Environmental Noise & Vibration Assessment

St. James Park Revitalization Project

San Jose, California

BAC Job # 2019-009

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Introduction

This study has been prepared to evaluate potential noise and vibration impacts related to the Saint James Park Revitalization Project (Project). It is based on a combination of noise and vibration surveys conducted at the project site, use of industry standard algorithms, and information contained within the ARUP 25% acoustical narrative.

Project Location and Surrounding Uses

St. James Park (Park) is a seven-acre park in the City of San Jose bounded by East St. James Street to the north, East St. John Street to the south, North 1st Street to the west, and North 3rd Street to the east. North 2nd Street bisects the park and includes a Valley Transportation Authority (VTA) light rail and local bus stops.

The surrounding area is urban and developed with by a variety of public, church, business, and residential land uses.

Figure 1 shows the Park location and surrounding land uses. Figure 2 shows the existing Park facilities.

Existing Park Facilities and Activities

The Park consists of lawn areas, mature landscape trees, paved walkways, seating areas, an 840 square foot fitness parcourse, a 2,750 square foot dog park, a 17,556 square foot playground, restrooms, memorials, a wood stage, and a fountain.

The Park currently hosts a variety of events. Between 2013 and 2018, a total of 125 events (or an average of 21 events per year) were held at the park. The events range in type and have included concerts, festivals, cinema nights, performances, yoga and games. Previous events at the park ranged in attendance from less than 10 to 7,500 people.

Figure 1
Saint James Park Location and Surrounding Land Uses

A – Sainte Claire Club
B – Residential
C – Church
D – Church
E – Commercial/Professional
F – Professional
G – Professional
H – Professional / Parking Structure
I – Commercial / Professional
J – Church
K – Mixed Use Residential
L – Commercial / Professional
M – Post Office
N – County Courthouse
O – Garden / Landscaped Area
P – County Courthouse
Q – Church (Renovation in progress)

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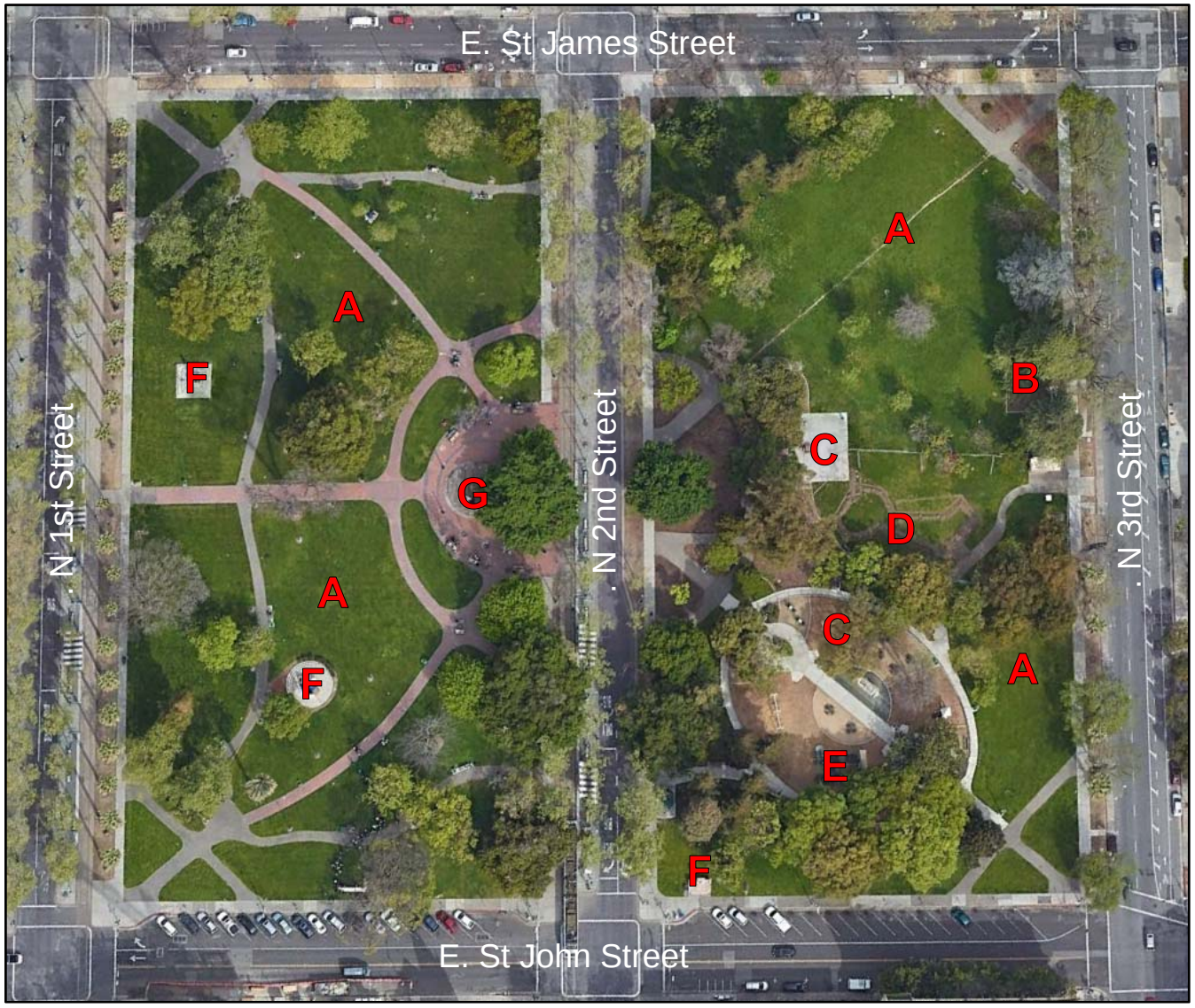
Figure 2
Existing Facilities
Saint James Park – San Jose, CA



A – Lawn Areas
B – Parcourse Fitness
C – Tables
D – Interim Dog Park
E – Play Structure
F – Monuments/Memorials
G – Fountain & Stage

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Project Description

The project proposes to renovate and revitalize St. James Park by implementing both physical and programmatic changes. The proposed park design centers around the following three concepts:

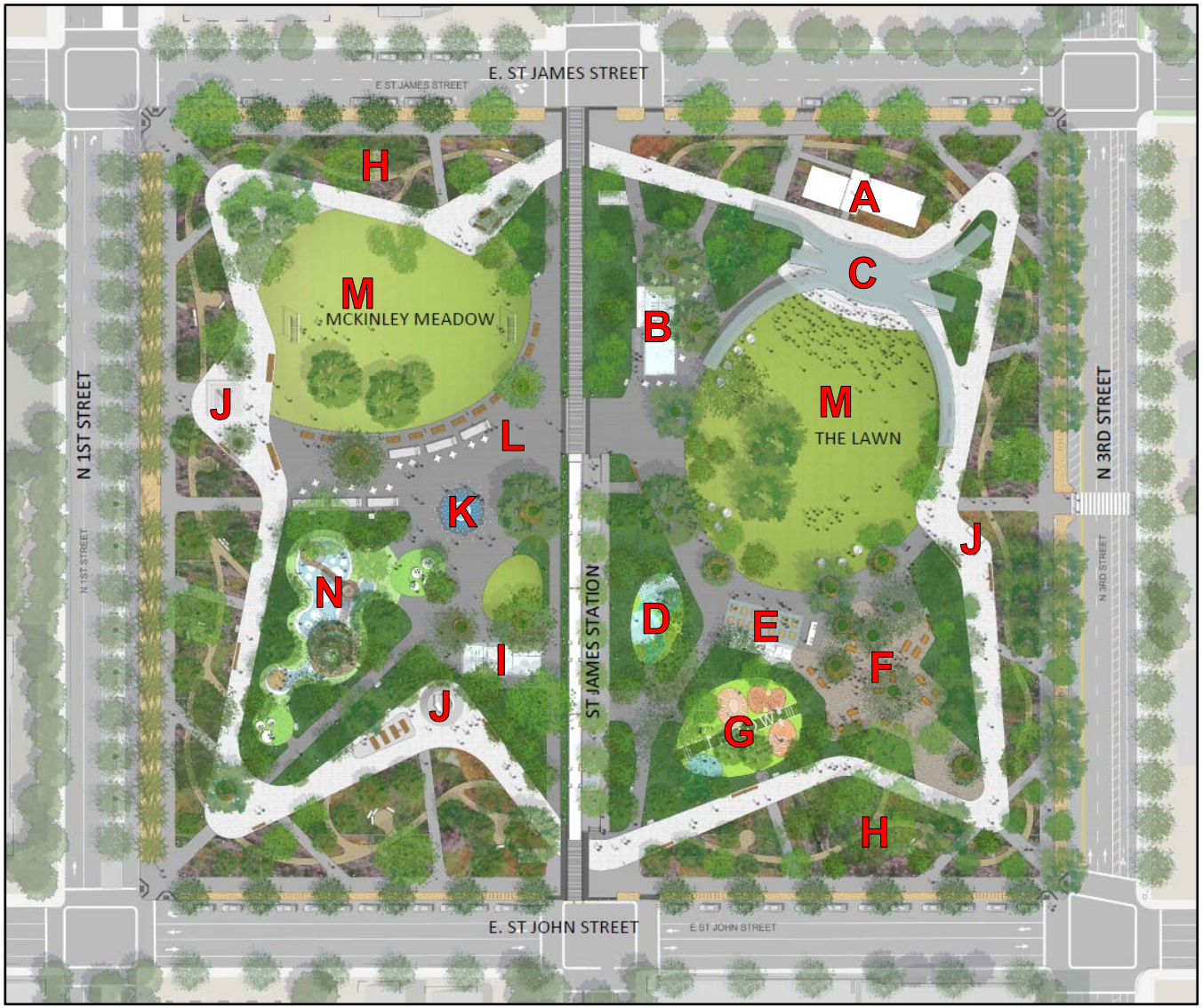
- **Historic Edge** – The historic edge would maintain the established heritage trees and would include a planting scheme around the perimeter of the park to recall the history of the park's development from initial dense and assorted tree planting to the Victorian-era gardens. The edge would act as a buffer, shielding the new park core from surrounding streets.

- **Contemporary Core** – The contemporary core would include passive and active uses, including a playground, picnic grove, café, two dog parks, and a performing arts pavilion.

- **Monument Walk** – The monument walk would include meandering paths connecting existing historic monuments within the park with the proposed performing arts pavilion. The path would organize the layout of the park by connecting and integrating the contemporary core with the historic edge, as well as providing access throughout the park.

The historic edge, contemporary core, and monument walk would integrate all of the proposed park elements. Figure 3 shows the proposed park site plan.

Figure 3
Proposed Site Plan
Saint James Park – San Jose, CA



A – Levitt Office
B – Café & Restrooms
C – Levitt Stage
D – Small Dog Park
E – Group Picnic Area
F – Picnic Grove
G – All Dog Park
H – Garden
I – Restrooms
J – Monuments / Memorials
K – Fountain
L – Plaza
M – Lawn Areas
N – Play Structures

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Analysis Objectives

Due to the potential for noise and vibration generation associated with the construction and operation of the project, Bollard Acoustical Consultants, Inc. (BAC) was retained to prepare this noise and vibration analysis. The specific objectives of this analysis are as follows:

- To provide background information pertaining to the effects of noise and vibration.
- To identify existing noise-sensitive land uses in the immediate project vicinity.
- To quantify the existing ambient noise and vibration levels at those nearest noise-sensitive land uses.
- To use the guidelines of the California Environmental Quality Act (CEQA), with applicable standards and measured existing noise and vibration levels to develop appropriate standards of significance for this project.
- To predict project-related noise and vibration levels at the nearest sensitive receptor areas and to compare those levels against the project standards of significance.
- Where significant project-related noise or vibration impacts are identified, to evaluate mitigation options.

Environmental Setting: Fundamentals and Terminology

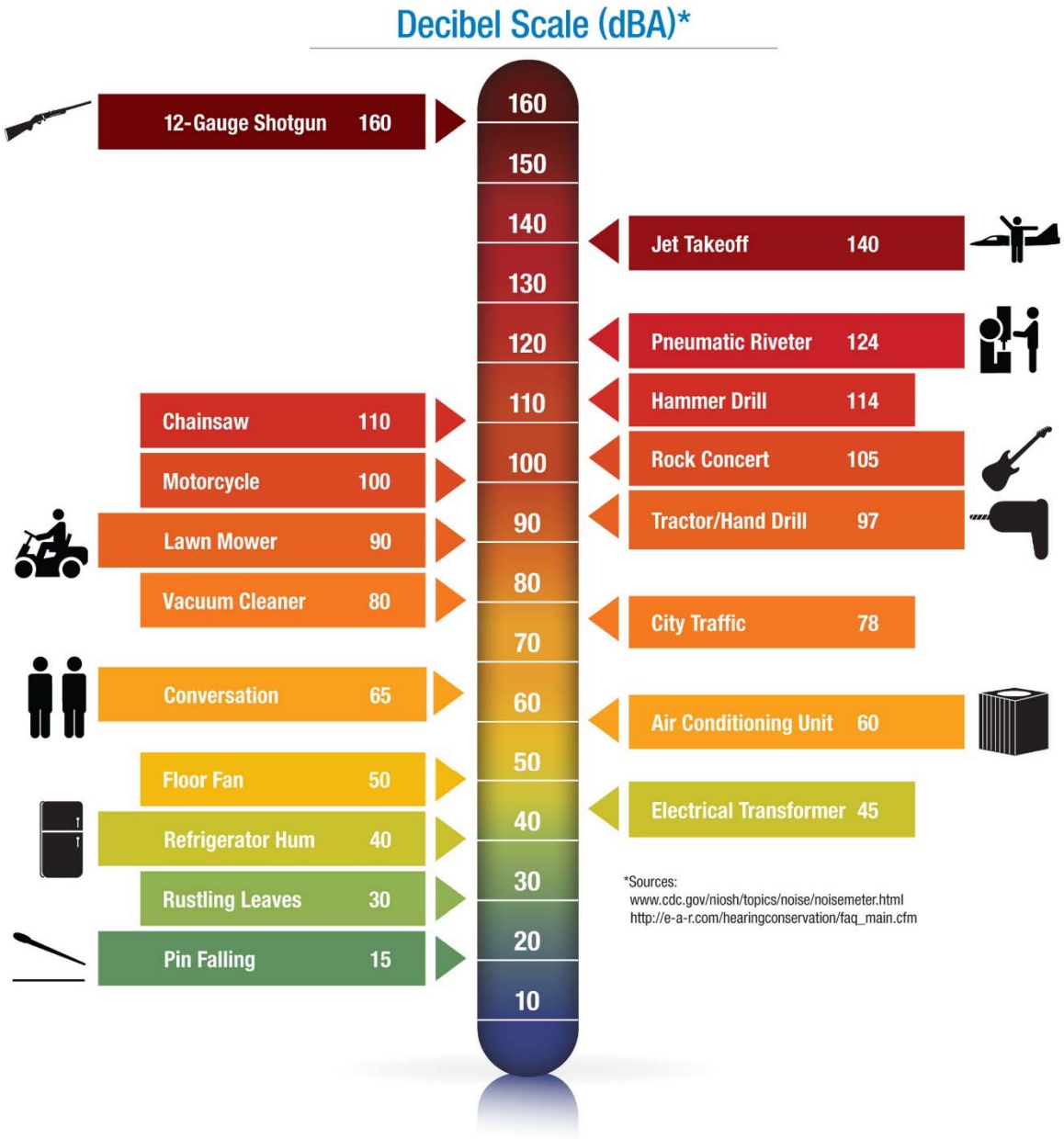
Noise

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are designated as sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or Hertz (Hz). Definitions of acoustical terminology are provided in Appendix A. Figure 4 shows common noise levels associated with various sources.

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

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by filtering the frequency response of a sound level meter by means of the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels.

Figure 4
Noise Levels Associated with Common Noise Sources



Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}). The L_{eq} is the foundation of the day/night average noise descriptor, L_{dn}, and shows very good correlation with community response to noise. The day/night average sound level (L_{dn} or DNL) is based on the average noise level over a 24-hour day, with a +10 decibel weighting applied to noise occurring during nighttime (10:00 PM to 7:00 AM) hours. The nighttime penalty is based on the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment. For this reason, the City of San Jose utilizes performance standards for non-transportation noise sources. Specifically, performance standards in terms of instantaneous maximum levels (L_{max}) and hourly average levels (L_{eq}), are used to assess noise generated on the project site.

Effects of Noise on People

The effects of noise on people can be divided into three categories:

1. Subjective effects of annoyance, nuisance, dissatisfaction;
2. Interference with activities such as speech, sleep, and learning; and
3. Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the third category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. 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.

An important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment (or ambient noise) to which one has adapted. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur (Caltrans, 2013):

- It is widely accepted that the average healthy ear can barely perceive noise level changes of 3 dBA;
- A change in level of 5 dBA is a readily perceptible increase in noise level; and
- A 10-dBA change is recognized as twice as loud as the original source.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. Noise levels are measured on a logarithmic scale, instead of a linear scale. On a logarithmic scale, the sum of two noise sources of equal loudness is 3 dBA greater than the noise generated by only one of the noise sources (e.g., a noise source of 60 dBA plus another noise source of 60 dBA generate a composite noise level of 63 dBA). To apply this formula to a specific noise source, in areas where existing levels are dominated by traffic, a doubling in traffic volume will increase ambient noise levels by 3 dBA. Similarly, a doubling in heavy equipment use, such as the use of two pieces of equipment where one formerly was used, would also increase ambient noise levels by 3 dBA.

Noise Attenuation with Distance

Stationary "point" sources of noise, attenuate (lessen) at a rate of approximately 6 dBA per doubling of distance from the source, not accounting for environmental conditions (i.e., atmospheric conditions, noise barriers, ground type, vegetation, topography, etc.). Surface traffic (a "moving point" source), would typically attenuate at a lower rate, approximately 4.5 dBA per doubling distance from the source (also dependent upon environmental conditions).

Noise from large construction sites (with heavy equipment moving dirt and trucks entering and exiting the site daily) would have characteristics of both "point" and "line" sources, so attenuation would generally range between 4.5 and 6 dBA per doubling of distance. Atmospheric absorption of sound varies depending on temperature and relative humidity, as well as the frequency content of the noise source. In general, "average day" atmospheric conditions result in attenuation at a rate of approximately 1.5 dB per thousand feet of distance in the 1,000 hertz frequency band (SAE ARP 866A, 1975).

Vibration

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, while vibration is usually associated with transmission through the ground or structures. As with noise, vibration consists of an amplitude and frequency. A person's response to vibration will depend on their individual sensitivity as well as the amplitude and frequency of the source.

Vibration can be described in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities (inches/second). Standards pertaining to perception as well as damage to structures have been developed for vibration in terms of peak particle velocity.

As vibrations travel outward from the source, they excite the particles of rock and soil through which they pass and cause them to oscillate. Differences in subsurface geologic conditions and distance from the source of vibration will result in different vibration levels characterized by different frequencies and intensities. In all cases, vibration amplitudes will decrease with increasing distance. The maximum rate, or velocity of particle movement, is the commonly accepted descriptor of the vibration "strength".

Human response to vibration is difficult to quantify. Vibration can be felt or heard well below the levels that produce any damage to structures. The duration of the event has an effect on human response, as does the frequency of the event. Generally, as the duration and vibration frequency increase, the potential for adverse human response increases.

According to the Transportation and Construction-Induced Vibration Guidance Manual (Caltrans, June 2004), operation of construction equipment and construction techniques generate ground vibration. Traffic traveling on roadways can also be a source of such vibration. At high enough amplitudes, ground vibration has the potential to damage structures and/or cause cosmetic damage (e.g., crack plaster). Ground vibration can also be a source of annoyance to individuals who live or work close to vibration-generating activities. However, traffic, including heavy trucks traveling on a highway, rarely generates vibration amplitudes high enough to cause structural or cosmetic damage.

Environmental Setting: Existing Ambient Conditions

Existing Ambient Noise Environment at the Project Site

The existing noise environment at the project site is primarily defined by local traffic on the surface streets surrounding the park site. Operations of the VTA transit system and occasional activities at the park also contribute to the local noise environment, but to a lesser extent.

To quantify existing ambient noise environment in the project vicinity, noise surveys conducted by BAC in February of 2019 and ARUP Engineering in August of 2018 were utilized. During BAC's 2019 surveys, continuous (72-hour) noise monitoring was conducted at one location with short term (15-minute) monitoring conducted at five additional (5) locations. During ARUP's 2018 survey, continuous (48-hour) noise monitoring was conducted at one location. Figure 5 shows the locations of the noise measurement sites.

Larson Davis Laboratories (LDL) Model 820 and 831 precision integrating sound level meters were used by BAC to conduct the noise level surveys. The meters were calibrated before use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4). The results of the continuous noise surveys are summarized in Table 1. Graphical depictions of the continuous noise measurement results are also provided in Appendix B. Table 2 shows the results of the short-term ambient noise surveys. Representative photographs of the noise measurement sites are provided in Appendix C.

Table 1
Summary of Continuous Ambient Noise Survey Results[1]
Saint James Park Revitalization Project

			Average Noise Levels (dBA)			
			Daytime (7 am to 10 pm)		Nighttime (10 pm to 7 am)	
Site	Description	L_{dn}	L_{eq}	L_{10}	L_{eq}	L_{10}
A	Balcony of Saint Claire Club[2]	65	63	67	57	59
B	Near Exterior Façade of Trinity Cathedral	67	64	66	59	60

Notes:
[1] Long-term noise measurement locations are shown on Figure 5.
[2] Source: Bollard Acoustical Consultants, Inc. (2019) & ARUP Engineering (2018)
[3] ARUP data at Site A was estimated from the graph provided in the project design narrative – reproduced in Appendix B1.

Figure 5
Noise and Vibration Measurement Locations
Saint James Park Revitalization Project – San Jose, CA

Continuous Monitoring Sites
A – St. Claire Club
B – Trinity Episcopal Cathedral

Short-Term Monitoring Sites
1 – NE Corner of Park
2 – SE Corner of Park
3 – SW Corner of Park
4 – North Central Park
5 – NW Corner of Park

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Table 2
Summary of Short-Term Ambient Noise Survey Results[1]
Saint James Park Revitalization Project – February 21, 2019

Site	Description	Time	Measured Noise Level, dBA[2] L_{eq}	L_{10}	L_{90}
1	E St James St and N 3rd St	1:17 PM	60	62	56
2	E St John St and N 3rd St	1:39 PM	59	62	55
3	E St John St and N 1st St	2:00 PM	65	70	58
4	50 ft from VTA tracks	2:27 PM	60	63	55
5	E St James St and N 1st St	2:47 PM	62	66	56

Notes:
1 Short-term noise measurement locations are shown on Figure 5.
2 The short-term measurement periods were 15 minutes.
3 Source: Bollard Acoustical Consultants, Inc. (2019)

The ambient noise monitoring results were fairly consistent between the short-term and long-term locations, with daytime average (L_{eq}) noise levels ranging from 59 to 65 dBA. Measured L10 values, which represent the loudest 10% of the measurement period, ranged from 62 to 70 dBA. Background (L_{90} – the quietest 10% of the measurement period), noise level data collected at the short-term measurement sites ranged from 55-56 dBA. At the two continuous measurement sites, the computed Day/Night Average Levels (L_{dn}) ranged from 65-67 dBA L_{dn}.

Overall, the noise survey results indicate that the existing ambient conditions in the immediate project vicinity are somewhat elevated. This result is not surprising given the urban nature of the project site and degree of surface traffic activity present in the area.

Existing VTA Operations Noise Environment in the Project Vicinity

The Santa Clara Valley Transportation Authority (VTA) light rail operations occur on the tracks which run adjacent to North 1st and North 2nd Streets on approximately 15-minute intervals. During the short-term ambient noise survey described above, two (2) light rail train passbys occurred on each of the two tracks. Each operation resulted in brief periods of increased ambient noise levels, measured to be approximately 30 seconds per event.

Appendix D shows the periods during which the light-rail passbys occurred and indicate that the maximum noise generation of the VTA operations was approximately equal to maximum noise levels generated by surface traffic. Due to the relative infrequency of the VTA passbys as compared to the near continuous presence of surface traffic on the local roadway network, this assessment concludes that VTA operations do not appreciably contribute to the local noise environment.

Existing Traffic Noise Environment

To allow the evaluation of relative changes in off-site traffic noise levels which would result from a project, the existing traffic noise environment must be quantified. The Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used with the Calveno vehicle noise emission curves to quantify existing traffic noise levels on the project area roadways.

The FHWA Model was used with traffic data prepared by Hexagon Transportation Consultants to predict existing traffic noise levels on the project area roadways. Traffic data was provided in the form of peak hour intersection turning movements for 27 intersections in the general project vicinity. Figure 6 shows the intersections evaluated in this study. The peak hour turning movement data was converted to daily segment volumes in each direction surrounding the intersection by summing turning movements and applying a factor of 10 to convert to average daily traffic volumes (ADT). The ADT's were used as inputs to the FHWA model, along with roadway speeds, truck percentages, day/night distribution of traffic, and distance to the roadway centerline. Appendix E contains the FHWA Model input data for existing conditions.

Table 3 shows the predicted existing traffic noise levels in terms of L_{dn} at a reference distance of 35 feet from the roadway centerlines.

Table 3
Existing Traffic Noise Levels at 35 feet from Project Area Roadway Centerlines
Saint James Park Revitalization Project Area Roadways – San Jose, California

		Ldn @ 100 feet			
ID	Intersection Description	North	East	South	West
1	Market St and Julian St	70	64	67	56
2	First St and Julian St	61	63	57	65
3	Second St and Julian St	60	63	59	63
4	Third St and Julian St	60	61	63	62
5	SR-87 and Julian St (West)*	59	68	56	68
6	SR-87 and Julian St (East)*	67	68	64	69
7	San Pedro St and St. James St	55	66	59	67
8	Market St and St. James St	66	63	66	64
9	First St and St. James St	57	63	57	63
10	Second St and St. James St	61	63	60	63
11	Third St and St. James St	63	63	62	63
12	Fourth St and St. James St	65	62	65	63
13	San Pedro St and St. John St	60	57	61	59
14	Market St and St. John St	66	59	66	55
15	First St and St. John St	57	59	56	59
16	Second St and St. John St	58	59	58	59
17	Third St and St. John St	62	59	64	58
18	Fourth St and St. John St	64	59	65	60

Table 3
Existing Traffic Noise Levels at 35 feet from Project Area Roadway Centerlines
Saint James Park Revitalization Project Area Roadways – San Jose, California

		Ldn @ 100 feet			
ID	**Intersection Description**	**North**	**East**	**South**	**West**
19	Fifth St and St. John St	57	58	58	58
20	SR-87 and Santa Clara St*	n/a	67	66	69
21	San Pedro St and Santa Clara St	60	66	57	66
22	Market St and Santa Clara St	66	66	65	66
23	First St and Santa Clara St	55	66	57	66
24	Second St and Santa Clara St	59	66	59	66
25	Third St and Santa Clara St	63	66	64	66
26	Fourth St and Santa Clara St	66	65	66	66
27	Fifth St and Santa Clara St	57	66	n/a	66

Source: FHWA-RD-77-108 with inputs prepared by Hexagon & BAC analysis

Noise Generated by Existing Amplified Music Events at the Park

As noted in the Introduction section of this report, the Park currently hosts a variety of events. Between 2013 and 2018, a total of 125 events (or an average of 21 events per year) were held at the park. The events range in type and have included concerts, festivals, cinema nights, performances, yoga and games. Previous events at the park ranged in attendance from less than 10 to 7,500 people.

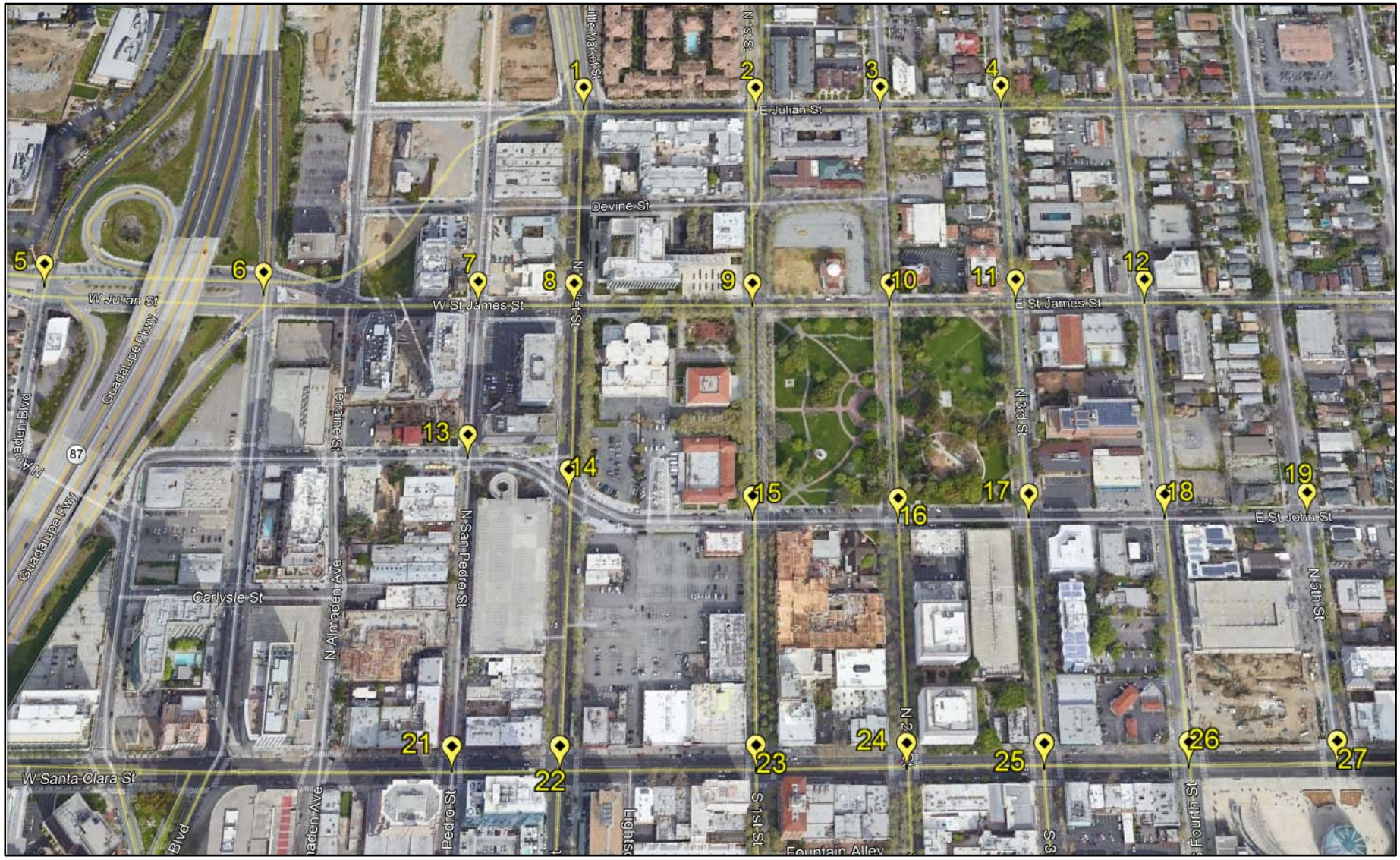
Bollard Acoustical Consultants, Inc. (BAC) was previously retained by the City of San Jose Parks Department to prepare a noise study for outdoor music events held at Saint James Park (BAC Job# 2014-271, report dated February 5, 2015 and incorporated by reference).

That study included an amplified event simulation as well as a comprehensive noise survey conducted during a Dia De Los Muertos festival held at the Park on October 25, 2014, including noise monitoring inside of the Sainte Claire Club, the Trinity Cathedral, and inside residences located at the northwest corner of the intersection of E. St. James Street and North 3rd Street.

During the Dia De Los Muertos festival, average and maximum noise levels up to 93 dBA and 100 dBA were measured at a position 100 feet directly in front of the main stage. Within the nearest sensitive receptors (St. Claire Club, Trinity Cathedral, and Apartments), noise levels ranged from 44 to 57 dBA L_{eq} and 46-67 dBA L_{max} while music was played at the main stage.

The results of the 2014 event simulation and measurements conducted during the Dia De Los Muertos festival were utilized to develop recommendations for controlling noise levels related to future amplified music events held at the Park. The recommendations which are pertinent to this study are described later in this report.

Figure 6
Intersections Evaluated in Traffic Noise Analysis
Saint James Park Revitalization Project Vicinity – San Jose, CA



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Existing Ambient Vibration Environment at the Project Site

Identified sources of local vibration in the immediate project vicinity include VTA light rail passages and local surface traffic. During a site visit on April 18, 2018, vibration levels at the Park site were subjectively evaluated as being below the threshold of perception. Nonetheless, to quantify existing vibration levels at the project site, BAC conducted short-term (15-minute) vibration measurements at the same locations on the project site which were used to conduct short-term ambient noise surveys. The vibration measurement locations are identified on Figure 5.

A Larson-Davis Laboratories Model LxT precision integrating sound level meter equipped with a PCB Electronics vibration transducer was used to complete the measurements. The system was calibrated in the field before use to ensure the accuracy of the measurements. The results of the short-term vibration measurements are provided in Table 4.

Table 4
Summary of Short-Term Ambient Vibration Survey Results[1,2]
Saint James Park Revitalization Project – February 21, 2019

			Measured Vibration Level, VdB		
Site	**Description**	**Time**	**Minimum**	**Average**	**Maximum**
1	E St James St and N 3rd St	1:17 PM	35	49	59
2	E St John St and N 3rd St	1:39 PM	38	50	67
3	E St John St and N 1st St	2:00 PM	38	54	71
4	50 ft from VTA tracks	2:27 PM	37	53	69
5	E St James St and N 1st St	2:47 PM	38	55	68

Notes:
1 Short-term vibration measurement locations are shown on Figure 5.
2 The short-term measurement periods were 15 minutes.

Source: Bollard Acoustical Consultants, Inc. (2019)

The ambient vibration monitoring results were fairly consistent between locations. The measured maximum vibration levels were believed to be caused by VTA passbys and local traffic.

Regulatory Setting: Noise and Vibration Exposure Criteria

Federal Transit Administration Vibration Criteria

The Federal Transit Administration's publication, *Transit Noise and Vibration Impact Assessment Manual*, (FTA Report No. 0123 dated September 2018), includes criteria for assessing potential impacts related to groundborne vibration in terms of both annoyance and damage to structures. The FTA vibration impact criteria are based on maximum overall levels for a single event. Although developed primarily for vibration generated by heavy rail operations, the criteria have been widely used to assess annoyance impacts related other sources as well. The FTA vibration impact criteria for interference with human activity and annoyance are shown in Table 5. A discussion of FTA criteria related to damage to structures follows.

Table 5
Groundborne Vibration Impact Criteria for Annoyance Determinations

Land Use Category	Groundborne Vibration Impact Levels (VdB re 1 µinch/sec, RMS) Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations.	65	65	65
Category 2: Residences and buildings where people normally sleep.	72	75	80
Category 3: Institutional land uses with primarily daytime use.	75	78	83

Notes:
1 "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
2 "Occasional Events" is defined as between 30 and 70 vibration events of the same kind per day. Most commuter trunk lines have this many operations.
3 "Infrequent Events" is defined by less than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

It is important to note that the FTA criteria identified in Table 5 were developed to assess potential annoyance related to recurring daily passages of trains in the vicinity of the sensitive receptor. As a result, the use of the Table 5 criteria to assess impacts of considerably less frequent amplified music events is considered to be conservative.

Table 7-5 of the Federal Transit Administration's publication, *Transit Noise and Vibration Impact Assessment Manual*, contains criteria for assessing damage to structures from vibration. That table is reproduced below as Table 6.

Table 6
FTA Vibration Damage Criteria

Building/ Structural Category	PPV, in/sec	Approximate L_V*
I. Reinforced-concrete, steel or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

*RMS velocity in decibels, VdB re I micro-in/sec

As indicated in Table 6, the intensity of vibration required to result in damage to structures depends on the construction of the structure. It is important to note that the Table 6 criteria do not differentiate between transient vibration and steady-state vibration. The importance of that distinction is presented in the following paragraphs of this report.

California Building Code Noise Standards

Title 24, Part 2 of the current version of the California Building Code (CBC) requires interior noise levels attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA DNL/CNEL in any habitable room.

CalGreen requires that wall and roof-ceiling assemblies exposed to the adjacent roadways have a composite Sound Transmission Class (STC) rating of at least 50 or a composite Outdoor-Indoor Transmission Class (OITC) rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 when the commercial property falls within the 65 dBA L_{dn} noise contour for a freeway or expressway, railroad, industrial source or fixed-guideway noise source. The state also requires interior noise levels to be maintained at 50 dBA $L_{eq(1\text{-}hr)}$ or less during hours of operation at a proposed office building.

City of San Jose General Plan Noise Element

Chapter 3 of the City of San Jose General Plan pertains to Environmental Leadership, and contains the City's noise-related policies. The specific policies which are generally applicable to this project are reproduced below.

Goal EC-1 – Community Noise Levels and Land Use Compatibility

> Minimize the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies. Policies – Community Noise Levels and Land Use Compatibility.

Policies – Community Noise Levels and Land Use Compatibility

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 *Envision General Plan* traffic volumes to ensure land use compatibility and 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 (Table EC-1). The acceptable exterior noise level objective is established for the City, except in the environs of the San José International Airport and the Downtown, as described below:

    - For new multi-family 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. Some common use areas that meet the 60 dBA DNL exterior standard will be available to all residents. Use noise attenuation techniques such as shielding by buildings and structures for outdoor common use areas. On sites subject to aircraft overflights or adjacent to elevated roadways, use noise attenuation techniques to achieve the 60 dBA DNL standard for noise from sources other than aircraft and elevated roadway segments.

    - For single family residential uses, use a standard of 60 dBA DNL for exterior noise in private usable outdoor activity areas, such as backyards.

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

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

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

Table EC-1: Land Use Compatibility Guidelines for Community Noise in San José

LAND USE CATEGORY	EXTERIOR NOISE EXPOSURE (DNL IN DECIBELS (DBA)) 55	60	65	70	75	80
1. Residential, Hotels and Motels, Hospitals and Residential Care[1]						
2. Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
3. Schools, Libraries, Museums, Meeting Halls, Churches						
4. Office Buildings, Business Commercial, and Professional Offices						
5. Sports Arena, Outdoor Spectator Sports						
6. Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters						

[1]Noise mitigation to reduce interior noise levels pursuant to Policy EC-1.1 is required.

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.

Conditionally Acceptable:

- Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

Unacceptable:

- New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

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.

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.

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.

EC-1.9 Require noise studies 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, implement mitigation so that recurring maximum instantaneous noise levels do not exceed 50 dBA Lmax in bedrooms and 55 dBA Lmax in other rooms.

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

Goal EC-2 - Vibration

Minimize vibration impacts on people, residences, and business operations.

Policies - Vibration

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.

EC-2.2 Require new sources of ground-borne vibration, such as transit along fixed rail systems or the operation of impulsive equipment, to minimize vibration impacts on existing sensitive land uses to levels at or below the guidelines of the Federal Transit Administration.

EC-2.3 Require new development to minimize vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, a 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 vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction.

City of San Jose Municipal Code

Municipal Code Chapters 6.60, 10.16, and 13.14 pertain to outdoor events, loudspeakers and sound amplifiers, and event permits. The project would be exempt from obtaining a public entertainment business permit as it is located on outdoor pubic property owned or controlled by the City.1 However, each individual event that takes place at the park would be required to obtain a special event permit from the director of the Department of Parks, Recreation, and Neighborhood Services. The director may condition the permit with reasonable requirements including, but not limited to, the timing and length of the event, and the use of and amount of noise generated by sound amplification equipment.

The following specific sections of the Code pertain to the most significant noise sources associated with the project: construction activities and sound generated by amplified music.

1 San José Municipal Code Chapter 6.60.050.

Chapter 6.60
PUBLIC ENTERTAINMENT PERMIT
Part 2 OPERATING REGULATIONS AND PERMIT CONDITIONS

6.60.230 Noise.

The permittee shall prevent noise from emanating beyond the premises of the public entertainment which is disturbing or unreasonably loud to persons on neighboring property.

Chapter 10.16
OFFENSES AGAINST PUBLIC PEACE
Part 1: DISTURBING THE PEACE

10.16.010 Disturbing the peace prohibited.

No person shall disturb the peace, quiet and comfort of any neighborhood by creating therein any disturbing or unreasonably loud noise.

10.16.020 Disturbing noises designated.

A. It is the intent of this chapter to prohibit all noises which are disturbing or unreasonably loud. The types of noises set out in subsection B. shall not be deemed or construed as in any way exclusive, but merely illustrative.

B. The following types of noises are declared to be disturbing to the peace, quiet and comfort of the neighborhood in which they are heard, and persons creating such noises are in violation of Section 10.16.010:

5. The playing or operating of any radio, phonograph, orchestra or other musical device or instrument in a manner that is disturbing or unreasonably loud to a reasonable person outside the facility or unit from which the noise emanates; and

Part 2: LOUDSPEAKERS AND SOUND AMPLIFIERS

10.16.030 Operation without permit prohibited.

No person shall operate any loudspeaker or sound amplifier or similar device in such a manner as to cause any sound to be projected outside of any building or out-of-doors, except upon receipt of a permit from the chief of police as provided in Section 10.16.040.

6.60.028 Public entertainment.

"Public entertainment" means any of the following activities:

C. Audience participation in the entertainment; or

D. Live entertainment.

6.60.050 Exceptions to the public entertainment business permit.

A public entertainment business permit shall not be required for persons conducting, managing or operating a place of public entertainment which is conducted in accordance with any of the following criteria:

A. On outdoor public property owned or controlled by the city;

B. In city owned or controlled facilities, including, but not limited to, the Convention Center, the Center for Performing Arts, the Montgomery Theater, the Civic Auditorium Complex, the Arena, and city park facilities.

Chapter 13.14
COMMUNITY SPECIAL EVENTS
Part 2 USE OF OUTDOOR CITY PROPERTY FOR COMMUNITY SPECIAL EVENTS

13.14.220 Issuance of event permits.

A. The director is authorized to issue special event permits consistent with this chapter.

C. The director may condition any permit issued pursuant to this chapter with reasonable requirements concerning the time, place or manner of holding the special event as is necessary to coordinate multiple uses of public property, assure preservation of public property and public spaces, prevent dangerous, unlawful or prohibited uses, protect the safety of persons and property and to control vehicular and pedestrian traffic in and around the venue, provided that such requirements shall not be imposed in a manner that will unreasonably restrict expressive or other activity protected by the California or United States Constitutions. Conditions may include, but are not limited to, the following:

10. The use of sound amplification equipment, and restrictions on the amount of noise generated by motors and other equipment used in the course of the special event.

C. Arena, and city park facilities.

Chapter 20
ZONING

20.100.450 - Hours of construction within 500 feet of a residential unit.

A. Unless otherwise expressly allowed in a development permit or other planning approval, no applicant or agent of an applicant shall suffer or allow any construction activity on a site located within 500 feet of a residential unit before 7:00 a.m. or after 7:00 p.m., Monday through Friday, or at any time on weekends.

B. Without limiting the scope of Section 20.100.310, no applicant or agent of an applicant shall suffer or allow any construction activity on a site subject to a development permit or other planning approval located within 500 feet of a residential unit at any time when that activity is not allowed under the development permit or planning approval.

C. This section is applicable whenever a development permit or other planning approval is required for construction activity.

Summary of City Noise Policy

The City's General Plan noise level standards are provided in terms of L_{dn}/DNL, which is a 24-hour average sound level. As a result, it may disguise short-term increases in ambient noise levels during park events. The City's Municipal Code has provisions pertaining to amplified speech and music, but the Municipal Code does not contain any numeric limits. In addition, the Municipal Code does not establish quantitative noise limits for demolition or construction activities occurring in the City.

Impacts and Mitigation Measures

Based on the Appendix G of the State CEQA Guidelines, a project could have a significant noise impact if it would cause any of the following conditions to occur:

1. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
2. Generation of excessive groundborne vibration or groundborne noise levels?
3. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Thresholds of Significance

As discussed in CEQA Guidelines Section 15064(b), the determination of whether a project may have a significant effect on the environment calls for judgment on the part of the lead agency and must be based to the extent possible on scientific and factual data. For the purposes of this analysis, the City of San José relies on the following as CEQA thresholds of significance:

- Construction Noise – For temporary construction-related noise to be considered significant, construction noise levels would have to exceed ambient noise levels by 5 dBA L_{eq} or more and exceed the normally acceptable levels of 60 dBA L_{eq} at the nearest noise-sensitive land uses or 70 dBA L_{eq} at office or commercial land uses for a period of more than 12 months.
- Operational Noise – Based on General Plan Policy EC-1.2, a significant noise impact would occur where existing noise sensitive land uses would be subject to permanent noise level increases of 3 dBA DNL or more where noise levels would equal or exceed the “Normally Acceptable” level, or 5 dBA DNL or more where noise levels would remain “Normally Acceptable”, as shown previously in **Error! Reference source not found.**.
- Construction Vibration – Based on General Plan Policy EC-2.3, significant vibration impacts would occur if the project generates a continuous vibration limit of 0.2 inches/sec (5.0 mm/sec) PPV for buildings of normal conventional construction, and a continuous vibration limit of 0.08 inches/sec (2.0 mm/sec) PPV for buildings that are historic or documented to be structurally weakened.

Methodology for Quantifying Project Noise and Vibration Levels

Construction Noise and Vibration Impact Evaluation:
Construction of the proposed project would include removal of existing structures (such as the bathroom, playground equipment, etc.), minimal excavation and grading, and construction of new buildings. The overall duration of construction is anticipated to be 24 months.

The proposed project would result in short-term increases in noise and vibration during project

construction. Construction noise levels are quantified using the methodology and reference noise level data contained within the FHWA Roadway Construction Noise Model (RCNM). Construction vibration is quantified using the Federal Transit Administration Noise and Vibration Impact Assessment methodology (FTA-VA-90-1003-06).

Off-Site Traffic Noise Increase Impact Evaluation:

To predict changes in offsite traffic noise levels resulting from ongoing operation of the Saint James Park following completion of the revitalization project, the Federal Highway Administration Highway Traffic Noise Prediction Model was used (FHWA-RD-77-108). The model was used with the Calveno emission curves and inputs obtained from Hexagon Transportation Consultants, posted speed limits and BAC speed observations, estimates of truck usage based on BAC observations, and day/night distribution of traffic based on BAC's continuous noise measurement results.

On-Site Park Activities (without Amplified Speech or Music) Noise Impact Evaluation:

Passive recreation activities at the Park Site are not considered noise-generating. However, active use of the park facilities for such activities as would occur within the play structure area and dog parks are considered noise-generating activities. BAC file data for active recreation areas of parks and noise generated by dog parks were used to quantify the potential noise generation of these sources.

On-Site Park Activities (with Amplified Speech or Music) Noise Impact Evaluation:

The component of the Project with the greatest potential for noise generation will be the Levitt Performing Arts Pavilion. The performing arts pavilion would be designed as a 5,000-spectator outdoor music and performance venue with lighting and sound amplification. Lighting for the performing arts pavilion (including stage) would be supported by the canopy structure and lighting towers within the audience area. The sound system would include arrays of loudspeakers from the stage and distributed loudspeakers throughout and/or around the audience lawn area.

The performing arts pavilion would be capable of accommodating a variety of events, such as film festivals, concerts, and dance and theatre performances. The City is collaborating with Levitt Pavilions, a national nonprofit organization working in partnership with the Mortimer & Mimi Levitt Foundation, to support the construction of the pavilion and sponsor approximately 50 family-friendly Levitt Foundation concerts per year. The performing arts pavilion could also host other City-sponsored events and concerts. While there is no schedule of events for the proposed pavilion at this point in time, for the purposes of this EIR, it is assumed that the project would host between 50 and 300 events annually at the performing arts pavilion ranging in scale from 20 to 5,000 attendees.

According to information provided by ARUP Engineers, the sound system employed for the performing arts pavilion will consist of state-of-the-art cardioid subwoofers and vertical line arrays at the stage area, and distributed loudspeakers throughout or around the audience area. Figure 7 shows a conceptual plan indicating locations for vertical line arrays and distributed sound systems.

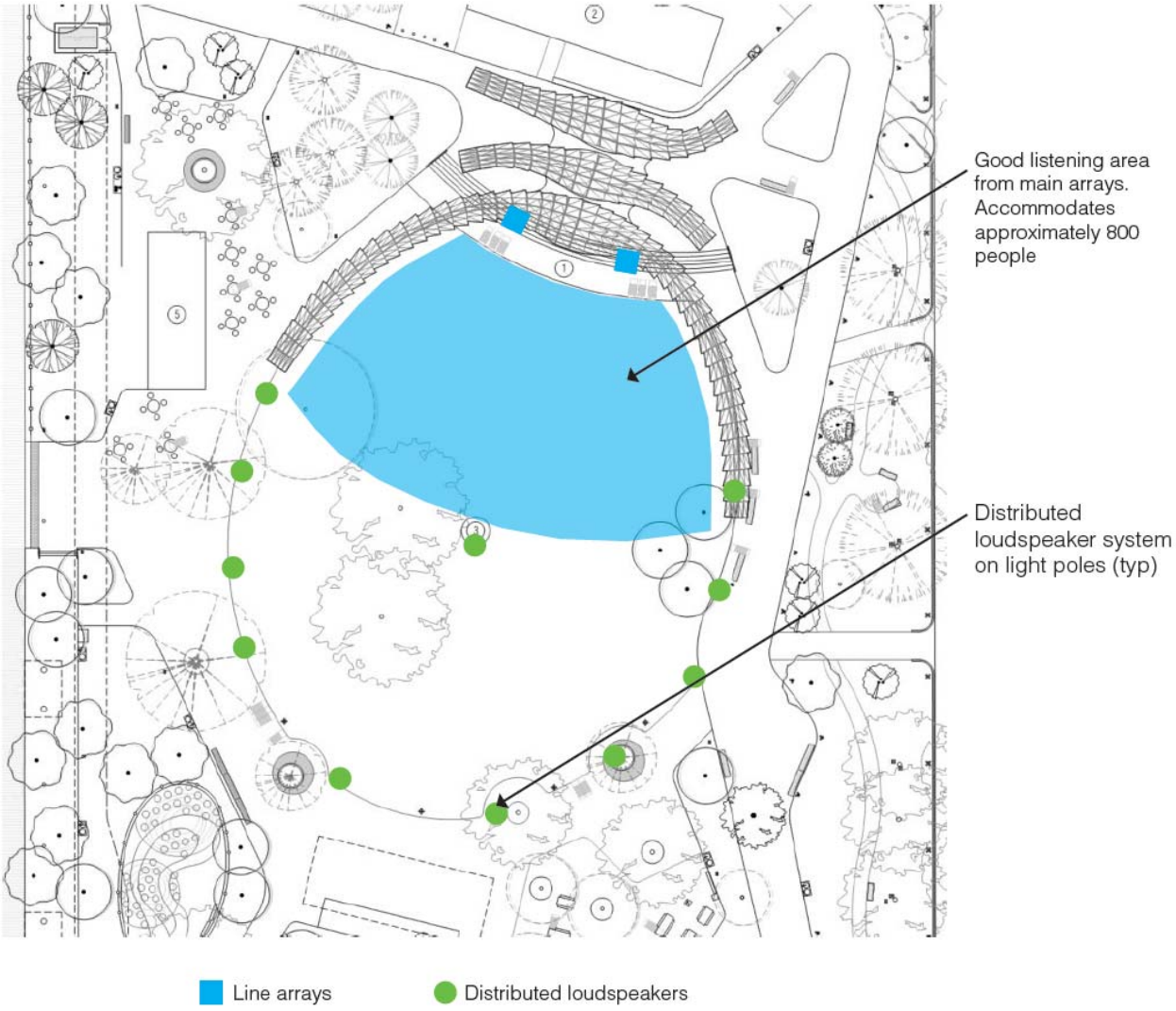
In addition to the active sound amplification system, the project engineers are recommending controlling reflections of sound off the undersides of the pavilion spines and back of house reflections through the inclusion of sound absorbing materials in the project construction.

One approach to controlling the overhead reflections being considered is to add sound absorbing

material to the opaque cladding panels over the stage area. Because the main program of the Levitt pavilion will reportedly be amplified rather than acoustic music, acoustic support from a traditional bandshell shape is not required. Should the sound absorbing layer of the cladding sandwich panel not be feasible, overstage reflectors may be needed. Reflectors provide acoustic support to performers by reflecting sound back diffusely and evenly, thereby minimizing unwanted acoustic artifacts due to aberrant reflections.

According to ARIP Engineering, echoes off the back of house support building back to performers should be mitigated. This can be done by adding absorption to the face of the building, or angling the façade to direct reflections upward and away from performers. Alternatively, a stage backdrop could provide both a visual barrier between the front of house and back of house and block unwanted echoes. Curving the backdrop into a convex shape would further improve stage acoustics.

Figure 7
Conceptual Loudspeaker Design for Levitt Performing Arts Pavilion



BAC's experience in conducting sound level measurements for performing arts venues where amplified speech and music is employed has been that noise levels of 100 dBA at a position 100 feet from the front of the stage are not uncommon for concerts with up to 5,000 persons in attendance.

As part of the 2014 study prepared by BAC for amplified music events held at the Saint James Park, and based on the sensitivity of the existing residential uses located directly north of the proposed pavilion, the Sainte Claire Club located west of the pavilion, and the Trinity Cathedral located opposite the proposed pavilion, the following conclusions and recommendations which are pertinent to this current project were presented:

1. The noise standards of the City of San Jose are not well suited to assessing or preventing the potential noise impacts associated with amplified sound events at Saint James Park. This is because the General Plan standards, being based on a 24-hour average, do not provide a good indication of public reaction to short, loud activities. Conversely, the Municipal Code provisions are very subjective, which makes enforcement difficult.

2. BAC recommends the City consider adopting numeric noise standards specific to outdoor amplified sound levels such as that generated during events at Saint James Park. Such standards should consider including a provision specifically limiting low-frequency sound to reasonable limits.

3. The use of subwoofers at this venue should be discouraged. If subwoofers are to be utilized, the low-frequency sound output should be controlled at the mixing booth. This is a difficult aspect of sound generation to monitor without sophisticated equipment, but has been cited as a significant source of concern by the local residents and churches.

4. Overall sound output should be limited to an average (L_{eq}) of 85 dBA and a maximum (L_{max}) of 90 dBA at the mixing booth located 100 feet from the stage. Stage managers should be required to mount a sound level meter with continuous A-weighted sound pressure level display adjacent to the mixing booth so there is no doubt as the current sound system output at any given time. Only by being aware of the instantaneous sound levels can the sound technicians make the appropriate adjustments to the sound mixing board. The meter should meet a minimum Type 2 compliance and be fitted with the manufacturer's windscreen and calibrated before use.

5. Based on BAC's observations during the Dia De Los Muertos festival, and experience in monitoring other concerts over the years, it is very difficult to enforce sound level limits on concert promoters. One avenue the City may wish to consider in this regard is to collect a deposit prior to the event which will be returned after it has been determined by City staff that the concert promoter has satisfied the City's noise performance standards. Additional information pertaining to this type of enforcement program can be developed upon request.

6. Due to the likely difficulty of providing additional acoustical isolation to the interior space of the Trinity Episcopalian Church, event coordinators should be required to work with the Church representatives to minimize interference with church functions to the maximum extent possible.

7. The Parks department should contact the local law enforcement agencies following the

concerts to determine if any noise complaints were registered during the concerts. All legitimate complaints should be investigated and additional sound controls evaluated and implemented as appropriate.

In spite of the recommendations presented above, at this time it is unknown if sound levels can feasibly be maintained at an average level of 85 dBA at a reference distance of 100 feet from the stage during larger concerts. Nonetheless, this assumption is used to assess potential noise impacts related to the use of the performing arts venue for this study.

Impact 1: Increases in Off-Site Traffic Noise Levels Resulting from the Project

Implementation of the proposed project will result in changes to traffic volumes and circulation patterns on the local roadway network. Specifically, North Second Street will be closed to vehicular traffic as part of this project (VTA operations will continue). In addition, during events at the park, local traffic volumes in the immediate park vicinity would logically increase. Those increases in traffic volumes will result in a corresponding increase in traffic noise levels.

The FHWA Model was used with traffic input data provided by the project transportation consultant (Hexagon) to predict traffic noise levels for the following scenarios: existing conditions, existing-plus-project conditions, background conditions, and background-plus-project conditions. Explanations for the differences between "Existing" and "Background" scenarios are presented in the Hexagon traffic study.

Results of the traffic noise analyses are summarized in Tables 7 and 8 for existing and background conditions, respectively, with and without the proposed project. Appendices E through H contain the FHWA Model input data for all scenarios.

The Table 7 and 8 data indicate that noise level increases due to the project would range from -5.6 dB to 1.7 dB L_{dn} relative to existing no-project conditions. Relative to background no-project conditions, the noise level increases due to the project would range from -5.3 dB to 1.5 dB $L_{dn.}$ The predicted ranges of project-related traffic noise level increases are below the City of San Jose 3 dB DNL threshold for a finding of a project-related noise impact. ***As a result, this impact is considered less-than-significant.***

Mitigation for Impact 1: ***None Required***

Table 7
Existing Vs. Existing Plus Project Traffic Noise Levels
Saint James Park Revitalization Project – San Jose, California

#	Intersection Description	L_{dn} @ 35 feet								Individual Roadway Direction Increase, dB				Substantial Increases?[1]
		Existing				Existing + Project								
		N	S	E	W	N	S	E	W	N	S	E	W	
1	Market St and Julian St	70.5	63.9	67.0	56.2	70.5	65.1	67.4	56.2	0.1	1.2	0.5	0.1	No
2	First St and Julian St	61.4	63.3	57.3	65.4	61.6	64.6	57.3	66.2	0.1	1.3	0.0	0.1	No
3	Second St and Julian St	59.8	62.8	59.5	63.3	59.9	63.2	57.1	64.6	0.1	0.4	-2.4	0.1	No
4	Third St and Julian St	60.4	61.0	62.7	61.8	60.4	61.2	63.0	62.3	0.1	0.2	0.3	0.1	No
5	SR-87 and Julian St (West)*	59.5	67.8	56.1	67.7	60.3	68.0	56.1	67.8	0.8	0.2	0.0	0.8	No
6	SR-87 and Julian St (East)*	66.6	67.5	63.9	69.0	66.8	67.7	63.9	69.3	0.2	0.2	0.0	0.2	No
7	San Pedro St and St. James St	55.0	66.1	58.9	66.8	55.0	66.5	59.4	67.2	0.0	0.3	0.5	0.0	No
8	Market St and St. James St	66.3	63.3	65.8	64.4	66.8	63.0	66.7	64.8	0.6	-0.3	0.9	0.6	No
9	First St and St. James St	56.8	63.3	57.0	63.2	56.8	63.0	57.0	62.9	0.0	-0.3	0.0	0.0	No
10	Second St and St. James St	60.9	63.4	59.7	63.3	59.3	64.2	n/a	63.0	-1.6	0.7	n/a	-1.6	No
11	Third St and St. James St	62.6	63.0	62.2	63.3	62.9	64.0	62.8	64.0	0.3	1.0	0.7	0.3	No
12	Fourth St and St. James St	64.6	61.7	64.5	63.0	64.8	61.8	65.7	64.0	0.2	0.1	1.2	0.2	No
13	San Pedro St and St. John St	59.8	57.0	61.4	58.6	60.2	57.0	61.7	58.6	0.4	0.0	0.3	0.4	No
14	Market St and St. John St	65.9	58.5	65.7	54.6	66.8	58.7	66.4	54.6	0.9	0.2	0.8	0.9	No
15	First St and St. John St	56.9	58.7	56.5	58.7	56.9	58.9	56.5	58.8	0.0	0.2	0.0	0.0	No
16	Second St and St. John St	57.9	58.6	57.9	58.6	n/a	58.8	52.2	58.8	n/a	0.2	-5.6	n/a	No
17	Third St and St. John St	62.0	59.3	63.8	58.5	62.7	59.3	64.0	58.7	0.7	0.0	0.3	0.7	No
18	Fourth St and St. John St	64.4	58.8	64.7	60.0	65.6	59.0	65.6	60.0	1.2	0.1	0.9	1.2	No
19	Fifth St and St. John St	56.8	58.4	58.3	58.3	56.9	58.5	58.3	58.5	0.1	0.1	0.0	0.1	No
20	SR-87 and Santa Clara St*	n/a	67.5	66.1	68.6	n/a	67.8	66.6	68.7	n/a	0.3	0.4	n/a	No
21	San Pedro St and Santa Clara St	60.3	65.8	57.3	66.4	60.9	66.1	57.3	66.8	0.6	0.3	0.0	0.6	No
22	Market St and Santa Clara St	65.7	65.6	65.3	65.6	66.4	66.2	65.8	65.9	0.7	0.5	0.4	0.7	No
23	First St and Santa Clara St	55.5	65.7	56.5	65.7	55.5	66.2	56.5	66.2	0.0	0.5	0.0	0.0	No
24	Second St and Santa Clara St	58.6	65.6	58.9	65.7	54.4	66.1	56.5	66.2	-4.2	0.5	-2.3	-4.2	No
25	Third St and Santa Clara St	62.9	65.8	63.6	65.7	64.6	66.1	64.1	66.2	1.7	0.3	0.5	1.7	No
26	Fourth St and Santa Clara St	65.6	65.4	66.3	65.6	66.3	65.5	66.7	65.9	0.7	0.1	0.4	0.7	No
27	Fifth St and Santa Clara St	57.4	65.7	n/a	65.7	57.4	65.8	n/a	65.8	0.0	0.1	n/a	0.0	No

1. A substantial increase is defined by the City of San Jose as 3 dB where noise levels exceed the normally acceptable levels for the sensitive uses.

Source: FHWA-RD-77-108 with inputs prepared by Hexagon & BAC

Table 8
Background Vs. Background Plus Project Traffic Noise Levels
Saint James Park Revitalization Project – San Jose, California

#	Intersection Description	L_{dn} @ 35 feet								Individual Roadway Direction Increase, dB				Substantial Increases?[1]
		Existing				Existing + Project								
		N	S	E	W	N	S	E	W	N	S	E	W	
1	Market St and Julian St	71.6	65.3	68.4	56.7	71.7	66.4	68.8	56.7	0.0	1.1	0.4	0.0	No
2	First St and Julian St	62.6	64.2	59.0	66.0	62.7	65.5	59.0	66.9	0.1	1.3	0.0	0.9	No
3	Second St and Julian St	60.2	63.5	59.9	63.9	60.3	63.8	56.6	65.3	0.1	0.3	-3.2	1.4	No
4	Third St and Julian St	62.6	62.4	63.8	64.1	62.7	62.6	64.0	64.4	0.1	0.1	0.2	0.3	No
5	SR-87 and Julian St (West)*	60.8	68.9	59.0	68.7	61.5	69.1	59.0	68.7	0.6	0.1	0.0	0.0	No
6	SR-87 and Julian St (East)*	67.2	68.7	64.9	70.0	67.4	68.9	64.9	70.2	0.2	0.2	0.0	0.2	No
7	San Pedro St and St. James St	55.9	67.5	59.5	68.0	55.9	67.7	59.9	68.3	0.0	0.3	0.5	0.3	No
8	Market St and St. James St	67.9	64.4	66.9	65.9	68.4	64.1	67.8	66.1	0.5	-0.3	0.8	0.3	No
9	First St and St. James St	59.4	64.7	58.9	64.8	59.4	64.4	58.9	64.5	0.0	-0.3	0.0	-0.3	No
10	Second St and St. James St	62.2	64.5	60.9	64.5	60.6	65.3	n/a	64.2	-1.6	0.8	n/a	-0.3	No
11	Third St and St. James St	64.5	64.3	64.0	64.7	64.7	65.3	64.5	65.4	0.2	0.9	0.5	0.7	No
12	Fourth St and St. James St	66.4	62.7	66.1	63.7	66.5	62.8	67.1	64.8	0.1	0.1	1.0	1.1	No
13	San Pedro St and St. John St	59.8	57.0	61.4	58.6	60.2	57.0	61.7	58.6	0.4	0.0	0.3	0.0	No
14	Market St and St. John St	66.0	58.5	65.8	54.6	67.0	58.6	66.7	54.6	1.0	0.1	0.9	0.0	No
15	First St and St. John St	56.9	58.7	56.5	58.7	56.9	58.8	56.5	58.8	0.0	0.1	0.0	0.1	No
16	Second St and St. John St	58.0	58.6	58.0	58.6	n/a	58.8	52.6	58.8	n/a	0.2	-5.3	0.2	No
17	Third St and St. John St	63.4	60.1	64.9	59.4	63.9	60.1	65.1	59.5	0.5	0.0	0.2	0.1	No
18	Fourth St and St. John St	65.7	59.3	65.9	60.4	66.8	59.4	66.7	60.4	1.1	0.1	0.8	0.0	No
19	Fifth St and St. John St	56.8	58.4	58.3	58.3	56.9	58.5	58.3	58.5	0.1	0.1	0.0	0.2	No
20	SR-87 and Santa Clara St*	n/a	67.8	66.4	69.0	n/a	68.1	66.8	69.0	n/a	0.3	0.4	0.1	No
21	San Pedro St and Santa Clara St	60.4	66.0	57.7	66.6	61.0	66.3	57.7	67.0	0.6	0.3	0.0	0.4	No
22	Market St and Santa Clara St	66.5	66.3	66.0	66.2	67.2	66.8	66.4	66.5	0.7	0.5	0.5	0.3	No
23	First St and Santa Clara St	56.3	66.5	57.1	66.4	56.3	66.9	57.1	66.9	0.0	0.5	0.0	0.5	No
24	Second St and Santa Clara St	59.3	66.4	59.9	66.5	56.1	66.9	58.4	67.0	-3.2	0.5	-1.5	0.5	No
25	Third St and Santa Clara St	63.6	66.6	64.2	66.4	65.1	66.8	64.7	66.8	1.5	0.3	0.4	0.5	No
26	Fourth St and Santa Clara St	66.6	66.1	67.0	66.2	67.3	66.1	67.4	66.5	0.7	0.1	0.4	0.3	No
27	Fifth St and Santa Clara St	57.4	65.9	n/a	65.8	57.4	66.0	n/a	65.9	0.0	0.1	n/a	0.1	No

1. A substantial increase is defined by the City of San Jose as 3 dB where noise levels exceed the normally acceptable levels for the sensitive uses.

Source: FHWA-RD-77-108 with inputs prepared by Hexagon & BAC

Impact 2: Noise Generated by Active Recreation Area of Park (Play Structures)

Noise generated by neighborhood parks varies depending on whether the parks are intended for passive or active use. Passive use includes picnic and sitting areas whereas active use incudes playing fields and play structures. According to the project illustrative site plan (Figure 4), the project proposes an active recreation area (play structure), in addition to passive areas (gardens, picnic areas, walking paths, etc.). According to BAC file data, parks consisting of active uses such as the proposed play structure can generate noise levels of approximately 50 dB L_{eq} and 70 dB L_{max} at a distance of 100 feet. These levels can be expected to vary somewhat (+/5 dB) depending on the number of children utilizing the play structure and their levels of vocal enthusiasm.

The nearest noise-sensitive uses to the proposed active recreation area of the park consist of the Trinity Cathedral and mixed-use housing development (Marshall Squares apartments) currently under construction adjacent to the Cathedral. Those uses are approximately 250 feet south of the proposed active recreation area of the park. The Saint James Place Apartments are located approximately 600 feet north of the proposed play structure area.

Based on the above mentioned reference noise levels, and assuming standard spherical spreading loss (-6 dB per doubling of distance), play structure noise exposure computes to approximately 42 dBA L_{eq} and 62 dBA L_{max} at the exterior facades of the Marshall Squares apartments and Trinity Cathedral. At the exterior facades of the Saint James Place Apartments to the north, predicted playground noise levels are predicted to be 34 dBA L_{eq}, with maximum noise levels approximately 20 dBA higher at those exterior facades.

General Plan Policy EC-1.3 requires that the noise generation of new nonresidential land uses be mitigated to 55 dBA L_{dn} at the property line when located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses.

If the play structure were in full use during the entire daytime period, computed L_{dn} values within these nearest sensitive receptor areas would be approximately equal to hourly average levels (L_{eq}). At the exterior building facades of the nearest sensitive receptors (Trinity Cathedral and Marshall Squares apartments), play structure area noise would be approximately 42 dB L_{dn}. Because this level is well below the City's 55 dB DNL standard, and because the predicted level is well below measured ambient noise levels at the nearest sensitive areas, ***this impact is considered less than significant.***

Mitigation for Impact 2: ***None Required***

Impact 3: Noise Generated by Dog Park Areas

Noise generated by dog parks varies depending on the number of dogs utilizing the area at any given time, the disposition of the dogs, and the level of supervision being provided by the dogs owners. In general, it has been BAC's experience that, while barking does periodically occur within dog parks, dogs playing and exercising are far less likely to bark than dogs left unattended in backyards.

BAC has prepared noise analyzes for Northern California dog parks in recent years. Those dog parks included the Marco Park, Granite Park, and Partner Park. In addition, barking dog noise level data collected at the All Pets Boarding facility in Loomis, California were used to supplement the dog park measurement data. The numbers of dogs present in the parks during the measurements varied from 10 to approximately 45 dogs. The noise surveys indicated that the noise generation during periods when dogs are barking within a dog park can be expected to be approximately 50-55 dBA L_{eq} and 65 dBA L_{max} at a reference distance of 100 feet from the dog park.

The nearest noise-sensitive use to the dog park areas consist of the office/professional uses located approximately 150 feet south of the proposed southerly dog park. The Trinity Cathedral, Marshall Squares apartments, and Saint James Place Apartments are located approximately 250, 350 and 500 feet from the proposed dog park area, respectively.

Based on the above mentioned reference noise levels, and assuming standard spherical spreading loss (-6 dB per doubling of distance), worst-case dog park noise exposure computes to approximately 51 dB L_{eq} and 61 dB L_{max} at the exterior facades of the nearest office/professional use. At the Trinity Cathedral, Marshall Squares apartments, and Saint James Place Apartments, predicted worst-case dog park exposure would be 47, 44 and 41 dBA L_{eq}, respectively.

General Plan Policy EC-1.3 requires that the noise generation of new nonresidential land uses be mitigated to 55 dBA L_{dn} at the property line when located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses.

If the dog park were in full use during the entire daytime period, the computed L_{dn} value at the nearest sensitive uses be approximately equal to hourly average levels (L_{eq}), ranging from approximately 41 to 51 dBA L_{dn}. This range of predicted dog park noise level would be satisfactory relative to the City's 55 dBA L_{dn} exterior noise standard, and well below measured ambient noise levels at the nearest building facades (See Appendix B-2). ***As a result, this impact is considered less-than-significant.***

Mitigation for Impact 3: ***None Required***

Impact 4: Noise Generated by Project Construction

During the construction phases of the proposed project, noise from construction activities would add to the noise environment in the immediate project vicinity. Activities involved in typical construction would generate maximum noise levels, as indicated in Table 9, ranging from 70 to 90 dB at a distance of 50 feet. It should be noted that project construction activities would not likely require the use of each type of equipment included in Table 9.

Table 9
Typical Construction Equipment Noise

Equipment Description	Maximum Noise Level at 50 feet, dBA
Auger drill rig	85
Backhoe	80
Bar bender	80
Boring jack power unit	80
Chain saw	85
Compactor (ground)	80
Compressor (air)	80
Concrete batch plant	83
Concrete mixer truck	85
Concrete pump truck	82
Concrete saw	90
Crane (mobile or stationary)	85
Dozer	85
Dump truck	84
Excavator	85
Flatbed truck	84
Front end loader	80
Generator (25 kilovolt-amperes [kVA] or less)	70
Generator (more than 25 kVA)	82
Grader	85
Jackhammer	85
Paver	85
Pickup truck	55
Pneumatic tools	85
Pumps	77
Rock drill	85
Scraper	85
Soil mix drill rig	80
Tractor	84
Vacuum street sweeper	80
Vibratory concrete mixer	80

Source: Federal Highway Administration 2006.

The nearest existing uses are residential apartments located approximately 100 feet north of the major project construction areas (Performing Arts Center). At the exterior building façade of those apartments, worst-case maximum noise levels generated by project construction would be expected to range from approximately 65-85 dBA L_{max}. Within those residences, worst-case maximum construction noise

levels would be approximately 60 dBA with windows closed and approximately 70 dBA with windows open.

As noted in the Regulatory Setting section of this report, hours for construction activities should be limited to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday when such activities would occur within 500 feet of an existing residences. However, the City's municipal code also states that this requirement is not applicable to construction activities occurring less than 12-months in duration. Because the construction of the park improvements are anticipated to require more than 12 months to complete, restrictions on hours of construction activities would be applicable to the nearby residences relative to the City's Municipal Code. Should construction activities occur during nighttime hours, a substantial temporary increase in ambient noise levels would likely result. The CEQA guidelines require identification of a significant noise impact for substantial temporary increases in ambient noise conditions, such as those which would occur during project construction activities. ***As a result, this impact is considered potentially-significant.***

Mitigation for Impact 4: ***Implement Construction Noise Control Measures.***

The San Jose Municipal Code requires that reasonable noise reduction measures be incorporated into the construction plan and implemented during all phases of construction activity. Accordingly, this analysis concludes that this project would be required to implement the following standard noise control measures:

- Construction will be limited to the hours of 7:00 a.m. to 7:00 p.m. Monday through Friday for any on-site or off-site work within 500 feet of any residential unit. Construction outside of these hours may be approved through a 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.

- The contractor shall use "new technology" power construction equipment with state-of-the-art noise shielding and muffling devices. All internal combustion engines used on the project site shall be equipped with adequate mufflers and shall be in good mechanical condition to minimize noise created by faulty or poorly maintained engines or other components.

- The unnecessary idling of internal combustion engines shall be prohibited.

- Staging areas and stationary noise-generating equipment shall be located as far as possible from noise-sensitive receptors such as residential uses (a minimum of 200 feet, where feasible).

- The surrounding neighborhood within 500 feet shall be notified early and frequently of the construction activities.

- A "noise disturbance coordinator" shall be designated to respond to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaints (e.g., beginning work too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. A telephone number for the disturbance coordinator would be conspicuously posted at the construction site.

Significance of Impact 4 after Mitigation: ***Less-than-Significant.***

Impact 5: Vibration Generated by Project Construction

Vibration amplitude attenuates over distance and is a complex function of how energy is imparted into the ground and the soil or rock conditions through which the vibration is traveling. The following equation is used to estimate the vibration level at a given distance for typical soil conditions (Federal Transit Administration 2006). PPV_{ref} is the reference PPV at 25 feet.

$PPV = PPV_{ref} \times (25/Distance)^{1.5}$

Table 10 summarizes typical vibration levels generated by construction equipment (Federal Transit Administration 2006) at the reference distance of 25 feet and other distances as determined using the attenuation equation above.

Table 10
Vibration Source Levels for Construction Equipment

	Maximum PPV (inches/second)				
Equipment	**PPV at 25 feet**	**PPV at 50 feet**	**PPV at 75 feet**	**PPV at 100 feet**	**PPV at 175 feet**
Vibratory roller	0.210	0.0742	0.0404	0.0263	0.0113
Large bulldozer	0.089	0.0315	0.0171	0.0111	0.0048
Caisson drilling	0.089	0.0315	0.0171	0.0111	0.0048
Loaded trucks	0.076	0.0269	0.0146	0.0095	0.0041
Jackhammer	0.035	0.0124	0.0067	0.0044	0.0019
Small bulldozer	0.003	0.0011	0.0006	0.0004	0.0002

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment (2006)
PPV = peak particle velocity.

The vibration data shown in Table 10 indicate that construction equipment-generated vibration levels are below the FTA thresholds for damage to structures of 0.5 in/sec PPV at the nearest off-site buildings located in excess of 50 feet from the park site. Furthermore, the Table 10 vibration levels are below the more restrictive City of San Jose vibration limit of 0.20 in/sec PPV at the nearest off-site buildings. ***As a result, this impact is considered less-than-significant.***

Mitigation for Impact 5: ***None Required***

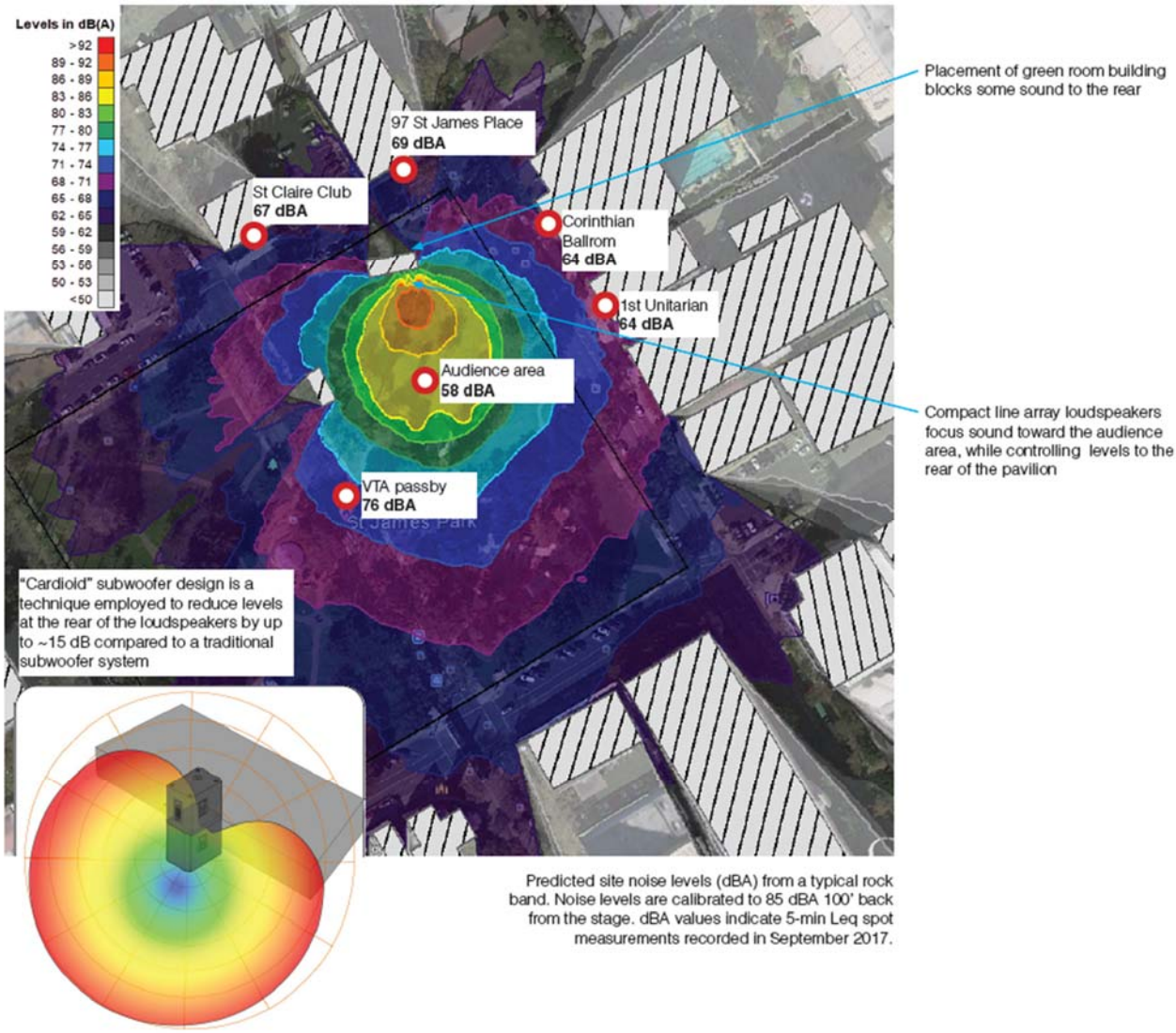
Impact 6: Noise Generated by Events at the Performing Arts Pavilion

As noted previously, the performing arts pavilion would be capable of accommodating a variety of events, such as film festivals, concerts, and dance and theatre performances. The City is collaborating with Levitt Pavilions, a national nonprofit organization working in partnership with the Mortimer & Mimi Levitt Foundation, to support the construction of the pavilion and sponsor approximately 50 family-friendly Levitt Foundation concerts per year. The performing arts pavilion could also host other City-sponsored events and concerts. While there is no schedule of events for the proposed pavilion at this point in time, for the purposes of this EIR, it is assumed that the project would host between 50 and 300 events annually at the performing arts pavilion ranging in scale from 20 to 5,000 attendees.

The noise generation of the performing arts pavilion, will vary significantly depending on the nature of the event, whether sound amplification equipment is used, and the size of the crowd. As such, reactions to the noise from nearby residents, churches and businesses will undoubtedly also vary. Additional factors contributing to these reactions will be the time of day of the events, event duration, and frequency of events. In light of these considerable variables, it is likely that smaller events held at the pavilion may not generate sound levels considered to be objectionable by local residences, churches and business. Conversely, it is equally likely that larger events may generate noise levels considered objectionable, particularly if the events occur frequently, late into the evening, and include higher levels of amplified sound, considerable low frequency content of that sound, and elevated crowd noise levels. Furthermore, local residences and churches may choose not to close their windows during events in order to achieve fresh air circulation, which would result in higher noise levels within sensitive interior spaces.

ARUP Engineering conducted computer modelling of the noise generation of amplified music events held at the proposed pavilion based on BAC's previous recommended maximum noise levels of 85 dBA at a position 100 feet from the stage area. That figure is reproduced below as Figure 8.

Figure 8
Noise Modelling of an Amplified Music Event at the Performing Arts Pavilion
Based on a reported 85 dBA level at 100 feet from the stage



Given an exterior building façade noise exposure of 70 dBA L_{eq} at the nearest apartments to the north of the pavilion, interior noise levels would be expected to be approximately 55 and 45 dB L_{eq} respectively, with windows open and closed.

Due to the directionality of the speakers, amplified music sound exposure would obviously be lower at equidistant positions behind the stage than in front of the stage. As a result of this directionality, noise exposure at the Trinity Cathedral to the south of the Pavilion, approximately 600 feet from the stage, is also predicted to be approximately 69 dBA given a reference level of 85 dBA at the location 100 feet from the stage. Resulting interior noise levels within the cathedral would be approximately comparable to those cited for the nearest apartments to the north, or 55 and 45 dB L_{eq} respectively, with the north-facing louvers open and closed.

During the music event simulation conducted by BAC on October 10, 2014 as part of the previously-described noise study prepared for the City Parks Department, noise level measurements were conducted inside of the apartments to the north, Trinity Cathedral, and Saint Claire Club. During that simulation, where the amplifications settings were also set to generate a level of 85 dBA at a distance of 100 feet, the levels measured inside these uses ranged from 47-49 dBA. When no music was present, baseline sound levels within these uses registered in the low 40's.

During the Dia de Los Muertos festival, where amplified music was played at elevated levels from a position southwest of the proposed pavilion site, noise levels within these three receptors were again measured and found to range from 45 to 50 dBA.

The results of the modelling conducted by ARUP Engineering and the noise monitoring conducted by BAC during an amplified music event simulation and again during the Dia de Los Muertos festival indicate fairly consistent results. Specifically, interior noise levels within the nearby residences, social club, and church were between 45-50 dBA L_{eq} with windows and church louvers in the closed positions. As a result, this range of interior noise levels are considered to be reasonably reliable for use in the prediction of noise impacts related to amplified music events at the performing arts pavilion.

To summarize, background sound pressure levels of 40-45 dBA were measured within the three nearest noise-sensitive receptors with no music present. With music present, sound pressure levels of 45-50 dBA dB were measured (both during the simulation and during the aforementioned festival). Therefore, the increase in sound levels which can be expected within these receptors resulting from amplified music played at the pavilion at a reference level of 85 dBA at 100 feet from the speakers is approximately 5 dBA.

An increase of 5 dBA is considered a clearly noticeable increase for similar noise sources. However, for differing noise sources, such as music versus background noise within a residence, the increase would be considerably more noticeable. Although audibility is not a test of significance under CEQA, a 5 dB increase in interior noise levels where a source consisting primarily of music is responsible for the increase would typically be considered significant. Furthermore, with windows in the open position, the increase in interior noise levels resulting from amplified music events held at the pavilion would be even greater. Although local residents, churches and other sensitive uses could choose to keep windows closed during amplified events, requiring windows to be closed during such events would be unenforceable and infeasible. As a result, this analysis concludes that interior spaces of noise-sensitive uses located in the immediate project vicinity could be exposed to substantial increases in ambient noise levels during amplified music events. ***Therefore, this impact is considered potentially significant.***

Mitigation for Impact 6: Include additional controls for events including amplified speech or music.

MM-6: The following specific measures should be included to decrease to potential for adverse public reaction to amplified speech and music events held at the proposed performing arts pavilion:

- All amplified music events at the amphitheater should be limited to daytime hours (ending prior to 10 pm).

- The pavilion sound system design should maximize the use of state-of-the-art technology to focus sound system output in the crowd areas and limit spillover of music into the community.

- The first two large concerts (in excess of 1,000 people) held at the pavilion should be completed by 8 pm to provide an opportunity to evaluate facility noise generation, including crowd noise, at the nearest residences and other sensitive receptors.

- To the maximum extent feasible, sound system output should be limited to an average of 85 dBA L_{eq} averaged over a 5 minute period at a position located 100 feet from the Amphitheater stage. This level could be increased if it can be demonstrated through noise level measurements that the design of the sound system can maintain exterior sound levels at the facades of the nearest sensitive receptors of 70 dBA or less.

- To control low-frequency sound in the surrounding neighborhood, C-weighted sound levels should be limited to 95 dBA L_{eq} averaged over a 5 minute period at a position located 100 feet from the Amphitheater stage.

- During all amplified music events with over 500 persons in attendance noise levels shall be monitored and logged in 5 minutes intervals. The monitoring should be conducted continuously from the sound stage using a logging sound level meter meeting ANSI Type 1 or 2 specifications. The meter should be calibrated before and after each music event. The logs shall be made available to the City of San Jose upon request.

- The amphitheater owner should make it very clear to event producers the sound level limits in effect as they are considerably lower than levels generated by typical large concerts. Suitable measures should be developed and implemented to both ensure the limits are maintained and penalties established if producers fail to comply with the noise level limits.

- During larger events, amplified music will likely be audible within the nearest sensitive receptors. This audibility will vary depending on several factors. As a result, a mechanism should be developed whereby residents concerned about amplified sound levels can reach a representative of the pavilion during the events so that appropriate investigation of those concerns can be accommodated.

- Due to the likely difficulty of providing additional acoustical isolation to the interior space of the Trinity Episcopalian Church, event coordinators should be required to work with the Church representatives to minimize interference with church functions to the maximum extent possible.

- The Parks department should contact the local law enforcement agencies following the concerts to determine if any noise complaints were registered during the concerts. All legitimate complaints should be investigated and additional sound controls evaluated and implemented as appropriate.

Significance of Impact 6 after Mitigation: ***Significant and Unavoidable.***

Although the requirements of Mitigation Measure MM-6 would reduce the potential for adverse public reaction to amplified music events proposed at the Saint James Park Performing Arts Pavilion, these measures would not ensure that the project does not result in a substantial increase in ambient noise levels within the noise-sensitive interior spaces of the nearest residences, churches, social club, and other land uses with interior noise sensitivity. This conclusion is reached because it is likely that substantial increases would occur despite implementation of these measures should local sensitive receptors desire to maintain windows in the open position for fresh air exchange during events. Although not all events held at the proposed pavilion will generated sound levels which will result in substantial increases in ambient noise levels within noise-sensitive land uses, there is a strong possibility that larger events would result in such increases, particularly when windows are open. As a result, despite implementation of the mitigation measures which would reduce the severity of this impact, this impact would remain ***significant and unavoidable.***

Appendix A

Acoustical Terminology

Acoustics The science of sound.

Ambient Noise The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.

Attenuation The reduction of an acoustic signal.

A-Weighting A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.

Decibel or dB Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.

CNEL Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.

Frequency The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.

Ldn Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.

Leq Equivalent or energy-averaged sound level.

Lmax The highest root-mean-square (RMS) sound level measured over a given period of time.

Loudness A subjective term for the sensation of the magnitude of sound.

Masking The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.

Noise Unwanted sound.

Peak Noise The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the Maximum level, which is the highest RMS level.

RT_{60} The time it takes reverberant sound to decay by 60 dB once the source has been removed.

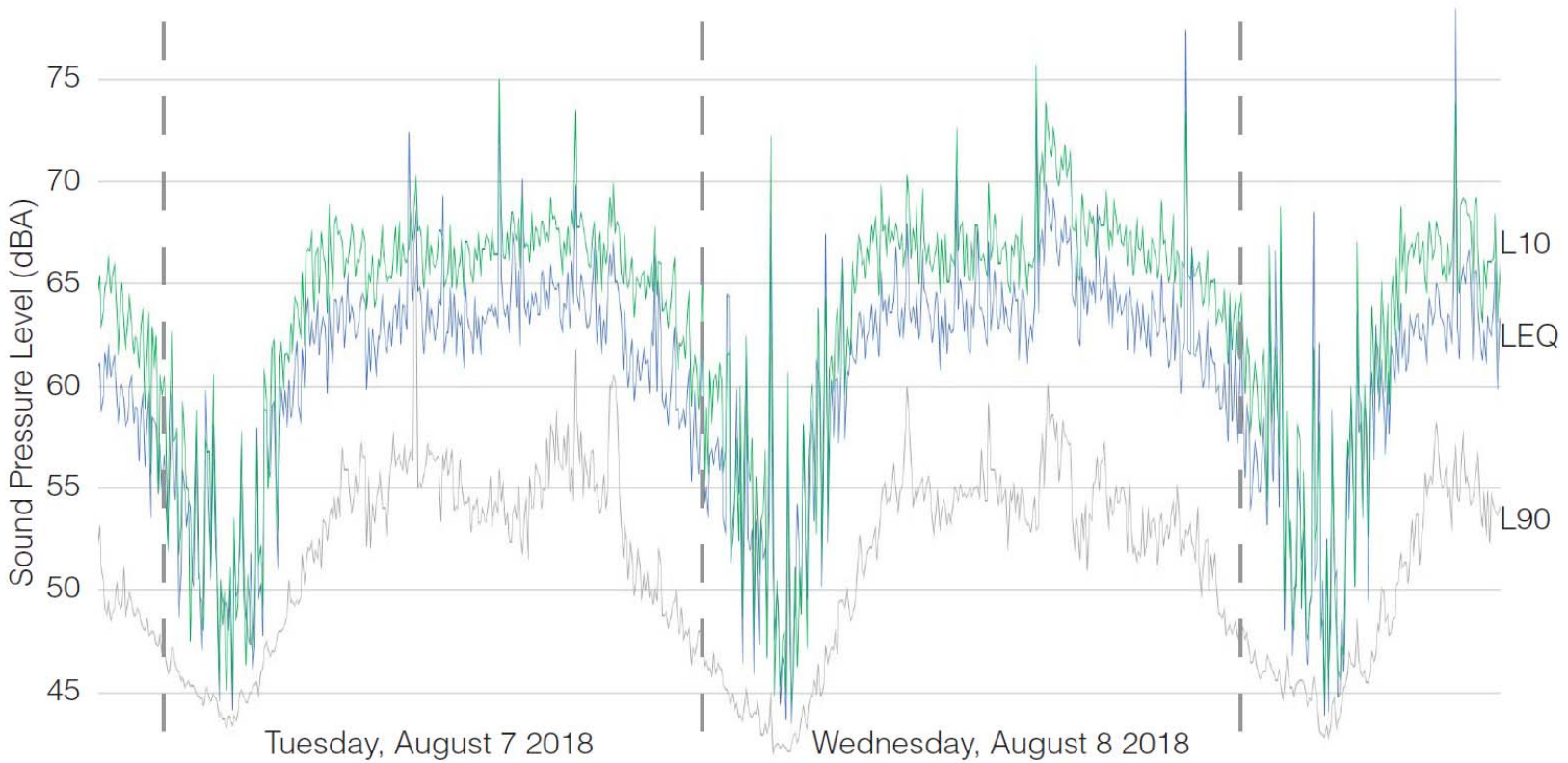
Sabin The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.

SEL A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy of the event into a 1-s time period.

Threshold of Hearing The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.

Threshold of Pain Approximately 120 dB above the threshold of hearing.

Appendix B-1
Ambient Noise Measurement Results: Site A – St. Claire Club Balcony
Saint James Park Revitalization Project – San Jose, CA



Notes:
Data collected by ARUP Engineering
Computed Day/Night Average Level = 65 dB Ldn

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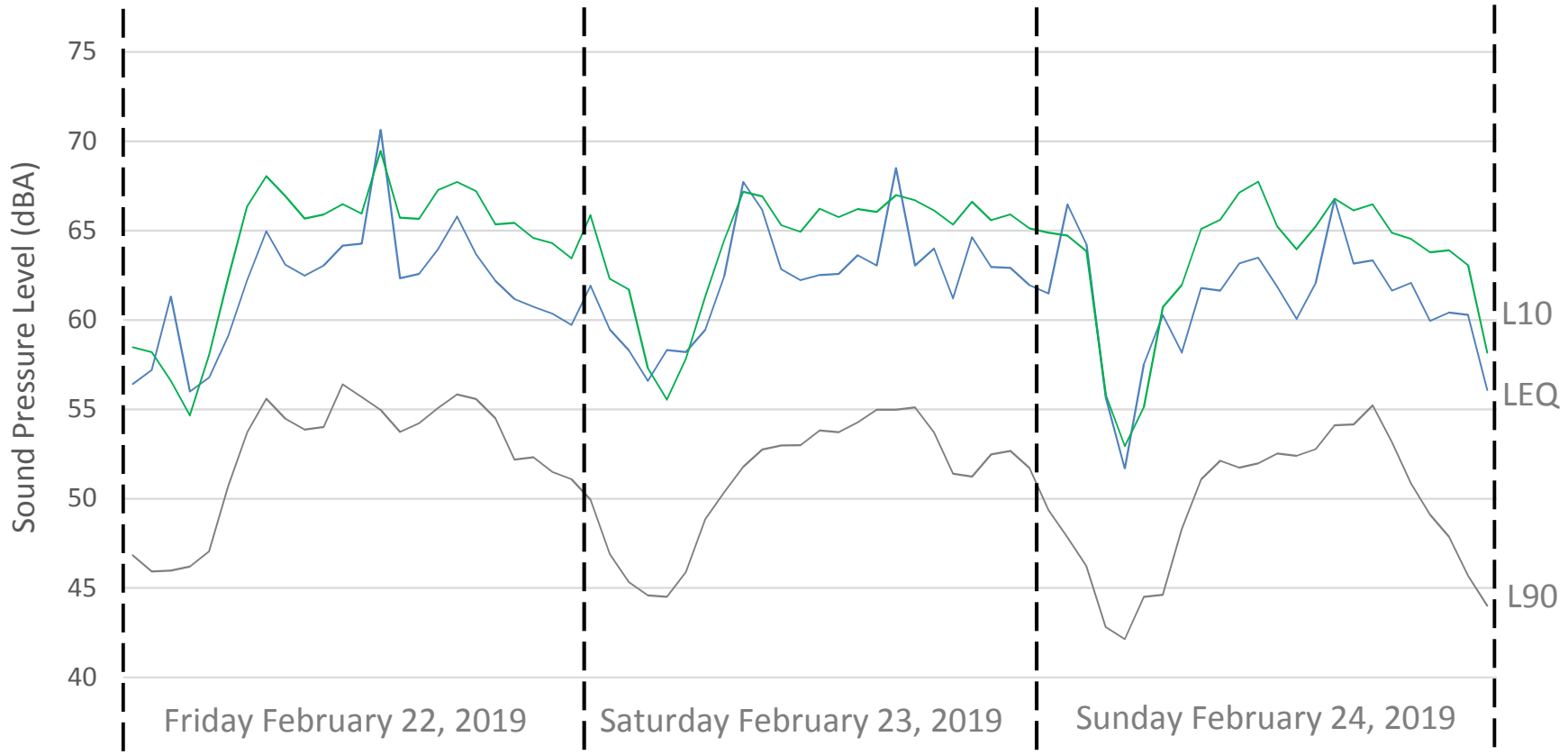
Appendix B-2
Ambient Noise Measurement Results: Site B – Trinity Cathedral
Saint James Park Revitalization Project – San Jose, CA



Notes:
Data collected by Bollard Acoustical Consultants (BAC)
Computed Day/Night Average Level = 67 dB Ldn

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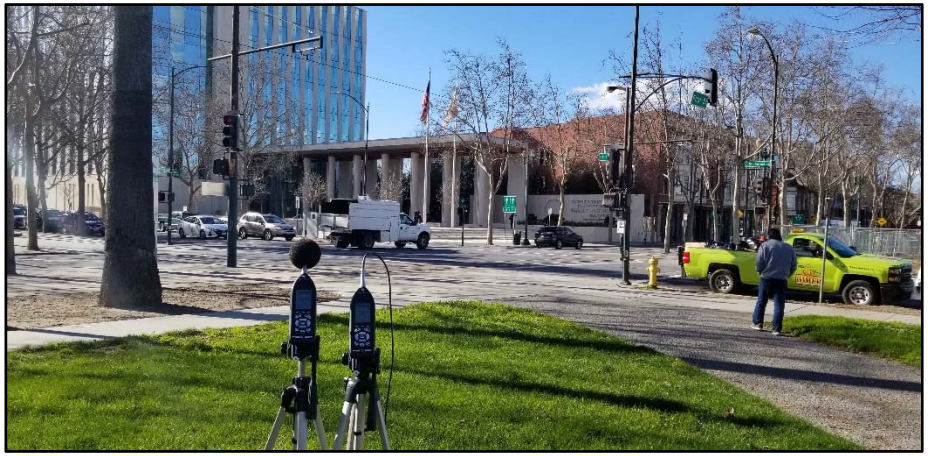
Appendix C-1
Photographs of Short-Term Ambient Noise and Vibration Measurement Locations
Saint James Park Revitalization Project – San Jose, CA



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Appendix C-2
Photographs of Continuous Noise Measurement Location: Site B – Trinity Cathedral
Saint James Park Revitalization Project – San Jose, CA

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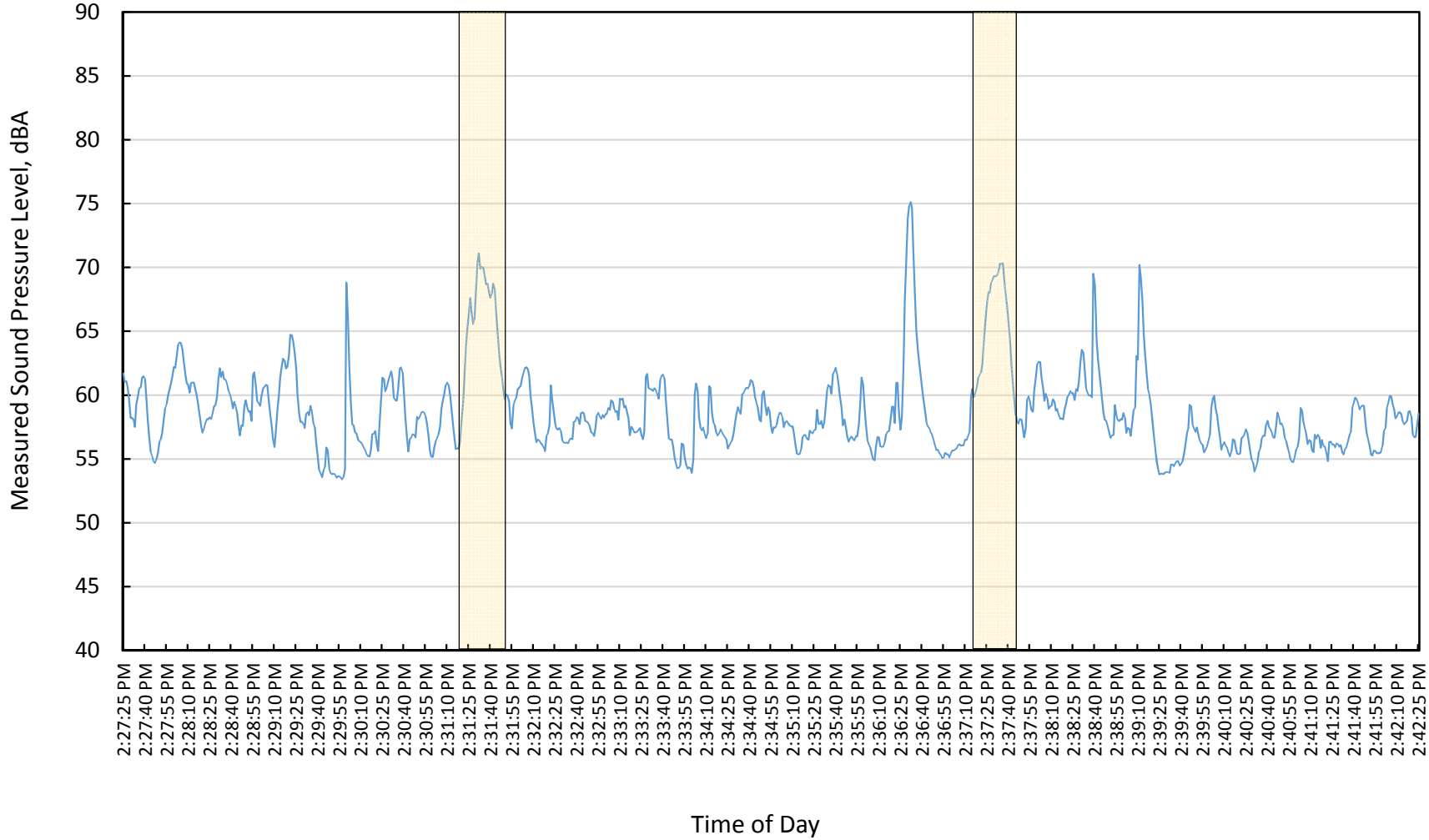
Appendix D-1
VTA Operations Pass By Noise Levels - Measurement Site 4
Saint James Park Revitalization Project - San Jose, CA



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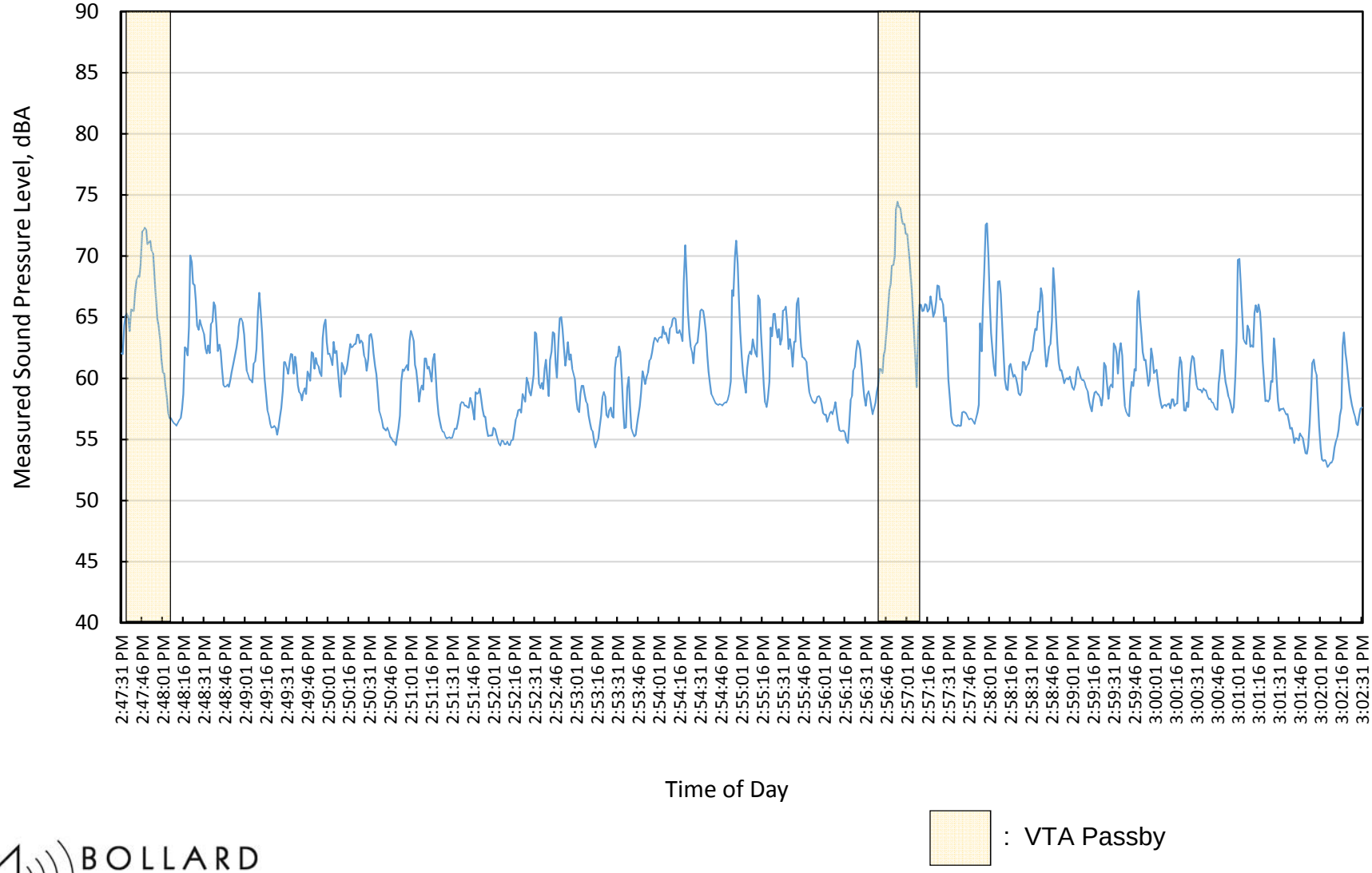
Appendix D-2
VTA Operations Pass By Noise Levels - Measurement Site 5
Saint James Park Revitalization Project - San Jose, CA



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Appendix E-1
FHWA Highway Traffic Noise Prediction Model Inputs
Saint James Park Master Plan Project
File Name: FHWA - Existing.xlsx

#	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Market St and Julian St	North	16,440	85	15	2	1	40	35	0
1	Market St and Julian St	East	6,370	85	15	2	1	30	35	0
1	Market St and Julian St	South	18,340	85	15	2	1	25	35	0
1	Market St and Julian St	West	1,530	85	15	2	1	25	35	0
2	First St and Julian St	North	5,120	85	15	2	1	25	35	0
2	First St and Julian St	East	5,530	85	15	2	1	30	35	0
2	First St and Julian St	South	1,990	85	15	2	1	25	35	0
2	First St and Julian St	West	8,840	85	15	2	1	30	35	0
3	Second St and Julian St	North	3,560	85	15	2	1	25	35	0
3	Second St and Julian St	East	4,930	85	15	2	1	30	35	0
3	Second St and Julian St	South	3,280	85	15	2	1	25	35	0
3	Second St and Julian St	West	5,490	85	15	2	1	30	35	0
4	Third St and Julian St	North	2,790	85	15	2	1	30	35	0
4	Third St and Julian St	East	4,630	85	15	2	1	25	35	0
4	Third St and Julian St	South	4,790	85	15	2	1	30	35	0
4	Third St and Julian St	West	3,930	85	15	2	1	30	35	0
5	SR-87 and Julian St (West)*	North	2,280	85	15	2	1	30	35	0
5	SR-87 and Julian St (West)*	East	15,450	85	15	2	1	30	35	0
5	SR-87 and Julian St (West)*	South	1,490	85	15	2	1	25	35	0
5	SR-87 and Julian St (West)*	West	15,180	85	15	2	1	30	35	0
6	SR-87 and Julian St (East)*	North	11,760	85	15	2	1	30	35	0
6	SR-87 and Julian St (East)*	East	14,470	85	15	2	1	30	35	0
6	SR-87 and Julian St (East)*	South	9,140	85	15	2	1	25	35	0
6	SR-87 and Julian St (East)*	West	20,490	85	15	2	1	30	35	0
7	San Pedro St and St. James St	North	1,180	85	15	2	1	25	35	0
7	San Pedro St and St. James St	East	10,520	85	15	2	1	30	35	0
7	San Pedro St and St. James St	South	2,860	85	15	2	1	25	35	0
7	San Pedro St and St. James St	West	12,320	85	15	2	1	30	35	0
8	Market St and St. James St	North	15,630	85	15	2	1	25	35	0
8	Market St and St. James St	East	7,920	85	15	2	1	25	35	0
8	Market St and St. James St	South	14,040	85	15	2	1	25	35	0
8	Market St and St. James St	West	10,210	85	15	2	1	25	35	0
9	First St and St. James St	North	1,750	85	15	2	1	25	35	0
9	First St and St. James St	East	7,880	85	15	2	1	25	35	0
9	First St and St. James St	South	1,840	85	15	2	1	25	35	0
9	First St and St. James St	West	7,790	85	15	2	1	25	35	0
10	Second St and St. James St	North	4,540	85	15	2	1	25	35	0
10	Second St and St. James St	East	8,140	85	15	2	1	25	35	0
10	Second St and St. James St	South	3,430	85	15	2	1	25	35	0
10	Second St and St. James St	West	7,930	85	15	2	1	25	35	0
11	Third St and St. James St	North	4,660	85	15	2	1	30	35	0
11	Third St and St. James St	East	7,400	85	15	2	1	25	35	0
11	Third St and St. James St	South	4,220	85	15	2	1	30	35	0
11	Third St and St. James St	West	7,840	85	15	2	1	25	35	0
12	Fourth St and St. James St	North	7,380	85	15	2	1	30	35	0
12	Fourth St and St. James St	East	5,410	85	15	2	1	25	35	0
12	Fourth St and St. James St	South	7,320	85	15	2	1	30	35	0
12	Fourth St and St. James St	West	7,370	85	15	2	1	25	35	0
13	San Pedro St and St. John St	North	3,500	85	15	2	1	25	35	0
13	San Pedro St and St. John St	East	2,810	85	15	2	1	20	35	0
13	San Pedro St and St. John St	South	5,100	85	15	2	1	25	35	0
13	San Pedro St and St. John St	West	4,050	85	15	2	1	20	35	0
14	Market St and St. John St	North	14,310	85	15	2	1	25	35	0
14	Market St and St. John St	East	3,930	85	15	2	1	20	35	0

Appendix E-2
FHWA Highway Traffic Noise Prediction Model Inputs
Saint James Park Master Plan Project
File Name: FHWA - Existing.xlsx

#	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
14	Market St and St. John St	South	13,590	85	15	2	1	25	35	0
14	Market St and St. John St	West	1,590	85	15	2	1	20	35	0
15	First St and St. John St	North	1,830	85	15	2	1	25	35	0
15	First St and St. John St	East	4,100	85	15	2	1	20	35	0
15	First St and St. John St	South	2,450	85	15	2	1	20	35	0
15	First St and St. John St	West	4,080	85	15	2	1	20	35	0
16	Second St and St. John St	North	3,440	85	15	2	1	20	35	0
16	Second St and St. John St	East	4,050	85	15	2	1	20	35	0
16	Second St and St. John St	South	3,380	85	15	2	1	20	35	0
16	Second St and St. John St	West	4,030	85	15	2	1	20	35	0
17	Third St and St. John St	North	4,090	85	15	2	1	30	35	0
17	Third St and St. John St	East	4,690	85	15	2	1	20	35	0
17	Third St and St. John St	South	6,120	85	15	2	1	30	35	0
17	Third St and St. John St	West	3,920	85	15	2	1	20	35	0
18	Fourth St and St. John St	North	7,160	85	15	2	1	30	35	0
18	Fourth St and St. John St	East	4,230	85	15	2	1	20	35	0
18	Fourth St and St. John St	South	7,610	85	15	2	1	30	35	0
18	Fourth St and St. John St	West	5,520	85	15	2	1	20	35	0
19	Fifth St and St. John St	North	1,760	85	15	2	1	25	35	0
19	Fifth St and St. John St	East	3,810	85	15	2	1	20	35	0
19	Fifth St and St. John St	South	2,480	85	15	2	1	25	35	0
19	Fifth St and St. John St	West	3,770	85	15	2	1	20	35	0
20	SR-87 and Santa Clara St*	North	0	85	15	2	1	30	35	0
20	SR-87 and Santa Clara St*	East	20,610	85	15	2	1	25	35	0
20	SR-87 and Santa Clara St*	South	10,590	85	15	2	1	30	35	0
20	SR-87 and Santa Clara St*	West	18,760	85	15	2	1	30	35	0
21	San Pedro St and Santa Clara St	North	3,920	85	15	2	1	25	35	0
21	San Pedro St and Santa Clara St	East	14,080	85	15	2	1	25	35	0
21	San Pedro St and Santa Clara St	South	2,000	85	15	2	1	25	35	0
21	San Pedro St and Santa Clara St	West	16,240	85	15	2	1	25	35	0
22	Market St and Santa Clara St	North	13,700	85	15	2	1	25	35	0
22	Market St and Santa Clara St	East	13,480	85	15	2	1	25	35	0
22	Market St and Santa Clara St	South	12,590	85	15	2	1	25	35	0
22	Market St and Santa Clara St	West	13,350	85	15	2	1	25	35	0
23	First St and Santa Clara St	North	1,950	85	15	2	1	20	35	0
23	First St and Santa Clara St	East	13,630	85	15	2	1	25	35	0
23	First St and Santa Clara St	South	2,500	85	15	2	1	20	35	0
23	First St and Santa Clara St	West	13,620	85	15	2	1	25	35	0
24	Second St and Santa Clara St	North	3,990	85	15	2	1	20	35	0
24	Second St and Santa Clara St	East	13,360	85	15	2	1	25	35	0
24	Second St and Santa Clara St	South	4,290	85	15	2	1	20	35	0
24	Second St and Santa Clara St	West	13,660	85	15	2	1	25	35	0
25	Third St and Santa Clara St	North	5,040	85	15	2	1	30	35	0
25	Third St and Santa Clara St	East	14,050	85	15	2	1	25	35	0
25	Third St and Santa Clara St	South	5,880	85	15	2	1	30	35	0
25	Third St and Santa Clara St	West	13,590	85	15	2	1	25	35	0
26	Fourth St and Santa Clara St	North	9,230	85	15	2	1	30	35	0
26	Fourth St and Santa Clara St	East	12,860	85	15	2	1	25	35	0
26	Fourth St and Santa Clara St	South	11,050	85	15	2	1	30	35	0
26	Fourth St and Santa Clara St	West	13,360	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	North	2,030	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	East	13,680	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	South	0	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	West	13,630	85	15	2	1	25	35	0

Appendix F-1
FHWA Highway Traffic Noise Prediction Model Inputs
Saint James Park Master Plan Project
File Name: FHWA - Existing+Project.xlsx

#	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Market St and Julian St	North	16,660	85	15	2	1	40	35	0
1	Market St and Julian St	East	8,360	85	15	2	1	30	35	0
1	Market St and Julian St	South	20,490	85	15	2	1	25	35	0
1	Market St and Julian St	West	1,530	85	15	2	1	25	35	0
2	First St and Julian St	North	5,280	85	15	2	1	25	35	0
2	First St and Julian St	East	7,390	85	15	2	1	30	35	0
2	First St and Julian St	South	1,990	85	15	2	1	25	35	0
2	First St and Julian St	West	10,820	85	15	2	1	30	35	0
3	Second St and Julian St	North	3,620	85	15	2	1	25	35	0
3	Second St and Julian St	East	5,370	85	15	2	1	30	35	0
3	Second St and Julian St	South	1,890	85	15	2	1	25	35	0
3	Second St and Julian St	West	7,360	85	15	2	1	30	35	0
4	Third St and Julian St	North	2,850	85	15	2	1	30	35	0
4	Third St and Julian St	East	4,820	85	15	2	1	25	35	0
4	Third St and Julian St	South	5,130	85	15	2	1	30	35	0
4	Third St and Julian St	West	4,360	85	15	2	1	30	35	0
5	SR-87 and Julian St (West)*	North	2,760	85	15	2	1	30	35	0
5	SR-87 and Julian St (West)*	East	16,090	85	15	2	1	30	35	0
5	SR-87 and Julian St (West)*	South	1,490	85	15	2	1	25	35	0
5	SR-87 and Julian St (West)*	West	15,340	85	15	2	1	30	35	0
6	SR-87 and Julian St (East)*	North	12,270	85	15	2	1	30	35	0
6	SR-87 and Julian St (East)*	East	15,250	85	15	2	1	30	35	0
6	SR-87 and Julian St (East)*	South	9,140	85	15	2	1	25	35	0
6	SR-87 and Julian St (East)*	West	21,640	85	15	2	1	30	35	0
7	San Pedro St and St. James St	North	1,180	85	15	2	1	25	35	0
7	San Pedro St and St. James St	East	11,380	85	15	2	1	30	35	0
7	San Pedro St and St. James St	South	3,220	85	15	2	1	25	35	0
7	San Pedro St and St. James St	West	13,540	85	15	2	1	30	35	0
8	Market St and St. James St	North	17,780	85	15	2	1	25	35	0
8	Market St and St. James St	East	7,370	85	15	2	1	25	35	0
8	Market St and St. James St	South	17,260	85	15	2	1	25	35	0
8	Market St and St. James St	West	11,070	85	15	2	1	25	35	0
9	First St and St. James St	North	1,750	85	15	2	1	25	35	0
9	First St and St. James St	East	7,330	85	15	2	1	25	35	0
9	First St and St. James St	South	1,840	85	15	2	1	25	35	0
9	First St and St. James St	West	7,240	85	15	2	1	25	35	0
10	Second St and St. James St	North	3,150	85	15	2	1	25	35	0
10	Second St and St. James St	East	9,630	85	15	2	1	25	35	0
10	Second St and St. James St	South	0	85	15	2	1	25	35	0
10	Second St and St. James St	West	7,380	85	15	2	1	25	35	0
11	Third St and St. James St	North	5,000	85	15	2	1	30	35	0
11	Third St and St. James St	East	9,280	85	15	2	1	25	35	0
11	Third St and St. James St	South	4,950	85	15	2	1	30	35	0
11	Third St and St. James St	West	9,330	85	15	2	1	25	35	0
12	Fourth St and St. James St	North	7,690	85	15	2	1	30	35	0
12	Fourth St and St. James St	East	5,540	85	15	2	1	25	35	0
12	Fourth St and St. James St	South	9,540	85	15	2	1	30	35	0
12	Fourth St and St. James St	West	9,250	85	15	2	1	25	35	0
13	San Pedro St and St. John St	North	3,860	85	15	2	1	25	35	0
13	San Pedro St and St. John St	East	2,810	85	15	2	1	20	35	0
13	San Pedro St and St. John St	South	5,460	85	15	2	1	25	35	0
13	San Pedro St and St. John St	West	4,050	85	15	2	1	20	35	0
14	Market St and St. John St	North	17,530	85	15	2	1	25	35	0
14	Market St and St. John St	East	4,090	85	15	2	1	20	35	0

Appendix F-2
FHWA Highway Traffic Noise Prediction Model Inputs
Saint James Park Master Plan Project
File Name: FHWA - Existing+Project.xlsx

#	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
14	Market St and St. John St	South	16,170	85	15	2	1	25	35	0
14	Market St and St. John St	West	1,590	85	15	2	1	20	35	0
15	First St and St. John St	North	1,830	85	15	2	1	25	35	0
15	First St and St. John St	East	4,260	85	15	2	1	20	35	0
15	First St and St. John St	South	2,450	85	15	2	1	20	35	0
15	First St and St. John St	West	4,240	85	15	2	1	20	35	0
16	Second St and St. John St	North	0	85	15	2	1	20	35	0
16	Second St and St. John St	East	4,200	85	15	2	1	20	35	0
16	Second St and St. John St	South	930	85	15	2	1	20	35	0
16	Second St and St. John St	West	4,190	85	15	2	1	20	35	0
17	Third St and St. John St	North	4,820	85	15	2	1	30	35	0
17	Third St and St. John St	East	4,710	85	15	2	1	20	35	0
17	Third St and St. John St	South	6,520	85	15	2	1	30	35	0
17	Third St and St. John St	West	4,070	85	15	2	1	20	35	0
18	Fourth St and St. John St	North	9,370	85	15	2	1	30	35	0
18	Fourth St and St. John St	East	4,370	85	15	2	1	20	35	0
18	Fourth St and St. John St	South	9,280	85	15	2	1	30	35	0
18	Fourth St and St. John St	West	5,540	85	15	2	1	20	35	0
19	Fifth St and St. John St	North	1,810	85	15	2	1	25	35	0
19	Fifth St and St. John St	East	3,920	85	15	2	1	20	35	0
19	Fifth St and St. John St	South	2,480	85	15	2	1	25	35	0
19	Fifth St and St. John St	West	3,910	85	15	2	1	20	35	0
20	SR-87 and Santa Clara St*	North	0	85	15	2	1	30	35	0
20	SR-87 and Santa Clara St*	East	22,030	85	15	2	1	25	35	0
20	SR-87 and Santa Clara St*	South	11,730	85	15	2	1	30	35	0
20	SR-87 and Santa Clara St*	West	19,040	85	15	2	1	30	35	0
21	San Pedro St and Santa Clara St	North	4,510	85	15	2	1	25	35	0
21	San Pedro St and Santa Clara St	East	15,020	85	15	2	1	25	35	0
21	San Pedro St and Santa Clara St	South	2,000	85	15	2	1	25	35	0
21	San Pedro St and Santa Clara St	West	17,770	85	15	2	1	25	35	0
22	Market St and Santa Clara St	North	15,940	85	15	2	1	25	35	0
22	Market St and Santa Clara St	East	15,280	85	15	2	1	25	35	0
22	Market St and Santa Clara St	South	13,890	85	15	2	1	25	35	0
22	Market St and Santa Clara St	West	14,290	85	15	2	1	25	35	0
23	First St and Santa Clara St	North	1,950	85	15	2	1	20	35	0
23	First St and Santa Clara St	East	15,440	85	15	2	1	25	35	0
23	First St and Santa Clara St	South	2,500	85	15	2	1	20	35	0
23	First St and Santa Clara St	West	15,430	85	15	2	1	25	35	0
24	Second St and Santa Clara St	North	1,530	85	15	2	1	20	35	0
24	Second St and Santa Clara St	East	15,040	85	15	2	1	25	35	0
24	Second St and Santa Clara St	South	2,500	85	15	2	1	20	35	0
24	Second St and Santa Clara St	West	15,470	85	15	2	1	25	35	0
25	Third St and Santa Clara St	North	7,460	85	15	2	1	30	35	0
25	Third St and Santa Clara St	East	14,990	85	15	2	1	25	35	0
25	Third St and Santa Clara St	South	6,580	85	15	2	1	30	35	0
25	Third St and Santa Clara St	West	15,270	85	15	2	1	25	35	0
26	Fourth St and Santa Clara St	North	10,900	85	15	2	1	30	35	0
26	Fourth St and Santa Clara St	East	13,190	85	15	2	1	25	35	0
26	Fourth St and Santa Clara St	South	12,030	85	15	2	1	30	35	0
26	Fourth St and Santa Clara St	West	14,300	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	North	2,030	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	East	14,010	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	South	0	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	West	13,960	85	15	2	1	25	35	0

Appendix G-1
FHWA Highway Traffic Noise Prediction Model Inputs
Saint James Park Master Plan Project
File Name: FHWA - Background.xlsx

#	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Market St and Julian St	North	21,500	85	15	2	1	40	35	0
1	Market St and Julian St	East	8,730	85	15	2	1	30	35	0
1	Market St and Julian St	South	25,360	85	15	2	1	25	35	0
1	Market St and Julian St	West	1,730	85	15	2	1	25	35	0
2	First St and Julian St	North	6,700	85	15	2	1	25	35	0
2	First St and Julian St	East	6,780	85	15	2	1	30	35	0
2	First St and Julian St	South	2,930	85	15	2	1	25	35	0
2	First St and Julian St	West	10,170	85	15	2	1	30	35	0
3	Second St and Julian St	North	3,860	85	15	2	1	25	35	0
3	Second St and Julian St	East	5,770	85	15	2	1	30	35	0
3	Second St and Julian St	South	3,590	85	15	2	1	25	35	0
3	Second St and Julian St	West	6,320	85	15	2	1	30	35	0
4	Third St and Julian St	North	4,720	85	15	2	1	30	35	0
4	Third St and Julian St	East	6,490	85	15	2	1	25	35	0
4	Third St and Julian St	South	6,150	85	15	2	1	30	35	0
4	Third St and Julian St	West	6,600	85	15	2	1	30	35	0
5	SR-87 and Julian St (West)*	North	3,120	85	15	2	1	30	35	0
5	SR-87 and Julian St (West)*	East	20,140	85	15	2	1	30	35	0
5	SR-87 and Julian St (West)*	South	2,960	85	15	2	1	25	35	0
5	SR-87 and Julian St (West)*	West	18,860	85	15	2	1	30	35	0
6	SR-87 and Julian St (East)*	North	13,640	85	15	2	1	30	35	0
6	SR-87 and Julian St (East)*	East	19,220	85	15	2	1	30	35	0
6	SR-87 and Julian St (East)*	South	11,460	85	15	2	1	25	35	0
6	SR-87 and Julian St (East)*	West	25,900	85	15	2	1	30	35	0
7	San Pedro St and St. James St	North	1,450	85	15	2	1	25	35	0
7	San Pedro St and St. James St	East	14,430	85	15	2	1	30	35	0
7	San Pedro St and St. James St	South	3,260	85	15	2	1	25	35	0
7	San Pedro St and St. James St	West	16,240	85	15	2	1	30	35	0
8	Market St and St. James St	North	22,810	85	15	2	1	25	35	0
8	Market St and St. James St	East	10,100	85	15	2	1	25	35	0
8	Market St and St. James St	South	18,280	85	15	2	1	25	35	0
8	Market St and St. James St	West	14,270	85	15	2	1	25	35	0
9	First St and St. James St	North	3,200	85	15	2	1	25	35	0
9	First St and St. James St	East	10,790	85	15	2	1	25	35	0
9	First St and St. James St	South	2,890	85	15	2	1	25	35	0
9	First St and St. James St	West	11,100	85	15	2	1	25	35	0
10	Second St and St. James St	North	6,130	85	15	2	1	25	35	0
10	Second St and St. James St	East	10,480	85	15	2	1	25	35	0
10	Second St and St. James St	South	4,570	85	15	2	1	25	35	0
10	Second St and St. James St	West	10,340	85	15	2	1	25	35	0
11	Third St and St. James St	North	7,250	85	15	2	1	30	35	0
11	Third St and St. James St	East	10,050	85	15	2	1	25	35	0
11	Third St and St. James St	South	6,470	85	15	2	1	30	35	0
11	Third St and St. James St	West	10,830	85	15	2	1	25	35	0
12	Fourth St and St. James St	North	11,150	85	15	2	1	30	35	0
12	Fourth St and St. James St	East	6,920	85	15	2	1	25	35	0
12	Fourth St and St. James St	South	10,390	85	15	2	1	30	35	0
12	Fourth St and St. James St	West	8,660	85	15	2	1	25	35	0
13	San Pedro St and St. John St	North	3,500	85	15	2	1	25	35	0
13	San Pedro St and St. John St	East	2,810	85	15	2	1	20	35	0
13	San Pedro St and St. John St	South	5,100	85	15	2	1	25	35	0
13	San Pedro St and St. John St	West	4,050	85	15	2	1	20	35	0
14	Market St and St. John St	North	14,850	85	15	2	1	25	35	0
14	Market St and St. John St	East	3,940	85	15	2	1	20	35	0

Appendix G-2
FHWA Highway Traffic Noise Prediction Model Inputs
Saint James Park Master Plan Project
File Name: FHWA - Background.xlsx

#	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
14	Market St and St. John St	South	14,120	85	15	2	1	25	35	0
14	Market St and St. John St	West	1,590	85	15	2	1	20	35	0
15	First St and St. John St	North	1,830	85	15	2	1	25	35	0
15	First St and St. John St	East	4,100	85	15	2	1	20	35	0
15	First St and St. John St	South	2,450	85	15	2	1	20	35	0
15	First St and St. John St	West	4,080	85	15	2	1	20	35	0
16	Second St and St. John St	North	3,530	85	15	2	1	20	35	0
16	Second St and St. John St	East	4,050	85	15	2	1	20	35	0
16	Second St and St. John St	South	3,460	85	15	2	1	20	35	0
16	Second St and St. John St	West	4,040	85	15	2	1	20	35	0
17	Third St and St. John St	North	5,650	85	15	2	1	30	35	0
17	Third St and St. John St	East	5,680	85	15	2	1	20	35	0
17	Third St and St. John St	South	7,940	85	15	2	1	30	35	0
17	Third St and St. John St	West	4,830	85	15	2	1	20	35	0
18	Fourth St and St. John St	North	9,610	85	15	2	1	30	35	0
18	Fourth St and St. John St	East	4,680	85	15	2	1	20	35	0
18	Fourth St and St. John St	South	10,110	85	15	2	1	30	35	0
18	Fourth St and St. John St	West	6,140	85	15	2	1	20	35	0
19	Fifth St and St. John St	North	1,760	85	15	2	1	25	35	0
19	Fifth St and St. John St	East	3,810	85	15	2	1	20	35	0
19	Fifth St and St. John St	South	2,480	85	15	2	1	25	35	0
19	Fifth St and St. John St	West	3,770	85	15	2	1	20	35	0
20	SR-87 and Santa Clara St*	North	0	85	15	2	1	30	35	0
20	SR-87 and Santa Clara St*	East	22,490	85	15	2	1	25	35	0
20	SR-87 and Santa Clara St*	South	11,220	85	15	2	1	30	35	0
20	SR-87 and Santa Clara St*	West	20,290	85	15	2	1	30	35	0
21	San Pedro St and Santa Clara St	North	4,010	85	15	2	1	25	35	0
21	San Pedro St and Santa Clara St	East	14,670	85	15	2	1	25	35	0
21	San Pedro St and Santa Clara St	South	2,160	85	15	2	1	25	35	0
21	San Pedro St and Santa Clara St	West	16,800	85	15	2	1	25	35	0
22	Market St and Santa Clara St	North	16,470	85	15	2	1	25	35	0
22	Market St and Santa Clara St	East	15,920	85	15	2	1	25	35	0
22	Market St and Santa Clara St	South	14,610	85	15	2	1	25	35	0
22	Market St and Santa Clara St	West	15,400	85	15	2	1	25	35	0
23	First St and Santa Clara St	North	2,390	85	15	2	1	20	35	0
23	First St and Santa Clara St	East	16,340	85	15	2	1	25	35	0
23	First St and Santa Clara St	South	2,850	85	15	2	1	20	35	0
23	First St and Santa Clara St	West	16,280	85	15	2	1	25	35	0
24	Second St and Santa Clara St	North	4,720	85	15	2	1	20	35	0
24	Second St and Santa Clara St	East	16,290	85	15	2	1	25	35	0
24	Second St and Santa Clara St	South	5,360	85	15	2	1	20	35	0
24	Second St and Santa Clara St	West	16,510	85	15	2	1	25	35	0
25	Third St and Santa Clara St	North	5,830	85	15	2	1	30	35	0
25	Third St and Santa Clara St	East	16,800	85	15	2	1	25	35	0
25	Third St and Santa Clara St	South	6,820	85	15	2	1	30	35	0
25	Third St and Santa Clara St	West	16,090	85	15	2	1	25	35	0
26	Fourth St and Santa Clara St	North	11,630	85	15	2	1	30	35	0
26	Fourth St and Santa Clara St	East	14,890	85	15	2	1	25	35	0
26	Fourth St and Santa Clara St	South	12,980	85	15	2	1	30	35	0
26	Fourth St and Santa Clara St	West	15,360	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	North	2,040	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	East	14,210	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	South	0	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	West	14,150	85	15	2	1	25	35	0

Appendix H-1
FHWA Highway Traffic Noise Prediction Model Inputs
Saint James Park Master Plan Project
File Name: FHWA - Background+Project.xlsx

#	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Market St and Julian St	North	21,720	85	15	2	1	40	35	0
1	Market St and Julian St	East	11,220	85	15	2	1	30	35	0
1	Market St and Julian St	South	28,010	85	15	2	1	25	35	0
1	Market St and Julian St	West	1,730	85	15	2	1	25	35	0
2	First St and Julian St	North	6,860	85	15	2	1	25	35	0
2	First St and Julian St	East	9,140	85	15	2	1	30	35	0
2	First St and Julian St	South	2,930	85	15	2	1	25	35	0
2	First St and Julian St	West	12,650	85	15	2	1	30	35	0
3	Second St and Julian St	North	3,920	85	15	2	1	25	35	0
3	Second St and Julian St	East	6,210	85	15	2	1	30	35	0
3	Second St and Julian St	South	1,700	85	15	2	1	25	35	0
3	Second St and Julian St	West	8,690	85	15	2	1	30	35	0
4	Third St and Julian St	North	4,780	85	15	2	1	30	35	0
4	Third St and Julian St	East	6,680	85	15	2	1	25	35	0
4	Third St and Julian St	South	6,490	85	15	2	1	30	35	0
4	Third St and Julian St	West	7,030	85	15	2	1	30	35	0
5	SR-87 and Julian St (West)*	North	3,600	85	15	2	1	30	35	0
5	SR-87 and Julian St (West)*	East	20,780	85	15	2	1	30	35	0
5	SR-87 and Julian St (West)*	South	2,960	85	15	2	1	25	35	0
5	SR-87 and Julian St (West)*	West	19,020	85	15	2	1	30	35	0
6	SR-87 and Julian St (East)*	North	14,150	85	15	2	1	30	35	0
6	SR-87 and Julian St (East)*	East	20,000	85	15	2	1	30	35	0
6	SR-87 and Julian St (East)*	South	11,460	85	15	2	1	25	35	0
6	SR-87 and Julian St (East)*	West	27,050	85	15	2	1	30	35	0
7	San Pedro St and St. James St	North	1,450	85	15	2	1	25	35	0
7	San Pedro St and St. James St	East	15,290	85	15	2	1	30	35	0
7	San Pedro St and St. James St	South	3,620	85	15	2	1	25	35	0
7	San Pedro St and St. James St	West	17,460	85	15	2	1	30	35	0
8	Market St and St. James St	North	25,460	85	15	2	1	25	35	0
8	Market St and St. James St	East	9,410	85	15	2	1	25	35	0
8	Market St and St. James St	South	22,140	85	15	2	1	25	35	0
8	Market St and St. James St	West	15,130	85	15	2	1	25	35	0
9	First St and St. James St	North	3,200	85	15	2	1	25	35	0
9	First St and St. James St	East	10,100	85	15	2	1	25	35	0
9	First St and St. James St	South	2,890	85	15	2	1	25	35	0
9	First St and St. James St	West	10,410	85	15	2	1	25	35	0
10	Second St and St. James St	North	4,240	85	15	2	1	25	35	0
10	Second St and St. James St	East	12,470	85	15	2	1	25	35	0
10	Second St and St. James St	South	0	85	15	2	1	25	35	0
10	Second St and St. James St	West	9,650	85	15	2	1	25	35	0
11	Third St and St. James St	North	7,590	85	15	2	1	30	35	0
11	Third St and St. James St	East	12,430	85	15	2	1	25	35	0
11	Third St and St. James St	South	7,200	85	15	2	1	30	35	0
11	Third St and St. James St	West	12,820	85	15	2	1	25	35	0
12	Fourth St and St. James St	North	11,460	85	15	2	1	30	35	0
12	Fourth St and St. James St	East	7,050	85	15	2	1	25	35	0
12	Fourth St and St. James St	South	13,110	85	15	2	1	30	35	0
12	Fourth St and St. James St	West	11,040	85	15	2	1	25	35	0
13	San Pedro St and St. John St	North	3,860	85	15	2	1	25	35	0
13	San Pedro St and St. John St	East	2,810	85	15	2	1	20	35	0
13	San Pedro St and St. John St	South	5,460	85	15	2	1	25	35	0
13	San Pedro St and St. John St	West	4,050	85	15	2	1	20	35	0
14	Market St and St. John St	North	18,710	85	15	2	1	25	35	0
14	Market St and St. John St	East	4,040	85	15	2	1	20	35	0

Appendix H-2
FHWA Highway Traffic Noise Prediction Model Inputs
Saint James Park Master Plan Project
File Name: FHWA - Background+Project.xlsx

#	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
14	Market St and St. John St	South	17,180	85	15	2	1	25	35	0
14	Market St and St. John St	West	1,590	85	15	2	1	20	35	0
15	First St and St. John St	North	1,830	85	15	2	1	25	35	0
15	First St and St. John St	East	4,200	85	15	2	1	20	35	0
15	First St and St. John St	South	2,450	85	15	2	1	20	35	0
15	First St and St. John St	West	4,180	85	15	2	1	20	35	0
16	Second St and St. John St	North	0	85	15	2	1	20	35	0
16	Second St and St. John St	East	4,240	85	15	2	1	20	35	0
16	Second St and St. John St	South	1,020	85	15	2	1	20	35	0
16	Second St and St. John St	West	4,240	85	15	2	1	20	35	0
17	Third St and St. John St	North	6,380	85	15	2	1	30	35	0
17	Third St and St. John St	East	5,640	85	15	2	1	20	35	0
17	Third St and St. John St	South	8,340	85	15	2	1	30	35	0
17	Third St and St. John St	West	4,920	85	15	2	1	20	35	0
18	Fourth St and St. John St	North	12,320	85	15	2	1	30	35	0
18	Fourth St and St. John St	East	4,820	85	15	2	1	20	35	0
18	Fourth St and St. John St	South	12,140	85	15	2	1	30	35	0
18	Fourth St and St. John St	West	6,100	85	15	2	1	20	35	0
19	Fifth St and St. John St	North	1,810	85	15	2	1	25	35	0
19	Fifth St and St. John St	East	3,920	85	15	2	1	20	35	0
19	Fifth St and St. John St	South	2,480	85	15	2	1	25	35	0
19	Fifth St and St. John St	West	3,910	85	15	2	1	20	35	0
20	SR-87 and Santa Clara St*	North	0	85	15	2	1	30	35	0
20	SR-87 and Santa Clara St*	East	23,910	85	15	2	1	25	35	0
20	SR-87 and Santa Clara St*	South	12,360	85	15	2	1	30	35	0
20	SR-87 and Santa Clara St*	West	20,570	85	15	2	1	30	35	0
21	San Pedro St and Santa Clara St	North	4,600	85	15	2	1	25	35	0
21	San Pedro St and Santa Clara St	East	15,610	85	15	2	1	25	35	0
21	San Pedro St and Santa Clara St	South	2,160	85	15	2	1	25	35	0
21	San Pedro St and Santa Clara St	West	18,330	85	15	2	1	25	35	0
22	Market St and Santa Clara St	North	19,190	85	15	2	1	25	35	0
22	Market St and Santa Clara St	East	17,850	85	15	2	1	25	35	0
22	Market St and Santa Clara St	South	16,260	85	15	2	1	25	35	0
22	Market St and Santa Clara St	West	16,340	85	15	2	1	25	35	0
23	First St and Santa Clara St	North	2,390	85	15	2	1	20	35	0
23	First St and Santa Clara St	East	18,280	85	15	2	1	25	35	0
23	First St and Santa Clara St	South	2,850	85	15	2	1	20	35	0
23	First St and Santa Clara St	West	18,220	85	15	2	1	25	35	0
24	Second St and Santa Clara St	North	2,270	85	15	2	1	20	35	0
24	Second St and Santa Clara St	East	18,070	85	15	2	1	25	35	0
24	Second St and Santa Clara St	South	3,810	85	15	2	1	20	35	0
24	Second St and Santa Clara St	West	18,450	85	15	2	1	25	35	0
25	Third St and Santa Clara St	North	8,250	85	15	2	1	30	35	0
25	Third St and Santa Clara St	East	17,840	85	15	2	1	25	35	0
25	Third St and Santa Clara St	South	7,520	85	15	2	1	30	35	0
25	Third St and Santa Clara St	West	17,870	85	15	2	1	25	35	0
26	Fourth St and Santa Clara St	North	13,660	85	15	2	1	30	35	0
26	Fourth St and Santa Clara St	East	15,220	85	15	2	1	25	35	0
26	Fourth St and Santa Clara St	South	14,220	85	15	2	1	30	35	0
26	Fourth St and Santa Clara St	West	16,400	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	North	2,040	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	East	14,540	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	South	0	85	15	2	1	25	35	0
27	Fifth St and Santa Clara St	West	14,480	85	15	2	1	25	35	0