# Acoustical Assessment
# 425 S. Winchester Boulevard Project
# City of San José, California

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## LIST OF ABBREVIATED TERMS

| | |
|---|---|
| APN | Assessor's Parcel Number |
| ADT | average daily traffic |
| ASTM | American Society for Testing and Materials |
| dBA | A-weighted sound level |
| CEQA | California Environmental Quality Act |
| CSMA | California Subdivision Map Act |
| CNEL | community equivalent noise level |
| $L_{dn}$ | day-night noise level |
| dB | decibel |
| du/ac | dwelling units per acre |
| $L_{eq}$ | equivalent noise level |
| FHWA | Federal Highway Administration |
| FTA | Federal Transit Administration |
| HVAC | heating ventilation and air conditioning |
| Hz | hertz |
| in/sec | inches per second |
| LUD | Land Use Designation |
| $L_{max}$ | maximum noise level |
| µPa | micropascals |
| $L_{min}$ | minimum noise level |
| PPV | peak particle velocity |
| RMS | root mean square |
| STC | Sound Transmission Class |
| sf | square feet |
| TNM | Traffic Noise Model |
| VdB | vibration velocity level |

# 1 INTRODUCTION

This report documents the results of an Acoustical Assessment completed for the 425 S. Winchester Boulevard Project. The purpose of this Acoustical Assessment is to evaluate the Project's potential construction and operational noise and vibration levels associated with the Project and determine the level of impact the Project would have on the environment.

## 1.1 PROJECT LOCATION

The proposed Project is located on 425 S. Winchester Boulevard on the northwest corner of Winchester Boulevard and Olin Avenue in western San José. Figure 1: Regional Vicinity and Figure 2: Project Location, depict the Project site in a regional and local context.

Currently, the Project site is developed as an existing gas station that is still in operation. The existing gas station has a single-story building. There are currently four pumping stations in the center of the Project site and surface parking along the northern and western boundaries of the Project site. There is existing landscaping along the western, northern and eastern (Winchester Boulevard) frontages of the Project site.

## 1.2 PROJECT DESCRIPTION

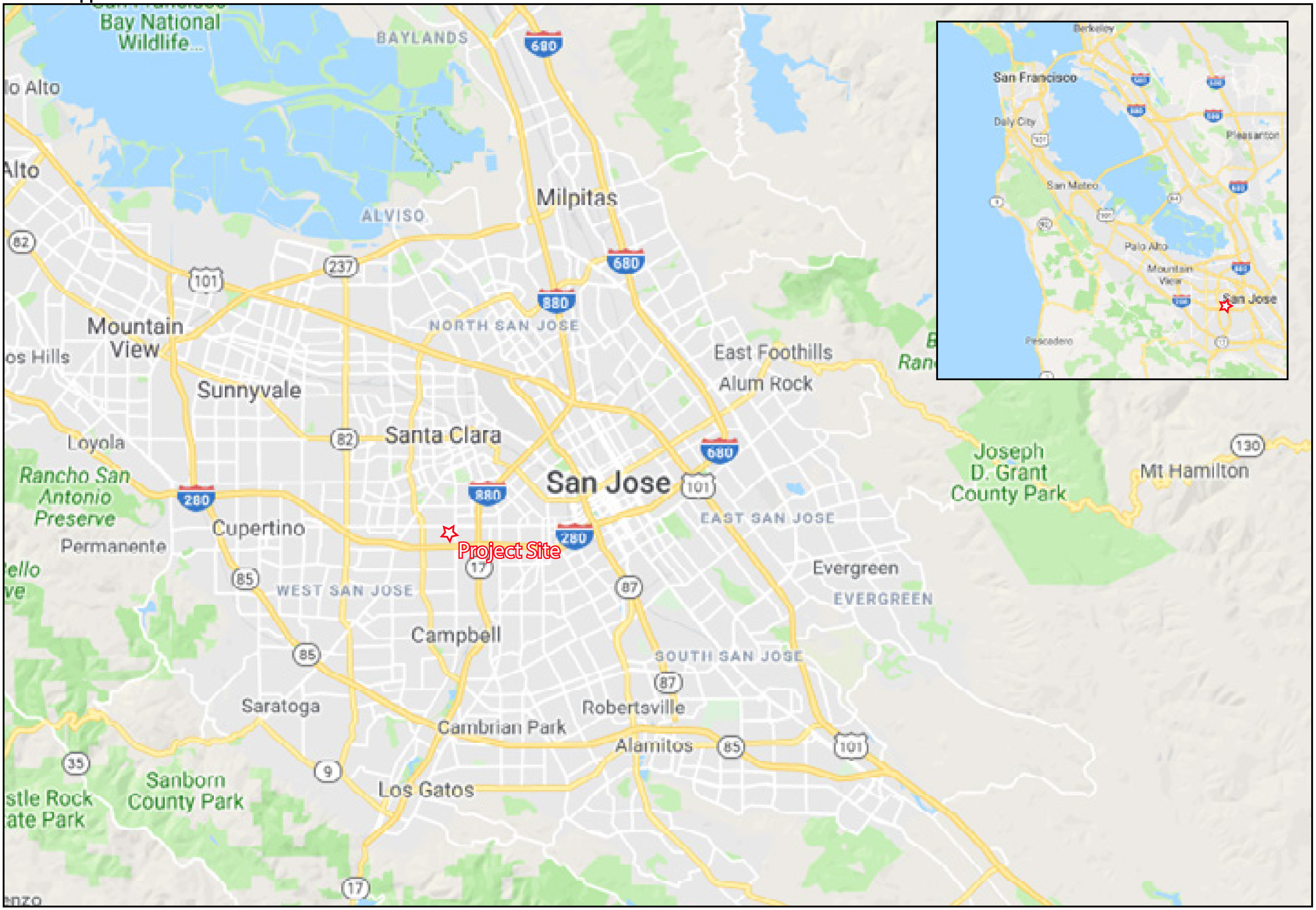
The Project site is located in an urban area with a mix of uses including commercial, office, and medium to high density residential uses. The proposed Project's existing land use designation is Mixed Use Commercial (MUC) and existing zoning designation is Commercial General (CG). The Project site is within the City of San José Santana Row/Valley Fair Urban Village Plan area, which is characterized by a wide range of commercial, residential, retail, and restaurant uses. The commercial area is home to two large retail commercial centers, Westfield Valley Fair Mall and Santana Row. The Project site is located approximately 114 feet west of Santana Row, immediately across South Winchester Boulevard.

The proposed Project would include approximately 9,181 square feet of retail/commercial space, approximately 5,000 square feet of 2nd floor office space, and 27 dwelling units on an approximate 0.55–acre site. The mixed-use building would include approximately 7,662 square feet of private open space and approximately 1,232 square feet of open space common to the Project residents. See Figure 1: Regional Vicinity for more details. Total on-site parking would include approximately 115 stalls. The proposed Project includes two levels of underground parking. Each underground parking level would have 55 stalls, total of 110 stalls, and five stalls would be on the surface level. Additionally, 24 bicycle racks would be located on the ground floor in a secured bike parking room with access from the lobby. The proposed building would be LEED certified as required by City Council policy. The Project would achieve LEED NC v4 certification through the USGBC.

Currently, one driveway allows access to the Project site from Winchester Boulevard and another driveway allows access to the Project site from Olin Avenue. For vehicles exiting the Project site onto Winchester Boulevard, vehicles must make a right turn to exit onto Winchester Boulevard. There is existing utility access (water, sewer, electricity, gas) to the Project site and no native habitat exists on the site.

In addition, the proposed Project is located adjacent to major bus Routes, therefore the residents of the proposed Project and the employment opportunities would have direct accessibility to local transit, furthering the City's General Plan goals to support a healthy community, reduce traffic congestion and decrease greenhouse gas emissions and energy consumption.

Construction is anticipated to begin in early Spring 2021 and last approximately 19 months until Fall of 2022. Construction methods would include demolition of the existing gas station and associated uses, site preparation, grading, paving, building construction, and architectural coating. Construction of the Project would be required to be consistent with the City's Best Management Practices and California Building Code.




Source: Google Earth, 2019

**Figure 1: Regional Location**

425 S. Winchester Blvd. Project

Not to scale

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Appendix F


Source: Nearmap, 2019

**Figure 2: Project Vicinity Map**

425 S. Winchester Blvd. Project

Not to scale

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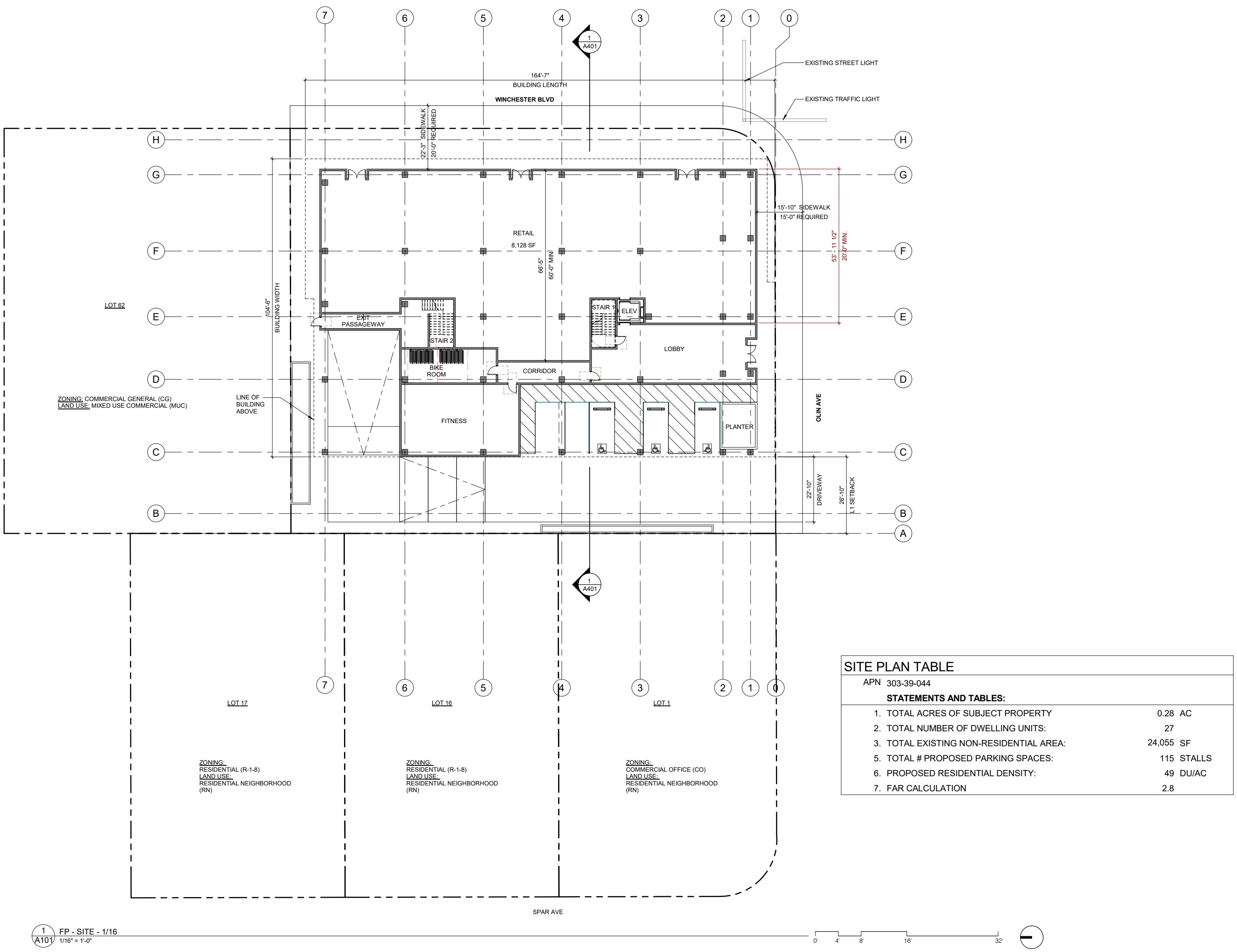


SITE PLAN TABLE

| APN | 303-39-044 | |
|---|---|---|
| | **STATEMENTS AND TABLES:** | |
| 1. | TOTAL ACRES OF SUBJECT PROPERTY | 0.28 AC |
| 2. | TOTAL NUMBER OF DWELLING UNITS: | 27 |
| 3. | TOTAL EXISTING NON-RESIDENTIAL AREA: | 24,055 SF |
| 5. | TOTAL # PROPOSED PARKING SPACES: | 115 STALLS |
| 6. | PROPOSED RESIDENTIAL DENSITY: | 49 DU/AC |
| 7. | FAR CALCULATION | 2.8 |

Source: C2K Architecture, 2019

## Figure 3: Project Site Plan

425 S. Winchester Blvd. Project

Not to scale

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# 2 ACOUSTIC FUNDAMENTALS

## 2.1 SOUND AND ENVIRONMENTAL NOISE

Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g. air) to human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is defined as loud, unexpected, or annoying sound. The fundamental acoustics model consists of a noise source, receptor, and the propagation path between the two. The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path, determine the perceived sound level and noise characteristics at the receptor. Acoustics deal primarily with the propagation and control of sound. A typical noise environment consists of ambient noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this ambient noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to continuous noise from traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold of 20 micropascals (μPa) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The dB scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels correspond closely to human perception of relative loudness. Table 1: Typical Noise Levels provides typical noise levels.

**Table 1: Typical Noise Levels**

| Common Outdoor Activities | Noise Level (dBA) | Common Indoor Activities |
|---:|:---:|---|
| | – 110 – | Rock Band |
| Jet fly-over at 1,000 feet | | |
| | – 100 – | |
| Gas lawnmower at 3 feet | | |
| | – 90 – | |
| Diesel truck at 50 feet at 50 miles per hour | | Food blender at 3 feet |
| | – 80 – | Garbage disposal at 3 feet |
| Noisy urban area, daytime | | |
| Gas lawnmower, 100 feet | – 70 – | Vacuum cleaner at 10 feet |
| Commercial area | | Normal Speech at 3 feet |
| Heavy traffic at 300 feet | – 60 – | |
| | | Large business office |
| Quiet urban daytime | – 50 – | Dishwasher in next room |
| Quiet urban nighttime | – 40 – | Theater, large conference room (background) |
| Quiet suburban nighttime | | |
| | – 30 – | Library |
| Quiet rural nighttime | | Bedroom at night, concert hall (background) |
| | – 20 – | |
| | | Broadcast/recording studio |
| | – 10 – | |
| Lowest threshold of human hearing | – 0 – | Lowest threshold of human hearing |

Source: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

### Noise Descriptors

The dB scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The equivalent noise level ($L_{eq}$) is the average noise level averaged over the measurement period, while the day-night noise level ($L_{dn}$) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Most commonly, environmental sounds are described in terms of $L_{eq}$ that has the same acoustical energy as the summation of all the time-varying events. Each is applicable to this analysis and defined Table 2: Definitions of Acoustical Terms.

**Table 2: Definitions of Acoustical Terms**

| Term | Definitions |
|---|---|
| Decibel (dB) | A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20. |
| Sound Pressure Level | Sound pressure is the sound force per unit area, usually expressed in µPa (or 20 micronewtons per square meter), where 1 pascals is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in dB as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g. 20 µPa). Sound pressure level is the quantity that is directly measured by a sound level meter. |
| Frequency (Hz) | The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz. |
| A-Weighted Sound Level (dBA) | The sound pressure level in dB as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. |
| Equivalent Noise Level ($L_{eq}$) | The average acoustic energy content of noise for a stated period of time. Thus, the Leq of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night. |
| Maximum Noise Level ($L_{max}$)<br>Minimum Noise Level ($L_{min}$) | The maximum and minimum dBA during the measurement period. |
| Exceeded Noise Levels ($L_1$, $L_{10}$, $L_{50}$, $L_{90}$) | The dBA values that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period. |
| Day-Night Noise Level ($L_{dn}$) | A 24-hour average Leq with a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity at nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour Leq would result in a measurement of 66.4 dBA $L_{dn}$. |
| Community Noise Equivalent Level (CNEL) | A 24-hour average Leq with a 5 dBA weighting during the hours of 7:00 a.m. to 10:00 a.m. and a 10 dBA weighting added to noise during the hours of 10:00 |

| | |
|---|---|
| | p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour Leq would result in a measurement of 66.7 dBA CNEL. |
| Ambient Noise Level | The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location. |
| Intrusive | That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level. |

The A-weighted decibel (dBA) sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be used. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source.

**A-Weighted Decibels**

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by dBA values. There is a strong correlation between dBA and the way the human ear perceives sound. For this reason, the dBA has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of dBA, but are expressed as dB, unless otherwise noted.

**Addition of Decibels**

The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic dB is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than one source under the same conditions. Under the dB scale, three sources of equal loudness together would produce an increase of 5 dBA.

**Sound Propagation and Attenuation**

Sound spreads (propagates uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics. No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The way older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

**Human Response to Noise**

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA, the following relationships should be noted:

- Except in carefully controlled laboratory experiments, a 1-dBA change cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A minimum 5-dBA change is required before any noticeable change in community response would be expected. A 5-dBA increase is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

**Effects of Noise on People**

Hearing Loss. While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Annoyance. Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The $L_{dn}$ as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA $L_{dn}$ is the threshold at which a substantial percentage of people begin to report annoyance[1].

## 2.2 GROUNDBORNE VIBRATION

Sources of groundborne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g. factory machinery) or transient (e.g. explosions). Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 3: Human Reaction and Damage to Buildings from Vibration, displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

**Table 3: Human Reaction and Damage to Buildings from Vibration**

| Peak Particle Velocity (in/sec) | Approximate Vibration Velocity Level (VdB) | Human Reaction | Effect on Buildings |
|---|---|---|---|
| 0.006-0.019 | 64-74 | Range of threshold of perception | Vibrations unlikely to cause damage of any type |
| 0.08 | 87 | Vibrations readily perceptible | Recommended upper level to which ruins and ancient monuments should be subjected |
| 0.1 | 92 | Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities | Virtually no risk of architectural damage to normal buildings |
| 0.2 | 94 | Vibrations may begin to annoy people in buildings | Threshold at which there is a risk of architectural damage to normal dwellings |
| 0.4-0.6 | 98-104 | Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges | Architectural damage and possibly minor structural damage |
| Source: California Department of Transportation, Transportation and Construction-Induced Vibration Guidance Manual, 2004. | | | |

[1] Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. Common sources for groundborne vibration are planes, trains, and construction activities such as earth-moving which requires the use of heavy-duty earth moving equipment. For the purposes of this analysis, a PPV descriptor with units of inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

# 3 REGULATORY SETTING

To limit population exposure to physically or psychologically damaging as well as intrusive noise levels, the Federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise.

## 3.1 STATE OF CALIFORNIA

**California Government Code**

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established 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" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

**Title 24 – Building Code**

The State's noise insulation standards are codified in the California Code of Regulations, Title 24: Part 1, Building Standards Administrative Code, and Part 2, California Building Code. These noise standards are applied to new construction in California for interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new multi-family residential buildings, the acceptable interior noise limit for new construction is 45 dBA CNEL.

## 3.2 LOCAL

**City of San José General Plan**

The San José General Plan identifies goals, policies, and implementations in the Noise Element. The Noise Element provides a basis for comprehensive local programs to regulate environmental noise and protect citizens from excessive exposure. Table 4: Land-Use Compatibility Guidelines for Community Noise in San José highlights five land-use categories and the outdoor noise compatibility guidelines.

**Table 4: Land-Use Compatibility Guidelines for Community Noise in San José**

| Land-Use Category | Exterior Noise Exposure (DNL), in dBA | | |
|---|---|---|---|
| | Normally Acceptable[1] | Conditionally Acceptable[2] | Normally Unacceptable[3] |
| Residential, Hotels and Motels, Hospitals, and Residential Care | Up to 60 | >60 to 75 | >75 |
| Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds | Up to 65 | >65 to 80 | >80 |
| Schools, Libraries, Museums, Meeting Halls, Churches | Up to 60 | >60 to 75 | >75 |
| Office Buildings, Business Commercial, and Professional Offices | Up to 70 | >70 to 80 | >75 |
| Sports Area, Outdoor Spectator Sports | Up to 70 | >70 to 80 | >65 |
| Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters | | >55 to 70 | >70 |

Source: City of San José General Plan, 2014.
Table Notes:
Sound levels above are as measured at the exterior of the proposed location of the new development (e.g., residential unit, commercial building, etc.) rather than at the property boundary of the source or the property to be developed. Refer to Table LU-1 (Land-Use Element) for detailed descriptions of land-use categories and land-uses for which these guidelines apply. These guidelines are derived from the California Department of Health Services, Guidelines for the Preparation and Content of the Noise Element of the General Plan, 2003. The State Guidelines have been modified to reflect standards for the City of Saratoga.

1. Normally Acceptable – Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction. There are no special noise insulation requirements.
2. Conditionally Acceptable – New construction should be undertaken only after a detailed analysis of the noise reduction requirement is conducted and needed noise insulation features included in the design.
3. Normally Unacceptable – New construction should be discouraged and may be denied as inconsistent with the General Plan and City Code. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
4. Outdoor open space noise standards do not apply to private balconies/patios.

Project relevant general plan goals and policies for noise are listed here:

**Goal EC – 1**: Minimize the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies.

- Policy EC – 1.1: Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state and City noise standards and guidelines as a part of new development review

- Policy EC – 1.2: Minimize the noise impacts of new development on land uses sensitive to increased noise levels (Categories 1, 2, 3 and 6) by limiting noise generation and by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible. The City considers significant noise impacts to occur if a project would:

    - Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain "Normally Acceptable"; or

- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where noise levels would equal or exceed the "Normally Acceptable" level

- Policy EC – 1.3: Mitigate noise generation of new nonresidential land uses to 55 dBA DNL at the property line when located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses.

- Policy EC – 1.6: Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City's Municipal Code.

- Policy EC – 1.7: Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

    - Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

- Policy EC – 1.13: Update noise limits and acoustical descriptors in the Zoning Code to clarify noise standards that apply to land uses throughout the City.

- Policy EC – 1.14: Require acoustical analyses for proposed sensitive land uses in areas with exterior noise levels exceeding the City's noise and land use compatibility standards to base noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency.

**Goal EC – 2:** Minimize vibration impacts on people, residences, and business operations

- Policy EC – 2.13: Require new development to minimize continuous vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, including ruins and ancient monuments or building that are documented to be structurally weakened, a continuous vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A continuous vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction. Equipment or activities typical of generating continuous vibration include but are not limited to: excavation equipment; static compaction equipment; vibratory pile drivers; pile-extraction equipment; and vibratory compaction equipment. Avoid use of impact pile drivers within 125 feet of any buildings, and within 300 feet of historical buildings, or buildings in poor condition. On a project-specific basis, this distance of 300 feet may be reduced where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction. Transient vibration impacts may exceed a vibration limit of 0.08 in/sec PPV only when and where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

**City of San José Municipal Code**

According to San José Municipal Code, Section 20.100.450, construction hours within 500 feet of a residential unit are limited to the hours of 7:00 a.m. to 7:00 p.m. on Monday through Friday, unless otherwise allowed in a Development Permit or other planning approval. The Municipal Code does not establish quantitative noise limits for construction activities in the City. Table 5: City of San José Zoning Ordinance Noise Standards shows the San José standards for maximum noise level at the property line.

**Table 5: City of San José Zoning Ordinance Noise Standards**

| Land Use Types | Maximum Noise Level in Decibels at Property Line |
|---|---|
| Residential, open space, industrial or commercial uses adjacent to a property used or zoned for residential purposes | 55 |
| Open space, commercial, or industrial use adjacent to a property used or zoned for commercial purposes or other nonresidential uses | 60 |
| Industrial use adjacent to a property used or zoned for industrial or use other than commercial or residential purposes | 70 |
| Source: City of San José General Plan, Noise Element (2009) | |

# 4 EXISTING CONDITIONS

## 4.1 EXISTING NOISE SOURCES

The City of San José is impacted by various noise sources. Mobile sources of noise, especially cars and trucks, are the most common and significant sources of noise in most communities. Other sources of noise are the various land uses (i.e., residential, commercial, institutional, and recreational and parks activities) throughout the City that generate stationary-source noise.

**Noise Measurements**

To determine ambient noise levels in the project area, three 10-minute noise measurements were taken using a 3M SoundPro DL-1 Type I integrating sound level meter between 10:12 a.m. and 10:47 a.m. on October 3, 2019; refer to Appendix A for existing noise measurement data and *Figure 4: Noise Measurement Locations.* Noise Measurement 1 and 2 were taken to represent the ambient noise level in the existing residential neighborhood on Spar Avenue northwest of the Project site while Noise Measurement 3 was taken to represent the ambient noise level east of the site, on Winchester Avenue. The primary noise sources during all three measurements was traffic on Winchester Avenue or other roadways, landscape equipment in the residential neighborhoods, and a large construction operation south of the Project site. Table 6: Noise Measurements, provides the ambient noise levels measured at these locations.

**Table 6: Noise Measurements**

| Site No. | Location | $L_{eq}$ (dBA) | $L_{min}$ (dBA) | $L_{max}$ (dBA) | Time |
|---|---|---|---|---|---|
| 1 | 366-375 Spar Avenue | 51.8 | 46.3 | 65.4 | 10:12 a.m. |
| 2 | 338-351 Spar Avenue | 51.2 | 45.4 | 64.8 | 10:26 a.m. |
| 3 | 334-337 Winchester Avenue | 73.1 | 59.1 | 87.7 | 10:47 a.m. |
| Source: Noise Measurements taken by Kimley-Horn on October 3, 2019. | | | | | |

**Existing Mobile Noise**

Existing roadway noise levels were calculated for the roadway segments in the Project vicinity. This task was accomplished using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) and existing traffic volumes from the Project Traffic Impact Analysis (Kimley-Horn 2019). The noise prediction model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (also referred to as energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by Caltrans. The Caltrans data indicates that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. The average daily noise levels along roadway segments in proximity to the Project site are included in Table 7: Existing Traffic Noise.

**Table 7: Existing Traffic Noise**

| Roadway Segment | ADT | dBA $L_{dn}$[1] |
|---|---|---|
| **Winchester Boulevard** | | |
| Stevens Creek Boulevard to Olin Avenue | 30,450 | 65.1 |
| Olin Avenue to Olsen Drive | 20,470 | 63.3 |
| **Stevens Creek Boulevard** | | |
| Winchester Boulevard to Santana Row | 28,220 | 64.9 |
| Santana Row to Monroe Street | 34,310 | 65.8 |
| **Olin Avenue** | | |
| Spar Avenue to Winchester Boulevard | 1,480 | 49.7 |
| ADT = average daily trips; dBA = A-weighted decibels; Ldn = day-night noise level | | |
| [1] Traffic noise levels are at 100 feet from the roadway centerline. | | |
| Source: Based on traffic data provided by Kimley-Horn, 2019. Refer to Appendix A for traffic noise modeling assumptions and results. | | |

The Project site is primarily surrounded by mixed-use commercial and single-family residential neighborhoods. Residential uses exist west of the Project site. The existing mobile noise in the Project area are generated along Winchester Boulevard, which is east of the Project site, and Stevens Creek Boulevard which is north of the Project site.

### Existing Stationary Noise

The primary sources of stationary noise in the Project vicinity are those associated with the operations of nearby residential uses to the west of the site and existing mixed-used commercial east of the Project site. The noise associated with these sources may represent a single-event noise occurrence, short-term noise, or long-term/continuous noise.

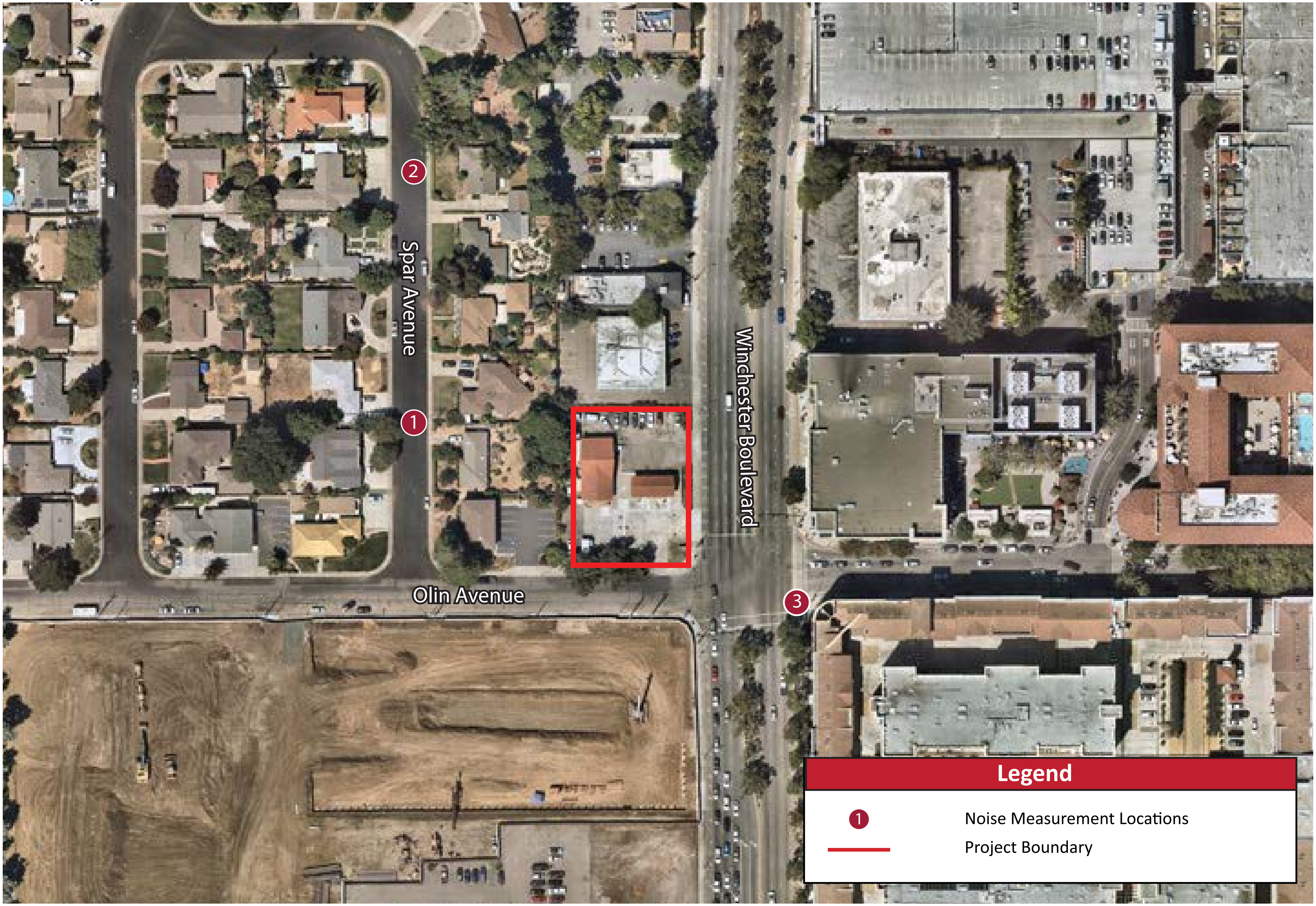
## 4.2 SENSITIVE RECEPTORS

Noise exposure standards and guidelines for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Residences, hospitals, schools, guest lodging, libraries, and churches are treated as the most sensitive to noise intrusion and therefore have more stringent noise exposure targets than do other uses, such as manufacturing or agricultural uses that are not subject to impacts such as sleep disturbance. As shown in Table 8: Sensitive Receptors, sensitive receptors near the Project site include single-family residences adjacent to the western boundary, approximately 20 feet from the Project site property line. Across Winchester Boulevard, approximately 30 feet south of the Project site, is a large mixed-use commercial area. These distances are from the Project site to the sensitive receptor property line.

**Table 8: Sensitive Receptors**

| Receptor Description | Distance and Direction from the Project Site |
|---|---|
| Single-family residential community | 20 feet west |
| Mixed- use commercial | 30 feet south |
| Hotel Valencia Santana Row | 150 feet east |
| Assisted Living Guidance | 750 feet south |
| Winchester Mystery House | 800 feet south |
| National University – San José | 1,300 feet southeast |
| Single-family residential community | 1,400 feet east |
| Santana Park | 1,600 feet southeast |
| West Valley Alliance Church | 1,800 feet southeast |
| Orion Montessori School | 0.5 miles west |

Appendix F




Source: Nearmap, 2019

**Figure 4: Noise Measurements**

425 S. Winchester Blvd. Project

N Not to scale

Kimley»Horn

Expect More. Experience Better.

# 5 SIGNIFICANCE CRITERIA AND METHODOLOGY

## 5.1 CEQA THRESHOLDS

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains analysis guidelines related to noise impacts. These guidelines have been used by the City to develop thresholds of significance for this analysis. A project would create a significant environmental impact if it would:

NOI-1 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;

NOI-2 Generate excessive groundborne vibration or groundborne noise levels; and

NOI-3 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, expose people residing or working in the project area to excessive noise levels.

## 5.2 METHODOLOGY

Construction noise estimates are based upon noise levels from the Federal Highway Administration (FHWA) Roadway Construction Noise Model (FHWA-HEP-05-054) as well as the distance to nearby receptors. Reference noise levels from FHWA are used to estimate noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Construction noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise.

This analysis of the existing and future noise environments is based on noise prediction modeling and empirical observations. Predicted construction noise levels were based on typical noise levels generated by construction equipment. The traffic noise levels in the Project vicinity were calculated using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108).

Groundborne vibration levels associated with construction-related activities for the Project were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from Federal Transit Administration (FTA) published data for construction equipment. Potential groundborne vibration impacts related to structural damage and human annoyance were evaluated, considering the distance from construction activities to nearby land uses and typically applied criteria for structural damage and human annoyance.

# 6 POTENTIAL IMPACTS AND MITIGATION

## 6.1 ACOUSTICAL IMPACTS

**Threshold 6.1 Would the Project 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?**

**Construction**

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g. land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. During construction, exterior noise levels could affect the residential neighborhoods surrounding the construction site. Project construction would occur approximately 20 feet from existing single-family residences to the west on Spar Avenue. However, construction activities would occur throughout the Project site and would not be concentrated at a single point near sensitive receptors. Noise levels typically attenuate (or drop off) at a rate of 6 dB per doubling of distance from point sources, such as industrial machinery. During construction, exterior noise levels could affect the residential neighborhoods near the construction site.

Construction activities associated with development of the Project would include demolition, site preparation, grading, paving, building construction, and architectural coating. Such activities would require graders, scrapers, and tractors during site preparation; graders, dozers, and tractors during grading; cranes, forklifts, generators, tractors, and welders during building construction; pavers, rollers, mixers, tractors, and paving equipment during paving; and air compressors during architectural coating. Grading and excavation phases of Project construction tend to be the shortest in duration and create the highest construction noise levels due to the operation of heavy equipment required to complete these activities. It should be noted that only a limited amount of equipment can operate near a given location at a particular time. Equipment typically used during this stage includes heavy-duty trucks, backhoes, bulldozers, excavators, front-end loaders, and scrapers. Operating cycles for these types of construction equipment may involve one or two minutes of full-power operation followed by three to four minutes at lower power settings. Other primary sources of noise would be shorter-duration incidents, such as dropping large pieces of equipment or the hydraulic movement of machinery lifts, which would last less than one minute. According to the applicant, no pile-driving would be required during construction and as such a project condition of approval will be included in the project permit to reflect the project's proposed construction.

Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Typical noise levels associated with individual construction equipment are listed in Table 9: Typical Construction Noise Levels.

The City of San José does not have construction noise standards. As shown in Table 9 noise levels at the sensitive receptor are below 90 dBA at 50 feet. The nearest sensitive receptor to the Project site is located approximately 20 feet west of the site. The highest anticipated construction noise level of 109.0 dBA at 20 feet is expected to occur during the demolition phase (jack hammer) and building construction phase (derrick crane). Additionally, the majority of construction would occur throughout the Project site and would not be concentrated at a single point near sensitive receptors. The Project construction would comply with Section 20.100.450 of the municipal code, limiting construction hours within 500 feet of a residential unit to the hours of 7:00 a.m. to 7:00 p.m. on Monday through Friday.

**Table 9: Typical Construction Noise Levels**

| Equipment | Typical Noise Level (dBA) at 50 feet from Source[1] | Typical Noise Level (dBA) at 20 feet from Source[1] | Typical Noise Level (dBA) at 150 feet from Source[1] |
|---|---|---|---|
| Air Compressor | 80.0 | 88.0 | 70.0 |
| Backhoe | 80.0 | 88.0 | 70.0 |
| Compactor | 82.0 | 90.0 | 72.0 |
| Concrete Mixer | 85.0 | 93.0 | 75.0 |
| Concrete Pump | 82.0 | 90.0 | 72.0 |
| Concrete Vibrator | 76.0 | 84.0. | 66.0 |
| Crane, Derrick | 88.0 | 96.0 | 78.0 |
| Crane, Mobile | 83.0 | 91.0 | 73.0 |
| Dozer | 85.0 | 93.0 | 75.0 |
| Generator | 82.0 | 90.0 | 72.0 |
| Grader | 85.0 | 93.0 | 75.0 |
| Impact Wrench | 85.0 | 93.0 | 75.0 |
| Jack Hammer | 88.0 | 96.0 | 78.0 |
| Loader | 80.0 | 88.0 | 70.0 |
| Paver | 85.0 | 93.0 | 75.0 |
| Pneumatic Tool | 85.0 | 109.0 | 75.0 |
| Pump | 77.0 | 103.0 | 67.0 |
| Roller | 85.0 | 93.0 | 75.0 |
| Saw | 83.0 | 85.0 | 66.0 |
| Scraper | 85.0 | 93.0 | 75.0 |
| Shovel | 82.0 | 84.0 | 72.0 |
| Truck | 84.0 | 93.0 | 74.0 |

Note:
[1] Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1 + 20Log(d_1/d_2)$
Where: $dBA_2$ = estimated noise level at receptor; $dBA_1$ = reference noise level; $d_1$ = reference distance; $d_2$ = receptor location distance
Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

Sensitive receptors near the Project site include: residences approximately 20 feet west of the site and approximately 1,400 feet east. These distances are from the Project site to the sensitive receptor property line. These sensitive uses may be exposed to elevated noise levels during Project construction. Construction activities would be limited to daytime hours when people would be out of their houses and would conform to the time-of-day restrictions of the City's Municipal Code. The proposed Project would be required to adhere to the Standard Permit Conditions which would ensure that all construction equipment is equipped with properly operating and maintained mufflers and other state required noise attenuation devices, helping to reduce noise at the source. The Standard Permit Conditions are required to ensure that construction noise levels do not exceed the City's standards and that time-of-day restrictions are adhered to. With implementation of these conditions, construction noise impacts to nearby receptors would be less than significant.

***Project Condition of Approval:***

The project would not include pile-driving activities during the construction phase.

**Construction Traffic Noise**

Construction noise may be generated by large trucks moving materials to and from the Project site. Large trucks would be necessary to deliver building materials as well as remove dump materials. Excavation and cut and fill would be required. Soil hauling would be required as approximately 25,000 cubic yards (cy) of soil would be exported during grading for the underground parking garage. Based on the California Emissions Estimator Model (CalEEMod) default assumptions for this Project, as analyzed in 425 S. Winchester Air Quality Assessment, the Project would generate the highest number of daily trips during the building construction and grading phases. The model estimates that the Project would generate up to 46 worker trips and 14 vendor trips per day for building construction. For grading, the model estimates approximately 3,125 hauling trips over 40 days which would result in approximately 78 daily hauling trips. During the Grading phase there would be approximately 10 daily worker trips. Therefore, a total of 88 daily trips would occur during the grading phase. Because of the logarithmic nature of noise levels, a doubling of the traffic volume (assuming that the speed and vehicle mix do not also change) would result in a noise level increase of 3 dBA. Winchester Boulevard between Olin Avenue to Stevens Creek Boulevard has an average daily trip volume of 30,450 vehicles (Table 7). Therefore, 88 Project construction trips would not double the existing traffic volume per day. Construction related traffic noise would not be noticeable and would not create a significant noise impact.

California establishes noise limits for vehicles licensed to operate on public roads using a pass-by test procedure. Pass-by noise refers to the noise level produced by an individual vehicle as it travels past a fixed location. The pass-by procedure measures the total noise emissions of a moving vehicle with a microphone. When the vehicle reaches the microphone, the vehicle is at full throttle acceleration at an engine speed calculated for its displacement.

For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dB. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons gross vehicle rating) is also 80 dB at 15 meters from the centerline. According to the FHWA, dump trucks typically generate noise levels of 77 dBA and flatbed trucks typically generate noise levels of 74 dBA, at a distance of 50 feet from the truck (FHWA, Roadway Construction Noise Model, 2006).

**Standard Permit Conditions**

Construction-Related Noise. Noise minimization measures include, but are not limited to, the following:

i. Limit construction hours to between 7:00 a.m. and 7:00 p.m., Monday through Friday, unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence.
ii. Construct solid plywood fences around ground level construction sites adjacent to operational businesses, residences, or other noise-sensitive land uses.
iii. Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
iv. Prohibit unnecessary idling of internal combustion engines.
v. Locate stationary noise-generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors. Construct temporary noise barriers

to screen stationary noise-generating equipment when located near adjoining sensitive land uses.

vi. Utilize "quiet" air compressors and other stationary noise sources where technology exists.

vii. Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.

viii. Notify all adjacent business, residences, and other noise-sensitive land uses of the construction schedule, in writing, and provide a written schedule of "noisy" construction activities to the adjacent land uses and nearby residences.

ix. If complaints are received or excessive noise levels cannot be reduced using the measures above, erect a temporary noise control blanket barrier along surrounding building facades that face the construction sites.

x. Designate a "disturbance coordinator" who shall be responsible for responding to any complaints about construction noise. The disturbance coordinator shall determine the cause of the noise complaint (e.g., bad muffler, etc.) and shall require that reasonable measures be implemented to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

xi. Limit construction to the hours of 7:00 a.m. to 7:00 p.m. Monday through Friday for any on-site or off-site work within 500 feet of any residential unit. Construction outside of these hours may be approved through a development permit based on a site-specific "construction noise mitigation plan" and a finding by the Director of Planning, Building and Code Enforcement that the construction noise mitigation plan is adequate to prevent noise disturbance of affected residential uses.

**Operations**

Implementation of the Project would create new sources of noise in the project vicinity. The major noise sources associated with the Project that would potentially impact existing and future nearby residences include the following:

- Off-site traffic noise;
- Mechanical equipment (i.e., trash compactors, air conditioners, etc.);
- Delivery trucks on the project site, and approaching and leaving the loading areas;
- Activities at the loading areas (i.e., maneuvering and idling trucks, loading/unloading, and equipment noise);
- Parking areas (i.e., car door slamming, car radios, engine start-up, and car pass-by); and
- Landscape maintenance activities.

As discussed above, the closest sensitive receptors are single-family residences located 20 feet to the west on Spar Avenue. The City of San José stationary source exterior Zoning Ordinance Noise Standards for residential areas is 55 dBA $L_{eq}$. The land use compatibility standard for residential areas is also 55 dBA DNL ($L_{dn}$) to 60 dBA DNL ($L_{dn}$) for normally acceptable conditions.

**Traffic Noise**

Implementation of the Project would generate increased traffic volumes along study roadway segments. The project is expected to generate 501 average daily trips, which would result in noise increases on project area roadways. In general, a traffic noise increase of less than 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable (Caltrans, 2013). Generally, traffic volumes on project area roadways would have to approximately double for the resulting traffic noise levels to increase by 3 dBA. Therefore, permanent increases in ambient noise levels of less than 3 dBA are considered to be less than significant.

As shown in Table 10: Existing and Project Traffic Noise, the existing traffic-generated noise level on Project area roadways is between 49.7 dBA $L_{dn}$ and 65.9 dBA $L_{dn}$ at 100 feet from the centerline. As previously described, $L_{dn}$ is 24-hour average noise level with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

Traffic noise levels for roadways primarily affected by the project were calculated using the FHWA's Highway Noise Prediction Model (FHWA-RD-77-108). Traffic noise modeling was conducted for conditions with and without the project, based on traffic volumes (Kimley-Horn, 2019). As noted in Table 10, Project noise levels 100 feet from the centerline would range from 50.2 dBA to 65.9 dBA. The project would have the highest increase of 0.5 dBA on Olin Avenue between Spar Avenue and Winchester Boulevard. However, the 0.5 dBA increase in under the perceptible 3.0 dBA noise level increase. Additionally, the resulting 50.2 dBA noise level is under the City's normally acceptable 55 dBA threshold for residential uses. Therefore, the Project would not have a significant impact on existing traffic noise levels.

**Table 10: Existing and Project Traffic Noise**

| Roadway Segment | Existing Conditions | | With Project | | Project Change from Existing Conditions | Significant Impact? |
|---|---|---|---|---|---|---|
| | ADT | dBA $L_{dn}$[1] | ADT | dBA $L_{dn}$[1] | | |
| **Winchester Boulevard** | | | | | | |
| Stevens Creek Boulevard to Olin Avenue | 30,450 | 65.3 | 30,582 | 65.4 | 0.1 | **No** |
| Olin Avenue to Olsen Drive | 20,470 | 63.6 | 20,564 | 63.6 | 0.0 | **No** |
| **Stevens Creek Boulevard** | | | | | | |
| Winchester Boulevard to Santana Row | 28,220 | 65.0 | 28,332 | 65.0 | 0.0 | **No** |
| Santana Row to Monroe Street | 34,310 | 65.9 | 34,422 | 65.9 | 0.0 | **No** |
| **Olin Avenue** | | | | | | |
| Spar Avenue to Winchester Boulevard | 1,480 | 49.7 | 1,668 | 50.2 | 0.5 | **No** |

ADT = average daily trips; dBA = A-weighted decibels; Ldn= day-night noise levels
1.Traffic noise levels are at 100 feet from the roadway centerline.
Source: Based on traffic data provided by Kimley-Horn, 2019. Refer to Appendix A for traffic noise modeling assumptions and results.

Table 11: Opening Year and Opening Year Plus Project Traffic Noise, shows the background conditions or Opening Year traffic. Per the Transportation Analysis, Opening Year includes nine approved/pending projects that were added to the existing 2019 volumes.

As shown in Table 11, opening year roadway noise levels with the Project would range from 55.6 dBA to 67.3 dBA. The highest increase in noise levels would occur on Olin Avenue between Spar Avenue and Winchester Boulevard. Noise levels along Olin Avenue would increase by 0.2 dBA with the Project. This level is below the perceptible noise level change of 3.0 dBA. Therefore, impacts are less than significant.

**Table 11: Opening Year and Opening Year Plus Project Traffic Noise**

| Roadway Segment | Opening Year | | With Project | | Project Change from Existing Conditions | Significant Impact? |
|---|---|---|---|---|---|---|
| | ADT | dBA $L_{dn}$[1] | ADT | dBA $L_{dn}$[1] | | |
| **Winchester Boulevard** | | | | | | |
| Stevens Creek Boulevard to Olin Avenue | 42,590 | 66.8 | 42,722 | 66.8 | 0.0 | **No** |
| Olin Avenue to Olsen Drive | 31,660 | 65.5 | 31,754 | 65.5 | 0.0 | **No** |
| **Stevens Creek Boulevard** | | | | | | |
| Winchester Boulevard to Santana Row | 41,000 | 66.6 | 41,112 | 66.6 | 0.0 | |
| Santana Row to Monroe Street | 47,660 | 67.3 | 47,772 | 67.3 | 0.0 | **No** |
| **Olin Avenue** | | | | | | |
| Spar Avenue to Winchester Boulevard | 5,570 | 55.4 | 5,758 | 55.6 | 0.2 | **No** |

ADT = average daily trips; dBA = A-weighted decibels; Ldn= day-night noise levels
1. Traffic noise levels are at 100 feet from the roadway centerline.
Source: Based on traffic data provided by Kimley-Horn, 2019. Refer to Appendix A for traffic noise modeling results.

Project traffic would traverse and disperse over project area roadways, where existing ambient noise levels already exist. Future development associated with the Project would result in additional traffic on adjacent roadways, thereby increasing vehicular noise near existing and proposed land uses. This level is below the perceptible noise level change of 3.0 dBA. Therefore, impacts would be less than significant.

**Stationary Noise Sources**

Implementation of the Project would create new sources of noise in the project vicinity from residential sources, mechanical equipment, truck loading areas, parking lot noise, and landscape maintenance.

Residential Areas

Noise that is typical of lodging areas includes group conversations, pet noise, vehicle noise (see discussion below) and general maintenance activities. Noise from residential stationary sources would primarily occur during the "daytime" activity hours of 7:00 a.m. to 7:00 p.m. Furthermore, the residences would be required to comply with the noise standards set forth in the City's General Plan and Municipal Code.

Mechanical Equipment

Regarding mechanical equipment, the Project would generate stationary-source noise associated with heating, ventilation, and air conditioning (HVAC) units. HVAC units typically generate noise levels of approximately 50 to 60 dBA at 50 feet. The nearest existing sensitive receptor's property lines are located approximately 20 feet from the closest potential proposed living area of the site. At 20 feet, mechanical equipment noise levels would be 58.0 dBA. This noise level is below the City's 60 dBA exterior standard. The Project would not place mechanical equipment near residential uses, and noise from this equipment would not be perceptible at the closest sensitive receptor (existing single-family residences 20 feet from the Project site). Impacts from mechanical equipment would be less than significant.

Loading Area Noise

The project is a mixed-use development that would necessitate occasional deliveries. The primary noise associated with deliveries is the arrival and departure of trucks. Operations of proposed mixed-use

Projects would potentially require deliveries of vans and light trucks and not heavy-duty trucks. Normal deliveries typically occur during daytime hours. During loading and unloading activities, noise would be generated by the trucks' diesel engines, exhaust systems, and brakes during low gear shifting' braking activities; backing up toward the docks/loading areas; dropping down the dock ramps; and maneuvering away from the docks. The Project is not anticipated to require a significant number of truck deliveries. The majority of deliveries for the commercial uses would consist of vendor deliveries in vans and would be infrequent and irregular. The closest that the proposed Project could be located to sensitive receptors would be approximately 20 feet away. However, the proposed truck activities would occur approximately 80 feet from the sensitive receptors. While there would be temporary noise increases during truck maneuvering and engine idling, these impacts would of short duration and infrequent. Typically, heavy truck operations generate a noise level of 68 dBA at a distance of 30 feet. At 20 feet, noise levels would attenuate to 71.5 dBA however at 80 feet noise levels would be 59.5 dBA. Noise levels would be further attenuated by intervening terrain and structures. As noise levels associated with trucks and loading/unloading activities would be infrequent and irregular, impacts would be less than significant.

<u>Parking Areas</u>
Traffic associated with parking areas is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. However, the instantaneous maximum sound levels generated by a car door slamming, engine starting up and car pass-bys may be an annoyance to adjacent noise-sensitive receptors. Parking lot noise can also be considered a "stationary" noise source.

The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 60 to 63 dBA at 50 feet and may be an annoyance to noise-sensitive receptors. Conversations in parking areas may also be an annoyance to sensitive receptors. Sound levels of speech typically range from 33 dBA at 48 feet for normal speech to 50 dBA at 50 feet for very loud speech. It should be noted that parking lot noise are instantaneous noise levels compared to noise standards in the DNL scale, which are averaged over time. As a result, actual noise levels over time resulting from parking lot activities would be far lower.

The proposed Project includes two levels of underground parking and five above ground parking spaces. Noise impacts associated with parking would be considered minimal since the parking area would be enclosed within a structure. In addition, parking lot noise would also be partially masked by the background noise from traffic along, Stevens Creek Boulevard and Winchester Boulevard. Noise associated with parking lot activities is not anticipated to exceed the City's Noise Standards or the California Land use Compatibility Standards during operation. Therefore, noise impacts from parking lots would be less than significant.

<u>Landscape Maintenance Activities</u>
Development and operation of the Project includes new landscaping that would require periodic maintenance. Noise generated by a gasoline-powered lawnmower is estimated to be approximately 70 dBA at a distance of 5 feet. Landscape Maintenance activities would be 58.0 dBA at the closest sensitive receptor approximately 20 feet away. Maintenance activities would operate during daytime hours for brief periods of time as allowed by the City Municipal Code and would not permanently increase ambient noise levels in the project vicinity and would be consistent with activities that currently occur at the surrounding uses. Therefore, with adherence to the City's Municipal Code, impacts associated with landscape maintenance would be less than significant.

**Summary**

Overall, implementation of Standard Permit Conditions and adherence to Municipal Code requirements, noise impacts associated with traffic, mechanical equipment, deliveries, loading/unloading activities, and parking lot noise would be reduced to a less than significant level.

**Mitigation Measures:** No mitigation is required.

**Level of Significance:** Less than significant impact.

**Threshold 6.2 Would the Project generate excessive groundborne vibration or groundborne noise levels?**

**Construction**

Increases in groundborne vibration levels attributable to the Project would be primarily associated with construction-related activities. Construction on the Project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The FTA has published standard vibration velocities for construction equipment operations. In general, depending on the building category of the nearest buildings adjacent to the potential pile driving area, the potential construction vibration damage criteria vary. For example, for a building constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.50 inch per second (in/sec) peak particle velocity (PPV) is considered safe and would not result in any construction vibration damage. In general, the FTA architectural damage criterion for continuous vibrations (i.e. 0.2 in/sec) appears to be conservative. The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience cosmetic damage (e.g. plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on soil composition and underground geological layer between vibration source and receiver.

Table 12: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet for typical construction equipment. Groundborne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. As indicated in Table 12, based on FTA data, vibration velocities from typical heavy construction equipment operations that would be used during Project construction range from 0.003 to 0.089 in/sec PPV at 25 feet from the source of activity. The nearest sensitive receptors are the single-family residences on Spar Avenue approximately 20 feet from the active construction zone.

**Table 12: Typical Construction Equipment Vibration Levels**

| Equipment | Peak Particle Velocity at 25 Feet (in/sec) | Peak Particle Velocity at 20 Feet (in/sec) [1] |
|---|---|---|
| Large Bulldozer | 0.089 | 0.124 |
| Loaded Trucks | 0.076 | 0.106 |
| Rock Breaker | 0.059 | 0.082 |
| Jackhammer | 0.035 | 0.048 |
| Small Bulldozer/Tractors | 0.003 | 0.004 |

1. Calculated using the following formula: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$, where: $PPV_{equip}$ = the peak particle velocity in in/sec of the equipment adjusted for the distance; $PPV_{ref}$ = the reference vibration level in in/sec from Table 7-4 of the Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018; D = the distance from the equipment to the receiver.
Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

As shown in Table 12, the highest vibration levels are achieved with the large bulldozer operations. This construction activity is expected to take place during grading. Project construction would be more than 20 feet from the closest structure. Therefore, construction equipment vibration velocities would not exceed the FTA's 0.20 PPV threshold. In general, other construction activities would occur throughout the Project site and would not be concentrated at the point closest to the nearest residential structure. Therefore, vibration impacts associated with the Project would be less than significant.

**Operations**

The Project would not generate groundborne vibration that could be felt at surrounding uses. Project operations would not involve railroads or substantial heavy truck operations, and therefore would not result in vibration impacts at surrounding uses. As a result, impacts from vibration associated with project operation would be less than significant.

**Mitigation Measures:** No mitigation is required.

**Level of Significance:** Less than significant impact.

**Threshold 6.3 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?**

The nearest airports to the Project site are the Norman Y. Mineta San José International Airport located approximately 3 miles northeast of the Project and Reid-Hillview Airport located approximately 7 miles east of the site. The Project is not within 2.0 miles of a public airport or within an airport influence zone. Additionally, there are no private airstrips located within the Project vicinity. According to the City's aircraft noise contour projections, the project site is located well outside the noise impact area of San José International Airport. Therefore, the Project would not expose people residing or working in the Project area to excessive airport- or airstrip-related noise levels and no mitigation is required.

**Mitigation Measures:** No mitigation is required.

**Level of Significance:** Less than significant impact.

## 6.2 CUMULATIVE NOISE IMPACTS

Noise by definition is a localized phenomenon, and drastically reduces as distance from the source increases. Cumulative noise impacts involve development of the Project in combination with ambient growth and other related development projects. As noise levels decrease as distance from the source increases, only projects in the nearby area could combine with the Project to potentially result in cumulative noise impacts.

**Cumulative Construction Noise**

The Project's construction activities, when properly mitigated, would not result in a substantial temporary increase in ambient noise levels. The City permits construction hours within 500 feet of a residential unit are limited to the hours of 7:00 a.m. to 7:00 p.m. on Monday through Friday, unless otherwise allowed in a Development Permit or other planning approval. The Project would contribute to other proximate construction noise impacts if construction activities were conducted concurrently. However, based on the noise analysis above, the Project's construction-related noise impacts would be less than significant following compliance with local regulations and City Standard Permit Conditions outlined in this study.

Construction activities at other planned and approved projects would be required to take place during daytime hours, and the City and project applicants would be required to evaluate construction noise impacts and implement mitigation, if necessary, to minimize noise impacts. Each project would be required to comply with the applicable City of San José Municipal Code limitations on allowable hours of construction. Therefore, Project construction would not contribute to cumulative impacts and impacts in this regard are not cumulatively considerable.

**Cumulative Operational Noise**

Cumulative noise impacts describe how much noise levels are projected to increase over existing conditions with the development of the Project and other foreseeable projects. Cumulative noise impacts would occur primarily as a result of increased traffic on local roadways due to buildout of the Project and other projects in the vicinity. However, noise from generators and other stationary sources could also generate cumulative noise levels.

Stationary Noise

As discussed above, impacts from the Project's operations would be less than significant. Due to site distance, intervening land uses, and the fact that noise dissipates as it travels away from its source, noise impacts from on-site activities and other stationary sources would be limited to the Project site and vicinity. No known past, present, or reasonably foreseeable projects would compound or increase the operational noise levels generated by the Project. Thus, cumulative operational noise impacts from related projects, in conjunction with project-specific noise impacts, would not be cumulatively significant.

Traffic Noise

A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. Cumulative increases in traffic noise levels were estimated by comparing the Existing Plus Project and Cumulative scenarios to existing conditions. The traffic analysis considers cumulative traffic from future growth assumed in the traffic mode, as well as cumulative projects identified by the City of San José.

The following criteria is used to evaluate the combined effect of the cumulative noise increase.

- Combined Effect. The cumulative with Project noise level ("Cumulative With Project") would cause a significant cumulative impact if a 3.0 dB increase over "Existing" conditions occurs and the resulting noise level exceeds the applicable exterior standard at a sensitive use. Although there may be a significant noise increase due to the project in combination with other related projects (combined effects), it must also be demonstrated that the project has an incremental effect. In other words, a significant portion of the noise increase must be due to the project.

The following criteria have been used to evaluate the incremental effect of the cumulative noise increase.

- Incremental Effects. The "Cumulative With Project" causes a 1.0 dBA increase in noise over the "Cumulative Without Project" noise level.

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. Noise by definition is a localized phenomenon and reduces as distance from the source increases. Consequently, only the Project and growth due to occur in the general area would contribute to cumulative noise impacts. Table 13: Cumulative Plus Project Conditions Predicted Traffic Noise Levels, identifies the traffic noise effects along roadway segments in the vicinity of the Project site for "Existing," "Cumulative Without Project," and "Cumulative With Project," conditions, including incremental and net cumulative impacts.

**Table 13: Cumulative Plus Project Conditions Predicted Traffic Noise Levels**

| Roadway Segment | Existing[1] | Cumulative Without Project[1] | Cumulative With Project[1] | Combined Effects | Incremental Effects | Cumulatively Significant Impact? |
|---|---|---|---|---|---|---|
| | | | | dBA Difference: Existing and Cumulative With Project | dBA Difference: Cumulative Without and With Project | |
| **Winchester Boulevard** | | | | | | |
| Stevens Creek Boulevard to Olin Avenue | 65.3 | 67.0 | 67.0 | 1.7 | 0.0 | No |
| Olin Avenue to Olsen Drive | 63.6 | 65.7 | 65.7 | 2.1 | 0.0 | No |
| **Stevens Creek Boulevard** | | | | | | |
| Winchester Boulevard to Santana Row | 65.0 | 66.8 | 66.9 | 1.9 | 0.1 | No |
| Santana Row to Monroe Street | 65.9 | 67.5 | 67.5 | 1.6 | 0.0 | No |
| **Olin Avenue** | | | | | | |
| Spar Avenue to Winchester Boulevard | 49.7 | 55.4 | 55.6 | 5.9 | 0.2 | No |
| ADT = average daily trips; dBA = A-weighted decibels; Ldn= day-night noise levels | | | | | | |
| 1. Traffic noise levels are at 100 feet from the roadway centerline. | | | | | | |
| Source: Based on traffic data provided by Kimley-Horn, 2019. Refer to Appendix A for traffic noise modeling assumptions and results. | | | | | | |

First, it must be determined whether the "Future With Project" increase above existing conditions (Combined Effects) is exceeded. As indicated in the table, the Project has one street segment (Olin Avenue between Spar Avenue to Winchester Boulevard) that exceeds the combined effects criterion. However, under the Incremental Effects criteria, cumulative noise impacts are defined by determining if the forecast ambient ("Future Without Project") noise level is increased by 1 dB or more. As indicated above, the Project does not exceed the Incremental Effects criteria for any roadway segment analyzed.

Therefore, the Project's cumulative noise contribution would be less than significant. Based on the significance criteria set forth in this Study, no roadway segments would result in significant impacts because they would not exceed the City's threshold for noise at nearby sensitive receptors. The Project would not result in long-term mobile noise impacts based on project-generated traffic as well as cumulative and incremental noise levels. Therefore, the Project, in combination with cumulative background traffic noise levels, would result in a less than significant cumulative impact. The Project's contribution to noise levels would not be cumulatively considerable.

# 7 REFERENCES

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5. California Department of Transportation, *Transportation and Construction-Induced Vibration Guidance Manual*, 2004.
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8. Cyril M. Harris, *Handbook of Noise Control*, Second Edition, 1979.
9. Cyril M. Harris, *Noise Control in Buildings – A Practical Guide for Architects and Engineers*, 1994.
10. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
11. Federal Highway Administration, Roadway Construction Noise Model User's Guide Final Report, 2006.
12. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, 1992.
13. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.
14. Kimley-Horn & Associates, *425 Winchester Boulevard Development Transportation Analysis*, October 2019.
15. United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, 1979.

# Appendix A

## Noise Data

**FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels**

**Project Name:** 425 Winchester Boulevard
**Project Number:**
**Scenario:** Existing
**Ldn/CNEL:** Ldn

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 77.70% | 12.70% | 9.60% |
| Medium-Duty Trucks | 87.43% | 5.05% | 7.52% |
| Heavy-Duty Trucks | 89.10% | 2.84% | 8.06% |

| | | | | | | | | Vehicle Mix | | Distance from Centerline of Roadway | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Median | ADT | Speed | Alpha | Medium | Heavy | Ldn at | Distance to Contour | | | |
| # | Roadway | Segment | Lanes | Width | Volume | (mph) | Factor | Trucks | Trucks | 100 Feet | 70 Ldn | 65 Ldn | 60 Ldn | 55 Ldn |
| 1 | Winchester | Stevens Creek to Olin | 6 | 20 | 30,450 | 35 | 0 | 2.0% | 1.0% | 65.3 | - | 108 | 342 | 1,080 |
| 2 | Winchester | Olin to Olsen | 6 | 20 | 20,470 | 35 | 0 | 2.0% | 1.0% | 63.6 | - | 73 | 230 | 726 |
| 3 | Stevens Creek | Winchester to Santana Row | 6 | 20 | 28,220 | 35 | 0 | 2.0% | 1.0% | 65.0 | - | 100 | 317 | 1,001 |
| 4 | Stevens Creek | Santana Row to Monroe | 6 | 20 | 34,310 | 35 | 0 | 2.0% | 1.0% | 65.9 | - | 122 | 385 | 1,217 |
| 5 | Olin | Spar to Winchester | 2 | 5 | 1,480 | 25 | 0 | 2.0% | 1.0% | 49.7 | - | - | - | - |

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

**FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels**

**Project Name:** 425 Winchester Boulevard
**Project Number:**
**Scenario:** Existing Plus Project
**Ldn/CNEL:** Ldn

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 77.70% | 12.70% | 9.60% |
| Medium-Duty Trucks | 87.43% | 5.05% | 7.52% |
| Heavy-Duty Trucks | 89.10% | 2.84% | 8.06% |

| | | | | | | | | Vehicle Mix | | Distance from Centerline of Roadway | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Median | ADT | Speed | Alpha | Medium | Heavy | Ldn at | Distance to Contour | | | |
| **#** | **Roadway** | **Segment** | **Lanes** | **Width** | **Volume** | **(mph)** | **Factor** | **Trucks** | **Trucks** | **100 Feet** | **70 Ldn** | **65 Ldn** | **60 Ldn** | **55 Ldn** |
| 1 | Winchester | Stevens Creek to Olin | 6 | 20 | 30,582 | 35 | 0 | 2.0% | 1.0% | 65.4 | - | 108 | 343 | 1,085 |
| 2 | Winchester | Olin to Olsen | 6 | 20 | 20,564 | 35 | 0 | 2.0% | 1.0% | 63.6 | - | 73 | 231 | 729 |
| 3 | Stevens Creek | Winchester to Santana Row | 6 | 20 | 28,332 | 35 | 0 | 2.0% | 1.0% | 65.0 | - | 100 | 318 | 1,005 |
| 4 | Stevens Creek | Santana Row to Monroe | 6 | 20 | 34,422 | 35 | 0 | 2.0% | 1.0% | 65.9 | - | 122 | 386 | 1,221 |
| 5 | Olin | Spar to Winchester | 2 | 5 | 1,668 | 25 | 0 | 2.0% | 1.0% | 50.2 | - | - | - | - |

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

**FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels**

**Project Name:** 425 Winchester Boulevard
**Project Number:**
**Scenario:** Opening Year
**Ldn/CNEL:** Ldn

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 77.70% | 12.70% | 9.60% |
| Medium-Duty Trucks | 87.43% | 5.05% | 7.52% |
| Heavy-Duty Trucks | 89.10% | 2.84% | 8.06% |

| | | | | | | | | Vehicle Mix | | Distance from Centerline of Roadway | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Median | ADT | Speed | Alpha | Medium | Heavy | Ldn at | Distance to Contour | | | |
| # | Roadway | Segment | Lanes | Width | Volume | (mph) | Factor | Trucks | Trucks | 100 Feet | 70 Ldn | 65 Ldn | 60 Ldn | 55 Ldn |
| 1 | Winchester | Stevens Creek to Olin | 6 | 20 | 42,590 | 35 | 0 | 2.0% | 1.0% | 66.8 | - | 151 | 478 | 1,511 |
| 2 | Winchester | Olin to Olsen | 6 | 20 | 31,660 | 35 | 0 | 2.0% | 1.0% | 65.5 | - | 112 | 355 | 1,123 |
| 3 | Stevens Creek | Winchester to Santana Row | 6 | 20 | 41,000 | 35 | 0 | 2.0% | 1.0% | 66.6 | - | 145 | 460 | 1,454 |
| 4 | Stevens Creek | Santana Row to Monroe | 6 | 20 | 47,660 | 35 | 0 | 2.0% | 1.0% | 67.3 | - | 169 | 535 | 1,691 |
| 5 | Olin | Spar to Winchester | 2 | 5 | 5,570 | 25 | 0 | 2.0% | 1.0% | 55.4 | - | - | 35 | 110 |

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

**FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels**

**Project Name:** 425 Winchester Boulevard
**Project Number:**
**Scenario:** Opening Year Plus Project
**Ldn/CNEL:** Ldn

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 77.70% | 12.70% | 9.60% |
| Medium-Duty Trucks | 87.43% | 5.05% | 7.52% |
| Heavy-Duty Trucks | 89.10% | 2.84% | 8.06% |

| # | Roadway | Segment | Lanes | Median Width | ADT Volume | Speed (mph) | Alpha Factor | Vehicle Mix Medium Trucks | Vehicle Mix Heavy Trucks | Ldn at 100 Feet | Distance to Contour 70 Ldn | Distance to Contour 65 Ldn | Distance to Contour 60 Ldn | Distance to Contour 55 Ldn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Winchester | Stevens Creek to Olin | 6 | 20 | 42,722 | 35 | 0 | 2.0% | 1.0% | 66.8 | - | 152 | 479 | 1,515 |
| 2 | Winchester | Olin to Olsen | 6 | 20 | 31,754 | 35 | 0 | 2.0% | 1.0% | 65.5 | - | 113 | 356 | 1,126 |
| 3 | Stevens Creek | Winchester to Santana Row | 6 | 20 | 41,112 | 35 | 0 | 2.0% | 1.0% | 66.6 | - | 146 | 461 | 1,458 |
| 4 | Stevens Creek | Santana Row to Monroe | 6 | 20 | 47,772 | 35 | 0 | 2.0% | 1.0% | 67.3 | - | 169 | 536 | 1,695 |
| 5 | Olin | Spar to Winchester | 2 | 5 | 5,758 | 25 | 0 | 2.0% | 1.0% | 55.6 | - | - | 36 | 114 |

(Distance from Centerline of Roadway)

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

**FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels**

**Project Name:** 425 Winchester Boulevard
**Project Number:**
**Scenario:** Horizon Year
**Ldn/CNEL:** Ldn

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 77.70% | 12.70% | 9.60% |
| Medium-Duty Trucks | 87.43% | 5.05% | 7.52% |
| Heavy-Duty Trucks | 89.10% | 2.84% | 8.06% |

| | | | | | | | | Vehicle Mix | | Distance from Centerline of Roadway | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Median | ADT | Speed | Alpha | Medium | Heavy | Ldn at | Distance to Contour | | | |
| **#** | **Roadway** | **Segment** | **Lanes** | **Width** | **Volume** | **(mph)** | **Factor** | **Trucks** | **Trucks** | **100 Feet** | **70 Ldn** | **65 Ldn** | **60 Ldn** | **55 Ldn** |
| 1 | Winchester | Stevens Creek to Olin | 6 | 20 | 44,800 | 35 | 0 | 2.0% | 1.0% | 67.0 | - | 159 | 503 | 1,589 |
| 2 | Winchester | Olin to Olsen | 6 | 20 | 33,190 | 35 | 0 | 2.0% | 1.0% | 65.7 | - | 118 | 372 | 1,177 |
| 3 | Stevens Creek | Winchester to Santana Row | 6 | 20 | 43,150 | 35 | 0 | 2.0% | 1.0% | 66.8 | - | 153 | 484 | 1,531 |
| 4 | Stevens Creek | Santana Row to Monroe | 6 | 20 | 49,810 | 35 | 0 | 2.0% | 1.0% | 67.5 | - | 177 | 559 | 1,767 |
| 5 | Olin | Spar to Winchester | 2 | 5 | 5,570 | 25 | 0 | 2.0% | 1.0% | 55.4 | - | - | 35 | 110 |

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

**FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels**

**Project Name:** 425 Winchester Boulevard
**Project Number:**
**Scenario:** Horizon Year Plus Project
**Ldn/CNEL:** Ldn

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 77.70% | 12.70% | 9.60% |
| Medium-Duty Trucks | 87.43% | 5.05% | 7.52% |
| Heavy-Duty Trucks | 89.10% | 2.84% | 8.06% |

| | | | | | | | | Vehicle Mix | | Distance from Centerline of Roadway | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Median | ADT | Speed | Alpha | Medium | Heavy | Ldn at | Distance to Contour | | | |
| **#** | **Roadway** | **Segment** | **Lanes** | **Width** | **Volume** | **(mph)** | **Factor** | **Trucks** | **Trucks** | **100 Feet** | **70 Ldn** | **65 Ldn** | **60 Ldn** | **55 Ldn** |
| 1 | Winchester | Stevens Creek to Olin | 6 | 20 | 44,932 | 35 | 0 | 2.0% | 1.0% | 67.0 | - | 159 | 504 | 1,594 |
| 2 | Winchester | Olin to Olsen | 6 | 20 | 33,284 | 35 | 0 | 2.0% | 1.0% | 65.7 | - | 118 | 373 | 1,181 |
| 3 | Stevens Creek | Winchester to Santana Row | 6 | 20 | 43,262 | 35 | 0 | 2.0% | 1.0% | 66.9 | - | 153 | 485 | 1,535 |
| 4 | Stevens Creek | Santana Row to Monroe | 6 | 20 | 49,922 | 35 | 0 | 2.0% | 1.0% | 67.5 | - | 177 | 560 | 1,771 |
| 5 | Olin | Spar to Winchester | 2 | 5 | 5,758 | 25 | 0 | 2.0% | 1.0% | 55.6 | - | - | 36 | 114 |

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

Appendix F

## Noise Measurement Field Data

| | | | |
|---|---|---|---|
| **Project:** | 425 S. Winchester Blvd. | **Job Number:** | 97817007 |
| **Site No.:** | 1 | **Date:** | 10/3/2019 |
| **Analyst:** | Sophie La Herran | **Time:** | 10:12am |
| **Location:** | 366 Spar Ave. | | |
| **Noise Sources:** | Construction, Birds, & Traffic | | |
| **Comments:** | | | |

**Results (dBA):**

| Leq: | Lmin: | Lmax: | Peak: |
|---|---|---|---|
| 51.8 | 46.3 | 65.4 | 85.3 |

| Equipment | |
|---|---|
| **Sound Level Meter:** | LD SoundExpert LxT |
| **Calibrator:** | CAL200 |
| **Response Time:** | Slow |
| **Weighting:** | A |
| **Microphone Height:** | 5 feet |

| Weather | |
|---|---|
| **Temp. (degrees F):** | 64 |
| **Wind (mph):** | < 5 |
| **Sky:** | Clear |
| **Bar. Pressure:** | 30.01 |
| **Humidity:** | 59% |

**Photo:**

Kimley»Horn

## Noise Measurement Field Data

| | | | |
|---|---|---|---|
| **Project:** | 425 S. Winchester Blvd. | **Job Number:** | 97817007 |
| **Site No.:** | 2 | **Date:** | 10/3/2019 |
| **Analyst:** | Sophie La Herran | **Time:** | 10:26am |
| **Location:** | 351 Spar Ave. | | |
| **Noise Sources:** | Leaf blower (landscaping), Birds, Traffic, Ambulance | | |
| **Comments:** | | | |

**Results (dBA):**

| Leq: | Lmin: | Lmax: | Peak: |
|---|---|---|---|
| 51.2 | 45.4 | 64.8 | 86.3 |

| Equipment | |
|---|---|
| **Sound Level Meter:** | LD SoundExpert LxT |
| **Calibrator:** | CAL200 |
| **Response Time:** | Slow |
| **Weighting:** | A |
| **Microphone Height:** | 5 feet |

| Weather | |
|---|---|
| **Temp. (degrees F):** | 64 |
| **Wind (mph):** | < 5 |
| **Sky:** | Clear |
| **Bar. Pressure:** | 30.01 |
| **Humidity:** | 59% |

**Photo:**

Kimley»Horn

## Noise Measurement Field Data

| | | | |
|---|---|---|---|
| **Project:** | 425 S. Winchester Blvd. | **Job Number:** | 97817007 |
| **Site No.:** | 3 | **Date:** | 10/3/2019 |
| **Analyst:** | Sophie La Herran | **Time:** | 10:47am |
| **Location:** | 337 S. Winchester Blvd. | | |
| **Noise Sources:** | Construction & Traffic | | |
| **Comments:** | | | |

**Results (dBA):**

| Leq: | Lmin: | Lmax: | Peak: |
|---|---|---|---|
| 73.1 | 59.1 | 87.7 | 98.6 |

| Equipment | |
|---|---|
| **Sound Level Meter:** | LD SoundExpert LxT |
| **Calibrator:** | CAL200 |
| **Response Time:** | Slow |
| **Weighting:** | A |
| **Microphone Height:** | 5 feet |

| Weather | |
|---|---|
| **Temp. (degrees F):** | 64 |
| **Wind (mph):** | < 5 |
| **Sky:** | Clear |
| **Bar. Pressure:** | 30.01 |
| **Humidity:** | 59% |

**Photo:**


Kimley»Horn