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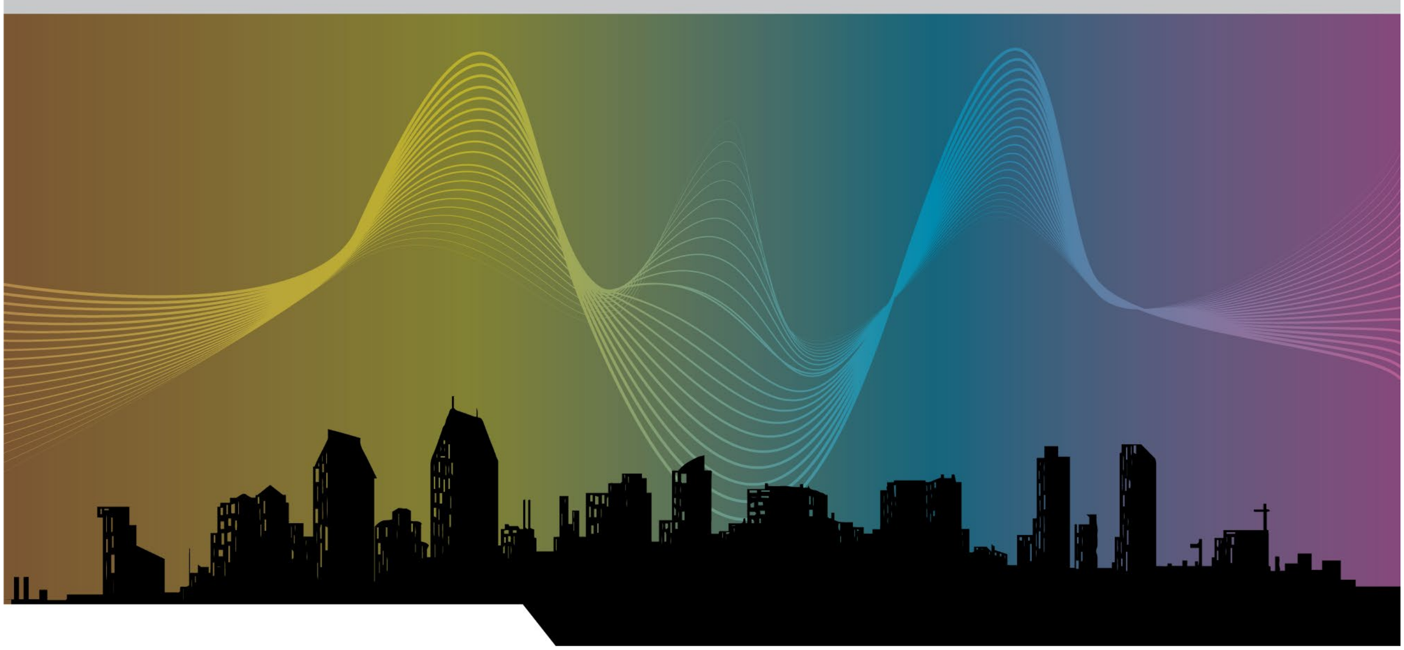

San Diego International Airport Noise Measurements

January 2021

Prepared for: Mead & Hunt
Denver, CO

BridgeNet International

20201 SW Birch Street, Suite 250
Newport Beach, CA 92660
T: 949-250-1222 | F: 949-250-1225
Airports@AirportNetwork.com

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1. Background

BridgeNet International was contracted by Mead Hunt to evaluate noise levels in two San Diego communities, Point Loma Heights and Mission Beach. Two noise monitoring locations, identified by the San Diego International Airport (SAN), were selected to the north and south of the departure path. The study includes portable noise monitoring and an evaluation of flight track data correlated to noise event results. The goals of the measurement program were as follows:

- **Conduct Noise Monitoring.** Continuously collect noise data at two locations in the community for one week. This data was used to determine noise levels related to SAN operations and ambient noise sources. The measurements included the continuous collection of one-second A-weighted noise data, along with frequency data and the audio signal.
- **Correlate with Radar Data.** Radar track data for flights that operated near the study area were analyzed and correlated to the measured noise data. The flight track analysis included determining the aircraft type, path location, altitude, and other flight parameters that are factors in noise generation.
- **Calculate Noise metrics.** The primary metric used in airport noise is the Community Noise Equivalent Level (CNEL) metric. This is the metric used by the State of California and the FAA (for airports in California) to assess airport noise. In this study, it was determined from measured noise data. In addition, the measurements were used to calculate ambient background noise and a number of single event noise metrics. These single event metrics included the Maximum Noise Level (Lmax), Sound Exposure Level (SEL), and duration of the noise events.

2. Noise Monitoring Locations

Two locations in San Diego were measured as part of this study. These sites were selected by the SAN staff with input of the consulting team. While SAN does operate an extensive airport noise and operations monitoring system, the two locations chosen for temporary monitoring during the ongoing CFR 14 Part 150 Study Update to provide additional measurement data. The locations chosen represent two communities that requested additional noise monitoring. These sites are described below, with the locations presented in **Figure 1**.

- **Site 100 (Point Loma)** was a short-term monitoring location placed on the west side of a private residence. The site was exposed to neighborhood events, such as cars on Liggett Drive. The measurement and analysis cover arrivals and departures at SAN as well as aircraft operating from other airports in the region. Operations from other aircraft were not included further in this report; these two aircraft events were from small, single engine propeller aircraft.

- **Site 101 (Mission Beach)** was a short-term monitoring location placed on the roof of the San Diego Rowing Club. The site was exposed to traffic noise from the associated parking lot and cars on the bridge portion of Ingraham St, east of the monitoring site. The measurement and analysis cover arrivals and departures at SAN as well as aircraft operating from other airports in the region. Operations from other aircraft were not included further in this report; these 19 aircraft events were from small, single engine propeller aircraft.

3. Methodology

Noise Monitoring Durations

The measurement program was scheduled for a one-week (seven day) period. The noise monitoring equipment was setup on August 25, 2020 at 1:00 PM and operated continuously through September 1, 2020 at 12 PM. The equipment operated unattended using battery power and was calibrated prior to deployment.

Noise Monitoring Equipment

During the duration of the noise measurements, the sound level meters were mounted on tripods five feet above the ground in Point Loma and five feet above the roof at Mission Beach and equipped with windscreens. State-of-the-art sound level meters were used to continuously measure the noise and record a measured noise value once every second (continuous one-second noise levels).

The measures used 01dB DUO and 01dB FUSION family of sound level meters. The equipment used meets the International Standard IEC 61672 specification for Class 1 precision sound level meters. The microphones were calibrated before the tests with a Brüel & Kjær Type 4231 sound level calibrator that meets International Standard IEC 60942. Calibration is traceable to the National Institute of Standards and Technology (NIST).

Noise Measurement Data

The noise measurements continuously measured and stored noise data. The data measured and stored includes:

- A-weighted noise level
- 1/3 octave frequency levels
- Continuous audio signal

The A-weighted noise level is the level used to calculate the CNEL noise metric, Lmax and SEL noise metrics (described in the next section of the report). The A-weighed measurement is the primary measure used in aircraft noise and is used to calculate CNEL, Lmax, and SEL.

Radar Data

Radar data from August 25, 2020 through September 1, 2020 was collected from the airport noise monitoring system. The data includes the raw radar tracking data (position, altitude, speed) and associated aircraft type, date, time, runway, descent rate, and aircraft performance. The radar data was reviewed and correlated with noise event data to accurately identify sources of noise.

Data Analysis

The measured noise data was used to calculate noise metrics of interest. This was accomplished through BridgeNet's software tool Volans™. The tool uses radar data and the measurements to determine aircraft noise events and calculate noise metrics. The system determines noise events and calculated noise metrics in an automated process that uses the radar information to identify potential noise events. In addition to the automated system, the software also allows the user to manually determine noise events and correlations to aircraft.

4. Definition of Terms

Characteristics of Sound

Sound can be described technically in terms of amplitude (loudness), frequency (pitch), or duration (time). Frequency (or pitch) is measured in hertz (Hz). The standard unit of measurement for the loudness of sound is the decibel (dB). Decibels are based on a 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).

Human hearing is not equally sensitive to sound at all frequencies. Sound waves below 16 Hz are not heard at all and are "felt" more 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 special frequency-dependent rating scale has been devised to measure loudness in a way that reflects how the human ear actually perceives sound. Community noise levels are measured in terms of this A-weighted decibel scale (or dBA), which is widely used in industrial and environmental noise-management contexts.

Propagation of Noise

Outdoor sound levels decrease as a result of several factors, including increased 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 radiates 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 power of the sound wave.

Atmospheric temperature and humidity also influence the sound levels received by the observer. How much sound is absorbed by the atmosphere depends on the 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 and sound travels farther. Higher frequencies are more readily absorbed than the lower frequencies. The fluctuations in sound levels created by atmospheric conditions increase with distance and become particularly important at distances greater than 1,000 feet. Over large distances, lower frequency sounds become dominant as the higher frequencies are attenuated. Noise propagation is one of the reasons that aircraft noise will be higher one day than other days even when the same aircraft are flying the same path and altitude.

Noise Metrics

The description, analysis, and reporting of noise levels around communities is made difficult by the complexity of human response to noise and the variety of metrics that have been developed for describing noise impacts. Each of these metrics attempts to quantify noise levels with respect to community impact.

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, typically from one to 24 hours. This study presents single event measurement results.

- **Maximum Noise Level,** or Lmax, is the maximum or peak sound level during an aircraft noise event. The metric accounts only for the 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 the low 50s dBA at more distant locations.
- **Single Event Noise Exposure Level (SEL)** - The duration of a noise event, or an aircraft flyover, is an important factor in assessing annoyance and is measured most typically as SEL. The effective duration of a sound starts when a sound rises above the background sound level and ends when it drops back below the background level. An SEL is calculated by summing the dB level at each second during a noise event and compressing that noise into one second. It is the level the noise would be if it all occurred in one second. The

SEL value is the integration of all the acoustic energy contained within the event. This metric takes into account the maximum noise level of the event and the duration of the event. For aircraft flyovers, the SEL value is numerically about 10 dBA higher than the maximum noise level.

- **Community Noise Equivalent Level (CNEL)** is a measure of not just one event like Lmax but of average noise over twenty-four hours; it applies a weighting factor that penalizes noise events occurring during the evening and night hours (when humans are typically more sensitive to noise and sleep disturbance is a concern). More specifically, noises occurring during the evening (from 7 PM to 10 PM) are penalized by 5 dB, while noises occurring during the night (10 PM to 7 AM) are penalized by 10 dB. CNEL noise levels near airports range from 70 CNEL directly next to an airport to less than 45 CNEL at more distant locations.

5. Radar Data

The radar data for the study period was collected and analyzed. A representative sample of tracks is shown in **Figure 1** for departures on Runway 27 and **Figure 2** shows the arrival flight tracks for Runway 9 for the study period. These figures show the primary jet departure procedures that depart on Runway 27 and arrivals that come in over the ocean and arrive on Runway 9. These arrival operations represent aircraft that fly during nighttime hours, between the hours of 10 PM – 7 AM. The departure flight procedures that primarily overfly the study area are the PADRZ and ZZOOO departure procedures, and include flights that may have received a heading to fly by air traffic control. Aircraft arriving from the west over the ocean typically use the instrument approach procedure to Runway 9 or are guided using visual navigation.

6. Ambient Noise Monitoring Results

The ambient background noise during the time of the measurements was also determined. Ambient background noise represents the typical residual noise that exists in the area independent of the aircraft noise. These results are presented in **Table 1** below. The results are presented in terms of the L% statistical noise levels. The L% is the percent of time that the noise is above that level. The L50 or mean noise level, which is defined as the point at which half the time the noise is above that value and half below that value. These results show that the daytime ambient noise ranged from 44 dBA at the Point Loma Site to 49 dBA at the Mission Beach site.

Ambient noise varies throughout the day; typically, ambient noise is reduced at night, are lower than the daytime. When ambient noise is low, the sound of an aircraft may be distinct, while when ambient noise is higher the same aircraft emitting the same noise may be not audible at all. The data in **Table 1** shows the ambient noise during the daytime hours (7am to 10pm) and the nighttime hours (10 pm to 7 am). Typically, ambient noise levels at night are roughly 5 dBA quieter than in the daytime hours; however, at these locations, the nighttime ambient was between 7-12 dBA quieter.

Table 1
Ambient Noise Measurement Results

Site	Description	Measured Ambient Noise Levels (dBA)						
		Lmax	L1	L10	**L50**	L90	L99	Lmin
	All Hours							
100	Point Loma	77	61	50	**42**	29	25	23
101	Mission Beach	79	61	53	**47**	38	33	30
	Daytime Hours							
100	Point Loma	77	62	52	**44**	39	34	29
101	Mission Beach	79	61	54	**49**	44	39	34
	Nighttime Hours							
100	Point Loma	70	53	39	**32**	26	24	23
101	Mission Beach	76	56	48	**42**	35	33	30

Source: BridgeNet International, 2021

7. Correlated Noise Events

An automated process was used to calculate noise events and when possible, correlated to an aircraft that generated the noise event. An example is shown in **Table 2** that shows the continuous measured 1-second noise for a 15-minute period at the Point Loma location. The background noise at the time was between 35 dBA and 53 dBA; there were eight correlated noise events, shown in red with the red box showing the calculated single event metrics with a peak Lmax value as high as 63 dBA. **Table 3** shows a second 15-minute period from the Mission Beach location where there are six aircraft events showing the same data as described above. Note the short duration peaks during this period are vehicle traffic on the nearby road.

Note that the lower the ambient, the greater possibility to measure lower noise level events. When the ambient is higher, or other noise sources are present, the more difficult it is to measure and separate aircraft events from other sources of noise. As an example, **Table 2** shows the ambient noise rising to the same dBA as the aircraft noise even that occurred at 6:41 AM. Because they occurred separately, it was possible to measure these separate noise events even though they occurred one after the other at a similar dBA. The correlation shows that aircraft noise events have a distinctive profile of rising above ambient noise, lasting a for a period of time, then dropping off precipitously.

The automated process was supplemented with the ability to manually create, edit and correlate noise events. This was used for a number of days of the measurements. This can be used to fix missed or wrong correlations and create noise events that are closer to the ambient where it is more difficult to do automatically. For the overall noise monitoring period, a total of 1,058 departures and 36 arrival aircraft operations were correlated to a noise event at the Point Loma location, and 894 departures and 15 arrivals to the Mission Beach location.

8. Noise Levels by Aircraft Type

The noise event calculation and correlation process were completed for the one week of measured noise data. This was completed for all potential aircraft operations, with the dominant number of events coming from SAN departures, followed by SAN arrivals and a small number of single engine propeller overflights from other airports. This automatic process was supplemented with the ability to complete a manual review and edit the events and correlation.

A summary of measured noise even levels is shown in **Table 4** for the Point Loma location and **Table 5** for the Mission Beach location. These tables list all the correlated noise events with the averaged measured noise metrics (Lmax, SEL) and information on the aircraft that was correlated to the event. For example, the aircraft with the most flights was the Boeing 737-800 (B378); at the Point Loma site, the average B738 Lmax was 62 dBA, while at the Mission Beach site, the average Lmax for this aircraft was 61 dBA.

This data shows the measured single event noise levels for SAN departures which was determined primarily with distance away from the measurement location, type of aircraft and altitude of the aircraft. The average departure flight tracks were approximately one mile away, laterally, from each of the temporary noise measurements sites. Arriving aircraft were slightly closer, between 0.74 – 0.84 miles laterally from the measurement sites. These events generated Lmax noise levels between 56 to 66 dBA during the daytime at Point Loma and for the Mission Beach location, between 60 to 70 dBA for operations during the daytime. Arrival operations in the early morning hours landing on Runway 9 generated an average Lmax of between 49-50 dBA at both sites.

The average duration of flights by each aircraft type was also measured; for the Point Loma site, the average duration was 34 seconds, and for Mission Beach was 40 seconds; there were three events longer than one minute recorded at the Point Loma location. The duration of a noise event is determined from the time it rises to be heard above ambient noise, then falls below background noise. For this monitoring period, the ambient threshold used was a “floating threshold” which is a threshold that accounts for the varying background noise in a 24-hour period. For example, during the early morning hours, the threshold at the Mission Beach site is 41 dBA due to the quiet background noise; at the Point Loma site, the threshold during the early morning hours was 33 dBA, again accounting for the very quiet background noise. By using a floating threshold, more low-level events can be detected. Noise events are measurable from more distant operations then when the ambient is higher. The thresholds varied between 41 – 45 dBA at Point Loma during daytime and evening hours and between 43 – 49 dBA at the Mission Beach site.

9. Measured CNEL Noise Levels

CNEL is a measure of cumulative noise throughout the day. CNEL noise levels typically range from 70 CNEL very close to an airport to less than 55 CNEL at communities a number of miles away. Note that measuring CNEL at levels below 55 CNEL becomes less precise because the noise from aircraft events can be close to existing ambient noise, and it is not always technically possible to separate the two. (Note that CNEL differs from the Lmax values presented previously. Lmax values are numerically higher than CNEL values because the CNEL represents an average that includes both peak sounds [like the Lmax] and lower values when aircraft noise is not present.)

Aircraft noise events and the time when aircraft noise was present were calculated for identified aircraft events above the ambient threshold and correlated with an aircraft that caused that event. The CNEL metric can be calculated by summing the noise energy from the aircraft events and applying the evening and night weighting penalty. The results are presented in **Table 6** and **7** for the measurement period from August 25 – September 1, 2020. These tables show the CNEL for aircraft events only on the top and the total hourly noise level for all noise, including ambient.

The results show that the measured SAN aircraft CNEL for both sites was 47 CNEL. Daily noise levels ranged from 45 to 52 CNEL for aircraft events and the total CNEL ranged from 50 to 57 CNEL. Note the Total CNEL is a measure of all the noise throughout the day including aircraft, traffic and background sounds. It also includes the evening and nighttime noise penalty of 5 dB and 10 dB, respectively.

10. Conclusion

BridgeNet International was contracted by Mead & Hunt to evaluate noise levels at two locations in the San Diego community. The study included portable noise monitoring near the primary departure paths at SAN at two locations identified by the airport. Noise measurements were correlated with flight track data and cumulative and single event noise metrics were calculated for aircraft operating at SAN, aircraft from other airports, and ambient sources of noise. This data will be provided to Mead & Hunt as well as SAN for their use in presenting this information to the public.

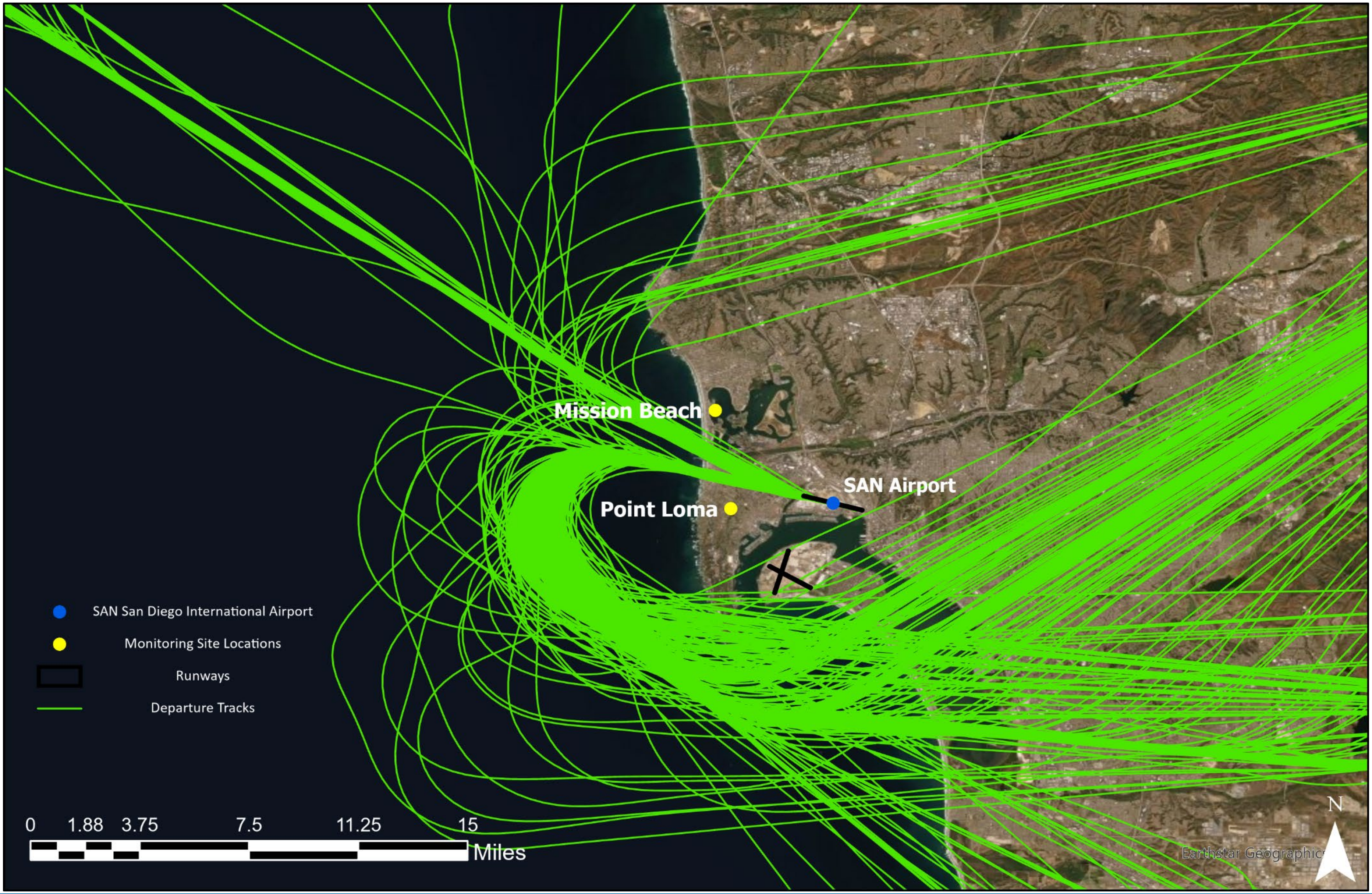
APPENDIX

Report Tables and Figures

Figure 1

Departure Tracks on Runway 27
Measurement Period: August 25, 2020 thru September 1, 2020

SAN DIEGO INTERNATIONAL AIRPORT NOISE MONITORING STUDY



Prepared by: BridgeNet International 2020

Figure 2

Arrival Tracks on Runway 09
Measurement Period: August 25, 2020 thru September 1, 2020

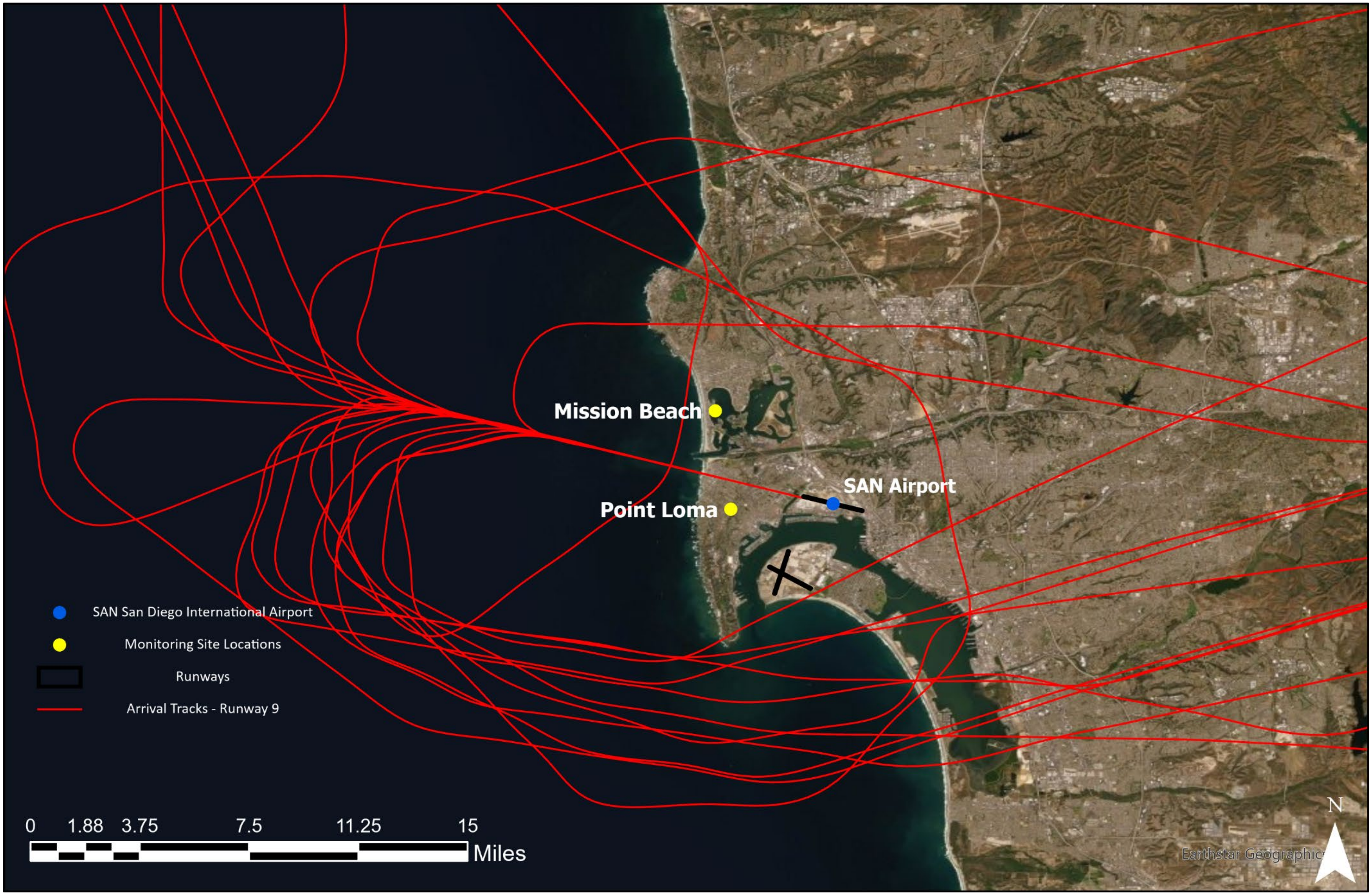


Table 2

Sample Time History Noise Plot of Aircraft and Ambient Noise

Site: Point Loma – Liggett Drive

Measurement Period: August 27, 2020 06:35:00 thru August 27, 2020 06:44:59

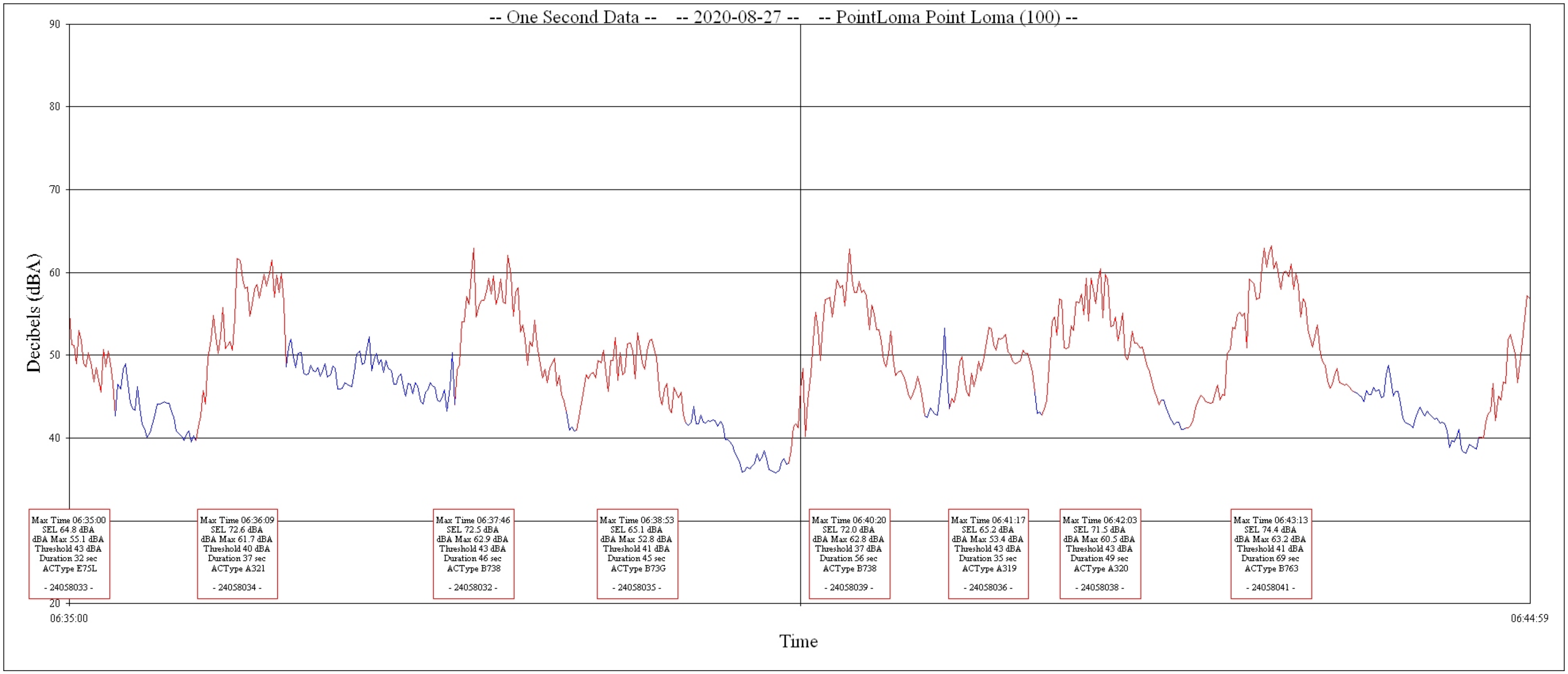


Table 3

Sample Time History Noise Plot of Aircraft and Ambient Noise

Site: Mission Beach – 1220 El Carmel Place, San Diego

Measurement Period: August 28, 2020 06:30:00 thru August 28, 2020 06:39:59

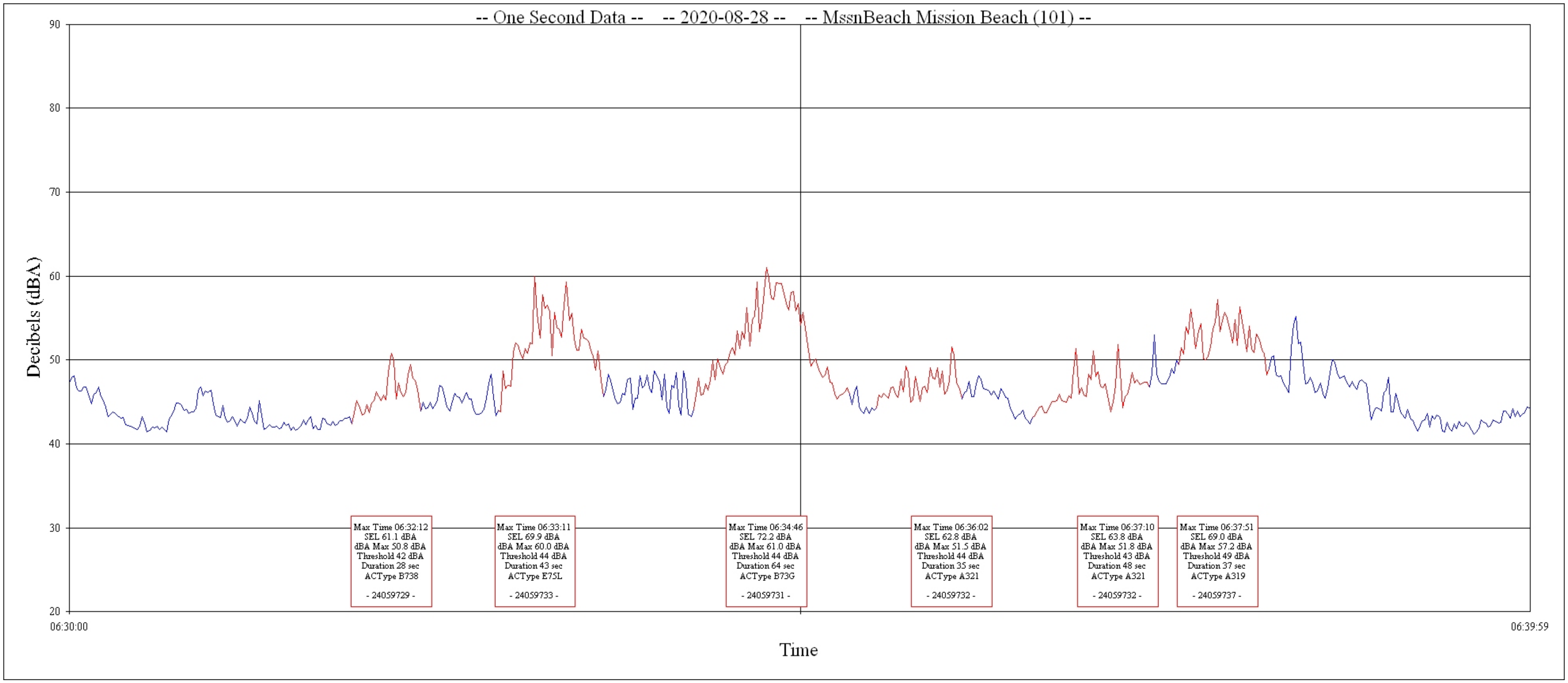


Table 4

Summary of Noise Levels by Aircraft Type

Site: Point Loma - Liggett Drive

Measurement Period: August 25, 2020 thru September 1, 2020

Airport Code	Arrival or Departure	Runway	Aircraft Type	Number of Operations	dBA max	SEL	Duration	Start to Peak	Threshold	Altitude	Ground Distance	Slant Range Distance
SAN	D	27	A20N	15	63	70	42	23	44	2,395	5,100	5,647
SAN	D	27	A21N	6	59	68	39	22	43	1,593	6,517	6,667
SAN	D	27	A319	25	61	72	47	23	43	1,648	5,770	5,961
SAN	D	27	A320	63	62	72	52	26	42	1,698	5,317	5,527
SAN	D	27	A321	119	65	75	54	27	44	1,780	5,194	5,431
SAN	D	27	B734	2	66	76	45	22	46	1,875	4,881	5,165
SAN	D	27	B737	7	64	75	49	26	40	1,434	4,986	5,135
SAN	D	27	B738	241	62	72	46	23	43	1,600	5,871	6,055
SAN	D	27	B739	59	63	72	46	22	42	1,460	5,929	6,064
SAN	D	27	B73G	236	62	72	45	22	43	1,683	6,092	6,295
SAN	D	27	B752	26	64	75	48	21	45	1,942	5,395	5,681
SAN	D	27	B763	29	66	77	59	28	44	1,921	4,985	5,280
SAN	D	27	CRJ2	11	56	66	36	19	42	1,516	6,638	6,771
SAN	D	27	CRJ7	1	64	73	46	21	43	2,060	4,621	4,978
SAN	D	27	E75L	117	59	69	40	19	44	1,593	6,869	7,015
SAN	D	27	BJ	83	58	68	40	19	43	2,030	5,677	5,991
Non SAN Airports	D		SE Piston	2	52	63	26	11	44	470	6,638	6,643
SAN Early AM	A	09	FedEx/UPS	8	50	60	58	32	33	573	4,993	5,006
SAN	A	09	JET	10	49	60	25	14	41	581	4,994	5,008

Table Note: Aircraft Type is shown in the table using the AEDT naming; aircraft with the code ‘A32N’ would be an Airbus A220 Neo; aircraft with the code ‘B734’ would be a Boeing 737-400. CRJ aircraft are regional jets.

Table 5

Summary of Noise Levels by Aircraft Type

Site: Mission Beach – 1220 El Carmel Place, San Diego

Measurement Period: August 25, 2020 thru September 1, 2020

SAN DIEGO INTERNATIONAL AIRPORT

Airport Code	Arrival or Departure	Runway	Aircraft Type	Number of Operations	dBA max	SEL	Duration	Start to Peak	Threshold	Altitude	Ground Distance	Slant Range Distance
SAN	D	27	A20N	9	57	68	33	18	46	2,577	10,941	11,245
SAN	D	27	A21N	7	62	73	48	26	47	2,420	7,351	7,740
SAN	D	27	A319	20	58	70	38	19	47	2,569	9,073	9,465
SAN	D	27	A320	50	59	70	42	23	46	2,244	10,246	10,503
SAN	D	27	A321	79	58	70	41	23	47	2,293	10,671	10,920
SAN	D	27	B734	1	54	67	60	40	43	2,160	11,901	12,089
SAN	D	27	B737	5	70	76	27	17	49	2,614	11,630	11,929
SAN	D	27	B738	201	61	73	44	24	48	2,360	8,745	9,099
SAN	D	27	B739	52	61	73	47	23	48	2,126	8,282	8,573
SAN	D	27	B73G	206	61	73	44	23	48	2,650	8,395	8,853
SAN	D	27	B752	21	59	71	44	21	48	2,810	9,616	10,065
SAN	D	27	B763	25	58	69	37	20	47	2,370	11,504	11,745
SAN	D	27	CRJ2	13	54	66	33	22	46	2,505	6,941	7,383
SAN	D	27	CRJ7	1	54	62	16	13	48	3,570	11,640	12,164
SAN	D	27	E75L	128	60	73	51	25	48	2,575	6,793	7,272
SAN	D	27	BJ	64	57	69	38	20	47	3,530	7,630	8,548
Non SAN Airports	D		SE Piston	19	60	72	41	23	49	1,840	5,508	6,027
SAN Early AM	A	09	FedEx/UPS	5	49	60	43	14	41	1,028	11,460	11,503

Table Note: Aircraft Type is shown in the table using the AEDT naming; aircraft with the code 'A32N' would be an Airbus A220 Neo; aircraft with the code 'B734' would be a Boeing 737-400. CRJ aircraft are regional jets.

Table 6

Total Hourly Noise Level Site Report

Site: Point Loma –Liggett Drive

Measurement Period: August 25, 2020 thru September 1, 2020

Metric: Hourly Noise Level (HNL)

SAN DIEGO INTERNATIONAL AIRPORT

SAN DIEGO INTERNATIONAL AIRPORT NOISE MONITORING STUDY

Aircraft HNL

DATE	Hour Of The Day																								CNEL
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Aug 25	--	--	--	--	--	--	--	--	--	--	--	--	--	46	47	39	44	43	45	49	37	41	34	0	47
Aug 26	0	0	0	0	24	0	45	46	46	45	44	48	45	44	45	40	41	38	39	44	37	38	35	0	45
Aug 27	0	0	0	22	24	24	48	50	50	47	47	48	49	49	49	50	45	42	45	49	44	36	39	0	49
Aug 28	0	32	0	0	28	0	45	48	50	48	46	49	50	47	45	42	43	43	45	46	45	39	41	0	48
Aug 29	0	0	0	22	0	0	48	49	50	46	49	50	48	46	49	45	47	38	43	45	42	41	35	28	48
Aug 30	0	0	0	0	0	0	50	51	49	48	48	50	49	47	48	46	47	46	45	45	45	45	34	0	50
Aug 31	0	0	0	0	0	0	48	48	49	46	46	50	49	48	49	44	46	46	46	50	41	39	35	26	49
Sep 1	0	0	0	0	21	21	49	51	48	48	46	51	42	--	--	--	--	--	--	--	--	--	--	--	50
Energy Average	0	24	0	17	23	17	48	49	48	46	46	49	47	47	48	45	45	43	44	48	42	41	37	22	47

Total HNL

DATE	Hour Of The Day																								CNEL
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Aug 25	--	--	--	--	--	--	--	--	--	--	--	--	--	51	51	49	49	48	48	50	42	45	38	35	52
Aug 26	34	36	31	30	33	37	46	48	48	47	48	50	49	50	49	47	48	49	46	48	47	43	40	36	50
Aug 27	39	32	33	31	33	37	48	50	51	49	49	53	56	57	58	58	54	49	49	51	46	43	43	38	53
Aug 28	36	37	35	31	34	36	46	49	51	50	49	51	52	50	49	47	47	50	53	49	46	42	42	35	51
Aug 29	32	32	29	29	30	33	48	50	51	47	52	52	50	48	53	49	49	46	47	48	44	43	39	37	50
Aug 30	36	30	28	29	29	32	51	51	49	49	49	51	50	51	51	50	49	50	48	47	46	46	38	34	51
Aug 31	32	30	32	32	33	36	48	49	49	48	48	51	50	50	51	48	48	48	48	51	44	42	38	36	51
Sep 1	32	32	26	27	30	38	50	52	49	49	48	52	46	--	--	--	--	--	--	--	--	--	--	--	51
Energy Average	35	34	32	30	32	36	49	50	50	49	49	51	51	52	53	52	50	49	49	49	45	44	40	36	50

Table 7

Total Hourly Noise Level Site Report

Site: Mission Beach – 1220 El Carmel Place, San Diego
Measurement Period: August 25, 2020 thru September 1, 2020
Metric: Hourly Noise Level (HNL)

SAN DIEGO INTERNATIONAL AIRPORT

Aircraft HNL

DATE	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	CNEL
Aug 25	--	--	--	--	--	--	--	--	--	--	--	--	--	0	47	45	47	49	47	54	39	42	42	0	52
Aug 26	0	32	31	0	23	0	40	45	45	38	45	43	43	46	44	46	46	45	40	46	42	36	0	0	45
Aug 27	0	0	0	0	23	28	42	48	50	45	47	48	39	47	47	45	48	47	41	49	48	0	38	34	48
Aug 28	0	0	0	0	0	0	41	45	47	47	48	48	46	48	48	47	45	46	47	47	44	35	33	0	47
Aug 29	0	0	0	22	0	0	42	47	46	47	47	49	46	48	46	48	48	48	45	50	48	44	49	27	50
Aug 30	28	0	0	0	0	0	52	50	47	44	52	50	45	49	47	48	47	49	42	51	48	41	39	0	52
Aug 31	0	0	0	0	0	0	41	44	44	42	49	46	45	49	47	46	48	47	42	49	42	40	42	0	47
Sep 1	0	25	0	0	0	28	42	46	44	46	46	48	43	45	--	--	--	--	--	--	--	--	--	--	45
Energy Average	20	24	23	13	18	23	45	47	46	45	48	48	44	47	47	47	47	47	44	50	46	40	42	26	47

Total HNL

DATE	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	CNEL
Aug 25	--	--	--	--	--	--	--	--	--	--	--	--	--	50	52	51	52	53	52	55	50	51	49	47	57
Aug 26	45	46	45	45	44	46	49	52	51	50	51	53	51	52	52	54	51	51	51	52	46	48	55	46	56
Aug 27	43	41	44	44	42	47	52	51	55	53	54	53	52	52	53	52	56	55	53	53	51	48	49	48	56
Aug 28	50	52	48	46	43	48	48	50	51	52	53	53	52	53	52	52	51	53	52	51	49	46	47	43	56
Aug 29	41	42	42	38	39	46	46	52	52	52	53	52	50	52	52	53	52	53	52	55	50	50	50	43	55
Aug 30	42	41	40	38	39	45	52	51	50	48	54	52	50	52	52	52	52	53	50	55	54	45	44	40	55
Aug 31	39	45	37	35	36	46	46	49	47	48	50	49	52	51	53	51	53	52	51	53	46	44	45	37	53
Sep 1	37	37	34	39	39	46	49	50	52	51	51	52	53	49	--	--	--	--	--	--	--	--	--	--	53
Energy Average	44	46	43	42	41	46	49	51	52	51	53	52	51	52	52	52	53	53	52	54	50	48	50	45	54