Appendix I
Noise Technical Report

Final

DOWNTOWN WEST MIXED-USE PLAN

Noise Technical Report

Prepared for
City of San José

August 2020

ESA

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August 2020

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TABLE OF CONTENTS

Downtown West Mixed-Use Plan
Noise Technical Report

Appendices

Page

List of Figures

List of Tables

DOWNTOWN WEST MIXED-USE PLAN
Noise Technical Report

1. Introduction

This technical report has been prepared to assess the potential noise and vibration impacts associated with the Downtown West Mixed-Use Plan (project), which consists of an approximately 80-acre project site that encompasses approximately 105 individual parcels. The project site is in an area of Downtown San José that accommodates manufacturing, light industrial, and business service land uses inter-mixed with residential and limited commercial uses. The proposed project consists of a General Plan Amendment, Planned Development Rezoning, and Planned Development Permit to allow the demolition of existing buildings and phased development of up to 7.3 million gross square feet (gsf) of commercial office space; up to 500,000 gsf of commercial retail/restaurant and arts/cultural space; a hotel use with up to 300 guest rooms; a 100,000-gsf event space; 5,900 residential units; a district-wide open space program totaling about 15 acres; a district-wide parking program; and other public realm improvements.

Data used to prepare this analysis were obtained from the *Envision San José 2040 General Plan* (General Plan) (City of San José, 2018); the City of San José (City) Municipal Code; *Transit Noise and Vibration Impact Assessment* by the Federal Transit Administration (FTA, 2018), and the California Department of Transportation (Caltrans) *Technical Noise Supplement to the Traffic Noise Analysis Protocol* (Caltrans, 2013a), and by measuring and modeling existing and future noise levels at the project site and the surrounding land uses.

1.1 Project Location

The project area is located in the western portion of Downtown San José, mostly in the area that the City designated in 2014 as the Diridon Station Area Plan (DSAP). **Figure 1** shows the project site generally bounded by Lenzen Avenue and the Union Pacific Railroad (UPRR)/Caltrain tracks to the north; North Montgomery Street, Los Gatos Creek, the Guadalupe River, South Autumn Street, and Royal Avenue to the east; Auzerais Avenue to the south; and Diridon Station and the UPRR/Caltrain rail tracks to the west.[1,2] The site is approximately one mile in length from north to south and generally less than 800 feet in width from east to west, although at its widest, just south of West Santa Clara Street, the site reaches nearly 1,500 feet from east to west.

[1] Caltrain is operated by the Peninsula Corridor Joint Powers Board, consisting of representatives from San Francisco, San Mateo, and Santa Clara Counties. From just north of Santa Clara Station to Diridon Station, Altamont Commuter Express (ACE) and Capitol Corridor and Amtrak trains also operate on the UPRR/Caltrain tracks.

[2] This wider portion of the site results from an easterly extension bounded by Santa Clara Street, the Guadalupe River, West San Fernando Street/VTA light rail tracks, and South Autumn Street.

SOURCES: Google LLC and SITELAB urban studio, 2020

Downtown West Mixed-Use Plan

Figure 1
Aerial Photo of Project Area

2. Project Description

The proposed project consists of a General Plan Amendment, Planned Development Rezoning, and Planned Development Permit to allow the demolition of existing buildings and phased development of up to 7.3 million gross square feet (gsf) of commercial office space; up to 500,000 gsf of commercial retail/restaurant and arts/cultural space; a hotel use with up to 300 guest rooms; a 100,000-gsf event space that could host various events and assemblies over the course of a year; 5,900 dwelling units; district-wide open space program totaling about 15 acres, including landscaping and ecological enhancements aimed at improving the function of and enhancing the public's access to Los Gatos Creek and the Guadalupe River; a district-wide parking program that would accommodate site-specific parking demands while also managing event parking needs at the SAP Center; and other public realm improvements that leverage new regional transit connectivity provided in the immediate vicinity (Caltrain, Altamont Corridor Express [ACE] trains, planned Bay Area Rapid Transit (BART) service, and, potentially, high-speed rail), enhance local pedestrian circulation, and improve bicycling linkages to Downtown for residents and visitors.

The project applicant, Google LLC, in December 2018 entered into a Memorandum of Understanding (MOU) with the City of San José with an intention to "collaborate on development in and around the Diridon Station Area to aid implementation of the planned expansion of San José's Downtown, the Diridon Station Area Plan, and the General Plan." The MOU set forth the 18 goals for new development to transform the current area through new construction and adaptive reuse of existing facilities to a vibrant, fully functional transit-oriented neighborhood. Among the established goals are the creation of a balanced development, capitalizing on transit synergy, optimizing density and the mix of land uses, preserving existing housing and crating new housing, creation of broad job opportunities, and pursuit of equitable development. Goals also address high-quality, human-scaled design; improvements in the public realm; enhancing sustainability, environmental stewardship, and innovation; improving transit access use while minimizing parking; timely implementation; ensuring that development funds its fair share of amenities and other improvements and pays prevailing wages to construction workers and that the public is involved in discussions concerning community benefits; and supporting local schools.

3. Characteristics of Noise and Vibration

3.1 Noise Principles and Descriptors

Noise is generally defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement. The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but

rather a broad band of frequencies varying in levels of magnitude. When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

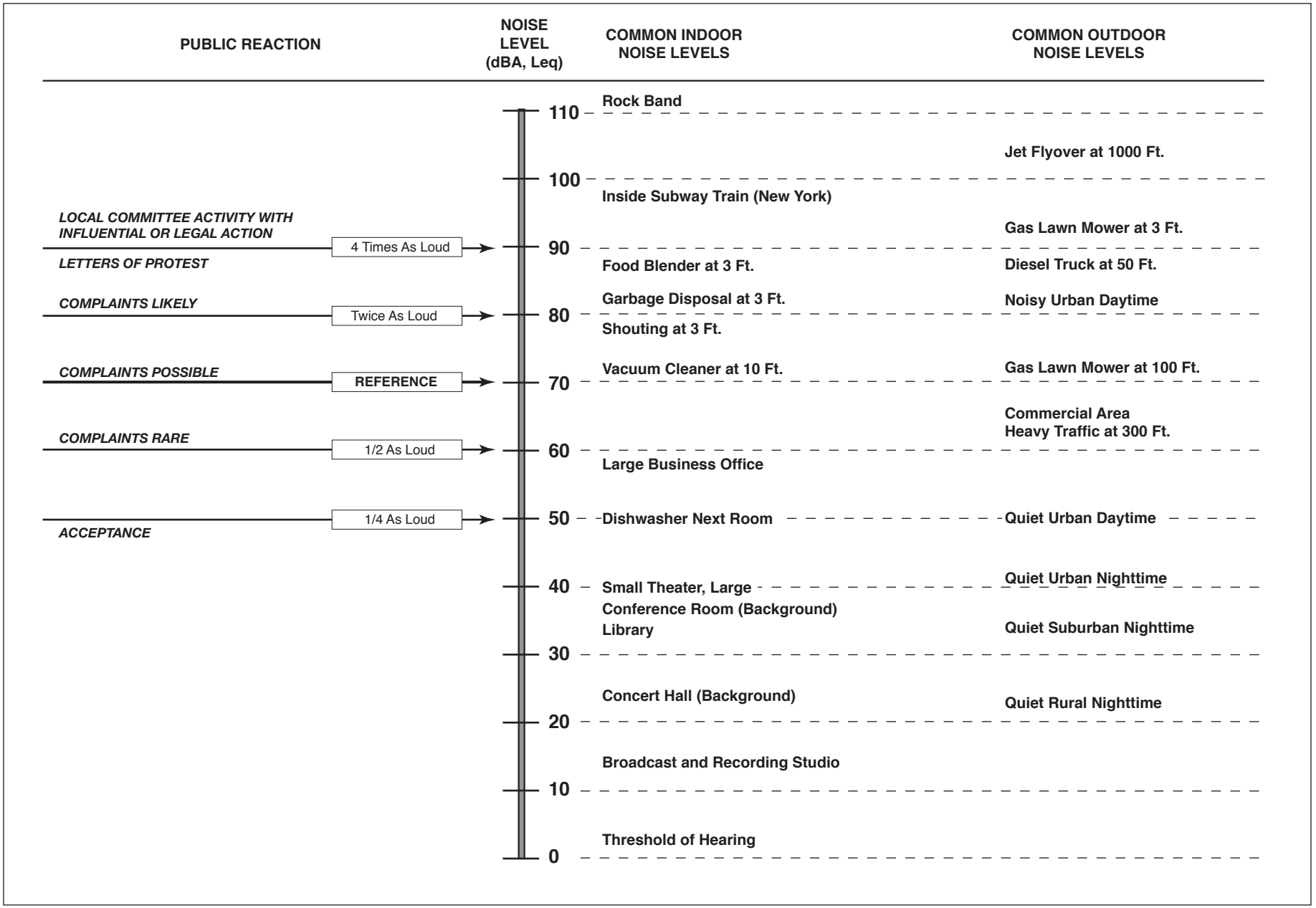
The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that deemphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown on **Figure 2**. All noise levels presented in this report are A-weighted unless otherwise stated.

3.2 Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented on Figure 2 are representative of measured noise at a given instant in time; however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic. What makes community noise variable throughout a day, besides the slowly changing background noise, is the addition of short-duration, single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

These successive additions of sound to the community noise environment change the community noise level from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The following are the most frequently used noise descriptors:

- **L_{eq}:** The equivalent-continuous sound level, used to describe noise over a specified period of time in terms of a single numerical value. The L_{eq} of a time-varying signal and that of a steady signal are the same if they deliver the same acoustic energy over a given time. May also be referred to as the "average sound level."
- **L_{max}:** The maximum, instantaneous noise level experienced during a given period of time.
- **L_{min}:** The minimum, instantaneous noise level experienced during a given period of time.



SOURCE: Caltrans Transportation Laboratory Noise Manual, 1982; and modification by ESA

Downtown West Mixed-Use Plan

Figure 2

Effects of Noise on People

- **L_{dn}:** The average A-weighted noise level during a 24-hour day, obtained after 10 dB are added to noise levels measured between 10 p.m. and 7 a.m. to account for nighttime noise sensitivity. Also referred to as the "day-night average noise level" (DNL). The L_{dn} is the metric used by the Noise Element of the *Envision San José General Plan* (General Plan) for assessing the land use compatibility of non-aviation sources.
- **CNEL:** The community noise equivalent level. This is the average A-weighted noise level during a 24-hour day that is obtained after 5 dB are added to measured noise levels between 7 p.m. and 10 p.m. and 10 dB are added to noise levels between 10 p.m. and 7 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The CNEL is the metric generally used for assessment of aircraft noise. The result is normally about 0.5 dBA higher than L_{dn} using the same 24-hour data.[3]

Noise Attenuation

Stationary "point" sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of 6 to 7.5 dBA per doubling of distance from the source, depending on the topography of the area and environmental conditions (e.g., atmospheric conditions and noise barriers, vegetative or manufactured). Widely distributed noise, such as that generated by a large industrial facility, spread over many acres, or by a street with moving vehicles (known as a "line" source), would typically attenuate at a lower rate—approximately 3 to 4.5 dBA each time the distance doubles from the source, which also depends on environmental conditions (Caltrans, 2009). Noise from large construction sites would exhibit characteristics of both "point" and "line" sources, and attenuation will therefore generally range between 4.5 and 7.5 dBA each time the distance doubles.

3.3 Effects of Noise on People

Noise is generally loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity that is a nuisance or disruptive. The effects of noise on people can be placed into four general categories:

- Subjective effects (e.g., dissatisfaction, annoyance);
- Interference effects (e.g., communication, sleep, and learning interference);
- Physiological effects (e.g., startle response); and
- Physical effects (e.g., hearing loss).

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects of environmental noise refer to those effects that interrupt daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep. Sleep interference effects can include both awakening and arousal to a lesser state of sleep. With regard to the subjective effects, the responses of individuals to similar noise events are diverse and are influenced by many factors, including the

[3] California Department of Transportation, *Technical Noise Supplement*, September 2013

type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity.

Overall, there is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction on people. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships generally occur (Caltrans, 2013a):

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived;
- Outside of the laboratory, a 3 dB change in noise levels is considered to be a barely perceivable difference;
- A change in noise levels of 5 dB is considered to be a readily perceivable difference; and
- A change in noise levels of 10 dB is subjectively heard as doubling of the perceived loudness.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed. Since the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dB, the combined sound level would be 53 dB, not 100 dB.

3.4 Noise Attenuation

Stationary "point" sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dB for hard sites and 7.5 dB for soft sites for each doubling of distance from the reference measurement. Hard sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the changes in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass, or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dB (per doubling distance) is normally assumed for soft sites. "Line" sources (such as traffic noise from vehicles) attenuate at a rate between 3 dB for hard sites and 4.5 dB for soft sites for each doubling of distance from the reference measurement (Caltrans, 2013a).

3.5 Fundamentals of Vibration

As described in the Federal Transit Administration's (FTA) Transit Noise and Vibration Impact Assessment (FTA, 2018), groundborne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to

be heard. In contrast to airborne noise, groundborne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains, buses on rough roads, and construction activities such as blasting, pile-driving, and operation of heavy earth-moving equipment.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The relationship of PPV to RMS velocity is expressed in terms of the "crest factor," defined as the ratio of the PPV amplitude to the RMS amplitude. Peak particle velocity is typically a factor of 1.7 to 6 times greater than RMS vibration velocity (FTA, 2018). The decibel notation acts to compress the range of numbers required to describe vibration. Typically, groundborne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration sensitive equipment.

The effects of groundborne vibration include movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, the vibration can cause damage to buildings. Building damage is not a factor for most projects, with the occasional exception of blasting and pile-driving during construction. Annoyance from vibration often occurs when the vibration levels exceed the threshold of perception by only a small margin. A vibration level that causes annoyance will be well below the damage threshold for normal buildings. The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 in/sec PPV (FTA, 2018).

In residential areas, the background vibration velocity level is usually around 50 VdB (approximately 0.0013 in/sec PPV). This level is well below the vibration velocity level threshold of perception for humans, which is approximately 65 VdB. A vibration velocity level of 75 VdB is considered to be the approximate dividing line between barely perceptible and distinctly perceptible levels for many people (FTA, 2018).

4. Environmental Setting

4.1 Existing Ambient Noise Levels

The project site is within an area of Downtown that accommodates manufacturing, light industrial and business service land uses inter-mixed with residential and limited commercial uses.

The project site is surrounded by a network of regional transportation facilities that influence the local noise environment. San José Diridon Station, a central passenger rail hub just outside and to the west of the project boundary, is served by Caltrain, Altamont Commuter Express (ACE),

Santa Clara Valley Transportation Authority (VTA) light rail, Capitol Corridor, and Amtrak Coast Starlight. BART service and high-speed rail system's San José-to-Central Valley segment to Diridon Station are future projects that may influence future noise levels around the project site. State and federal highways also contribute to the noise environment around the project site. State Route (SR) 87 is adjacent to the easternmost portion of the project site, Interstate 280 (I-280) is one block south of the southern project site boundary, and I-880 is just under one mile northwest of the site's northern boundary.

The SAP Center sports and entertainment venue is located on West Santa Clara Street close to the center of the project site which can generate substantial traffic and traffic-related noise before and after events.

Long-term noise level measurements were conducted in the project vicinity in October of 2019 to establish existing ambient noise conditions. Noise measurements were taken in proximity of the residential uses located to the north and south of the project site. The noise surveys were conducted using a Larson Davis Model LxT2 sound level meter that was calibrated before use and operated according to the manufacturer's written specifications. These measurements included the evenings of October 24 and 25, when there were no events at the SAP Center. The measured average noise level (L_{eq}) during different averaging periods are shown in **Table 1**. The measurement locations are identified on **Figure 3**. Note that monitoring locations LT-1, LT-2, and LT-3 were monitored in 2017 and 2018 as a part of the Downtown Strategy EIR (City of San José, 2019) and are included in the results of the measurements, with the available metric values published. No substantial development occurred in the vicinity of these monitoring locations between 2017 and the time of the Notice of Preparation; therefore, the data reflect the baseline noise environment.

The Norman Y. Mineta San José International Airport (Airport) is also located slightly less than one mile north-northwest of the northern site boundary. **Figure 4** presents the existing 65 CNEL noise contour for 2019. As can be seen from the figure, the 65 CNEL contour intersects Block E1 south of West Santa Clara Street and north of West Santa Clara Street, along the eastern boundary of the project site.

Existing roadside noise levels along roadway segments near the project site were modeled to provide existing weekday noise level estimates for the roadway segments near the project site. The existing roadside noise levels are presented in **Table 2** during the weekday peak commute hour[4]. These modeled noise levels reflect only the noise generated by traffic on the identified roadway segments; they do not include other sources in the area, such as rail and highway noise where these other sources are nearby.

[4] Existing and future traffic volumes provided by the transportation analysis were in the average daily trip metric for weekdays. These values were adjusted to reflect a peak-traffic-hour volume percentage of 5 percent.

TABLE 1
EXISTING NOISE ENVIRONMENTS IN THE PROJECT VICINITY

Long-Term (LT) Noise Monitoring Location	Noise Levels (dBA)				Primary Noise Sources
	Day-Night Noise Level	24-Hour L_{eq}	Daytime[a] Hourly Average L_{eq}	Nighttime[b] Hourly Average L_{eq}	
LT-A: 311 North Montgomery Street	66	62	63	59	Traffic on West Julian Street
LT-B: Terminus of Cinnabar Street at railroad tracks	76	70	71	68	Rail noise from Caltrain and UPRR
LT-C: South Montgomery Street, 300 feet south of Santa Clara Street	69	65	66	61	Traffic on West Santa Clara Street and rail noise
LT-D: West San Fernando Street, 80 feet west of SR 87	71	67	68	63	Traffic on SR 87
LT-E: 565 Lorraine Avenue	66	62	64	58	Traffic on South Montgomery Street
LT-F: Auzerais Avenue at Drake Street	66	62	64	58	Traffic on Auzerais Avenue
LT-1: 90 feet west from the center of Stockton Avenue, north of West Julian Street	65	NA	NA	NA	Traffic on West Julian Street and Stockton Avenue
LT-2: 50 feet south from the center of Park Avenue	66	NA	NA	NA	Traffic on Park Avenue and rail noise
LT-3: 45 feet north from the center of West San Carlos Street	73	NA	NA	NA	Traffic on West San Carlos Street and rail noise

NOTES:

dBA = A-weighted decibels; L_{eq} = equivalent-continuous sound level; NA = not applicable (these data points were not reported in the *Downtown Strategy 2040 Integrated Final EIR*); SR = State Route; UPRR = Union Pacific Railroad
Noise levels at LT-1, LT-2, and LT-3 were monitored for the Downtown Strategy EIR and were recorded in February 2017, February 2018, and February 2017, respectively.

[a] Daytime hours are considered to be 7 a.m. to 10 p.m.

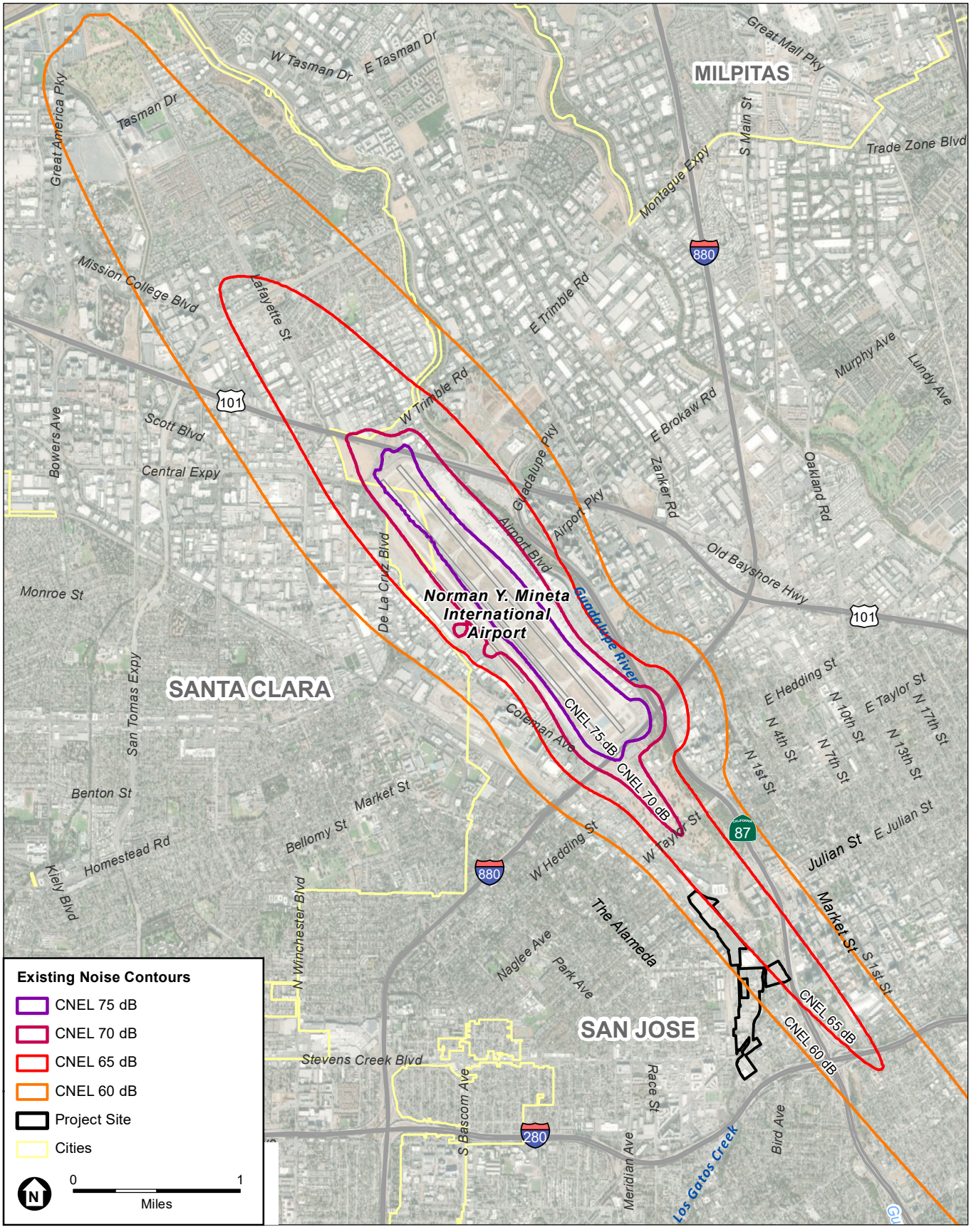
[b] Nighttime hours are considered to be 10 p.m. to 7 a.m.

SOURCE: Data compiled by Fehr & Peers in 2019 and Environmental Science Associates in 2020.

SOURCES: Esri, 2020, City of San Jose, 2020, ESA, 2020

Downtown West Mixed-Use Plan

Figure 3
Noise Monitoring Locations



SOURCES: Esri, 2019, City of San Jose, 2019, DJP, 2020; ESA, 2020

Downtown West Mixed-Use Plan

Figure 4
Existing Noise Contours for
Norman Y. Mineta San José International Airport

TABLE 2
EXISTING TRAFFIC NOISE ALONG ROADS IN THE PROJECT VICINITY

Roadway Segment	Existing Hourly (dBA)
Weekday Peak-Hour Noise Levels	
W. Julian Street from Stockton Avenue to The Alameda	63.1
W. Julian Street from N. Montgomery Street to Market Street	63.1
N. Autumn Street from W. Julian Street to Cinnabar Street	43.0
N. Autumn Street from W. Julian Street to St. John Street	53.2
N. Montgomery Street from W. Julian Street to Cinnabar Street	42.0
Stockton Avenue from W. Julian Street to Lenzen Avenue	54.3
Stockton Avenue from W. Julian Street to The Alameda	60.6
The Alameda from Stockton Avenue to Sunol Street	60.3
W. Santa Clara Street from Stockton Avenue to Delmas Avenue	63.3
S. Montgomery Street from W. Santa Clara Street to W. San Fernando Street	54.0
Cahill Street from W. Santa Clara Street to W. San Fernando Street	37.4
S. Autumn Street from W. Santa Clara Street to W. San Fernando Street	49.5
W. San Fernando Street from S. Montgomery Street to Delmas Avenue	58.3
Park Avenue from S. Montgomery Street to Sunol Street	58.8
Park Avenue from S. Montgomery Street to S. Delmas Avenue	61.9
W. San Carlos Street from S. Montgomery Street to Sunol Street	58.8
W. San Carlos Street from S. Montgomery Street to S. Delmas Avenue	56.5
Auzerais Avenue from Bird Avenue to Sunol Street	50.7
Auzerais Avenue from Bird Avenue to Delmas Avenue	56.9
Bird Avenue from W. San Carlos Street to Auzerais Avenue	65.8
Bird Avenue from Auzerais Avenue to Virginia Street	67.0

NOTE: dBA = A-weighted decibels

SOURCES: Traffic data compiled by Fehr & Peers in 2019 and noise modeling performed by Environmental Science Associates in 2020.

4.2 Existing Groundborne Vibration Levels

Sources of vibration in the project vicinity include Caltrain, Amtrak, and ACE railroad operations, portions of which abut parcels proposed for residential and office uses. FTA has published generalized ground-surface vibration curves for locomotive-powered passenger and freight trains, which are presented in **Table 3**. It should be noted that all Caltrain operations stop at Diridon Station, and hence, train speeds along the western project boundary are generally in the range of 5 to 20 miles per hour.

The only other sources of groundborne vibration in the project site vicinity are heavy-duty vehicular travel (e.g., refuse trucks, haul trucks) on local roadways. Trucks traveling at a distance of 50 feet typically generate groundborne vibration velocity levels of around 63 VdB (approximately 0.006 in/sec PPV), and these levels could reach 72 VdB (approximately 0.016 in/sec PPV) where trucks pass over discontinuities in the roadway (FTA, 2018).

TABLE 3
GENERALIZED VIBRATION LEVELS FROM LOCOMOTIVE-POWERED PASSENGER OR FREIGHT TRAINS*
(VIBRATION DECIBELS AND PEAK PARTICLE VELOCITY)

Train Speed	Distance from Tracks				
	30 Feet	50 Feet	100 Feet	150 Feet	200 Feet
10 mph	74 VdB/0.051 PPV	71 VdB/0.040 PPV	62 VdB/0.019 PPV	60 VdB/0.016 PPV	58 VdB/0.013 PPV
20 mph	80 VdB/0.085 PPV	77 VdB/0.066 PPV	68 VdB/0.031 PPV	66 VdB/0.026 PPV	64 VdB/0.022 PPV
30 mph	84 VdB/0.12 PPV	81 VdB/0.092 PPV	72 VdB/0.043 PPV	70 VdB/0.037 PPV	68 VdB/0.03 PPV
50 mph	88 VdB/0.17 PPV	85 VdB/0.13 PPV	76 VdB/0.060 PPV	74 VdB/0.024 PPV	72 VdB/0.043 PPV

NOTES:

mph = miles per hour; PPV = peak particle velocity; VdB = vibration decibels

* These levels reflect generalized diesel locomotive activity and do not reflect potential future reductions from electrification of Caltrain north of Diridon Station and increases from High-Speed Rail operations.

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

4.3 Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, and auditoriums generally are more sensitive to noise than are commercial and industrial land uses. Sensitive receptors in the study area are described below and presented in **Table 4**, along with their approximate distance to the project site boundary. The location of the sensitive receptors nearest to the project site (i.e., within 500 feet of the site) are presented on **Figure 5**.

Working from north to south along the project area, the northernmost sensitive receptors adjacent to the project consist of three single-family residences along the north side of West Julian Street (on the project site) and one on North Montgomery Street (east of the project area), which is also the north side of West Julian Street. South of West Julian Street there are several single and multifamily residences along the east side of North Montgomery Street south toward the SAP Center. There is also a condominium tower under construction along Stockton Avenue, south of West Julian Street and north of The Alameda.

South of West Santa Clara Street there is Templo la Hermosa at 56 South Montgomery Street. The Lakehouse District is a residential area east of South Autumn Street that includes single-family residences along Gifford Avenue and Park Avenue.

South of Park Avenue, a mixture of multifamily and single-family residences is located along the east side of South Montgomery Street and Bird Avenue, south to the I-280 freeway. There are also single-family residences along the southern boundary of the project site on both sides of Auzerais Avenue.

TABLE 4
EXISTING NOISE-SENSITIVE RECEPTORS WITHIN 500 FEET OF THE PROJECT SITE

Type of Sensitive Receptor	Location	Minimum Distance from Project Site Boundaries	Representative Monitoring Location
West of the Project Site			
Multifamily residential building (under construction)	139 Stockton Avenue	120 feet	LT-1
Multifamily residential complex	50 Bush Street	470 feet	LT-1
Multifamily residential complex	100–200 block of Laurel Grove Lane	480 feet	LT-1
Monte Vista multifamily residential community complex	300 block of Bautista Place	200 feet	LT-3
Multifamily residential complex	899 Morrison Park Drive	500 feet	LT-1
East of the Project Site			
Single-family residences (3)	567 West Julian Street	On project site	LT-A
Single-family residence	311 North Montgomery Street	25 feet[a]	LT-A
Multifamily residential	546 West Julian Street	50 feet	LT-A
Single-family residences	100–200 block of North Montgomery Street	50 feet	LT-A
Templo la Hermosa church	56 South Montgomery Street	On project site	LT-C
Single-family residences in Lakehouse District	400–500 block of Park Avenue	250 feet	LT-E
Multifamily residential Delmas Park	350 Bird Avenue	250 feet	LT-F
South of the Project Site			
Single-family residences	652 and 786 Auzerais Avenue	50 feet	LT-F

NOTES:

[a] Minimum distance is estimated at 25 feet because project setbacks have not yet been determined. Monitoring numbers correspond to the locations shown on Figure 2.

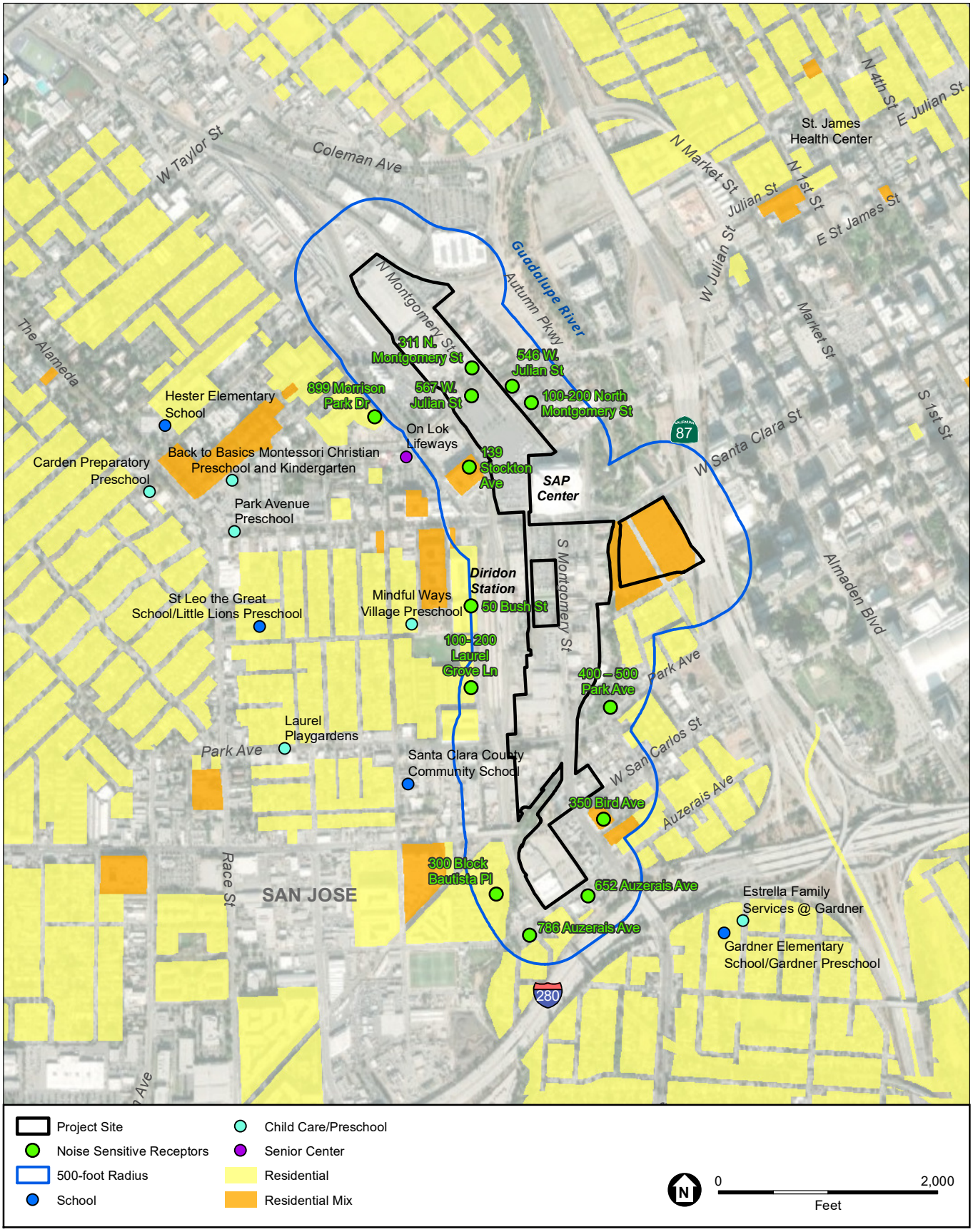
SOURCES: Data compiled by Environmental Science Associates in 2019; Google Earth (imagery date September 11, 2017) for parcel data (address and distance to the site).

On the west side of the project area across the railroad tracks is the Monte Vista community development northwest of Auzerais Avenue. Also west of the project area, across the railroad tracks, are multifamily residences on Laurel Grove Lane and Bush Street, south of The Alameda.

4.4 Regulatory Setting

Federal Noise Standards

The primary federal noise standards that directly regulate noise related to the operation of the proposed project are with regard to noise exposure and workers. The U.S. Occupational Safety and Health Administration (OSHA) enforces regulations to safeguard the hearing of workers exposed to occupational noise. OSHA has established worker noise exposure limits that vary with the duration of the exposure and requires implementation of a hearing conservation program if employees are exposed to noise levels in excess of 85 dBA.



SOURCES: Esri, 2019, City of San Jose, 2019, Google, 2019; GreenInfo Network, 2019; ESA, 2020

Downtown West Mixed-Use Plan

Figure 5

Existing Nearby Sensitive Receptors and Planned Sensitive Land Uses

Federal regulations also establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 Code of Federal Regulations (CFR), Part 205, Subpart B. The federal truck pass-by noise standard is 80 dB at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers.

Federal Transit Authority Vibration Standards

FTA has adopted vibration standards that are used to evaluate potential building damage impacts related to construction activities. The vibration damage criteria adopted by FTA are shown in **Table 5**.

TABLE 5
CONSTRUCTION VIBRATION DAMAGE CRITERIA

Building Category	PPV (in/sec)
I. Reinforced concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

NOTES:
in/sec = inches per second; PPV = peak particle velocity
SOURCE: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

In addition, the FTA has also adopted standards associated with human annoyance for groundborne vibration impacts for the following three land-use categories:

- **Category 1—High Sensitivity:** Buildings where vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes.
- **Category 2—Residential:** All residential land uses and any buildings where people sleep, such as hotels and hospitals.
- **Category 3—Institutional:** Land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference.

Under conditions where there are an infrequent number of events per day, FTA has established thresholds of 65 VdB for Category 1 buildings, 80 VdB for Category 2 buildings, and 83 VdB for Category 3 buildings.[5] Under conditions where there are an occasional number of events per day, FTA has established thresholds of 65 VdB for Category 1 buildings, 75 VdB for Category 2 buildings, and 78 VdB for Category 3 buildings.[6] No thresholds have been adopted or recommended for commercial and office uses.

[5] "Infrequent events" is defined by FTA as being fewer than 30 vibration events of the same kind per day.

[6] "Occasional events" is defined by FTA as between 30 and 70 vibration events of the same source per day.

California Department of Public Health Noise Standards

The California Department of Public Health has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. These guidelines for land use and noise exposure compatibility are shown in **Table 6**. In addition, Section 65302(f) of the California Government Code requires each county and city in the state to prepare and adopt a comprehensive long-range general plan for its physical development, with Section 65302(g) requiring a noise element to be included in the general plan. The noise element must: (1) identify and appraise noise problems in the community; (2) recognize Office of Noise Control guidelines; and (3) analyze and quantify current and projected noise levels.

TABLE 6
COMMUNITY NOISE EXPOSURE (DNL OR CNEL)

Land Use	Normally Acceptable[a]	Conditionally Acceptable[b]	Normally Unacceptable[c]	Clearly Unacceptable[d]
Single-Family Homes, Duplexes, Mobile Homes	50–60	55–70	70–75	above 75
Multifamily Homes	50–65	60–70	70–75	above 75
Schools, Libraries, Churches, Hospitals, Nursing Homes	50–70	60–70	70–80	above 80
Transient Lodging—Motels, Hotels	50–65	60–70	70–80	above 75
Auditoriums, Concert Halls, Amphitheaters	—	50–70	—	above 70
Sports Arenas, Outdoor Spectator Sports	—	50–75	—	above 75
Playgrounds, Neighborhood Parks	50–70	—	67–75	above 75
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50–75	—	70–80	above 80
Office Buildings, Business and Professional, Commercial	50–70	67–77	above 75	—
Industrial, Manufacturing, Utilities, Agriculture	50–75	70–80	above 75	—

NOTES:

CNEL = community noise equivalent level; DNL = day-night average noise level

[a] Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

[b] Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

[c] Normally Unacceptable: New construction or development should generally be discouraged. 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.

[d] Clearly Unacceptable: New construction or development should generally not be undertaken.

SOURCE: Governor's Office of Planning and Research, *State of California General Plan Guidelines*, Appendix D, 2017.

The State of California also establishes noise limits for vehicles licensed to operate on public roads. 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. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by state and local law enforcement officials.

California Building Code

The California Building Code requires that walls and floor/ceiling assemblies separating dwelling units from each other, or from public or service areas, have a *Sound Transmission Class* (STC)[7] of 50 dB for all common interior walls and floor/ceiling assemblies between adjacent dwelling units or between dwelling units and adjacent public area for multifamily units and transient lodging. The code specifies a maximum interior performance standard of 45 dBA. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

The state has also established noise insulation standards for new multifamily residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of 45 dB CNEL in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than 60 dB CNEL. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

State Vibration Standards

No state vibration standards are applicable to the proposed project. Moreover, according to the California Department of Transportation's (Caltrans) *Transportation and Construction Vibration Guidance Manual* (Caltrans, 2013b), there are no official Caltrans standards for vibration. However, this manual provides guidelines for assessing vibration damage potential to various types of buildings, ranging from 0.08 to 0.12 in/sec PPV for extremely fragile historic buildings, ruins, and ancient monuments to 0.50 to 2.0 in/sec PPV for modern industrial/commercial buildings.

Santa Clara County Airport Land Use Commission Comprehensive Land Use Plan

The project site is located within the Airport Influence Area (AIA), as defined by the Norman Y. Mineta San José International Airport's Comprehensive Land Use Plan (CLUP), adopted by the Santa Clara County Airport Land Use Commission (ALUC) on May 25, 2011 (SCALUC, 2011). The AIA includes areas around the Airport that are affected by noise, height, and safety considerations. The CLUP includes noise policies and standards for projects in the vicinity of the Airport, as summarized below.

> **Policy N-1:** The CNEL method of representing noise levels shall be used to determine if a specific land use is consistent with the CLUP.
>
> **Policy N-2:** In addition to the other policies herein, the Noise Compatibility Policies presented in Table 4-1 of the CLUP [**Table 7**] shall be used to determine if a specific land use is consistent with the CLUP, which shows residential uses are generally acceptable in 55–60 CNEL environments, conditionally acceptable in 60–65 CNEL environments, generally unacceptable in 65–70 CNEL environments, and unacceptable in 70+ CNEL environments.

[7] The STC is used as a measure of a materials ability to reduce sound. The STC is equal to the number of decibels a sound is reduced as it passes through a material.

Transient lodging including motels and hotels are generally acceptable in 55–65 CNEL noise environments, conditionally acceptable in 65 to 70 CNEL noise environments, unacceptable at 70+ CNEL noise environments. Commercial uses are generally acceptable in 55-65 CNEL noise environments, conditionally acceptable in 65–70 CNEL noise environments, generally unacceptable in 70–75 noise environments, and unacceptable in 75+ CNEL noise environments.

TABLE 7
NOISE COMPATIBILITY POLICIES OF THE SANTA CLARA COUNTY AIRPORT LAND USE COMMISSION COMPREHENSIVE LAND USE PLAN

	CNEL					
Land Use Category	**55–60**	**60–65**	**65–70**	**70–75**	**75–80**	**80–85**
Residential—low-density single-family, duplex, mobile homes	GA	CA	GU	U	U	U
Residential—multifamily, condominiums, townhouses	GA	CA	GU	U	U	U
Transient lodging—motels, hotels	GA	GA	CA	U	U	U
Schools, libraries, indoor religious assemblies, hospitals, nursing homes	GA	GU	U	U	U	U
Auditoriums, concert halls, amphitheaters	GA	GU	GU	U	U	U
Sports arena, outdoor spectator sports, parking	GA	GA	GA	CA	GU	U
Playgrounds, neighborhood parks	GA	GA	GU	U	U	U
Golf courses, riding stables, water recreation, cemeteries	GA	GA	GA	CA	GU	U
Office buildings, business commercial and professional, retail	GA	GA	CA	GU	U	U
Industrial, manufacturing, utilities, agriculture	GA	GA	GA	GU	GU	U

GA	Generally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements. Mobile homes may not be acceptable in these areas. Some outdoor activities might be adversely affected.
CA	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Outdoor activities may be adversely affected. Residential: Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
GU	Generally Unacceptable	New construction or development should be discouraged. 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. Outdoor activities are likely to be adversely affected.
U	Unacceptable	New construction or development shall not be undertaken.

NOTE:
CNEL = community noise equivalent level
SOURCE: SCALUC, 2011

Policy N-3: Noise impacts shall be evaluated according to the Aircraft Noise Contours presented on Figure 5 of the CLUP [refer to the most recent existing noise contours on Figure 4].

Policy N-4: No residential or transient lodging construction shall be permitted within the 65 dB CNEL contour boundary unless it can be demonstrated that the resulting interior sound levels will be less than 45 dB CNEL and there are no outdoor patios or outdoor activity areas associated with the residential portion of a mixed use residential project or a multi-unit residential project.

Policy N-5: All property owners within the Airport Influence Area who rent or lease their property for residential use shall include in their rental/lease agreement with the tenant, a

statement advising that they (the tenants) are living within a high noise area and the exterior noise level is predicted to be greater than 65 dB CNEL in a manner that is consistent with current state law including AB2776 (2002).

Policy N-6: Noise level compatibility standards for other types of land uses shall be applied in the same manner as the above residential noise level criteria. Table 7 presents acceptable noise levels for other land uses in the vicinity of the Airport (refer to Policy N-2 to land uses proposed by the project) as established in Table 4-1 of the CLUP.

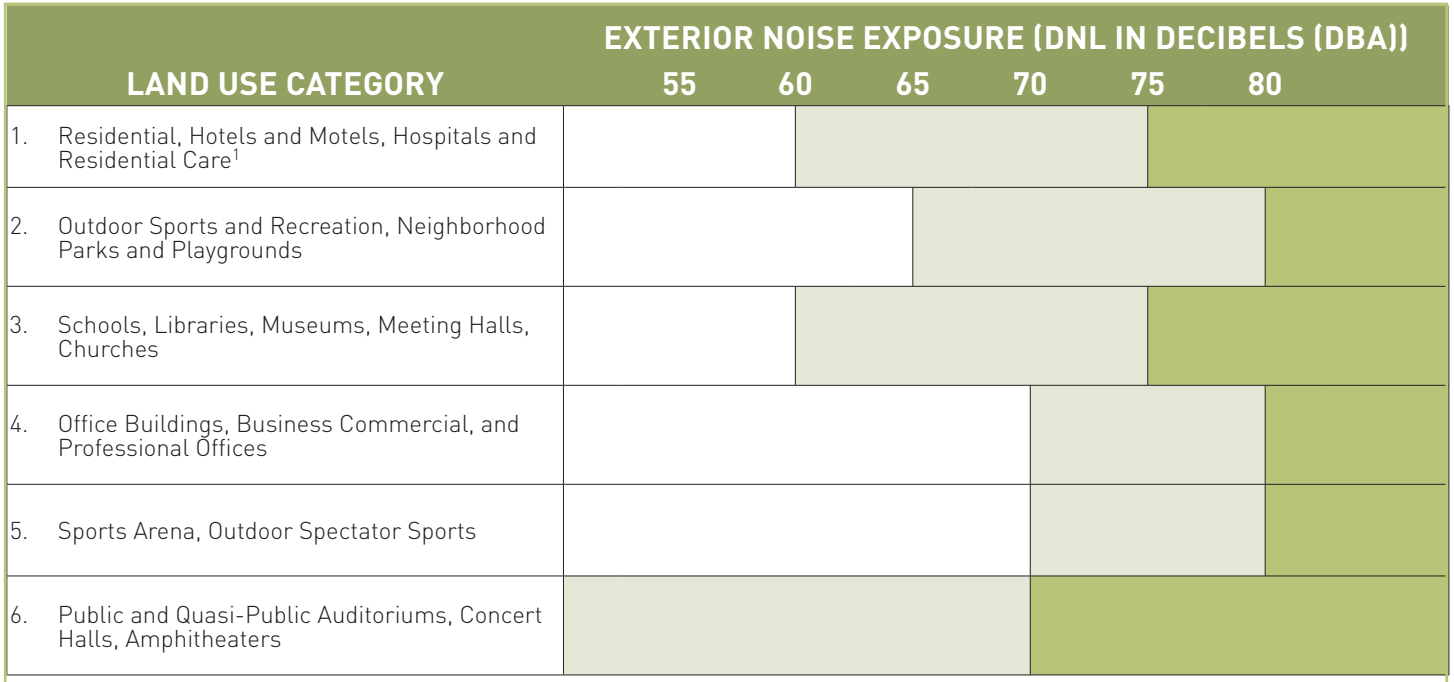
Policy N-7: Single-event noise levels (SENL) from single aircraft overflights are also to be considered when evaluating the compatibility of highly noise-sensitive land uses such as schools, libraries, outdoor theaters, and mobile homes. Single-event noise levels are especially important in the areas regularly overflown by aircraft, but which may not produce significant CNEL contours, such as the down-wind segment of the traffic pattern, and airport entry and departure flight corridors.

Envision San José 2040 General Plan

The Environmental Considerations/Hazards Chapter of the General Plan (City of San José, 2011, amended 2018) contains the following policies and actions regarding noise and vibration that are salient to the proposed mixed-use development project:

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. Applicable standards and guidelines for land uses in San José include.

- Interior Noise Levels: The City's standard for interior noise levels in residences, hotels, motels, residential care facilities, and hospitals is 45 dBA DNL. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard. For sites with exterior noise levels of 60 dBA DNL or more, an acoustical analysis following protocols in the City-adopted California Building Code is required to demonstrate that development projects can meet this standard. The acoustical analysis shall base required noise attenuation techniques on expected 2040 General Plan traffic volumes to ensure land use compatibility and 2040 General Plan consistency over the life of this plan.
- Exterior Noise Levels: The City's acceptable exterior noise level objective is 60 dBA DNL or less for residential and most institutional land uses (**Figure 6**). The acceptable exterior noise level objective is established for the City, except in the environs of the Norman Y. Mineta San José International Airport, the Downtown Core Area, and adjacent to elevated roadways. For the remaining areas of the City, the following standards apply:
  - For new multifamily residential projects and for the residential component of mixed-use development, use a standard of 60 dBA DNL in usable outdoor activity areas, excluding balconies and residential stoops and porches facing existing roadways. There will be common use areas available to all residents that meet the 60 dBA exterior standard. Use noise attenuation techniques such as shielding by buildings and structures for outdoor common use areas.
  - For single-family residential uses, use a standard of 60 dBA DNL for exterior noise in private usable outdoor activity areas, such as back yards.



SOURCE: San José, Envision San Jose 2040 General Plan Update, 2018

Downtown West Mixed-Use Plan

Figure 6

Land Use Compatibility Guidelines for Community Noise in San José

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 5 dBA DNL or more where the noise levels would remain "Normally Acceptable"; or
- Cause the DNL at noise sensitive receptors to increase by 3 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-1.4: Include appropriate noise attenuation techniques in the design of all new General Plan streets projected to adversely impact noise sensitive 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-1.8: Commercial drive-through uses will be allowed only when consistency with the City's exterior noise level guidelines and compatibility with adjacent land uses can be demonstrated.

Policy EC-1.9: Noise studies are required for land use proposals where known or suspected loud intermittent noise sources occur which may impact adjacent existing or planned land uses. For new residential development affected by noise from heavy rail, light rail, BART or other single-event noise sources, mitigation will be implemented so that recurring maximum instantaneous noise levels do not exceed 50 dBA Lmax in bedrooms and 55 dBA Lmax in other rooms.

Policy EC-1.11: Require safe and compatible land uses within the Norman Y. Mineta International Airport noise zone (defined by the 65 CNEL contour as set forth in State law) and encourage aircraft operating procedures that minimize noise.

> **Action 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.

Policy EC-2.1: Near light and heavy rail lines or other sources of ground-borne vibration, minimize vibration impacts on people, residences, and businesses through the use of setbacks and/or structural design features that reduce vibration to levels at or below the guidelines of the Federal Transit Administration. Require new development within 100 feet of rail lines to demonstrate prior to project approval that vibration experienced by residents and vibration sensitive uses would not exceed these guidelines.

Policy EC-2.3: 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

Section 20.100.450 of the City of San José Municipal Code establishes noise exposure limits for stationary noise sources (non-transportation sources) and specifies hours for project construction. The Municipal Code restricts construction hours within 500 feet of a residential unit to the hours of 7 a.m. to 7 p.m. Monday through Friday, with no construction on weekends; however, overnight and weekend construction is permitted if expressly allowed in a Development Permit or other planning approval. The Municipal Code does not establish quantitative noise limits for demolition or construction activities occurring in San José.

Sections 20.20.300, 20.30.700, 20.40,600, and 20.50.300 of the Municipal Code establish performance standards for noise exposure associated with stationary/non-transportation sources at the property line of noise-sensitive uses. Specifically, noise exposure is limited to 55 dB, 60 dB, and 70 dB at the property line of residential, commercial, and industrial receivers, respectively. Although the code is not explicit with respect to the acoustical descriptor assigned to these noise levels, it is a reasonable interpretation that these levels may be applied to an hourly average noise level (Hourly L_{eq}). This assumption is consistent with other jurisdictions in the Bay Area and Northern California.

Municipal Code Section 13.44.150 establishes restrictions on amplified sound in San José. Specifically, operation of loudspeakers or sound amplifiers in parks is prohibited unless approved under a lease or contract entered into by the City or authorized through issuance of a special event permit under Municipal Code Chapter 13.14, which may establish additional operational conditions.

City of San José Standard Conditions of Approval

The following City Standard Conditions of Approval (SCAs) regarding noise generation are applicable to the proposed project.

SCA NO-1: Construction-Related Noise

The project applicant shall implement noise minimization measures that include, but are not limited to, the following:

- Limit construction hours to between 7 a.m. and 7 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.
- Construct solid plywood fences around ground level construction sites adjacent to operational businesses, residences, or other noise-sensitive land uses.
- Equip all internal combustion-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Prohibit unnecessary idling of internal combustion engines.
- 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 noise-sensitive land uses.
- Utilize "quiet" air compressors and other stationary noise sources where technology exists.
- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.
- Notify all adjacent businesses, 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.
- 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.
- 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.
- Limit construction hours to 7 a.m. and 7 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. Because it is anticipated that certain construction activities (such as continuous pours of concrete foundations) may require work outside normally permitted construction hours, the project's Planned Development Permit would allow for such construction activities, subject to conditions of approval, including performance standards, imposed by the City to limit noise impacts.

SCA NO-2: Interior Noise Standard for Residential Development

The project applicant shall prepare final design plans and incorporate building design and acoustical treatments to ensure compliance with state building codes and City noise standards. A project-specific acoustical analysis shall be prepared to ensure that the design incorporates controls to reduce interior noise levels to 45 dBA DNL or lower within the residential units. The project applicant shall conform with any special building construction techniques requested by the City's Building Department, which may include sound-rates windows and doors, sound-rated wall constructions, and acoustical caulking.

5. Impacts and Mitigation Measures

This section describes the impact analysis relating to noise and vibration for the proposed project. It describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant.

5.1 Thresholds of Significance

Based on the CEQA Guidelines, an impact related to noise and/or groundborne vibration project would be significant if implementing the proposed project would:

- 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;
- Generate excessive groundborne vibration or groundborne noise levels; or
- For a project located within the vicinity of a private airstrip or an airport land use plan area or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, expose people residing or working in the area to excessive noise levels.

5.2 Methodology

Following is a description of the methodology used to evaluate the impacts of project site development relative to each of the significance thresholds cited above.

Substantial Increase in Noise

The first threshold of significance examines whether project construction and/or operations would generate noise in excess of established noise standards which are different for stationary, mobile, and construction noise sources.

Evaluation of the proposed project relative to this threshold under Impact 1 focuses on operational increases in ambient noise level from stationary sources, while Impact 2 focuses on the project's contribution to localized increases is traffic-generated noise along roadways, while Impact 3 focuses on construction-related noise generated by the project.

Stationary-Source Noise

Office, commercial, retail, event and conference space, on-site utility plants and logistics centers, or other noise-generating uses developed under the proposed project could substantially increase noise levels at noise-sensitive land uses or could expose sensitive receptors to noise levels exceeding standards established by General Plan Policies EC-1.2, EC-1.3, and EC-1.6. Policy EC-1.6 requires compliance with noise standards in the City's Municipal Code, specifically Sections 20.20.300, 20.30.700, 20.40,600, and 20.50.300.

Operations at proposed noise-producing land uses would be dependent on many variables. The following analysis considers the potential for noise from sources such as mechanical equipment, outdoor maintenance areas, truck loading docks and delivery activities, public address systems, and parking lots by describing reference noise levels that are documented to be associated with these sources. Existing General Plan policies and applicable restrictions in the City's Municipal Code that address such sources are identified. Finally, mitigation measures with performance standards to address the potential impacts are identified.

Project-Generated Traffic Noise

Guidance on the significance of changes in ambient noise levels from transportation is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels caused by aircraft operations (FICON, 1992). The recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. The term "annoyance" summarizes the general adverse reaction of people to noise that interferes with speech, disturbs sleep, or interferes with the desire for a tranquil environment. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, they apply to all sources of transportation noise described in terms of cumulative noise exposure metrics such as the DNL. The measures of a substantial increase in transportation noise exposure as recommended by FICON are presented in **Table 8**.

TABLE 8
MEASURES OF A SUBSTANTIAL INCREASE IN TRANSPORTATION NOISE EXPOSURE

Ambient Noise Level without Project (DNL)	Significant Impact Assumed to Occur if Project Site Development Increases Ambient Noise Levels by:
<60 dB	+ 5.0 dB or more
60–65 dB	+ 3.0 dB or more
>65 dB	+ 1.5 dB or more[a]

NOTES:

dB = decibels; DNL = day-night average noise level

[a] According to the Federal Interagency Committee on Noise report, the 1.5 A-weighted decibel (dBA) increase in environments that exceed 65 dBA is not necessarily a significant increase but, rather, an increase warranting further investigation.

SOURCE: Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.

The rationale for the Table 8 criteria is that, as ambient noise levels increase, a small increase in decibel levels is sufficient to cause significant annoyance. The quieter the ambient noise level is, the more the noise can increase (in decibels) before it causes significant annoyance. The 5-dBA

and 3 dBA noise level increases presented in Table 8 also correlate directly with noise level increases that Caltrans consider to represent "readily perceivable" and "barely perceivable," respectively, for short-term noise increases. The 5-dBA and 3-dBA noise level increases presented in Table 8 also correlate directly with the standards established in Policy EC-1.2 of the General Plan. Thus, the significance of permanent increases in transportation noise levels is evaluated based on the increases presented in Table 8.

Traffic noise levels were modeled using the algorithms of the Federal Highway Administration's Traffic Noise Model for the existing and existing plus project and cumulative plus project scenarios. The resulting noise levels were then compared to existing modeled or monitored conditions, depending on the contribution of other noise sources in the local environment, to determine significance. Where significant impacts may occur, mitigation addressing sensitive receptors may also consider the City's standard of 45 dBA DNL for interior noise levels at residences, hotels, motels, residential care facilities, and hospitals.

Construction Noise

The City of San José Municipal Code does not establish quantitative noise standards for construction activity. However, according to General Plan Policy EC-1.7, 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, the policy requires that the project implement a construction-noise logistics plan before the start of construction. The plan must specify hours of construction, identify noise and vibration minimization measures, include the posting or notification of construction schedules, and designate a noise disturbance coordinator who would respond to neighborhood complaints. The construction-noise logistics plan must be implemented during construction to reduce noise impacts on neighboring residents and other uses. Because the project would be constructed in distinct phases, the analysis also considers the construction noise impacts from later phases of construction on proposed sensitive receptors on the project site constructed during earlier phases and assumed to be occupied during construction of later phases.

Construction noise levels were estimated for standard construction equipment and for high-impact construction equipment for informational purposes. However, the level of significance was determined based on the duration and intensity of construction activities with the application of the Standard Conditions of Approval.

Groundborne Vibration

Impacts from groundborne vibration during project site construction are assessed in Impact 2, using vibration damage threshold criteria expressed in PPV for architectural damage. Equipment or activities that typically generate continuous vibration include but are not limited to: excavation equipment; static compaction equipment; vibratory pile drivers; pile-extraction equipment; and vibratory compaction equipment. General Plan Policy EC-2.3 requires new development to

minimize continuous vibration impacts on 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 is the standard applied to minimize the potential for cosmetic damage to a building. A continuous vibration limit of 0.20 in/sec PPV is applied to minimize the potential for cosmetic damage at buildings of normal conventional construction.

Policy EC-2.3 also discourages the 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 who verifies that there would 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 who verifies that there would be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

Caltrans's measure of the threshold of architectural damage for conventional sensitive structures is 0.5 in/sec PPV for new residential structures and modern commercial buildings and 0.25 in/sec PPV for historic and older buildings (Caltrans, 2013b). However, because the General Plan's standards are more restrictive, the City's thresholds are applied in the analysis.

Vibration impacts were estimated using reference vibration levels for construction equipment in concert with vibration propagation equations published by FTA, and estimating the potential for resultant vibration levels in excess of the General Plan standards.

Exposure of People to Excessive Noise Levels

As indicated on Figure 4, a portion of the project site is within the 65 CNEL noise contour of Norman Y. Mineta San José International Airport. CEQA requires the analysis of potential adverse effects of a project on the environment; however, the California Supreme Court ruled in *BIA v. BAAQMD* that the potential effects of the environment on the project are legally not required to be analyzed or mitigated under CEQA, except where the project's impacts would exacerbate the existing conditions.

However, the ruling provided several exceptions to the general rule that CEQA does not require an evaluation of the impacts of the environment on the project. These exceptions include if the project is exposed to potential noise and safety impacts on the project occupants because of the project site's proximity to an airport (Public Resources Code Section 21096). In addition, the subsequently updated Appendix G of the CEQA Guidelines continues to identify a project's exposure to airport noise as an impact under CEQA. Therefore, this analysis uses the future noise exposure estimates provided in the CLUP for the Airport to assess the potential for proposed land uses to be adversely affected by aircraft noise.

Non-CEQA Planning Considerations

Noise and vibration impacts on proposed future project development from the existing environment, such as existing roadway noise, existing noise-generating land uses, existing railway noise, and existing railway vibration, would not be subject to CEQA. However, the City has policies and regulations that address existing conditions affecting a proposed project, and General Plan Policy EC-2.1 provides standards for minimizing groundborne vibration impacts near light and heavy rail lines or other sources of groundborne vibration. The analysis of noise and vibration impacts on future development allowed by the project, therefore, is discussed in the context of consistency with relevant policies and regulations. It should be noted that the acceptable exterior noise level objective established for the City in General Plan Policy EC-1.1 exempts the environs of the Norman Y. Mineta San José International Airport and Downtown, including the project site.

Cumulative Traffic Impacts

The significance of cumulative impacts related to traffic noise levels is determined using a two-step process. First, similar to the project-level assessment of traffic impacts, the increase in noise levels between cumulative (2040) conditions with the project and existing baseline (2019) conditions is compared to an incremental 3 dBA or 5 dBA threshold, as applicable based on the existing noise level. If the roadside noise levels would exceed this incremental threshold, a significant cumulative noise impact would be identified.

The second step of the analysis of cumulative roadside noise impacts (if a significant cumulative noise impact is predicted based on the above methodology) is to evaluate whether the contribution of the project to roadside noise levels would be cumulatively considerable. This second step (if necessary) involves assessing whether the project's contribution to roadside noise levels (i.e., the difference between cumulative conditions and cumulative plus project conditions) would exceed a 1.5 dBA incremental contribution; this is a threshold that is considered cumulatively considerable. The 1.5 dBA increase used to represent a cumulatively considerable contribution is conservatively based on the minimum increase identified as potentially significant by FICON (refer to Table 8). As stated above, except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived. Consequently, a cumulatively considerable contribution would reasonably be more than 1 dBA.

5.3 Project Impacts

Impact 1: Would the project result in exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan, noise ordinance, or other land use plan?

Stationary Noise Sources

Operation of the proposed project would increase ambient noise levels in the immediate vicinity primarily through the on-site use of stationary equipment, such as heating, ventilation, and air conditioning (HVAC) systems, and by emergency generators that would be required by building

code for emergency egress of high-rise buildings more than 75 feet in height. Because mechanical equipment is commonly available with noise-attenuating enclosures designed to meet local noise ordinances, the equipment's noise generation would not be expected to exceed the City's established standards in the Municipal Code or General Plan policies.

Emergency backup generators, if required, would be tested regularly, and operated occasionally. Typically, the Bay Area Air Quality Management District permits emergency backup generators to operate for up to 50 hours per year, or on average about one hour per week. The noise generated by generator testing would be akin to that of a diesel-powered truck engine and this occasional testing would not result in a substantial permanent increase in noise levels over ambient conditions.

Sections 20.20.300, 20.30.700, 20.40,600, and 20.50.300 of the City's Municipal Code establish performance standards for noise exposure associated with stationary/non-transportation sources at the property line of noise-sensitive uses. Specifically, noise exposure is limited to 55 dB, 60 dB, and 70 dB at the property line of residential, commercial, and industrial receivers.

Implementing General Plan Policies EC-1.2, EC-1.3, EC-1.6, and EC-1.9 would reduce potential impacts associated with new noise-producing land uses facilitated by the plan. These policies are described in more detail above in Section 4.4, *Regulatory Setting*, and summarized below.

Policy EC-1.2 limits noise generation by requiring the use of noise attenuation measures such as acoustical enclosures and sound barriers. The policy states that the City considers a significant noise impact to occur if a project would cause the DNL at noise-sensitive receptors to:

- Increase by 5 dBA DNL or more where noise levels would remain within the General Plan's "normally acceptable" land use standard (Figure 6); or
- Increase by 3 dBA DNL or more where noise levels would equal or exceed the "normally acceptable" level.

Policy EC-1.3 indicates that new non-residential land uses are to mitigate noise generation 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 regulates operational noise impacts from new industrial and commercial development on adjacent residential, commercial, and industrial uses by requiring compliance with noise standards in the City's Municipal Code.

Finally, Policy EC-1.9 requires land use proposals that include known or suspected loud intermittent noise sources that may affect adjacent existing or planned land uses to prepare a noise study and provide mitigation such that recurring maximum instantaneous noise levels would not exceed 50 dBA L_{max} in bedrooms and 55 dBA L_{max} in other rooms.

Anticipated development of the proposed project includes generalized land uses designated for each development block.

The Downtown West Design Standards and Guidelines do not depict or require specific building designs for buildings within the project, and thus do not provide exact locations or specifications for mechanical equipment or loading docks at this time. Therefore, it is not possible to provide specific

estimates of the noise levels at individual receptor locations that would result from operation of such stationary sources. It may reasonably be expected that mechanical equipment of proposed buildings may be 50 feet from existing receptors (refer to Table 4). **Table 9** presents reference noise levels for many of these sources for informational purposes. Given the data in Table 9 and the possibility that receptors could be as close as 50 feet away, the potential exists for unobstructed noise levels to be 70 dBA or higher at the nearest receptor locations, which would exceed exterior noise standards. However, it can be reasonably anticipated that building mechanical equipment would be roof-mounted and shielded by screens or parapets, which would generally reduce noise levels for receptors except those in adjacent buildings with a greater number of stories. Notwithstanding the requirements of Municipal Code Sections 20.20.300, 20.30.700, 20.40,600, and 20.50.300, this impact would be potentially significant. A mitigation measure is identified to establish these requirements through a project-specific performance standard.

TABLE 9
REFERENCE NOISE LEVELS FOR STATIONARY NOISE SOURCES ASSOCIATED WITH THE PROPOSED PROJECT

Stationary Noise Source	Documented Sound Levels (dBA)	Source
HVAC Equipment	72–78 dBA at 30 feet without acoustical treatments	Trane, *Sound Data and Application Guide*, 2002
Standby Diesel Generator	75–90 dBA at 23 feet (size dependent) without acoustical enclosure	Cummins Power Generation, *Sound Attenuated and Weather Protective Enclosures*, 2008
Parking Lot (four stories)	53–58 dBA at 75 feet	Illingworth and Rodkin, *Santana Row Parking Structure Project Noise Assessment, San José, California*, 2014
Loading Dock	77 dBA at 20 feet	Urban Crossroads, *Moreno Valley Walmart Noise Impact Analysis*, 2015
Central Utility Plant	64 dBA at property line	ESA, *Stanford University 2018 General Use Permit Draft Environmental Impact Report*, October 2017

NOTES:
dBA = A-weighted decibels; ESA = Environmental Science Associates; HVAC = heating, ventilation and air conditioning
SOURCE: Data compiled by Environmental Science Associates in 2020. (Additional sources noted above.)

Central Utility Plant Impacts on Existing Receptors

The project proposes up to two central utility plants: one in the Southern Infrastructure Zone and the second in the Northern Infrastructure Zone. The Southern Infrastructure Zone, between West San Fernando Street and where Los Gatos Creek passes through the southern area of the project site, would be within about 300 feet of residences to the east and approximately 500 feet from residential uses to the west and south, but would be 150 feet from an unoccupied and boarded-up residence at the corner of South Montgomery Street and Lorraine Avenue. The Northern Infrastructure Zone would be north of West Julian Street between North Montgomery Street and the Caltrain tracks, approximately 150 feet from a transitional housing facility at 546 West Julian Street.

Most operational noise sources of modern central utility plants, such as the one at Stanford University (refer to Table 9), are enclosed in buildings that attenuate noise from these sources (e.g., heat recovery systems). However, the exterior blowers of this similar, modern central utility plant facility at Stanford have been demonstrated to generate noise levels of up to 64 dBA at the

fence line of the central utility plant, which is approximately 150 feet away (ESA, 2017). Given the minimum 300-foot distance of the southern facility from existing residential receptors, noise from central utility plant operation in an enclosed building would be less than the 55 dBA standard established by Sections 20.30.700 of the Municipal Code. However, noise generated from the northern central utility plant could result in noise levels exceeding the 55 dBA standard, given the proximity to existing sensitive land uses.

Central Utility Plant Impacts on Proposed Receptors

Because, at a minimum, the southern central utility plant would be constructed in Phase 1, subsequent operations could also affect future occupants of residential development in Phase 1 and later phases of the project. Noise from central utility plant operation could also affect new residential uses proposed by the project, particularly those in Block C1, south of West Julian Street and west of North Montgomery Street, and on Blocks F1 and F4, on South Autumn Street near West San Fernando Street. These proposed residential uses would be directly across West Julian Street from the proposed northern central utility plant. Depending on the location of any outdoor equipment, such as blowers—which have been demonstrated to generate 64 dBA at a utility plant property line—and assuming that proposed Blocks C1, F1, and F4 receptors could be as close as 100 feet from the property line, the potential would exist for noise from central utility plant operations to exceed the 55 dBA standard established by Municipal Code Section 20.30.700 at the locations of future project-sensitive receptors. This impact would be potentially significant. Mitigation Measure NO-1a-1 would be implemented to reduce impacts on new receptors in Blocks C1, F1, and F4.

Noise Impacts of Public Gathering Spaces

The proposed project would include the following public gathering spaces:

- Two indoor event centers, largely reserved for the applicant's use, accommodating a total of up to 2,000 attendees, each on Blocks E and F;
- One or more publically accessible indoor live entertainment venues on Blocks D4, D5, and/or D6 accommodating an aggregate capacity of approximately 500 people;
- An outdoor performance space in St. John Triangle, at which live music performances would be expected to occur; and
- Up to five enclosed pavilions providing indoor event space for public use and gatherings.

Event Center & Live Entertainment Venue Noise

Generally, event centers are enclosed structures that cater to business gatherings, or public events (e.g., dog show, circus). While presentations may be aided by public address systems, these gatherings would occur in an interior space that would attenuate noise levels from reaching the exterior of the building. Crowd ingress and egress at the event center may generate exterior noise from multiple human voices. In general, based on capacity, crowd noise from these events would be substantially less than that associated with concerts and events at the SAP Center.

One event center on Block F1 would be more than 500 feet from the nearest existing residences to the south, but may be as close as 50 feet from proposed residential uses on Block F2 and F4.

Similarly, an event center on Block E1 would be more than 500 feet from the nearest existing residence, but also may be as close as 50 feet from proposed residential uses on Block E2 and/or E3.

One or more indoor live entertainment venues in the project's central area. The venue(s) would likely be on Blocks D4, D5, and/or D6. The venue(s), which could include live music, would operate 5 to 6 days per week, with anticipated daytime events (11 a.m.–3 p.m.) held Wednesday through Sunday and nighttime events (7–11 p.m.) held Thursday through Saturday. There could be up to about 15 events per week. The venue(s) would have a maximum aggregate capacity of approximately 500. The venue(s) may be as close as 50 feet from proposed residential uses on Block D1. Live entertainment would occur in an interior space that would attenuate noise levels from reaching the exterior of the building, although crowd ingress and egress may generate exterior noise from multiple human voices.

Given the relatively small attendance size of the event center and performance venues, exterior crowd noise during ingress and egress before and after events would not be expected to result in a prolonged nuisance noise source, particularly in an urbanized area with existing elevated noise levels, and would comply with the noise ordinance; therefore, the impact of crowd noise would be less than significant.

Outdoor Performance Space Noise

The proposed outdoor performance space at St. James Triangle, depending on its location in the park, could be as close as 120 feet from the multifamily residences at 139 Stockton Avenue, across the Caltrain tracks. City of San José Municipal Code Section 13.44.150 establishes restrictions on amplified sound in San José and would apply to events at the outdoor performance space. Operators of events at the outdoor performance space would be required to obtain a special event permit from the City to operate any loudspeaker or sound amplifier. Such a permit may establish additional operational conditions such as hours of operation, direction of speakers, or sound level restrictions. Such events would not be regular occurrences, would be restricted by permit conditions to certain hours, and would occur in an area where rail noise occurs multiple times an hour during daytime periods and approximately once an hour into the late evening. This would limit the noticeable increase in noise generated by occasional events at the outdoor performance space, and the noise impact would be less than significant.

Pavilion Event Noise

In addition to the outdoor performance space, four enclosed pavilions structures are proposed and would be located at Los Gatos Creek Park, Los Gatos Creek East, Gateway to San José, and Northend Park.

The pavilion at Los Gatos Creek Park would be approximately 200 feet from an unoccupied, boarded-up residence at the corner of South Montgomery Street and Lorraine Avenue, and other residences farther east on Lorraine Avenue. The pavilion at the Creekside Walk at South Autumn Street would be adjacent to the VTA crossing at San Fernando Street and approximately 250 feet from residences on West San Fernando Street. The pavilion at Gateway to San José would be approximately 600 feet from the nearest residences on West San Fernando Street. The pavilion at Northend Park would be approximately 200 feet from the nearest residences on North Autumn Street.

Like the outdoor performance space, these pavilion structures could accommodate relatively small musical performances. The pavilion structures would be enclosed structures, each approximately 3,000–4,000 square feet. The pavilion structures would function as standalone, enclosed structures to be used for indoor gatherings or events. Should the event spill outdoors, operators at the pavilions would be required to obtain a special event permit from the City to operate any loudspeaker or sound amplifier. Such a permit may establish conditions such as hours of operation, direction of speakers, or sound level restrictions. Such events would not be regular occurrences, would be restricted by permit conditions to certain hours to ensure compliance with noise ordinance standards. This would limit the noticeable increase in noise generated by occasional events at these enclosed performance spaces, and the noise impact would be less than significant.

Mitigation Measure NO-1a: Operational Noise Performance Standard

Prior to the issuance of any building permit, the project applicant shall ensure that all mechanical equipment is selected and designed to reduce impacts on surrounding uses by meeting the performance standards of Chapters 20.20 through 20.50 of the San José Municipal Code, limiting noise from stationary sources such as mechanical equipment, loading docks, and central utility plants to 55 dBA, 60 dBA, and 70 dBA at the property lines of residential, commercial, and industrial receivers, respectively. If noise levels exceed these standards, the activity causing the noise shall be abated until appropriate noise reduction measures have been installed and compliance has been verified by the City. Methods of achieving these standards include using low-noise-emitting HVAC equipment, locating HVAC and other mechanical equipment within a rooftop mechanical penthouse, and using shields and parapets to reduce noise levels to adjacent land uses. For emergency generators, industrial-grade silencers can reduce exhaust noise by 12–18 dBA, and residential-grade silencers can reduce such noise by 18–25 dBA. (ASHRAE TC, 2006) Acoustical screening can also be applied to exterior noise sources of the proposed central utility plants and can achieve up to 15 dBA of noise reduction (ENC, 2014).

An acoustical study shall be prepared by a qualified acoustical engineer during final building design to evaluate the potential noise generated by building mechanical equipment and to identify the necessary design measures to be incorporated to meet the City's standards. The study shall be submitted to the Director of the City of San José Department of Planning, Building and Code Enforcement or the Director's designee for review and approval before the issuance of any building permit.

Project-Generated Traffic Noise

Vehicle trips generated by the development allowed by the Downtown Strategy 2040 would generate roadway noise in the project area and surrounding environment. Increases in traffic noise gradually degrade the environment in areas sensitive to noise.

The significance of traffic noise levels is determined by comparing the increase in noise levels (from the traffic contribution only) to increments recognized by General Plan Policy EC-1.2 as significant.

Traffic noise levels were determined based on the transportation analysis, and assessed in this section for the following scenarios:

1. Existing traffic conditions (year 2018) during the weekday peak commute hour, as estimated based on average daily traffic (using data generated for the project's transportation analysis); and
2. Existing plus proposed full buildout of project mixed uses during the weekday peak commute hour.

All traffic volumes provided in the project's transportation analysis and used in this roadway noise analysis were provided by Fehr & Peers Transportation Consultants, and reflect the proximity of Diridon Station and internal trip reduction resulting from the proposed mix of uses. Modeled weekday noise level estimates for the most highly affected roadway segments near the project site are presented in **Table 10** for full buildout of the project's mixed uses during the weekday peak commute hour. While some smaller roadway segments may also experience traffic increases, the limitations of the transportation model preclude analyzing some of the smaller roadways; therefore, what is provided is a best-efforts analysis.

Initial modeling of traffic noise increases along these roadway segments indicated that the following 9 segments of the 20 analyzed could experience roadside noise increases that would be considered significant in the absence of other noise sources, and if sensitive receptors were present:

- North Autumn Street from West Julian Street to West St. John Street;
- Stockton Avenue from West Julian Street to The Alameda;
- West Santa Clara Street from Stockton Avenue to Delmas Avenue;
- South Montgomery Street from West Santa Clara Street to West San Fernando Street;
- Cahill Street from West Santa Clara Street to West San Fernando Street;
- South Autumn Street from West Santa Clara Street to West San Fernando Street;
- West San Fernando Street from South Montgomery Street to Delmas Avenue;
- Bird Avenue from West San Carlos Street to Auzerais Avenue; and
- Bird Avenue from Auzerais Avenue to Virginia Street

These segments were then assessed to determine whether the presence of other noise sources, such as rail activity, would render these increases from traffic alone unnoticeable, or whether sensitive receptors are not present along these roadways to be affected by these increases.

Each of these locations was examined to determine whether it includes existing sensitive receptors, or whether there are other factors relevant to identifying whether exceedances would be potential significant impacts.

Currently, no sensitive land uses are located along three of the nine roadway segments identified above that would be affected by predicted noise level increases: along Cahill Street, along West Santa Clara Street from Stockton Avenue to Delmas Avenue, and along Bird Avenue from Auzerais Avenue to Virginia Street (south of the project site). Therefore, these increases would not be considered significant roadway noise impacts. There is one sensitive receptor along South

Montgomery Street, Templo La Hermosa, but this receptor is planning to relocate and would not be affected by this predicted increase.[8] There are two sensitive receptors along South Autumn Street from West Santa Clara Street to West San Fernando Street that would be demolished as part of the proposed project. Therefore, noise increases along this roadway segment would not be considered a significant roadway noise impact.

[8] The project applicant has purchased the church building, and the congregation plans to relocate its church to North San José.

TABLE 10
TRAFFIC NOISE INCREASES ALONG ROADS IN THE PROJECT VICINITY

Roadway Segment	Existing	Applicable Increase Threshold (dB)	Existing plus Full Buildout of Project	dBA Difference	Significant Increase?
Weekday Peak-Hour Noise Levels					
W. Julian St. from Stockton Ave. to The Alameda	63.1	3	63.8	0.7	No
W. Julian St. from N. Montgomery St. to Market St.	63.1	3	64.8	1.7	No
N. Autumn St. from W. Julian St. to St. John St.	53.2	5	58.8	5.6	**Yes**
N. Montgomery St. from W. Julian St. to St. John St.	NA	5	46.0	NA[e]	No
Stockton Ave. from W. Julian St. to Lenzen Ave.	54.3	5	57.1	2.8	No
Stockton Ave. from W. Julian St. to The Alameda	60.6	3	64.1	3.5	No[b]
The Alameda from Stockton Ave. to Sunol St.	60.3	3	60.6	0.3	No
W. Santa Clara St. from Stockton Ave. to Delmas Ave.	63.3	3	67.5	4.2	No[c]
S. Montgomery St. from W. Santa Clara St. to W. San Fernando St.	54.0	5	62.7	8.7	No[d]
Cahill St. from W. Santa Clara St. to W. San Fernando St.	37.4	5	53.1	15.7	No[c]
S. Autumn St. from W. Santa Clara St. to W. San Fernando St.	49.5	5	56.6	7.1	No[d]
W. San Fernando St. from S. Montgomery St. to Delmas Ave.	58.3	5	66.6	8.3	**Yes**
Park Ave. from S. Montgomery St. to Sunol St.	58.8	5	63.0	4.2	No
Park Ave. from S. Montgomery St. to S. Delmas Ave.	61.9	3	64.3	2.4	No
W. San Carlos St. from S. Montgomery St. to Sunol St.	58.8	3	59.1	0.3	No
W. San Carlos St. from S. Montgomery St. to S. Delmas Ave.	56.5	5	57.9	1.4	No
Auzerais Ave. from Bird Ave. to Sunol St.	50.7	5	50.5	-0.2[a]	No
Auzerais Ave. from Bird Ave. to Delmas Ave.	56.9	5	58.3	1.4	No
Bird Ave. from W. San Carlos St. to Auzerais Ave.	65.8	3	71.3	5.5	**Yes**
Bird Ave. from Auzerais Ave. to Virginia St.	67.0	3	71.9	4.9	No[c]

NOTES:

dB = decibels; dBA = A-weighted decibels; NA = not applicable

[a] Negative values indicate a decrease in roadway noise at these locations that results when traffic distribution changes reduce future traffic volumes compared to the existing conditions, as predicted in the transportation analysis.

[b] The impact along this segment would be less than significant because, as explained below, existing noise from train operations at Diridon Station would reduce the realized increase to less than 1.0 dBA.

[c] There are no existing noise-sensitive land uses along these roadway segments; thus, the impact would be less than significant.

[d] The noise-sensitive land use(s) along this segment would be relocated or demolished.

[e] The traffic model shows no meaningful existing traffic volumes on this segment. Resultant noise levels with the project are well below the normally acceptable exterior noise level for residential uses. Consequently, there is no resultant traffic noise impact along this segment.

SOURCES: Traffic data compiled by Fehr & Peers in 2019 and 2020, and modeling performed by Environmental Science Associates in 2020.

The largest increase in roadway noise would occur along Cahill Street between West Santa Clara Street and West San Fernando Street because existing volumes on Cahill Street are relatively low compared to forecasted volumes. Although the project proposes residential uses on Block C1, west of the northerly extension of Cahill Street (but north of the segment in question), these future receptors would not experience a noise increase relative to existing conditions because the receptors are not currently present. Moreover, Block C1 is also adjacent to the Caltrain tracks, meaning that traffic noise would make a relatively minimal contribution to overall noise levels.

The predicted noise levels presented in Table 10 reflect the contribution from vehicle traffic on the given roadway only. On two of the nine roadway segments identified above, the substantial contribution of existing non-roadway sources would render the predicted increase in roadway noise less than significant. Specifically, receptors located near the UPRR/Caltrain tracks and Diridon Station (e.g., on Stockton Avenue) would not experience the predicted noise increase because existing noise levels are elevated beyond the roadway contribution, given the presence of railroad operations. Similarly, the northernmost receptors located near SR 87 (e.g., existing residences on West San Fernando Street) would also not fully experience the predicted noise increase because existing noise levels are elevated by the presence of freeway traffic.

The only receptor on the segment along Stockton Avenue from West Julian Street to The Alameda is the newly constructed Vespaio apartment and commercial building adjacent to the UPRR/Caltrain tracks, where the existing 24-hour average noise levels at location LT-B were 70 dBA. In addition, given their recent construction, these residential units were required to conform with Title 24 noise insulation standards. Because the existing noise levels are elevated by the presence of railroad activity, the increase in traffic noise along Stockton Avenue over the monitored noise levels would be only approximately 0.6 dBA, rather than the 3.3 dBA predicted by the model that considers traffic contributions alone. Consequently, the roadway noise impact along this particular roadway would be less than significant.

Single-family residences along West San Fernando Street from South Montgomery Street to Delmas Avenue would experience a significant impact from roadway noise increases, although those residences east of Delmas Avenue would not experience the increase because of the contribution to existing noise levels from existing traffic on the elevated SR 87.

Despite the considerations described here, the impact of traffic noise level increases along three of the nine preliminarily identified roadway segments—along North Autumn Street, some portions of West San Fernando Street, and Bird Avenue—would be potentially significant.

A mitigation measure implementing a Transportation Demand Management Program is identified in the analysis of air quality impacts which is predicted to reduce the project's peak-hour contributions by at least 24 percent. **Table 11** presents the predicted roadside noise levels for full buildout of the project's mixed uses during the weekday peak commute hour assuming a 24 percent reduction from the air quality mitigation measures implementing the Transportation Demand Management Program. Taking these reduced contributions into account, the impact of noise level increases along these three roadways would still remain potentially significant.

TABLE 11
TRAFFIC NOISE INCREASES ALONG ROADS IN THE PROJECT VICINITY WITH TRANSPORTATION DEMAND MANAGEMENT MITIGATION MEASURES

Roadway Segment	Existing	Applicable Increase Threshold (dB)	Existing plus Full Buildout of Project with TDM	dBA Difference	Significant Increase?
Weekday Peak-Hour Noise Levels					
W. Julian St. from Stockton Ave. to The Alameda	63.1	3	63.6	0.5	No
W. Julian St. from N. Montgomery St. to Market St.	63.1	3	64.9	1.8	No
N. Autumn St. from W. Julian St. to St. John St.	53.2	5	58.8	5.6	**Yes**
N. Montgomery St. from W. Julian St. to St. John St.	NA	5	44.8	NA[e]	No
Stockton Ave. from W. Julian St. to Lenzen Ave.	54.3	5	56.4	2.1	No
Stockton Ave. from W. Julian St. to The Alameda	60.6	3	64.2	3.6	No[b]
The Alameda from Stockton Ave. to Sunol St.	60.3	3	60.4	0.1	No
W. Santa Clara St. from Stockton Ave. to Delmas Ave.	63.3	3	64.6	1.3	No
S. Montgomery St. from W. Santa Clara St. to W. San Fernando St.	54.0	5	61.6	7.6	No[d]
Cahill St. from W. Santa Clara St. to W. San Fernando St.	37.4	5	51.9	14.5	No[c]
S. Autumn St. from W. Santa Clara St. to W. San Fernando St.	49.5	5	55.9	6.4	No[d]
W. San Fernando St. from S. Montgomery St. to Delmas Ave.	58.3	5	65.5	7.2	**Yes**
Park Ave. from S. Montgomery St. to Sunol St.	58.8	5	62.3	3.5	No
Park Ave. from S. Montgomery St. to S. Delmas Ave.	61.9	3	63.7	1.8	No
W. San Carlos St. from S. Montgomery St. to Sunol St.	58.8	3	58.9	0.1	No
W. San Carlos St. from S. Montgomery St. to S. Delmas Ave.	56.5	5	57.6	1.1	No
Auzerais Ave. from Bird Ave. to Sunol St.	50.7	5	50.5	-0.2[a]	No
Auzerais Ave. from Bird Ave. to Delmas Ave.	56.9	5	57.9	1.0	No
Bird Ave. from W. San Carlos St. to Auzerais Ave.	65.8	3	70.4	4.6	**Yes**
Bird Ave. from Auzerais Ave. to Virginia St.	67.0	3	69.0	2.0	No

NOTES:

dB = decibels; dBA = A-weighted decibels; NA = not applicable; TDM = transportation demand management

[a] Negative values indicate a decrease in roadway noise at these locations that results when traffic distribution changes reduce future traffic volumes compared to existing conditions, as predicted in the transportation analysis.

[b] The impact along this segment would be less than significant because, as explained below, existing noise from train operations at Diridon Station would reduce the realized increase to less than 1.0 dBA.

[c] There are no existing noise-sensitive land uses along these roadway segments; thus, the impact would be less than significant.

[d] The noise-sensitive land use(s) along this segment would be relocated or demolished.

[e] The traffic model shows no meaningful existing traffic volumes on this segment. Resultant noise levels with the project are well below the normally acceptable exterior noise level for residential uses. Consequently, there is no resultant traffic noise impact along this segment.

SOURCES: Traffic data compiled by Fehr & Peers in 2019 and 2020, and modeling performed by Environmental Science Associates in 2020.

A number of options are available to reduce noise from project-generated traffic, depending on the specific circumstances. For example, in some situations where private outdoor-use areas, such as rear yards, are located adjacent to the roadway, new or larger noise barriers can be constructed to provide the additional necessary noise attenuation. Typically, increasing the height of an existing barrier results in approximately 1 dBA of attenuation per 1 foot of additional barrier height. However, designing and installing such noise barriers may not be appropriate in an urban setting such as Downtown San José. The barriers would be appropriate only in cases where uses back up to a roadway and egress points do not exist, because barriers are of negligible effectiveness if they require openings for driveway ingress and egress; they would also require the consent and cooperation of off-site property owners.

Existing residences along affected roadways could also be provided with sound insulation treatments where the projected increase in traffic noise would cause interior noise levels inside the affected residential units to exceed 45 dBA DNL. Treatments for the homes may include replacing the existing windows and doors with sound-rated windows and doors and providing a suitable form of forced-air mechanical ventilation to allow the occupants the option of controlling noise by closing their windows.

Mitigation Measure NO-1b identifies measures to reduce traffic noise levels at affected properties along two of the roadway segments where the project would result in significant traffic noise impacts. Measures would not be effective on the segment of N. Autumn Street from W. Julian Street to St. John Street for the following reasons:

- Existing residential receptors on Autumn Street would require driveway egress, and therefore, barriers would not be feasible mitigation.
- Assuming a 15 dBA reduction from standard building construction with open windows (EPA, 1974), interior noise levels at these receptors would be below 45 DNL and sound insulation treatments for these receptors would not be warranted.

In addition, a future realignment of North Autumn Street, planned by the Valley Transportation Authority as part of the Valley Transportation Plan 2040, would relocate existing and future increased traffic volumes away from these receptors, potentially obviating the need for mitigation in the long term.

Mitigation Measure NO-1b includes site-specific measures for affected segments of West San Fernando Street and Bird Avenue. On West San Fernando Street from South Montgomery Street to Delmas Avenue, there are several single-family residences, many of which are more than 500 feet from SR 87, at which distance highway traffic would not contribute noise that would mask the predicted noise level increase at these receptors. Assuming a 15 dBA reduction from standard building construction with open windows,[9] interior noise levels at these West San Fernando Street receptors could still exceed 45 dBA DNL. Mitigation Measure NO-1b would require the project applicant to contact the property owners to seek the permission and access necessary to implement

[9] U.S. Environmental Protection Agency (EPA), *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, March 1974. Available at https://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF. Accessed March 14, 2019.

sound transmission reduction remedies, should access be granted. However, because access cannot be guaranteed, the effectiveness of this measure cannot be assured.

The same measures would reduce impacts on residents of older single-family homes along Auzerais Avenue that would be affected by traffic noise increases along Bird Avenue from West San Carlos Street to Auzerais Avenue. The newer condominium complex on Bird Avenue at West San Carlos Street would not require mitigation because it has closed windows and no balconies and are of recent construction, and so was constructed to Title 24 noise insulation standards applicable to multifamily dwellings.

Mitigation Measure NO-1b: Traffic Noise Impact Reduction

Prior to the issuance of any building permits, the project applicant shall implement the following measures to reduce roadside noise impacts at the following roadway segments:

- *West San Fernando Street from South Montgomery Street to Delmas Avenue*. Prior to the issuance of any building permits are issued for Phase 1 construction on this block, the project applicant for the construction work proposed shall prepare and submit to the Director of Panning, Building and Code Enforcement, or the Director's designee, a site-specific acoustical study for review and approval. Upon approval of the site-specific acoustical study, the project applicant shall directly contact property owners of single-family residences to implement, with the owners' consent, reasonable sound insulation treatments, such as replacing the existing windows and doors with sound-rated windows and doors and providing a suitable form of forced-air mechanical ventilation, that could reduce indoor noise levels up to 45 dBA DNL, as warranted by the study.
- *Bird Avenue from West San Carlos Street to Auzerais Avenue*. Prior to the issuance of any building permits for Phase 1 construction on this block, the project applicant for the construction work proposed shall prepare and submit to the Director of Planning, Building and Code Enforcement, or the Director's designee, a site-specific acoustical study for review and approval. Upon approval of the site-specific acoustical study, the project applicant shall directly contact the property owners of single-family homes on Auzerais Avenue, within 200 feet of Bird Avenue, to implement, with the owners' consent, reasonable sound insulation treatments, such as replacing the existing windows and doors with sound-rated windows and doors and providing a suitable form of forced-air mechanical ventilation, that could reduce indoor noise levels up to 45 dBA DNL, as warranted by the study.

Construction Noise

Construction Impacts on Existing Nearby Off-Site Receptors

Construction of the project's proposed buildings, street network changes, and infrastructure would be sequenced over three primary phases. Construction would begin in 2021 and is conservatively assumed to continue through 2031. The duration of each phase would vary, with the end of one phase and the start of the subsequent phase potentially overlapping one another. Actual phased implementation could be constrained by external factors such as construction

staging for the BART Downtown extension, and thus could extend over a longer period, as described below. The development schedule could also be affected by market forces.

The specific types of construction work would also vary by phase, but would generally consist of the following sequence for each of the three phases:

1. Demolition and site clearance;
2. Excavation and soils removal (and remediation, as needed);
3. Foundation and/or basement level/garage work; utilities and sub-surface infrastructure;
4. Vertical construction;
5. Surface street/right-of-way work; and
6. Streetscape and open space improvements.

Construction, although typically temporary, short-term and/or intermittent, can be a substantial source of noise. Construction noise is of greatest concern where it takes place near noise-sensitive land uses, or occurs at night and/or in early morning hours; however, it can also affect commercial uses and other receptors. Local governments typically regulate noise associated with construction equipment and activities by enforcing noise ordinance standards, implementing General Plan policies, and/or imposing conditions of approval for building or grading permits. The following analysis addresses potential construction impacts on off-site receptors with respect to standards established in applicable noise ordinances and General Plan policies. Noise-sensitive land uses proposed by the project and occupied before construction of Phase 2 and Phase 3 may also be considered potentially affected uses.

Major noise-generating construction activities associated with the project would include demolition of existing pavement and structures, site grading and excavation, installation of utilities, the construction of building foundations, cores, and shells, paving, and landscaping. The highest noise levels would be generated during the demolition of existing structures when impact tools are used (e.g., jackhammers, hoe rams) and during construction of building foundations when impact pile driving is required to support the structure. Site grading and excavation activities would also generate high noise levels, as these phases often require the simultaneous use of multiple pieces of heavy equipment such as dozers, excavators, scrapers, and loaders. Vertical construction would involve the operation of cranes, man lifts, gradall/forklifts, and pneumatic hand tools. Lower noise levels result from building construction activities when these activities move indoors and less heavy equipment is required to complete the tasks. Construction equipment would typically include, but would not be limited to, earth-moving equipment and trucks, pile driving rigs, mobile cranes, compressors, pumps, generators, paving equipment, and pneumatic, hydraulic, and electric tools.

Table 12 shows typical noise levels associated with various types of construction equipment, including pile drivers, which may be required to support some structures.

TABLE 12
TYPICAL MAXIMUM NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level (dBA, L_{max} at 50 feet)
Backhoe	78
Excavator	81
Compactor	83
Scraper	84
Air Compressor	78
Pneumatic Tools	85
Pumps	77
Dozer	82
Crane	81
Grader	85
Paver	77
Roller	80
Front-End Loader	79
Truck	76
Concrete Crusher	79
Drill Rig	85
Impact and Vibratory Pile Drivers	101

NOTES:

dBA = A-weighted decibels; L_{max} = maximum, instantaneous noise level experienced during a given period of time
These are maximum field measured values at 50 feet as reported from multiple samples.

SOURCE: Federal Highway Administration, *Roadway Construction Noise Model User Guide*, 2006.

The City of San José does not establish quantitative noise limits for demolition or construction activities occurring in the city. According to the San José Municipal Code, the legal hours of construction within 500 feet of a residential unit are limited to the hours of 7 a.m. to 7 p.m. on Monday through Friday.

The potential short-term noise impacts associated with construction facilitated by the proposed project is addressed by General Plan Policy EC-1.7, which states that 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.

Based on the construction timelines for the three project phases, the proximity of sensitive receptors as indicated in Table 3.10-4, the potential for occupied residences constructed during earlier construction phases to be adjacent or close to later phase construction, and the standard provided by General Plan Policy EC-1, the impact of project construction noise would be potentially significant, and would therefore warrant implementing mitigation measures to reduce and restrict construction noise levels.

In addition, some project elements may require nighttime concrete pours or other nighttime work to achieve satisfactory results or avoid traffic impacts, which could conflict with the City ordinance limiting the hours and days allowed for construction work, where such work occurs within 500 feet of a residence or 200 feet of a commercial use. Such construction activities would be subject to review, permitting, and approval by the Director of Planning, Building and Code Enforcement, or the Director's designee. Therefore, construction noise impacts would be potentially significant with respect to exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan, specific plan, or other land use plan.

Mitigation Measure NO-1c: Master Construction Noise Reduction Plan

Prior to the issuance of the first building permit for new construction within the project site, the project applicant shall prepare a Master Construction Noise Reduction Plan, to be implemented as development occurs throughout the project site to address demolition and construction of buildings within 500 feet of residential uses, or within 200 feet of commercial or office uses. The plan shall be submitted to the Director of Planning, Building and Code Enforcement, or the Director's designee, for review and approval, and implementation of the identified measures shall be required as a condition of each permit. This Master Construction Noise Reduction Plan shall include, at a minimum, the following noise reduction measures:

1. **Noise Monitoring:** The Master Construction Noise Reduction Plan shall include a requirement for noise monitoring of construction activity throughout the duration of project construction, at times and locations determined appropriate by the qualified consultant and approved by the Director of Planning, Building and Code Enforcement, or the Director's designee.
2. **Schedule:** Loud activities such as rock breaking and pile driving shall occur only between 8 a.m. and 4 p.m., every day (with pile driving and rock breaking to start no earlier than 9 a.m. on weekends). Similarly, other activities with the potential to create extreme noise levels exceeding 90 dBA shall be avoided where possible. Where such activities cannot be avoided, they shall also occur only between 8 a.m. and 4 p.m. Any proposed nighttime construction activities, such as nighttime concrete pours or other nighttime work necessary to achieve satisfactory results or to avoid traffic impacts, shall undergo review, permitting, and approval by the Director of Planning, Building and Code Enforcement, or the Director's designee.
3. **Site Perimeter Barrier:** To reduce noise levels for work occurring adjacent to residences, schools, or other noise-sensitive land uses, a noise barrier(s) shall be constructed on the edge of the work site facing the receptor(s). Barriers shall be constructed either with two layers of 0.5-inch-thick plywood (joints staggered), and K-rail or other support, or with a limp mass barrier material weighing 2 pounds per square foot. If commercial barriers are employed, such barriers shall be constructed of materials with a Sound Transmission Class rating of 25 or greater.
4. **Stationary-Source Equipment Placement:** Stationary noise sources, such as generators and air compressors, shall be located as far from adjacent properties as possible. These noise sources shall be muffled and enclosed within temporary sheds, shall incorporate insulation barriers, or shall use other measures as determined by the Director of Planning, Building, and Code Enforcement, or the Director's designee, to provide equivalent noise reduction.

5. **Stationary-Source Equipment Local Barriers:** For stationary equipment, such as generators and air compressors, that will operate for more than one week within 500 feet of a noise-sensitive land use, the project contractor shall provide additional localized barriers around such stationary equipment that break the line of sight to neighboring properties.
6. **Temporary Power:** The project applicant shall use temporary power poles instead of generators, where feasible.
7. **Construction Equipment:** Exhaust mufflers shall be provided on pneumatic tools when in operation for more than one week within 500 feet of a noise-sensitive land use. All equipment shall be properly maintained.
8. **Truck Traffic:** The project applicant shall restrict individual truck idling to no more than two consecutive minutes per trip end. Trucks shall load and unload materials in the construction areas, rather than idling on local streets. If truck staging is required, the staging area shall be located along major roadways with higher traffic noise levels or away from the noise-sensitive receivers, where such locations are available.
9. **Methods:** The construction contractor(s) shall consider means to reduce the use of heavy impact tools, such as pile driving, and shall locate these activities away from the property line, as practicable. Alternative methods of pile installation, including drilling, could be employed if noise levels are found to be excessive. Piles could be pre-drilled, as practicable, and a wood block placed between the hammer and pile to reduce metal-to-metal contact noise and "ringing" of the pile.
10. **Noise Complaint Liaison:** A noise complaint liaison shall be identified to field complaints regarding construction noise and interface with the project construction team. Contact information shall be distributed to nearby noise-sensitive receivers. Signs that include contact information shall be posted at the construction site.
11. **Notification and Confirmation:** Businesses and residents within 500 feet shall be notified by certified mail at least one month before the start of extreme noise-generating activities (to be defined in the Construction Noise Reduction Plan). The notification shall include, at a minimum, the estimated duration of the activity, construction hours, and contact information.
12. **Nighttime Construction:** If monitoring confirms that nighttime construction activities substantially exceed the ambient noise level (to be defined for receptors near each nighttime construction area in the site-wide Master Construction Noise Reduction Plan) and complaints occur regularly (generally considered to be two or more per week), additional methods shall be implemented, such as installing additional storm windows in specific residences and/or constructing additional local barriers. The specific approach shall be refined as the construction activities and noise levels are refined.
13. **Complaint Protocol:** Protocols shall be implemented for receiving, responding to, and tracking received complaints. A noise complaint liaison shall be designated by the applicant and shall be responsible for responding to any local complaints about construction noise. The community liaison will determine the cause of the noise complaint and require that measures to correct the problem be implemented. Signage that includes the community liaison's telephone number

shall be posted at the construction site and the liaison's contact information shall be included in the notice sent to neighbors regarding the construction schedule.

Impact 2: Would the project expose people to or generate excessive groundborne vibration or groundborne noise levels during construction or operation?

This analysis addresses vibration impacts generated by construction activities at existing off-site buildings and at buildings constructed during the early phases of construction. Equipment or activities that typically generate continuous vibration include but are not limited to: excavation equipment; impact pile drivers; static compaction equipment; vibratory pile drivers; pile-extraction equipment; tunnel boring machines; and vibratory compaction equipment.

General Plan Policy EC-2.3 requires new development to minimize impacts of continuous vibration on adjacent uses during demolition and construction. For sensitive historic structures, including ruins and ancient monuments or buildings that are documented to be structurally weakened, a continuous vibration limit of 0.08 in/sec PPV is the standard applied to minimize the potential for cosmetic damage to a building. A continuous vibration limit of 0.20 in/sec PPV is applied to minimize the potential for cosmetic damage at buildings of normal conventional construction.

Policy EC-2.3 also discourages the 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 who verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

Proposed project plans are currently conceptual and the specific locations of pile driving activities, among other construction activities, are not yet known with certainty; therefore, a matrix of vibration from construction activities with distance to receptors was used to conduct the analysis. This matrix, presented in **Table 13**, uses dark-shaded areas to indicate the distances at which vibration levels would exceed the criterion for conventional structures. The lighter shaded areas indicate the distances at which the criterion for historic structures or buildings that are documented to be structurally weakened would be exceeded. As shown in Table 13, cosmetic damage could result from pile driving closer to a conventionally constructed building than 75 feet or closer to a historic building than 170 feet.

TABLE 13
VIBRATION LEVELS FOR CONSTRUCTION ACTIVITY

	Estimated Peak Particle Velocity (inches per second)				
Equipment	**At 25 Feet (reference)**	**At 50 Feet**	**At 75 Feet**	**At 100 Feet**	**At 170 Feet**
Jackhammer	0.035	0.016	0.010	0.008	0.004
Loaded Trucks	0.076	0.035	0.023	0.017	0.009
Caisson Drilling	0.089	0.041	0.027	0.019	0.011
Large Bulldozer	0.089	0.041	0.027	0.019	0.011
Vibratory Roller	0.20	0.100	0.063	0.046	0.025
Impact Pile Driver	0.65	0.303	0.194	0.141	0.079
Vibratory Pile Driver	0.65	0.303	0.194	0.141	0.079

NOTE:

Dark-shaded areas indicate distances where vibration levels would exceed the criterion for conventional structures. Lighter shaded areas indicate the distances at which the criterion for historic structure or buildings that are documented to be structurally weakened would be exceeded.

SOURCES: California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, September 2013.
Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.

In addition to the conventional construction methods included in Table 13, the project may use a tunnel boring machine to install the proposed utility corridor. If the new tunnel were bored through dense soil and rock, it could transmit vibration, although the vibration would diminish with distance, and would generally not be detectable at more than 160 feet (BPTunnel, 2016). Many variables affect the generation of vibration, including the size and depth of the tunnel boring machine and the soil types. Based on preliminary designs presented to the VTA board in April 2020, the top of a single-bore, stacked-track tunnel would be about 50 feet below grade. Also, tunnel boring machines typically advance at a rate of about 30 feet per day, which means that the vibration source would not affect any one location for an extended period of time.

The potential for damage to historic structures resulting from project-related construction vibration is addressed in the City's **SCA CR-3, Vibration Impacts to Adjacent and Nearby Historic Buildings**.

As shown in Table 13, proposed construction equipment could also result in damage to nearby non-historic structures if the activities occur within the distances specified. In addition, buildings constructed during earlier phases of the project may be exposed to construction-generated vibration during the later construction phases, which could also result in damage to nearby non-historic structures if the activities occur within the distances specified. This would be a **potentially significant** impact warranting mitigation measures. **Mitigation Measures NO-2a, Master Construction Vibration Avoidance and Reduction Plan**, and **NO-2b, Master Construction Vibration Avoidance from Compaction**, are recommended below to address this impact.

Mitigation Measure NO-2a: Master Construction Vibration Avoidance and Reduction Plan

Prior to the issuance of the first building permit for the project, the project applicant shall prepare a Master Construction Vibration Avoidance and Reduction Plan. The plan shall be implemented by the applicant as development occurs throughout the project site to address demolition and construction activity that involves impact or vibratory pile driving, or use of a tunnel boring machine within 75 feet of conventionally constructed buildings. The plan shall be submitted to the Director of Planning, Building and Code Enforcement, or the Director's designee, for review and approval before the issuance of the initial grading or building permit. The plan shall include, at a minimum, the following vibration avoidance and reduction measures:

- Neighbors within 500 feet of the construction site shall be notified of the construction schedule and that noticeable vibration levels could result from pile driving.
- Foundation pile holes shall be pre-drilled to minimize the number of impacts required to seat the pile.
- Piles shall be jetted or partially jetted into place to minimize the number of impacts required to seat the piles.
- A construction vibration monitoring plan shall be implemented to document conditions before, during, and after pile driving and use of the tunnel boring machine. All plan tasks shall be undertaken under the direction of a licensed Professional Structural Engineer in the State of California (and a Historic Architect if the affected structures are historic resources) and shall be in accordance with industry-accepted standard methods. The construction vibration monitoring plan should include the following tasks:
  - Identify the sensitivity of nearby structures to groundborne vibration. A vibration survey (generally described below) would need to be performed.
  - Perform a pre-construction photo survey, elevation survey, and crack monitoring survey for each of these structures. Surveys shall be performed before any pile driving activity, at regular intervals during pile driving, and after completion. The surveys shall include internal and external crack monitoring in structures, settlement, and distress, and shall document the condition of foundations, walls, and other structural elements in the interior and exterior of the structures.
  - Develop a vibration monitoring and construction contingency plan. The plan shall identify structures where monitoring is to be conducted, establish a vibration monitoring schedule, define structure-specific vibration limits, and address the need to conduct photo, elevation, and crack surveys to document conditions before and after pile driving.
  - Identify alternative construction methods for when vibration levels approach the limits stated in the General Plan, such as in Policy EC-2.3.
  - If vibration levels approach limits, suspend construction and implement alternative construction methods to either lower vibration levels or secure the affected structures.
  - Conduct a post-construction survey on structures where either monitoring has indicated high levels or complaints have been received regarding damage.

Where damage has resulted from construction activities, make appropriate repairs or provide compensation.

– Within one month after substantial completion of each phase identified in the project schedule, summarize the results of all vibration monitoring in a report and submit the report for review by the Director of Planning, Building and Code Enforcement or the Director's designee. The report shall describe measurement methods and equipment used, present calibration certificates, and include graphics as required to clearly identify the locations of vibration monitoring. An explanation of all events that exceeded vibration limits shall be included together with proper documentation supporting any such claims.

– Designate a person responsible for registering and investigating claims of excessive vibration. The contact information of such person shall be clearly posted on the construction site.

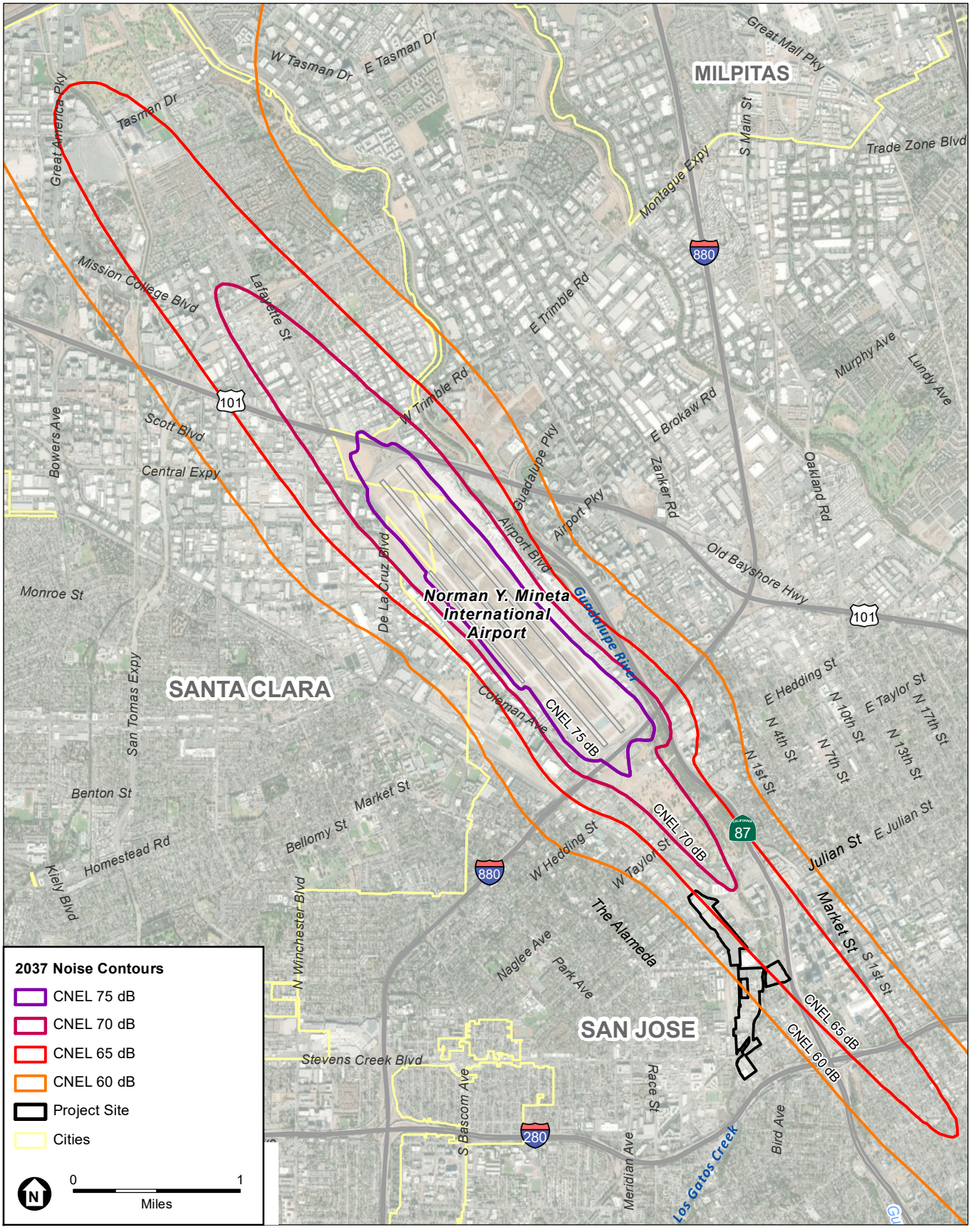
Mitigation Measure NO-2b: Master Construction Vibration Avoidance from Compaction

The project applicant shall prepare a Master Construction Vibration Avoidance and Reduction Plan for construction activities that will not involve impact or vibratory pile driving but will employ a vibratory roller as a method of compaction. The plan shall be implemented by the applicant as development occurs throughout the project site to address construction activity occurring within 25 feet of conventionally constructed buildings. The plan shall be submitted to the Director of Planning, Building and Code Enforcement, or the Director's designee, for review and approval before the issuance of the initial grading or building permit. The plan shall include, at a minimum, the following vibration avoidance and reduction measures:

- Contractors shall use non-vibratory excavator-mounted compaction wheels and small smooth drum rollers for final compaction of asphalt base and asphalt concrete if within 50 feet of a historic structure or 25 feet of a conventionally-constructed structure. If needed to meet compaction requirements, smaller vibratory rollers will be used to minimize vibration levels during repaving activities where needed to meet vibration standards.
- The use of vibratory rollers and clam shovel drops near sensitive areas shall be avoided.
- Construction methods shall be modified, or alternative construction methods shall be identified, and designed to reduce vibration levels below the limits.

Impact 3: Would the project expose people residing or working within the Airport Influence Area of Norman Y. Mineta San José International Airport Noise Impact Area to excessive aircraft noise levels?

As indicated on Figure 4, a portion of the project site is within the existing 65 CNEL noise contour of Norman Y. Mineta San José International Airport. In addition, noise levels expected from aircraft in 2027 are indicated by the 2027 CNEL contours noise exposure map in the CLUP and presented on **Figure 7**.



SOURCES: Esri, 2019, City of San Jose, 2019, DJP, 2020; ESA, 2020

Downtown West Mixed-Use Plan

Figure 7
Year 2027 Noise Contours
Norman Y. Mineta San José International Airport

The Santa Clara County ALUC evaluates the compatibility of new land uses in the vicinity of airports, and establishes 65 dBA CNEL as the maximum allowable noise level considered compatible with residential uses. CLUP Policy N-4 would prohibit residential or transient lodging within the 65 dB CNEL contour boundary unless it can be demonstrated that the resulting interior sound levels would be less than 45 dB CNEL and there are no outdoor patios or outdoor activity areas associated with the residential portion of a mixed use residential project or a multi-unit residential project. In addition, CLUP Policy N-5 would require all property owners within the Airport Influence Area (the 65 dB CNEL contour boundary) who rent or lease their property for residential use to disclose to the tenants that they are living in a high-noise area as part of their rental/lease agreement.

General Plan Policies EC-1.1, EC-1.9, and EC-1.11 provide guidance for new development proposed for areas susceptible to noise associated with the Airport. Policy EC-1.1 requires that the General Plan's compatibility standards be used to determine where noise levels in the community are acceptable or unacceptable, and require noise attenuation measures to achieve the "normally acceptable" noise level standards. This policy allows noise levels to exceed the "normally acceptable" noise level standard in the environs of the Airport. General Plan Policy EC-1.9 requires that studies be conducted to mitigate loud intermittent noise sources such as aircraft. Policy EC-1.11 requires that incompatible land uses be located outside of the 65 dBA CNEL noise contour. To be consistent with Policy N-4 of the CLUP and General Plan, future residential and transient lodging developments within the 65 dBA CNEL noise contour are required to prepare a detailed noise analysis and incorporate noise insulation features into project design.

The proposed project would construct up to 5,900 residential units and a 300-room hotel in addition to private corporate accommodations. As indicated in Figure 7, the 2027 65 dBA CNEL noise contour extends into the project site to encompass blocks designated for residential use or hotel use, including most of Block E3 and, potentially, the northeastern most corner of Block E2 (between West Santa Clara Street and West San Fernando Street, east of the Guadalupe River), along with the eastern edge of Block C1 and, potentially, the eastern edge of Block C3 (between West Julian and West St. John Streets). Proposed residential and development on these blocks would be located between the 65 and 70 dBA CNEL contours. These portions of the project site could have a significant noise exposure impact from Airport operations. Therefore, in addition to implementation of **SCA NO-2, Interior Noise Standard for Residential Development**, a mitigation measure is identified to address potential aircraft noise exposure impacts on interior noise for residential uses in this portion of the project site.

The California Building Code requires that walls and floor/ceiling assemblies separating dwelling units from each other, or from public or service areas, have a sound transmission class (STC)[10] of 50 dB for all common interior walls and floor/ceiling assemblies between adjacent dwelling units, or between dwelling units and adjacent public area for multifamily units and transient lodging. These requirements would apply to corporate accommodation uses because they would be considered transient lodging.

[10] The STC is used as a measure of a material's ability to reduce sound. The STC is equal to the number of decibels a sound is reduced as it passes through a material.

Implementing this identified mitigation measure would reduce impacts related to interior noise exposure near an airport to a less-than-significant level. However, because residential uses within the 65 dBA CNEL noise contour may have outdoor patios and other outdoor spaces, this would result in a land use that is inconsistent with Policy N-4 and the impact resulting from exposure to excessive noise levels as defined in the CLUP would remain significant and unavoidable.

It is noted that noise levels are anticipated to increase further in the future, based on the 2037 noise contours in the City's recently approved *Master Plan for Norman Y. Mineta San José International Airport*, and presented in **Figure 8**. These contours are anticipated to be adopted as part of a subsequent CLUP; however, the analysis relies upon the current CLUP, and the noise contours in Figure 8 are shown for informational purposes.

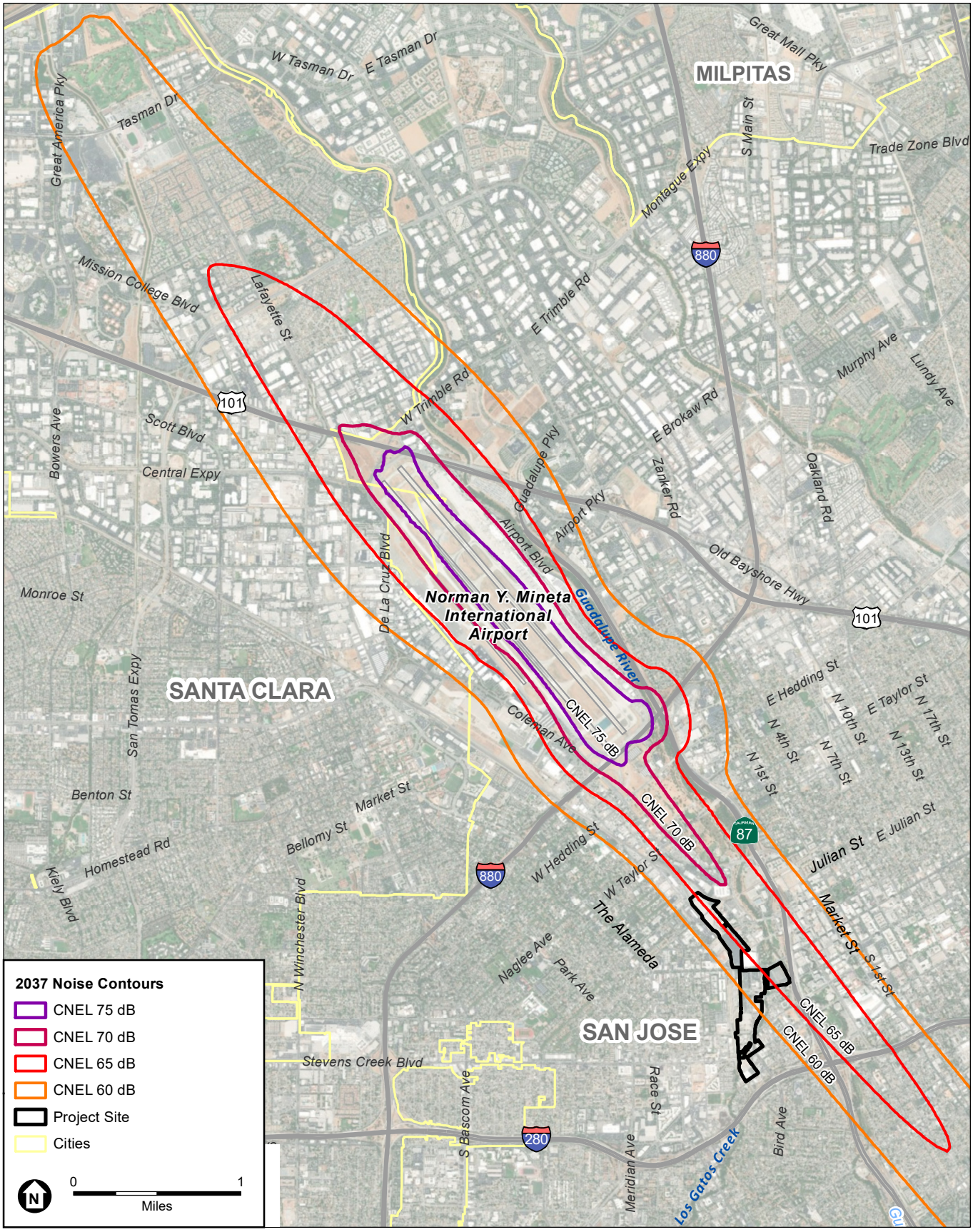
Mitigation Measure NO-3: Exposure to Airport Noise

Prior to approval of construction-related permits for residential and hotel structures on the easternmost blocks of the project site, which are located within the year 2027 65 dBA CNEL noise contour (including Blocks E2, E3, C1, and C3) each project applicant for a residential or hotel structure shall submit a noise reduction plan prepared by a qualified acoustical engineer for review and approval by the Director of Planning, Building and Code Enforcement or the Director's designee. The noise reduction plan shall contain noise reduction measures (e.g., sound-rated window, wall, and door assemblies) to achieve an acceptable interior noise level in accordance with the land use compatibility guidelines of the General Plan's Noise Element for any and all proposed residential land uses within the 65 CNEL noise contour for operations at Norman Y. Mineta San José International Airport. Exterior-to-interior noise reductions of 36 dBA have been demonstrated in modern urban residential uses,[11] while attenuation of up to 45 dBA CNEL has been achieved at Airport hotels. Noise-reduction specifications shall be included on all building plans, and the construction contractor shall implement the approved plans during construction such that interior noise levels shall not exceed 45 dBA CNEL at these residential land uses.

Impact 4 (Non-CEQA noise impacts of the environment on the project): Would the project expose people residing or working within the project area to excessive noise levels?

Development of the proposed project could expose future occupants of the project site to existing sources of noise. However, CEQA does not require that potential effects of the environment on the project be analyzed or mitigated. Nevertheless, an analysis of existing noise effects on the project is included to provide information to the public and decision-makers and to comply with General Plan policies.

[11] Environmental Science Associates, *301 Mission Street, Millennium Tower Perimeter Pile Upgrade Project, Preliminary Mitigated Negative Declaration and Initial Study*, November 2019, p. 102.



SOURCES: Esri, 2019, City of San Jose, 2019, DJP, 2020; ESA, 2020

Downtown West Mixed-Use Plan

Figure 8
Year 2037 Noise Contours for
Norman Y. Mineta San José International Airport

The City of San José uses land use compatibility guidelines to determine noise-affected uses (refer to Figure 6):

- For *residential uses and hotels*, noise environments of 60 DNL or less represent normally acceptable noise exposure, noise environments between 60 DNL and 75 DNL are considered conditionally acceptable, and noisier than 75 DNL is considered unacceptable.
- For *commercial uses*, noise environments of 70 DNL or less represent the normally acceptable noise exposure, noise environments between 70 DNL and 80 DNL are considered conditionally acceptable, and noisier than 80 DNL is considered unacceptable.
- For *neighborhood parks*, noise environments of 65 DNL or less represent the normally acceptable noise exposure, noise environments between 65 DNL and 80 DNL are considered conditionally acceptable, and noisier than 80 DNL is considered unacceptable.

"Conditionally acceptable" means that development of such uses may be permitted only after detailed analysis of the noise-reduction requirements is conducted and noise insulation features are included in the design to reduce noise to "normally acceptable" levels.

Noise Exposure of Residential, Corporate Accommodation, and Hotel Uses

Noise measurements were conducted at six locations representative of both existing and proposed residential land uses and are presented in Table 1. As shown in the table, existing noise levels for representative locations in the project area vary from 66 DNL to 76 DNL adjacent to the UPRR/Caltrain line at monitoring location LT-B. Based on monitoring data for monitoring location LT-B, approximately one-half mile north of Diridon Station at the northern extent of the project site, existing noise levels would be in the unacceptable category for residential uses if such uses were located within 50 feet of the railroad right-of-way, representing a non-CEQA significant impact. Because train speeds decrease closer to the station, this estimated distance and noise level represents the worst-case noise level with respect to rail operations. The southern extent of the project site is also approximately one-half mile from Diridon Station.

All other locations of proposed residential uses would be within the conditionally acceptable exposure category, which is generally common of urban environments close to transportation sources. SCA NO-2 would require the project applicant to prepare final design plans and incorporate building design and acoustical treatments to ensure compliance with state building codes and City noise standards. This would include a project-specific acoustical analysis to ensure that the design incorporates controls to reduce interior noise levels to 45 dBA DNL or lower within the residential units. Such design controls may include sound-rated windows and doors, sound-rated wall constructions, and acoustical caulking.

With implementation of the required SCA NO-2, the impact related to noise exposure of proposed residential, corporate accommodation, and hotel uses would be less than significant.

Impact 5 (Non-CEQA vibration impacts of the environment on the project): Would the project expose people residing or working within the project area to excessive groundborne vibration levels?

Development of the proposed project could expose future occupants of the project site to perceptible groundborne vibration when located near separate train lines that run northwest/ southeast and are used by Caltrain, ACE, Amtrak Capitol Corridor, and Union Pacific freight trains. However, CEQA does not require that potential effects of the environment on the project be analyzed or mitigated. Nevertheless, an analysis of the vibration-related effects on the project of existing train operations is included to provide information to the public and decision-makers and to comply with General Plan policies.

FTA's *Transit Noise and Vibration Impact Assessment* is specifically developed for determining significant noise and vibration impacts for transit projects involving rail or bus facilities, and includes noise impact criteria. **Table 14** presents vibration impact criteria.

TABLE 14
FEDERAL TRANSIT ADMINISTRATION GROUNDBORNE VIBRATION IMPACT CRITERIA

Land Use Category	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]
Category I: Buildings where vibration would interfere with interior operations	65 VdB[d]	65 VdB[d]	65 VdB[d]
Category II: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category III: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

NOTES:

VdB = vibration decibels

[a] More than 70 vibration events of the same source per day.

[b] Between 30 and 70 vibration events of the same source per day.

[c] Fewer than 30 vibration events of the same source per day.

[d] This criterion is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research should always require a detailed evaluation to define the acceptable vibration levels.

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

Because the project site is bounded by railroad tracks that service Caltrain, ACE, and Amtrak trains as well as freight train activity, project site development would expose people to vibration from rail operations. Currently, Caltrain operates 92 passenger trains every weekday on this track, which alone would represent frequent events with respect to the above FTA criteria.

FTA acknowledges that steel-wheeled/steel-rail vehicles can generate vibration impacts. FTA identifies screening buffer distances in its document, *Transit Noise and Vibration Impact Assessment*. Specifically, for commuter rail lines, buffer distances of 50 to 100 feet from the right-of-way are recommended for residences or any land uses where people sleep, such as hotels and hospitals, to avoid vibration impacts. Therefore, because the project proposes to develop land uses that could include residences within 100 feet of the Caltrain tracks, non-CEQA vibration exposure impacts could occur. The following condition of approval to address this non-CEQA impact would establish a vibration performance standard for residential developments exposed to vibration levels

in excess of 72 VdB from operations of the adjacent railroad tracks and would require preparation of detailed project-level vibration analyses to ensure that standard would be met.

Condition of Approval: Vibration Reduction Plan

All residential development with vibration exposure exceeding 72 VdB from operations on the Caltrain tracks shall be designed to reduce vibration exposure from Caltrain and other rail operations to 72 VdB or less for residential uses. Before any building permit is issued for structures intended for human occupancy within 100 feet of the mainline track, a qualified engineer shall complete a detailed vibration design study. The study shall confirm the ground vibration levels and frequency along the Caltrain tracks and determine the appropriate design to limit interior vibration levels to 72 VdB for residences, if necessary. A qualified acoustical engineer shall review the plans and provide documentation to the City of San José Department of Planning, Building and Code Enforcement to ensure that the recommended measures in the acoustical study have been incorporated into the project's design elements.

Specific measures to achieve the performance standards set forth above may include one or a combination of the following methods:

- Using vibration isolation techniques such as supporting the new building foundations on elastomer pads similar to bridge bearing pads.
- Installing vibration wave barriers. Wave barriers would consist of control trenches or sheet piles, which are analogous to controlling noise with a sound barrier. The applicability of this technique depends on the characteristics of the vibration waves.

Cumulative Impacts

Would construction activities for the proposed project combined with cumulative construction noise in the project area would result in a substantial temporary or periodic increase in ambient noise levels in excess of standards established in the General Plan or Noise Ordinance?

The geographic scope of analysis for cumulative noise and vibration construction impacts encompasses sensitive receptors within approximately 1,000 feet of the project site.[12] Beyond 1,000 feet, the contributions of noise from other projects would be greatly attenuated through both distance and intervening structures and their contribution would be expected to be minimal. Based on a list of reasonably foreseeable future projects in the vicinity that could contribute to cumulative construction noise, 15 of these projects are currently under construction and

[12] This screening threshold distance was developed based on stationary source noise attenuation equations (Caltrans, 2013) and the combined noise level generated by typical construction phases for a given project (assuming multiple pieces of equipment) at a distance of 50 feet. Using the attenuation equations, the maximum noise level of 89 A-weighted decibels (dBA) for both excavation and finishing would diminish to below 65 dBA at 1,000 feet. A receptor experiencing noise levels of 89 dBA from two adjacent construction sites would experience a cumulative noise level of 91 dBA (the acoustical sum of 89 dBA plus 89 dBA), which would still be below 65 dBA at 1,000 feet which, hence, is used as the geographic scope.

anticipated to have completed the noisiest phases of construction[13] before construction of the project, and thus, would not cumulatively combine with project construction, which would begin in 2021. Of the remaining 27 cumulative projects, seven of them would be within the 1,000-foot geographic scope of analysis:

- Montgomery 7, 565 Lorraine Avenue (54 residential units)—approximately 100 feet east of the project site.
- West San Carlos Supportive Housing, 750 West San Carlos Street (80 residential units)—approximately 400 feet west of the project site.
- McEvoy Residences, 280 McEvoy Street (358 residential units)—approximately 300 feet west of the project site.
- Josefa, 500 West San Carlos Street (19 residential units)—approximately 400 feet east of the project site.
- Stockton Hotel, 292 Stockton Avenue (19 hotel rooms)—approximately 120 feet west of the project site.
- Montgomery Phase 2, 543 Lorraine Avenue (69 residential units)—approximately 200 feet east of the project site.
- BART and high-speed rail service extension to San José—the Diridon BART station would be located within the project site, underground along the south side of West Santa Clara Street between South Autumn and Cahill Streets, across from the SAP Center.

The Stockton Hotel project would be closest to construction of Block C1 of the proposed project, which would occur in Phase 2 (between 2025 and 2032, at which time construction of the Stockton Hotel is likely to have been completed. In addition, SAP Center parking changes are described in Section 2.7.6, *Off-Site Transportation Improvements*, of the EIR and are analyzed as a likely component of development in the Diridon Station Area Plan (DSAP) area. Because the configuration and location of replacement parking is not known at this time, the analysis is provided at a programmatic or qualitative level, and replacement parking is considered a cumulative project. All of the cumulative residential and hotel projects would be subject to the City's SCA NO-1, which would reduce noise levels from construction activity associated with these cumulative projects.

The VTA BART Silicon Valley Phase II Project is a six-mile, four-station extension that will bring BART train service through Downtown San José to the city of Santa Clara. The Phase II Project is planned to include an approximately five-mile tunnel that would include three underground stations (Alum Rock/28th Street, Downtown San José, and Diridon), one ground-level station (Santa Clara), and general and maintenance facilities. VTA's BART Diridon Station would be located adjacent to the south side of West Santa Clara Street, between Autumn Street and Diridon Station. The proposed underground station and system facilities would be located beneath Santa Clara Street, between the SAP Center and the current Diridon Station parking lot.

[13] The earliest phases of a construction project, which may involve demolition, excavation, pile driving, and foundation work are generally associated with the highest noise levels. Later phases occurring once the building skin is in place are generally not a source of noise complaints.

Construction is anticipated for 2022 through 2028, and staging for this project would constrain the sequence of construction of the proposed project.

Although it would depend on the sequence of events, funding, and approvals, it is possible that construction activities for the BART extension, particularly the Diridon BART station, would occur simultaneously with the proposed project. As federally funded regional transit projects, BART extension projects are not subject to the ordinances of local jurisdictions, and construction of the BART station would not be subject to the City's SCAs for construction. Station construction would require pile driving and other extreme noise-generating construction activities. The Final Supplemental Environmental Impact Statement and Subsequent Environmental Impact Report for the Phase II Project found that constructing the Diridon BART station would have the potential to result in adverse construction noise effects. Implementing mitigation measures would reduce the noise impacts, but would not guarantee that the noise levels would be less than the FTA criteria; therefore, construction noise impacts for the Diridon BART station were identified as an adverse effect despite mitigation (Valley Transportation Agency, 2018).

In addition, the Diridon Integrated Station Concept may result in an expansion and redesign of the existing Diridon Station. Although there are no specifics or timeline for this conceptual project, it is proposed within a 2040 horizon year and, as such, may be expected to involve concurrent construction with later phases of the proposed project.

Although the proposed project would implement both the City's SCA NO-1, *Construction-Related Noise*, and Mitigation Measure NO-1c in combination with the identified significant construction noise impact for the BART Phase II Project, the project could contribute considerably to **significant** cumulative construction noise impacts in excess of standards established in the local general plan or noise ordinance—or in this case, the applicable standards of another agency (FTA).

Would operation of the proposed project when considered with other cumulative development would cause a substantial permanent increase in ambient noise levels in substantial temporary or periodic increase in ambient noise levels in excess of standards established in the general plan or noise ordinance?

Caltrain, the California High-Speed Rail Authority, and VTA are currently developing the Diridon Integrated Station Concept Plan, which envisions potential changes to track and platform configurations, station location, and station layout that will accommodate future increases in Caltrain operations resulting from electrification as well as future operation of high-speed rail. At the present time, the specifics of future operations are not known. While electrifying Caltrain would reduce the noise generation of individual pass-by events compared to that of existing diesel locomotives, the increase in headways potentially accommodated by electrification may offset some of the beneficial reductions in noise and vibration generation. At the present time, the cumulative non-CEQA noise and vibration impacts of future rail operations are speculative. The project-level analysis presented in Impact NO-4 and the requirements under SCA NO-2 would provide proposed noise sensitive receptors of the proposed project with measures to reduce noise compatibility impacts.

Operational noise impacts of the proposed project would result primarily from increased traffic on the local roadway network. Cumulative (year 2040) plus project traffic data were used to estimate cumulative operational noise increases. The 2040 traffic data inherently include City growth projections, including additional development as a result of the DSAP amendments.

The significance of cumulative impacts related to traffic noise levels is determined using a two-step process, as discussed in Section 3.10, *Noise*, under *Approach to Analysis*. If a cumulative impact is identified, the second step is to evaluate whether the contribution of the project to roadside noise levels would be cumulatively considerable.

The roadway segments analyzed and the results of the noise increases resulting from modeling are shown in **Table 15** for 2040 Cumulative plus weekday p.m.[14] full buildout of the project's mixed uses.

As shown in Table 15, although cumulative traffic noise impacts would occur along 10 of the roadways analyzed, the traffic noise associated with the proposed project would only represent a cumulatively considerable contribution to these cumulative impacts (i.e., there would be an increase of more than 1.5 dBA over the cumulative without project scenario) along four of them:

- West Julian Street from North Montgomery Street to Market Street,
- North Montgomery Street from West Julian Street to St. John Street,
- Stockton Street from West Julian Street to Lenzen Avenue, and
- West San Carlos Street from South Montgomery Street to Sunol Street.

The air quality mitigation measure implementing transportation demand management measures is predicted to reduce the cumulative plus project's peak-hour contributions by approximately 27 percent at build-out and following commencement of BART service to the area. **Table 16** presents the predicted roadside noise levels for full buildout of the project's mixed uses during the weekday peak commute hour assuming a 27 percent reduction from this mitigation measure. Taking these reduced contributions into account, noise level increases along three of the four roadways would still remain significant (the impact along West Julian Street from North Montgomery Street to Market Street would be reduced to less than significant). **Mitigation Measure NO-1b, Traffic Noise Impact Reduction**, was identified at the project level to address this potentially significant noise impact for affected segments of West San Fernando Street and Bird Avenue and would not address these three additional roadways that would be affected in the cumulative scenario.

There are existing, older (pre-1950) single-family residences along North Montgomery Street that appear not to have been retrofitted with acoustical windows. The existing multifamily residences along both Stockton and San Carlos Streets are of recent construction but have usable balconies where mitigating noise increases is not possible. Therefore, the proposed project's cumulative noise impact would be potentially significant.

[14] The peak hour was used to represent the maximum period of traffic generation and associated noise generated by the project.

TABLE 15
MODELED TRAFFIC NOISE LEVELS YEAR 2040 WITH WEEKDAY P.M. FULL BUILDOUT OF PROJECT MIXED USES

Roadway Segment	Existing	Applicable Increase Threshold (dB)	2040 plus Full Buildout of Project Mixed Uses	dBA Difference 2040 plus Full Buildout of Project Mixed Uses from Existing	Significant Cumulative Increase?	2040 No Project	dBA Difference 2040 plus Full Buildout of Project Mixed Uses from 2040 No Project	Cumulatively Considerable Project Increase[g]?
Weekday Peak-Hour Noise Levels								
W. Julian Street from Stockton Avenue to The Alameda	63.1	3	65.5	2.4	No	64.3	1.2	N/A
W. Julian Street from N. Montgomery Street to Market Street	63.1	3	67.1	**4.0**	**Yes**	64.7	**2.4**	**Yes**
N. Autumn Street from W. Julian Street to St. John Street	53.2	5	64.9	**11.7**	No[b]	64.1	0.8	N/A
N. Montgomery Street from W. Julian Street to St. John Street	NA[e]	5	63.5	NA	**Yes**	57.3	**6.2**	**Yes**
Stockton Avenue from W. Julian Street to Lenzen Avenue	54.3	5	63.5	**9.2**	**Yes**	61.1	**2.4**	**Yes**
Stockton Avenue from W. Julian Street to The Alameda	60.6	3	67.0	**6.4**	No[d]	65.5	1.5	N/A
The Alameda from Stockton Avenue to Sunol Street	60.3	3	67.7	**7.4**	**Yes**	67.2	0.5	No
W. Santa Clara Street from Stockton Avenue to Delmas Avenue	63.3	3	70.0	**6.7**	No[c]	68.8	1.2	N/A
S. Montgomery Street from W. Santa Clara Street to W. San Fernando Street	54.0	5	60.5	**6.5**	No[f]	58.1	2.4	N/A
Cahill Street from W. Santa Clara Street to W. San Fernando Street	37.4	5	62.2	**24.8**	No[c]	49.0	13.2	N/A
S. Autumn Street from W. Santa Clara Street to W. San Fernando Street	49.5	5	63.7	**14.2**	No[c]	62.7	1.0	N/A
W. San Fernando Street from S. Montgomery Street to Delmas Avenue	58.3	5	66.6	**8.3**	**Yes**	66.9	-0.3	No
Park Avenue from S. Montgomery Street to Sunol Street	58.8	5	64.3	**5.5**	**Yes**	65.3	-1.0	No

TABLE 15
MODELED TRAFFIC NOISE LEVELS YEAR 2040 WITH WEEKDAY P.M. FULL BUILDOUT OF PROJECT MIXED USES

Roadway Segment	Existing	Applicable Increase Threshold (dB)	2040 plus Full Buildout of Project Mixed Uses	dBA Difference 2040 plus Full Buildout of Project Mixed Uses from Existing	Significant Cumulative Increase?	2040 No Project	dBA Difference 2040 plus Full Buildout of Project Mixed Uses from 2040 No Project	Cumulatively Considerable Project Increase[g]?
Park Avenue from S. Montgomery Street to S. Delmas Avenue	61.9	3	64.4	2.5	No	64.4	0.0	N/A
W. San Carlos Street from S. Montgomery Street to Sunol Street	58.8	3	68.4	**9.6**	**Yes**	65.7	**2.7**	**Yes**
W. San Carlos Street from S. Montgomery Street to S. Delmas Avenue	56.5	5	66.5	**10.0**	**Yes**	65.7	0.8	No
Auzerais Avenue from Bird Avenue to Sunol Street	50.7	5	58.0	**7.3**	**Yes**	57.9	0.1	No
Auzerais Avenue from Bird Avenue to Delmas Avenue	56.9	5	60.1	3.2	No	59.9	0.2	N/A
Bird Avenue from W. San Carlos Street to Auzerais Avenue	65.8	3	72.1	**6.3**	**Yes**	71.1	1.0	No
Bird Avenue from Auzerais Avenue to Virginia Street	67.0	3	73.0	**6.0**	No[c]	72.0	1.0	N/A

NOTES:

dB = decibels; dBA = A-weighted decibels; N/A = The cumulative contribution test for the project is not applicable because there is no cumulative impact along this roadway.

[a] Negative values indicate a decrease in roadway noise at these locations that result from traffic distribution changes reducing future traffic volumes compared to the existing conditions, as predicted in the transportation analysis.

[b] North Autumn Street would be realigned to a more easterly location, so existing receptors along this roadway would not be affected by this predicted increase.

[c] There are no noise-sensitive land uses along these roadway segments; thus, the impact would be less than significant.

[d] The impact along this segment would be less than significant because, as explained above, existing noise from Caltrain and other rail operations would render the realized increase to less than 1.0 dBA.

[e] The traffic model shows no meaningful existing traffic volumes on this segment. Resultant cumulative noise levels with the project would be greater than the normally acceptable exterior noise level for residential uses. Consequently, there would be a cumulative traffic noise impact along this segment and the contribution of the project would be considerable (greater than 1.5 dBA).

[f] The noise-sensitive land use(s) along this segment would be relocated or demolished.

[g] As discussed in the *Approach to Analysis* section, a 1.5 dB increase is used as an indication of a cumulatively considerable contribution to a significant cumulative roadway noise impact.

SOURCE: Data compiled by Fehr & Peers in 2019 and Environmental Science Associates in 2020.

TABLE 16
MODELED TRAFFIC NOISE LEVELS YEAR 2040 WITH WEEKDAY P.M. FULL BUILDOUT OF PROJECT MIXED USES AND TRANSPORTATION DEMAND MANAGEMENT

Roadway Segment	Existing	Applicable Increase Threshold (dB)	2040 plus Full Buildout of Project Mixed Uses with TDM	dBA Difference 2040 plus Full Buildout of Project Mixed Uses from Existing	Significant Cumulative Increase?	2040 No Project	dBA Difference 2040 plus Full Buildout of Project Mixed Uses with TDM from 2040 No Project	Cumulatively Considerable Project Increase[g]?
Weekday Peak-Hour Noise Levels								
W. Julian Street from Stockton Avenue to The Alameda	63.1	3	65.3	2.2	No	64.3	1.0	N/A
W. Julian Street from N. Montgomery Street to Market Street	63.1	3	65.9	2.8	No	64.7	1.2	N/A
N. Autumn Street from W. Julian Street to St. John Street	53.2	5	64.6	**11.4**	No[b]	64.1	0.5	N/A
N. Montgomery Street from W. Julian Street to St. John Street	NA[e]	5	63.0	NA	**Yes**[e]	57.3	**5.7**	**Yes**
Stockton Avenue from W. Julian Street to Lenzen Avenue	54.3	5	63.1	**8.8**	**Yes**	61.1	**2.0**	**Yes**
Stockton Avenue from W. Julian Street to The Alameda	60.6	3	66.9	**6.3**	No[d]	65.5	1.4	N/A
The Alameda from Stockton Avenue to Sunol Street	60.3	3	67.5	**7.2**	**Yes**	67.2	0.3	No
W. Santa Clara Street from Stockton Avenue to Delmas Avenue	63.3	3	69.8	**6.5**	No[c]	68.8	1.0	N/A
S. Montgomery Street from W. Santa Clara Street to W. San Fernando Street	54.0	5	59.7	**5.7**	No[f]	58.1	1.6	N/A
Cahill Street from W. Santa Clara Street to W. San Fernando Street	37.4	5	61.8	**24.4**	No[c]	49.0	12.8	N/A
S. Autumn Street from W. Santa Clara Street to W. San Fernando Street	49.5	5	63.5	**14.0**	No[c]	62.7	0.8	N/A
W. San Fernando Street from S. Montgomery Street to Delmas Avenue	58.3	5	66.3	**8.0**	**Yes**	66.9	-0.6	No

TABLE 16
MODELED TRAFFIC NOISE LEVELS YEAR 2040 WITH WEEKDAY P.M. FULL BUILDOUT OF PROJECT MIXED USES AND TRANSPORTATION DEMAND MANAGEMENT

Roadway Segment	Existing	Applicable Increase Threshold (dB)	2040 plus Full Buildout of Project Mixed Uses with TDM	dBA Difference 2040 plus Full Buildout of Project Mixed Uses from Existing	Significant Cumulative Increase?	2040 No Project	dBA Difference 2040 plus Full Buildout of Project Mixed Uses with TDM from 2040 No Project	Cumulatively Considerable Project Increase[g]?
Park Avenue from S. Montgomery Street to Sunol Street	58.8	5	64.1	**5.3**	**Yes**	65.3	-1.2	No
Park Avenue from S. Montgomery Street to S. Delmas Avenue	61.9	3	64.3	2.4	No	64.4	-0.1	N/A
W. San Carlos Street from S. Montgomery Street to Sunol Street	58.8	3	67.7	**8.9**	**Yes**	65.7	**2.0**	**Yes**
W. San Carlos Street from S. Montgomery Street to S. Delmas Avenue	56.5	5	66.3	**9.8**	**Yes**	65.7	0.6	No
Auzerais Avenue from Bird Avenue to Sunol Street	50.7	5	57.6	**6.9**	**Yes**	57.9	-0.3	No
Auzerais Avenue from Bird Avenue to Delmas Avenue	56.9	5	60.2	3.3	No	59.9	0.3	N/A
Bird Avenue from W. San Carlos Street to Auzerais Avenue	65.8	3	72.0	**6.2**	**Yes**	71.1	0.9	No
Bird Avenue from Auzerais Avenue to Virginia Street	67.0	3	72.4	**5.4**	No[c]	72.0	0.4	N/A

NOTES:

dB = decibels; dBA = A-weighted decibels; N/A = The cumulative contribution test for the project is not applicable because there is no cumulative impact along this roadway; TDM = transportation demand management

[a] Negative values indicate a decrease in roadway noise at these locations that would result when traffic distribution changes reduce future traffic volumes compared to existing conditions, as predicted in the transportation analysis.

[b] North Autumn Street would be realigned to a more easterly location, so existing receptors along this roadway would not be affected by this predicted increase.

[c] There are no noise-sensitive land uses along these roadway segments; thus, the impact would be less than significant.

[d] The impact along this segment would be less than significant because, as explained above, existing noise from Caltrain and other rail operations would render the realized increase to less than 1.0 dBA.

[e] The traffic model shows no meaningful existing traffic volumes on this segment. Resultant cumulative noise levels with the project would be greater than the normally acceptable exterior noise level for residential uses. Consequently, there would be a cumulative traffic noise impact along this segment and the contribution of the project would be considerable (greater than 1.5 dBA).

[f] The noise-sensitive land use(s) along this segment would be relocated or demolished.

[g] As discussed in the *Approach to Analysis* section, a 1.5 dB increase is used as an indication of a cumulatively considerable contribution to a significant cumulative roadway noise impact.

SOURCE: Data compiled by Fehr & Peers in 2019 and Environmental Science Associates in 2020.

Mitigation Measure C-NO-2, Cumulative Traffic Noise Impact Reduction, is identified to reduce interior noise levels for the affected residences along North Montgomery Street to the extent feasible. Existing multifamily residences along Stockton Street and San Carlos Street have usable balconies where mitigating noise increases is not possible.

> **Mitigation Measure C-NO-2: Cumulative Traffic Noise Impact Reduction**
>
> Prior to the issuance of any building permits, the project applicant shall implement the following measures to reduce roadside noise impacts at the following roadway segment:
>
> - *North Montgomery Street from West Julian Street to St. John Street.* Prior to the issuance of any building permits for Phase 1 construction on this block, the project applicant shall prepare and submit to the Director of Planning, Building and Code Enforcement, or the Director's designee, a site-specific acoustical study for review and approval. Upon approval of the site-specific acoustical study, the project applicant shall directly contact property owners of single-family homes on this stretch of North Montgomery Street to implement, with the owners' consent, reasonable sound insulation treatments. Treatments may include replacing the existing windows and doors with sound-rated windows and doors and providing a suitable form of forced-air mechanical ventilation, which could reduce indoor noise levels up to 45 dBA DNL, as warranted by the study.

Would the proposed project would make a considerable contribution to exposure of people to excessive airport noise levels?

As explained in Impact NO-3, CLUP Policy N-4 prohibits residential or transient lodging within the 65 dBA CNEL contour boundary unless it can be demonstrated that the resulting interior sound levels would be less than 45 dBA CNEL and, in a mixed-use or multi-unit residential project, there are no residential-use outdoor patios or outdoor activity areas. Mitigation Measure NO-3 would ensure that interior noise levels comply with this requirement. However, because project residential uses within the 65 dBA CNEL noise contour may have outdoor patios and other outdoor spaces, the land use would be inconsistent with Policy N-4 and a **significant and unavoidable** impact.

This impact would result from the proposed project, affecting some future residential receptors on the project site. Areas outside of the project site are zoned for residential uses such that additional residential development could occur in the 65 dB CNEL contour, including the Market/Almaden, Washington/Guadalupe, Tamien, and Goodyear/Mastic neighborhoods to the southeast, and the Rosemary Gardens neighborhood as well as portions of the City of Santa Clara, from south of Montague Expressway to Tasman Drive, to the north. These neighborhoods have existing residential uses already within the 65 dB CNEL noise contour and new residential development there, should it occur, would likewise be subject to aircraft noise that could be in conflict with CLUP Policy N-4. Because the proposed project would also conflict with CLUP Policy N-4, the impact of the proposed project in combination with cumulative projects would likewise be significant and unavoidable.

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Appendix A
Noise Monitoring Data and Traffic Noise Level Calculations

Appendix A1
Traffic Noise Calculations

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Existing

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Distance from Roadway to 65 dBA	Distance from Roadway to 65 dBA
Calveno Peak				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT					
	from:	to:		%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	(m.)	(ft)
Julian	Sockton	Alameda	476	95	452.2	3	14.28	2	9.52	30	48	30	48	30	48	58.9	54.5	59.9	63.1	40	58.9	9.7	31.9
Julian	N. Montgomery	Market	476	95	452.3	3	14.28	2	9.52	30	48	30	48	30	48	58.9	54.5	59.9	63.1	40	58.9	9.7	31.9
Autumn	Julian	St John	67	95	63.318	3	2	2	1.33	25	40	25	40	25	40	48.1	44.8	50.6	53.2	40	49.0	1.0	3.3
N.Montgomery	Julian	St John	0	95	0	3	0	2	0	25	40	25	40	25	40	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0
Stockton	Julian	Lenzen	62.3	95	59.185	3	1.869	2	1.25	30	48	30	48	30	48	50.1	45.7	51.1	54.3	40	50.0	1.3	4.2
Stockton	Julian	Santa Clara	267	95	253.94	3	8.019	2	5.35	30	48	30	48	30	48	56.4	52.0	57.4	60.6	40	56.3	5.5	17.9
Santa Clara	Stockton	Race	187	95	177.75	3	5.613	2	3.74	35	56	35	56	35	56	56.8	51.5	56.5	60.3	40	56.0	5.1	16.6
Santa Clara	Stockton	Delmas	378	95	359.29	3	11.35	2	7.56	35	56	35	56	35	56	59.9	54.6	59.5	63.3	40	59.1	10.2	33.5
S Montgomery	Santa Clara	San Fernando	78.8	95	74.86	3	2.364	2	1.58	25	40	25	40	25	40	48.8	45.5	51.4	54.0	40	49.7	1.2	3.9
Cahill	Santa Clara	San Fernando	1.75	95	1.6625	3	0.053	2	0.04	25	40	25	40	25	40	32.3	29.0	34.8	37.4	40	33.2	0.0	0.1
S Autmn	Santa Clara	San Fernando	28.45	95	27.028	3	0.854	2	0.57	25	40	25	40	25	40	44.4	41.1	47.0	49.5	40	45.3	0.4	1.4
W San Fernando	Montgomery	Delmas	119.55	95	113.57	3	3.587	2	2.39	35	56	35	56	35	56	54.9	49.6	54.5	58.3	40	54.1	3.2	10.6
Park Ave	Montgomery	Sunol	177.55	95	168.67	3	5.327	2	3.55	30	48	30	48	30	48	54.7	50.3	55.6	58.8	40	54.6	3.6	11.9
Park Ave	Montgomery	Delmas	361.15	95	343.09	3	10.83	2	7.22	30	48	30	48	30	48	57.7	53.3	58.7	61.9	40	57.7	7.4	24.2
San Carlos	Montgomery	Sunol	133.9	95	127.21	3	4.017	2	2.68	35	56	35	56	35	56	55.4	50.1	55.0	58.8	40	54.6	3.6	11.9
San Carlos	Montgomery	Delmas	78.4	95	74.48	3	2.352	2	1.57	35	56	35	56	35	56	53.0	47.7	52.7	56.5	40	52.2	2.1	6.9
Auzerais	Bird	Sunol	37.05	95	35.198	3	1.112	2	0.74	25	40	25	40	25	40	45.6	42.2	48.1	50.7	40	46.4	0.6	1.8
Auzerais	Bird	Delmas	154.05	95	146.35	3	4.622	2	3.08	25	40	25	40	25	40	51.8	48.4	54.3	56.9	40	52.6	2.3	7.6
Bird	San Carlos	Auzerais	673.3	95	639.64	3	20.2	2	13.5	35	56	35	56	35	56	62.4	57.1	62.0	65.8	40	61.6	18.2	59.7
Bird	Auzerais	SR87	872.4	95	828.78	3	26.17	2	17.4	35	56	35	56	35	56	63.5	58.2	63.2	67.0	40	62.7	23.6	77.3

Assumptions: 5% ADT traffic data from Fehr & Peers

Existing + Project

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE %						VEHICLE SPEED						NOISE LEVEL (dBA)			CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Distance from Roadway to 65 dBA	Distance from Roadway to 65 dBA
Calveno Peak				Auto		MT		HT		Auto	k/h	MT	k/h	HT	k/h	Auto	MT	HT					
	from:			%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	(m.)	(ft)
Julian	Sockton	Alameda	559	95	531.1	3	16.77	2	11.2	30	48	30	48	30	48	59.6	55.2	60.6	63.8	40	59.6	11.4	37.4
Julian	N. Montgomery	Market	702	95	666.57	3	21.05	2	14	30	48	30	48	30	48	60.6	56.2	61.6	64.8	40	60.5	14.3	47.0
Autumn	Julian	St John	687	95	652.6	3	20.61	2	13.7	25	40	25	40	25	40	58.2	54.9	60.8	63.4	40	59.1	10.3	33.8
N.Montgomery	Julian	St John	12.5	95	11.875	3	0.375	2	0.25	25	40	25	40	25	40	40.8	37.5	43.4	46.0	40	41.7	0.2	0.6
Stockton	Julian	Lenzen	118	95	112.34	3	3.548	2	2.37	30	48	30	48	30	48	52.9	48.5	53.9	57.1	40	52.8	2.4	7.9
Stockton	Julian	Santa Clara	592	95	562.35	3	17.76	2	11.8	30	48	30	48	30	48	59.9	55.5	60.9	64.1	40	59.8	12.1	39.6
Santa Clara	Stockton	Race	204	95	193.33	3	6.105	2	4.07	35	56	35	56	35	56	57.2	51.9	56.8	60.6	40	56.4	5.5	18.0
Santa Clara	Stockton	Delmas	991	95	941.02	3	29.72	2	19.8	35	56	35	56	35	56	64.0	58.8	63.7	67.5	40	63.3	26.8	87.8
S Montgomery	Santa Clara	San Fernando	590.4	95	560.88	3	17.71	2	11.8	25	40	25	40	25	40	57.6	54.2	60.1	62.7	40	58.5	8.9	29.1
Cahill	Santa Clara	San Fernando	64.1	95	60.895	3	1.923	2	1.28	25	40	25	40	25	40	47.9	44.6	50.5	53.1	40	48.8	1.0	3.2
S Autmn	Santa Clara	San Fernando	143.05	95	135.9	3	4.292	2	2.86	25	40	25	40	25	40	51.4	48.1	54.0	56.6	40	52.3	2.1	7.0
W San Fernando	Montgomery	Delmas	796.25	95	756.44	3	23.89	2	15.9	35	56	35	56	35	56	63.1	57.8	62.8	66.6	40	62.3	21.5	70.6
Park Ave	Montgomery	Sunol	465.7	95	442.42	3	13.97	2	9.31	30	48	30	48	30	48	58.8	54.4	59.8	63.0	40	58.8	9.5	31.2
Park Ave	Montgomery	Delmas	622.9	95	591.76	3	18.69	2	12.5	30	48	30	48	30	48	60.1	55.7	61.1	64.3	40	60.0	12.7	41.7
San Carlos	Montgomery	Sunol	142.2	95	135.09	3	4.266	2	2.84	35	56	35	56	35	56	55.6	50.3	55.3	59.1	40	54.8	3.8	12.6
San Carlos	Montgomery	Delmas	109	95	103.55	3	3.27	2	2.18	35	56	35	56	35	56	54.5	49.2	54.1	57.9	40	53.7	2.9	9.7
Auzerais	Bird	Sunol	35.15	95	33.393	3	1.055	2	0.7	25	40	25	40	25	40	45.3	42.0	47.9	50.5	40	46.2	0.5	1.7
Auzerais	Bird	Delmas	214.85	95	204.11	3	6.446	2	4.3	25	40	25	40	25	40	53.2	49.8	55.7	58.3	40	54.1	3.2	10.6
Bird	San Carlos	Auzerais	2356.7	95	2238.9	3	70.7	2	47.1	35	56	35	56	35	56	67.8	62.5	67.5	71.3	40	67.0	63.7	208.9
Bird	Auzerais	SR87	2710.15	95	2574.6	3	81.3	2	54.2	35	56	35	56	35	56	68.4	63.1	68.1	71.9	40	67.6	73.2	240.2

Assumptions: 5% ADT traffic data from Fehr & Peers

Cumulative 2040 No Project

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Distance from Roadway to 65 dBA	Distance from Roadway to 65 dBA
Calveno Peak																							
	from:			%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	(m.)	(ft)
Julian	Sockton	Alameda	625	95	593.89	3	18.75	2	12.5	30	48	30	48	30	48	60.1	55.7	61.1	64.3	40	60.0	12.8	41.8
Julian	N. Montgomery	Market	679	95	644.81	3	20.36	2	13.6	30	48	30	48	30	48	60.5	56.1	61.5	64.7	40	60.4	13.8	45.4
Autumn	Julian	St John	809	95	768.98	3	24.28	2	16.2	25	40	25	40	25	40	59.0	55.6	61.5	64.1	40	59.8	12.1	39.8
N.Montgomery	Julian	St John	169.45	95	160.98	3	5.084	2	3.39	25	40	25	40	25	40	52.2	48.8	54.7	57.3	40	53.0	2.5	8.3
Stockton	Julian	Lenzen	302	95	286.47	3	9.047	2	6.03	30	48	30	48	30	48	57.0	52.6	57.9	61.1	40	56.9	6.2	20.2
Stockton	Julian	Santa Clara	823	95	781.42	3	24.68	2	16.5	30	48	30	48	30	48	61.3	56.9	62.3	65.5	40	61.2	16.8	55.1
Santa Clara	Stockton	Race	922	95	875.43	3	27.65	2	18.4	35	56	35	56	35	56	63.7	58.4	63.4	67.2	40	62.9	24.9	81.7
Santa Clara	Stockton	Delmas	1,347	95	1279.5	3	40.4	2	26.9	35	56	35	56	35	56	65.4	60.1	65.0	68.8	40	64.6	36.4	119.4
S Montgomery	Santa Clara	San Fernando	202.15	95	192.04	3	6.065	2	4.04	25	40	25	40	25	40	52.9	49.6	55.5	58.1	40	53.8	3.0	10.0
Cahill	Santa Clara	San Fernando	24.85	95	23.608	3	0.746	2	0.5	25	40	25	40	25	40	43.8	40.5	46.4	49.0	40	44.7	0.4	1.2
S Autmn	Santa Clara	San Fernando	593.9	95	564.21	3	17.82	2	11.9	25	40	25	40	25	40	57.6	54.3	60.1	62.7	40	58.5	8.9	29.2
W San Fernando	Montgomery	Delmas	866	95	822.51	3	25.97	2	17.3	35	56	35	56	35	56	63.5	58.2	63.1	66.9	40	62.7	23.4	76.7
Park Ave	Montgomery	Sunol	783.65	95	744.47	3	23.51	2	15.7	30	48	30	48	30	48	61.1	56.7	62.1	65.3	40	61.0	16.0	52.4
Park Ave	Montgomery	Delmas	635.8	95	604.01	3	19.07	2	12.7	30	48	30	48	30	48	60.2	55.8	61.2	64.4	40	60.1	13.0	42.6
San Carlos	Montgomery	Sunol	650.95	95	618.4	3	19.53	2	13	35	56	35	56	35	56	62.2	56.9	61.9	65.7	40	61.4	17.6	57.7
San Carlos	Montgomery	Delmas	653.15	95	620.49	3	19.59	2	13.1	35	56	35	56	35	56	62.2	57.0	61.9	65.7	40	61.4	17.6	57.9
Auzerais	Bird	Sunol	193.95	95	184.25	3	5.819	2	3.88	25	40	25	40	25	40	52.8	49.4	55.3	57.9	40	53.6	2.9	9.5
Auzerais	Bird	Delmas	310.75	95	295.21	3	9.323	2	6.22	25	40	25	40	25	40	54.8	51.4	57.3	59.9	40	55.7	4.7	15.3
Bird	San Carlos	Auzerais	2260.15	95	2147.1	3	67.8	2	45.2	35	56	35	56	35	56	67.6	62.3	67.3	71.1	40	66.8	61.1	200.3
Bird	Auzerais	SR 87	2759.85	95	2621.9	3	82.8	2	55.2	35	56	35	56	35	56	68.5	63.2	68.2	72.0	40	67.7	74.6	244.6

Assumptions: 5% ADT traffic data from Fehr & Peers

Cumulative 2040 + Project

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto k/h		MT k/h		HT k/h		NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Distance from Roadway to 65 dBA	Distance from Roadway to 65 dBA
Calveno Peak																							
	from:			%	Auto	%	MT	%	HT										roadway center)	Center (m.)	(dBA)	(m.)	(ft)
Julian	Sockton	Alameda	819	95	778.1	3	24.57	2	16.4	30	48	30	48	30	48	61.3	56.9	62.3	65.5	40	61.2	16.7	54.8
Julian	N. Montgomery	Market	1,202	95	1141.6	3	36.05	2	24	30	48	30	48	30	48	63.0	58.6	63.9	67.1	40	62.9	24.5	80.4
Autumn	Julian	St John	976	95	927.34	3	29.28	2	19.5	25	40	25	40	25	40	59.8	56.4	62.3	64.9	40	60.6	14.6	48.1
N.Montgomery	Julian	St John	710.6	95	675.07	3	21.32	2	14.2	25	40	25	40	25	40	58.4	55.0	60.9	63.5	40	59.3	10.7	35.0
Stockton	Julian	Lenzen	520	95	494.05	3	15.6	2	10.4	30	48	30	48	30	48	59.3	54.9	60.3	63.5	40	59.2	10.6	34.8
Stockton	Julian	Santa Clara	1,179	95	1119.6	3	35.36	2	23.6	30	48	30	48	30	48	62.9	58.5	63.9	67.0	40	62.8	24.0	78.9
Santa Clara	Stockton	Race	1,030	95	978.5	3	30.9	2	20.6	35	56	35	56	35	56	64.2	58.9	63.9	67.7	40	63.4	27.8	91.3
Santa Clara	Stockton	Delmas	1,748	95	1660.6	3	52.44	2	35	35	56	35	56	35	56	66.5	61.2	66.2	70.0	40	65.7	47.2	154.9
S Montgomery	Santa Clara	San Fernando	350.9	95	333.36	3	10.53	2	7.02	25	40	25	40	25	40	55.3	52.0	57.9	60.5	40	56.2	5.3	17.3
Cahill	Santa Clara	San Fernando	526.2	95	499.89	3	15.79	2	10.5	25	40	25	40	25	40	57.1	53.7	59.6	62.2	40	58.0	7.9	25.9
S Autmn	Santa Clara	San Fernando	749.35	95	711.88	3	22.48	2	15	25	40	25	40	25	40	58.6	55.3	61.2	63.7	40	59.5	11.2	36.9
W San Fernando	Montgomery	Delmas	800.95	95	760.9	3	24.03	2	16	35	56	35	56	35	56	63.1	57.8	62.8	66.6	40	62.3	21.6	71.0
Park Ave	Montgomery	Sunol	625.8	95	594.51	3	18.77	2	12.5	30	48	30	48	30	48	60.1	55.7	61.1	64.3	40	60.0	12.8	41.9
Park Ave	Montgomery	Delmas	642.65	95	610.52	3	19.28	2	12.9	30	48	30	48	30	48	60.2	55.8	61.2	64.4	40	60.2	13.1	43.0
San Carlos	Montgomery	Sunol	1213.55	95	1152.9	3	36.41	2	24.3	35	56	35	56	35	56	64.9	59.6	64.6	68.4	40	64.1	32.8	107.6
San Carlos	Montgomery	Delmas	778.45	95	739.53	3	23.35	2	15.6	35	56	35	56	35	56	63.0	57.7	62.7	66.5	40	62.2	21.0	69.0
Auzerais	Bird	Sunol	201.1	95	191.05	3	6.033	2	4.02	25	40	25	40	25	40	52.9	49.6	55.4	58.0	40	53.8	3.0	9.9
Auzerais	Bird	Delmas	326.35	95	310.03	3	9.791	2	6.53	25	40	25	40	25	40	55.0	51.7	57.5	60.1	40	55.9	4.9	16.1
Bird	San Carlos	Auzerais	2874.55	95	2730.8	3	86.24	2	57.5	35	56	35	56	35	56	68.7	63.4	68.3	72.1	40	67.9	77.7	254.8
Bird	Auzerais	SR 87	3535.8	95	3359	3	106.1	2	70.7	35	56	35	56	35	56	69.6	64.3	69.2	73.0	40	68.8	95.5	313.4

Assumptions: 5% ADT traffic data from Fehr & Peers

Existing + Project – Mitigated; Reduction = 24%

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto k/h	MT k/h	HT k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Distance from Roadway to 65 dBA	Distance from Roadway to 65 dBA
Calveno Peak	from:			%	Auto	%	MT	%	HT							roadway center)	Center (m.)	(dBA)	(m.)	(ft)
Julian	Sockton	Alameda	536	95	509.53	3	16.09	2	10.7	30 48	30 48	30 48	59.5	55.1	60.4	63.6	40	59.4	10.9	35.9
Julian	N. Montgomery	Market	721	95	685.33	3	21.64	2	14.4	30 48	30 48	30 48	60.7	56.3	61.7	64.9	40	60.7	14.7	48.3
Autumn	Julian	St John	241	95	228.67	3	7.221	2	4.81	25 40	25 40	25 40	53.7	50.3	56.2	58.8	40	54.6	3.6	11.8
N.Montgomery	Julian	St John	10	95	9.1675	3	0.29	2	0.19	25 40	25 40	25 40	39.7	36.4	42.3	44.8	40	40.6	0.1	0.5
Stockton	Julian	Lenzen	102	95	96.473	3	3.047	2	2.03	30 48	30 48	30 48	52.2	47.8	53.2	56.4	40	52.1	2.1	6.8
Stockton	Julian	Santa Clara	616	95	584.73	3	18.47	2	12.3	30 48	30 48	30 48	60.1	55.7	61.0	64.2	40	60.0	12.6	41.2
Santa Clara	Stockton	Race	193	95	183.64	3	5.799	2	3.87	35 56	35 56	35 56	56.9	51.7	56.6	60.4	40	56.2	5.2	17.1
Santa Clara	Stockton	Delmas	506	95	480.32	3	15.17	2	10.1	35 56	35 56	35 56	61.1	55.8	60.8	64.6	40	60.3	13.7	44.8
S Montgomery	Santa Clara	San Fernando	458	95	434.67	3	13.73	2	9.15	25 40	25 40	25 40	56.5	53.1	59.0	61.6	40	57.3	6.9	22.5
Cahill	Santa Clara	San Fernando	49	95	46.788	3	1.478	2	0.99	25 40	25 40	25 40	46.8	43.4	49.3	51.9	40	47.7	0.7	2.4
S Autmn	Santa Clara	San Fernando	123	95	116.38	3	3.675	2	2.45	25 40	25 40	25 40	50.8	47.4	53.3	55.9	40	51.6	1.8	6.0
W San Fernando	Montgomery	Delmas	621	95	590.24	3	18.64	2	12.4	35 56	35 56	35 56	62.0	56.7	61.7	65.5	40	61.2	16.8	55.1
Park Ave	Montgomery	Sunol	393	95	372.88	3	11.78	2	7.85	30 48	30 48	30 48	58.1	53.7	59.1	62.3	40	58.0	8.0	26.3
Park Ave	Montgomery	Delmas	543	95	515.9	3	16.29	2	10.9	30 48	30 48	30 48	59.5	55.1	60.5	63.7	40	59.4	11.1	36.3
San Carlos	Montgomery	Sunol	137	95	130.15	3	4.11	2	2.74	35 56	35 56	35 56	55.5	50.2	55.1	58.9	40	54.7	3.7	12.1
San Carlos	Montgomery	Delmas	100	95	95	3	3	2	2	35 56	35 56	35 56	54.1	48.8	53.8	57.6	40	53.3	2.7	8.9
Auzerais	Bird	Sunol	35	95	33.393	3	1.055	2	0.7	25 40	25 40	25 40	45.3	42.0	47.9	50.5	40	46.2	0.5	1.7
Auzerais	Bird	Delmas	194	95	184.73	3	5.834	2	3.89	25 40	25 40	25 40	52.8	49.4	55.3	57.9	40	53.6	2.9	9.6
Bird	San Carlos	Auzerais	1906	95	1810.8	3	57.18	2	38.1	35 56	35 56	35 56	66.9	61.6	66.6	70.4	40	66.1	51.5	169.0
Bird	Auzerais	SR87	1408	95	1337.1	3	42.23	2	28.2	35 56	35 56	35 56	65.6	60.3	65.2	69.0	40	64.8	38.0	124.8

Assumptions: 5% ADT traffic data from Fehr & Peers

Cumul. 2040 + Proj.-Mitigated; Reduction= 27%

ROAD SEGMENT			TOTAL # VEHICLES	VEHICLE TYPE % Auto		MT		HT		VEHICLE SPEED Auto k/h	MT k/h	HT k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL 15 meters from	Receptor Dist. from Roadway	Adjusted Noise Level	Distance from Roadway to 65 dBA	Distance from Roadway to 65 dBA
Calveno Peak	from:			%	Auto	%	MT	%	HT							roadway center)	Center (m.)	(dBA)	(m.)	(ft)
Julian	Sockton	Alameda	789	95	749.84	3	23.68	2	15.8	30 48	30 48	30 48	61.1	56.7	62.1	65.3	40	61.0	16.1	52.8
Julian	N. Montgomery	Market	913	95	867.68	3	27.4	2	18.3	30 48	30 48	30 48	61.8	57.4	62.7	65.9	40	61.7	18.6	61.1
Autumn	Julian	St John	917	95	870.96	3	27.5	2	18.3	25 40	25 40	25 40	59.5	56.1	62.0	64.6	40	60.4	13.8	45.1
N.Montgomery	Julian	St John	636	95	604.15	3	19.08	2	12.7	25 40	25 40	25 40	57.9	54.6	60.4	63.0	40	58.8	9.5	31.3
Stockton	Julian	Lenzen	475	95	451.06	3	14.24	2	9.5	30 48	30 48	30 48	58.9	54.5	59.9	63.1	40	58.8	9.7	31.8
Stockton	Julian	Santa Clara	1142	95	1084.6	3	34.25	2	22.8	30 48	30 48	30 48	62.7	58.3	63.7	66.9	40	62.7	23.3	76.4
Santa Clara	Stockton	Race	996	95	946.11	3	29.88	2	19.9	35 56	35 56	35 56	64.1	58.8	63.7	67.5	40	63.3	26.9	88.3
Santa Clara	Stockton	Delmas	1670	95	1586.9	3	50.11	2	33.4	35 56	35 56	35 56	66.3	61.0	66.0	69.8	40	65.5	45.1	148.1
S Montgomery	Santa Clara	San Fernando	294	95	279.73	3	8.834	2	5.89	25 40	25 40	25 40	54.6	51.2	57.1	59.7	40	55.4	4.4	14.5
Cahill	Santa Clara	San Fernando	479	95	454.81	3	14.36	2	9.58	25 40	25 40	25 40	56.7	53.3	59.2	61.8	40	57.5	7.2	23.6
S Autmn	Santa Clara	San Fernando	706	95	670.37	3	21.17	2	14.1	25 40	25 40	25 40	58.4	55.0	60.9	63.5	40	59.2	10.6	34.7
W San Fernando	Montgomery	Delmas	756	95	718.25	3	22.68	2	15.1	35 56	35 56	35 56	62.9	57.6	62.5	66.3	40	62.1	20.4	67.0
Park Ave	Montgomery	Sunol	597	95	566.91	3	17.9	2	11.9	30 48	30 48	30 48	59.9	55.5	60.9	64.1	40	59.8	12.2	39.9
Park Ave	Montgomery	Delmas	626	95	594.8	3	18.78	2	12.5	30 48	30 48	30 48	60.1	55.7	61.1	64.3	40	60.0	12.8	41.9
San Carlos	Montgomery	Sunol	1040	95	988.43	3	31.21	2	20.8	35 56	35 56	35 56	64.3	59.0	63.9	67.7	40	63.5	28.1	92.2
San Carlos	Montgomery	Delmas	743	95	705.76	3	22.29	2	14.9	35 56	35 56	35 56	62.8	57.5	62.5	66.3	40	62.0	20.1	65.8
Auzerais	Bird	Sunol	182	95	172.71	3	5.454	2	3.64	25 40	25 40	25 40	52.5	49.1	55.0	57.6	40	53.3	2.7	9.0
Auzerais	Bird	Delmas	329	95	312.55	3	9.87	2	6.58	25 40	25 40	25 40	55.0	51.7	57.6	60.2	40	55.9	4.9	16.2
Bird	San Carlos	Auzerais	2762	95	2623.9	3	82.86	2	55.2	35 56	35 56	35 56	68.5	63.2	68.2	72.0	40	67.7	74.6	244.8
Bird	Auzerais	SR 87	2423	95	2301.4	3	72.68	2	48.5	35 56	35 56	35 56	67.9	62.6	67.6	71.4	40	67.1	65.4	214.7

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Appendix A2
Noise Monitoring Results

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Calculated Ldn from long-term noise monitoring data LT-A: 311 North Montgomery Street

		TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
10/29/2019	Midnight	0 / 24	54.9	311740	3117403	985810
	am 1:00	100	50.7	118370	1183701	374319
	2:00	200	52.7	187698	1876982	593554
	3:00	300	55.7	374377	3743769	1183884
	4:00	400	59.4	870769	8707691	2753614
	5:00	500	62.5	1791031	17910306	5663736
	6:00	600	62.8	1910988	19109882	6043075
	7:00	700	63.5	2263263	22632629	7157066
	8:00	800	64.7	2933756	29337561	9277351
	9:00	900	65.2	3311212	33112121	10470972
	10:00	1000	64.6	2858150	28581499	9038264
10/28/2019	11:00	1100	63.5	2252812	22528123	7124018
	12:00	1200	63.5	2234833	22348326	7067161
	pm 1:00	1300	62.0	1575226	15752265	4981303
	2:00	1400	62.7	1872419	18724188	5921108
	3:00	1500	61.7	1494514	14945140	4726068
	4:00	1600	62.2	1662061	16620612	5255899
	5:00	1700	61.0	1247366	12473663	3944519
	6:00	1800	60.1	1019490	10194901	3223911
	7:00	1900	61.9	1564656	15646565	4947878
	8:00	2000	59.8	961590	9615901	3040815
	9:00	2100	61.8	1501789	15017893	4749075
	10:00	2200	61.4	1385240	13852399	4380513
	pm 11:00	2300	56.6	459814	4598138	1454059

Leq Morning Peak Hour 7:00-10:00 a.m.

65 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.

61 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)

59 dBA

Leq Daytime 7:00 am-10:00 p.m.

63 dBA

Leq 24-Hour

62 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.

66 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,

67 dBA **and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.**

CNEL - Ldn 0.35302043

Calculated Ldn from long-term noise monitoring data LT-B: Terminus of Cinnabar Street

		TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
10/29/2019	Midnight	0 / 24	68.8	7530885	75308847	23814749
	am 1:00	100	68.5	7145078	71450784	22594722
	2:00	200	64.5	2820058	28200577	8917806
	3:00	300	59.7	940490	9404896	2974089
	4:00	400	62.1	1639695	16396947	5185170
	5:00	500	66.2	4159346	41593455	13153005
	6:00	600	73.3	21347351	213473514	67506253
	7:00	700	71.0	12512296	125122957	39567353
	8:00	800	69.8	9612581	96125807	30397649
	9:00	900	68.1	6474854	64748543	20475287
	10:00	1000	69.4	8612832	86128325	27236168
10/28/2019	11:00	1100	70.9	12269137	122691366	38798416
	12:00	1200	66.8	4736298	47362978	14977489
	pm 1:00	1300	60.7	1169147	11691467	3697166
	2:00	1400	67.2	5268464	52684638	16660345
	3:00	1500	67.9	6199505	61995048	19604556
	4:00	1600	74.6	28520097	285200971	90188466
	5:00	1700	72.4	17205449	172054486	54408406
	6:00	1800	73.5	22646078	226460781	71613187
	7:00	1900	69.8	9568701	95687014	30258891
	8:00	2000	69.6	9034643	90346431	28570050
	9:00	2100	74.0	25236667	252366672	79805349
	10:00	2200	67.9	6203460	62034602	19617064
	pm 11:00	2300	68.1	6500983	65009825	20557912

Leq Morning Peak Hour 7:00-10:00 a.m.

70 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.

73 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)

68 dBA

Leq Daytime 7:00 am-10:00 p.m.

71 dBA

Leq 24-Hour

70 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.

75 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m., and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.

76 dBA

CNEL - Ldn 0.50925357

Calculated Ldn from long-term noise monitoring data LT-C: S. Montgomery Street South of Santa Clara Street

		TIME		dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
10/29/2019	Midnight	0 / 24		57.6	571664	5716642	1807761
	am	1:00	100	55.9	385706	3857056	1219708
		2:00	200	54.2	262441	2624412	829912
		3:00	300	56.5	443103	4431033	1401216
		4:00	400	62.5	1791187	17911873	5664232
		5:00	500	62.6	1805303	18053026	5708868
		6:00	600	65.1	3206269	32062693	10139114
		7:00	700	65.2	3316263	33162633	10486945
		8:00	800	64.3	2713445	27134449	8580666
		9:00	900	63.3	2138174	21381738	6761499
		10:00	1000	63.0	1977011	19770106	6251856
10/28/2019		11:00	1100	63.6	2289702	22897022	7240674
		12:00	1200	74.5	28402528	284025282	89816680
	pm	1:00	1300	63.5	2228630	22286301	7047547
		2:00	1400	63.0	1993315	19933153	6303416
		3:00	1500	63.8	2408064	24080639	7614967
		4:00	1600	64.0	2517138	25171378	7959889
		5:00	1700	64.0	2536571	25365709	8021341
		6:00	1800	64.2	2648756	26487563	8376103
		7:00	1900	64.0	2526754	25267542	7990298
		8:00	2000	62.7	1851024	18510238	5853451
		9:00	2100	62.6	1802204	18022042	5699070
		10:00	2200	63.1	2039407	20394074	6449173
	pm	11:00	2300	57.3	540515	5405153	1709259

Leq Morning Peak Hour 7:00-10:00 a.m.
64 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
64 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
61 dBA

Leq Daytime 7:00 am-10:00 p.m.
66 dBA

Leq 24-Hour
65 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
69 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
69 dBA **and 10 dBA penalty for noise between**
10:00 p.m. and 7:00 a.m.

CNEL - Ldn 0.32529657

Calculated Ldn from long-term noise monitoring data LT-D: West San Fernando Street 80 feet west of SR 87

		TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
10/30/2019	Midnight	0 / 24	63.2	2089253	20892528	6606798
	am 1:00	100	56.8	481570	4815695	1522857
	2:00	200	56.4	432703	4327031	1368327
	3:00	300	56.2	412230	4122304	1303587
	4:00	400	61.0	1270873	12708726	4018852
	5:00	500	64.3	2681637	26816371	8480081
	6:00	600	67.1	5118798	51187981	16187061
	7:00	700	68.0	6339354	63393539	20046797
	8:00	800	69.3	8527368	85273679	26965905
	9:00	900	68.7	7413222	74132219	23442666
	10:00	1000	67.5	5578649	55786485	17641236
	11:00	1100	69.1	8058069	80580693	25481853
	12:00	1200	68.4	6846695	68466953	21651152
	pm 1:00	1300	67.6	5792780	57927795	18318377
	2:00	1400	71.4	13783928	137839281	43588608
	3:00	1500	69.0	7988992	79889923	25263412
	4:00	1600	67.8	5998422	59984218	18968675
	5:00	1700	67.1	5087870	50878699	16089257
	6:00	1800	67.8	6067657	60676567	19187615
	7:00	1900	65.7	3704333	37043328	11714129
	8:00	2000	66.3	4254544	42545438	13454049
	9:00	2100	65.2	3322645	33226454	10507127
	10:00	2200	64.6	2872010	28720103	9082094
	pm 11:00	2300	62.9	1939849	19398493	6134342

Leq Morning Peak Hour 7:00-10:00 a.m.
69 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
67 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
63 dBA

Leq Daytime 7:00 am-10:00 p.m.
68 dBA

Leq 24-Hour
67 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
71 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
71 dBA **and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.**

CNEL - Ldn 0.37332572

Calculated Ldn from long-term noise monitoring data LT-E: 569 Lorraine Avenue

		TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
10/30/2019	Midnight	0 / 24	54.7	298141	2981412	942805
	am 1:00	100	54.3	272209	2722087	860799
	2:00	200	52.9	195525	1955253	618305
	3:00	300	54.9	309930	3099296	980083
	4:00	400	56.0	401805	4018047	1270618
	5:00	500	60.0	1004836	10048356	3177569
	6:00	600	61.5	1412381	14123814	4466342
	7:00	700	62.1	1614641	16146411	5105943
	8:00	800	69.0	7860986	78609856	24858619
	9:00	900	62.6	1835811	18358111	5805345
	10:00	1000	62.4	1722166	17221660	5445967
	11:00	1100	61.9	1547647	15476473	4894091
	12:00	1200	61.6	1460512	14605116	4618543
	pm 1:00	1300	63.4	2204332	22043320	6970710
	2:00	1400	62.9	1928133	19281331	6097292
	3:00	1500	65.4	3485628	34856277	11022523
	4:00	1600	62.3	1680804	16808037	5315168
	5:00	1700	61.9	1563148	15631476	4943107
	6:00	1800	62.4	1720925	17209252	5442043
	7:00	1900	63.0	1987994	19879937	6286588
	8:00	2000	61.7	1476111	14761109	4667873
	9:00	2100	62.2	1648998	16489975	5214588
	10:00	2200	59.7	937737	9377369	2965384
	pm 11:00	2300	57.9	616137	6161366	1948395

Leq Morning Peak Hour 7:00-10:00 a.m.
66 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
62 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
58 dBA

Leq Daytime 7:00 am-10:00 p.m.
64 dBA

Leq 24-Hour
62 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
66 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
66 dBA **and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.**

CNEL - Ldn 0.51274333

Calculated Ldn from long-term noise monitoring data LT-F: Auzerais Avnue at Drake Street

		TIME	dBA	Remove LOG	10 dBA Penalized Values	5 dBA Penalized Values
10/30/2019	Midnight	0 / 24	54.7	298141	2981412	942805
	am 1:00	100	54.3	272209	2722087	860799
	2:00	200	52.9	195525	1955253	618305
	3:00	300	54.9	309930	3099296	980083
	4:00	400	56.0	401805	4018047	1270618
	5:00	500	60.0	1004836	10048356	3177569
	6:00	600	61.5	1412381	14123814	4466342
	7:00	700	62.1	1614641	16146411	5105943
	8:00	800	69.0	7860986	78609856	24858619
	9:00	900	62.6	1835811	18358111	5805345
	10:00	1000	62.4	1722166	17221660	5445967
	11:00	1100	61.9	1547647	15476473	4894091
	12:00	1200	61.6	1460512	14605116	4618543
	pm 1:00	1300	63.4	2204332	22043320	6970710
	2:00	1400	62.9	1928133	19281331	6097292
	3:00	1500	65.4	3485628	34856277	11022523
	4:00	1600	62.3	1680804	16808037	5315168
	5:00	1700	61.9	1563148	15631476	4943107
	6:00	1800	62.4	1720925	17209252	5442043
	7:00	1900	63.0	1987994	19879937	6286588
	8:00	2000	61.7	1476111	14761109	4667873
	9:00	2100	62.2	1648998	16489975	5214588
	10:00	2200	59.7	937737	9377369	2965384
	pm 11:00	2300	57.9	616137	6161366	1948395

Leq Morning Peak Hour 7:00-10:00 a.m.
66 dBA

Leq Evening Peak Hour 4:00-8:00 p.m.
62 dBA

Leq Nighttime 10:00 pm-7:00 a.m. (not penalized)
58 dBA

Leq Daytime 7:00 am-10:00 p.m.
64 dBA

Leq 24-Hour
62 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
66 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m.,
66 dBA **and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.**

CNEL - Ldn 0.51274333