

SAN FRANCISCO INTERNATIONAL AIRPORT
CITY & COUNTY OF SAN FRANCISCO



MEMORANDUM

TO: PACIFICA COMMUNITY

FROM: SAN FRANCISCO INTERNATIONAL AIRPORT AIRCRAFT NOISE OFFICE

SUBJECT: CITY OF PACIFICA SHORT TERM NOISE MONITORING REPORT – 4TH QUARTER 2020

DATE: October 3, 2021

The San Francisco International Airport (SFO) Aircraft Noise Office conducted aircraft noise monitoring in the City of Pacifica, California to determine noise levels within the community from aircraft operations at SFO. Noise monitoring occurs every quarter for a 14-day data collection period. This measurement period occurred between December 15 and December 29, 2020. The monitoring is made possible with the assistance of the North Coast Water District and the City of Pacifica staff. This site was located next to the Fassler Water Tank (Site 1013) at the end of Fassler Road.

Pacifica is located approximately 10 miles west of SFO and aircraft noise events sources include primarily SFO departures utilizing the SSTIK and GAP departure procedures. There were also aircraft from Oakland utilizing the CNDEL departure procedures. On an average day there were 93 overflights, out of which 16 exceeded the noise monitor threshold and recorded a noise event. During the monitoring period, there were no changes to departure procedures. Aircraft departing SFO from Runways 01L/R for destinations to the west, south, and southeast typically overfly Pacifica. Most aircraft departing from SFO overfly Pacifica in the 6,000 ft – 10,000 ft range. SFO aircraft arrivals from the north (BDEGA) on a typical day (West Plan) overfly Pacifica at or above 10,000 feet. Community (non-aircraft) noise sources included construction and maintenance activity and weather-related conditions such as wind. During the noise-monitoring, there was a great deal of heavy sustained winds.

The noise event thresholds were 55 dBA for daytime and 50 dBA for nighttime. During the monitoring period at Site 1013, the average daily ambient noise level was 66 dBA and the overall Aircraft Community Noise Equivalent Level (CNEL) was 46 dBA. The Community CNEL and Total CNEL were 69 dBA. Noise from all aircraft increased the Total CNEL level by less than 1 dBA. Community and Total CNEL values along with other noise metrics are shown in the summary section of the data report.

During the noise-monitoring period, the SFO Aircraft Noise Office received 321 noise reports from 12 individuals in Pacifica. The majority of aircraft noise events occurred between 6 am and 8 pm. The noise monitor in Pacifica was located in an urban area with daily ambient noise ranging from 42 to 72 dBA and aircraft noise above ambient levels may have been perceptible by residents. Additionally, the frequency of flights due to the proximity of the Airport may have increased annoyance levels.

This report includes 15 parts (charts and graphics) that represent summaries of the aircraft noise-related data (values are subject to rounding) collected during the monitoring period. Each part and key terms used in this report are described in the Appendix and Glossary, respectively.

A – Monitoring Summary

Monitoring Site	Fassler Water Tank, Pacifica
Monitoring Site Elevation (ft)	709
Monitoring Period	Dec 15 – 29, 2020
Aircraft CNEL (dBA)	46
Community (non-aircraft) CNEL (dBA)	69
Total CNEL (dBA)	69
Average Aircraft SEL (dBA)	82
Average Aircraft Lmax (dBA)	61
Average Ambient Noise (dBA)	66
Avg Daily SFO Noise Events	13
Avg Daily Overflights Registering a Noise Event	16 of 93 (17%)
SFO West Flow	95%
SFO Southeast Flow	5%

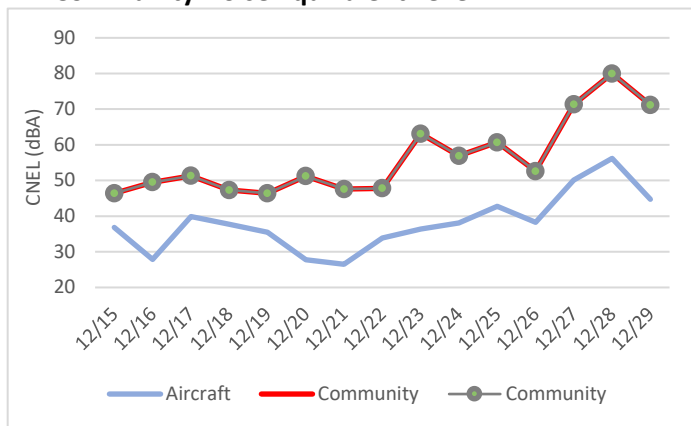
B – Monitoring Location



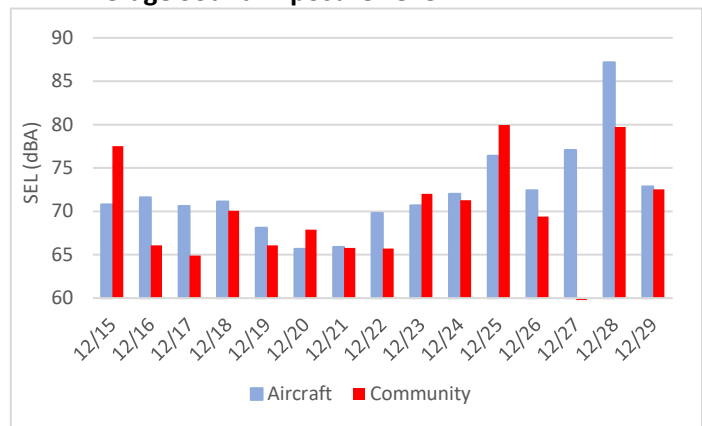
C – Daily Noise Event Averages

Date	SFO Aircraft			Non-SFO Aircraft			Community		
	Noise Events	Avg SEL	Avg Lmax	Noise Events	Avg SEL	Avg Lmax	Noise Events	Avg SEL	Avg Lmax
12/15	7	71	58	3	71	60	4	78	62
12/16	2	72	58	0	0	0	5	66	56
12/17	14	71	60	1	71	62	2	65	55
12/18	9	70	58	2	74	60	4	70	63
12/19	6	68	56	2	68	59	3	66	61
12/20	4	66	55	0	0	0	1	68	59
12/21	1	66	53	0	0	0	1	66	60
12/22	6	71	58	3	67	58	2	66	55
12/23	7	70	59	7	71	60	34	72	59
12/24	14	72	60	3	71	61	13	71	57
12/25	16	76	63	0	0	0	16	80	65
12/26	19	73	61	3	69	60	2	69	60
12/27	15	78	63	8	72	59	0	0	0
12/28	48	88	64	15	74	63	3	80	66
12/29	20	73	61	3	73	61	6	73	63
Daily Average	13	83	61	3	72	61	6	75	60
Total Count	188			50			96		

D – Community Noise Equivalent Level



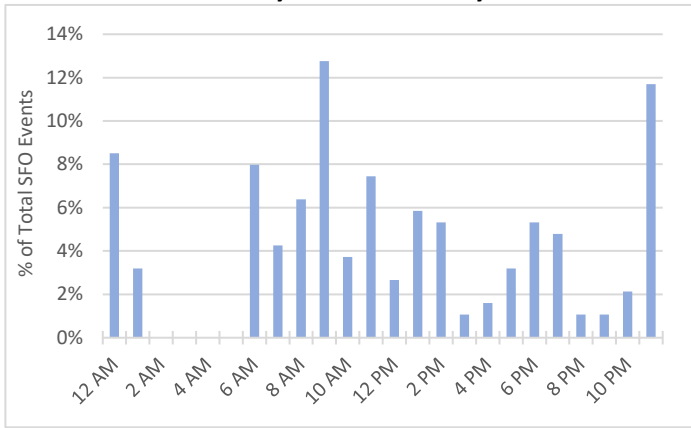
E – Average Sound Exposure Level



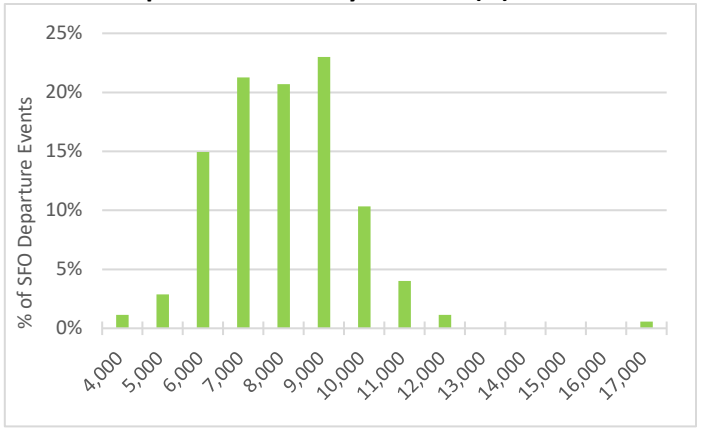
F – SFO Aircraft Noise Events by Time of Day

Time of Day	Noise Events	Noise Events %	Daily Avg SEL (dBA)	Min SEL (dBA)	Max SEL (dBA)	Avg Lmax (dBA)	Min Max (dBA)	Max Lmax (dBA)	Avg Duration (sec)	Min Duration (sec)	Max Duration (sec)
Day (7am–7pm)	112	60%	85	64	105	63	57	97	27	6	60
Evening (7pm–10pm)	13	7%	75	66	84	63	59	83	27	8	49
Night (10pm–7am)	63	34%	74	59	89	58	51	84	35	6	60

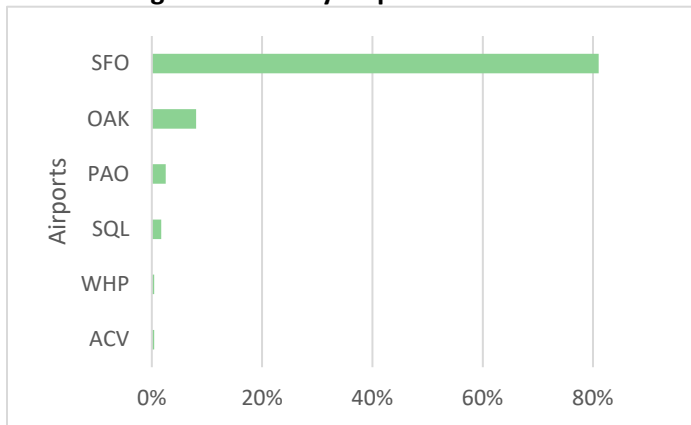
G – SFO Noise Event by Hour of the Day



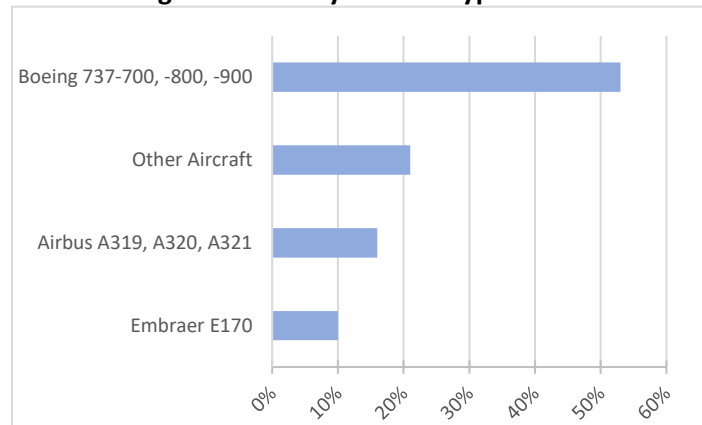
H – SFO Departure Events by Altitude (ft) over Site



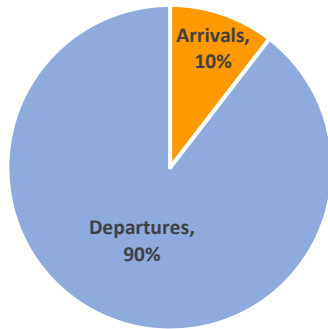
I – Percentage of Events by Airports



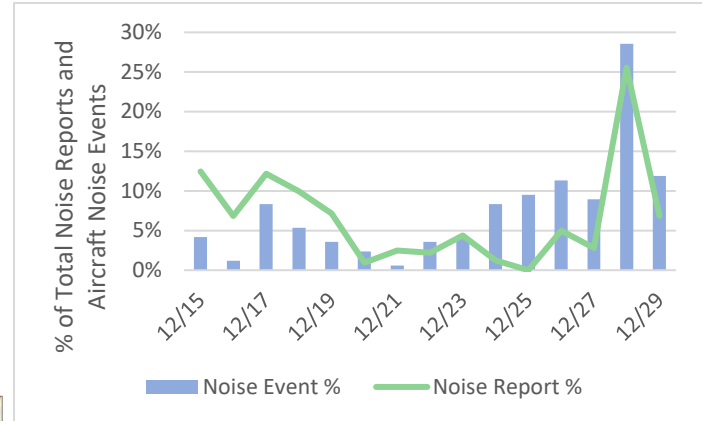
J – Percentage of Events by Aircraft Types



K – Percentage of Events by Operation Type



L – Noise Reports vs Aircraft Noise Events per Day



M – Noise Reporters

Date	Individual Noise Reporters	Noise Reports
12/15	7	40
12/16	4	22
12/17	3	39
12/18	4	32
12/19	2	23
12/20	1	3
12/21	3	8
12/22	3	7
12/23	2	14
12/24	3	4
12/25	0	0
12/26	3	16
12/27	5	9
12/28	8	82
12/29	8	22
Total	12	321

N – Noise Reporter Locations



O - Noise Monitor on Location



Appendix

This Appendix describes the sections of the noise monitoring report and a glossary of terms.

Part A – Monitoring Summary lists the monitoring location, elevation, the monitoring time period, and the key monitoring results including the Aircraft, Community, and Total Community Noise Equivalent level (CNEL), single event levels, and air traffic flow breakdown. The CNEL metric is used to assess and regulate aircraft noise exposure in communities surrounding the airport. California Title 21 Noise Regulations established an acceptable level of 65 dBA CNEL.

Part B – Monitoring Location illustrates the location of the portable noise monitor and examples of typical SFO flight operations that registered noise events at the portable noise monitor.

Part C – Daily Noise Event Averages lists the number of noise events registered at the noise monitor by SFO Aircraft, non-SFO Aircraft, and Community noise sources during each day of the noise monitoring period. The noise event levels are expressed as average Sound Exposure Level (SEL) and average peak noise level (Lmax).

Part D – Community Noise Equivalent Level shows a chart that compares the Aircraft (SFO and non-SFO), Community, and Total CNEL during each day of the monitoring period. Note that California Title 21 Noise Contours are based on SFO Aircraft only.

Part E – Average Sound Exposure Level (SEL) shows a chart that compares the Aircraft (SFO and non-SFO) and Community average SEL during each day of the monitoring period.

Part F – SFO Aircraft Noise Events by Time of Day lists the daily minimum, maximum, and average SEL, Lmax, duration and number of SFO Aircraft noise events during the Daytime (7am to 7pm), Evening (7pm to 10pm), and Nighttime (10pm to 7am).

Part G – SFO Noise Event by Hour of the Day shows the percentage of total SFO Aircraft noise events by hour of the day.

Part H – SFO Departure Events by Altitude (ft) over Site shows the percentage of SFO Aircraft Departures or Arrivals (depending on monitoring site location) that registered noise events at the noise monitor by altitude intervals. Altitudes are relative to the noise monitor elevation.

Part I – Percentage of Events by Airports shows the percentage of aircraft events by the aircraft's nearest airport of origin or destination.

Part J – Percentage of Events by Airport Types shows the percentage of aircraft events by aircraft types.

Part K – Percentage of Events by Operation Type shows the percentage of aircraft noise events registered by Arrivals and Departures.

Part L – Noise Reports vs Aircraft Noise Events per Day compares the number of noise reports to the number of aircraft noise events per day.

Part M – Noise Reporters lists the number of individual noise reporters and noise reports per day registered by individuals living in the city in which the monitoring site was located.

Part N – Noise Report Locations illustrates a map that shows the noise report locations and the noise monitor location.

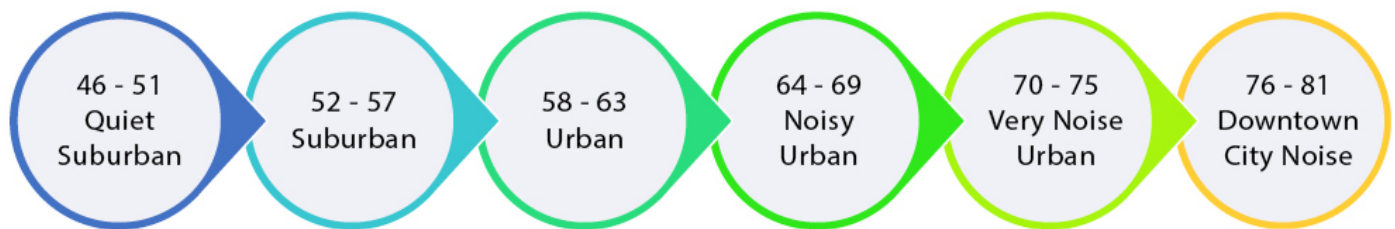
Part O – Noise Monitor on Location shows photographs of the actual location of the noise monitoring equipment.

Glossary

A-Weighted Decibel, dBA – The most common unit used for measuring environmental sound levels. The human ear does not respond equally to different frequencies of sound. An A-weight adjusts the frequency components of sound to conform to your ear’s normal response at conversational levels. The FAA and State of the California have adopted the A-weighted sound level for environmental analysis. Sound level meters have an A-weighting network for measuring noise in A-weighted decibels.

California Code of Regulations Title 21, Subchapter 6 – This code describes noise standards by defining metrics terminology and requirements regarding compatible land use. SFO was one of the first airports in the state to achieve a zero impact area within the 65 dB CNEL (Community Noise Equivalent Level) noise contour.

Community Noise Equivalent Level (CNEL) – A noise metric required by the California Airport Noise Standards for use by airport proprietors to measure aircraft noise levels. CNEL includes an additional weighting for each event occurring during the evening (7:00 p.m. – 9:59 p.m.) and nighttime (10:00 p.m. – 6:59 a.m.) periods to account for increased sensitivity to noise during these periods. Evening events are treated as though there were three and nighttime events are treated as though there were ten. This results in a 4.77 and 10 decibel penalty for operations occurring in the evening and nighttime periods, respectively. For a more in-depth explanation of CNEL and other technical noise terms, please visit the Federal Aviation Administration (FAA) website. Below is a graphic illustrating types of metropolitan areas and their corresponding CNEL intervals.



Decibel (dB) – A unit used to measure the magnitude or intensity of sound. The decibel uses a logarithmic scale to cover the very large range of sound pressures that can be heard by the human ear. Decibels measure a scale from the threshold of human hearing, 0 dB, upward towards the threshold of pain, about 120-140 dB. Because decibels are such a small measure, they are computed logarithmically and cannot be added arithmetically. A 10 dB increase will be perceived by most people to be a doubling in loudness, i.e., 80 dB seems twice as loud as 70 dB. A-weighted decibels (dBA) adjust sound pressure towards the frequency range of human hearing.

Maximum Sound Level (L_{max}) – The maximum a-weighted sound level, in dBA, for a given noise event. The peak noise level reached by a single aircraft event.

Noise Event (Threshold) – A Noise Event is the measured sound produced by a single source of noise over a duration of time. An aircraft noise event begins when the sound level of a flight operation exceeds a noise threshold and ends when the level drops down below that threshold.

Sound Exposure Level (SEL) – SEL is a measure of a single aircraft noise event spread out over its entirety compressed into one second. It allows for a comparison of aircraft noise events of different durations and noise levels. For example, think of the moment you hear a plane from a quarter mile away; we measure from that moment, as the aircraft flies overhead, and until it can’t be heard. This is the duration of sound we use and then compress it into one second for a measure. SEL measures noise energy above the threshold (normally 65 dBA for aircraft noise events). This way, any ambient noise is separated out from the measurement.