Norman Y. Mineta San Jose International Airport

Noise Assessment for the Master Plan Environmental Impact Report

Prepared for:

David J. Powers and Associates
FINAL | October 2019

Prepared by:

Clint Morrow
Cynthia Gibbs
Kurt Dunholter
Mike Holritz

BridgeNet INTERNATIONAL

20201 SW Birch Street, Suite 250
Newport Beach, CA 92660
T: 949-250-1222 | F: 949-250-1225

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1.0 Introduction

This report summarizes the noise assessment in support of the Norman Y. Mineta San Jose International Airport (SJC) Master Plan Environmental Impact Report (EIR). The objective of this study is to analyze existing (2018) and future year (2037) scenarios for aircraft operations and ground traffic generated at the airport and to determine the noise impacts related with each scenario.

The proposed amendment to the Airport Master Plan would extend the horizon year and demand forecasts from 2027 to 2037, incorporate the set of airfield configuration changes recommended in the Runway Incursion Mitigation/Design Standards Analysis Study, and update the layout and sizing of various landside facilities to adequately serve the projected 2037 demand. The following list shows the air traffic and ground vehicle traffic scenarios that were analyzed for noise impacts.

Aircraft Noise Scenarios:

- Scenario 1 - Existing/Baseline (2018)
- Scenario 2 - Project (2037)
- Scenario 3 - No Project/No New Facilities (2037)
- Scenario 4 - No Project/Buildout under Existing MP (2037)

Ground Traffic Noise Scenarios:

- Scenario 1 - Existing/Baseline (2018)
- Scenario 2 - Project (2037)
- Scenario 3 - Cumulative (2037)
- Scenario 4 - No Project/No New Facilities (2037)
- Scenario 5 - No Project/Buildout under Existing MP (2037)

For the purposes of the noise analysis, several of the scenarios listed above are identical. For aircraft noise, future Scenarios 3 and 4 are identical, because both include full accommodation of year 2037 forecasted demand with Runway 11/29 open. In contrast, in the Existing/Baseline and Project Scenarios, Runway 11/29 is closed. However, the activity levels at the Airport for air passengers, air cargo, and general aviation will be identical under *all* year 2037 scenarios. For ground traffic noise, future Scenarios 2, 4, and 5 are identical because they include existing traffic plus additional airport-related traffic from full accommodation of the 2037 forecasted demand. Ground traffic Scenario 3 accounts for all of this forecasted traffic, and additional non-airport traffic from regional growth projected in 2037.

For the purposes of this aircraft noise exposure analysis, the patterns of aircraft-related noise are described using noise contours prepared with the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT) Version 2d, in compliance with 14 CFR Part 150 *Airport Noise Compatibility Planning,* FAA Order 1050.1F and FAA Order 5050.4B. Version 2d was the most current version of the AEDT at the time the noise contours for this EIR were prepared.

For ground traffic noise exposure analysis, calculations based upon the Federal Highway Administration's Traffic Noise Model (TNM) version 2.5 were used to predict the increases in traffic noise levels for future conditions – with and without the roadway improvements associated with the project.

2.0 Noise and Effects on People

The following section provides basic information on noise and its characteristics, and the effects of noise on people.

2.1 Characteristics of Sound

Sound can be described in terms of amplitude (loudness), frequency (pitch), and duration (time). The standard unit of measurement of the loudness of sound is the decibel (dB). Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes.

The human hearing system is not equally sensitive to sound at all frequencies. Sound waves below 16 Hz are not heard at all but are "felt" as a vibration. Similarly, while people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz. Since the human ear is not equally sensitive to sound at all frequencies, a frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. Community noise levels are measured in terms of the A-weighted decibel abbreviated dBA or dB.

2.2 Propagation of Noise

Outdoor sound levels decrease as a result of several factors, including distance from the sound source, atmospheric absorption (characteristics in the atmosphere that absorb sound), and ground attenuation (characteristics on the ground that absorb sound). If sound is radiated from a source in a homogeneous and undisturbed manner, the sound travels in spherical waves. As the sound wave travels away from the source, the sound energy is spread over a greater area dispersing the sound power of the wave.

Temperature and humidity of the atmosphere also influence the sound levels received by the observer. The influence of the atmosphere and the resultant fluctuations increase with distance and become particularly important at distances greater than 1,000 feet. The degree of absorption depends on frequency of the sound as well as the humidity and air temperature. For example, when the air is cold and humid, and therefore denser, atmospheric absorption is lowest. Higher frequencies are more readily absorbed than the lower frequencies. Over large distances, lower frequency sounds become dominant as the higher frequencies are attenuated.

2.3 Noise Metrics

The analysis and reporting of community noise levels around communities has to account for the complexity of human response to noise and the variety of noise metrics that have been developed for describing noise impacts. Each of these metrics attempts to quantify noise levels with respect to community response.

Noise metrics can be divided into two categories: single event and cumulative. Single event metrics describe the noise levels from an individual event such as an aircraft flyover. Cumulative metrics average the total noise over a specific time period, which is typically from one to 24-hours for community noise levels. This study presents both single event and cumulative noise modeling results.

Maximum Noise Level (Lmax) is the peak sound level during an aircraft noise event. The metric only accounts for the instantaneous peak intensity of the sound, and not for the duration of the event. As an aircraft passes by an observer, the sound level increases to a maximum level and then decreases. Typical single event noise levels range from over 90 dBA close to the airport to 50-60 dBA at more distant locations.

Sound Exposure Level (SEL) is calculated by summing the decibel levels during a noise event and compressing that noise into one second. The SEL value is the integration of all the acoustic energy contained within the noise event (for example, an aircraft overflight or automobile pass-by). This metric considers both the maximum noise level of the event and the duration of the event. For aircraft flyovers, the SEL value is approximately 10 dB higher than the maximum noise level.

Community Noise Equivalent Level (CNEL) is a measure of twenty-four hours and applies a weighting factor which places greater significance on noise events occurring during the evening and night hours. CNEL is a 24-hour, time-weighted average noise level based on the A-weighted decibel. Time-weighted refers to the fact that noise which occurs during certain sensitive time periods is penalized for occurring at these times. The evening time period is penalized by 5 dB (7 p.m. to 10 p.m.) while the night time period (10 p.m. to 7 a.m.) is penalized by 10 dB. This penalty and these time periods were selected to attempt to account for increased human sensitivity to noise during the quieter period of a day, where sleep is the most common activity. CNEL levels near airports range from 75 CNEL on airport property to below 45 CNEL at more distant locations.

3.0 Noise Regulations and Policies

The City of San José (the "City") is preparing an Environmental Impact Report (EIR) for the Norman Y. Mineta San Jose International Airport (SJC) Master Plan Update in compliance with the California Environmental Quality Act (CEQA) and the CEQA Guidelines. This section discusses the regulatory environment at the Federal, state, and local levels.

3.1 Federal Regulations

Separate from the Federal National Environmental Policy Act (NEPA) regulations, the State of California has its own set of CEQA regulations and guidelines which pertain to this EIR. However, it is notable that the Airport has participated in the FAA's noise compatibility program in the past under 14 CFR Part 150, including the sound insulation of homes and noise-sensitive land uses surrounding the airport area.

3.2 State Regulations

The State of California and the City of San Jose have established regulatory criteria through CEQA to determine potentially significant impacts from noise both to a project and from the project as defined in Appendix G of the CEQA guidelines as follows:

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

The thresholds for significant aircraft noise impact are defined using the CNEL metric. CEQA does not establish thresholds for changes in noise; according to the Land Use Guidance Table in 14 CFR Part 150, CNEL 65 dB (in the State of California) is the threshold to determine land use compatibility and therefore will be used as the threshold for this project. Where the existing conditions or future no project scenarios indicate a CNEL of 65 dB or greater, an increase of CNEL 1.5 dB or more due to the implementation of the project is considered significant. And, where the existing or future no project scenarios are below CNEL 65 dB, an increase of 3 dB or more due to the project is significant. Of note, these noise level increases are only considered significant when impacting a noise-sensitive land use (e.g., residence, school, place of worship, etc.). In general, commercial, industrial, and outdoor recreation land uses are compatible with these levels of aircraft noise, independent of any density requirements per SJC's adopted airport Land Use Compatibility Plan.

For roadway noise, the accepted and typical threshold for a noise increase to be considered significant is 3 dBA or greater at noise-sensitive land uses.

3.3 SJC Airport and Surrounding Noise Environment

The California Airport Noise Standards (California Code of Regulations, Title 21, Section 5000 et seq.) apply to any airport that is determined to have a noise problem by the local County Board of Supervisors in accordance with the provisions in the regulation. Norman Y. SJC is one of ten airports in California that have been determined to have a noise problem by local County governments. Norman Y. Mineta San Jose

International Airport uses the 65 CNEL contour to identify non-compatible land uses and determine eligibility for federal funds for noise mitigation. Any noise sensitive uses (such as residences, schools, churches, etc.) within the 65 CNEL and greater contour are considered to be noncompatible with aircraft noise.

In order to be compliant with the CCR Title 21, the Airport generates two types of reports, a Quarterly Noise Report and an Annual Noise Report that contains the 65 CNEL noise contour and a detailed description of aircraft operations, and number of compatible and incompatible land uses within the 65 CNEL. The Airport is in compliance with CCR Title 21, with no incompatible land uses within the 65 CNEL for the latest published Annual Noise Report for calendar year 2018.

3.4 City of San Jose General Plan and Municipal Code

The City of San Jose's General Plan *Chapter 3 Environmental Leadership – Environmental Considerations/ Hazards* includes goals for noise. The applicable goals include:

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.

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-1.10 Monitor Federal legislative and administrative activity pertaining to aircraft noise for new possibilities for noise-reducing modifications to aircraft engines beyond existing Stage 3 requirements. Encourage the use of quieter aircraft at the San José International Airport.

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

EC-1.12 Encourage the Federal Aviation Administration to enforce current cruise altitudes that minimize the impact of aircraft noise on land use.

In addition, the *City of San José Municipal Code* Chapter 20.100.450 establishes allowable hours of construction within 500 feet of a residential unit between 7:00 am and 7:00 pm Monday through Friday unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence.

Chapter 25 of the Municipal Code establishes operational requirements for the Airport. Specifically, Chapter 25.03.300 establishes curfew hour operations at the Airport as follows, with the curfew hours being 11:30 pm – 6:30 am local time:

A. Except as otherwise expressly authorized herein, all persons shall be prohibited from scheduling and/or conducting a takeoff or a landing using a jet aircraft during curfew hours unless such takeoff or landing is conducted by a jet aircraft that is listed on the schedule of authorized aircraft.

B. If a jet aircraft is not listed on the schedule of authorized aircraft, then the aircraft will be allowed to operate during curfew hours only if the operator demonstrates in writing to the director that the FAA Part 36 manufacturer certificated noise level of such aircraft (using the arithmetic average of the takeoff, sideline, and approach noise levels) is equal to or less than 89.0 EPNdB.

3.5 Santa Clara County Airport Land Use Commission Comprehensive Land Use Plan

The Comprehensive Land Use Plan adopted by the Santa Clara County Airport Land Use Commission contains standards for projects within the vicinity of San José International Airport. Relevant policies are listed below.

Policy G-3 The Airport is exempt from the policies of this CLUP for the development of projects on airport property that are directly related to airport operations (examples: terminals, FBOs, fuel storage, passenger and employee parking). This policy does not relieve the Airport of its other obligations to the ALUC, such as providing Airport Master Plan Updates for ALUC review.

Policy N-3 Noise impacts shall be evaluated according to the Aircraft Noise Contours presented on Figure 5 (2022 Aircraft Noise Contours).

Policy N-6 Noise level compatibility standards for other types of land uses shall be applied in the same manner as the above residential noise level criteria. Table 4-1 presents acceptable noise levels for other land uses in the vicinity of the Airport.

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

3.6 SJC Airport Acoustical Treatment Program (ACT)

The Airport has previously sound-insulated homes and other noise-sensitive buildings in adjacent communities north and south of the airport. The Acoustical Treatment (ACT) Program was first approved in 1993 and was completed in 2009. Treatment of homes and schools typically included the installation of acoustically-rated doors and windows, building insulation, and central air conditioning in accordance with the California Airport Noise Regulations. The boundaries of the ACT Program were last updated as a result of the 2003 EIR and are depicted in **Figure 8** at the end of this report. The boundaries were determined from modeled CNEL contours.

4.0 Existing and Future Noise Conditions

The existing aircraft noise environment at SJC was evaluated based upon the measured level of ambient noise and modeling of the aircraft operations in 2018. This section of the report provides a description of the data and assumptions used to develop the noise exposure map for 2018 existing conditions and future year 2037 conditions.

For this analysis, data from the SJC Airport Noise and Operations Monitoring System (ANOMS) was used to develop existing conditions AEDT inputs. Additional supporting data was collected and developed from the following sources:

- Average daily commercial aircraft activity obtained from landings report data.
- Day/evening/night distributions of flights and departure trip lengths determined from published flight schedules, and from ANOMS data for cargo aircraft.
- Counts of scheduled and unscheduled aircraft activity obtained from City of San Jose aircraft activity reports and the FAA's Operations and Performance Data (OPSNET) Tower counts.
- Runway utilization factors estimated based upon an analysis of annual aircraft operational data collected by the ANOMS.

4.1 Airport Noise Measurement Data

Noise from aircraft operations is measured on a continual basis from the Airport's ANOMS system at its 13 remote noise monitors located throughout the community. The location of the RMT's is shown in **Table 1** and **Figure 1**.

Table 1 – Remote Noise Monitoring Locations

RMT	Location	Latitude	Longitude
101	Oak Street - San Jose, CA	37.321292	-121.881981
102	Center for Performing Arts San Jose, CA	37.329572	-121.892365
104	Bellarmine Prep School San Jose, CA	37.340997	-121.917993
105	Rosemary Garden San Jose, CA	37.3624	-121.91475
106	St. John/Autumn San Jose, CA	37.33424	-121.899946
107	Fire Station 6 Santa Clara, CA	37.39516	-121.949916
108	MacGregor Lane Santa Clara, CA	37.386895	-121.946527
109	Lake Santa Clara Santa Clara, CA	37.392133	-121.967717
110	Chestnut St. Santa Clara, CA	37.390153	-121.959598
111	Fuller Street Park Santa Clara, CA	37.397987	-121.965516
112	Mnt. View/Alviso Santa Clara, CA	37.40969	-121.97944
114	Fairway Glen Park Santa Clara, CA	37.405623	-121.961404
115	3rd/Reed San Jose, CA	37.328608	-121.882987

Source: BridgeNet International, May 2019

CNEL is a measure of the cumulative noise throughout the day and can be used to describe aircraft-related noise, background noise from other sources in the community, and the total noise environment. The "Aircraft CNEL" is calculated by summing the noise energy from all measured aircraft events and applying the evening and night weighting penalty. The "Community CNEL" is calculated from all remaining measured noise not related to aircraft operations (such as local automobile traffic, noise from industrial sources, construction and other background noise sources).

The results are presented in **Table 2** for calendar year 2018, which shows CNEL values for aircraft events, ambient/community noise and the sum of aircraft and community events. Note that measuring CNEL at levels below 55 CNEL becomes less precise because the aircraft events can be closer to the background noise, and it is not always possible to separate the aircraft noise from the ambient noise. The results show that the measured aircraft CNEL levels range between 58.2 CNEL and 66.6 CNEL, with the highest CNEL at the noise monitoring location situated at the Center for Performing Arts (255 Almaden Blvd) and the lowest CNEL at Bellarmine Prep School (960 W. Hedding St).

Table 2 – CNEL Noise Measurement Results for Year 2018

Monitoring Terminal No.	Location Street	Location City	Latitude	Longitude	Measured CNEL Aircraft	Community	Total
101	Oak Street	San Jose, CA	37.321292	-121.881981	63.5	64.1	66.8
102	Center for Performing Arts	San Jose, CA	37.329572	-121.892365	66.6	68.5	70.7
104	Bellarmine Prep School	San Jose, CA	37.340997	-121.917993	58.2	74.0	74.1
105	Rosemary Garden	San Jose, CA	37.3624	-121.91475	60.5	66.0	67.1
106	St. John/Autumn	San Jose, CA	37.33424	-121.899946	66.2	66.6	69.4
107	Fire Station 6	Santa Clara, CA	37.39516	-121.949916	63.3	68.7	69.8
108	MacGregor Lane	Santa Clara, CA	37.386895	-121.946527	65.3	61.8	66.9
109	Lake Santa Clara	Santa Clara, CA	37.392133	-121.967717	62.1	58.3	63.6
110	Chestnut St.	Santa Clara, CA	37.390153	-121.959598	65.8	62.2	67.3
111	Fuller Street Park	Santa Clara, CA	37.397987	-121.965516	63.3	58.7	64.6
112	Mnt. View/Alviso	Santa Clara, CA	37.40969	-121.97944	59.8	59.9	62.9
114	Fairway Glen Park	Santa Clara, CA	37.405623	-121.961404	60.4	57.2	62.1
115	3rd/Reed	San Jose, CA	37.328608	-121.882987	58.7	65.7	66.5

Source: BridgeNet International, May 2019

4.2 Existing Conditions Aircraft Activity

Activity levels for 2018 Existing Conditions at SJC were derived from the sources listed in Section 4.0. The specific data for aircraft types, time of day, runway use, and flight tracks for 2018 Existing Conditions are discussed in this section.

4.2.1 Operations by Aircraft Type

As shown in **Table 3** there were 195,655 operations at the Airport in 2018 (an average of 536 operations per day). An operation is one takeoff or one landing. As indicated by the table, the largest number of operations was conducted by air carrier narrow body aircraft with 49% of the annual operations, mostly conducted by Airbus A319/A320 and Boeing B737-700 and -800 aircraft.

Table 3 – Airport Operations by Aircraft Category, 2018

Aircraft Categories	Arrivals Day	Arrivals Evening	Arrivals Night	Departure Day	Departure Evening	Departure Night	Total
Air Carrier Wide Body	1,897	558	8	1,513	974	30	4,980
Air Carrier Narrow Body	31,876	10,395	5,497	33,839	6,738	7,130	95,474
Regional Jets	12,979	2,637	1,928	13,227	2,559	1,757	35,087
Commuter Prop	497	263	125	482	407	0	1,774
General Aviation Jet	12,151	1,733	920	12,650	1,107	1,052	29,613
General Aviation Prop	11,780	1,570	892	12,137	1,152	949	28,480
Military	123			123			247
Total Daily Operations	71,302	17,156	9,371	73,971	12,937	10,918	195,655

Source: BridgeNet International, 2019

4.2.2 Fleet Mix and Operations by Time of Day

Table 4 presents the operational data for 2018 used to develop this study's AEDT inputs. It includes the detailed fleet mix and operations by time of day for each type of aircraft used in the AEDT noise model during 2018. As shown, this table lists the specific aircraft in the 2018 fleet mix as well as identifies the AEDT category for each aircraft type. The average number of daily arrivals and departures during the daytime, evening and nighttime hours is also listed. Daytime operations, those arrivals and departures between 7 am – 7 pm accounted for 74% of operations; evening operations between the hours of 7 pm – 10 pm accounted for 16% of operations and nighttime operations between 10 pm – 7 am accounted for 10% of all airport operations.

Table 4 - Airport Operations by Aircraft Type and Time of Day, 2018

Aircraft Description	Arrivals Day	Arrivals Evening	Arrivals Night	Departure Day	Departure Evening	Departure Night	Total
Airbus A300F4-600 Series	0.5894	0.0330		0.1010	0.4868	0.0345	1.2447
Airbus A330-300 Series	0.2841	0.0989	0.0220	0.3928	0.0123	0.0141	0.8241
Airbus A340-200 Series	0.4078			0.4078			0.8156
Airbus A340-600 Series	0.0188			0.0047			0.0235
Boeing 767-200 Series	0.0121			0.0081			0.0202
Boeing 767-300 Series	1.4058	1.3860		1.7411	1.1932	0.0111	5.7372
Boeing 767-400 ER	0.0153	0.0119		0.0242		0.0030	0.0544
Boeing 777-200-ER	0.0151			0.0060		0.0091	0.0302
B787-8R	2.4002			1.4583	0.9289	0.0111	4.7984
Boeing MD-10-30	0.0483				0.0483		0.0967
Daily Operations	**5.1968**	**1.5298**	**0.0220**	**4.1439**	**2.6695**	**0.0829**	**13.6449**
Annual Operations	**1,897**	**558**	**8**	**1,513**	**974**	**30**	4,980
Operation Percentages	**38.1%**	**11.2%**	**0.2%**	**30.4%**	**19.6%**	**0.6%**	100.0%
dC8-70/CFM56-2C-5	5.0230	1.1714	0.6543	4.6806	1.1385	1.0277	13.6954
Airbus A320-200 Series	7.9353	2.3651	1.2670	7.7062	1.9017	1.9582	23.1335
Airbus A321-200 Series	0.0221	0.7060	0.0995	0.0881	0.0224	0.7065	1.6446
BOEING 717-200/BR 715	2.0835	0.2112	0.6555	2.1842	0.0332	0.7309	5.8985
BOEING 727-200/JT8D-15	0.0285		0.0048	0.0332			0.0665
BOEING 737-400/CFM56-3C-1	0.0343	0.0222	0.0222	0.0528	0.0113	0.0145	0.1571
BOEING 737-500/CFM56-3C-1	0.0427		0.0691	0.0789	0.0110	0.0219	0.2236
BOEING 737-700/CFM56-7B24	48.5480	12.8170	6.0965	48.0297	12.3564	7.0737	134.9214
BOEING 737-800/CFM56-7B26	22.5271	10.9777	5.7426	28.8472	2.7151	7.6862	78.4959
7378MAX\CFMLeap1B27	0.5574	0.0757	0.0730	0.5298	0.1171	0.0590	1.4119
BOEING 757-200/PW2037	0.2386	0.0222	0.0111	0.0761	0.1401	0.0559	0.5439
BOEING 757-300/RB211-535E4B	0.0242	0.0121	0.1554	0.0266	0.0097	0.0040	0.2320
DC8-70/CFM56-2C-5	0.0272			0.0272			0.0544
MD-83/JT8D-219	0.0242			0.0106	0.0030	0.0106	0.0484
MD-90/V2525-D5	0.2150	0.0994	0.2082	0.3377		0.1849	1.0452
Daily Operations	**87.3311**	**28.4798**	**15.0593**	**92.7090**	**18.4593**	**19.5339**	**261.5723**
Annual Operations	**31,876**	**10,395**	**5,497**	**33,839**	**6,738**	**7,130**	95,474
Operation Percentages	**33.4%**	**10.9%**	**5.8%**	**35.4%**	**7.1%**	**7.5%**	100.0%
CL-600-2D15/CL-600-2D24/CF34-8C5	1.6138	0.0884	0.4764	1.5059	0.0445	0.6279	4.3569
CL-600-2D15/CL-600-2D24/CF34-8C5	1.7662	0.0333	0.8381	2.0033	0.1887	0.4456	5.2751
EMBRAER 145 ER/ALLISON AE3007	5.4467	0.7227	0.3820	5.6735	0.8545	0.0247	13.1041
ERJ170-100	26.7316	6.3542	3.5857	27.0399	5.9232	3.7049	73.3395
ERJ190-100		0.0272		0.0166		0.0106	0.0544
Daily Operations	**35.5584**	**7.2257**	**5.2822**	**36.2391**	**7.0108**	**4.8137**	**96.1300**
Annual Operations	**12,979**	**2,637**	**1,928**	**13,227**	**2,559**	**1,757**	35,087
Operation Percentages	**37.0%**	**7.5%**	**5.5%**	**37.7%**	**7.3%**	**5.0%**	100.0%
DASH 8-300/PW123	1.3614	0.7193	0.3434	1.3205	1.1149		4.8595
Daily Operations	**1.3614**	**0.7193**	**0.3434**	**1.3205**	**1.1149**	**0.0000**	**4.8595**
Annual Operations	**497**	**263**	**125**	**482**	**407**	**0**	1,774
Operation Percentages	**28.0%**	**14.8%**	**7.1%**	**27.2%**	**22.9%**		100.0%

Bombardier Challenger 600	5.2710	0.8133	0.3901	5.6866	0.3624	0.4256	12.9489
Bombardier Global Express	1.1800	0.2648	0.0777	1.2134	0.2547	0.0546	3.0451
Bombardier Global 5000 Business	0.4557	0.0891	0.0446	0.4999	0.0441	0.0452	1.1786
Bombardier Learjet 25	0.0662	0.0275		0.0831	0.0106		0.1873
Bombardier Learjet 35A/36A (C-21A)	1.2849	0.1882	0.0889	1.2699	0.1801	0.1121	3.1241
Cessna 500 Citation I	2.1970	0.2104	0.0997	2.2293	0.1674	0.1115	5.0153
Cessna 510 Citation	1.4559	0.2457	0.1113	1.5457	0.1672	0.1003	3.6261
Cessna 525 Citation Jet	0.1923	0.0111	0.0111	0.2032	0.0113		0.4290
Cessna 550 Citation II	2.2844	0.2113	0.2117	2.3608	0.1227	0.2232	5.4141
Cessna 560 Citation V	0.7734	0.0664	0.0878	0.7611	0.0998	0.0665	1.8549
Cessna 560 Citation XLS	2.8738	0.3442	0.3656	3.1070	0.2223	0.2674	7.1803
Cessna 650 Citation III	0.1400		0.0111	0.1511			0.3022
Cessna 680 Citation Sovereign	1.7708	0.1889	0.0890	1.8603	0.0888	0.0998	4.0975
Cessna 750 Citation X	5.8854	0.9509	0.4552	6.1112	0.5448	0.6355	14.5830
Dassault Falcon 20-D	0.0181			0.0091		0.0091	0.0363
Eclipse 500 / PW610F	0.0906			0.0564	0.0222	0.0121	0.1813
Gulfstream II	0.0604			0.0363	0.0121	0.0121	0.1209
Gulfstream II-B	0.0852	0.0115		0.0796	0.0111	0.0060	0.1934
Gulfstream IV-SP	2.3685	0.4669	0.2003	2.5483	0.2336	0.2549	6.0725
Gulfstream V/G500	2.8162	0.6011	0.2335	2.8285	0.4334	0.3891	7.3018
Gulfstream Aerospace G650	1.3425			1.3425			2.6849
Israel IAI-1125 Astra	0.3241	0.0446		0.3579	0.0108		0.7374
Mitsubishi MU-300 Diamond	0.3530	0.0110	0.0441	0.3175	0.0337	0.0567	0.8159
Daily Operations	**33.2892**	**4.7469**	**2.5216**	**34.6585**	**3.0331**	**2.8816**	**81.1308**
Annual Operations	**12,151**	**1,733**	**920**	**12,650**	**1,107**	**1,052**	**29,613**
Operation Percentages	**41.0%**	**5.9%**	**3.1%**	**42.7%**	**3.7%**	**3.6%**	**100.0%**
Cessna 441 Conquest II	1.1659	0.5738	0.3602	1.5790		0.5129	4.1919
DeHavilland DHC-6-200 Twin Otter	5.1587	0.7085	0.4428	4.9665	0.7087	0.5758	12.5610
Piper PA-42 Cheyenne Series	0.2139			0.2139			0.4278
Cessna 208 Caravan	3.8173	0.4630	0.2016	3.9809	0.2200	0.2791	8.9620
Boeing DC-3	0.0101		0.0262	0.0264	0.0099		0.0725
Boeing DC-6	0.0201	0.0101		0.0302			0.0604
Raytheon Beech Baron 58	4.0255	0.5260	0.3175	4.2019	0.4574	0.2462	9.7747
Piper PA-30 Twin Comanche	0.0525	0.0075		0.0355		0.0245	0.1200
Cessna 172 Skyhawk	1.2035	0.1888	0.0763	1.2571	0.1669	0.0444	2.9370
Cessna 182	0.6181	0.0446	0.0111	0.6173	0.0444	0.0121	1.3476
Cessna 206	0.9284	0.0308	0.0557	0.9955	0.0332	0.0108	2.0544
EADS Socata TB-9 Tampico	2.7271	0.1286	0.3021	2.5131	0.6447		6.3156
Piper PA-24 Comanche	4.3293	0.5555	0.2152	4.5069	0.3955	0.1976	10.2000
Piper PA-28 Cherokee Series	0.1536		0.0459	0.1513	0.0110	0.0371	0.3989
1985 1-ENG COMP	6.1460	0.8154	0.1252	6.4581	0.2515	0.3774	14.1737
Aerospatiale SA-341G/342 Gazelle	0.0782	0.0200	0.0100	0.0782	0.0200	0.0100	0.2165
Aerospatiale SA-350D Astar (AS-350)	0.0870	0.0300	0.0310	0.1070	0.0180	0.0210	0.2940
Agusta A-109	0.1709	0.0293	0.0196	0.1709	0.0293	0.0196	0.4396
Bell 206L Long Ranger	0.0302			0.0302			0.0604
Bell 407 / Rolls-Royce 250-C47B	0.0227	0.0227		0.0340	0.0113		0.0906
Eurocopter EC-130 w/Arriel 2B1	0.9122	0.1057	0.1840	0.8959	0.0952	0.2107	2.4037
Robinson R22B w/Lycoming 0320	0.3115	0.0200	0.0100	0.3115	0.0200	0.0100	0.6830
Robinson R44 Raven	0.0912	0.0200	0.0100	0.0912	0.0200	0.0100	0.2424
Daily Operations	**32.2742**	**4.3003**	**2.4444**	**33.2527**	**3.1569**	**2.5994**	**78.0278**
Annual Operations	**11,780**	**1,570**	**892**	**12,137**	**1,152**	**949**	**28,480**
Operation Percentages	**41.3%**	**5.5%**	**3.2%**	**42.6%**	**4.1%**	**3.3%**	**100.0%**
C-130H/T56-A-15	0.0414			0.0412			0.0826
	0.0384			0.0384			0.0767
EAGLE F100-PW-100	0.0207			0.0206			0.0413
HORNET F404-GE-400	0.0415			0.0414			0.0829
Northrop F-5E/F Tiger II	0.0207			0.0206			0.0413
BOEING 737-800/CFM56-7B26	0.0685			0.0685			0.1370
Sikorsky S-61 (CH-3A)	0.0570			0.0570			0.1141
Sikorsky S-76 Spirit	0.0500			0.0500			0.1000
Daily Operations	**0.3382**			**0.3377**			**0.6759**
Annual Operations	**123**			**123**			**247**
Operation Percentages	**50.0%**			**50.0%**			**100.0%**
	195	**47**	**26**	**203**	**35**	**30**	**536**
	71,302	**17,156**	**9,371**	**73,971**	**12,937**	**10,918**	**195,655**

Source: BridgeNet International, May 2019

Note: Totals and percentages are subject to rounding.

4.2.3 Departure Stage Length

From the ANOMS data aircraft departures were grouped within the following five stage length categories:

- Departure stage length 1: 0 to 500 nautical miles (great circle distance[1])
- Departure stage length 2: 501 to 1,000 nautical miles
- Departure stage length 3: 1,001 to 1,500 nautical miles
- Departure stage length 4: 1,501 miles to 2,500 nautical miles
- Departure stage length 5: 2,501 nautical miles or greater

An aircraft with a short stage length is assumed to be carrying less fuel, passengers, and cargo than an aircraft with a long stage length. Aircraft with longer stage lengths are assumed to be heavier, with longer stage lengths requiring more fuel. Stage length impacts noise levels because weight affects aircraft performance and resulting noise levels. For each departure at SJC, 12 months of radar data (for January 1, 2018 – December 31, 2018) was used to assign the departure stage length.

4.2.4 Runway Use

At the Airport, there are two 11,000 feet-long runways oriented roughly north-south, 12R/30L and 12L/30R. A third runway, 11/29 with a length of 4,600 feet, is presently used as a taxiway; when operated as a runway, it was used by small general aviation aircraft. Historical data shows that the Airport is in north flow (departing to the north and arriving from the south) approximately 89% of the time and south flow (departing to the south and arriving from the north) approximately 11% of the time. **Table 5** presents the percentage that each runway was used for departures and arrivals.

[1] Great circle distance is the shortest distance between any two points on the surface of the earth.

Table 5 – Departures and Arrivals by Runway – Existing Conditions 2018

Aircraft Description	Arrival Runways 12L	Arrival Runways 12R	Arrival Runways 30L	Arrival Runways 30R	Departure Runways 12L	Departure Runways 12R	Departure Runways 30L	Departure Runways 30R	Helicopter Pad
Airbus A300F4-600 Series		0.045	0.548	0.030	0.048		0.015	0.559	
Airbus A330-300 Series		0.036	0.363	0.006	0.037	0.012	0.034	0.322	
Airbus A340-200 Series		0.018	0.384	0.003	0.018		0.015	0.374	
Airbus A340-600 Series			0.019				0.005	0.014	
Boeing 767-200 Series			0.012		0.004		0.004	0.004	
Boeing 767-300 Series	0.009	0.201	2.642	0.096	0.335	0.003	0.060	2.546	
Boeing 767-400 ER		0.003	0.024		0.003			0.024	
Boeing 777-200-ER			0.015				0.009	0.006	
B787-8R	0.012	0.230	2.137	0.021	0.154	0.039	0.042	2.163	
Boeing MD-10-30		0.008	0.040		0.009			0.039	
Airbus A319-100 Series	0.049	0.593	5.811	0.396	0.698	0.030	0.211	5.907	
Airbus A320-200 Series	0.083	1.086	9.717	0.682	1.184	0.027	0.208	10.146	
Airbus A321-200 Series	0.003	0.036	0.752	0.039	0.040	0.006	0.033	0.738	
BOEING 717-200/BR 715	0.006	0.299	2.491	0.154	0.296		0.063	2.589	
BOEING 727-200/JT8D-15		0.005	0.024	0.005			0.033		
BOEING 737-400/CFM56-3C-1		0.012	0.066		0.003	0.003	0.057	0.016	
BOEING 737-500/CFM56-3C-1		0.005	0.107		0.003	0.006	0.088	0.015	
BOEING 737-700/CFM56-7B24	1.081	5.574	48.825	11.982	6.804	0.057	1.483	59.112	
BOEING 737-800/CFM56-7B26	0.400	3.471	31.818	3.627	4.392	0.121	0.934	33.870	
7378MAX\CFMLeap1B27	0.008	0.065	0.555	0.078	0.075		0.016	0.615	
BOEING 757-200/PW2037		0.018	0.244	0.009	0.006		0.009	0.257	
BOEING 757-300/RB211-535E4B		0.012	0.024		0.007			0.029	
DC8-70/CFM56-2C-5			0.027				0.021	0.006	
MD-83/JT8D-219			0.024				0.003	0.021	
MD-90/V2525-D5	0.003	0.049	0.453	0.018	0.054	0.003	0.006	0.459	
CL-600-2D15/CL-600-2D24/CF34-8C5	0.018	0.191	1.863	0.106	0.272	0.012	0.048	1.846	
CL-600-2D15/CL-600-2D24/CF34-8C5	0.016	0.224	2.231	0.167	0.269		0.042	2.326	
EMBRAER 145 ER/ALLISON AE3007	0.049	0.723	5.619	0.161	0.272	0.474	4.005	1.801	
ERJ170-100	0.351	3.480	30.279	2.562	3.939	0.033	0.686	32.007	
ERJ190-100			0.027				0.021	0.006	
DASH 8-300/PW123	0.021	0.206	1.990	0.206	0.215	0.003	0.018	2.200	
Bombardier Challenger 600	0.047	0.609	5.685	0.133	0.230	0.544	3.909	1.792	
Bombardier Global Express	0.003	0.156	1.332	0.028	0.051	0.118	1.045	0.308	
Bombardier Global 5000 Business		0.049	0.535	0.006	0.024	0.036	0.387	0.142	
Bombardier Learjet 25		0.019	0.071	0.004	0.006	0.009	0.063	0.015	
Bombardier Learjet 35A/36A (C-21A)	0.009	0.209	1.322	0.022	0.060	0.127	0.961	0.414	
Cessna 500 Citation I	0.007	0.262	2.172	0.066	0.094	0.206	1.490	0.719	
Cessna 510 Citation	0.006	0.177	1.571	0.059	0.079	0.127	1.106	0.502	
Cessna 525 CitationJet		0.026	0.189		0.015	0.015	0.136	0.048	
Cessna 550 Citation II	0.012	0.215	2.413	0.067	0.118	0.181	1.625	0.783	
Cessna 560 Citation V		0.062	0.830	0.036	0.015	0.024	0.640	0.248	
Cessna 560 Citation XLS	0.031	0.298	3.166	0.088	0.127	0.281	2.180	1.009	
Cessna 650 Citation III	0.003	0.012	0.133	0.003	0.003	0.009	0.103	0.036	
Cessna 680 Citation Sovereign	0.006	0.169	1.811	0.063	0.063	0.151	1.136	0.698	
Cessna 750 Citation X	0.031	0.742	6.308	0.210	0.275	0.553	4.518	1.946	
Dassault Falcon 20-D		0.006	0.012				0.018		
Eclipse 500 / PW610F		0.012	0.076	0.003	0.003	0.006	0.048	0.033	
Gulfstream II	0.005	0.005	0.045	0.005	0.003	0.009	0.024	0.024	
Gulfstream II-B	0.003	0.006	0.081	0.006	0.006	0.009	0.048	0.033	
Gulfstream IV-SP	0.024	0.266	2.649	0.097	0.080	0.240	1.970	0.747	
Gulfstream V/G500	0.009	0.305	3.266	0.070	0.094	0.269	2.391	0.897	
Gulfstream Aerospace G650			1.342					1.342	
Israel IAI-1125 Astra	0.009	0.030	0.323	0.006	0.022	0.022	0.189	0.136	
Mitsubishi MU-300 Diamond		0.033	0.363	0.012	0.012	0.025	0.238	0.133	
Cessna 441 Conquest II	0.049	0.342	1.514	0.195	0.049	0.146	1.368	0.529	
DeHavilland DHC-6-200 Twin Otter	0.066	0.642	5.336	0.266	0.310	0.465	3.765	1.749	
Piper PA-42 Cheyenne Series			0.143	0.071		0.071	0.071	0.071	
Cessna 208 Caravan	0.055	0.344	3.478	0.606	0.121	0.352	2.930	1.078	
Boeing DC-3	0.006	0.030			0.003	0.030	0.003		
Boeing DC-6		0.030				0.015	0.012		
Raytheon Beech Baron 58	0.087	0.435	3.621	0.726	0.124	0.325	3.293	1.164	
Piper PA-30 Twin Comanche		0.015	0.038	0.007	0.005		0.049	0.005	
Cessna 172 Skyhawk	0.030	0.073	1.133	0.233	0.035	0.078	1.001	0.355	
Cessna 182	0.011	0.050	0.501	0.112	0.024	0.042	0.511	0.097	
Cessna 206	0.045	0.045	0.730	0.194	0.025	0.055	0.764	0.195	
EADS Socata TB-9 Tampico	0.035	0.174	2.186	0.763	0.076	0.114	2.321	0.646	
Piper PA-24 Comanche	0.138	0.257	3.905	0.800	0.107	0.346	3.499	1.147	
Piper PA-28 Cherokee Series	0.003	0.031	0.131	0.034		0.015	0.154	0.030	
1985 1-ENG COMP	0.127	0.489	5.510	0.960	0.307	0.393	4.866	1.520	
Aerospatiale SA-341G/342 Gazelle									0.216
Aerospatiale SA-350D Astar (AS-350)									0.296
Agusta A-109									0.440
Bell 206L Long Ranger									0.305
Bell 407 / Rolls-Royce 250-C47B									0.091
Eurocopter EC-130 w/Arriel 2B1									1.202
Robinson R22B w/Lycoming 0320									0.683
Robinson R44 Raven									0.242
C-130H/T56-A-15	0.004	0.002	0.015	0.021	0.004	0.002	0.015	0.021	
EAGLE F100-PW-100	0.002	0.001	0.008	0.010	0.002	0.001	0.007	0.010	
HORNET F404-GE-400	0.004	0.002	0.015	0.021	0.004	0.002	0.015	0.021	
Northrop F-5E/F Tiger II	0.002	0.001	0.008	0.010	0.002	0.001	0.007	0.010	
Sikorsky S-61 (CH-3A)									0.114
Sikorsky S-76 Spirit									0.100
Total Daily Runway Operations	**2.979**	**23.223**	**213.096**	**26.361**	**21.717**	**6.246**	**57.049**	**180.675**	**3.689**
Percentage of Runway Operations	**0.3%**	**4.5%**	**41.8%**	**3.3%**	**4.2%**	**0.9%**	**8.6%**	**36.2%**	**0.3%**

4.2.5 Flight Paths and Flight Path Utilization

The identification of the location and use of the flight tracks is based upon radar data. A sample from year 2018 of over 21,000 flight tracks was used in the development of the AEDT flight paths, derived from all of the flight paths flown throughout the year.

A sample of the radar flight tracks used in the modeling analysis is presented in **Figure 2** and **Figure 3** for arrivals and departure operations. These radar tracks show flight tracks for one day which was chosen as they are representative of the majority of aircraft operations (i.e., north flow).

4.3 Existing Baseline Noise Conditions

The compiled data as described in the preceding sections is used as input to the FAA's AEDT computer model for the calculation of noise in the airport environs. The CNEL contours do not represent the noise levels present on any specific day; rather they represent the daily energy-average of all 365 days of operation during the year. The noise contour pattern extends from the Airport, from the runway ends, reflective of the flight tracks used. The relative distance of the contours from the Airport along each route is a function of the frequency of use of each runway for total arrivals and departures, time of day, and the type of aircraft assigned to it.

Based upon the operational conditions presented previously CNEL contours were developed. The existing conditions (annual 2018) CNEL noise exposure contours are presented in **Figure 4**. This figure presents the 60, 65, 70, and 75 CNEL noise exposure contours. **Table 6** summarizes noise exposure for 2018 Existing Conditions. The dwelling units and other noise-sensitive parcels within the 65 CNEL and higher are sound insulated, and therefore are compatible with airport operations (per the Airport's State of California Title 21 Quarterly Noise Report for the fourth quarter of 2018). This table also lists the population count within each contour and the total land area encompassed.

Table 6 – Summary of Noise Exposure 2018 Existing Conditions

Category	Noise Level Range (CNEL)			
	>60 dB	**>65 dB**	**>70 dB**	**>75 dB**
Noise-sensitive Land Uses:				
Residential	10,301	0	0	0
Hospital	0	0	0	0
School	6	0	0	0
Church	2	0	0	0
Population	29,048	0	0	0
Land Area (Acres)	6,024	2,225	803	400

Note: Table indicates the number of homes, hospitals, schools, and churches that are **not** sound-insulated within each noise level range and the population living in homes that are **not** sound insulated.

Sources: AEDT version 2d, 2019 (population and land area); San Jose International Airport, 2019 (hospital, school, and church land uses and sound-insulated residences); U.S. Census, 2010 (number of residences estimated from the ratio of persons to homes which is 2.82 in Santa Clara County)

4.4 Future Year 2037 Noise Conditions

The future noise environment for SJC was analyzed based upon year 2037 operational conditions. The aircraft operational levels and fleet mix were from the approved aviation forecast from the ongoing Master Plan study (HNTB, June 2017). These forecast data show that for year 2037, a total of 237,722 operations are anticipated to occur at SJC (which is 42,067 more operations than year 2018). This equates to an average of 651 operations per day. The two aircraft noise scenarios modeled for 2037 include:

- **Project (2037).** This alternative includes the accommodation of the full 2037 forecast of aircraft activity with Runway 11/29 permanently closed.
- **No Project (Buildout Under Existing Master Plan).** This alternative includes the accommodation of the full 2037 forecast of aircraft activity with Runway 11/29 remaining open.

The noise modeling inputs for runway utilization, flight tracks, and flight track use were kept the same as the existing conditions. However, Scenario 3 includes operations on Runway 11/29, therefore flight tracks were added to model arrivals and departures from the runway. Time-of-day percentages (i.e., 74% daytime, 16% evening, and 10% nighttime) were maintained from the existing conditions, because it is expected that the nighttime curfew will continue in the future despite the forecast increase in air carrier operations. **Tables 7 and 8** present the airport operations and runway use for Scenarios 2 and 3, respectively.

Table 7 - Airport Operations and Runway Use, 2037 Scenario 2

Aircraft Description	Arrival Runways 12L	Arrival Runways 12R	Arrival Runways 30L	Arrival Runways 30R	Departure Runways 12L	Departure Runways 12R	Departure Runways 30L	Departure Runways 30R	Helicopter Pad
Airbus A330-200 Series	0.004	0.143	1.895	0.056	0.149	0.018	0.099	1.832	
Airbus A350-900 Series		0.222	1.907		0.123		2.006		
Boeing 747-400 Series Freighter			0.008					0.008	
Boeing 767-300 Series	0.006	0.139	1.857	0.067	0.233	0.002	0.057	1.776	
Boeing 767-400 ER		0.005	0.050		0.006			0.049	
Boeing 777-200-ER		0.010	0.072		0.012		0.012	0.059	
Boeing 777-300 ER		0.035	0.964	0.035			0.033	1.000	
Boeing 787-800 Dreamliner	0.025	0.270	2.660	0.044	0.206	0.082	0.088	2.625	
Airbus A319-100 Series	0.179	2.157	21.152	1.441	2.541	0.110	0.770	21.502	
Airbus A320-200 Series	0.045	0.597	5.344	0.375	0.651	0.015	0.115	5.580	
Airbus A321-200 Series		0.682	14.150	0.739	0.744	0.115	0.630	13.882	
Boeing 737-700 Series	0.240	1.236	10.825	2.656	1.508	0.013	0.330	13.105	
Boeing 737-800 Series	0.424	3.683	33.757	3.848	4.660	0.128	0.991	35.934	
Boeing 737-800 MAX	0.454	11.410	97.559	6.688	11.338	0.321	6.982	97.428	
Boeing 757-200 Series		0.005			0.005				
Boeing 757-300 Series		0.005			0.005				
Bombardier CRJ-900			0.041					0.041	
Embraer ERJ175	0.225	2.279	20.109	1.659	2.622	0.027	0.456	21.166	
Embraer ERJ190			0.047				0.036	0.010	
Bombardier de Havilland Dash 8 Q400	0.003	0.029	0.281	0.029	0.030	0.000	0.003	0.310	
Bombardier Global 5000 Business		0.070	0.771	0.009	0.035	0.052	0.557	0.205	
Bombardier Global Express	0.005	0.296	2.384	0.054	0.097	0.215	1.879	0.548	
Bombardier Challenger 600	0.046	0.593	5.533	0.129	0.224	0.529	3.804	1.744	
Bombardier Learjet 35A/36A (C-21A)	0.011	0.261	1.647	0.027	0.075	0.158	1.197	0.516	
Cessna 500 Citation I	0.001	0.036	0.297	0.009	0.013	0.028	0.203	0.098	
Cessna 510 Citation	0.008	0.215	1.911	0.072	0.096	0.154	1.345	0.610	
Cessna 525 Citation Jet		0.090	0.663		0.053	0.053	0.478	0.170	
Cessna 550 Citation II	0.014	0.251	2.808	0.078	0.137	0.211	1.891	0.911	
Cessna 560 Citation V		0.046	0.613	0.026	0.011	0.018	0.473	0.183	
Cessna 560 Citation XLS	0.047	0.449	4.772	0.132	0.191	0.424	3.285	1.521	
Cessna 650 Citation III	0.003	0.012	0.133	0.003	0.003	0.009	0.103	0.036	
Cessna 680 Citation Sovereign	0.008	0.220	2.361	0.082	0.083	0.197	1.481	0.910	
Cessna 750 Citation X	0.056	1.329	11.298	0.376	0.492	0.990	8.091	3.485	
Eclipse 500 / PW610F		0.058	0.281	0.010	0.010	0.019	0.213	0.106	
Embraer ERJ145	0.027	0.408	3.172	0.091	0.153	0.268	2.261	1.017	
Gulfstream IV-SP	0.014	0.156	1.554	0.057	0.047	0.141	1.155	0.438	
Gulfstream V/G500	0.013	0.436	4.669	0.100	0.134	0.385	3.418	1.283	
Gulfstream Aerospace G650	0.008	0.012	1.494	0.012	0.009	0.018	0.074	1.425	
Israel IAI-1125 Astra	0.024	0.079	0.841	0.016	0.056	0.056	0.492	0.355	
Mitsubishi MU-300 Diamond		0.039	0.426	0.014	0.015	0.029	0.280	0.156	
Cessna 441 Conquest II	0.005	0.038	0.168	0.022	0.005	0.016	0.152	0.059	
DeHavilland DHC-6-200 Twin Otter	0.024	0.232	1.926	0.096	0.112	0.168	1.359	0.632	
Piper PA-42 Cheyenne Series			0.091	0.046		0.046	0.046	0.046	
Cessna 208 Caravan	0.022	0.141	1.428	0.249	0.050	0.144	1.203	0.442	
Raytheon Beech Baron 58	0.030	0.151	1.256	0.247	0.043	0.112	1.138	0.402	
Piper PA-30 Twin Comanche		0.015	0.038	0.007	0.005		0.049	0.005	
Cessna 172 Skyhawk	0.020	0.049	0.761	0.156	0.023	0.053	0.672	0.238	
Cessna 182	0.011	0.050	0.501	0.112	0.024	0.042	0.511	0.097	
Cessna 206	0.039	0.039	0.771	0.195	0.019	0.040	0.851	0.165	
EADS Socata TB-9 Tampico	0.015	0.074	0.929	0.325	0.032	0.049	0.987	0.275	
Piper PA-24 Comanche	0.088	0.164	2.497	0.512	0.069	0.222	2.238	0.734	
Piper PA-28 Cherokee Series	0.003	0.031	0.131	0.034		0.015	0.154	0.030	
1985 1-ENG COMP	0.034	0.132	1.491	0.260	0.083	0.106	1.317	0.411	
Agusta A-109									0.241
Bell 206L Long Ranger									0.095
Bell 407 / Rolls-Royce 250-C47B									0.060
Eurocopter EC-130 w/Arriel 2B1									0.749
Robinson R22B w/Lycoming 0320									0.213
Robinson R44 Raven									0.076
C-130H/T56-A-15	0.009	0.005	0.038	0.053	0.010	0.005	0.038	0.053	
EAGLE F100-PW-100	0.002	0.001	0.008	0.010	0.002	0.001	0.007	0.010	
HORNET F404-GE-400	0.004	0.002	0.015	0.021	0.004	0.002	0.015	0.021	
BOEING 737-800/CFM56-7B26	0.001	0.006	0.055	0.006	0.008	0.000	0.002	0.059	
Sikorsky S-61 (CH-3A)									0.114
Sikorsky S-76 Spirit									0.100
Total Daily Runway Operations	**2.201**	**29.094**	**272.409**	**21.284**	**27.258**	**5.806**	**56.025**	**235.704**	**1.649**
Percentage of Runway Operations	**0.3%**	**4.5%**	**41.8%**	**3.3%**	**4.2%**	**0.9%**	**8.6%**	**36.2%**	**0.3%**

Table 8 - Airport Operations and Runway Use, 2037 Scenario 3

Aircraft Description	Arrival Runways 12L	12R	30L	30R	Departure Runways 12L	12R	30L	30R	11	29	Helicopter Pad
Airbus A330-200 Series	0.004	0.143	1.895	0.056	0.149	0.018	0.099	1.832			
Airbus A350-900 Series		0.222	1.907		0.123		2.006				
Boeing 747-400 Series Freighter			0.008					0.008			
Boeing 767-300 Series	0.006	0.139	1.857	0.067	0.233	0.002	0.057	1.776			
Boeing 767-400 ER		0.005	0.050		0.006			0.049			
Boeing 777-200-ER		0.010	0.072		0.012		0.012	0.059			
Boeing 777-300 ER		0.035	0.964	0.035			0.033	1.000			
Boeing 787-800 Dreamliner	0.025	0.270	2.660	0.044	0.206	0.082	0.088	2.625			
Airbus A319-100 Series	0.179	2.157	21.152	1.441	2.541	0.110	0.770	21.502			
Airbus A320-200 Series	0.045	0.597	5.344	0.375	0.651	0.015	0.115	5.580			
Airbus A321-200 Series		0.682	14.150	0.739	0.744	0.115	0.630	13.882			
Boeing 737-700 Series	0.240	1.236	10.825	2.656	1.508	0.013	0.330	13.105			
Boeing 737-800 Series	0.424	3.683	33.757	3.848	4.660	0.128	0.991	35.934			
Boeing 737-800 MAX	0.454	11.410	97.559	6.688	11.338	0.321	6.982	97.428			
Boeing 757-200 Series		0.005			0.005						
Boeing 757-300 Series		0.005			0.005						
Bombardier CRJ-900			0.041					0.041			
Embraer ERJ175	0.225	2.279	20.109	1.659	2.622	0.027	0.456	21.166			
Embraer ERJ190			0.047				0.036	0.010			
Bombardier de Havilland Dash 8 Q400	0.003	0.029	0.281	0.029	0.030	0.000	0.003	0.310			
Bombardier Global 5000 Business		0.070	0.771	0.009	0.035	0.052	0.557	0.205			
Bombardier Global Express	0.005	0.296	2.384	0.054	0.097	0.215	1.879	0.548			
Bombardier Challenger 600	0.046	0.593	5.533	0.129	0.224	0.529	3.804	1.744			
Bombardier Learjet 35A/36A (C-21A)	0.011	0.261	1.647	0.027	0.075	0.158	1.197	0.516			
Cessna 500 Citation I	0.001	0.036	0.297	0.009	0.001	0.001	0.010	0.005	0.041	0.302	
Cessna 510 Citation	0.008	0.215	1.911	0.072	0.096	0.154	1.345	0.610			
Cessna 525 Citation Jet		0.090	0.663		0.053	0.053	0.478	0.170			
Cessna 550 Citation II	0.014	0.251	2.808	0.078	0.137	0.211	1.891	0.911			
Cessna 560 Citation V		0.046	0.613	0.026	0.011	0.018	0.473	0.183			
Cessna 560 Citation XLS	0.047	0.449	4.772	0.132	0.191	0.424	3.285	1.521			
Cessna 650 Citation III	0.003	0.012	0.133	0.003	0.003	0.009	0.103	0.036			
Cessna 680 Citation Sovereign	0.008	0.220	2.361	0.082	0.083	0.197	1.481	0.910			
Cessna 750 Citation X	0.056	1.329	11.298	0.376	0.492	0.990	8.091	3.485			
Eclipse 500 / PW610F		0.058	0.281	0.010					0.029	0.319	
Embraer ERJ145	0.027	0.408	3.172	0.091	0.153	0.268	2.261	1.017			
Gulfstream IV-SP	0.014	0.156	1.554	0.057	0.047	0.141	1.155	0.438			
Gulfstream V/G500	0.013	0.436	4.669	0.100	0.134	0.385	3.418	1.283			
Gulfstream Aerospace G650	0.008	0.012	1.494	0.012	0.009	0.018	0.074	1.425			
Israel IAI-1125 Astra	0.024	0.079	0.841	0.016	0.056	0.056	0.492	0.355			
Mitsubishi MU-300 Diamond		0.039	0.426	0.014	0.015	0.029	0.280	0.156			
Cessna 441 Conquest II	0.005	0.038	0.168	0.022					0.022	0.210	
DeHavilland DHC-6-200 Twin Otter	0.024	0.232	1.926	0.096					0.280	1.991	
Piper PA-42 Cheyenne Series			0.091	0.046					0.046	0.091	
Cessna 208 Caravan	0.022	0.141	1.428	0.249					0.194	1.645	
Raytheon Beech Baron 58	0.030	0.151	1.256	0.247					0.155	1.541	
Piper PA-30 Twin Comanche		0.015	0.038	0.007					0.005	0.055	
Cessna 172 Skyhawk	0.020	0.049	0.761	0.156					0.076	0.910	
Cessna 182	0.011	0.050	0.501	0.112					0.067	0.607	
Cessna 206	0.039	0.039	0.771	0.195					0.059	1.017	
EADS Socata TB-9 Tampico	0.015	0.074	0.929	0.325					0.081	1.262	
Piper PA-24 Comanche	0.088	0.164	2.497	0.512					0.290	2.971	
Piper PA-28 Cherokee Series	0.003	0.031	0.131	0.034					0.015	0.184	
1985 1-ENG COMP	0.034	0.132	1.491	0.260					0.189	1.728	
Agusta A-109											0.241
Bell 206L Long Ranger											0.095
Bell 407 / Rolls-Royce 250-C47B											0.060
Eurocopter EC-130 w/Arriel 2B1											0.749
Robinson R22B w/Lycoming 0320											0.213
Robinson R44 Raven											0.076
C-130H/T56-A-15	0.009	0.005	0.038	0.053	0.010	0.005	0.038	0.053			
EAGLE F100-PW-100	0.002	0.001	0.008	0.010	0.002	0.001	0.007	0.010			
HORNET F404-GE-400	0.004	0.002	0.015	0.021	0.004	0.002	0.015	0.021			
BOEING 737-800/CFM56-7B26	0.001	0.006	0.055	0.006	0.008	0.000	0.002	0.059			
Sikorsky S-61 (CH-3A)											0.114
Sikorsky S-76 Spirit											0.100
Total Daily Runway Operations	**2.201**	**29.094**	**272.409**	**21.284**	**26.770**	**4.747**	**44.942**	**231.967**	**1.549**	**14.834**	**1.649**
Percentage of Runway Operations	**0.3%**	**4.5%**	**41.8%**	**3.3%**	**4.1%**	**0.7%**	**6.9%**	**35.6%**	**0.2%**	**2.3%**	**0.3%**

Based upon the operational conditions presented previously CNEL contours were developed. The future 2037 CNEL noise exposure contours for SJC are presented in **Figure 5** and **Figure 6**. These figures present the 60, 65, 70, and 75 CNEL noise exposure contours.

Table 9 summarizes noise exposure for 2037 Future Year Conditions. The population and overall land area affected by CNEL 65 dB and greater noise levels would change in the future – with or without the proposed project – in comparison to 2018 noise exposure due to a projected increase in operations that is not project-related. However, these homes have been sound insulated by the Airport under the ACT Program. Therefore, the homes and residential population within the 2037 CNEL 65 dB contours are considered to be compatible with aircraft noise.

Table 9 - Summary of Noise Exposure 2037 Future Year Conditions

SCENARIO 2:				
Category	Noise Level Range (CNEL)			
	>60 dB	>65 dB	>70 dB	>75 dB
Noise-sensitive Land Uses:				
Residential	10,602	0	0	0
Hospital	0	0	0	0
School	6	0	0	0
Church	2	0	0	0
Population	29,897	0	0	0
Land Area (Acres)	6,443	2,346	827	399

SCENARIO 3:				
Category	Noise Level Range (CNEL)			
	>60 dB	>65 dB	>70 dB	>75 dB
Noise-sensitive Land Uses:				
Residential	10,600	0	0	0
Hospital	0	0	0	0
School	6	0	0	0
Church	2	0	0	0
Population	29,891	0	0	0
Land Area (Acres)	6,458	2,358	846	408

Note: Table indicates the number of homes, hospitals, schools, and churches that are **not** sound-insulated within each noise level range and the population living in homes that are **not** sound insulated.

Sources: AEDT version 2d, 2019 (population and land area); San Jose International Airport, 2019 (hospital, school, and church land uses and sound-insulated residences); U.S. Census, 2010 (number of residences estimated from the ratio of persons to homes which is 2.82 in Santa Clara County)

4.5 CNEL at Reference Points

CNEL levels were determined at each of the 18 representative grid locations (shown in **Figure 7**) in the study area. **Table 10** shows the CNEL receptor analysis for the 2018 existing conditions (baseline), Project

(Scenario 2) and No Project (Scenario 3). As discussed previously, an increase in CNEL of 1.5 dB or more is considered significant when the baseline CNEL is 65 dB or above. In addition, an increase in CNEL of 3.0 dB or more is considered significant when the baseline CNEL is less than 65 dB. As shown in Table 10, there are no exceedances of these thresholds at any of the 18 grid locations. In general, the increase in CNEL from existing to future conditions is due to the growth in aircraft operations projected for 2037, which is the same for the Project and No Project scenarios. Of note, at some reference points the CNEL decreases in the future as a result of changes in the aircraft fleet mix, primarily at points north of the airport where departures are predominant.

Table 10 – Grid Point Analysis for All Scenarios (CNEL in dB)

Reference Grid Points	Location Street	Location City	Modeled			
			Baseline 2018	Project 2037	No Project 2037	Project vs. Baseline*
1	RMS 10 - Residential	Santa Clara, CA	65.2	65.6	65.6	0.4
2	Public Utility (adjacent residential	Santa Clara, CA	62.2	62.5	62.5	0.3
3	Agnew Park - SW cr. Agnew Rd. / Cheeney St.	Santa Clara, CA	64.4	64.9	64.9	0.4
4	Convalescent Hospital - N. Side Clyde Ave. @ Loch Lomond St.	Santa Clara, CA	65.2	65.3	65.3	0.1
5	Center for Performing Arts	San Jose, CA	66.0	67.2	67.2	1.2
6	Montague Park/School	Santa Clara, CA	65.2	65.4	65.4	0.1
7	Chestnut St.	Santa Clara, CA	61.5	61.0	61.0	-0.5
8	Fairway Glen Park/Hughes School	Santa Clara, CA	60.5	60.1	60.1	-0.4
9	Washington School	San Jose, CA	64.5	65.6	65.6	1.1
10	Bellarmine Prep School	San Jose, CA	57.6	57.6	57.6	0.0
11	Residential	San Jose, CA	67.8	67.7	67.7	0.0
12	Alviso Community Center - SE cr. San Jose Alviso Rd./Liberty St.	San Jose, CA	58.1	57.7	57.7	-0.4
13	Cottage Trailer Grove - SW cr. Monterey Hwy./San Jose Ave.	San Jose, CA	62.4	63.9	63.9	1.4
14	Agnews State Hospital - SW cr. Lick Mill Rd./Lick Mill Blvd.	Santa Clara, CA	59.2	58.2	58.2	-1.0
15	Bachrodt School - SE cr. Sonora Ave./Forrestal Ave.	San Jose, CA	59.9	59.3	59.3	-0.5
16	Hester School - SE cr. Alameda/Pershing Ave.	San Jose, CA	54.1	54.1	54.1	0.0
17	Ryland Park - SW cr. N. First St./Fox Ave.	San Jose, CA	57.3	57.5	57.4	0.1
18	Lamplighter Trailer Park - Swvof Hwy 237 and N. First St.	San Jose, CA	56.8	55.9	55.9	-0.9

Source: AEDT version 2d and BridgeNet International, 2019

*Due to rounding, comparisons shown between scenarios in the final column may vary by +/- 0.1 dB.

Table 11 presents a similar analysis of modeled noise levels at the airport's permanent noise monitoring terminals. However, there are no significant noise impacts at any of these locations when comparing baseline to future conditions (the greatest increase shown is CNEL 1.4 dB). This table also compares the annual year 2018 measured aircraft CNEL to the modeled 2018 CNEL. As shown, the difference in CNEL between measured and modeled is within +/- 1 dB except at Terminal 107 (Fire Station 6). At this location, the measured CNEL is 2 dB greater than the modeled CNEL. However, this is likely due to a bias in the measured value, because the nearby fire station generates high levels of background noise from sirens and trucks which can occur at the same time aircraft are flying overhead.

Table 11 – Noise Monitoring Terminal Sound Levels for All Scenarios (CNEL in dB)

Monitoring Terminal No.	Location Street	Location City	Measured 2018	Modeled Baseline 2018	Modeled Project 2037	Modeled No Project 2037	Modeled Project vs. Baseline*
101	Oak Street	San Jose, CA	63.5	63.8	64.9	64.9	1.1
102	Center for Performing Arts	San Jose, CA	66.6	66.0	67.2	67.2	1.2
104	Bellarmine Prep School	San Jose, CA	58.2	57.6	57.6	57.6	0.0
105	Rosemary Garden	San Jose, CA	60.5	60.7	60.2	60.2	-0.5
106	St. John/Autumn	San Jose, CA	66.2	67.0	68.4	68.4	1.4
107	Fire Station 6	Santa Clara, CA	63.3	61.3	60.6	60.6	-0.8
108	MacGregor Lane	Santa Clara, CA	65.3	65.4	65.6	65.6	0.1
109	Lake Santa Clara	Santa Clara, CA	62.1	61.5	61.1	61.2	-0.4
110	Chestnut St.	Santa Clara, CA	65.8	65.1	65.5	65.5	0.4
111	Fuller Street Park	Santa Clara, CA	63.3	62.9	63.1	63.2	0.2
112	Mnt. View/Alviso	Santa Clara, CA	59.8	60.0	60.2	60.2	0.2
114	Fairway Glen Park	Santa Clara, CA	60.4	60.0	59.4	59.4	-0.6
115	3rd/Reed	San Jose, CA	58.7	58.1	58.8	58.8	0.7

Source: SJC Airport, AEDT version 2d and BridgeNet International, 2019

*Due to rounding, comparisons shown between scenarios in the final column may vary by +/- 0.1 dB.

4.6 Time Above

Time Above (TA) is a measure of the time – in minutes per day – that the aircraft noise levels are greater than a specific sound level. Values that were calculated for time above 75 dB and 85 dB (TA75 and TA85, respectively). These results are summarized in **Table 12** and show the amount of time that the noise levels were greater than the specified noise levels for each of the scenarios. The largest increase in TA75 was about 16 minutes when comparing existing conditions to future project or no project. The TA85 was below one minute for all scenarios, except at point 6.

Table 12 – Time Above (TA) 75 dBA and 85 dBA for All Scenarios (in minutes)

Reference Grid Points	Location Street	Location City	Time Above 75dB in Minutes			Time Above 85dB in Minutes		
			Baseline	Project	No Project	Baseline	Project	No Project
1	RMS 10 - Residential	Santa Clara, CA	12.0	14.4	14.5	0.1	0.1	0.1
2	Public Utility (adjacent residential	Santa Clara, CA	3.5	4.6	4.6	0.0	0.0	0.0
3	Agnew Park - SW cr. Agnew Rd. / Cheeney St.	Santa Clara, CA	8.7	11.7	11.8	0.1	0.1	0.1
4	Convalescent Hospital - N. Side Clyde Ave. @ Loch Lomond St.	Santa Clara, CA	13.3	14.6	14.6	0.1	0.1	0.1
5	Center for Performing Arts	San Jose, CA	22.4	30.5	30.5	0.0	0.0	0.0
6	Montague Park/School	Santa Clara, CA	14.8	17.6	17.6	0.0	0.0	0.0
7	Chestnut St.	Santa Clara, CA	1.3	1.8	1.8	0.0	0.0	0.0
8	Fairway Glen Park/Hughes School	Santa Clara, CA	0.4	0.4	0.4	0.0	0.0	0.0
9	Washington School	San Jose, CA	14.1	18.7	18.7	0.0	0.0	0.0
10	Bellarmine Prep School	San Jose, CA	0.2	0.3	0.3	0.0	0.0	0.0
11	Residential	San Jose, CA	23.8	21.6	21.5	0.1	0.5	0.5
12	Alviso Community Center - SE cr. San Jose Alviso Rd./Liberty St.	San Jose, CA	0.2	0.1	0.1	0.0	0.0	0.0
13	Cottage Trailer Grove - SW cr. Monterey Hwy./San Jose Ave.	San Jose, CA	2.7	3.0	3.0	0.0	0.0	0.0
14	Agnews State Hospital - SW cr. Lick Mill Rd./Lick Mill Blvd.	Santa Clara, CA	0.1	0.1	0.1	0.0	0.0	0.0
15	Bachrodt School - SE cr. Sonora Ave./Forrestal Ave.	San Jose, CA	0.7	0.8	0.8	0.0	0.0	0.0
16	Hester School - SE cr. Alameda/Pershing Ave.	San Jose, CA	0.1	0.0	0.0	0.0	0.0	0.0
17	Ryland Park - SW cr. N. First St./Fox Ave.	San Jose, CA	0.8	0.8	0.8	0.0	0.0	0.0
18	Lamplighter Trailer Park - Swvof Hwy 237 and N. First St.	San Jose, CA	0.1	0.0	0.0	0.0	0.0	0.0

Source: AEDT version 2d and BridgeNet International, 2019

4.7 Sound Exposure Level

Table 13 shows the size of the sound exposure level noise contour in acres for the most commonly flown narrow-body, regional jets and business jet aircraft at SJC. This comparison provides a relative view of the sound levels due to different types of aircraft common at the airport, but not specific to a location in the community.

Table 13 – Sound Exposure Level in Acres

Arrivals AEDT Type	SEL dBA Area in Acres							
	55	***60***	***65***	***70***	***75***	***80***	***85***	***90***
A319-131	73,526	49,723	30,018	14,404	5,311	2,357	718	204
A320-211	87,915	60,293	38,675	19,987	7,429	2,875	913	269
737700	73,780	51,305	31,580	16,669	8,094	3,499	1,362	415
737800	93,976	64,126	39,599	21,138	9,252	4,695	1,473	406
7378MAX	174,321	118,790	78,087	45,420	22,402	4,475	1,282	354
EMB175	55,634	37,137	21,031	10,332	4,699	2,175	802	203
CL600	23,021	11,590	5,576	2,768	1,285	509	156	41
CNA750	44,486	26,813	13,045	6,147	2,583	962	318	111

Departures AEDT Type	SEL dBA Area in Acres							
	55	***60***	***65***	***70***	***75***	***80***	***85***	***90***
A319-131	99,036	66,711	43,014	24,653	10,913	4,190	1,733	752
A320-211	123,021	82,972	53,975	31,719	13,919	5,639	2,224	1,057
737700	137,667	93,838	63,336	40,538	22,209	8,238	2,890	982
737800	165,198	111,320	74,816	47,957	26,648	9,989	3,650	1,605
7378MAX	121,346	75,489	44,387	19,464	7,889	2,969	1,245	421
EMB175	119,372	80,689	52,755	31,165	13,780	5,461	1,942	705
CL600	74,648	49,482	29,943	13,404	5,548	2,301	1,061	373
CNA750	55,461	28,770	12,386	5,471	2,264	890	355	140

Source: AEDT version 2d and BridgeNet International, 2019

Table 14 presents SEL results for the predominant aircraft in the fleet mix. The SEL were computed from single arrival and departure operations using Runway 30L for arrivals or Runway 30R for departures (depending on the grid point location). Of note, a similar analysis was presented in the 2003 EIR which also compared existing and future conditions and identified increases in SEL. However, in this EIR the proposed project does not affect single-event noise levels because the runways, flight tracks, and track use do not change as a result of the project. On a single-flight basis, a given SEL for existing conditions would be the same for the future project and no-project conditions.

Table 14 – Single Event Aircraft Sound Levels for All Scenarios (SEL in dB)

Reference Grid Points	Location Street	Location City	Airbus A319	Boeing B737	Boeing B38M	Embraer E175
1	RMS 10 - Residential	Santa Clara, CA	88.5	89.1	86.7	87.4
2	Public Utility (adjacent residential	Santa Clara, CA	83.6	86.7	82.7	84.9
3	Agnew Park - SW cr. Agnew Rd. / Cheeney St.	Santa Clara, CA	87.5	88.5	86.1	86.8
4	Convalescent Hospital - N. Side Clyde Ave. @ Loch Lomond St.	Santa Clara, CA	88.5	87.6	86.5	87.7
5	Center for Performing Arts	San Jose, CA	89.0	91.3	90.7	88.7
6	Montague Park/School	Santa Clara, CA	87.8	86.8	85.5	87.1
7	Chestnut St.	Santa Clara, CA	82.2	84.2	80.6	83.6
8	Fairway Glen Park/Hughes School	Santa Clara, CA	80.5	83.8	79.1	82.8
9	Washington School	San Jose, CA	87.1	89.5	88.7	87.0
10	Bellarmine Prep School	San Jose, CA	69.1	72.6	71.7	70.0
11	Residential	San Jose, CA	75.3	80.2	74.6	78.9
12	Alviso Community Center - SE cr. San Jose Alviso Rd./Liberty St.	San Jose, CA	72.9	77.3	71.2	75.8
13	Cottage Trailer Grove - SW cr. Monterey Hwy./San Jose Ave.	San Jose, CA	84.9	87.2	86.7	85.1
14	Agnews State Hospital - SW cr. Lick Mill Rd./Lick Mill Blvd.	Santa Clara, CA	78.5	81.5	76.7	80.5
15	Bachrodt School - SE cr. Sonora Ave./Forrestal Ave.	San Jose, CA	77.1	80.1	76.3	80.4
16	Hester School - SE cr. Alameda/Pershing Ave.	San Jose, CA	68.2	71.8	70.9	69.2
17	Ryland Park - SW cr. N. First St./Fox Ave.	San Jose, CA	72.3	75.7	74.9	73.1
18	Lamplighter Trailer Park - Swvof Hwy 237 and N. First St.	San Jose, CA	73.0	78.1	71.2	76.4

Source: AEDT version 2d and BridgeNet International, 2019

4.8 Ground Traffic Noise Effects

The proposed Master Plan would increase automobile traffic surrounding the Airport, due to the increase in air passengers and cargo. This section provides an analysis of the resulting traffic noise exposure levels due to the scenarios listed in **Table 15.**

Table 15 - Ground Traffic Noise Scenarios

Scenario	Description	Traffic Levels
1	Existing/Baseline (2018)	Existing traffic
2	Project (2037)	Existing traffic plus: • Additional airport traffic from full accommodation of 2037 forecasted demand
3	Cumulative (2037)	Existing traffic plus: • Additional airport traffic from full accommodation of 2037 forecasted demand • Additional non-Airport traffic from regional growth
4	No Project/No New Facilities (2037)	Existing traffic plus: • Additional airport traffic from full accommodation of 2037 forecasted demand
5	No Project/Buildout under Existing MP (2037)	Existing traffic plus: • Additional airport traffic from full accommodation of 2037 forecasted demand

Source: Master Plan Team, 2019

The Average Daily Traffic (ADT) volumes for three scenarios (existing conditions, existing plus project, and cumulative) were provided by the study team. The traffic volumes are presented below in **Table 16**. As discussed earlier in this report, future Scenarios 2, 4, and 5 are identical because they include existing traffic plus additional airport-related traffic from full accommodation of the 2037 forecasted demand. Ground traffic Scenario 3 (cumulative) accounts for all of this forecasted traffic, and additional non-airport traffic from regional growth projected in 2037.

Table 16 – Traffic Volumes Modeled (Average Daily Traffic Volume)

Roadway Segment	Existing	Existing Plus Project	Cumulative
U.S. 101			
De La Cruz Boulevard to SR-87	202,700	207,600	258,100
SR-87 to Airport Parkway/Brokaw Road	155,400	158,200	191,100
Airport Parkway/Brokaw Road to I-880	202,700	206,600	252,300
I-880			
The Alameda to Coleman Avenue	159,000	163,300	182,300
Coleman Avenue to SR-87	158,000	159,100	178,900
SR-87			
U.S. 101 to I-880	90,300	94,900	140,300
Coleman Avenue			
De La Cruz Boulevard to I-880	40,000	42,300	68,300
De La Cruz Boulevard			
U.S. 101 to Reed Street	36,900	38,600	52,900
1st Street			
Brokaw Road to I-880	20,900	22,700	41,100

Source: Master Plan Team, 2019

Using these existing and projected volumes, the changes in traffic noise level (compared to existing conditions) were calculated for each roadway segment for the existing plus project and cumulative scenarios. Noise exposure calculations were developed using a spreadsheet tool which incorporates the TNM 2.5 source data and noise propagation algorithms; this was used as a screening process to determine if significant noise impacts were present requiring further analysis in the full TNM software. Changes in noise levels expressed in CNEL were calculated for each roadway segment using the tool.

The traffic noise analysis results are presented below in **Table 17.** Of note, the traffic speeds are not expected to change for either scenario. Therefore, the change in noise levels will be caused solely by the traffic volume changes.

Table 17 – Increases in Traffic Noise Levels (CNEL, dB)

Roadway Segment	Existing Plus Project (increase from existing)	Cumulative (increase from existing)
U.S. 101		
De La Cruz Boulevard to SR-87	0.1	1.1
SR-87 to Airport Parkway/Brokaw Road	0.1	0.9
Airport Parkway/Brokaw Road to I-880	0.1	1.0
I-880		
The Alameda to Coleman Avenue	0.1	0.6
Coleman Avenue to SR-87	<0.1	0.5
SR-87		
U.S. 101 to I-880	0.2	1.9
Coleman Avenue		
De La Cruz Boulevard to I-880	0.2	2.3
De La Cruz Boulevard		
U.S. 101 to Reed Street	0.2	1.6
1st Street		
Brokaw Road to I-880	0.4	2.9

Source: BridgeNet International, 2019

In community noise assessment, changes in noise levels greater than 3 dB are often identified as significant, while changes less than 1 dB will not be discernible to local residents. In the range of 1 to 3 dB, residents who are very sensitive to noise may perceive a slight change.

Long-term off-site impacts from traffic noise are measured against two criteria; both criteria must be met for a significant impact to be identified. First, project traffic must cause a substantial noise level increase (greater than 3 dB) on a roadway segment adjacent to a noise sensitive land use. Second, the future noise level that will exist if the project is completed must exceed the criteria level for the noise sensitive land use. The project would have a significant impact if it causes a 3-dB increase and the resulting noise level is 65 CNEL or higher for noise-sensitive land uses.

The results in **Table 17** show that the traffic noise levels are not expected to increase by 3 dB for any roadway segment for either future scenario. Therefore, the traffic noise level increases are not considered significant. Furthermore, the greatest increases in noise are related to the cumulative scenario, which includes both the airport traffic for the 2037 forecasted demand and additional non-Airport traffic from anticipated regional growth. Because there are no significant increases in noise, modeling in the full TNM 2.5 software was not necessary.

5.0 Summary of Noise Impacts and Mitigation

This analysis considered the noise exposure levels due to aircraft and automobile sources, for existing conditions in 2018 and future forecast scenarios in 2037 (both with and without the proposed airport development project).

The existing conditions aircraft noise contours encompass homes near the Airport. However, those homes within the CNEL 65 dB contour have been sound-insulated and are therefore considered compatible with aircraft noise. Thus, there were no significant noise impacts reported for the existing conditions.

In both future scenarios, with or without the proposed project, the area affected by the 65 CNEL noise contour would increase compared to existing conditions. The increase in CNEL from existing to future conditions is due primarily to the growth in aircraft operations projected for 2037, which is the same for the Project and No Project scenarios. There are no increases of 1.5 dB or more within the CNEL 65 dB contour which are considered significant noise impacts. Further, there are no increases of 3 dB or greater when comparing the existing conditions to the future forecast scenario below CNEL 65 dB. Therefore, aircraft-related noise impacts would not be significant.

The Airport has mitigated aircraft noise impacts by implementing the Acoustical Treatment Program (ACT). Homes within the CNEL 65 dB contour published in the 2003 EIR were offered sound insulation. . A map of the boundaries of the ACT Program, which was completed in 2009, is shown in **Figure 8**. On this map, Category 1 offered sound insulation to all homes and schools, and Category 2 offered sound insulation contingent on the availability of Federal funding from FAA grants. Of note, the future 2037 CNEL 65 dB contours for this EIR are smaller than the Category 1 contour shown in **Figure 8** north of the Airport and are approximately equal to the Category 1 contour south of the Airport. As such, the CNEL 65 dB contours modeled for 2037 are contained within the extents of the prior ACT Program boundaries.

Ground traffic noise levels are not expected to increase by 3 dB for any roadway segment for either future scenario. Furthermore, the greatest increases in noise are related to the cumulative scenario, which includes both the Airport traffic for the 2037 forecasted demand and additional non-Airport traffic from anticipated regional growth. Therefore, the traffic noise level increases due to the proposed project are not considered significant.

Temporary noise impacts from construction of the proposed project would be addressed according to the requirements shown in Section 3 of this report. 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 would be implemented during construction to reduce noise impacts on neighboring residents. Changes in ground traffic patterns and congestion due to construction would be temporary in nature as well, therefore such traffic noise would not need to be mitigated.

In conclusion, based on the results of the analyses undertaken in this report, the proposed Project will not result in any significant short-term or long-term noise impacts.

6.0 Figures

The figures for this report are shown on the following pages.

Figure 1
Study Area Map

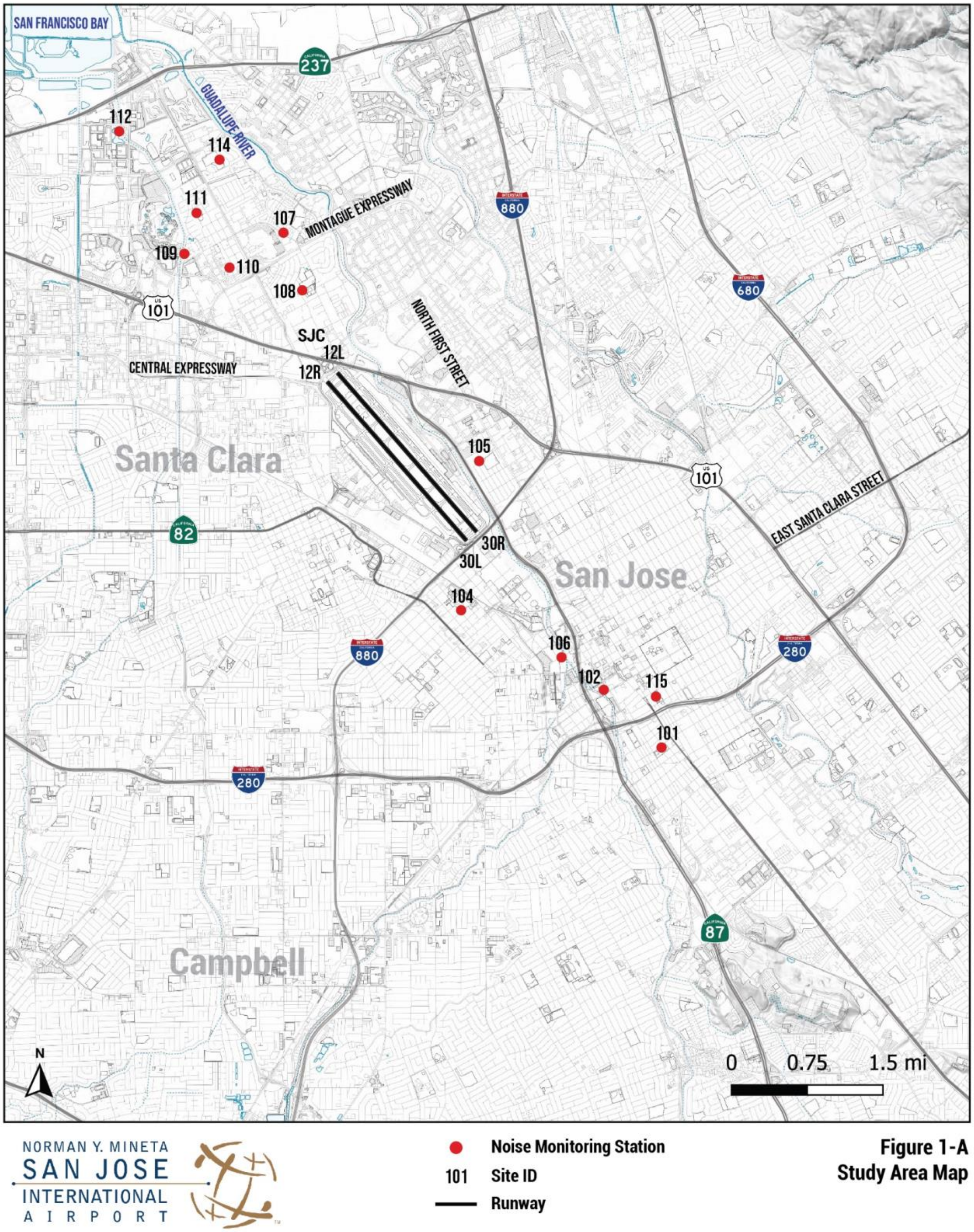
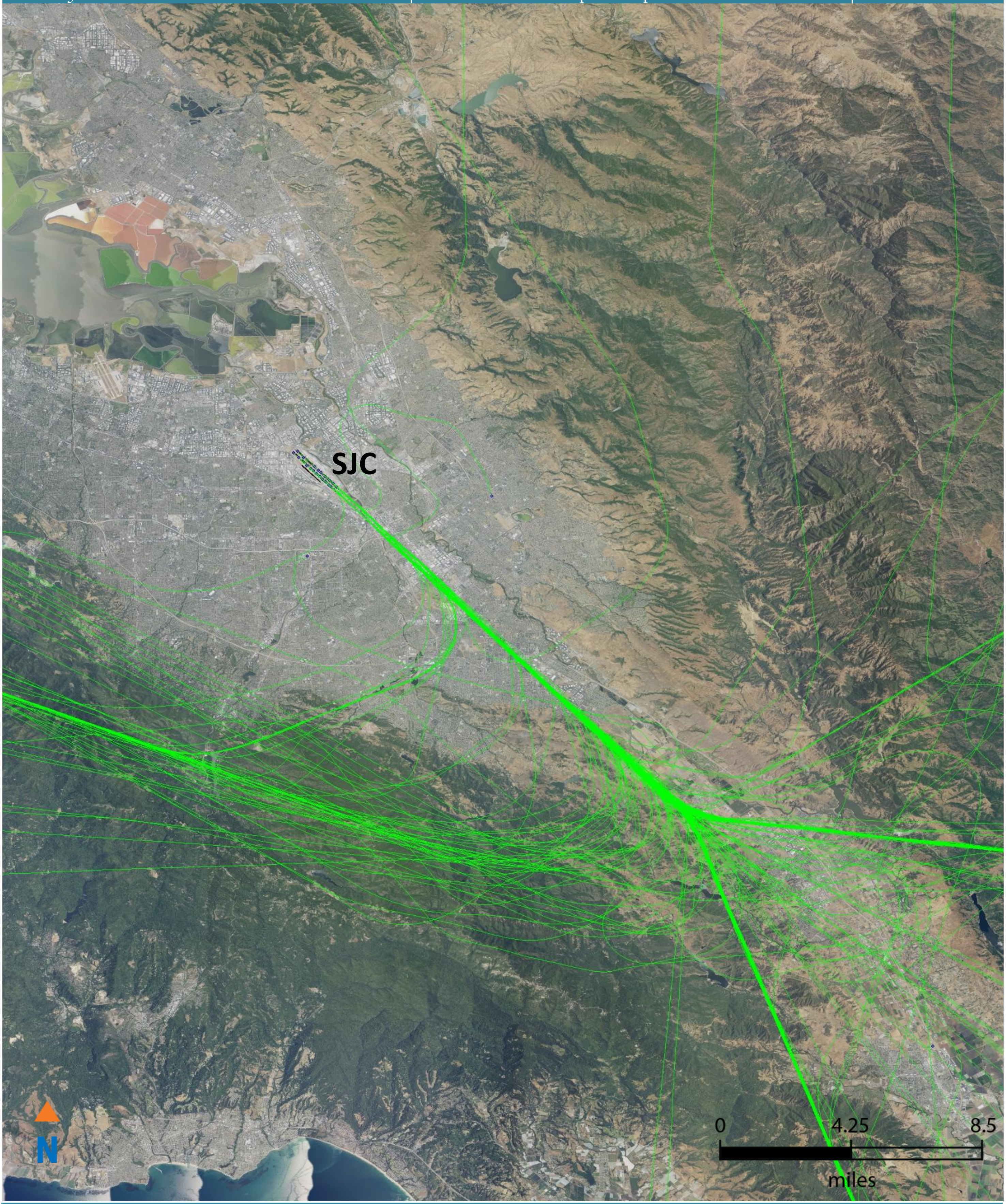


Figure 2
Arrival Tracks - One day of North Flow



Source: BridgeNet International 2019

Figure 3
Departure Tracks - One day of North Flow

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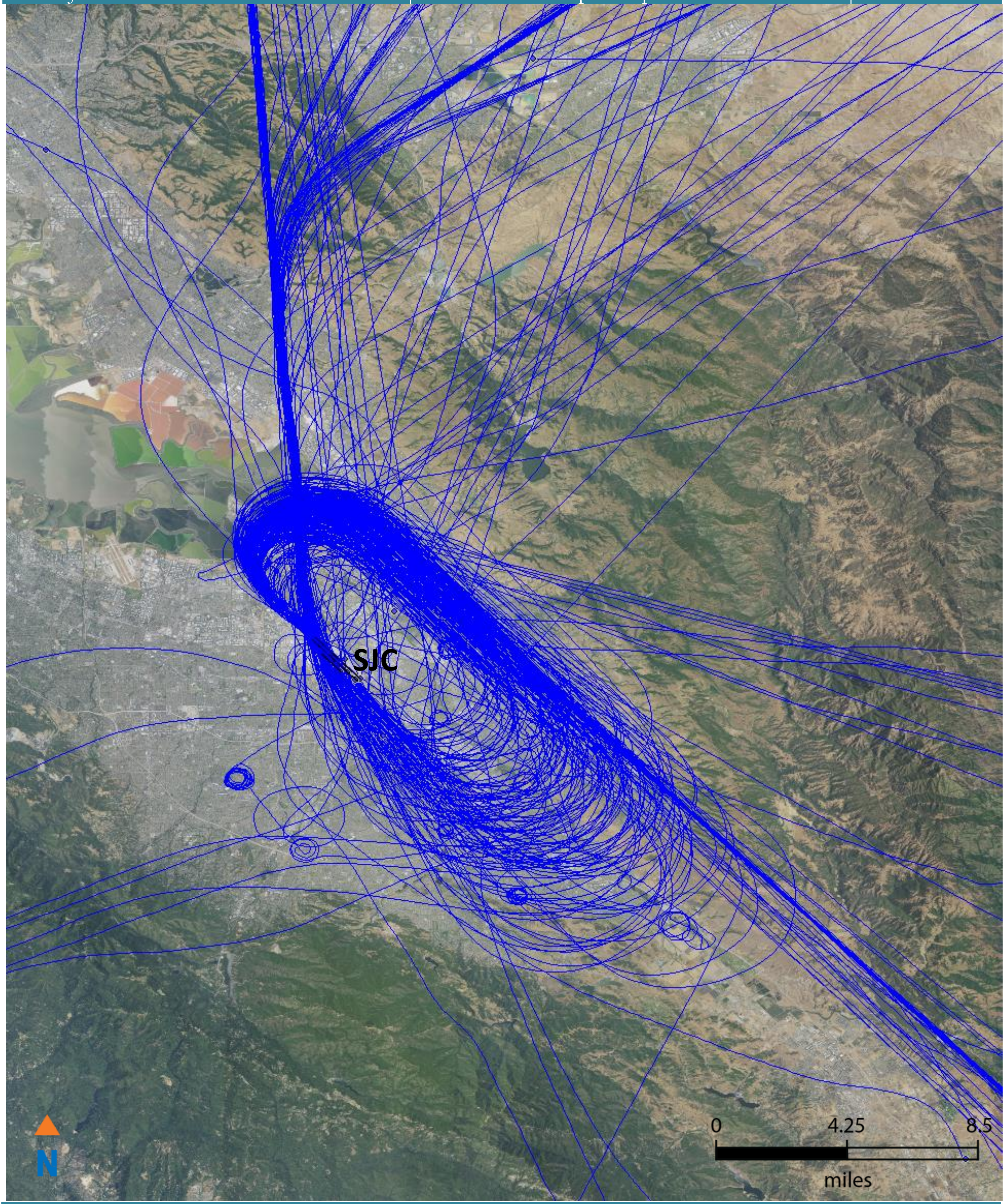
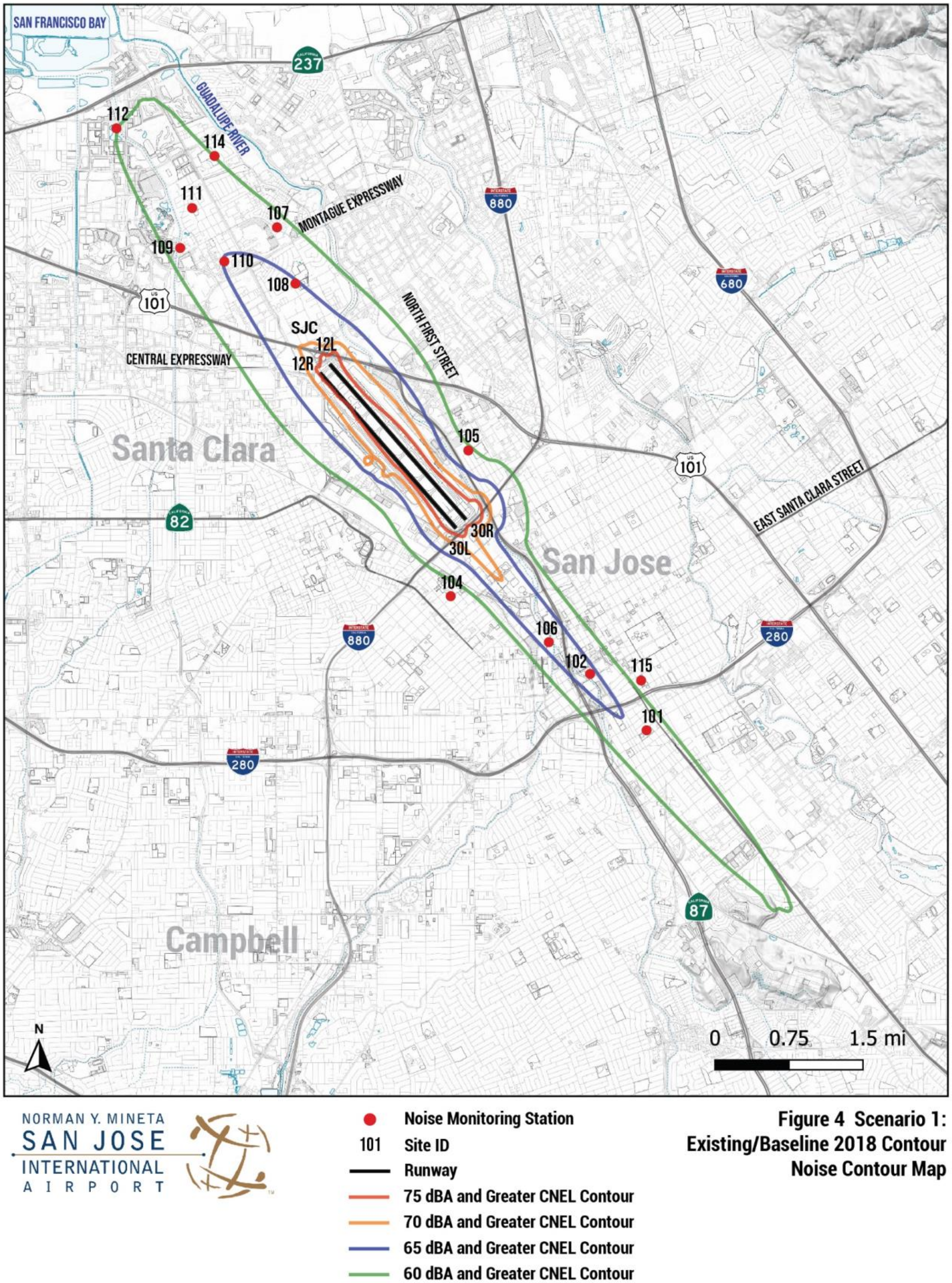


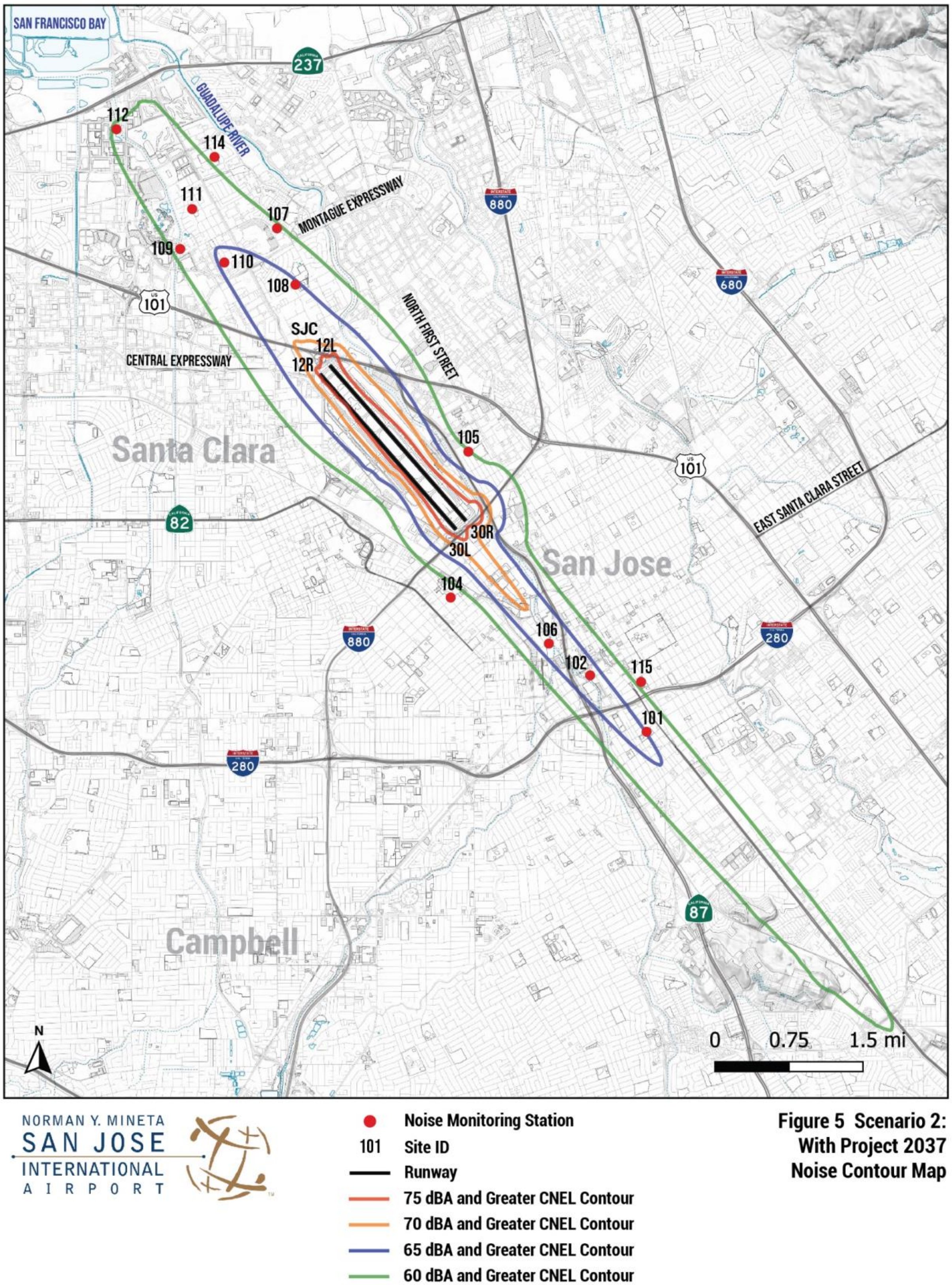
Source: BridgeNet International 2019

Figure 4
Scenario 1: Existing 2018 Noise Contour Map



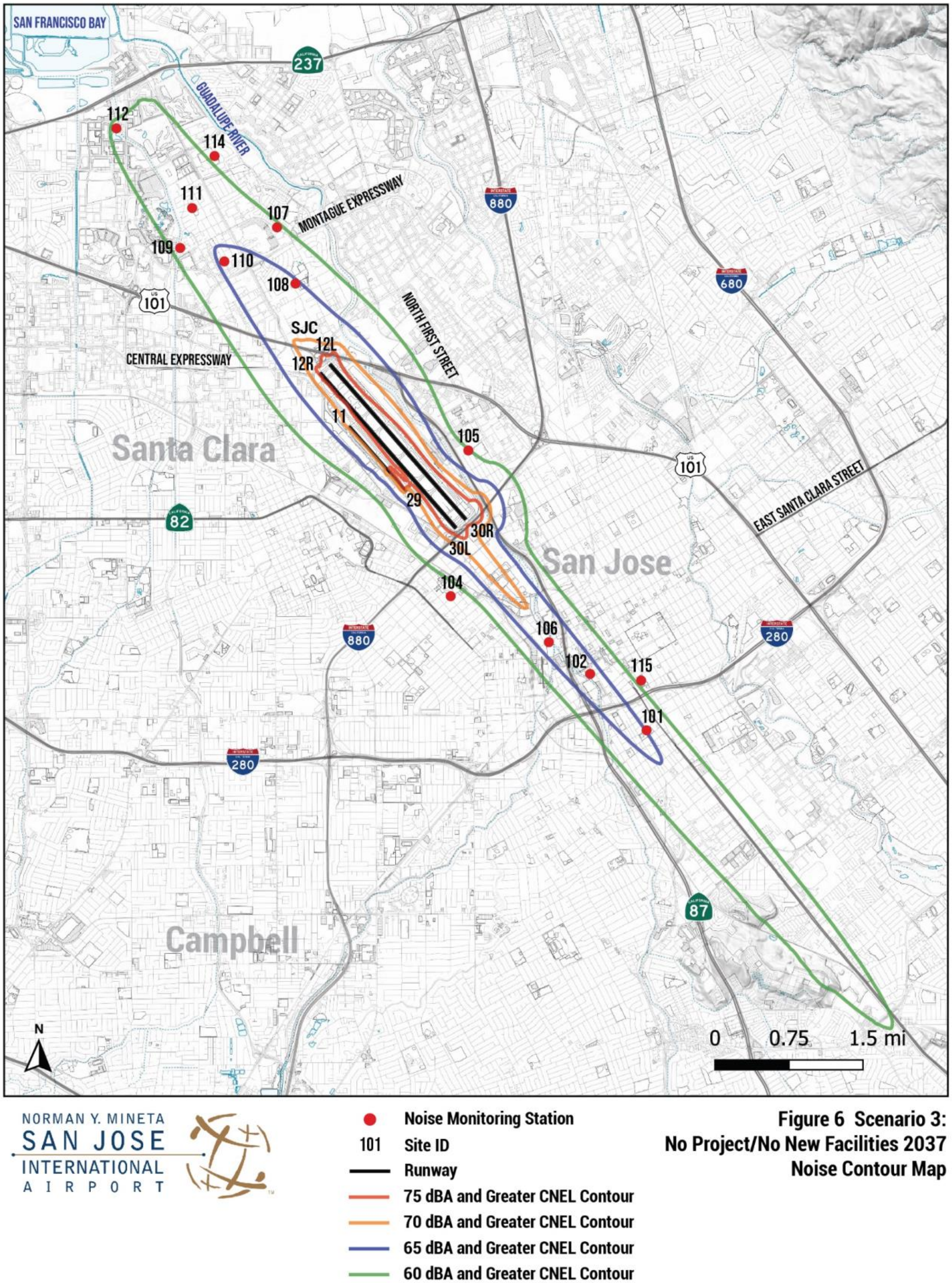
Source: BridgeNet International 2019

Figure 5
Scenario 2: With Project 2037 Noise Contour Map



Source: BridgeNet International 2019

Figure 6
Scenario 3: No Project/No New Facilities 2037 Noise Contour Map



Source: BridgeNet International 2019

Figure 7
Reference Grid Points

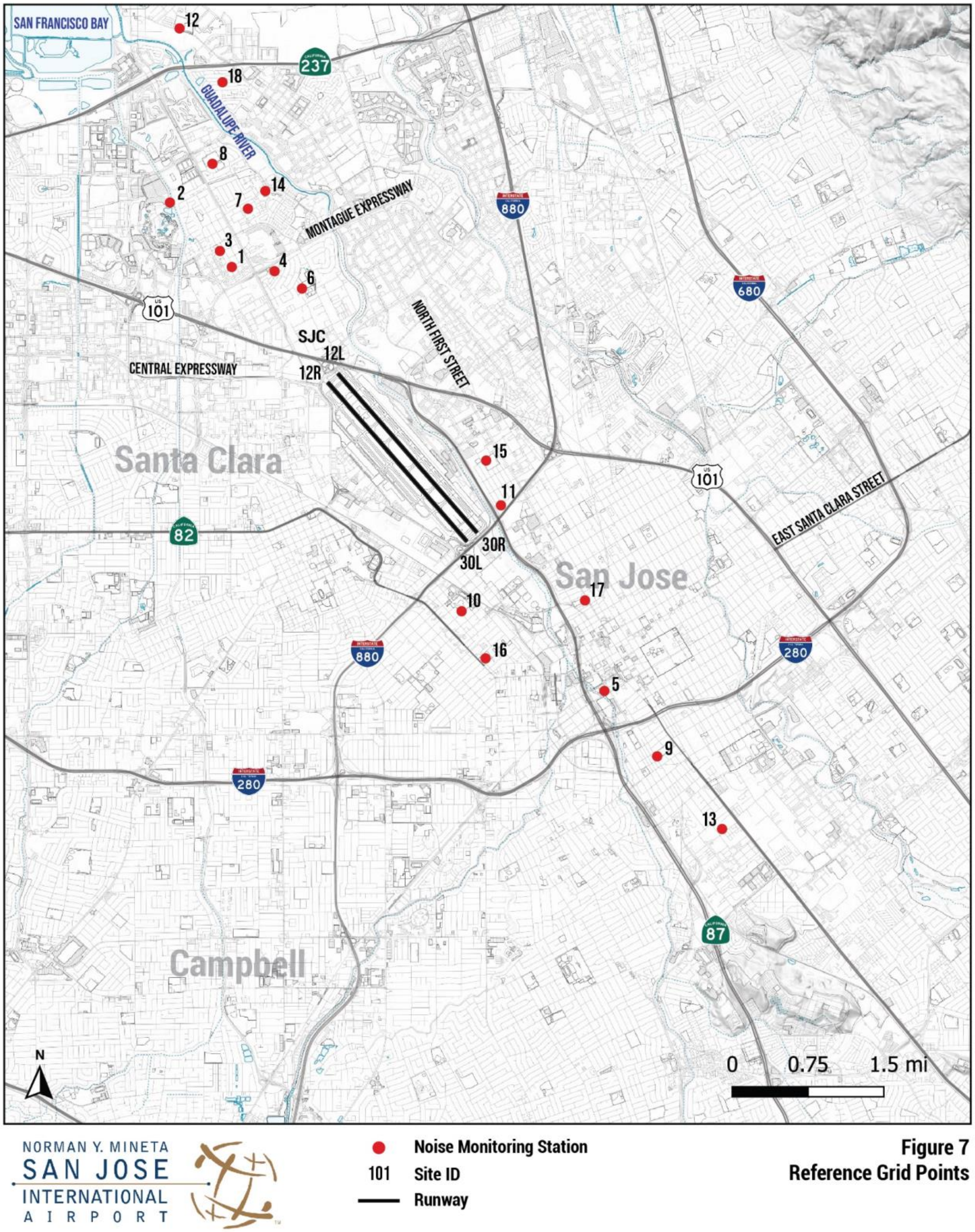
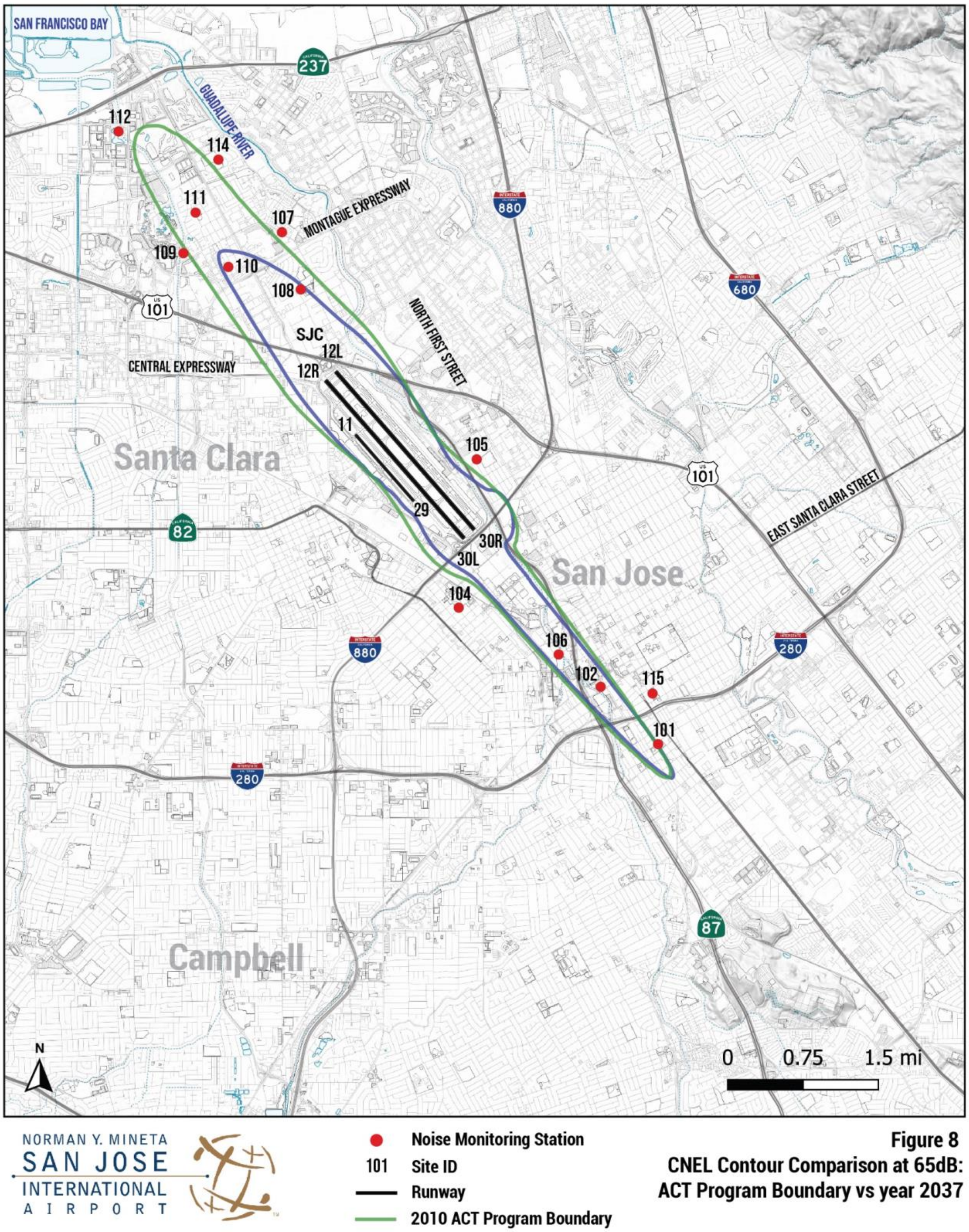


Figure 7
Reference Grid Points

Figure 8
ACT Program Boundary Compared to Scenario 2 CNEL 65 dB Contour



Source: BridgeNet International 2019