

NOISE IMPACT ANALYSIS

MONITORING WELL SA-5 REPLACEMENT PROJECT

CITIES OF HUNTINGTON BEACH & FOUNTAIN VALLEY

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TABLE OF CONTENTS

| | | |
|------------|--|-----------|
| 1.0 | Introduction | 1 |
| 1.1 | Purpose of Analysis and Study Objectives | 1 |
| 1.2 | Proposed Project Locations | 1 |
| 1.3 | Proposed Project Description | 1 |
| 1.4 | Proposed Construction Activities..... | 2 |
| 1.5 | Monitoring Well Long-Term Operation and Maintenance Activities | 4 |
| 1.6 | Standard Noise Regulatory Conditions | 5 |
| 1.7 | Summary of Analysis Results | 5 |
| 1.8 | Project Design Features Incorporated into the Proposed Project..... | 6 |
| 1.9 | Mitigation Measures for the Proposed Project | 6 |
| 2.0 | Noise Fundamentals | 11 |
| 2.1 | Noise Descriptors | 11 |
| 2.2 | Tone Noise | 11 |
| 2.3 | Noise Propagation..... | 11 |
| 2.4 | Ground Absorption | 12 |
| 3.0 | Ground-Borne Vibration Fundamentals | 13 |
| 3.1 | Vibration Descriptors | 13 |
| 3.2 | Vibration Perception | 13 |
| 3.3 | Vibration Propagation..... | 13 |
| 4.0 | Regulatory Setting | 14 |
| 4.1 | Federal Regulations | 14 |
| 4.2 | State Regulations | 15 |
| 4.3 | Local Regulations | 16 |
| 5.0 | Existing Noise Conditions..... | 25 |
| 5.1 | Noise Measurement Equipment..... | 25 |
| 5.2 | Noise Measurement Results | 25 |
| 6.0 | Modeling Parameters and Assumptions..... | 26 |
| 6.1 | Construction Noise..... | 26 |
| 6.2 | Operations-Related Noise..... | 27 |
| 6.3 | Vibration | 27 |
| 7.0 | Impact Analysis | 29 |
| 7.1 | CEQA Thresholds of Significance..... | 29 |
| 7.2 | Generation of Noise Levels in Excess of Standards | 29 |
| 7.3 | Generation of Excessive Groundborne Vibration | 31 |
| 7.4 | Aircraft Noise | 32 |
| 8.0 | References..... | 33 |

TABLE OF CONTENTS CONTINUED

APPENDIX

Appendix A – Field Noise Measurements Photo Index

Appendix B – Field Noise Measurements Printouts

Appendix C – RCNM Model Construction Noise Calculation Printouts

Appendix D – RCNM Model Monitoring Well M58 Operational Noise Calculation Printouts

LIST OF FIGURES

| | |
|--|----|
| Figure 1 – Regional Location Map..... | 7 |
| Figure 2 – Proposed Monitoring Well Site OCWD-M58..... | 8 |
| Figure 3 – OCWD-SA5 Proposed Work Area | 9 |
| Figure 4 – OCWD-M58 Proposed Work Area..... | 10 |

LIST OF TABLES

| | |
|---|----|
| Table A – Monitoring Well SA-5 Decommissioning Equipment Mix..... | 2 |
| Table B – Monitoring Well M58 Noise Panel/Protective Fencing/Utility Clearance Equipment Mix..... | 3 |
| Table C – Monitoring Well M58 Well Drilling Equipment Mix..... | 3 |
| Table D – Monitoring Well M58 Well Development Equipment Mix..... | 4 |
| Table E – Monitoring Well M58 Subgrade Protective Well Vault Installation Equipment Mix | 4 |
| Table F – Monitoring Well Sampling and Redevelopment Equipment Mix..... | 5 |
| Table G – FTA General Assessment Construction Noise Criteria | 14 |
| Table H – City of Fountain Valley Exterior and Interior Noise Standards | 16 |
| Table I – City of Fountain Valley Exterior Noise Standards..... | 17 |
| Table J – City of Fountain Valley Exterior Noise Standards | 18 |
| Table K – City of Huntington Beach Land Use-Noise Compatibility Standards..... | 20 |
| Table L – City of Huntington Beach Exterior Noise Standards | 22 |
| Table M – City of Huntington Beach Interior Noise Standards..... | 23 |
| Table N – Noise Level Measurement Results..... | 25 |
| Table O – Construction Equipment Noise Emissions and Usage Factors from RCNM Model | 26 |
| Table P – Operational Equipment Noise Emissions and Usage Factors from RCNM Model | 27 |
| Table Q – Vibration Source Levels for Construction Equipment | 28 |
| Table R – Construction Noise Levels at the Nearest Home to Each Construction Phase | 30 |
| Table S – Monitoring Well M58 Operational Noise Levels at the Nearest Home | 31 |

ACRONYMS AND ABBREVIATIONS

| | |
|----------|---|
| ANSI | American National Standards Institute |
| Caltrans | California Department of Transportation |
| CEQA | California Environmental Quality Act |
| CNEL | Community Noise Equivalent Level |
| dB | Decibel |
| dBA | A-weighted decibels |
| DOT | Department of Transportation |
| FHWA | Federal Highway Administration |
| FTA | Federal Transit Administration |
| EPA | Environmental Protection Agency |
| Hz | Hertz |
| Ldn | Day-night average noise level |
| Leq | Equivalent sound level |
| Lmax | Maximum noise level |
| OCWD | Orange County Water District |
| ONAC | Federal Office of Noise Abatement and Control |
| OSB | Oriented Strand Board |
| OSHA | Occupational Safety and Health Administration |
| PPV | Peak particle velocity |
| RMS | Root mean square |
| SEL | Single Event Level or Sound Exposure Level |
| STC | Sound Transmission Class |
| UMTA | Federal Urban Mass Transit Administration |
| VdB | Vibration velocity level in decibels |

1.0 INTRODUCTION

1.1 Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared to determine the noise impacts associated with the proposed Monitoring Well SA-5 replacement project (proposed project). The following is provided in this report:

- A description of the study area and the proposed project;
- Information regarding the fundamentals of noise;
- Information regarding the fundamentals of vibration;
- A description of the local noise guidelines and standards;
- An evaluation of the current noise environment;
- An analysis of the potential short-term construction-related noise impacts from the proposed project; and
- An analysis of long-term operations-related noise impacts from the proposed project.

1.2 Proposed Project Locations

The proposed project would occur within portions of the City of Fountain Valley and City of Huntington Beach, which are shown in Figure 1, Regional Vicinity Map. As shown in Figure 2, Project Area, the proposed project would be implemented within two separate sites within the northeastern portion of the City of Huntington Beach and the southwestern portion of the City of Fountain Valley.

Specifically, the decommissioning of the existing Monitoring Well SA-5 would occur with the Brookhurst Street right-of-way in the City of Huntington Beach, approximately 300 feet south of Yorktown Avenue. The proposed replacement Monitoring Well M58 would be constructed with the Oriole Avenue right-of-way in the City of Fountain Valley, approximately 130 feet east of Acacia Street.

1.3 Proposed Project Description

The proposed project would consist of the permanent decommissioning of the existing SA-5 Monitoring Well and the construction of a new replacement monitoring well that would be designated as OCWD-M58. The two project components are described below.

Monitoring Well SA-5 Decommissioning

As shown in Figure 3, Monitoring Well SA-5 Site Plan, the existing SA-5 Monitoring Well is located with the sidewalk along the west (southbound) side of Brookhurst Street. The decommissioning would require an approximately 12-foot wide by 40-foot long temporary work area that would extend into the first southbound lane along Brookhurst Street.

The decommissioning of the Monitoring Well would require the removal of sediment within the lower portions of the existing well through air-lifting methods. The Monitoring Well would then be filled with cement and would be capped to a depth of five feet below the ground surface. After sealing the well casing with cement, capping would be conducted by excavating to a depth of 5 feet, removing the upper

5 feet of well casing, and installing a 1-foot thick concrete cap over the top of the well. The excavation would be back-filled and the sidewalk would be restored to the existing condition.

The decommissioning of the Monitoring Well would be conducted over approximately 5 working days. Construction activities would be limited to weekdays only and no nighttime construction would be required.

Proposed Monitoring Well OCWD-M58

The proposed project involves the construction and operation of the proposed multi-depth Monitoring Well OCWD-M58 that would be located with the Oriole Avenue right-of-way in the City of Fountain Valley as depicted in Figure 4, OCWD-M58 Site Plan. The proposed 3-casing nested monitoring well would be used to monitor seawater intrusion and groundwater flow within the Talbert Gap, and would be constructed to a depth of 230 feet below the ground surface.

The construction of OCWD-M58 would occur within the northern portion of Oriole Avenue, adjacent to the residential properties located on the north side of Oriole Avenue, which are the nearest sensitive receptors. The construction duration period would be approximately three weeks and would occur only on weekdays and would not include any nighttime construction. The construction would occur within an approximately 12-foot wide by 220 foot long construction area. Due to the proximity to the residences on the north side of the construction area, temporary noise barriers would be erected along the northern portion of the construction area.

1.4 Proposed Construction Activities

Monitoring Well SA-5 Decommissioning

The decommissioning of the existing SA-5 Monitoring Well would occur over a 5-day period. The proposed well decommissioning would occur in four steps; 1) fill removal, 2) pressure grout well casings, 3) cap well, and 4) sidewalk repair. The equipment mix for each step of the well decommissioning is shown in Table A.

Table A – Monitoring Well SA-5 Decommissioning Equipment Mix

| Activity | Equipment | Pieces of Equipment | Hours of Operation | Days of Operation | Horsepower |
|-----------------------------|------------------|----------------------------|---------------------------|--------------------------|-------------------|
| Fill Removal | Pump Rig | 1 | 8 | 1 | 550 |
| | Air Compressor | 1 | 4 | 1 | 200 |
| Pressure Grout Well Casings | Pump Rig | 1 | 8 | 1 | 550 |
| | Air Compressor | 1 | 2 | 1 | 200 |
| Cap Well | Vacuum Truck | 1 | 6 | 1 | 425 |
| | Backhoe | 1 | 8 | 2 | 90 |
| Sidewalk Repair | Cement Truck | 1 | 4 | 1 | 350 |
| | Pick-up Truck | 1 | 2 | 2 | 250 |

Construction Trips: 15 round trips mobilizing, 15 round trips demobilizing. All trips assumed 50 miles.
Source: OCWD.

Proposed Monitoring Well OCWD-M58

The proposed construction activities associated with the construction of proposed OCWD-M58 would occur in three construction phases. Phase 1 involves surveying the well site for possible underground utilities, installation of temporary noise panels, and installation of a six-foot protective chain link fence around the perimeter of the well site and construction work area. Phase 2 involves drilling and well construction activities, Phase 3 involves well development, and Phase 4 involves site clean-up and vault installation.

Phase 1: Noise Panel and Protective Fencing Installation/Utility Clearance

Phase 1 of the proposed project involves installation of 10-foot high noise panels on the north side and a 6-foot high chain link fencing around the remainder of the perimeter of the well site and construction work area. Phase 1 would also include surveying the well site for possible underground utilities. The equipment mix for Phase 1 is shown in Table B.

Table B – Monitoring Well M58 Noise Panel/Protective Fencing/Utility Clearance Equipment Mix

| Activity | Equipment | Pieces of Equipment | Hours of Operation | Days of Operation | Horsepower |
|--------------------------------------|---------------|---------------------|--------------------|-------------------|------------|
| Delivery of Fencing | Support Truck | 1 | 4 | 1 | 550 |
| Utility Clearance | Vacuum Truck | 1 | 5 | 1 | 425 |
| Fencing and Noise Panel Installation | No Equipment | - | - | - | - |

Construction Trips: 1 round trip mobilizing, 1 round trip demobilizing. All trips assumed 50 miles.

Source: OCWD.

Phase 2: Monitoring Well Drilling and Construction

Phase 2 of the proposed project involves the drilling and construction of the Monitoring Well. The proposed monitoring well would be drilled by using the direct mud rotary drilling method. The Monitoring Well would include up to three 2-inch diameter PVC casings installed into a single 12-inch diameter borehole to an approximate depth of 230 feet below ground surface (bgs). Once the borehole drilling is completed, the Well would then be constructed. The depth of the borehole and depth of each of the three well casings and associated screened intervals would be determined based on the lithology observed during drilling and the acquired borehole geophysical logs. The Well would have a 3 foot by 4-foot concrete apron with a 2 foot by 3-foot traffic-rated subgrade protective vault. The equipment mix for Phase 2 is shown in Table C.

Table C – Monitoring Well M58 Well Drilling Equipment Mix

| Activity | Equipment | Pieces of Equipment | Hours of Operation | Days of Operation | Horsepower |
|------------------------------|---------------|---------------------|--------------------|-------------------|------------|
| Well Drilling & Construction | Drilling Rig | 1 | 8 | 7 | 550 |
| | Mud Tank | 1 | 8 | 7 | 75 |
| | Fork Lift | 1 | 3 | 7 | 75 |
| | Support Truck | 1 | 2 | 7 | 350 |
| | Pick-up Truck | 1 | 2 | 7 | 250 |

Construction Trips: 1 round trip mobilizing, 1 round trip demobilizing. All trips assumed 50 miles.

Source: OCWD.

Phase 3: Monitoring Well Development

Phase 3 of the proposed project involves the mechanical and pumping development for each of the three well casings. The equipment mix for Phase 3 is shown in Table D.

Table D – Monitoring Well M58 Well Development Equipment Mix

| Activity | Equipment | Pieces of Equipment | Hours of Operation | Days of Operation | Horsepower |
|------------------|----------------------|---------------------|--------------------|-------------------|------------|
| Well Development | Pump Rig | 1 | 8 | 5 | 325 |
| | Air Compressor | 1 | 8 | 5 | 200 |
| | Electrical Generator | 1 | 8 | 1 | 20 |
| | Pick-up Truck | 1 | 2 | 6 | 250 |

Construction Trips: 1 trip mobilizing, 1 trip demobilizing. All trips assumed 50 miles.
Source: OCWD.

Phase 4: Site Cleanup and Traffic-Rated Vault Installation

Phase 4 of the proposed project involves site cleanup and installation of the below ground traffic-rated well vault. The equipment mix for Phase 4 is shown in Table E.

Table E – Monitoring Well M58 Subgrade Protective Well Vault Installation Equipment Mix

| Activity | Equipment | Pieces of Equipment | Hours of Operation | Days of Operation | Horsepower |
|---|---------------|---------------------|--------------------|-------------------|------------|
| Delivery of Pre-Cast Concrete Vault | Truck | 1 | 2 | 1 | 550 |
| Receive and Install Pre-Cast Concrete Vault | Forklift | 1 | 8 | 1 | 75 |
| Install Well Vault | Pick-up Truck | 1 | 2 | 1 | 250 |

Source: OCWD.

1.5 Monitoring Well Long-Term Operation and Maintenance Activities

Monitoring well operation involves periodically measuring the depth to groundwater, and collecting groundwater samples for laboratory analysis. The depth to groundwater would be measured by hand using a battery powered wire-line sounder. A submersible pump would be used for periodic sampling. Operation of a submersible pump would require the use of a small portable generator. OCWD staff would collect groundwater samples on a semi-annual basis and record water levels on a monthly basis. In total, the monitoring well would be visited by OCWD staff up to 14 times per year. One truck and two workers would access the well site during collection of water levels, assuming a round trip length of 10 miles per trip. Every three to five years OCWD would conduct maintenance activities to redevelop the well. A typical monitoring well redevelopment process would be completed in one day. All sampling and redevelopment activities would occur during the day. Table F identifies the equipment required for well sampling and redevelopment.

Table F – Monitoring Well Sampling and Redevelopment Equipment Mix

| Activity | Equipment | Pieces of Equipment | Hours of Operation | Days of Operation | Horsepower |
|---------------|----------------|---------------------|--------------------|-------------------|------------|
| Sampling | Generator | 1 | 4 | 1 | 20 |
| | Pump Rig | 1 | 8 | 1 | 325 |
| Redevelopment | Air Compressor | 1 | 8 | 1 | 200 |
| | Pick-up Truck | 1 | 2 | 1 | 300 |

Sampling & Redevelopment Trips: 1 round trip, all trips assumed 10 miles.

Source: OCWD.

1.6 Standard Noise Regulatory Conditions

The proposed project will be required to comply with the following regulatory conditions from the City of Huntington Beach, City of Fountain Valley, and State of California (State).

Cities of Huntington Beach and Fountain Valley Noise Regulations

The proposed project will be required to comply with the Cities of Huntington Beach and Fountain Valley Municipal Codes that limit noise impacts to all residential properties to 55 dBA from 7:00 a.m. to 10:00 p.m. and 50 dBA from 10:00 p.m. to 7:00 a.m. Both Cities exempt construction noise from the above noise standard, provided construction activities occur between 7:00 a.m. and 8:00 p.m. on weekdays.

State of California Noise Regulations

The following lists the State of California noise regulations that are applicable, but not limited to the proposed project.

- California Vehicle Code Section 2700-27207 – On Road Vehicle Noise Limits
- California Vehicle Code Section 38365-38350 – Off-Road Vehicle Noise Limits

1.7 Summary of Analysis Results

The following is a summary of the proposed project's impacts with regard to the State CEQA Guidelines noise checklist questions.

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?

Less than significant impact.

Generation of excessive groundborne vibration or groundborne noise levels?

Less than significant impact.

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?

No impact.

1.8 Project Design Features Incorporated into the Proposed Project

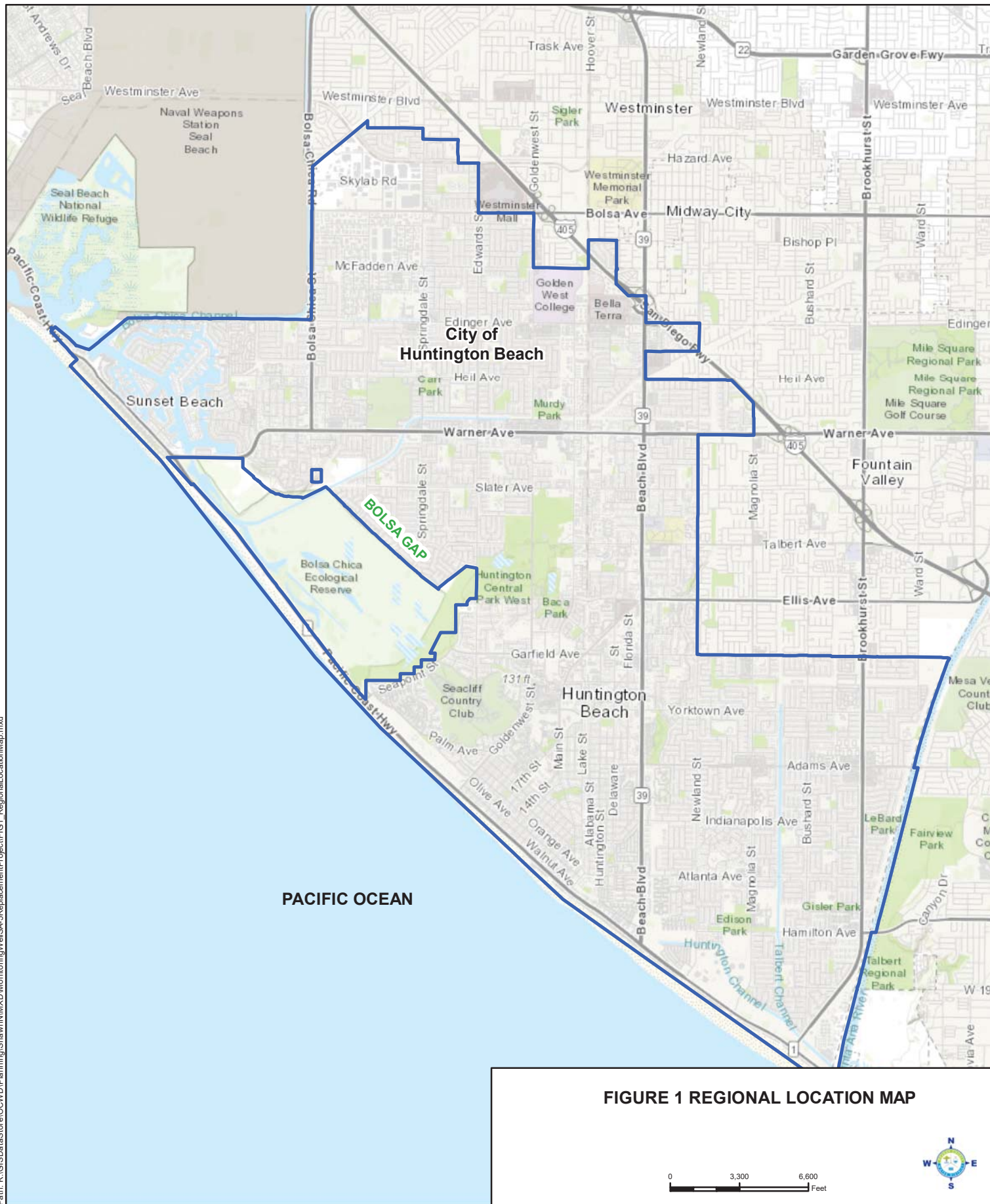
This analysis was based on implementation of the following project design features that are either already depicted on the proposed project site plans or are features that have detailed by the applicant.


Project Design Feature 1:

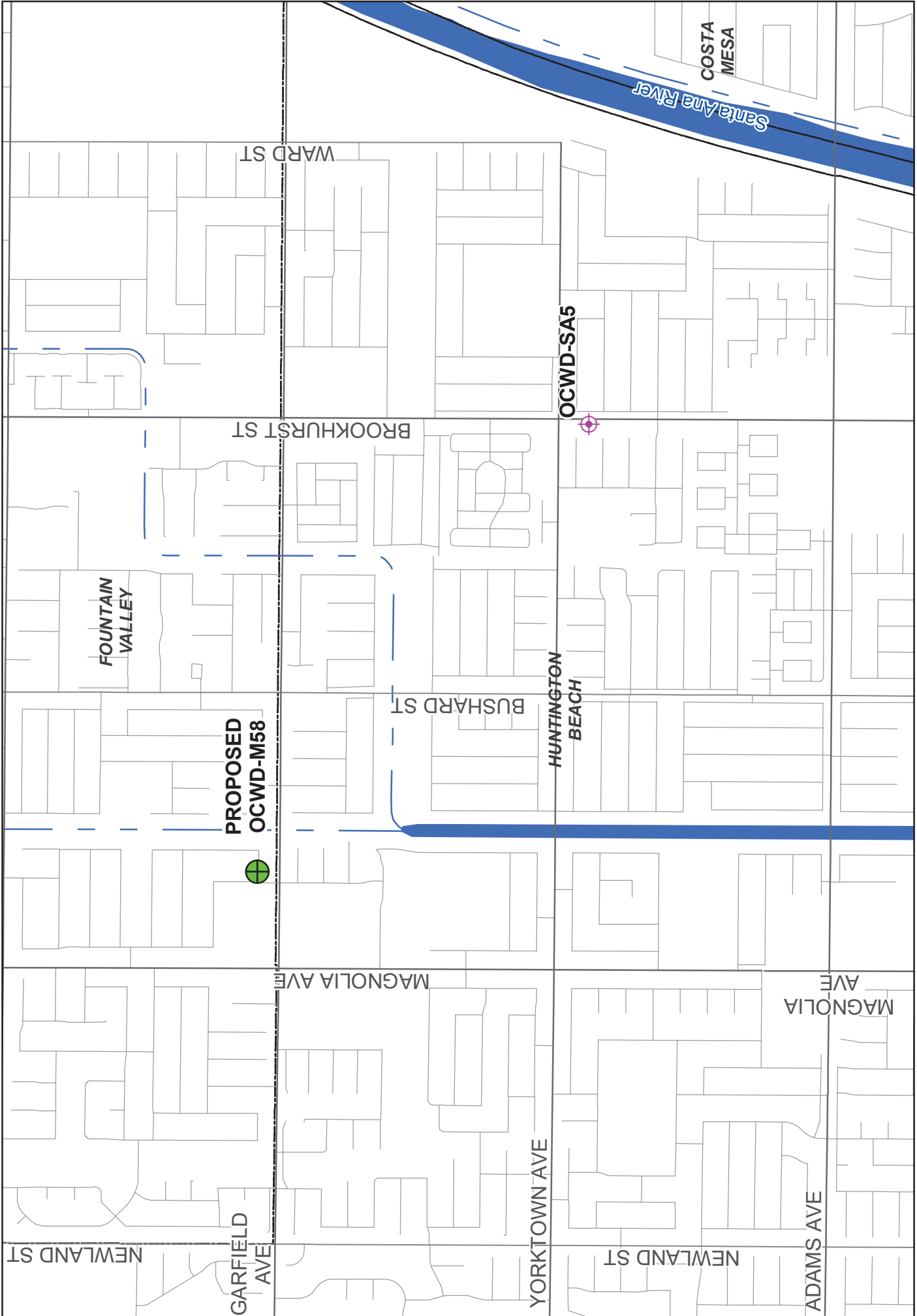
During Monitoring Well M58 construction activities, the project applicant will install a minimum 12-foot high temporary sound barrier along the entire extents of the northern edge of the proposed Monitoring Well M58 work site. The temporary sound wall shall be constructed with a minimum 5/8" plywood or oriented strand board (OSB) and shall be maintained in place for the extents of well construction activities.

1.9 Mitigation Measures for the Proposed Project

This analysis found that through adherence to the noise and vibration regulations detailed in Section 1.6 and Project Design Feature 1 detailed in Section 1.8 above were adequate to limit all noise and vibration impacts to less than significant levels. No mitigation measures are required for the proposed project with respect to noise and vibration impacts.



 City of Huntington Beach

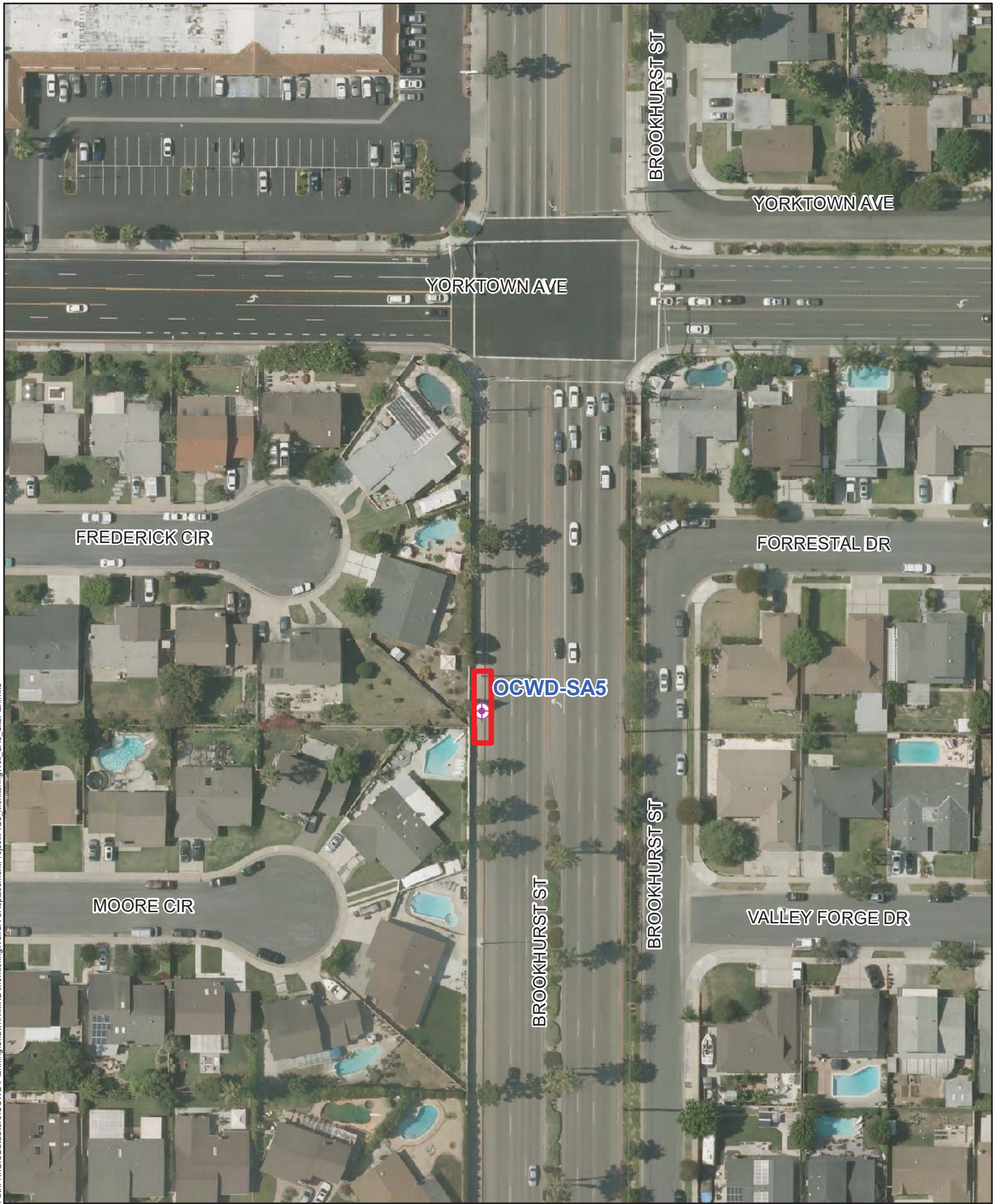


Path: K:\GISDataStore\OCWD\Planning\Shawm\N\MXD\MonitoringWell\SA-5Replacement\Project\Fig2 Project Area.mxd



- Existing Monitoring Well To Be Destroyed
- Proposed Replacement Monitoring Well

Proposed Monitoring Well Site
OCWD-M58
Figure 2



Existing Monitoring Well To Be Destroyed

OCWD-SA5

Proposed Work Site

Figure 3



Proposed Monitoring Well Location

OCWD-M58

Proposed Work Site

Figure 4

2.0 NOISE FUNDAMENTALS

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear.

2.1 Noise Descriptors

Noise Equivalent sound levels are not measured directly, but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The peak traffic hour Leq is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Level (Ldn) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of ten decibels to sound levels at night between 10 p.m. and 7 a.m. While the Community Noise Equivalent Level (CNEL) is similar to the Ldn with regard to the ten decibel addition to sound levels between 10 p.m. and 7 a.m., it has an additional 4.77 decibel addition to sound levels during the evening hours between 7 p.m. and 10 p.m. These additions are made to the sound levels at these time periods because during the evening and nighttime hours, when compared to daytime hours, there is a decrease in the ambient noise levels, which creates an increased sensitivity to sounds. For this reason the sound appears louder in the evening and nighttime hours and is weighted accordingly. Both of the Cities of Fountain Valley and Huntington Beach rely on the CNEL noise standard to assess transportation-related impacts on noise sensitive land uses.

2.2 Tone Noise

A pure tone noise is a noise produced at a single frequency and laboratory tests have shown that humans are more perceptible to changes in noise levels of a pure tone. For a noise source to contain a “pure tone,” there must be a significantly higher A-weighted sound energy in a given frequency band than in the neighboring bands, thereby causing the noise source to “stand out” against other noise sources. A pure tone occurs if the sound pressure level in the one-third octave band with the tone exceeds the average of the sound pressure levels of the two contiguous one-third octave bands by:

- 5 dB for center frequencies of 500 hertz (Hz) and above
- 8 dB for center frequencies between 160 and 400 Hz
- 15 dB for center frequencies of 125 Hz or less

2.3 Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground

absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound from point sources, such as air conditioning condensers, radiate uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

2.4 Ground Absorption

The sound drop-off rate is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in traffic noise models, soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA/DD is typically observed over soft ground with landscaping, as compared with a 6.0 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3.0 dBA/DD drop-off rate for hard-site conditions. Caltrans research has shown that the use of soft-site conditions is more appropriate for the application of the Federal Highway Administration (FHWA) traffic noise prediction model used in this analysis.

3.0 GROUND-BORNE VIBRATION FUNDAMENTALS

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

3.1 *Vibration Descriptors*

There are several different methods that are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (rms) amplitude of the vibration velocity. Due to the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels and is denoted as (L_v) and is based on the rms velocity amplitude. A commonly used abbreviation is “VdB”, which in this text, is when L_v is based on the reference quantity of 1 micro inch per second.

3.2 *Vibration Perception*

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Off-site 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.

3.3 *Vibration Propagation*

The propagation of ground-borne vibration is not as simple to model as airborne noise. This is due to the fact that noise in the air travels through a relatively uniform median, while ground-borne vibrations travel through the earth which may contain significant geological differences. There are three main types of vibration propagation; surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground’s surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a “push-pull” fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or “side-to-side and perpendicular to the direction of propagation.”

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

4.0 REGULATORY SETTING

The project sites are located in the Cities of Fountain Valley and Huntington Beach. Noise regulations are addressed through the efforts of various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

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

- Promulgating noise emission standards for interstate commerce
- Assisting state and local abatement efforts
- Promoting noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency prohibits exposure of workers to excessive sound levels. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA). Transit noise is regulated by the federal Urban Mass Transit Administration (UMTA), while freeways that are part of the interstate highway system are regulated by the Federal Highway Administration (FHWA). Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that “noise sensitive” uses are either prohibited from being sited adjacent to a highway or, alternately that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Although the proposed project is not under the jurisdiction of the FTA, the FTA is the only agency that has defined what constitutes a significant noise impact from implementing a project. The FTA recommends developing construction noise criteria on a project-specific basis that utilizes local noise ordinances if possible. However, local noise ordinances usually relates to nuisance and hours of allowed activity and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the noise impacts of a construction project. Project construction noise criteria should take into account the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land uses. The FTA standards are based on extensive studies by the FTA and other governmental agencies on the human effects and reaction to noise and a summary of the FTA findings for a detailed construction noise assessment are provided below in Table G.

Table G – FTA General Assessment Construction Noise Criteria

| Land Use | Day (dBA Leq _(1-hour)) | Night (dBA Leq _(1-hour)) |
|-------------|---------------------------------------|---|
| Residential | 90 | 80 |
| Commercial | 100 | 100 |
| Industrial | 100 | 100 |

Source: Federal Transit Administration, 2018.

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

4.2 State Regulations

Noise Standards

California Department of Health Services Office of Noise Control

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the “Land Use Compatibility for Community Noise Environments Matrix,” which allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise. The land use compatibility guidelines developed by ONC along with other parameters from the California Governor’s Office of Planning and Research were used by the Cities of Fountain Valley and Huntington Beach to develop its own land use compatibility standards as described below under Local Regulations.

California Noise Insulation Standards

Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60-dBA CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL annual threshold. In addition, Title 21, Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

California Vehicle Code Section 27200-27207 – On-Road Vehicle Noise

California Vehicle Code Section 27200-27207 provides noise limits for vehicles operated in California. For vehicles over 10,000 pounds noise is limited to 88 dB for vehicles manufactured before 1973, 86 dB for vehicles manufactured before 1975, 83 dB for vehicles manufactured before 1988, and 80 dB for vehicles manufactured after 1987. All measurements are based at 50 feet from the vehicle.

California Vehicle Section 38365-38380 – Off-Road Vehicle Noise

California Vehicle Code Section 38365-38380 provides noise limits for off-highway motor vehicles operated in California. 92 dBA for vehicles manufactured before 1973, 88 dBA for vehicles manufactured before 1975, 86 dBA for vehicles manufactured before 1986, and 82 dBA for vehicles manufactured after December 31, 1985. All measurements are based at 50 feet from the vehicle.

Vibration Standards

Title 14 of the California Administrative Code Section 15000 requires that all state and local agencies implement the California Environmental Quality Act (CEQA) Guidelines, which requires the analysis of exposure of persons to excessive groundborne vibration. However, no statute has been adopted by the state that quantifies the level at which excessive groundborne vibration occurs.

Caltrans issued the *Transportation- and Construction-Induced Vibration Guidance Manual* in 2004. The manual provides practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. However, this manual is also used as a reference point by many lead agencies and CEQA practitioners throughout California, as it provides numeric thresholds for vibration impacts. Thresholds are established for continuous (construction-related) and transient (transportation-related) sources of vibration, which found that the human response becomes distinctly perceptible at 0.25 inch per second PPV for transient sources and 0.04 inch per second PPV for continuous sources.

4.3 Local Regulations

The Cities of Fountain Valley and Huntington Beach General Plans and Municipal Codes establish the following applicable policies related to noise and vibration.

City of Fountain Valley General Plan

The City of Fountain Valley has the authority to set land use noise standards and place restrictions on private activities that generate excessive or intrusive noise. Chapter 7, Noise Element, of the General Plan states that “noise concerns should be incorporated into land use planning to reduce future noise and land use incompatibility.” The following goals and policies are set forth in the Noise Element of the General Plan.

Goal 7.1 Protect public health and welfare by eliminating existing noise problems and preventing significant degradation of the future acoustic environment.

Table H – City of Fountain Valley Exterior and Interior Noise Standards

| Categories | Uses | Energy Average CNEL | |
|-------------|---|-----------------------|-----------------------|
| | | Interior ¹ | Exterior ² |
| Residential | Single Family, Duplex, Multiple Family | 45 ³ | 60 |
| | Mobile | 45* | 60 |
| Commercial | Hotel, Motel, Transient Lodging | 45 | 60 ⁴ |
| | Commercial Retail, Bank Restaurant | 55 | -- |
| | Office Building, Research and Development, Professional Offices, City Office Building | 45 | -- |
| | Amphitheatre, Concert Hall, Auditorium, Meeting Hall | 45 | -- |
| | Gymnasium (Multipurpose) | 50 | -- |
| | Sports Club | 55 | -- |
| | Manufacturing, Warehousing, Wholesale, Utilities | 65 | -- |
| | Movie Theatres | 45 | -- |

| Categories | Uses | Energy Average CNEL | |
|---------------|------------------------------|-----------------------|-----------------------|
| | | Interior ¹ | Exterior ² |
| Institutional | Hospital, Schools' classroom | 45 | 65 |
| | Church, Library | 45 | -- |
| Open Space | Parks | -- | 65 |

Notes:

¹ Indoor environment excluding, Bathrooms, toilets, closets, corridors.

² Outdoor environment limited to: Private yard of single family

Multi-family private patio or balcony which is served by means of exit from inside.

Mobile home Park

Hospital patio, office patio

Park's picnic area

School's playground

Hotel and motel recreation area

³ Noise level requirement with closed windows. Mechanical ventilation system or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of the UBC.

⁴ Except those areas effected by aircraft noise.

* Due to the variable nature of mobile homes, a 15 dB outdoor to indoor noise reduction with windows closed should be assumed for indicating compliance with this standard.

Source: Figure 7-9, City of Fountain Valley General Plan, 1995.

Policies:

7.1.1 Incorporate noise considerations into land use planning decisions.

- a) Establish acceptable limits of noise for various land uses throughout the community. The City adopts the noise standards presented in Figure 7-9 (see Table H above) which identify interior and exterior noise standards in relation to specific land uses; particularly residential areas, schools, hospitals, open space preserves and parks. The standards specify the maximum noise levels allowable for new developments impacted by noise sources operating in public or quasi-public property.

7.1.3 Establish measures to control non-transportation noise impacts.

City of Fountain Valley Municipal Code

The Fountain Valley Municipal Code establishes the following applicable standards related to noise.

6.28.050 Exterior noise standards

- (a) The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

Table I – City of Fountain Valley Exterior Noise Standards

| Noise Zone | Noise Level | Time Period |
|------------|-------------|------------------|
| 1 | 55 dB(A) | 7 a.m. – 10 p.m. |
| | 50 dB(A) | 10 p.m. – 7 a.m. |

Source: City of Fountain Valley Municipal Code, Section 6.28.050.

In the even the alleged offensive 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 5 dB(A).

(b) 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 such person, when the foregoing causes the noise level, when measured on any other residential property, either incorporated or unincorporated, to exceed:

- (1) The noise standard for a cumulative period of more than thirty minute in any hour; or
- (2) The noise standard plus five dB(A) for a cumulative period of more than fifteen minutes in any hour; or
- (3) The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour; or
- (4) The noise standard plus fifteen dB(A) for a cumulative period of more than one minute in any hour; or
- (5) The noise standard plus twenty dB(A) for any period of time.

(c) In the event the ambient noise level exceeds any of the first four noise limit categories set forth in subsection (b) of this section, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

6.28.060 Interior noise standards

(a) The following interior noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

Table J – City of Fountain Valley Exterior Noise Standards

| Noise Zone | Noise Level | Time Period |
|------------|-------------|------------------|
| 1 | 55 dB(A) | 7 a.m. – 10 p.m. |
| | 45 dB(A) | 10 p.m. – 7 a.m. |

Source: City of Fountain Valley Municipal Code, Section 6.28.050.

In the even the alleged offensive 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 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 such person, when the foregoing causes the noise level, when measured on any other residential property, either incorporated or unincorporated, to exceed:

- (1) The interior noise standard for a cumulative period of more than five minute in any hour; or
- (2) The interior noise standard plus five dB(A) for a cumulative period of more than one minute in any hour; or
- (3) The interior noise standard plus ten dB(A) for any period of time.

(c) In the event the ambient noise level exceeds any of the first four noise limit categories set forth in subsection (b) of this section, the cumulative period applicable to said category shall be increased to

reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

6.28.070 Special provisions

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

- (5) Noise sources associated with the construction, repair, remodeling or grading of any real property, provided said activities take place between the hours of seven a.m. and eight p.m. Monday through Friday, nine a.m. through eight p.m. on Saturday and at no time on Sunday or any legal holiday. For purposes of this exception the use of saws, buffers, sanders, drills, and sprayers shall be included, as shall similar activity.

City of Huntington Beach General Plan

The following applicable goals, objectives, and policies to the proposed project are from the Noise Element of the General Plan.

Goal N-1 Noise-sensitive land uses are protected in areas with acceptable noise levels.

Policies:

- A. Maintain acceptable stationary noise levels at existing noise-sensitive land uses such as schools, residential areas, and open spaces.
- B. Incorporate design and construction features into residential, mixed-use, commercial, and industrial projects that shield noise-sensitive land uses from excessive noise.

Goal N-2 Land use patterns are compatible with current and future noise levels.

Policies:

- A. Require an acoustical study for proposed projects in areas where the existing or projected noise level exceeds or would exceed the maximum allowable levels identified in Table N-2 (see Table K). The acoustical study shall be performed in accordance with the requirements set forth in this Noise Element.
- B. Allow a higher exterior noise level standard for infill projects in existing residential areas adjacent to major arterials if no feasible mechanisms exist to meet exterior noise standards.
- C. Minimize excessive noise from industrial land uses through incorporation of site and building design features that are intended to reduce noise impacts to sensitive land uses.
- D. Encourage new mixed-use development projects to site loading areas, parking lots, driveways, trash enclosures, mechanical equipment, and other noise sources away from residential portions of the development, to the extent feasible.

Goal N-4 Noise from construction activities associated with discretionary projects, maintenance vehicles, special events, and other nuisances is minimized in residential areas and near noise-sensitive land uses.

Policies:

- A. Reduce construction, maintenance, and nuisance noise at the source as the first and preferred strategy to reduce noise conflicts.
- B. Require that new discretionary uses and special events such as restaurants, bars, entertainment, parking facilities, and other commercial uses or beach events where large numbers of people may be present adjacent to sensitive noise receptors comply with the noise standards in Table N-2 and the City Noise Ordinance.
- C. Encourage shielding for construction activities to reduce noise levels and protect adjacent noise-sensitive land uses.
- D. Limit allowable hours for construction activities and maintenance operations located adjacent to noise-sensitive land uses.

Table K – City of Huntington Beach Land Use-Noise Compatibility Standards

| General Plan Land Use Designation | Proposed Uses | Exterior Normally Acceptable (dBA CNEL) | Exterior Conditionally Acceptable (dBA CNEL) | Exterior Normally Unacceptable (dBA CNEL) | Interior Acceptable (dBA CNEL) |
|---|---|---|--|---|--------------------------------|
| Residential | | | | | |
| Low Density | Single-family, mobile home, senior housing | Up to 60 | 61-65 | ≥66 | 45 |
| Medium Density, Medium High Density, High Density | Attached single-family, duplex, townhomes, multi-family, condominiums, apartments | Up to 65 | 66-70 | ≥71 | 45 |
| Mixed-Use | | | | | |
| Mixed-Use | Combination of commercial and residential uses | Up to 70 | 71-75 | ≥76 | 45 |
| Commercial | | | | | |
| Neighborhood Commercial, General Commercial | Retail, professional office, health services, restaurant, government offices, hotel/motel | Up to 70 | 71-75 | ≥76 | 45 |
| Visitor Commercial | Hotel/motel, timeshares, recreational commercial, cultural facilities | Up to 65 | 66-75 | ≥75 | 45 |
| Office | Office, financial institutions | NA | NA | NA | NA |
| Public/Semi-public | | | | | |
| Semi-public (School) | Schools | Up to 60 | 61-65 | ≥66 | 45 |
| Semi-public (Other) | Hospitals, churches, cultural facilities | Up to 65 | 66-70 | ≥71 | 45 |
| Public | Public utilities, parking lot | NA | NA | NA | NA |
| Industrial | | | | | |

| General Plan Land Use Designation | Proposed Uses | Exterior Normally Acceptable (dBA CNEL) | Exterior Conditionally Acceptable (dBA CNEL) | Exterior Normally Unacceptable (dBA CNEL) | Interior Acceptable (dBA CNEL) |
|------------------------------------|--|---|--|---|--------------------------------|
| Research and Technology | Research and development, technology, warehousing, business park | NA | NA | NA | NA |
| Industrial | Manufacturing, construction, transportation, business park | NA | NA | NA | NA |
| Open Space and Recreational | | | | | |
| Conservation | Environmental resource conservation | NA | NA | NA | NA |
| Park | Public Park | Up to 65 | 65-75 | ≥76 | NA |
| Recreation | Golf courses, recreational water bodies | Up to 65 | 66-75 | ≥76 | NA |
| Shore | City and state beaches | NA | NA | NA | NA |

Notes:

¹ Normally acceptable means that land uses may be established in areas with the stated ambient noise level, absent any unique noise circumstances.

² Conditionally acceptable means that land uses should be established in areas with the stated ambient noise level only when exterior areas are omitted from the project or noise levels in exterior areas can be mitigated to the normally acceptable level. Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use. Where it is not practical to mitigate exterior noise levels at patio or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.

³ Normally unacceptable means that land uses should generally not be established in areas with the stated ambient noise level. If the benefits of the project in addressing other General Plan goals and policies outweigh concerns about noise, the use should be established only where exterior areas are omitted from the project or where exterior areas are located and shielded from noise sources to mitigate noise to the maximum extent feasible. Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use. Where it is not practical to mitigate exterior noise levels at patio or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.

⁴ Interior acceptable means that the building must be constructed so that interior noise levels do not exceed the stated maximum, regardless of the exterior noise level. Stated maximums are as determined for a typical worst-case hour during periods of use.

Source: City of Huntington Beach General Plan Table N-2.

City of Huntington Beach Municipal Code

The City of Huntington Beach Municipal Code establishes the following applicable standards related to noise.

8.40.040 Designated noise zones

The properties hereinafter described, whether within or without the City, are hereby assigned to the following noise zones:

Noise Zone 1: All residential properties;

Noise Zone 2: All professional office and public institutional properties;

Noise Zone 3: All commercial properties with the exception of professional office properties;

Noise Zone 4: All industrial properties.

8.40.050 Exterior noise standards

(a) The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

Table L – City of Huntington Beach Exterior Noise Standards

| Exterior Noise Standards | | |
|--------------------------|-------------|------------------|
| Noise Zone | Noise Level | Time Period |
| 1 | 55 dB(A) | 7 a.m. – 10 p.m. |
| | 50 dB(A) | 10 p.m. – 7 a.m. |
| 2 | 55 dB(A) | Anytime |
| 3 | 60 dB(A) | Anytime |
| 4 | 70 dB(A) | Anytime |

Source: City of Huntington Beach, 2012.

The above standard does not apply to the establishment of multi-family residence private balconies and patios. Multi-family developments with balconies or patios that do not meet CNEL standards are required to provide occupancy disclosure notices to all future tenants.

(b) In the event the alleged offensive 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 (5) dB(A).

8.40.060 Exterior noise levels prohibited

It shall be unlawful for any person at any location within the incorporated area of the City to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level when measured on any residential, public institutional, professional, commercial or industrial property, either within or without the City, to exceed the applicable noise standards:

- (a) For a cumulative period of more than thirty (30) minutes in any hour;
- (b) Plus 5 dB(A) for cumulative period of more than fifteen (15) minutes in any hour;
- (c) Plus 10 dB(A) for cumulative period of more than five (5) minutes in any hour;
- (d) Plus 15 dB(A) for cumulative period of more than one (1) minute in any hour; or
- (e) Plus 20 dB(A) for any period of time.

In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

8.40.070 Interior noise standards

(a) The following noise standards, unless otherwise specifically indicated, shall apply to all real property within a designated noise zone:

Table M – City of Huntington Beach Interior Noise Standards

| Interior Noise Standards | | |
|--------------------------|-------------|------------------|
| Noise Zone | Noise Level | Time Period |
| 1 | 55 dB(A) | 7 a.m. – 10 p.m. |
| | 45 dB(A) | 10 p.m. – 7 a.m. |
| 2,3,4 | 55 dB(A) | Anytime |

Source: City of Huntington Beach, 2012.

(b) In the event the alleged offensive 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 (5) dB(A).

8.40.080 Interior levels of noise prohibited

It shall be unlawful for any person at any location within the incorporated area of the City to create any noise, or to allow the creation of any noise on property owned, leased occupied, or otherwise controlled by such person, which causes the noise level when measured within any other structure on any residential, public institutional, commercial, or industrial property to exceed:

The noise standard for a cumulative period of more than five minutes in any hour;

The noise standards plus 5 dB(A) for a cumulative period of more than one (1) minute in any hour; or

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

In the even the ambient noise level exceeds either of the first two noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise level, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

Each of the noise limits specified above shall be reduced by 5 dB(A) for impact or predominant tone noises, or for noises consisting of speech or music.

In the event that the noise source and the affected property are within different noise zones, the noise standards of the affected property shall apply.

8.40.090 Special Provisions

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

(d) Noise sources associated with construction, repair, remodeling, or grading of any real property; provided a permit has been obtained from the City as provided herein; and provided said activities do not take place between the hours of 8 p.m. and 7 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

(j) Any activity or equipment to the extent that design regulation thereof has been pre-empted by state or federal laws.

8.40.100 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 same is in use, to exceed the noise limits specified for exterior noise standards in this chapter, or which noise level unreasonably interferes with the use of such institutions or which unreasonably disturbs or annoys patients in the hospital, provided conspicuous signs are displayed in three (3) separate locations within one-tenth (1/10) of a mile of the institution indicating the presence of a school, hospital or church.

5.0 EXISTING NOISE CONDITIONS

To determine the existing noise levels, noise measurements have been taken in the vicinity of both existing Monitoring Well SA-5 and proposed Monitoring Well M58. The following describes the measurement procedures, measurement locations, noise measurement results, and the modeling of the existing noise environment.

5.1 Noise Measurement Equipment

The noise measurements were taken using a Larson-Davis Model 831 Type 1 precision sound level meter programmed in “slow” mode to record noise levels in “A” weighted form as well as the frequency spectrum of the noise broken down into 1/3 octaves. The sound level meter and microphone were mounted on a tripod five feet above the ground and were equipped with a windscreen during all measurements. The sound level meter was calibrated before and after the monitoring using a Larson-Davis calibrator, Model CAL 200. The accuracy of the calibrator is maintained through a program established through the manufacturer and is traceable to the National Bureau of Standards. The unit meets the requirements of ANSI Standard S1.4-1984 and IEC Standard 942: 1988 for Class 1 equipment. All noise level measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

Noise Measurement Location

The noise monitoring locations were selected in order to obtain noise levels in the vicinity of the nearest home to existing Monitoring Well SA-5 and proposed Monitoring Well M58. Descriptions of the noise monitoring sites are provided below in Table N. Appendix A includes a photo index of the study area and noise level measurement locations.

Noise Measurement Timing and Climate

The noise measurements were recorded between 1:59 p.m. and 2:30 p.m. on Wednesday, September 18, 2019. During the noise measurements, the sky was clear (no clouds), the temperature was 78 degrees Fahrenheit, the humidity was 63 percent, barometric pressure was 29.85 inches of mercury, and the wind was blowing around five miles per hour.

5.2 Noise Measurement Results

The results of the noise level measurements are presented in Table N and the noise monitoring data printouts are included in Appendix B.

Table N – Noise Level Measurement Results

| Site No. | Description | Primary Noise Source | Start Time of Measurement | Measured Noise Level | |
|----------|--|---|---------------------------|----------------------|----------|
| | | | | dBA Leq | dBA Lmax |
| 1 | Located northeast of Well SA-5 in the front yard of the nearest home at 9962 Frederick Circle. | Vehicles on Brookhurst Street and Yorktown Avenue | 1:59 p.m. | 51.0 | 60.1 |
| 2 | Located north of Well M58 in the side yard of the nearest home at 18952 Acacia Street. | Vehicles on Garfield Avenue | 2:20 p.m. | 53.6 | 63.0 |

Notes: Noise measurements taken with a Larson-Davis Model 831 Type 1 precision sound level meter on Wednesday, September 18, 2019.

6.0 MODELING PARAMETERS AND ASSUMPTIONS

6.1 Construction Noise

The noise impacts from construction of the proposed project have been analyzed through use of the FHWA's Roadway Construction Noise Model (RCNM). The FHWA compiled noise measurement data regarding the noise generating characteristics of several different types of construction equipment used during the Central Artery/Tunnel project in Boston. Table O below provides a list of the construction equipment anticipated to be used for each phase of construction as detailed above in Section 1.4 as well as the nearest match to each piece of construction equipment provided in the RCNM model, the acoustical use factor and the measured noise level that is utilized in the RCNM Model.

Table O – Construction Equipment Noise Emissions and Usage Factors from RCNM Model

| Equipment Description | Number of Equipment | Equivalent Equipment in RCNM | Acoustical Use Factor ¹ (percent) | Actual Measured Lmax at 50 feet ³ (dBA, slow ²) |
|--|---------------------|------------------------------|--|--|
| Monitoring Well SA-5 Decommissioning | | | | |
| Pump Rig | 1 | Pumps | 50 | 80.9 |
| Air Compressor | 1 | Compressor (air) | 40 | 77.7 |
| Vacuum Truck | 1 | Vacuum Excavator | 40 | 85.3 |
| Backhoe | 1 | Backhoe | 40 | 77.6 |
| Cement Truck | 1 | Concrete Mixer Truck | 40 | 78.8 |
| Pick-up Truck | 1 | Pickup Truck | 40 | 75.0 |
| Monitoring Well M58 Phase 1 – Noise Panel and Protective Fencing Installation / Utility Clearance | | | | |
| Support Truck | 1 | Flat Bed Truck | 40 | 74.3 |
| Vacuum Truck | 1 | Vacuum Excavator | 40 | 85.3 |
| Monitoring Well M58 Phase 2 – Monitoring Well Drilling and Construction | | | | |
| Drilling Rig | 1 | Auger Drill Rig | 20 | 84 |
| Mud Circulation System | 1 | Pump | 50 | 80.9 |
| Forklift | 1 | Gradall | 40 | 83 |
| Support Truck | 1 | Flat Bed Truck | 40 | 74.3 |
| Pick-up Truck | 1 | Pickup Truck | 40 | 75.0 |
| Monitoring Well M58 Phase 3 – Monitoring Well Development | | | | |
| Air Compressor | 1 | Compressor (air) | 40 | 77.7 |
| Pump Rig | 1 | Pumps | 50 | 80.9 |
| Electrical Generator | 1 | Generator (<25KVA, VMS) | 50 | 72.8 |
| Pick-up Truck | 1 | Pickup Truck | 40 | 75.0 |
| Monitoring Well M58 Phase 4 – Site Cleanup and Traffic-Rated Vault Installation | | | | |
| Delivery Truck | 1 | Flat Bed Truck | 40 | 74.3 |
| Forklift | 1 | Gradall | 40 | 83 |
| Pick-up Truck | 1 | Pickup Truck | 40 | 75.0 |

Notes:

¹ Acoustical use factor is the percentage of time each piece of equipment is operational during a typical workday.

² The "slow" response averages sound levels over 1-second increments. A "fast" response averages sound levels over 0.125-second increments.

³ Actual Measured is the average noise level measured of each piece of equipment during the Central Artery/Tunnel project in Boston, Massachusetts primarily during the 1990s.

Source: Federal Highway Administration, 2006 and CalEEMod default equipment mix.

Construction noise impacts to the nearby sensitive receptors have been calculated according to the equipment noise levels and usage factors listed in Table O and through use of the RCNM. For each phase of construction, the first piece of equipment was placed the shortest distance to the nearest home and each subsequent piece of equipment was placed an additional 20 feet away from the home.

6.2 Operations-Related Noise

In general, operation of the monitoring well would be passive as there would be no permanent equipment installed in the well. Monitoring well operation involves periodically measuring the depth to groundwater and collecting groundwater samples for laboratory analysis. The depth to groundwater would be measured by hand using a battery-powered wire-line sounder. During a groundwater sampling event, a portable submersible pump would be lowered in each of the well casings. Operation of a submersible pump to lift water from the well would require the use of a small portable generator. OCWD staff would collect groundwater samples on a semi-annual basis and record water levels on a monthly basis. In total, the monitoring well would be visited by OCWD staff up to 14 times a year. Every three to five years OCWD would conduct maintenance activities to redevelop the well. A typical monitoring well redevelopment process would be completed in one day. All sampling and redevelopment activities would occur during daylight hours. The anticipated timing and construction equipment utilized during well sampling and rehabilitation have been discussed above in Section 1.5.

Table P below provides a list of the equipment anticipated to be used during monitoring well operational activities of well sampling and well rehabilitation activities as detailed above in Section 1.6 as well as the nearest match to each piece of equipment provided in the RCNM model, the acoustical use factor and the measured noise level that is utilized in the RCNM Model.

Table P – Operational Equipment Noise Emissions and Usage Factors from RCNM Model

| Equipment Description | Number of Equipment | Equivalent Equipment in RCNM | Acoustical Use Factor ¹ (percent) | Actual Measured Lmax at 50 feet ³ (dBA, slow ²) |
|---------------------------|---------------------|------------------------------|--|--|
| Well Sampling | | | | |
| Electrical Generator | 1 | Generator (<25KVA, VMS) | 50 | 72.8 |
| Well Redevelopment | | | | |
| Pump Rig | 1 | Pumps | 50 | 80.9 |
| Air Compressor | 1 | Compressor (air) | 40 | 77.7 |
| Pick-up Truck | 1 | Pickup Truck | 40 | 75.0 |

Notes:

¹ Acoustical use factor is the percentage of time each piece of equipment is operational during a typical workday.

² The “slow” response averages sound levels over 1-second increments. A “fast” response averages sound levels over 0.125-second increments.

³ Actual Measured is the average noise level measured of each piece of equipment during the Central Artery/Tunnel project in Boston, Massachusetts primarily during the 1990s.

Source: Federal Highway Administration, 2006 and OCWD.

6.3 Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the construction site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight

damage at the highest levels. Table Q gives approximate vibration levels for particular construction activities. The data in Table Q provides a reasonable estimate for a wide range of soil conditions.

Table Q – Vibration Source Levels for Construction Equipment

| Equipment | | Peak Particle Velocity (inches/second) | Approximate Vibration Level (L _v) ¹ at 25 feet |
|--------------------------------|-------------|---|--|
| Pile driver (impact) | Upper range | 1.518 | 112 |
| | typical | 0.644 | 104 |
| Pile driver (sonic) | Upper range | 0.734 | 105 |
| | typical | 0.170 | 93 |
| Clam shovel drop (slurry wall) | | 0.202 | 94 |
| 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 |

Notes:

¹ root mean square (rms) velocity in decibels. VdB re 1 micro-inch per second.

Source: Federal Transit Administration, May 2018.

The construction-related vibration impacts have been calculated through the vibration levels shown above in Table Q and through typical vibration propagation rates. The equipment assumptions were based on the equipment lists provided above in Table O.

7.0 IMPACT ANALYSIS

7.1 CEQA Thresholds of Significance

Consistent with the California Environmental Quality Act (CEQA) and the State CEQA Guidelines, a significant impact related to noise would occur if a proposed project is determined to result in:

- 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;
- Generation of excessive groundborne vibration or groundborne noise levels; or
- 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.

7.2 Generation of Noise Levels in Excess of Standards

The proposed project would not generate 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. The following section calculates the potential noise emissions associated with the construction and operations of the proposed project and compares the noise levels to both Cities standards.

Construction-Related Noise

The proposed project involves the destruction and permanent decommissioning of Monitoring Well SA-5 and construction and operation of proposed Monitoring Well M58. Noise impacts from construction activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. All well destruction and construction operations would occur between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday or as otherwise specified in the City Encroachment Permits.

Both the City of Huntington Beach and Fountain Valley exempt construction noise from the Municipal Code noise standards provided that construction occurs on weekdays between the hours of 7:00 a.m. and 8:00 p.m.. However, the Cities construction noise standards do not provide any limits to the noise levels that may be created from construction activities and even with adherence to the City standards, the resultant construction noise levels may result in a significant substantial temporary noise increase to the nearby residents.

In order to determine if the proposed construction activities would create a significant substantial temporary noise increase, the FTA construction noise criteria thresholds detailed above in Section 4.1 have been utilized, which shows that a significant construction noise impact would occur if construction noise exceeds 90 dBA Leq worst-case hourly period at any of the nearby homes.

Construction noise impacts to the nearby sensitive receptors have been calculated through use of the RCNM and the parameters and assumptions detailed in Section 6.1 of this report. The results are shown below in Table R and the RCNM printouts are provided in Appendix C.

Table R – Construction Noise Levels at the Nearest Home to Each Construction Phase

| Construction Phase | Noise Level at Nearest Homes (dBA Leq) |
|--|--|
| Monitoring Well SA-5 Decommissioning ¹ | 82 |
| Monitoring Well M58 Phase 1 – Noise Panel and Protective Fencing Installation / Utility Clearance ¹ | 79 |
| Monitoring Well M58 Phase 2 – Monitoring Well Drilling and Construction ² | 77 |
| Monitoring Well M58 Phase 3 – Monitoring Well Development ² | 75 |
| Monitoring Well M58 Phase 4 – Site Cleanup and Traffic-Rated Vault Installation ² | 73 |
| FTA Construction Noise Threshold³ | 90 |
| Exceed Threshold? | No |

¹ The calculated noise levels include 5 dB of attenuation to account for the existing 6 to 8 foot high walls.

² The calculated noise levels include 10 dB of attenuation to account for Project Design Feature 1 that requires the installation of a 12-foot high temporary sound wall.

³ Construction Noise Threshold shown above in Table G (FTA, 2018).

Source: RCNM, Federal Highway Administration, 2018

Table R shows that the greatest noise impacts would occur during the demolition phase of construction, with a noise level as high as 79 dBA Leq at the nearest homes to the east. Table R also shows that none of the construction phases would exceed the FTA construction noise standard of 90 dBA for residential uses. Therefore, through adherence to allowable construction times provided in both Cities Municipal Codes^T, the construction activities for the proposed project would not create a substantial temporary increase in ambient noise levels that are in excess of applicable noise standards. Impacts would be less than significant.

Monitoring Well OCWD-M57 Operational Noise Impacts

In general, operation of the monitoring well would be passive as there would be no permanent equipment installed in the well. Monitoring well operation involves periodically measuring the depth to groundwater and collecting groundwater samples for laboratory analysis. The depth to groundwater would be measured by hand using a battery-powered wire-line sounder. During a groundwater sampling event, a portable submersible pump would be lowered in each of the well casings. Operation of a submersible pump to lift water from the well would require the use of a small portable generator. OCWD staff would collect groundwater samples on a semi-annual basis and record water levels on a monthly basis. In total, the monitoring well would be visited by OCWD staff up to 14 times a year. Every three to five years OCWD would conduct maintenance activities to redevelop the well. A typical monitoring well redevelopment process would be completed in one day. All sampling and redevelopment activities would occur during daylight hours.

The noise impacts created from the monitoring well sampling and redevelopment activities have been calculated and the noise level results are shown below in Table Sand the RCNM printouts are provided in Appendix D. Since the well sampling and well redevelopment activities would involve the use of construction equipment, which is exempt from both Cities noise ordinances, provided that use of the equipment occurs within allowable times for construction, the calculated well sampling and well redevelopment noise levels shown in Table S have been compared to the FTA construction noise criteria thresholds detailed above in Section 4.1.

Table S – Monitoring Well M58 Operational Noise Levels at the Nearest Home

| Operational Activity | Noise Level at Nearest Home¹ (dBA Leq) |
|--|--|
| Monitoring Well M58 Well Sampling | 73 |
| Monitoring Well M58 Well Redevelopment | 81 |
| FTA Noise Threshold² | 90 |
| Exceed Threshold? | No |

¹ The calculated noise levels include 5 dB of attenuation to account for the existing 6 to 8 foot high walls.

² Noise Threshold shown above in Table G (FTA, 2018).

Source: RCNM, Federal Highway Administration, 2018

Table S shows that the greatest operational noise impact would occur during Monitor Well M58 redevelopment activities with a noise level as high as 81 dBA Leq, which is within the FTA construction noise standard of 90 dBA for residential uses. Therefore, through adherence to allowable construction times provided in both Cities Municipal Codes, the operational well sampling and well redevelopment activities for the proposed project would not create a substantial temporary or permanent increase in ambient noise levels that are in excess of applicable noise standards. Impacts would be less than significant.

Level of Significance

Less than significant impact.

7.3 Generation of Excessive Groundborne Vibration

The proposed project would not expose persons to or generation of excessive groundborne vibration or groundborne noise levels. Vibration impacts from construction and operational activities associated with the proposed project would be a function of the vibration generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. The construction activities for the proposed project involves the destruction and permanent decommissioning of Monitoring Well SA-5 and construction of proposed Monitoring Well M58. In addition, operational activities associated with well redevelopment would also utilize construction equipment.

Since Neither Cities Municipal Codes nor their General Plans provide a quantifiable vibration threshold, Caltrans guidance that is detailed above in Section 4.2 has been utilized, which defines the threshold of perception from transient sources at 0.25 inch per second PPV.

Table Q above in Section 6.3 provides a list of construction equipment that are known sources of vibration. Of the equipment listed in Table Q above, the caisson drill, which is similar to a drill rig is the only piece of equipment that would be utilized during either construction or operation of the proposed project that is a known source of vibration. A drill rig would be utilized during Monitor Phase 2, Monitor Well M58 well drilling and construction activities and according to Table Q above, a caisson drill creates a vibration level of 0.089 inch per second PPV at 25 feet. Based on typical propagation rates, the vibration level at the nearest home to the monitoring well construction activities (20 feet away) would be 0.11 inch per second PPV. The vibration level at the nearest offsite receptor would be below the 0.25 inch per second PPV threshold detailed above. Therefore, a less than significant vibration impact is anticipated from construction and operation of the proposed project.

Level of Significance

Less than significant impact.

7.4 Aircraft Noise

The proposed project would not expose people residing or working in the project area to excessive noise levels from aircraft. The proposed project consists of the destruction and permanent decommissioning of Monitoring Well SA-5 and construction of proposed Monitoring Well M58. The operational activities associated with the proposed monitoring well will typically be passive and would not require anyone onsite and would not introduce any new sensitive receptors to the project site. No aircraft noise impacts would occur.

Level of Significance

No impact.

8.0 REFERENCES

California Department of Transportation (Caltrans), *Technical Noise Supplement to the Traffic Noise Analytics Protocol*, September 2013.

California Department of Transportation, *Transportation- and Construction-Induced Vibration Guidance Manual*, September 2013.

City of Fountain Valley, *City of Fountain Valley General Plan Chapter 7. 0: Noise*, January 25, 1995

City of Fountain Valley, *Fountain Valley Municipal Code Chapter 6.28 Noise Control*, May 2019.

City of Huntington Beach, *City of Huntington Beach General Plan*, October 2017.

City of Huntington Beach, *Chapter 8.40 Noise Control*, 2012.

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

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

Vista Environmental, *Air Quality, Energy, and Greenhouse Gas Emissions Impact Analysis Monitoring Well SA-5 Replacement Project*, September 19, 2019.

APPENDIX A

Field Noise Measurements Photo Index



Noise Measurement Site 1 - looking north



Noise Measurement Site 1 - looking northeast



Noise Measurement Site 1 - looking east



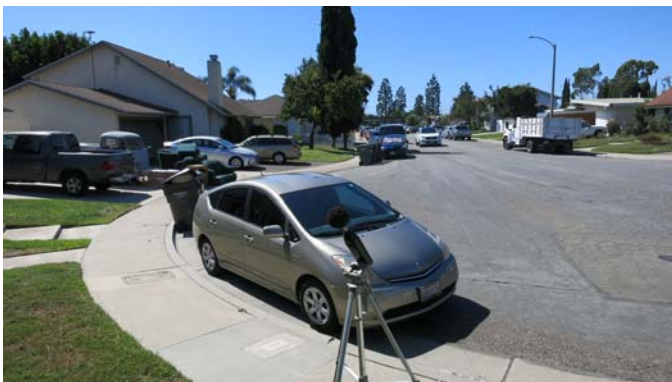
Noise Measurement Site 1 - looking southeast



Noise Measurement Site 1 - looking south



Noise Measurement Site 1 - looking southwest



Noise Measurement Site 1 - looking west



Noise Measurement Site 1 - looking northwest



Noise Measurement Site 2 - looking north



Noise Measurement Site 2 - looking northeast



Noise Measurement Site 2 - looking east



Noise Measurement Site 2 - looking southeast



Noise Measurement Site 2 - looking south



Noise Measurement Site 2 - looking southwest



Noise Measurement Site 2 - looking west



Noise Measurement Site 2 - looking northwest

APPENDIX B

Field Noise Measurements Printouts

| General Information | | | | | | | | | | | | | |
|--|---------------------------------------|------|------|------|------|------|------|------|------|------|------|-------------|-----|
| Serial Number | 02509 | | | | | | | | | | | | |
| Model | 831 | | | | | | | | | | | | |
| Firmware Version | 2.314 | | | | | | | | | | | | |
| Filename | 831_Data.006 | | | | | | | | | | | | |
| User | GT | | | | | | | | | | | | |
| Job Description | Monitoring Well SA-5 Replacement | | | | | | | | | | | | |
| Location | Front Yard at 9962 Frederick Ci | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Measurement Description | | | | | | | | | | | | | |
| Start Time | Wednesday, 2019 September 18 13:59:53 | | | | | | | | | | | | |
| Stop Time | Wednesday, 2019 September 18 14:09:53 | | | | | | | | | | | | |
| Duration | 00:10:00.0 | | | | | | | | | | | | |
| Run Time | 00:10:00.0 | | | | | | | | | | | | |
| Pause | 00:00:00.0 | | | | | | | | | | | | |
| Pre Calibration | Wednesday, 2019 September 18 13:58:17 | | | | | | | | | | | | |
| Post Calibration | None | | | | | | | | | | | | |
| Calibration Deviation | --- | | | | | | | | | | | | |
| Note | | | | | | | | | | | | | |
| Noise from Brookhurst St _Yorktown Ave | | | | | | | | | | | | | |
| 78 F, 29.85 in Hg, 63% Hu, 5 mph wind, clear sky | | | | | | | | | | | | | |
| Overall Data | | | | | | | | | | | | | |
| LAeq | | | | | | | | | | | | 51.0 | dB |
| LASmax | 2019 Sep 18 14:01:18 | | | | | | | | | | | 60.1 | dB |
| LZpeak (max) | 2019 Sep 18 13:59:53 | | | | | | | | | | | 106.8 | dB |
| LASmin | 2019 Sep 18 14:00:56 | | | | | | | | | | | 44.5 | dB |
| LCeq | | | | | | | | | | | | 65.5 | dB |
| LAeq | | | | | | | | | | | | 51.0 | dB |
| LCeq - LAeq | | | | | | | | | | | | 14.5 | dB |
| LA1eq | | | | | | | | | | | | 53.0 | dB |
| LAeq | | | | | | | | | | | | 51.0 | dB |
| LA1eq - LAeq | | | | | | | | | | | | 2.0 | dB |
| Ldn | | | | | | | | | | | | 51.0 | dB |
| LDay 07:00-22:00 | | | | | | | | | | | | 51.0 | dB |
| LNight 22:00-07:00 | | | | | | | | | | | | --- | dB |
| Lden | | | | | | | | | | | | 51.0 | dB |
| LDay 07:00-19:00 | | | | | | | | | | | | 51.0 | dB |
| LEvening 19:00-22:00 | | | | | | | | | | | | --- | dB |
| LNight 22:00-07:00 | | | | | | | | | | | | --- | dB |
| LAE | | | | | | | | | | | | 78.8 | dB |
| # Overloads | | | | | | | | | | | | 0 | |
| Overload Duration | | | | | | | | | | | | 0.0 | s |
| # OBA Overloads | | | | | | | | | | | | 0 | |
| OBA Overload Duration | | | | | | | | | | | | 0.0 | s |
| Statistics | | | | | | | | | | | | | |
| LAS5.00 | | | | | | | | | | | | 54.7 | dBA |
| LAS10.00 | | | | | | | | | | | | 53.2 | dBA |
| LAS33.30 | | | | | | | | | | | | 51.4 | dBA |
| LAS50.00 | | | | | | | | | | | | 50.2 | dBA |
| LAS66.60 | | | | | | | | | | | | 49.2 | dBA |
| LAS90.00 | | | | | | | | | | | | 46.5 | dBA |
| | | | | | | | | | | | | | |
| LAS > 65.0 dB (Exceedence Counts / Duration) | | | | | | | | | | | | 0 / 0.0 | s |
| LAS > 85.0 dB (Exceedence Counts / Duration) | | | | | | | | | | | | 0 / 0.0 | s |
| LZpeak > 135.0 dB (Exceedence Counts / Duration) | | | | | | | | | | | | 0 / 0.0 | s |
| LZpeak > 137.0 dB (Exceedence Counts / Duration) | | | | | | | | | | | | 0 / 0.0 | s |
| LZpeak > 140.0 dB (Exceedence Counts / Duration) | | | | | | | | | | | | 0 / 0.0 | s |
| Settings | | | | | | | | | | | | | |
| RMS Weight | | | | | | | | | | | | A Weighting | |
| Peak Weight | | | | | | | | | | | | Z Weighting | |
| Detector | | | | | | | | | | | | Slow | |
| Preamp | | | | | | | | | | | | PRM831 | |
| Integration Method | | | | | | | | | | | | Linear | |
| OBA Range | | | | | | | | | | | | Low | |
| OBA Bandwidth | | | | | | | | | | | | 1/1 and 1/3 | |
| OBA Freq. Weighting | | | | | | | | | | | | Z Weighting | |
| OBA Max Spectrum | | | | | | | | | | | | Bin Max | |
| Gain | | | | | | | | | | | | +0 | dB |
| | | | | | | | | | | | | | |
| Under Range Limit | | | | | | | | | | | | 26.5 | dB |
| Under Range Peak | | | | | | | | | | | | 78.8 | dB |
| Noise Floor | | | | | | | | | | | | 17.4 | dB |
| Overload | | | | | | | | | | | | 144.3 | dB |
| 1/1 Spectra | | | | | | | | | | | | | |
| Freq. (Hz): | 8.0 | 16.0 | 31.5 | 63.0 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | 16k | |
| LZeq | 65.7 | 61.0 | 64.0 | 61.8 | 58.3 | 50.5 | 46.5 | 47.5 | 40.2 | 34.3 | 29.3 | 21.4 | |
| LZSmax | 86.2 | 77.2 | 73.5 | 72.7 | 69.9 | 64.8 | 58.5 | 55.5 | 49.1 | 42.6 | 39.1 | 30.6 | |
| LZSmin | 47.9 | 53.6 | 58.4 | 53.1 | 48.4 | 41.6 | 38.9 | 40.0 | 34.3 | 28.3 | 22.3 | 15.6 | |

| 1/3 Spectra | | | | | | | | | | | | |
|-------------|------|------|------|-------|------|------|------|------|------|-------|------|-------|
| Freq. (Hz): | 6.3 | 8.0 | 10.0 | 12.5 | 16.0 | 20.0 | 25.0 | 31.5 | 40.0 | 50.0 | 63.0 | 80.0 |
| LZeq | 62.6 | 61.4 | 57.9 | 57.0 | 55.7 | 56.1 | 60.3 | 58.1 | 59.3 | 58.0 | 56.6 | 56.4 |
| LZSmax | 81.1 | 83.2 | 75.4 | 75.1 | 72.1 | 66.5 | 65.9 | 63.9 | 73.0 | 72.6 | 67.5 | 69.9 |
| LZSmin | 41.8 | 41.1 | 42.7 | 44.2 | 45.4 | 49.1 | 53.5 | 51.1 | 49.9 | 49.1 | 47.0 | 44.8 |
| | | | | | | | | | | | | |
| Freq. (Hz): | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1k | 1.25k |
| LZeq | 55.0 | 54.5 | 49.0 | 46.7 | 46.3 | 43.5 | 42.6 | 41.1 | 41.4 | 42.9 | 43.4 | 41.6 |
| LZSmax | 67.4 | 69.3 | 62.7 | 60.3 | 61.2 | 58.4 | 55.6 | 52.9 | 51.8 | 52.3 | 50.3 | 51.3 |
| LZSmin | 43.0 | 43.2 | 37.5 | 37.0 | 37.0 | 35.1 | 34.0 | 33.7 | 33.9 | 34.8 | 35.9 | 33.6 |
| | | | | | | | | | | | | |
| Freq. (Hz): | 1.6k | 2k | 2.5k | 3.15k | 4k | 5k | 6.3k | 8k | 10k | 12.5k | 16k | 20k |
| LZeq | 37.7 | 34.4 | 32.2 | 30.8 | 29.4 | 27.9 | 26.3 | 24.4 | 21.7 | 18.6 | 16.3 | 13.4 |
| LZSmax | 47.6 | 44.2 | 41.6 | 39.3 | 38.5 | 35.4 | 34.8 | 32.2 | 34.8 | 29.6 | 23.6 | 20.9 |
| LZSmin | 30.9 | 28.5 | 26.4 | 25.0 | 23.0 | 21.2 | 19.3 | 17.3 | 14.3 | 11.6 | 10.7 | 9.9 |

| Calibration History | | | | | | | | | | | | |
|---------------------|------|-----|------|----------|--|--|--------------|--|--|--|--|--|
| Preamp | Date | | | | | | dB re. 1V/Pa | | | | | |
| PRM831 | 18 | Sep | 2019 | 13:58:16 | | | -26.8 | | | | | |
| PRM831 | 18 | Sep | 2019 | 11:09:07 | | | -26.6 | | | | | |
| PRM831 | 07 | Aug | 2019 | 12:27:09 | | | -27.3 | | | | | |
| PRM831 | 07 | Aug | 2019 | 05:49:21 | | | -27.0 | | | | | |
| PRM831 | 06 | Aug | 2019 | 15:11:44 | | | -26.3 | | | | | |
| PRM831 | 06 | Aug | 2019 | 12:24:00 | | | -26.0 | | | | | |
| PRM831 | 22 | Jul | 2019 | 10:48:48 | | | -26.3 | | | | | |
| PRM831 | 12 | Jul | 2019 | 20:18:07 | | | -26.0 | | | | | |
| PRM831 | 29 | May | 2019 | 13:46:43 | | | -25.9 | | | | | |
| PRM831 | 07 | May | 2019 | 12:46:08 | | | -24.7 | | | | | |
| PRM831 | 07 | May | 2019 | 11:41:50 | | | -25.6 | | | | | |

| General Information | | | | | | | | | | | | |
|--|---------------------------------------|------|-------------|------|------|------|------|------|------|------|------|------|
| Serial Number | 02509 | | | | | | | | | | | |
| Model | 831 | | | | | | | | | | | |
| Firmware Version | 2.314 | | | | | | | | | | | |
| Filename | 831_Data.007 | | | | | | | | | | | |
| User | GT | | | | | | | | | | | |
| Job Description | Monitoring Well SA-5 Replacement | | | | | | | | | | | |
| Location | Side Yard of 18952 Acacia St | | | | | | | | | | | |
| Measurement Description | | | | | | | | | | | | |
| Start Time | Wednesday, 2019 September 18 14:20:05 | | | | | | | | | | | |
| Stop Time | Wednesday, 2019 September 18 14:30:05 | | | | | | | | | | | |
| Duration | 00:10:00.0 | | | | | | | | | | | |
| Run Time | 00:10:00.0 | | | | | | | | | | | |
| Pause | 00:00:00.0 | | | | | | | | | | | |
| Pre Calibration | Wednesday, 2019 September 18 13:58:16 | | | | | | | | | | | |
| Post Calibration | None | | | | | | | | | | | |
| Calibration Deviation | --- | | | | | | | | | | | |
| Note | | | | | | | | | | | | |
| Noise from Garfield Ave _dogs barking | | | | | | | | | | | | |
| 78 F, 29.85 in Hg, 63% Hu, 5 mph wind, clear sky | | | | | | | | | | | | |
| Overall Data | | | | | | | | | | | | |
| LAeq | | | 53.6 | dB | | | | | | | | |
| LASmax | 2019 Sep 18 14:30:03 | | 63.0 | dB | | | | | | | | |
| LZpeak (max) | 2019 Sep 18 14:22:12 | | 102.5 | dB | | | | | | | | |
| LASmin | 2019 Sep 18 14:28:38 | | 46.4 | dB | | | | | | | | |
| LCeq | | | 69.0 | dB | | | | | | | | |
| LAeq | | | 53.6 | dB | | | | | | | | |
| LCeq - LAeq | | | 15.4 | dB | | | | | | | | |
| LAIEq | | | 55.7 | dB | | | | | | | | |
| LAeq | | | 53.6 | dB | | | | | | | | |
| LAIEq - LAeq | | | 2.1 | dB | | | | | | | | |
| Ldn | | | 53.6 | dB | | | | | | | | |
| LDay 07:00-22:00 | | | 53.6 | dB | | | | | | | | |
| LNight 22:00-07:00 | | | --- | dB | | | | | | | | |
| Lden | | | 53.6 | dB | | | | | | | | |
| LDay 07:00-19:00 | | | 53.6 | dB | | | | | | | | |
| LEvening 19:00-22:00 | | | --- | dB | | | | | | | | |
| LNight 22:00-07:00 | | | --- | dB | | | | | | | | |
| LAE | | | 81.4 | dB | | | | | | | | |
| # Overloads | | | 0 | | | | | | | | | |
| Overload Duration | | | 0.0 | s | | | | | | | | |
| # OBA Overloads | | | 0 | | | | | | | | | |
| OBA Overload Duration | | | 0.0 | s | | | | | | | | |
| Statistics | | | | | | | | | | | | |
| LAS5.00 | | | 57.5 | dBA | | | | | | | | |
| LAS10.00 | | | 56.7 | dBA | | | | | | | | |
| LAS33.30 | | | 53.6 | dBA | | | | | | | | |
| LAS50.00 | | | 51.4 | dBA | | | | | | | | |
| LAS66.60 | | | 50.2 | dBA | | | | | | | | |
| LAS90.00 | | | 48.4 | dBA | | | | | | | | |
| LAS > 65.0 dB (Exceedence Counts / Duration) | | 0 / | 0.0 | s | | | | | | | | |
| LAS > 85.0 dB (Exceedence Counts / Duration) | | 0 / | 0.0 | s | | | | | | | | |
| LZpeak > 135.0 dB (Exceedence Counts / Duration) | | 0 / | 0.0 | s | | | | | | | | |
| LZpeak > 137.0 dB (Exceedence Counts / Duration) | | 0 / | 0.0 | s | | | | | | | | |
| LZpeak > 140.0 dB (Exceedence Counts / Duration) | | 0 / | 0.0 | s | | | | | | | | |
| Settings | | | | | | | | | | | | |
| RMS Weight | | | A Weighting | | | | | | | | | |
| Peak Weight | | | Z Weighting | | | | | | | | | |
| Detector | | | Slow | | | | | | | | | |
| Preamp | | | PRM831 | | | | | | | | | |
| Integration Method | | | Linear | | | | | | | | | |
| OBA Range | | | Low | | | | | | | | | |
| OBA Bandwidth | | | 1/1 and 1/3 | | | | | | | | | |
| OBA Freq. Weighting | | | Z Weighting | | | | | | | | | |
| OBA Max Spectrum | | | Bin Max | | | | | | | | | |
| Gain | | | +0 | dB | | | | | | | | |
| Under Range Limit | | | 26.5 | dB | | | | | | | | |
| Under Range Peak | | | 78.8 | dB | | | | | | | | |
| Noise Floor | | | 17.4 | dB | | | | | | | | |
| Overload | | | 144.3 | dB | | | | | | | | |
| 1/1 Spectra | | | | | | | | | | | | |
| Freq. (Hz): | 8.0 | 16.0 | 31.5 | 63.0 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | 16k |
| LZeq | 68.3 | 62.6 | 62.5 | 67.6 | 62.4 | 51.7 | 50.2 | 48.9 | 43.5 | 37.6 | 29.1 | 21.8 |
| LZSmax | 86.2 | 78.5 | 73.5 | 79.8 | 72.2 | 62.2 | 64.5 | 56.7 | 54.0 | 48.6 | 44.5 | 34.3 |
| LZSmin | 48.3 | 52.2 | 52.8 | 55.0 | 50.4 | 45.4 | 43.0 | 42.2 | 36.1 | 29.0 | 21.3 | 15.7 |

| 1/3 Spectra | | | | | | | | | | | | |
|-------------|------|------|------|-------|------|------|------|------|------|-------|------|-------|
| Freq. (Hz): | 6.3 | 8.0 | 10.0 | 12.5 | 16.0 | 20.0 | 25.0 | 31.5 | 40.0 | 50.0 | 63.0 | 80.0 |
| LZeq | 65.6 | 63.1 | 60.4 | 59.2 | 57.9 | 56.0 | 55.1 | 57.3 | 59.2 | 66.4 | 60.9 | 57.7 |
| LZSmax | 85.3 | 80.1 | 76.8 | 72.6 | 76.2 | 71.2 | 67.5 | 71.0 | 73.3 | 79.6 | 72.0 | 77.5 |
| LZSmin | 39.8 | 41.1 | 41.9 | 44.9 | 44.9 | 47.1 | 47.3 | 42.4 | 46.8 | 50.5 | 51.0 | 45.2 |
| | | | | | | | | | | | | |
| Freq. (Hz): | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1k | 1.25k |
| LZeq | 58.6 | 59.2 | 52.1 | 48.0 | 46.8 | 45.6 | 45.5 | 45.3 | 45.6 | 44.3 | 44.5 | 43.7 |
| LZSmax | 66.2 | 71.4 | 62.6 | 59.7 | 58.8 | 54.3 | 62.8 | 61.9 | 62.1 | 55.7 | 52.4 | 51.5 |
| LZSmin | 45.5 | 45.6 | 41.3 | 39.6 | 40.5 | 40.3 | 38.1 | 38.0 | 37.8 | 37.5 | 37.8 | 36.0 |
| | | | | | | | | | | | | |
| Freq. (Hz): | 1.6k | 2k | 2.5k | 3.15k | 4k | 5k | 6.3k | 8k | 10k | 12.5k | 16k | 20k |
| LZeq | 40.5 | 38.3 | 35.4 | 33.8 | 33.8 | 29.8 | 26.4 | 23.8 | 20.9 | 18.7 | 17.3 | 13.9 |
| LZSmax | 50.3 | 49.7 | 47.2 | 44.8 | 45.2 | 41.2 | 37.4 | 35.3 | 34.0 | 33.7 | 29.8 | 26.1 |
| LZSmin | 33.1 | 30.7 | 28.2 | 25.8 | 23.9 | 21.6 | 18.7 | 15.7 | 13.3 | 11.0 | 11.3 | 9.9 |

| Calibration History | | | | | | | | | | | | |
|---------------------|------|-----|------|----------|--|--|--------------|-------|--|--|--|--|
| Preamp | Date | | | | | | dB re. 1V/Pa | | | | | |
| PRM831 | 18 | Sep | 2019 | 13:58:16 | | | | -26.8 | | | | |
| PRM831 | 18 | Sep | 2019 | 11:09:07 | | | | -26.6 | | | | |
| PRM831 | 07 | Aug | 2019 | 12:27:09 | | | | -27.3 | | | | |
| PRM831 | 07 | Aug | 2019 | 05:49:21 | | | | -27.0 | | | | |
| PRM831 | 06 | Aug | 2019 | 15:11:44 | | | | -26.3 | | | | |
| PRM831 | 06 | Aug | 2019 | 12:24:00 | | | | -26.0 | | | | |
| PRM831 | 22 | Jul | 2019 | 10:48:48 | | | | -26.3 | | | | |
| PRM831 | 12 | Jul | 2019 | 20:18:07 | | | | -26.0 | | | | |
| PRM831 | 29 | May | 2019 | 13:46:43 | | | | -25.9 | | | | |
| PRM831 | 07 | May | 2019 | 12:46:08 | | | | -24.7 | | | | |
| PRM831 | 07 | May | 2019 | 11:41:50 | | | | -25.6 | | | | |

APPENDIX C

RCNM Model Construction Noise Calculation Printouts

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 9/27/2019

Case Description: Monitoring Well SA-5 Replacement Project - Well SA-5 Decommissioning

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) | | Night |
|--------------|-------------|-----------------|---------|-------|
| | | Daytime | Evening | |
| Nearest Home | Residential | 51 | 51 | 51 |

| Description | Impact Device | Usage(%) | Equipment | | Receptor Distance (feet) | Estimated Shielding (dBA) |
|------------------------------|---------------|----------|-----------------|-------------------|--------------------------|---------------------------|
| | | | Spec Lmax (dBA) | Actual Lmax (dBA) | | |
| Pumps | No | 50 | | 80.9 | 20 | 5 |
| Compressor (air) | No | 40 | | 77.7 | 40 | 5 |
| Vacuum Excavator (Vac-truck) | No | 40 | | 85.3 | 60 | 5 |
| Backhoe | No | 40 | | 77.6 | 80 | 5 |
| Concrete Mixer Truck | No | 40 | | 78.8 | 100 | 5 |
| Pickup Truck | No | 40 | | 75 | 120 | 5 |

| Equipment | Calculated (dBA) | | Results | | | |
|------------------------------|------------------|-----------|--------------------|-----|---------|-----|
| | *Lmax | Leq | Noise Limits (dBA) | | | |
| | | | Day | | Evening | |
| Pumps | 83.9 | 80.9 | Lmax | Leq | Lmax | Leq |
| Compressor (air) | 74.6 | 70.6 | N/A | N/A | N/A | N/A |
| Vacuum Excavator (Vac-truck) | 78.7 | 74.7 | N/A | N/A | N/A | N/A |
| Backhoe | 68.5 | 64.5 | N/A | N/A | N/A | N/A |
| Concrete Mixer Truck | 67.8 | 63.8 | N/A | N/A | N/A | N/A |
| Pickup Truck | 62.4 | 58.4 | N/A | N/A | N/A | N/A |
| Total | 84 | 82 | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 9/27/2019

Case Description: Monitoring Well SA-5 Replacement Project - Well M58 Phase 1

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) | | |
|--------------|-------------|-----------------|---------|-------|
| | | Daytime | Evening | Night |
| Nearest Home | Residential | 53.6 | 53.6 | 53.6 |

| Description | Impact Device | Usage(%) | Equipment | | Receptor Distance (feet) | Estimated Shielding (dBA) |
|------------------------------|---------------|----------|-----------------|-------------------|--------------------------|---------------------------|
| | | | Spec Lmax (dBA) | Actual Lmax (dBA) | | |
| Flat Bed Truck | No | 40 | | 74.3 | 20 | 5 |
| Vacuum Excavator (Vac-truck) | No | 40 | | 85.3 | 40 | 5 |

| Equipment | Calculated (dBA) | | Results | | | |
|------------------------------|------------------|-----------|---------|-----|----------------------------|-----|
| | *Lmax | Leq | Day | | Noise Limits (dBA) Evening | |
| | | | Lmax | Leq | Lmax | Leq |
| Flat Bed Truck | 77.2 | 73.2 | N/A | N/A | N/A | N/A |
| Vacuum Excavator (Vac-truck) | 82.2 | 78.3 | N/A | N/A | N/A | N/A |
| Total | 82 | 79 | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 9/29/2019

Case Description: Monitoring Well SA-5 Replacement Project - Well M58 Phase 2

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) | | |
|--------------|-------------|-----------------|---------|-------|
| | | Daytime | Evening | Night |
| Nearest Home | Residential | 53.6 | 53.6 | 53.6 |

| Description | Impact Device | Usage(%) | Equipment | | Receptor Distance (feet) | Estimated Shielding (dBA) |
|-----------------|---------------|----------|-----------------|-------------------|--------------------------|---------------------------|
| | | | Spec Lmax (dBA) | Actual Lmax (dBA) | | |
| Auger Drill Rig | No | 20 | | 84.4 | 20 | 10 |
| Pumps | No | 50 | | 80.9 | 40 | 10 |
| Gradall | No | 40 | | 83.4 | 60 | 10 |
| Flat Bed Truck | No | 40 | | 74.3 | 80 | 10 |
| Pickup Truck | No | 40 | | 75 | 100 | 10 |

| Equipment | Calculated (dBA) | | Results | | Noise Limits (dBA) | |
|-----------------|------------------|-----------|----------|-----|--------------------|-----|
| | *Lmax | Leq | Day Lmax | Leq | Evening Lmax | Leq |
| Auger Drill Rig | 82.3 | 75.3 | N/A | N/A | N/A | N/A |
| Pumps | 72.9 | 69.9 | N/A | N/A | N/A | N/A |
| Gradall | 71.8 | 67.8 | N/A | N/A | N/A | N/A |
| Flat Bed Truck | 60.2 | 56.2 | N/A | N/A | N/A | N/A |
| Pickup Truck | 59.0 | 55.0 | N/A | N/A | N/A | N/A |
| Total | 82 | 77 | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 9/29/2019

Case Description: Monitoring Well SA-5 Replacement Project - Well M58 Phase 3

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) | | |
|--------------|-------------|-----------------|---------|-------|
| | | Daytime | Evening | Night |
| Nearest Home | Residential | 53.6 | 53.6 | 53.6 |

| Description | Impact Device | Usage(%) | Equipment Spec | Actual | Receptor | Estimated |
|------------------|---------------|----------|----------------|------------|-----------------|-----------------|
| | | | Lmax (dBA) | Lmax (dBA) | Distance (feet) | Shielding (dBA) |
| Compressor (air) | No | 40 | | 77.7 | 20 | 10 |
| Pumps | No | 50 | | 80.9 | 40 | 10 |
| Generator | No | 50 | | 80.6 | 60 | 10 |
| Pickup Truck | No | 40 | | 75 | 80 | 10 |

| Equipment | Calculated (dBA) | | Results | | | |
|------------------|------------------|-----------|---------|-----|----------------------------|-----|
| | *Lmax | Leq | Day | | Noise Limits (dBA) Evening | |
| | | | Lmax | Leq | Lmax | Leq |
| Compressor (air) | 75.6 | 71.6 | N/A | N/A | N/A | N/A |
| Pumps | 72.9 | 69.9 | N/A | N/A | N/A | N/A |
| Generator | 69.0 | 66.0 | N/A | N/A | N/A | N/A |
| Pickup Truck | 60.9 | 56.9 | N/A | N/A | N/A | N/A |
| Total | 76 | 75 | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 9/29/2019

Case Description: Monitoring Well SA-5 Replacement Project - Well M58 Phase 4

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) | | |
|--------------|-------------|-----------------|---------|-------|
| | | Daytime | Evening | Night |
| Nearest Home | Residential | 53.6 | 53.6 | 53.6 |

| Description | Impact Device | Usage(%) | Equipment Spec | Actual | Receptor | Estimated |
|----------------|---------------|----------|----------------|------------|-----------------|-----------------|
| | | | Lmax (dBA) | Lmax (dBA) | Distance (feet) | Shielding (dBA) |
| Flat Bed Truck | No | 40 | | 74.3 | 20 | 10 |
| Gradall | No | 40 | | 83.4 | 40 | 10 |
| Pickup Truck | No | 40 | | 75 | 60 | 10 |

| Equipment | Calculated (dBA) | | Results | | | |
|----------------|------------------|-----------|----------|-----|--------------------|-----|
| | *Lmax | Leq | Day Lmax | Leq | Noise Limits (dBA) | |
| Flat Bed Truck | 72.2 | 68.2 | N/A | N/A | Lmax | Leq |
| Gradall | 75.3 | 71.4 | N/A | N/A | N/A | N/A |
| Pickup Truck | 63.4 | 59.4 | N/A | N/A | N/A | N/A |
| Total | 75 | 73 | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

APPENDIX D

RCNM Model Monitoring Well M58 Operational Noise Calculation Printouts

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 9/30/2019

Case Description: Monitoring Well SA-5 Replacement Project - Well M58 Well Sampling

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) | | |
|--------------|-------------|-----------------|---------|-------|
| | | Daytime | Evening | Night |
| Nearest Home | Residential | 53.6 | 53.6 | 53.6 |

| Description | Impact Device | Usage(%) | Equipment | | Receptor Distance (feet) | Estimated Shielding (dBA) |
|-------------------------------|---------------|----------|-----------------|-------------------|--------------------------|---------------------------|
| | | | Spec Lmax (dBA) | Actual Lmax (dBA) | | |
| Generator (<25KVA, VMS signs) | No | 50 | | 72.8 | 20 | 5 |

| Equipment | Calculated (dBA) | | Results | | | |
|-------------------------------|------------------|-----------|--------------------|---------|------|-----|
| | | | Noise Limits (dBA) | | | |
| | | | Day | Evening | | |
| | *Lmax | Leq | Lmax | Leq | Lmax | Leq |
| Generator (<25KVA, VMS signs) | 75.8 | 72.8 | N/A | N/A | N/A | N/A |
| Total | 76 | 73 | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 9/30/2019

Case Description: Monitoring Well SA-5 Replacement Project - Well M58 Well Redevelopment

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) | | |
|--------------|-------------|-----------------|---------|-------|
| | | Daytime | Evening | Night |
| Nearest Home | Residential | 53.6 | 53.6 | 53.6 |

| Description | Impact Device | Usage(%) | Equipment Spec | Actual | Receptor | Estimated |
|------------------|---------------|----------|----------------|------------|-----------------|-----------------|
| | | | Lmax (dBA) | Lmax (dBA) | Distance (feet) | Shielding (dBA) |
| Pumps | No | 50 | | 80.9 | 20 | 5 |
| Compressor (air) | No | 40 | | 77.7 | 40 | 5 |
| Pickup Truck | No | 40 | | 75.0 | 60 | 5 |

| Equipment | Results | | | Noise Limits (dBA) | | |
|------------------|------------------|-----------|-----|--------------------|---------|-----|
| | Calculated (dBA) | | Day | | | |
| | *Lmax | Leq | | Leq | Evening | Leq |
| Pumps | 83.9 | 80.9 | N/A | N/A | N/A | N/A |
| Compressor (air) | 74.6 | 71 | N/A | N/A | N/A | N/A |
| Pickup Truck | 68.4 | 64.4 | N/A | N/A | N/A | N/A |
| Total | 84 | 81 | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.