of 60 CNEL.

California Department of Health Services Guidelines

The State Department of Health Services has developed guidelines of community noise acceptability for use by local agencies (OPR 2003). Selected relevant levels are listed here:

- Below 60 dBA CNEL: normally acceptable for low-density residential use
- 50 to 70 dBA: conditionally acceptable for low-density residential use
- Below 65 dBA CNEL: normally acceptable for high-density residential use
- 60 to 70 dBA CNEL: conditionally acceptable for high-density residential, transient lodging, churches, educational, and medical facilities.

The acceptable exterior noise level for low-density residential use of 60 dBA CNEL would be reduced by a typical residential building envelope to an interior level of not greater than 45 dBA CNEL.

3.2 Local

City of Oceanside Noise Level Compatibility Standards

The Noise Element of the City's General Plan (City of Oceanside 1974) establishes target maximum noise levels in the city. The Noise Element provides the following limitations on construction noise:

1. It should be unlawful for any person within any residential zone of 500 feet there from to operate any pile driver, power shovel, pneumatic, power hoist, or other construction equipment between 8:00 p.m. and 7:00 a.m. generating an ambient noise levels of 50 dBA at any property line unless an emergency exists.

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2. It should be unlawful for any person to operate any construction equipment at a level in excess of 85 dBA at 100 feet from the source.
3. It should be unlawful for any person to engage in construction activities between 6:00 p.m. and 7:00 a.m. when such activities exceed the ambient noise level by 5 dBA. A special permit may be granted by the Director of Public Works if extenuating circumstances exist.

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

Transportation-Related Noise Standards

The City's Noise Element establishes a policy for exterior sensitive areas to be protected from high noise levels. The Noise Element sets 65 dBA CNEL for the outdoor areas and interior noise levels of less than 45 dBA CNEL as the "normally acceptable" level.

For interior noise, the Noise Element also establishes 45 dBA CNEL as the maximum acceptable level for habitual rooms when exterior noise levels are 60 dBA CNEL or more. If windows and doors are required to be closed to meet this standard, then mechanical ventilation (i.e., air conditioning) shall be included in the project design.

Noise Element Policies:

- Noise levels shall not be so loud as to cause danger to public health in all zones except manufacturing zones where noise levels may be greater.
- Noise shall be controlled at the source where possible.
- Noise shall be intercepted by barriers or dissipated by space where other controls fail or are impractical.
- Noise levels shall be considered in any change to the Land Use and Circulation Elements of the General Plan
- Noise levels of City vehicles, construction equipment, and garbage trucks shall be reduced to acceptable levels.

City of Oceanside Noise Ordinance

Chapter 38 of the Oceanside Municipal Code governs operational noise and contains the maximum one-hour average sound levels for various land uses for operational noise (Table 2). The Noise Ordinance sets an allowed level for single-family and medium-density residential areas to 50 dBA L_{eq} from 7:00 a.m. to 9:59 p.m., and 45 dBA L_{eq} from 10:00 p.m. to 6:59 a.m.

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High density residential areas are limited to 55 dBA L_{eq} from 7:00 a.m. to 9:59 p.m. and 50 dBA L_{eq} from 10:00 p.m. to 6:59 a.m.

Table 2
City of Oceanside Exterior Noise Standards

| Zone | Applicable Limit (decibels) ¹ | Time Period |
|---------------------------------------|--|-------------------------|
| Residential Estate, Single-Family | 50 | 7:00 a.m. to 9:59 p.m. |
| Residential, Medium Density | 45 | 10:00 p.m. to 6:59 a.m. |
| Residential, Agricultural, Open Space | | |
| High Density, Residential Tourist | 55 | 7:00 a.m. to 9:59 p.m. |
| | 50 | 10:00 p.m. to 6:59 a.m. |
| Commercial | 65 | 7:00 a.m. to 9:59 p.m. |
| | 60 | 10:00 p.m. to 6:59 a.m. |
| Industrial | 70 | 7:00 a.m. to 9:59 p.m. |
| | 65 | 10:00 p.m. to 6:59 a.m. |
| Downtown | 65 | 7:00 a.m. to 9:59 p.m. |
| | 55 | 10:00 p.m. to 6:59 a.m. |

One-hour average sound level.

Source: Oceanside Municipal Code, Section 38.12

Construction activities are subject to Section 38.17 of the Noise Ordinance, which specifically prohibits the operation of any pneumatic or air hammer, pile driver, steam shovel, derrick, steam, or electric hoist, parking lot cleaning equipment or other appliance, the use of which is attended by loud or unusual noise, between the hours of 10:00 p.m. and 7:00 a.m..

Section 38.16 prohibits nuisance noise as recommended in the General Plan Noise Element. It is unlawful for any person to make, continue or cause to be made or continued, within the limits of the City of Oceanside, any disturbing, excessive, or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity.

City of Oceanside Engineering Manual

Construction noise in Oceanside is governed by the City Engineering Manual. Construction is normally limited to the hours between 7:00 a.m. and 6:00 p.m., Monday through Friday.

Vibration Standards

Numerous public and private organizations and governing bodies have provided guidelines to assist in the analysis of groundborne noise and vibration. To date, the City has not adopted a threshold for ground-borne vibration impacts. However, the Department of Transportation (Caltrans) has adopted vibration standards to evaluate potential impacts related to construction activities. Information from Caltrans indicates that continuous vibrations with a peak particle velocity of approximately 0.1 inches/second begin to cause annoyance. For purposes of this analysis, the Caltrans threshold of 0.1

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inches/second is used to evaluate the vibrational construction-related and operational impacts of the proposed project. For engineered concrete and masonry buildings, 0.3 inches/second PPV is a limit where building damage is possible. For non-engineered timber and masonry building, the building damage vibration limit is 0.2 inches/second PPV (Caltrans 2004). Hence, the use of the 0.1 inches/second vibration annoyance threshold is also meant to be very conservative in avoiding damage to existing structures in the project vicinity.

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4 SIGNIFICANCE CRITERIA

Based on the criteria identified in Appendix G of the CEQA Guidelines, the proposed project would have a significant impact on noise if it would result in:

1. The exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
2. The exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?
3. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?
4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?
5. For a project located within 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, expose people residing or working in the project area to excessive noise levels?
6. Be inconsistent with General Plan, GDP or other objectives and policies regarding noise thereby resulting in a significant physical impact?

4.1 Significance Thresholds Applied to Project

Regarding 1, a significant impact would occur if new residences could be exposed to traffic noise exposure greater than 65 dBA CNEL. A significant impact could also occur if proposed uses were to generate noise levels in exceed of 50 dBA during the day or 45 dBA overnight, which is the limit for residential zone districts.

Regarding 2, a significant impact would occur if the project generates construction related vibration which exceeds 0.1 inches/second PPV at existing residences in the project vicinity.. There are no operational concerns related to vibration or groundbourne noise because no large impact or rotating equipment is planned for the site.

Regarding 3, a significant noise impact would occur if project generated trip additions to the area roadway network were to cause a 3 dBA CNEL or greater increase over ambient traffic noise levels.

Regarding 4, a significant temporary construction noise impact would occur if construction were to occur outside of the allowable daily schedule between 7 AM and 6 PM with resulting noise levels greater than 5 dBA over ambient; if construction employs equipment with noise generation greater than 85 dBA at 100 feet from the equipment; or if construction equipment were to be operated between 8 PM and 7 AM in a residential zone, or within 500 feet of a

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residential zone, that creates an ambient noise level of 50 dBA at any residential property line. No substantial periodic noise increases are expected due to the project.

Regarding 5, the project location is approximately 4.5 miles from a small regional airport and would not be anticipated to be affected by noise from airport operations. Airport noise is discussed briefly.

Regarding 6, one objective is stated in the city's noise element. That objective is "to protect the residences and visitors...from noise pollution. To improve the quality of Oceanside's environment." Policies are listed in the previous section. If noise mitigations measures are implemented as discussed in this report, the project will be consistent with the General Plan objective and policies.

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5 METHODOLOGY

Ambient noise measurements were conducted to quantify the existing daytime noise environment at locations in the project vicinity. The noise impact assessment used criteria established in the noise regulations as summarized in Section 4.

The noise levels associated with roadway traffic were determined based on data obtained from the traffic impact report (LLG 2018 Ref. 3-16-2596) for the proposed project. Datakustic's CadnaA sound modeling software was used to model the traffic noise that would result from the roadway traffic volumes identified in the LLG report. CadnaA software includes traffic noise modeling algorithms based on the Federal Highway Administration's Traffic Noise Model (TNM), Version 2.5 (FHWA 2004) software. Field noise measurements and manual traffic counts were used to calibrate the model to ensure model assumptions and inputs accurately reflect existing conditions, and that the model will reliably calculate traffic noise levels from predicted future traffic volumes.

Noise levels resulting from the proposed construction activities have been calculated using the Federal Highway Administration (FHWA) Roadway Construction Noise Modeling software (FHWA 2008).

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6 EXISTING CONDITIONS

The ambient noise in the project vicinity is dominated by traffic. To address the existing noise environment of the project vicinity, short term noise measurements were conducted in the vicinity of the proposed project site. Details and results of those measurements are discussed in the following section. Following the measurement discussion, a brief summary of existing traffic noise modeling results is included. Finally, this chapter includes a discussion of the aircraft noise due to the nearby airport.

6.1 Ambient Noise Monitoring

General ambient and traffic noise measurements were conducted at the site to determine the existing noise levels in the project vicinity. The measurements were conducted by Connor Burke, of Dudek, using a Rion NL-52 sound level meter. This sound level meter meets the current American National Standards Institute standard for a Type 1 Precision sound level meter. The sound level meter was positioned on a tripod at a height of approximately five feet above the ground and fitted with a windscreen during measurements. The instrument was calibrated prior to measurements.

The short-term noise measurements were conducted on Thursday, January 4, 2018. The measured average noise levels and the concurrent traffic volumes are presented in Table 3.

Table 3
Measured Noise Levels and Traffic Volumes

| Site | Description/Noise Sources Observed | Date/Time | L _{eq} ¹ | Cars | MT ² | HT ³ | B/M ⁴ |
|------|--|--------------------------|------------------------------|------|-----------------|-----------------|------------------|
| ST1 | Traffic/Aircraft, Birds, Distance Landscaping or Gardening, Distant Traffic, 35 feet from the edge of the pavement | 11:50 a.m. to 12:10 a.m. | 56.9 dBA | 26 | 5 | 5 | 0 |
| ST2 | Traffic, Rustling Leaves, 35 feet from the edge of the pavement | 12:30 a.m. to 12:40 a.m. | 62.7 dBA | 226 | 6 | 4 | 0 |
| ST3 | Traffic, Birds, Distant Traffic, Rustling Leaves, 55 feet from road centerline | 10:46 a.m. to 10:56 a.m. | 55.8 dBA | 300 | 5 | 4 | 2 |
| ST4 | Traffic, Birds, Distant Landscaping or Gardening, Rustling Leaves, 70 feet from roadway centerline | 10:20 a.m. to 10:35 a.m. | 67.1 dBA | 102 | 2 | 0 | 0 |
| ST5 | Aircraft, Birds, Distant Conversations/Yelling, Distant Traffic, Distant Backup Alarm, Music in Garages, | 11:00 a.m. to 11:10 a.m. | 46.1 dBA | N/A | N/A | N/A | N/A |
| ST6 | Traffic, Birds, Distant Traffic, Rustling Leaves, 50 feet from road centerline | 11:15 a.m. to 11:45 a.m. | 56.3 dBA | 108 | 7 | 8 | 2 |

Notes:

- ¹ Equivalent Continuous Sound Level (Time-Average Sound Level)
- ² Medium Trucks
- ³ Heavy Trucks
- ⁴ Buses or Motorcycles depending on location

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Despite focusing on traffic noise, the measurements also included aircraft flyovers and other common noise sources. The measured sound levels were as high as 67 dBA L_{eq} at ST4. The lowest sound level measured was 46 dBA L_{eq} at ST5.

6.2 Noise Modeling

The CadnaA noise modeling software was used to model noise generated by existing and future traffic along vicinity roadways. The road alignments, the number and types of vehicles on the roadway, vehicle speeds, future building locations, receiver locations, and other data were input into the noise model. The data is based on the sound level measurements, vicinity GIS data, and project plans.

Based on sound level measurement results and traffic counts, the traffic noise model was calibrated to within approximately 1.5 dB of the measured results. Traffic speeds were the primary parameter altered during the calibration process. A CadnaA default local road vehicle mix (i.e., percentage of cars, trucks, and motorcycles) was used.

6.3 Traffic Noise Modeling – Current Conditions

The existing CNEL along major roadways was calculated to establish existing traffic noise levels. The existing CNEL calculated/modeled for each major roadway is presented in Table 4. It should be noted the dB values in Table 4 calculated for existing roadway traffic volumes are on a CNEL basis, and are therefore different than the dBA L_{eq} values measured for each roadway in the field (and presented in Table 3). The measured L_{eq} values simply reflect actual traffic occurring during the short term measurement, which is used to calibrate the model; the noise level (CNEL) from existing traffic is then calculated using the calibrated model.

Table 4
Calculated Existing Community Noise Equivalent Level (CNEL)
Associated with Local Roadways

| Figure Indicator | Noise Modeling Location | Calculated CNEL (dBA) |
|------------------|---|-----------------------|
| M1 | Proposed Project: Future Lot 30 On North River Road | 55 |
| M2 | Proposed Project: Future Alternative Lot On North River Road | 61 |
| M3 | Proposed Project: Representative Future North Village Lot, North River Road | 60 |
| M4 | Proposed Project: Representative Future Hilltop Village Lot | 44 |
| M5 | North River Road Existing Residential Apartments | 55 |
| M6 | North River Road/ Vandegrift Residence | 67 |
| M7 | North River Road Eastern Residence | 54 |
| M8 | College Boulevard North Residence | 66 |
| M9 | Vandegrift Boulevard South Residence | 60 |
| M10 | SR76 West Residence | 70 |
| M11 | SR76 East Residence | 71 |

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Table 4
Calculated Existing Community Noise Equivalent Level (CNEL)
Associated with Local Roadways

| Figure Indicator | Noise Modeling Location | Calculated CNEL (dBA) |
|-------------------------|---------------------------------|------------------------------|
| M12 | Vandegrift Blvd North Residence | 60 |
| M13 | School North of River Road | 50 |
| M14 | College Blvd South Residence | 55 |

Based upon the calculated/modeled CNEL values presented in Table 4, some areas of existing and proposed residential land uses have existing calculated traffic noise exposure greater than the normally acceptable range (of 65 dBA CNEL or less).

6.4 Airport Noise

The nearest airport to the project site is Oceanside Municipal Airport, located approximately 4.5 miles west of the project site in the city of Oceanside. The Oceanside Municipal Airport is a public airport with one runway. Due to distance, the project site is not located within the 60 dBA CNEL noise contour for the airport, or within the airport's area of influence (SDCRAA 2010).

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7 IMPACT ANALYSIS

The Project site will primarily be affected by traffic noise along North River Road. The Project will also generate traffic trips, resulting in potential increases in traffic noise along vicinity roadways. Finally, construction of the project would generate temporary (short-term) construction noise, which could affect noise-sensitive uses in the project vicinity. Each of these potential impacts is discussed below.

7.1 Traffic Noise

Traffic data was provided by Linscott, Law, & Greenspan (LLG 2018) for roadway volumes existing on the vicinity roadway network, as well as traffic forecasts addressing a number of future roadway traffic scenarios.

Table 5 shows the ADT numbers for the analyzed traffic scenarios in the traffic impact analysis.

**Table 5
Average Daily Traffic Scenarios**

| Street Segment | Existing 2016 | Existing + Cumulative | Existing + Proposed Project | Existing + Cumulative + Project | Buildout (Year 2035 CE) | Buildout 2035 with Project |
|---|---------------|-----------------------|-----------------------------|---------------------------------|-------------------------|----------------------------|
| Vandegrift Boulevard: North River Rd to Doulgas Dr | 25,750 | 25,750 | 26,372 | 26,372 | 23,200 | 23,822 |
| North River Road: College Blvd to Vandegrift Blvd | 34,080 | 34,400 | 39,131 | 39,451 | 31,300 | 35,263 |
| North River Road: Douglas Dr to College Blvd | 19,810 | 21,410 | 20,976 | 22,576 | 23,200 | 24,366 |
| North River Road: Vandegrift Blvd to Stallion Drive | 13,280 | 13,550 | 18,953 | 19,223 | 11,800 | 16,385 |
| North River Road: Stallion Dr to Wilshire Rd | 9,690 | 9,880 | 15,518 | 15,708 | 14,000 | 18,740 |
| North River Road: Wilshire Rd to Sleeping Indian Rd | 9,230 | 9,420 | 11,173 | 11,363 | 12,400 | 15,431 |
| State Route 76: College Blvd to Sante Fe Rd. | 43,500 | 44,370 | 44,926 | 45,796 | 40,600 | 40,755 |
| State Route 76: Santa Fe Rd To Melrose Dr. | 47,500 | 48,450 | 48,035 | 48,985 | 50,500 | 50,655 |
| State Route 76: Melrose Rd to Vista Way. | 37,500 | 38,250 | 37,946 | 38,696 | 59,300 | 60,388 |
| College Blvd: N River Rd to SR-76 | 45,980 | 47,390 | 49,632 | 51,002 | 33,800 | 36,364 |
| College Blvd: SR-76 to Frazee Rd | 28,550 | 30,400 | 30,026 | 31,876 | 34,500 | 35,976 |

Notes: ADT = average daily traffic

The ADT values illustrated in Table 5 above were used with the calibrated CadnA traffic noise model to calculate existing and expected noise levels along the identified roadway segments, in

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order to determine traffic noise exposure levels for existing noise-sensitive land uses and for future residential lots of the project.

7.1.1 Traffic Noise Exposure for Project Land Uses

The major local roadway, North River Road, provides direct access to the project and will be the dominant source of noise contributing to the future community noise level within the project area. Noise evaluations for new development are required to address the largest traffic volumes which the development could experience. Based on the traffic impact assessment, the Buildout 2035 with project is the worst case traffic. The future traffic noise exposure levels under the “Year 2035 with project traffic” scenario were calculated using the CadnaA model, as indicated above. To evaluate noise exposure for future residential lots within the development, points representing noise receivers were placed in the yard area of selected lots Table 6 provides a summary of the traffic noise exposure level results from the CadnaA analysis at representative residential lot locations of the project for buildout year 2035 (with project traffic).

Table 6
Traffic Noise Model Results at Representative Receivers On-site Build Out Year 2035

| Map Indicator: Receiver | Traffic Noise (CNEL dBA) |
|--|-----------------------------------|
| | <i>Buildout 2035 with Project</i> |
| M00: Future North Village Lot with Setback | 50 |
| M01: Future Lot 30 North River Road | 57 |
| M02: Future Lot Alternative North River Road | 64 |
| M03: Representative Future North Village Lot | 63 |
| M04: Representative Future Hilltop Village Lot | 45 |

The first row of homes aligned closest to North River Road could be exposed to noise levels ranging up to 64 dB CNEL from future traffic along this road. The Noise Element sets 65 dBA CNEL as the outdoor area significance threshold. The expected Year 2035 traffic noise does not exceed this threshold, so outdoor use areas are acceptable. However, interior noise studies are required where exterior noise levels would exceed 60 dBA CNEL, because there is a potential for interior noise levels to exceed the criterion of 45 dBA CNEL if exterior noise levels exceed 60 dBA CNEL. The possibility of interior noise levels exceeding 45 dBA CNEL is considered a potentially significant impact. Mitigation is available to address this impact, and involves review of the residential building construction details to assure that interior noise levels do not exceed 45 dBA CNEL (see *Section 8, Mitigation Measures, MM-NOI-1*).

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7.1.2 Off-site Noise Impacts Associated with Project Traffic

The project would contribute vehicle trips onto the regional roadway network, particularly onto the major roadways in close proximity to the Project. To evaluate the change in noise level on area roadways from project trip contributions, traffic noise modeling was performed. Existing residential locations along vicinity roads were modeled. First, the distance from the roadway to the closest existing residences located along each roadway segment of concern was determined from aerial photographs. Some of these existing residential areas include existing landscape walls along the roadway. In cases where it appeared the wall was at least 5 feet high and solid, the existing building façade or elevated balcony areas were used as the modeling receiver location. Next, current traffic volume data (on an average daily trip basis) for each segment was entered into the model. The same evaluation was then performed using the “Existing Plus Project” traffic volumes. The results are presented in Table 7, Project Contribution to Off-Site Traffic Noise (Off-Site Traffic Noise Level Increase).

**Table 7
Project Contribution to Off-Site Traffic Noise
(Off-Site Traffic Noise Level Increase)**

| Roadway (segment) | CNEL (dB) | | |
|---|-----------|--------------------|-----------|
| | Existing | Existing + Project | dB Change |
| M05: North River Road Existing Residential Area | 55 | 56 | 1 |
| M06: North River Road /Vandegrift Residence | 67 | 69 | 2 |
| M07: North River Road East Residences | 54 | 54 | 0 |
| M08: College Boulevard North Residence | 66 | 67 | 1 |
| M09: Vandegrift Boulevard South Residence | 60 | 62 | 2 |
| M10: SR76 West Residence | 70 | 70 | 0 |
| M11: SR76 East Residence | 71 | 71 | 0 |
| M12: Vandegrift Boulevard North Residence | 60 | 61 | 1 |
| M13: School North of River Road | 50 | 51 | 1 |
| M14:College Boulevard South Residence | 55 | 57 | 2 |

At all receivers, the addition of project traffic to the roadway network would result in an increase in the CNEL of 2 dB or less, which is below the discernible level of change for the average human ear. Thus a less than significant impact is expected for project-related off-site traffic noise increases affecting existing residences in the vicinity.

None of the modelled off-site receptors would experience noise levels that increase from below 65 dBA CNEL to greater than 65 dBA CNEL. Since the limit of acceptable exterior noise

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exposure for residences is 65 dBA CNEL, project-related traffic noise increases would not cause traffic noise exposure at existing residences to exceed an established standard.

7.1.3 Cumulative Noise Impacts Associated with Project Traffic

The project’s contributions to long-term traffic noise levels on the roadway network are considered in this section. Table 8 shows the modeling results for Year 2035 and Year 2035 plus project traffic scenarios.

**Table 8
Project Contribution to Off-Site Traffic Noise
(Off-Site Traffic Noise Level Increase)**

| Roadway (segment) | CNEL (dB) | | |
|---|-----------|---------------------|-----------|
| | Year 2035 | Year 2035 + Project | dB Change |
| M05: North River Road Existing Residential Area | 54 | 56 | 2 |
| M06: North River Road /Vandegrift Residence | 69 | 69 | 0 |
| M07: North River Road East Residences | 54 | 54 | 0 |
| M08: College Boulevard North Residence | 66 | 67 | 1 |
| M09: Vandegrift Boulevard South Residence | 61 | 63 | 2 |
| M10: SR76 West Residence | 73 | 71 | -2 |
| M11: SR76 East Residence | 71 | 71 | 0 |
| M12: Vandegrift Boulevard North Residence | 61 | 61 | 0 |
| M13: School North of River Road | 50 | 51 | 1 |
| M14: College Boulevard South Residence | 57 | 59 | 2 |

When full build-out has occurred in Year 2035, the Project’s contribution to overall traffic on the vicinity roadways is expected to be 2 dB or less. This change in noise levels is less than the threshold of perception for most people. With a less than perceptible increase in Year 2035 traffic noise levels for vicinity residences, the project would not have a substantial contribution to a cumulatively significant noise impact.

None of the modelled off-site receptors would experience noise levels that increase from below 65 dBA CNEL to greater than 65 dBA CNEL comparing the Year 2035 to the Year 2035 with project traffic scenarios. Since the limit of acceptable exterior noise exposure for residences is 65 dBA CNEL, project-related traffic noise increases would not cause traffic noise exposure at existing residences to exceed an established standard.

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7.1.4 On-Site Noise Impacts Associated with Project Operation

The project site would be landscaped, requiring routine maintenance activities. Maintenance activities are assumed to include the use of gasoline-powered mowers, trimmers, and blowers, which would result in intermittent short-term temporary noise increases. Maintenance activities are permitted uses and would be subject to the daytime one-hour L_{eq} noise limit of 50 dBA in residential neighborhoods. Maintenance equipment would not be expected to operate at any one location for more than a few minutes. Due to the limited amount of time equipment would be operating in one location, operation of landscape equipment would generally not exceed the hourly noise level limit at a particular receptor. Therefore, landscape maintenance is expected to result in a **less than significant impact**.

7.1.5 Non-Residential On-Site Noise Impacts Associated with Project

The overall project also includes areas for commercial spaces, gathering spaces, and a hotel. We estimate that setbacks between the commercial and residential areas would be at least 24 feet.

When the detailed site planning is completed for each commercial area that includes individual lot layouts, site plans, and building specification, a noise assessment should be performed to address potential noise impacts from non-residential land uses upon the adjacent residential land uses within the project area. Evaluation of commercial mechanical equipment noise and truck delivery noise shall be considered in the assessment. Setbacks or noise barriers may be features analyzed as mitigation (see Section 8, Mitigation Measures, MM-NOI-2).

Based on the modeling results, outdoor use areas are recommended to be positioned away from North River Road and shielded from the road by building structures when possible.

Future on-site residences could be subject to noise generated from off-site sources. The project is largely surrounded by existing residential, institutional, and agricultural land uses that are not typically considered substantial sources of noise. However, the Paradise Falls property located across Wilshire Road is used for weddings and other private events. These events could be located outdoors where use of public address (PA) systems and music would likely generate noise. The location of these events on the Paradise Falls property would be located at a distance greater than 400 feet from the nearest future on-site residential property line. Noise sourced from PA systems and outdoor music can vary drastically depending on the event but generally can reach a one-hour average up to 65 dBA at a distance of 50 feet. Given the distance from the project site and that events held at the Paradise Falls property would be subject to the City's noise ordinance, impacts to on-site residences would be **less than significant**.

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7.2 Construction Noise

Construction noise is a temporary phenomenon. Construction noise levels will vary from hour to hour and day to day, depending on the equipment in use, the operations being performed, and the distance between the source and receptor.

Construction is expected to include demolition, site preparation, grading, paving, building construction, and architectural coating. Construction equipment with substantially higher noise-generation characteristics (such as pile drivers, rock drills, blasting equipment) would not be necessary.

The Federal Highway Administration (FHWA) has developed the Roadway Construction Noise Model (RCNM) software, which can be used to evaluate construction noise from any major construction proposal. RCNM contains a large database of construction equipment, including noise generation level and load factor (percentage of time each piece of equipment is active on a typical construction site). Dudek used RCNM to assess construction noise impacts of the proposed project.

Construction noise is difficult to quantify because of the many variables involved, including the specific equipment types, size of equipment used, percentage of time in use, condition of each piece of equipment, and number of pieces of equipment that will actually operate on site. The construction vehicle assemblage would include standard equipment such as dozers, tractors, loaders, backhoes, excavators, graders, scrapers, trenchers, lifts, paving equipment, rollers, compressors, and miscellaneous trucks. Specified and measured noise level ranges for various pieces of construction equipment at a distance of 50 feet are presented in Table 9. The noise values presented are used as reference noise data for respective equipment in RCNM. The construction equipment is expected to be spread out over the entire site, with some equipment operating along the perimeter of the site while the rest of the equipment may be located several hundred feet further away from the noise sensitive receptors.

Table 9
Typical Construction Equipment Noise Levels

| Equipment Description | Acoustical Use Factor (%) | Measured L _{max} @50ft (dBA, slow) |
|-----------------------------------|---------------------------|---|
| All Other Equipment > 5 HP (spec) | 50 | 85 |
| Auger Drill Rig | 20 | 84 |
| Backhoe | 40 | 78 |
| Compactor (ground) | 20 | 83 |
| Compressor (air) | 40 | 78 |
| Concrete Saw | 20 | 90 |
| Crane | 16 | 81 |
| Dozer | 40 | 82 |
| Dump Truck | 40 | 76 |
| Excavator | 40 | 81 |

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**Table 9
Typical Construction Equipment Noise Levels**

| Equipment Description | Acoustical Use Factor (%) | Measured L _{max} @50ft (dBA, slow) |
|-------------------------------|---------------------------|---|
| Flat Bed Truck | 40 | 74 |
| Front End Loader | 40 | 79 |
| Generator | 50 | 81 |
| Generator (<25KVA, VMS signs) | 50 | 73 |
| Gradall | 40 | 83 |
| Grader *(spec) | 40 | 85 |
| Man Lift | 20 | 75 |
| Paver | 50 | 77 |
| Pickup Truck | 40 | 75 |
| Pneumatic Tools | 50 | 85 |
| Pumps | 50 | 81 |
| Roller | 20 | 80 |
| Scraper | 40 | 84 |
| Tractor *(spec) | 40 | 84 |
| Warning Horn | 5 | 83 |
| Welder / Torch | 40 | 74 |

* (spec) indicates that the L_{max} is based on common specifications for this equipment, not measured data.
Source: DOT 2006.

As stated in point #2 from the City’s Noise Element limitation on construction noise, construction equipment shall not exceed 85 dBA at 100 feet. The piece of equipment with the highest noise level shown in Table 9 is the concrete saw with a maximum level of 90 dBA at 50 feet. At 100 feet, the expected maximum noise level would drop to 84 dBA. Thus, all of the expected construction equipment would comply with the second point related to construction noise in the City Noise Element.

Construction would occur during the City’s allowable hours of construction activities. The City Engineering Manual states that construction can occur Monday through Friday from 7:00 a.m. to 6:00 p.m.. Table 10 shows the construction phasing assumptions.

**Table 10
Construction Phasing Assumptions**

| Proposed Project Construction Phase | Construction Start Month/Year | Construction End Month/Year |
|-------------------------------------|-------------------------------|-----------------------------|
| Demolition | 06/2019 | 07/2019 |
| Site Preparation | 07/2019 | 08/2019 |
| Grading | 08/2019 | 03/2020 |
| Paving | 03/2020 | 09/2020 |
| Building Construction | 08/2020 | 08/2024 |

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Table 10
Construction Phasing Assumptions

| Proposed Project Construction Phase | Construction Start Month/Year | Construction End Month/Year |
|-------------------------------------|-------------------------------|-----------------------------|
| Architectural Coating | 08/2020 | 08/2024 |

Source: Integral Communities 2017

Construction of the Proposed Project is expected to commence mid-2019 and then continue over a 5-year period, with buildout at the end of 2024. Demolition of existing on-site structures would last for 1-month. Site preparation would occur thereafter and would require approximately 1-month. Grading of approximately 155 acres of the project site would be completed over a 7-month period from the end of 2019 through the beginning of 2020. Site paving would occur over a 6-month period following grading, which would include the paving of roadways and other asphalt surfaces. The development of site infrastructure and building construction including single-family and multifamily residential uses, the Village Core, and agriculture facilities, would occur over 4 years beginning in late 2020. Table 11 shows the expected equipment use by phase for the construction of the project.

Table 11
Typical Construction Equipment Noise Levels

| Construction Phase Name | Equipment | Number of pieces of Equipment |
|-------------------------|---------------------------|-------------------------------|
| Demolition | Concrete/Industrial Saws | 1 |
| | Excavators | 3 |
| | Rubber Tired Dozers | 2 |
| Site Preparation | Rubber Tired Dozers | 3 |
| | Tractors/Loaders/Backhoes | 4 |
| Grading | Excavators | 2 |
| | Graders | 1 |
| | Rubber Tired Dozers | 1 |
| | Scrapers | 2 |
| | Tractors/Loaders/Backhoes | 2 |
| Paving | Pavers | 2 |
| | Paving Equipment | 2 |
| | Rollers | 2 |
| Building Construction | Cranes | 1 |
| | Forklifts | 3 |
| | Generator Sets | 1 |
| | Tractors/Loaders/Backhoes | 3 |
| | Trenchers | 1 |
| | Welders | 1 |
| Architectural Coating | Air Compressors | 1 |

Source: Dudek 2018.

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The magnitude of the impact would depend on the type of construction activity, equipment, duration of the construction phase, distance between the noise source and receiver, and any intervening structures. The typical operating cycles for construction equipment involve one or two minutes of full power operation followed by three or four minutes at lower power settings. Noise from construction equipment generally exhibits point source acoustical characteristics. A point source sound is attenuated (is reduced) at a rate of 6 decibels per doubling of distance from the source for “hard site” conditions and at 7.5 decibels per doubling of distance for “soft site” conditions. A hard site is characterized by ground surface covered by pavement, or hard compacted soils; a soft site is characterized by ground covered with vegetation, or loose soil with a rough surface (such as tilled land). These rules apply to the propagation of sound waves with no obstacles between source and receivers, such as topography (ridges or berms) or structures.

Table 12 shows the calculated noise levels at nearby noise-sensitive receptors (i.e., the residential property lines to the west of the project site) during construction phases for this project, employing the RCNM software and based on construction equipment defaults found in the air quality model CalEEMod for a project of this size and scope. The noise levels shown in Table 11 take into account operation of multiple pieces of construction equipment simultaneously for the L_{eq} results. More details from the RCNM analysis can be found in Appendix B. These noise levels are based on surveys conducted by the United States Environmental Protection Agency in 1971. In the time since 1971, regulations have been enforced to improve noise generated by certain types of construction equipment to meet worker noise exposure standards. Also because of stringent air quality emissions standards, newer, cleaner, and quieter heavy equipment is used on most construction projects in California. Thus, construction phase noise levels indicated in Table 11 represent worst-case conditions. L_{max} levels are focused on the single piece of equipment with the highest L_{max} . These L_{max} results do not account for multiple pieces of equipment producing maximum levels at the same time, since this is an unlikely occurrence. For this reason and because construction phases typical include multiple pieces of equipment operating, the calculated L_{eq} levels can be higher than the L_{max} .

Worst-case conditions occur when construction is happening near the project boundary closest to the noise sensitive receptors, which are represented in the left-hand column for each residence in Table 12. Typical conditions represent noise levels if construction were being conducted near the center of the project, as listed in the right-hand column for each residence in Table 12.

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Table 12
RCNM Results Summary

| Case Description | Leq (dBA) | | | | | | |
|-----------------------|--------------------------------------|--|-------------------------------------|---|--|---|----------------------------|
| | R1 - Residences on Tyler Street 780' | R2 - Typical Residence on Tyler Street 1800' | R3 - Residences on Leon Street 880' | R4 - Typical Residence on Leon Street 1650' | R5 - Nearby Church on N River Rd. 200' | R6 - Nearby School on N River Rd. Typical 1000' | R7 - Nearest Residence 50' |
| Architectural Coating | 50 | 43 | 49 | 43 | 62 | 48 | 74 |
| Building Construction | 60 | 52 | 59 | 53 | 70 | 58 | 78 |
| Demolition | 63 | 55 | 62 | 56 | 74 | 60 | 85 |
| Grading | 63 | 56 | 62 | 57 | 74 | 61 | 85 |
| Paving | 62 | 55 | 61 | 56 | 74 | 60 | 84 |
| Site Preparation | 60 | 53 | 59 | 54 | 72 | 58 | 83 |

As the table shows, the highest noise levels are expected to occur during the Demolition and Grading Phases. Construction-related noise levels could reach up to 85 dBA L_{eq} at residential properties to the west. ST5 represents the vicinity of the closest residential neighbors that might be impacted by construction noise. The short-term measured L_{eq} at this location is about 46 dBA. With expected construction levels of as high as 85 dBA L_{eq} at the same vicinity, a 39 dB increase in ambient noise levels is expected. With the construction operations limited to the hours between 7:00 a.m. and 6:00 p.m. during weekdays, significant noise impacts would be avoided during evening relaxing, and nighttime sleeping, hours.

Construction-related noise levels at other sensitive receivers adjacent to on-site and off-site construction activity (such as Del Rio Elementary School and residences along Leon Street, Stallion Drive, Wilshire Road, and Sleeping Indian Road) would increase the daytime ambient noise levels at these noise sensitive receptors. However, the expected noise levels would be temporary and will conclude with the completion of the proposed project. Furthermore, as indicated previously, the City restricts construction equipment that generates more than 85 dBA L_{eq} at 100 feet from the source. While construction noise is not expected to exceed 85 dBA at the nearest existing residence, it could reach up to 85 DBA L_{eq} at the nearest residence. Therefore, to ensure construction-related noise remains below the City’s noise threshold, mitigation is required (see Section 8, Mitigation Measures, MM-NOI-3).

Although unlikely, the proposed project could require blasting to excavate granitic rock located in portions of the project site. To ensure that blasting activities do not result in an exceedance of noise standards, mitigation would be required. Therefore, if blasting is required to excavate granitic rock,

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MM-NOI-4 would require that a blast drilling and monitoring plan be prepared. With incorporation of MM-NOI-4, construction-related noise impacts would be reduced to a **level below significance**.

7.3 Construction Vibration Impact to Off-Site Residences

The heavier pieces of construction equipment used at this site would include dozers, graders, and pavers. Ground-borne vibration information related to construction activities has been collected by the California Department of Transportation (Caltrans) (Caltrans 2004). Based on published vibration data, the anticipated construction equipment would generate a peak particle velocity of approximately 0.09 inch/second or less at a distance of 25 feet (FTA 2006).

Information from Caltrans indicates that continuous vibrations with a peak particle velocity of approximately 0.1 inch/second begin to annoy people. Ground-borne vibration is typically attenuated over short distances. The closest existing residences would be approximately 50 feet from the edge of the project site and 800 feet from the center of the project area. A school is also located over 200 feet from the site boundary and over 1,000 feet from the center of the project. At these distances, the peak particle velocity from construction would be below 0.1 inch/second. Vibration levels of this magnitude would likely be perceptible at nearby residences but would be below the Federal Transit Administration threshold of potential damage for normal structures (0.20 PPV inches/second) and would not be considered excessive.

Although unlikely, the proposed project could require blasting to excavate granitic rock located in portions of the project site. To ensure that blasting activities do not result in excessive vibration, mitigation would be required. Therefore, if blasting is required to excavate granitic rock, MM-NOI-5 would require that a vibration monitoring plan be prepared. With incorporation of MM-NOI-5, construction-related vibration impacts would be reduced to a **level below significance**.

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8 MITIGATION MEASURES

Construction noise and roadway traffic noise pose potential impacts that may be significant. To reduce these impacts to less than significant the following mitigation measures are required.

Roadway Traffic Noise Mitigation

Roadway traffic from North River Road would result in potentially significant noise exposure impacts. The following mitigation measures are required in order to reduce the potential for significant noise impact from this noise source.

MM-NOI-1 Interior Noise Study

To comply with the City and State's 45 dB CNEL interior noise standard, the residential dwelling units would most likely require mechanical ventilation system or air conditioning system and possibly sound-rated windows. Thus, prior to the approval of building permits, the applicant shall submit an interior noise study for approval by the City Planning Department for lots identified to have a future traffic noise exposure level above 60 dBA CNEL. The interior noise study would ensure compliance with the City and State's 45 dB CNEL noise standard.

Commercial Operational Noise Mitigation

Detailed plans are not available at this time regarding site layout, building configuration, and mechanical equipment that could be associated with commercial portions of the Specific Plan. The following mitigation is required in order to avoid potentially significant noise impacts associated with commercial operations.

MM-NOI-2 On-site Non-Residential Noise Study

When the specific detailed site planning is completed for each commercial area that includes individual lot layouts, site plans, and building specification, a noise assessment should be performed to address potential noise impacts from non-residential land uses upon the adjacent residential land uses within the project area. Evaluation of commercial mechanical equipment noise and truck delivery noise shall be considered in the assessment. Setbacks or noise barriers may be features analyzed as noise control methods to ensure compliance with the noise element and noise ordinance.

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Construction Noise Mitigation

While construction noise is not expected to exceed 85 dBA at the nearest existing residence, it could reach up to 85 DBA L_{eq} at the nearest residence. Therefore, to ensure construction-related noise remains below the City's noise threshold, the following mitigation is required.

MM-NOI-3 Construction Noise Reduction Measures. Noise-generating activities at the construction site or in areas adjacent to the construction site associated with the project in any way shall be restricted to the hours of 7:00 a.m. to 6:00 p.m. In addition, all construction activity shall comply with the following requirements:

1. Use available noise suppression devices and properly maintain and muffle loud construction equipment.
2. Avoid the unnecessary idling of equipment and stage construction equipment as far as reasonable from residences.
3. Notify adjacent uses of the construction schedule.
4. All noise-producing project equipment and vehicles using internal combustion engines shall be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) shall be equipped with shrouds and noise control features that are readily available for that type of equipment.
5. All mobile or fixed noise-producing equipment used on the project that are regulated for noise output by a local, state, or federal agency shall comply with such regulation while in the course of project activity.
6. The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only.
7. Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow surrounding property owners to contact the job superintendent if necessary.

Although unlikely, the proposed project could require blasting to excavate granitic rock located in portions of the project site. To ensure that blasting activities do not result in an exceedance of noise standards, the following mitigation would be required.

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MM-NOI-4 Prior to approval of the grading permit for any portion of the proposed project, the project applicant or the designated contractor shall prepare, or cause to be prepared, a blast drilling and monitoring plan. The plan shall include estimates of the drill noise levels, maximum noise levels (L_{max}), air-blast overpressure levels, and groundborne vibration levels at each residential property line within 1,000 feet of the blasting location, and shall be submitted to the City of Oceanside (City) for review prior to the first blast. Blasting shall not commence until the City has approved the blast plan. Where potential exceedances of the City's Noise Ordinance are identified, the blast drilling and monitoring plan shall identify mitigation measures shown to effectively reduce noise and vibration levels (e.g., altering orientation of blast progression, increased delay between charge detonations, presplitting) to be implemented to comply with the noise level limits of the City's Noise Ordinance. The identified mitigation measures shall be implemented by the applicant or its designee prior to the issuance of the grading permit. Additionally, all project phases involving blasting shall conform to the following requirements:

- All blasting shall be performed by a blast contractor and blasting personnel licensed to operate in the City.
- Each blast shall be monitored and recorded with an air-blast overpressure monitor and groundborne vibration accelerometer that is located outside the closest residence to the blast and is approved by the City.

Construction Vibration Mitigation

Although unlikely, the proposed project could require blasting to excavate granitic rock located in portions of the project site. To ensure that blasting activities do not result in excessive vibration, the following mitigation would be required.

MM-NOI-5 Prior to beginning construction of any project component within 200 feet of an existing or future occupied residence, the project applicant or its designee shall require preparation of a vibration monitoring plan for submittal to the City of Oceanside (City) noise control officer for review and approval. At a minimum, the vibration monitoring plan shall require data be sent to the City noise control officer or designee on a weekly basis or more frequently as determined by the noise control officer.

The vibration monitoring plan shall include the location of vibration monitors, the vibration instrumentation used, a data acquisition and retention plan, and

Environmental Noise Assessment for the North River Farms Project

exceedance notification and reporting procedures. A description of these plan components is provided in the following text.

Location of Vibration Monitors: The vibration monitoring plan shall include a scaled plan indicating monitoring locations, including the location of measurements to be taken at construction site property lines and at nearby residential properties.

Vibration Instrumentation: Vibration monitors shall be capable of measuring maximum unweighted RMS and PPV levels triaxially (in three directions) over a frequency range of 1 to 100 Hertz. The vibration monitor shall be set to automatically record daily events during working hours and to record peak triaxial PPV values in 5-minute interval histogram plots. The method of coupling the geophones to the ground shall be described and included in the report. The vibration monitors shall be calibrated within 1 year of the measurement, and a certified laboratory conformance report shall be included in the report.

Data Acquisition: The information to be provided in the data reports shall include, at a minimum, daily histogram plots of PPV versus time of day for three triaxial directions, and maximum peak vector sum PPV and maximum frequency for each direction. The reports shall also identify the construction equipment operation during the monitoring period and their locations and distances to all vibration measurement locations.

Exceedance Notification and Reporting Procedures: A description of the notification of exceedance and reporting procedures shall be included, and follow-up procedures taken to reduce vibration levels to below the allowable limits.

Environmental Noise Assessment for the North River Farms Project

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Environmental Noise Assessment for the North River Farms Project

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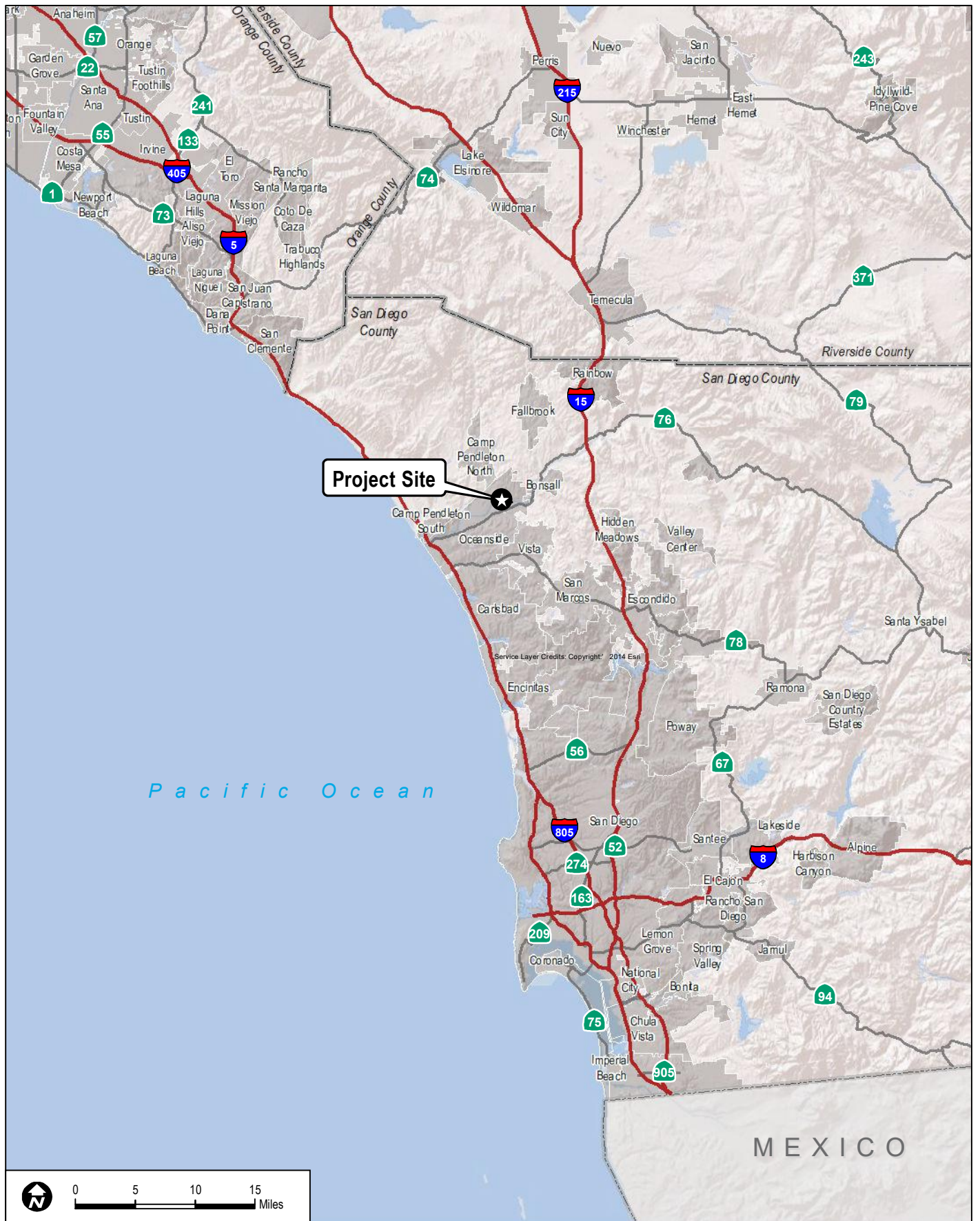
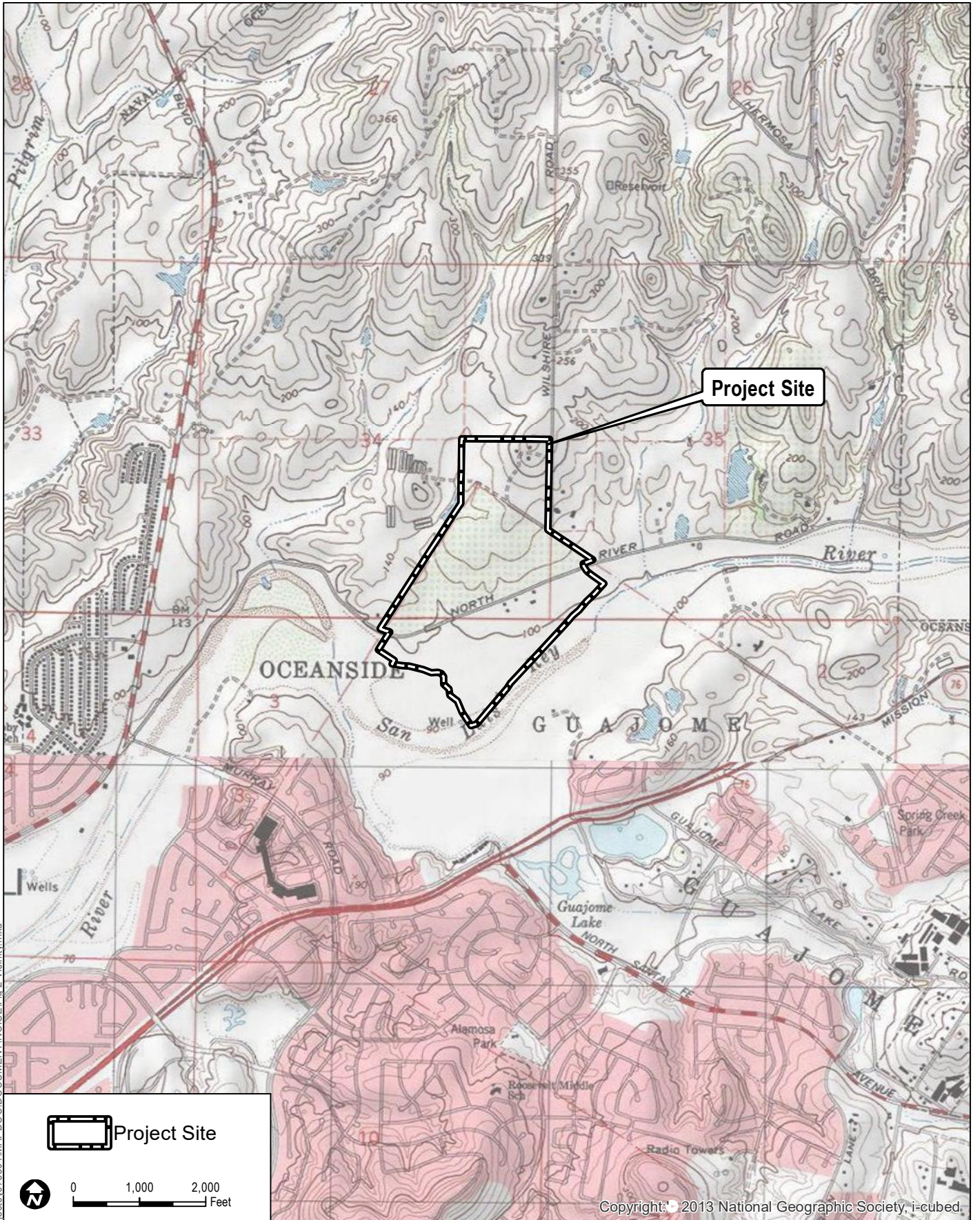


FIGURE 1
Regional Map

Environmental Noise Assessment for the North River Farms Project

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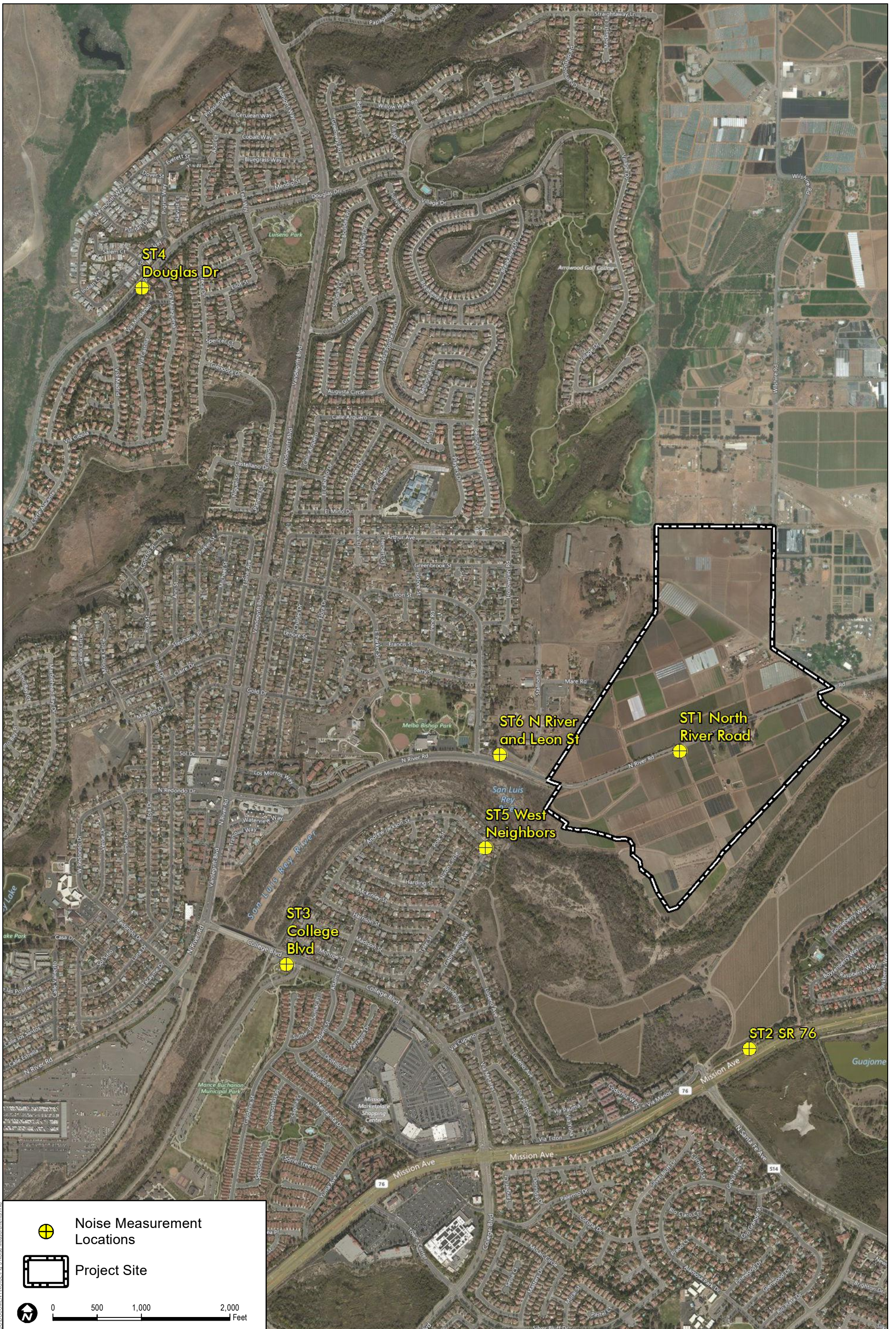
SOURCE: USGS 7.5-Minute Series Quadrangle.

**FIGURE 2
Vicinity Map**

Noise Technical Report for the North River Farms Project

Environmental Noise Assessment for the North River Farms Project

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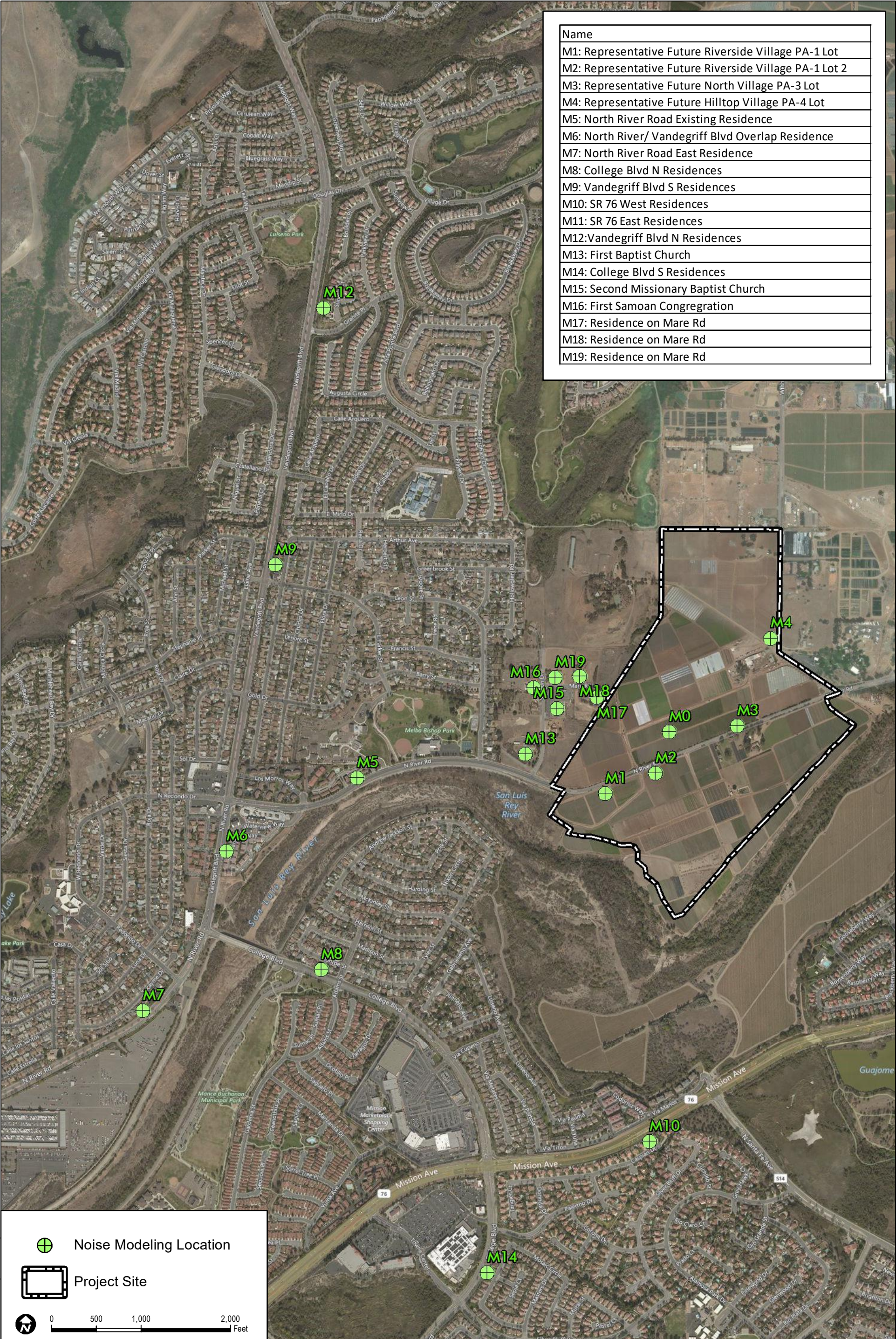
AERIAL SOURCE: BING MAPPING SERVICE



Noise Technical Report for the North River Farms Project

FIGURE 3
Noise Measurement Locations

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| Name |
|--|
| M1: Representative Future Riverside Village PA-1 Lot |
| M2: Representative Future Riverside Village PA-1 Lot 2 |
| M3: Representative Future North Village PA-3 Lot |
| M4: Representative Future Hilltop Village PA-4 Lot |
| M5: North River Road Existing Residence |
| M6: North River/ Vandegriff Blvd Overlap Residence |
| M7: North River Road East Residence |
| M8: College Blvd N Residences |
| M9: Vandegriff Blvd S Residences |
| M10: SR 76 West Residences |
| M11: SR 76 East Residences |
| M12: Vandegriff Blvd N Residences |
| M13: First Baptist Church |
| M14: College Blvd S Residences |
| M15: Second Missionary Baptist Church |
| M16: First Samoan Congregation |
| M17: Residence on Mare Rd |
| M18: Residence on Mare Rd |
| M19: Residence on Mare Rd |

Noise Modeling Location
 Project Site
 0 500 1,000 2,000 Feet

AERIAL SOURCE: BING MAPPING SERVICE



FIGURE 4
Noise Modeling Locations

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APPENDIX A

Definitions

APPENDIX A Definitions

| Term | Definition |
|---|---|
| Ambient Noise Level | The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location. |
| A-Weighted Sound Level (dBA) | 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 frequency response of the human ear and correlates well with subjective reactions to noise. |
| Community Noise Equivalent Level (CNEL) | CNEL is the A-weighted equivalent continuous sound exposure level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during nighttime hours (10 p.m. to 7 a.m.) and a 5 dB adjustment added to the sound levels occurring during the evening hours (7 p.m. to 10 p.m.). |
| Decibel (dB) | A unit for measuring sound pressure level, equal to 10 times the logarithm to the base 10 of the ratio of the measured sound pressure squared to a reference pressure, which is 20 micropascals. |
| Equivalent Sound Level (L_{eq}) | The sound level corresponding to a steady-state sound level and containing the same total energy as a time varying signal over a given sample period. L_{eq} is designed to average all of the loud and quiet sound levels occurring over a specific time period. |

APPENDIX A (Continued)

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APPENDIX B

RCNM Modeling

| Report date: 1/8/2018 | <u>Case Description: Site Preparation</u> | | | *Calculated Lmax is the Loudest value. | | | | |
|---------------------------|--|----------|-------------------|--|------------------------|----------------------|--|-------------|
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | 780 ft | 780 ft | | | |
| Rubber Tired Dozers | 3 | No | 40 | 81.7 | | 57.8 | | 53.8 |
| Tractors/Loaders/Backhoes | 4 | No | 40 | 77.6 | | 53.7 | | 49.7 |
| | | | | Total | | 57.8 | | 60.4 |
| Report date: 1/8/2018 | <u>Case Description: Grading</u> | | | *Calculated Lmax is the Loudest value. | | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | 780 ft | 780 ft | | | |
| Excavators | 2 | No | 40 | 80.7 | | 56.8 | | 52.9 |
| Graders | 1 | No | 40 | 81.7 | | 61.1 | | 57.2 |
| Rubber Tired Dozers | 1 | No | 40 | 81.7 | | 57.8 | | 53.8 |
| Scrapers | 2 | No | 40 | 83.6 | | 59.7 | | 55.7 |
| Tractors/Loaders/Backhoes | 2 | No | 40 | 77.6 | | 53.7 | | 49.7 |
| | | | | Total | | 61.1 | | 63.2 |
| Report date: 1/8/2018 | <u>Case Description: Building Construction</u> | | | *Calculated Lmax is the Loudest value. | | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | 780 ft | 780 ft | | | |
| Cranes | 1 | No | 16 | 80.6 | | 56.7 | | 48.7 |
| Forklifts | 3 | No | 20 | 74.7 | | 50.8 | | 43.8 |
| Generator Sets | 1 | No | 50 | 80.6 | | 56.8 | | 53.8 |
| Tractors/Loaders/Backhoes | 3 | No | 40 | 77.6 | | 53.7 | | 49.7 |
| Trenchers | 1 | No | 50 | 80.4 | | 56.5 | | 53.5 |
| Welders | 1 | No | 40 | 74 | | 50.1 | | 46.2 |
| | | | | Total | | 56.8 | | 59.7 |
| Report date: 1/8/2018 | <u>Case Description: Paving</u> | | | *Calculated Lmax is the Loudest value. | | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | 780 ft | 780 ft | | | |
| Pavers | 2 | No | 50 | 77.2 | | 53.4 | | 50.3 |
| Paving Equipment | 2 | No | 50 | N/A | | 61.1 | | 58.1 |
| Rollers | 2 | No | 20 | 80 | | 56.1 | | 49.1 |
| | | | | Total | | 61.1 | | 62.3 |
| Report date: 1/8/2018 | <u>Case Description: Architectural Coating</u> | | | *Calculated Lmax is the Loudest value. | | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | 780 ft | 780 ft | | | |
| Compressor (air) | 1 | No | 40 | 77.7 | | 53.8 | | 49.8 |
| | | | | Total | | 53.8 | | 49.8 |

| Report date: 1/8/2018 | | <u>Case Description: Site Preparation</u> | | | *Calculated Lmax is the Loudest value. | | | |
|---------------------------|---------------|--|-------------------|--------------------|--|----------------------|---------|-------------|
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1800 ft | | 1800 ft | |
| Rubber Tired Dozers | 3 | No | 40 | 81.7 | | 50.5 | | 46.6 |
| Tractors/Loaders/Backhoes | 4 | No | 40 | 77.6 | | 46.4 | | 42.5 |
| | | | | | Total | 50.5 | | 53.1 |
| Report date: 1/8/2018 | | <u>Case Description: Grading</u> | | | *Calculated Lmax is the Loudest value. | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1800 ft | | 1800 ft | |
| Excavators | 2 | No | 40 | 80.7 | | 49.6 | | 45.6 |
| Graders | 1 | No | 40 | 81.7 | | 53.9 | | 49.9 |
| Rubber Tired Dozers | 1 | No | 40 | 81.7 | | 50.5 | | 46.6 |
| Scrapers | 2 | No | 40 | 83.6 | | 52.5 | | 48.5 |
| Tractors/Loaders/Backhoes | 2 | No | 40 | 77.6 | | 46.4 | | 42.5 |
| | | | | | Total | 53.9 | | 55.9 |
| Report date: 1/8/2018 | | <u>Case Description: Building Construction</u> | | | *Calculated Lmax is the Loudest value. | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1800 ft | | 1800 ft | |
| Cranes | 1 | No | 16 | 80.6 | | 49.4 | | 41.5 |
| Forklifts | 3 | No | 20 | 74.7 | | 43.6 | | 36.6 |
| Generator Sets | 1 | No | 50 | 80.6 | | 49.5 | | 46.5 |
| Tractors/Loaders/Backhoes | 3 | No | 40 | 77.6 | | 46.4 | | 42.5 |
| Trenchers | 1 | No | 50 | 80.4 | | 49.2 | | 46.2 |
| Welders | 1 | No | 40 | 74 | | 42.9 | | 38.9 |
| | | | | | Total | 49.5 | | 52.4 |
| Report date: 1/8/2018 | | <u>Case Description: Paving</u> | | | *Calculated Lmax is the Loudest value. | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1800 ft | | 1800 ft | |
| Pavers | 2 | No | 50 | 77.2 | | 46.1 | | 43.1 |
| Paving Equipment | 2 | No | 50 | N/A | | 53.9 | | 50.9 |
| Rollers | 2 | No | 20 | 80 | | 48.9 | | 41.9 |
| | | | | | Total | 53.9 | | 55 |
| Report date: 1/8/2018 | | <u>Case Description: Architectural Coating</u> | | | *Calculated Lmax is the Loudest value. | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1800 ft | | 1800 ft | |
| Compressor (air) | 1 | No | 40 | 77.7 | | 46.5 | | 42.6 |
| | | | | | Total | 46.5 | | 42.6 |

| Report date: 1/8/2018 | <u>Case Description: Site Preparation</u> | | | *Calculated Lmax is the Loudest value. | | | | |
|---------------------------|--|----------|-------------------|--|------------------------|----------------------|--|--|
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | 880 ft | 880 ft | | | |
| Rubber Tired Dozers | 3 | No | 40 | 81.7 | 56.8 | 52.8 | | |
| Tractors/Loaders/Backhoes | 4 | No | 40 | 77.6 | 52.6 | 48.7 | | |
| Total | | | | | 56.8 | 59.4 | | |
| Report date: 1/8/2018 | <u>Case Description: Grading</u> | | | *Calculated Lmax is the Loudest value. | | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | 880 ft | 880 ft | | | |
| Excavators | 2 | No | 40 | 80.7 | 55.8 | 51.8 | | |
| Graders | 1 | No | 40 | 81.7 | 60.1 | 56.1 | | |
| Rubber Tired Dozers | 1 | No | 40 | 81.7 | 56.8 | 52.8 | | |
| Scrapers | 2 | No | 40 | 83.6 | 58.7 | 54.7 | | |
| Tractors/Loaders/Backhoes | 2 | No | 40 | 77.6 | 52.6 | 48.7 | | |
| Total | | | | | 60.1 | 62.1 | | |
| Report date: 1/8/2018 | <u>Case Description: Building Construction</u> | | | *Calculated Lmax is the Loudest value. | | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | 880 ft | 880 ft | | | |
| Cranes | 1 | No | 16 | 80.6 | 55.6 | 47.7 | | |
| Forklifts | 3 | No | 20 | 74.7 | 49.8 | 42.8 | | |
| Generator Sets | 1 | No | 50 | 80.6 | 55.7 | 52.7 | | |
| Tractors/Loaders/Backhoes | 3 | No | 40 | 77.6 | 52.6 | 48.7 | | |
| Trenchers | 1 | No | 50 | 80.4 | 55.4 | 52.4 | | |
| Welders | 1 | No | 40 | 74 | 49.1 | 45.1 | | |
| Total | | | | | 55.7 | 58.6 | | |
| Report date: 1/8/2018 | <u>Case Description: Paving</u> | | | *Calculated Lmax is the Loudest value. | | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | 880 ft | 880 ft | | | |
| Pavers | 2 | No | 50 | 77.2 | 52.3 | 49.3 | | |
| Paving Equipment | 2 | No | 50 | N/A | 60.1 | 57.1 | | |
| Rollers | 2 | No | 20 | 80 | 55.1 | 48.1 | | |
| Total | | | | | 60.1 | 61.2 | | |
| Report date: 1/8/2018 | <u>Case Description: Architectural Coating</u> | | | *Calculated Lmax is the Loudest value. | | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | 880 ft | 880 ft | | | |
| Compressor (air) | 1 | No | 40 | 77.7 | 52.8 | 48.8 | | |
| Total | | | | | 52.8 | 48.8 | | |

| Report date: 1/8/2018 | <u>Case Description: Site Preparation</u> | | | *Calculated Lmax is the Loudest value. | | | | |
|---------------------------|--|----------|-------------------|--|------------------------|----------------------|---------|-------------|
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1650 ft | | 1650 ft | |
| Rubber Tired Dozers | 3 | No | 40 | 81.7 | | 51.3 | | 47.3 |
| Tractors/Loaders/Backhoes | 4 | No | 40 | 77.6 | | 47.2 | | 43.2 |
| Total | | | | | | 51.3 | | 53.9 |
| Report date: 1/8/2018 | <u>Case Description: Grading</u> | | | *Calculated Lmax is the Loudest value. | | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1650 ft | | 1650 ft | |
| Excavators | 2 | No | 40 | 80.7 | | 50.3 | | 46.4 |
| Graders | 1 | No | 40 | 81.7 | | 54.6 | | 50.7 |
| Rubber Tired Dozers | 1 | No | 40 | 81.7 | | 51.3 | | 47.3 |
| Scrapers | 2 | No | 40 | 83.6 | | 53.2 | | 49.2 |
| Tractors/Loaders/Backhoes | 2 | No | 40 | 77.6 | | 47.2 | | 43.2 |
| Total | | | | | | 54.6 | | 56.7 |
| Report date: 1/8/2018 | <u>Case Description: Building Construction</u> | | | *Calculated Lmax is the Loudest value. | | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1650 ft | | 1650 ft | |
| Cranes | 1 | No | 16 | 80.6 | | 50.2 | | 42.2 |
| Forklifts | 3 | No | 20 | 74.7 | | 44.3 | | 37.3 |
| Generator Sets | 1 | No | 50 | 80.6 | | 50.3 | | 47.2 |
| Tractors/Loaders/Backhoes | 3 | No | 40 | 77.6 | | 47.2 | | 43.2 |
| Trenchers | 1 | No | 50 | 80.4 | | 50.0 | | 47.0 |
| Welders | 1 | No | 40 | 74 | | 43.6 | | 39.7 |
| Total | | | | | | 50.3 | | 53.2 |
| Report date: 1/8/2018 | <u>Case Description: Paving</u> | | | *Calculated Lmax is the Loudest value. | | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1650 ft | | 1650 ft | |
| Pavers | 2 | No | 50 | 77.2 | | 46.8 | | 43.8 |
| Paving Equipment | 2 | No | 50 | N/A | | 54.6 | | 51.6 |
| Rollers | 2 | No | 20 | 80 | | 49.6 | | 42.6 |
| Total | | | | | | 54.6 | | 55.7 |
| Report date: 1/8/2018 | <u>Case Description: Architectural Coating</u> | | | *Calculated Lmax is the Loudest value. | | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1650 ft | | 1650 ft | |
| Compressor (air) | 1 | No | 40 | 77.7 | | 47.3 | | 43.3 |
| Total | | | | | | 47.3 | | 43.3 |

| Report date: 1/8/2018 | | Case Description: Site Preparation | | | *Calculated Lmax is the Loudest value. | | | |
|---------------------------|---------------|--|-------------------|--------------------|--|----------------------|--|-------------|
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 200 ft | 200 ft | | |
| Rubber Tired Dozers | 3 | No | 40 | 81.7 | | 69.6 | | 71.8 |
| Tractors/Loaders/Backhoes | 4 | No | 40 | 77.6 | | 64.5 | | 60.5 |
| | | | | | Total | 69.6 | | 71.8 |
| Report date: 1/8/2018 | | Case Description: Grading | | | *Calculated Lmax is the Loudest value. | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 200 ft | 200 ft | | |
| Excavators | 2 | No | 40 | 80.7 | | 68.7 | | 64.7 |
| Graders | 1 | No | 40 | 81.7 | | 73 | | 69 |
| Rubber Tired Dozers | 1 | No | 40 | 81.7 | | 68.6 | | 64.6 |
| Scrapers | 2 | No | 40 | 83.6 | | 70.5 | | 66.5 |
| Tractors/Loaders/Backhoes | 2 | No | 40 | 77.6 | | 63.6 | | 59.6 |
| | | | | | Total | 73 | | 74.4 |
| Report date: 1/8/2018 | | Case Description: Building Construction | | | *Calculated Lmax is the Loudest value. | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 200 ft | 200 ft | | |
| Cranes | 1 | No | 16 | 80.6 | | 68.5 | | 60.6 |
| Forklifts | 3 | No | 20 | 74.7 | | 62.7 | | 55.7 |
| Generator Sets | 1 | No | 50 | 80.6 | | 67.6 | | 64.6 |
| Tractors/Loaders/Backhoes | 3 | No | 40 | 77.6 | | 64.5 | | 59.6 |
| Trenchers | 1 | No | 50 | 80.4 | | 66.4 | | 63.4 |
| Welders | 1 | No | 40 | 74 | | 59.2 | | 55.2 |
| | | | | | Total | 68.5 | | 70.5 |
| Report date: 1/8/2018 | | Case Description: Paving | | | *Calculated Lmax is the Loudest value. | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 200 ft | 200 ft | | |
| Pavers | 2 | No | 50 | 77.2 | | 65.2 | | 62.2 |
| Paving Equipment | 2 | No | 50 | N/A | | 73 | | 69.9 |
| Rollers | 2 | No | 20 | 80 | | 66.9 | | 59.9 |
| | | | | | Total | 73 | | 73.6 |
| Report date: 1/8/2018 | | Case Description: Architectural Coating | | | *Calculated Lmax is the Loudest value. | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 200 ft | 200 ft | | |
| Compressor (air) | 1 | No | 40 | 77.7 | | 65.6 | | 61.6 |
| | | | | | Total | 65.6 | | 61.6 |

| Report date: 1/8/2018 | | Case Description: Site Preparation | | | *Calculated Lmax is the Loudest value. | | | |
|---------------------------|---------------|--|-------------------|--------------------|--|----------------------|--|-------------|
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1000 ft | 1000 ft | | |
| Rubber Tired Dozers | 3 | No | 40 | 81.7 | | 55.6 | | 51.7 |
| Tractors/Loaders/Backhoes | 4 | No | 40 | 77.6 | | 51.5 | | 47.6 |
| | | | | | Total | 55.6 | | 58.3 |
| Report date: 1/8/2018 | | Case Description: Grading | | | *Calculated Lmax is the Loudest value. | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1000 ft | 1000 ft | | |
| Excavators | 2 | No | 40 | 80.7 | | 54.7 | | 50.7 |
| Graders | 1 | No | 40 | 81.7 | | 59 | | 55 |
| Rubber Tired Dozers | 1 | No | 40 | 81.7 | | 55.6 | | 51.7 |
| Scrapers | 2 | No | 40 | 83.6 | | 57.6 | | 53.6 |
| Tractors/Loaders/Backhoes | 2 | No | 40 | 77.6 | | 51.5 | | 47.6 |
| | | | | | Total | 59 | | 61 |
| Report date: 1/8/2018 | | Case Description: Building Construction | | | *Calculated Lmax is the Loudest value. | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1000 ft | 1000 ft | | |
| Cranes | 1 | No | 16 | 80.6 | | 54.5 | | 46.6 |
| Forklifts | 3 | No | 20 | 74.7 | | 48.7 | | 41.7 |
| Generator Sets | 1 | No | 50 | 80.6 | | 54.6 | | 51.6 |
| Tractors/Loaders/Backhoes | 3 | No | 40 | 77.6 | | 51.5 | | 47.6 |
| Trenchers | 1 | No | 50 | 80.4 | | 54.6 | | 51.3 |
| Welders | 1 | No | 40 | 74 | | 48 | | 44 |
| | | | | | Total | 54.6 | | 57.5 |
| Report date: 1/8/2018 | | Case Description: Paving | | | *Calculated Lmax is the Loudest value. | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1000 ft | 1000 ft | | |
| Pavers | 2 | No | 50 | 77.2 | | 51.2 | | 48.2 |
| Paving Equipment | 2 | No | 50 | N/A | | 59 | | 56 |
| Rollers | 2 | No | 20 | 80 | | 54 | | 47 |
| | | | | | Total | 59 | | 60.1 |
| Report date: 1/8/2018 | | Case Description: Architectural Coating | | | *Calculated Lmax is the Loudest value. | | | |
| # of Devices | Impact Device | Usage(%) | Actual Lmax (dBA) | Receptor Distance: | Calculated Lmax* (dBA) | Calculated Leq (dBA) | | |
| | | | | | 1000 ft | 1000 ft | | |
| Compressor (air) | 1 | No | 40 | 77.7 | | 51.6 | | 47.7 |
| | | | | | Total | 51.6 | | 47.7 |