

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Revised Draft 2022 AQMP Aircraft Emissions Inventory Report

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1. Introduction

As part of the development of the 2022 Air Quality Management Plan (AQMP), the aircraft emissions inventory was evaluated and updated for the 2018 base year and 2023, 2031, and 2037 forecast years based on the latest available activity data and calculation methodologies. The inventory is presented herein for each airport by pollutant, including VOC, CO, NO_x, SO₂, PM₁₀, and PM_{2.5}. A comparison of revised draft aircraft emissions against those in the draft inventory is presented in Appendix B.

2. Emissions Inventory Methodology

The overall methodology for estimating aircraft emissions involved: 1) identification of airports operating in the region, 2) collection of aircraft activity data from airports and FAA's databases for base year and future milestone years and 3) application of FAA's Aviation Environmental Design Tool (AEDT) for airports with detailed aircraft activity data mainly for commercial air carrier/air taxi operations (i.e., number of operations by aircraft model). For most commercial airports, the aircraft operations forecast did not include specific information regarding the fleet mix (i.e., aircraft and engine combinations). For these airports, engine models were initially matched with aircraft based on the list of engines available in AEDT, generally selecting older engines for the base year and newer engines for future years, reflecting turnover in the aircraft fleet. The projected fleet mix including aircraft and engine models was then sent to each airport for review, validation, or correction of selected engines (to select the most common engine for each aircraft type at each airport). The future fleet mixes were also shared with FAA and Airlines for America. Based on announced aircraft/engine purchases, aircraft retirements, registrations, and markets served, FAA recommended that the future fleet mixes be revised to reflect a transition toward newer aircraft (e.g., Airbus A320neo and Boeing 737-MAX8) and engines (e.g., TAPS II combustor LEAP models). The final fleet mix used in AEDT is provided in Appendix C for each commercial airport.

The airports were also asked to provide the average stage length for each airframe/engine combination, which could significantly impact the landing/takeoff NO_x emissions. The stage length is a parameter in AEDT that represents the flight distance from takeoff to landing and is a proxy for the aircraft weight. The weight associated with the stage length is based on the assumed amount of fuel that is needed for the flight distance. Table 1 summarizes the stage lengths available in AEDT.

Table 1. Stage lengths and corresponding trip lengths assumed in AEDT.

Stage Number	Trip Length (nmi)
1	0-500
2	500-1,000
3	1,000-1,500
4	1,500-2,500
5	2,500-3,500
6	3,500-4,500
7	4,500-5,500
8	5,500-6,500
9	6,500-11,000
M	Maximum range/takeoff weight

Airport specific mixing heights and airport-provided taxi times, as specified in Table 2, were also applied in the AEDT model. Only emissions up to the mixing height were considered in this analysis. The mixing height is defined as the maximum altitude of the mixed layer, a region of the lower troposphere where vigorous dispersion of pollutants occurs. While AEDT assumed a fixed mixing height for each airport, the actual mixing height varies depending on temperature, convection, and other meteorological factors. Aircraft operational modes that occur below the mixing height include startup, taxi-out, takeoff, climb below mixing height, descend below mixing height, and taxi-in. Finally, the APU default assignments and usage times for each aircraft model in AEDT were utilized.

Table 2. Taxi times and mixing heights.

Airport	Taxi time (min) ¹		Mixing height (feet)
	In	Out	
LAX (2018)	12.18	19.24	1,800
LAX (2023)	13.26	21.01	1,800
LAX (2031)	15.76	24.97	1,800
LAX (2037)	17.91	28.39	1,800
LGB	4.39	13.17	1,800
SNA	5.75	9.63	1,900
BUR (pre-terminal) ²	1.25	4.67	2,500
BUR (post-terminal) ³	2.49	2.97	2,500
PSP	5	5	4,000
ONT	3.5	3.5	3,000
SBD	Default	Default	3,500

¹For airports other than LAX and BUR, the taxi time is assumed to remain constant

²Pre-terminal replacement taxi times used for 2018 and 2023

³Post-terminal replacement taxi times used for 2031 and 2037

A reconciliation process was developed to address aircraft operations lacking detailed aircraft activity data. This was either because the airport did not provide detailed data or because the detailed data did not account for all operations when compared to the total aircraft operations by major aircraft type in FAA's databases. Emissions for these operations were quantified using EPA's average emission factors by major aircraft type (i.e., commercial air carrier, air taxi, general aviation, and military).¹ For air taxi and general aviation (GA), the average piston/jet engine ratios from FAA's survey data were assumed. EPA's average emission factors along with FAA's engine type survey data are provided in Appendix A.

2.1. List of Airports

The list of airports identified in the previous aircraft inventory study was used as the basis for this inventory update.² Of the 43 airports included in the previous study, two permanently closed (Pines Airpark and Rialto-Miro Municipal). The remaining 41 airports are listed in Table 3.

¹ 2017 National Emissions Inventory: Aviation Component, Appendix C, July 2019.

² South Coast Air Quality Management District, Aircraft Emissions Inventory for 2012 and 2040, August 2016.

Table 3. Airports in South Coast Air Quality Management District.

FAA ID	Facility Name	County	Owner ¹	Longitude	Latitude
L70	Agua Dulce Airpark	Los Angeles	PR/PU	-118.315	34.503
BNG	Banning Municipal Airport	Riverside	PU	-116.851	33.923
UDD	Bermuda Dunes	Riverside	PR/PU	-116.275	33.748
L35	Big Bear City	San Bernardino	PU	-116.854	34.264
BUR	Bob Hope Airport	Los Angeles	PU	-118.359	34.201
POC	Brackett Field	Los Angeles	PU	-117.782	34.092
CCB	Cable	San Bernardino	PR	-117.688	34.112
AVX	Catalina	Los Angeles	PR/PU	-118.416	33.405
CNO	Chino	San Bernardino	PU	-117.637	33.975
L77	Chiriaco Summit	Riverside	PU	-115.711	33.665
CPM	Compton/Woodley	Los Angeles	PU	-118.244	33.89
AJO	Corona Municipal Airport	Riverside	PU	-117.602	33.898
63CA	Desert Air Sky Ranch	Riverside	PR	-115.874	33.481
L64	Desert Center	Riverside	PU	-115.323	33.749
EMT	El Monte	Los Angeles	PU	-118.035	34.086
86CL	Ernst Field	Riverside	PR	-116.883	33.597
RIR	Flabob	Riverside	PR	-117.411	33.99
F70	French Valley	Riverside	PU	-117.128	33.576
FUL	Fullerton Municipal Airport	Orange	PU	-117.98	33.872
HMT	Hemet-Ryan	Riverside	PU	-117.023	33.734
HHR	Jack Northrop Field/Hawthorne Muni	Los Angeles	PU	-118.335	33.923
TRM	Jacqueline Cochran Regional Airport	Riverside	PU	-116.16	33.627
SNA	John Wayne Airport	Orange	PU	-117.868	33.676
54CL	Lake Riverside Estates	Riverside	PR	-116.797	33.521
LGB	Long Beach Airport	Los Angeles	PU	-118.152	33.818
SLI	Los Alamitos Army Air Base	Orange	MR	-118.052	33.79
LAX	Los Angeles International Airport	Los Angeles	PU	-118.408	33.943
RIV	March Air ForceBase	Riverside	MA	-117.26	33.881
ONT	Ontario International Airport	San Bernardino	PU	-117.601	34.056
PSP	Palm Springs International Airport	Riverside	PU	-116.507	33.83
L65	Perris Valley	Riverside	PR	-117.218	33.761
CL46	Quail Lake Sky Park	Los Angeles	PR	-118.732	34.768
REI	Redlands Municipal Airport	San Bernardino	PU	-117.146	34.085
RAL	Riverside Municipal	Riverside	PU	-117.445	33.952
SBD	San Bernardino International Airport	San Bernardino	PU	-117.235	34.095
NUC	San Clemente Island Naval Air Station	Orange	MN	-118.587	33.023
SMO	Santa Monica Municipal Airport	Los Angeles	PU	-118.451	34.016
CA89	Skylark Field	Riverside	PR	-117.303	33.63
VNY	Van Nuys	Los Angeles	PU	-118.49	34.21
WHP	Whiteman	Los Angeles	PU	-118.413	34.259
TOA	Zamperini Field	Los Angeles	PU	-118.34	33.803

¹PU = Public; PR = Private; MR = Military (Army); MA = Military (Air Force); MN = Military (Navy)

2.2. 2018 Aircraft Activity Data

The 2018 total number of aircraft operations by airport for air carrier, air taxi, GA, and military aircraft was obtained from FAA's databases (ATADS, TAF, and GCR).³ The commercial airports⁴ were contacted for detailed aircraft activity data for 2018 and were also requested to review the 2018 aircraft activity data (i.e., by aircraft model) retrieved from the Bureau of Transportation Statistics Form 41, Schedule T-100.⁵ Three airports (LAX, Burbank, and Long Beach) provided their own aircraft operations and emissions. John Wayne, Ontario, and Palm Springs Airports provided detailed aircraft activity data for 2018. San Bernardino Airport provided detailed aircraft data for 2017, which was assumed to be representative of the 2018 base year as the expanded cargo operations had not yet commenced.

³ Federal Aviation Administration, Air Traffic Activity Data System (ATADS).

<https://aspm.faa.gov/opsnet/sys/Main.asp?force=atads>

Federal Aviation Administration, Terminal Area Forecast (TAF). <https://aspm.faa.gov/main/taf.asp>

GCR Inc. <https://www.airportiq5010.com/5010web/>

⁴ Commercial airports are Los Angeles International, Burbank, Ontario, Long Beach, Palm Springs, John Wayne, and San Bernardino

⁵ Bureau of Transportation Statistics. <http://www.transtats.bts.gov/>

Table 4 lists the total number of operations by major aircraft type and the corresponding data source(s) for each airport.

Table 4. Total operations by airport for 2018.

Facility Name	Air Carrier	Air Taxi	GA	Military	Total	Data Source
March Air Force Base	1,772	0	5,154	5,870	12,796	Airport
Ontario International Airport	74,348	13,397	16,499	334	104,578	Airport/ATADS
Palm Springs International Airport	21,228	10,872	23,788	1,626	57,514	Airport/ATADS
Perris Valley	0	0	27,500	50	27,550	GCR
Quail Lake Sky Park	0	0	0	0	0	TAF/GCR
Redlands Municipal Airport	0	0	44,000	0	44,000	TAF
Riverside Municipal	0	2,378	102,782	368	105,528	ATADS
San Bernardino International Airport	751	2,065	59,887	1,761	64,464	Airport
San Clemente Island Naval Air Station	4,330	0	1,437	5,034	10,801	Airport
Santa Monica Municipal Airport	5	3,935	68,197	96	72,233	ATADS
Skylark Field	0	0	0	0	0	TAF/GCR
Van Nuys	196	27,365	227,599	690	255,850	Airport/ATADS
Whiteman	0	7	82,774	0	82,781	ATADS
Zamperini Field	0	574	110,463	63	111,100	ATADS
Total Operations	933,158	161,461	2,295,217	32,643	3,422,479	

2.3. 2023, 2031, and 2037 Activity Data

FAA's 2020 TAF was initially used to forecast aircraft operations unless the airport provided its own projections or the airport was not covered by TAF. In the latter case, which mainly affected smaller GA airports, operations were carried over from the base year and held constant. In May 2021, FAA released a 2021 TAF, which reflected the impact of COVID-19 on aircraft operations projections. Commercial airports were asked to consider the new forecast for 2023, 2031, and 2037 years. Burbank Airport agreed to incorporate the revised TAF for all three years. Palm Springs Airport also agreed with the revised TAF for all years, except for Air Taxi forecasts, which were not updated. LAX and Long Beach Airport agreed to incorporate the revised TAF for 2023 only (Long Beach used an average of the 2021 and 2020 TAF operations for AirCarrier). John Wayne, Ontario, and San Bernardino Airports opted to use the previous operations forecasts because TAF did not account for various constraints at their airports. LAX also opted to use the previous forecast for 2031 and 2037. Table 5-7 provide the operations by major aircraft type for each airport in 2023, 2031, and 2037, respectively, along with the corresponding data source(s).

Table 5. Total aircraft operations by airport for 2023.

Facility Name	Air Carrier	Air Taxi	GA	Military	Total	Data Source
Agua Dulce Airpark	0	0	720	0	720	TAF
Banning Municipal Airport	0	0	3,624	0	3,624	TAF
Bermuda Dunes	0	0	14,000	30	14,030	TAF
Big Bear City	0	0	28,000	2,000	30,000	TAF
Bob Hope Airport	51,561	13,643	62,306	503	128,013	Airport/TAF
Brackett Field	59	542	81,715	132	82,448	TAF
Cable	0	0	92,189	0	92,189	TAF
Catalina	0	2,266	14,157	50	16,473	TAF
Chino	27	463	210,194	1,268	211,952	TAF
Chiriaco Summit	0	0	6,000	0	6,000	TAF
Compton/Woodley	0	0	66,000	0	66,000	TAF
Corona Municipal Airport	0	0	50,000	0	50,000	TAF
Desert Air Sky Ranch	0	0	0	0	0	TAF
Desert Center	0	0	150	0	150	TAF
El Monte	1	217	88,418	51	88,687	TAF
Ernst Field	0	0	0	0	0	TAF
Flabob	0	0	11,100	0	11,100	TAF
French Valley	0	0	62,733	47	62,780	TAF
Fullerton Municipal Airport	3	105	69,556	85	69,749	TAF
Hemet-Ryan	0	0	75,444	0	75,444	TAF
Jack Northrop Field/Hawthorne Muni	3	4,469	71,303	260	76,035	TAF
Jacqueline Cochran Regional Airport	0	500	75,000	1,000	76,500	TAF
John Wayne Airport	89,810	16,117	218,748	934	325,609	Airport/TAF
Lake Riverside Estates	0	0	0	0	0	TAF
Long Beach Airport	32,035	7,375	264,375	716	304,501	Airport/TAF
Los Alamitos Army Air Base	0	162	6,094	12,190	18,446	2016 AQMP
Los Angeles International Airport	529,067	19,143	17,055	369	565,634	Airport/TAF
March Air Force Base	1,772	0	5,154	5,870	12,796	TAF
Ontario International Airport	96,422	8,177	6,069	291	110,959	Airport/TAF
Palm Springs International Airport	27,424	11,932	22,229	943	62,528	TAF
Perris Valley	0	0	27,500	50	27,550	TAF
Quail Lake Sky Park	0	0	0	0	0	TAF
Redlands Municipal Airport	0	0	44,000	0	44,000	TAF
Riverside Municipal	0	2,378	102,782	368	105,528	TAF
San Bernardino International Airport	17,729	2,180	63,204	1,859	84,972	Airport
San Clemente Island Naval Air Station	4,665	0	1,548	5,423	11,636	Airport
Santa Monica Municipal Airport	0	3,948	70,071	96	74,115	TAF
Skylark Field	0	0	0	0	0	TAF
Van Nuys	95	29,932	189,976	532	220,535	TAF
Whiteman	107	4	84,637	11	84,759	TAF
Zamperini Field	0	654	119,057	99	119,810	TAF
Total Operations	850,780	124,207	2,325,108	35,177	3,335,272	

Table 6. Total aircraft operations by airport for 2031.

Facility Name	Air Carrier	Air Taxi	GA	Military	Total	Data Source
Agua Dulce Airpark	0	0	720	0	720	TAF
Banning Municipal Airport	0	0	3,624	0	3,624	TAF
Bermuda Dunes	0	0	14,000	30	14,030	TAF
Big Bear City	0	0	28,000	2,000	30,000	TAF
Bob Hope Airport	77,492	15,613	66,230	503	159,838	Airport/TAF
Brackett Field	59	542	83,123	132	83,856	TAF
Cable	0	0	92,189	0	92,189	TAF
Catalina	0	2,266	14,157	50	16,473	TAF
Chino	27	463	210,194	1,268	211,952	TAF
Chiriaco Summit	0	0	6,000	0	6,000	TAF
Compton/Woodley	0	0	66,000	0	66,000	TAF
Corona Municipal Airport	0	0	50,000	0	50,000	TAF
Desert Air Sky Ranch	0	0	0	0	0	TAF
Desert Center	0	0	150	0	150	TAF
El Monte	1	217	91,125	51	91,394	TAF
Ernst Field	0	0	0	0	0	TAF
Flabob	0	0	11,100	0	11,100	TAF
French Valley	0	0	62,733	47	62,780	TAF
Fullerton Municipal Airport	3	105	71,756	85	71,949	TAF
Hemet-Ryan	0	0	75,444	0	75,444	TAF
Jack Northrop Field/Hawthorne Muni	3	4,838	74,192	260	79,293	TAF
Jacqueline Cochran Regional Airport	0	500	75,000	1,000	76,500	TAF
John Wayne Airport	95,369	17,004	222,756	934	336,063	Airport/TAF
Lake Riverside Estates	0	0	0	0	0	TAF
Long Beach Airport	41,938	9,294	255,889	663	307,784	Airport/TAF
Los Alamitos Army Air Base	0	162	6,094	12,190	18,446	2016 AQMP
Los Angeles International Airport	768,714	27,850	18,436	0	815,000	Airport/TAF
March Air Force Base	1,772	0	5,154	5,870	12,796	TAF
Ontario International Airport	127,437	11,613	7,006	291	146,347	Airport/TAF
Palm Springs International Airport	38,344	13,792	24,356	943	77,435	TAF
Perris Valley	0	0	27,500	50	27,550	TAF
Quail Lake Sky Park	0	0	0	0	0	TAF
Redlands Municipal Airport	0	0	44,000	0	44,000	TAF
Riverside Municipal	0	2,378	102,782	368	105,528	TAF
San Bernardino International Airport	18,879	2,321	67,305	1,980	90,485	Airport
San Clemente Island Naval Air Station	5,255	0	1,744	6,109	13,108	Airport
Santa Monica Municipal Airport	0	4,278	70,071	96	74,445	TAF
Skylark Field	0	0	0	0	0	TAF
Van Nuys	95	35,079	189,976	532	225,682	TAF
Whiteman	107	4	84,637	11	84,759	TAF
Zamperini Field	0	654	119,057	99	119,810	TAF
Total Operations	1,175,495	148,973	2,342,499	35,562	3,702,529	

Table 7. Total aircraft operations by airport for 2037.

Facility Name	Air Carrier	Air Taxi	GA	Military	Total	Data Source
Agua Dulce Airpark	0	0	720	0	720	TAF
Banning Municipal Airport	0	0	3,624	0	3,624	TAF
Bermuda Dunes	0	0	14,000	30	14,030	TAF
Big Bear City	0	0	28,000	2,000	30,000	TAF
Bob Hope Airport	85,844	16,674	69,354	503	172,375	Airport/TAF
Brackett Field	59	542	84,200	132	84,933	TAF
Cable	0	0	92,189	0	92,189	TAF
Catalina	0	2,266	14,157	50	16,473	TAF
Chino	27	463	210,194	1,268	211,952	TAF
Chiriaco Summit	0	0	6,000	0	6,000	TAF
Compton/Woodley	0	0	66,000	0	66,000	TAF
Corona Municipal Airport	0	0	50,000	0	50,000	TAF
Desert Air Sky Ranch	0	0	0	0	0	TAF
Desert Center	0	0	150	0	150	TAF
El Monte	1	217	93,216	51	93,485	TAF
Ernst Field	0	0	0	0	0	TAF
Flabob	0	0	11,100	0	11,100	TAF
French Valley	0	0	62,733	47	62,780	TAF
Fullerton Municipal Airport	3	105	73,458	85	73,651	TAF
Hemet-Ryan	0	0	75,444	0	75,444	TAF
Jack Northrop Field/Hawthorne Muni	3	5,133	76,433	260	81,829	TAF
Jacqueline Cochran Regional Airport	0	500	75,000	1,000	76,500	TAF
John Wayne Airport	95,369	17,004	225,815	934	339,122	Airport/TAF
Lake Riverside Estates	0	0	0	0	0	TAF
Long Beach Airport	46,544	9,867	257,143	663	314,217	Airport/TAF
Los Alamitos Army Air Base	0	162	6,094	12,190	18,446	2016 AQMP
Los Angeles International Airport	791,472	26,872	17,156	0	835,500	Airport/TAF
March Air Force Base	1,772	0	5,154	5,870	12,796	TAF
Ontario International Airport	160,075	15,406	7,770	291	183,542	Airport/TAF
Palm Springs International Airport	43,616	15,346	24,529	943	84,434	TAF
Perris Valley	0	0	27,500	50	27,550	TAF
Quail Lake Sky Park	0	0	0	0	0	TAF
Redlands Municipal Airport	0	0	44,000	0	44,000	TAF
Riverside Municipal	0	2,378	102,782	368	105,528	TAF
San Bernardino International Airport	19,046	2,342	67,899	1,997	91,285	Airport
San Clemente Island Naval Air Station	5,746	0	1,907	6,680	14,332	Airport
Santa Monica Municipal Airport	0	4,542	70,071	96	74,709	TAF
Skylark Field	0	0	0	0	0	TAF
Van Nuys	95	39,506	189,976	532	230,109	TAF
Whiteman	107	4	84,637	11	84,759	TAF
Zamperini Field	0	654	119,057	99	119,810	TAF
Total Operations	1,249,779	159,983	2,357,462	36,150	3,803,374	

3. Emissions Inventory

Table 8-11 present the 2018, 2023, 2031, and 2037 aircraft emissions by pollutant for all airports. The 2018 base year and future year AEDT runs were performed for Ontario, John Wayne, and San Bernardino Airports based on airport-provided 2018 operations and future forecasts. The same reconciliation process described for the base year was applied to future years based on FAA's TAF, except for Palm Springs, John Wayne, and San Bernardino Airports. LAX, Burbank, and Long Beach Airport provided emissions for the base and future years.

Future Air Carrier and Air Taxi operations at John Wayne Airport were constrained by the airport's 2014 settlement agreement.⁶ San Bernardino Airport's emissions were calculated based on the information available in the airport's cargo expansion environmental assessment report.⁷ Base year emissions were calculated based on 2017 detailed aircraft activity data. AEDT emissions for 2023 were determined by linear interpolation of the 2019 and 2024 activity data. Finally, 2031 and 2037 emissions were scaled based on total operations forecasts provided in Appendix F of the environmental assessment. Figure 1 provides a summary of total emissions by pollutant for all inventoried years.

⁶ 2014 Settlement Agreement Amendment. <https://www.ocair.com/communityrelations/settlementagreement/>

⁷ SBD Eastgate Air Cargo Final EA. www.sbiaa.org

Table 8. 2018 aircraft emissions (tons per year) by airport.

Facility Name	VOC	CO	NOx	SO2	PM10	PM2.5
Agua Dulce Airpark	0.06	2.02	0.03	0.01	0.04	0.03
Banning Municipal Airport	0.30	10.16	0.14	0.03	0.21	0.17
Bermuda Dunes	1.23	39.43	0.69	0.12	0.84	0.66
Big Bear City	2.30	78.47	1.05	0.22	1.66	1.30
Bob Hope Airport	110.00	1,211.00	188.00	41.00	4.00	4.00
Brackett Field	7.48	241.49	4.12	0.76	5.19	4.09
Cable	7.57	258.36	3.47	0.71	5.46	4.28
Catalina	1.80	43.99	1.20	0.22	1.20	0.99
Chino	17.94	571.72	10.23	1.83	12.23	9.63
Chiriaco Summit	0.49	16.82	0.23	0.05	0.36	0.28
Compton/Woodley	5.42	184.97	2.48	0.51	3.91	3.06
Corona Municipal Airport	4.10	140.13	1.88	0.39	2.96	2.32
Desert Air Sky Ranch	0.00	0.00	0.00	0.00	0.00	0.00
Desert Center	0.01	0.42	0.01	0.00	0.01	0.01
El Monte	7.04	240.48	3.23	0.66	5.08	3.98
Ernst Field	0.00	0.00	0.00	0.00	0.00	0.00
Flabob	0.91	31.11	0.42	0.09	0.66	0.52
French Valley	5.15	175.81	2.36	0.49	3.71	2.91
Fullerton Municipal Airport	5.84	192.92	2.97	0.57	4.10	3.23
Hemet-Ryan	6.19	211.43	2.84	0.58	4.47	3.50
Jack Northrop Field/Hawthorne Muni	7.56	208.56	4.39	0.84	5.23	4.27
Jacqueline Cochran Regional Airport	8.98	217.56	8.49	1.13	4.86	3.89
John Wayne Airport	85.61	1,037.88	370.50	38.53	21.93	18.96
Lake Riverside Estates	0.00	0.00	0.00	0.00	0.00	0.00
Long Beach Airport	131.83	1,043.75	193.22	25.77	4.30	4.30
Los Alamitos Army Air Base	33.65	96.48	68.34	6.48	4.63	4.45
Los Angeles International Airport	636.34	4,433.47	4,606.75	409.35	46.53	46.53
March Air Force Base	6.00	93.94	72.89	6.72	17.08	11.90
Ontario International Airport	70.77	319.42	462.40	35.19	6.63	6.35
Palm Springs International Airport	24.62	167.18	111.31	10.09	4.47	4.09
Perris Valley	2.39	77.39	1.31	0.24	1.65	1.29
Quail Lake Sky Park	0.00	0.00	0.00	0.00	0.00	0.00
Redlands Municipal Airport	3.61	123.31	1.65	0.34	2.60	2.04
Riverside Municipal	9.96	294.63	6.33	1.07	6.57	5.23
San Bernardino International Airport	7.18	160.35	13.52	1.49	3.36	2.69
San Clemente Island Naval Air Station	29.34	138.19	133.05	8.07	68.16	68.16
Santa Monica Municipal Airport	6.74	198.71	3.80	0.72	4.67	3.75
Skylark Field	0.00	0.00	0.00	0.00	0.00	0.00
Van Nuys	26.94	691.63	18.04	3.18	17.89	14.70
Whiteman	6.80	231.99	3.11	0.64	4.90	3.84
Zamperini Field	9.37	311.00	4.60	0.91	6.65	5.23
Total	1,291.53	13,496.16	6,309.04	599.00	288.21	256.64

Table 9. 2023 aircraft emissions (tpy) by airport.

Facility Name	VOC	CO	NOx	SO2	PM10	PM2.5
Agua Dulce Airpark	0.06	2.02	0.03	0.01	0.04	0.03
Banning Municipal Airport	0.30	10.16	0.14	0.03	0.21	0.17
Bermuda Dunes	1.23	39.43	0.69	0.12	0.84	0.66
Big Bear City	7.73	91.45	12.22	1.27	2.35	1.98
Bob Hope Airport	65.08	415.08	304.64	26.04	3.60	3.60
Brackett Field	7.28	231.15	4.18	0.75	4.98	3.93
Cable	7.57	258.36	3.47	0.71	5.46	4.28
Catalina	1.80	43.99	1.20	0.22	1.20	0.99
Chino	20.84	598.27	15.19	2.33	12.96	10.26
Chiriaco Summit	0.49	16.82	0.23	0.05	0.36	0.28
Compton/Woodley	5.42	184.97	2.48	0.51	3.91	3.06
Corona Municipal Airport	4.10	140.13	1.88	0.39	2.96	2.32
Desert Air Sky Ranch	0.00	0.00	0.00	0.00	0.00	0.00
Desert Center	0.01	0.42	0.01	0.00	0.01	0.01
El Monte	7.45	248.51	3.65	0.72	5.29	4.15
Ernst Field	0.00	0.00	0.00	0.00	0.00	0.00
Flabob	0.91	31.11	0.42	0.09	0.66	0.52
French Valley	5.28	176.12	2.62	0.51	3.73	2.93
Fullerton Municipal Airport	5.97	195.69	3.12	0.59	4.16	3.27
Hemet-Ryan	6.19	211.43	2.84	0.58	4.47	3.50
Jack Northrop Field/Hawthorne Muni	7.56	209.41	4.92	0.85	4.99	4.03
Jacqueline Cochran Regional Airport	8.98	217.56	8.49	1.13	4.86	3.89
John Wayne Airport	97.56	1,096.66	376.84	42.02	10.18	9.38
Lake Riverside Estates	0.00	0.00	0.00	0.00	0.00	0.00
Long Beach Airport	187.03	1,217.25	208.65	25.67	4.54	4.54
Los Alamitos Army Air Base	33.65	96.48	68.34	6.48	4.63	4.45
Los Angeles International Airport	510.07	3,938.84	4,362.50	347.97	40.39	40.39
March Air Force Base	6.00	93.94	72.89	6.72	17.08	11.90
Ontario International Airport	54.09	302.50	581.83	44.56	5.83	5.75
Palm Springs International Airport	18.26	160.04	138.57	12.00	3.30	3.01
Perris Valley	2.39	77.39	1.31	0.24	1.65	1.29
Quail Lake Sky Park	0.00	0.00	0.00	0.00	0.00	0.00
Redlands Municipal Airport	3.61	123.31	1.65	0.34	2.60	2.04
Riverside Municipal	9.96	294.63	6.33	1.07	6.57	5.23
San Bernardino International Airport	25.15	298.31	181.25	15.61	5.75	4.93
San Clemente Island Naval Air Station	31.54	148.56	143.02	8.67	73.27	73.27
Santa Monica Municipal Airport	6.89	203.95	3.85	0.73	4.78	3.84
Skylark Field	0.00	0.00	0.00	0.00	0.00	0.00
Van Nuys	23.84	589.12	15.71	2.86	15.97	13.24
Whiteman	7.14	237.87	3.74	0.71	5.04	3.96
Zamperini Field	10.19	335.46	5.14	1.00	7.18	5.65
Total	1,191.63	12,536.37	6,544.05	553.54	275.80	246.73

Table 10. 2031 aircraft emissions (tpy) by airport.

Facility Name	VOC	CO	NOx	SO2	PM10	PM2.5
Agua Dulce Airpark	0.06	2.02	0.03	0.01	0.04	0.03
Banning Municipal Airport	0.30	10.16	0.14	0.03	0.21	0.17
Bermuda Dunes	1.23	39.43	0.69	0.12	0.84	0.66
Big Bear City	7.73	91.45	12.22	1.27	2.35	1.98
Bob Hope Airport	72.92	471.61	539.20	35.86	4.53	4.53
Brackett Field	7.39	235.10	4.23	0.76	5.06	3.99
Cable	7.57	258.36	3.47	0.71	5.46	4.28
Catalina	1.80	43.99	1.20	0.22	1.20	0.99
Chino	20.84	598.27	15.19	2.33	12.96	10.26
Chiriaco Summit	0.49	16.82	0.23	0.05	0.36	0.28
Compton/Woodley	5.42	184.97	2.48	0.51	3.91	3.06
Corona Municipal Airport	4.10	140.13	1.88	0.39	2.96	2.32
Desert Air Sky Ranch	0.00	0.00	0.00	0.00	0.00	0.00
Desert Center	0.01	0.42	0.01	0.00	0.01	0.01
El Monte	7.67	256.10	3.75	0.74	5.45	4.28
Ernst Field	0.00	0.00	0.00	0.00	0.00	0.00
Flabob	0.91	31.11	0.42	0.09	0.66	0.52
French Valley	5.28	176.12	2.62	0.51	3.73	2.93
Fullerton Municipal Airport	6.15	201.85	3.20	0.61	4.29	3.37
Hemet-Ryan	6.19	211.43	2.84	0.58	4.47	3.50
Jack Northrop Field/Hawthorne Muni	7.88	218.15	5.09	0.88	5.21	4.21
Jacqueline Cochran Regional Airport	8.98	217.56	8.49	1.13	4.86	3.89
John Wayne Airport	89.24	1,025.03	500.93	42.73	10.88	9.87
Lake Riverside Estates	0.00	0.00	0.00	0.00	0.00	0.00
Long Beach Airport	186.78	1,213.01	271.18	28.99	4.86	4.86
Los Alamitos Army Air Base	33.65	96.48	68.34	6.48	4.63	4.45
Los Angeles International Airport	685.79	5,508.76	6,439.98	489.06	54.48	54.48
March Air Force Base	6.00	93.94	72.89	6.72	17.08	11.90
Ontario International Airport	63.69	346.57	868.20	56.89	7.23	7.14
Palm Springs International Airport	19.36	162.65	194.08	15.28	3.62	3.30
Perris Valley	2.39	77.39	1.31	0.24	1.65	1.29
Quail Lake Sky Park	0.00	0.00	0.00	0.00	0.00	0.00
Redlands Municipal Airport	3.61	123.31	1.65	0.34	2.60	2.04
Riverside Municipal	9.96	294.63	6.33	1.07	6.57	5.23
San Bernardino International Airport	28.47	330.17	213.96	18.35	6.28	5.41
San Clemente Island Naval Air Station	35.06	165.14	158.99	9.64	81.45	81.45
Santa Monica Municipal Airport	6.96	204.53	3.91	0.75	4.83	3.89
Skylark Field	0.00	0.00	0.00	0.00	0.00	0.00
Van Nuys	24.98	598.19	16.60	3.04	16.75	13.96
Whiteman	7.14	237.87	3.74	0.71	5.04	3.96
Zamperini Field	10.19	335.46	5.14	1.00	7.18	5.65
Total	1,386.20	14,218.17	9,434.61	728.09	303.69	274.14

Table 11. 2037 aircraft emissions (tpy) by airport.

Facility Name	VOC	CO	NOx	SO2	PM10	PM2.5
Agua Dulce Airpark	0.06	2.02	0.03	0.01	0.04	0.03
Banning Municipal Airport	0.30	10.16	0.14	0.03	0.21	0.17
Bermuda Dunes	1.23	39.43	0.69	0.12	0.84	0.66
Big Bear City	7.73	91.45	12.22	1.27	2.35	1.98
Bob Hope Airport	78.05	505.72	593.70	39.22	4.91	4.91
Brackett Field	7.48	238.11	4.27	0.77	5.13	4.04
Cable	7.57	258.36	3.47	0.71	5.46	4.28
Catalina	1.80	43.99	1.20	0.22	1.20	0.99
Chino	20.84	598.27	15.19	2.33	12.96	10.26
Chiriaco Summit	0.49	16.82	0.23	0.05	0.36	0.28
Compton/Woodley	5.42	184.97	2.48	0.51	3.91	3.06
Corona Municipal Airport	4.10	140.13	1.88	0.39	2.96	2.32
Desert Air Sky Ranch	0.00	0.00	0.00	0.00	0.00	0.00
Desert Center	0.01	0.42	0.01	0.00	0.01	0.01
El Monte	7.84	261.96	3.83	0.76	5.57	4.37
Ernst Field	0.00	0.00	0.00	0.00	0.00	0.00
Flabob	0.91	31.11	0.42	0.09	0.66	0.52
French Valley	5.28	176.12	2.62	0.51	3.73	2.93
Fullerton Municipal Airport	6.29	206.62	3.27	0.62	4.39	3.45
Hemet-Ryan	6.19	211.43	2.84	0.58	4.47	3.50
Jack Northrop Field/Hawthorne Muni	8.13	224.95	5.22	0.91	5.39	4.36
Jacqueline Cochran Regional Airport	8.98	217.56	8.49	1.13	4.86	3.89
John Wayne Airport	80.97	967.72	618.74	42.10	10.83	9.78
Lake Riverside Estates	0.00	0.00	0.00	0.00	0.00	0.00
Long Beach Airport	188.51	1,226.96	315.54	30.78	5.03	5.03
Los Alamitos Army Air Base	33.65	96.48	68.34	6.48	4.63	4.45
Los Angeles International Airport	679.58	5,550.86	6,769.05	498.69	54.20	54.20
March Air Force Base	6.00	93.94	72.89	6.72	17.08	11.90
Ontario International Airport	73.10	389.73	1,191.38	69.91	8.65	8.54
Palm Springs International Airport	20.07	168.49	220.97	16.78	3.66	3.34
Perris Valley	2.39	77.39	1.31	0.24	1.65	1.29
Quail Lake Sky Park	0.00	0.00	0.00	0.00	0.00	0.00
Redlands Municipal Airport	3.61	123.31	1.65	0.34	2.60	2.04
Riverside Municipal	9.96	294.63	6.33	1.07	6.57	5.23
San Bernardino International Airport	28.72	333.09	215.85	18.51	6.34	5.46
San Clemente Island Naval Air Station	37.70	177.58	170.96	10.36	83.36	85.68
Santa Monica Municipal Airport	7.02	205.00	3.95	0.75	4.87	3.92
Skylark Field	0.00	0.00	0.00	0.00	0.00	0.00
Van Nuys	25.96	605.99	17.36	3.20	17.42	14.58
Whiteman	7.14	237.87	3.74	0.71	5.04	3.96
Zamperini Field	10.19	335.46	5.14	1.00	7.18	5.65
Total	1,393.27	14,344.09	10,345.41	757.87	308.52	281.08

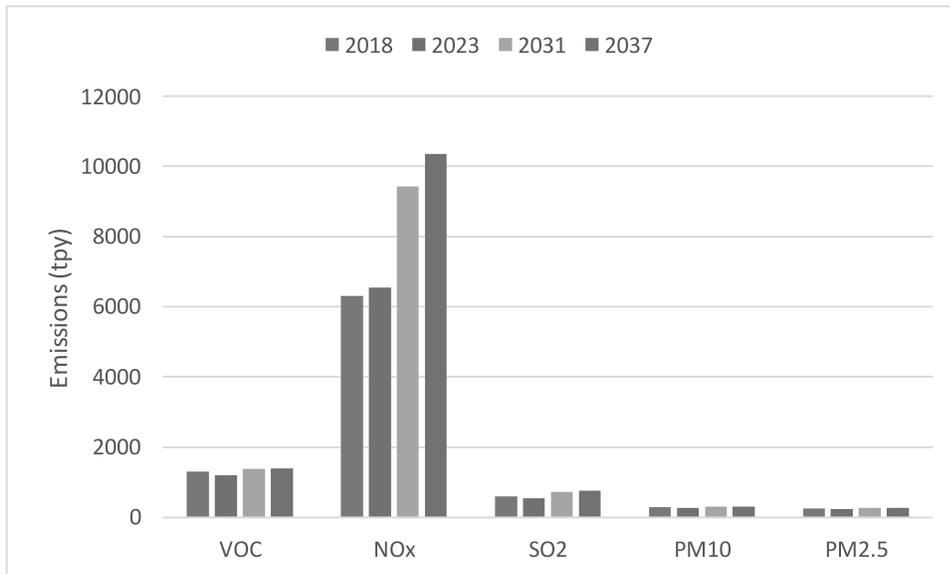


Figure 1. Total aircraft emissions for the base and future milestone years.

Appendix A
EPA's Average Aircraft Emission Factors⁸
(tons/Landing Takeoff)⁹

	Air Taxi-Jet	Air Taxi-Piston	GA-Jet	GA-Piston	Military	Commercial
VOC	5.03E-04	8.48E-05	3.45E-04	7.52E-05	5.43E-03	3.08E-03
CO	1.81E-03	1.41E-02	4.79E-03	6.01E-03	1.30E-02	1.12E-02
NO _x	3.88E-04	7.90E-05	1.62E-04	3.25E-05	1.12E-02	9.29E-03
SO _x	8.12E-05	7.50E-06	3.68E-05	5.00E-06	1.06E-03	8.91E-04
PM10	3.02E-04	3.02E-04	1.18E-04	1.18E-04	6.97E-04	5.39E-04
PM2.5	2.94E-04	2.02E-04	1.16E-04	8.17E-05	6.80E-04	5.26E-04

FAA's GA/Air Taxi Survey Results¹⁰

	% Jet	% Piston
Air Taxi	86	14
GA	33	67

⁸ 2017 National Emissions Inventory: Aviation Component, Appendix C, July 2019.

⁹ One landing take-off cycle is equivalent to two operations.

¹⁰ FAA, 2018. https://www.faa.gov/data_research/aviation_data_statistics/general_aviation/CY2018/

Appendix B

Aircraft Emissions and Operations for Commercial Airports Compared with the Draft Inventory

Figures B-1 - B-6 compare future year SCAB commercial airport NOx emissions with those in the draft inventory, while Figure 7 compares the total difference in the NOx inventory for all airports. Decreases in 2023 at LAX, LGB, and BUR are attributable to lower forecasted operations in the latest TAF. The decrease is less pronounced at LGB because Air Carrier operations were averaged between the 2021 and 2020 TAFs. Emissions decreased at SBD due to modification of the assumed stage lengths. After consulting with SBD, cargo operations were determined to fly shorter distances than originally assumed.

Increases in 2031 and 2037 are driven by changes in the fleet mix. Some newer aircraft, despite being more fuel efficient, produce greater NOx emissions. Table B1 compares LTO emissions and fuel burned for aircraft that are representative of the turnover in the aircraft fleet at SCAB airports. For example, Boeing 737-800 transitioning to newer Boeing 737-MAX8 will result in substantially higher NOx emissions, while Airbus A319-100 replaced with Airbus A220-100 will result in significantly lower NOx emissions. However, A220-100s have a narrower body than A319-100s and generally accommodate fewer passengers which should be taken into account.

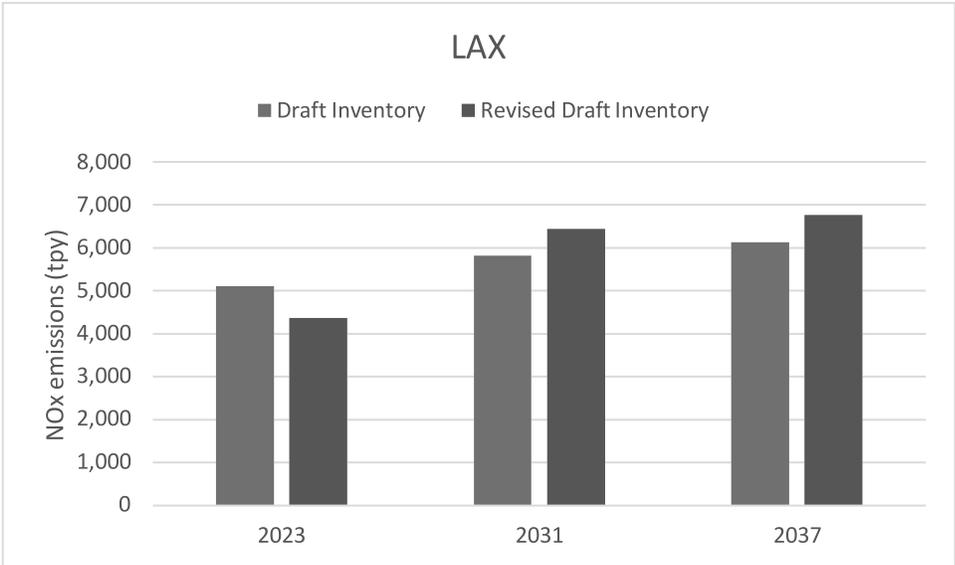


Figure B-1. NOx emissions comparison at LAX.

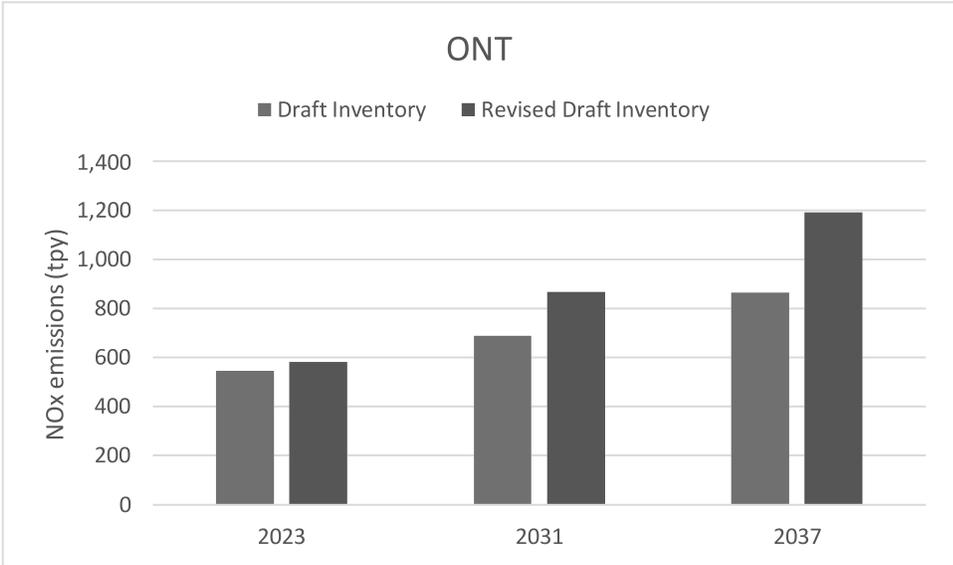


Figure B-2. NOx emissions comparison at ONT.

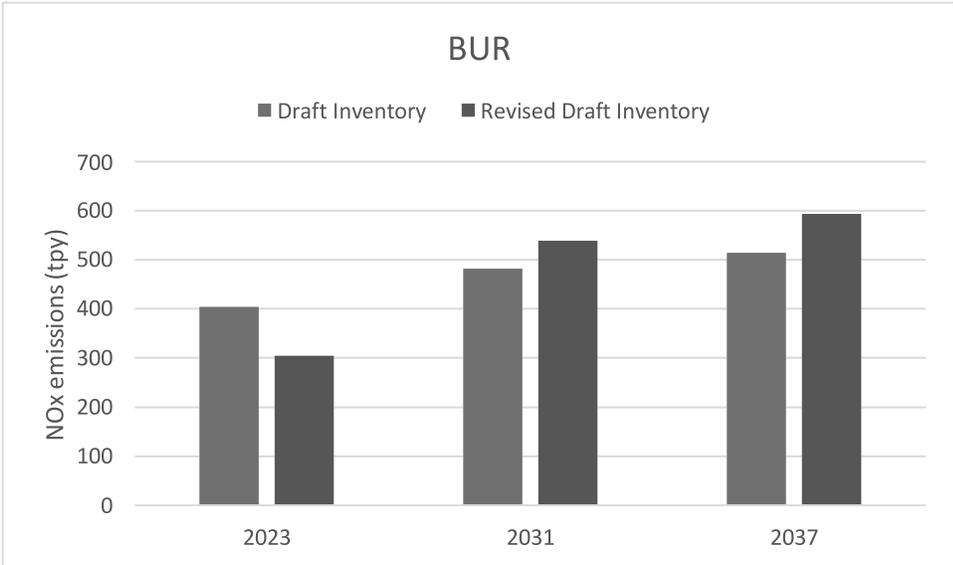


Figure B-3. NOx emissions comparison at BUR.

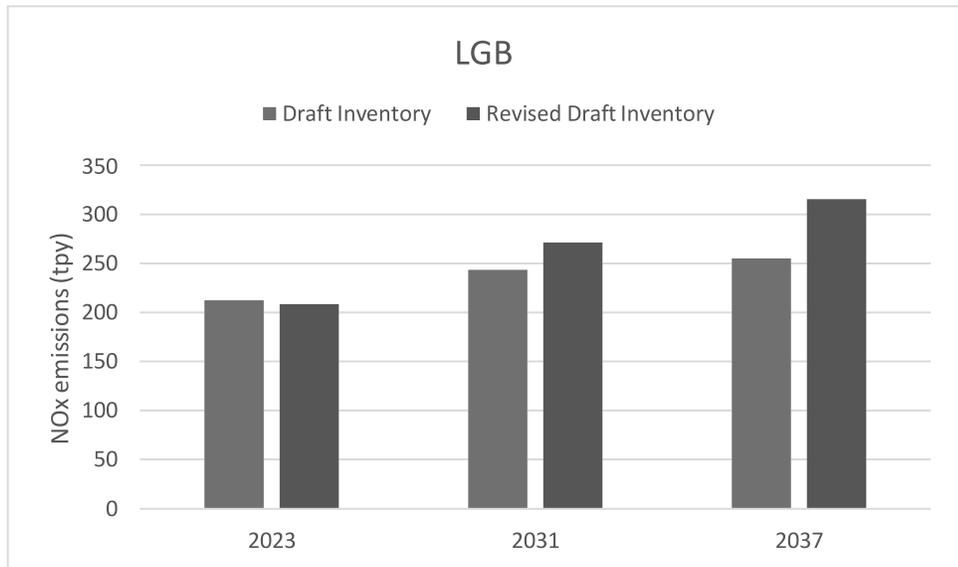


Figure B-4. NOx emissions comparison at LGB.

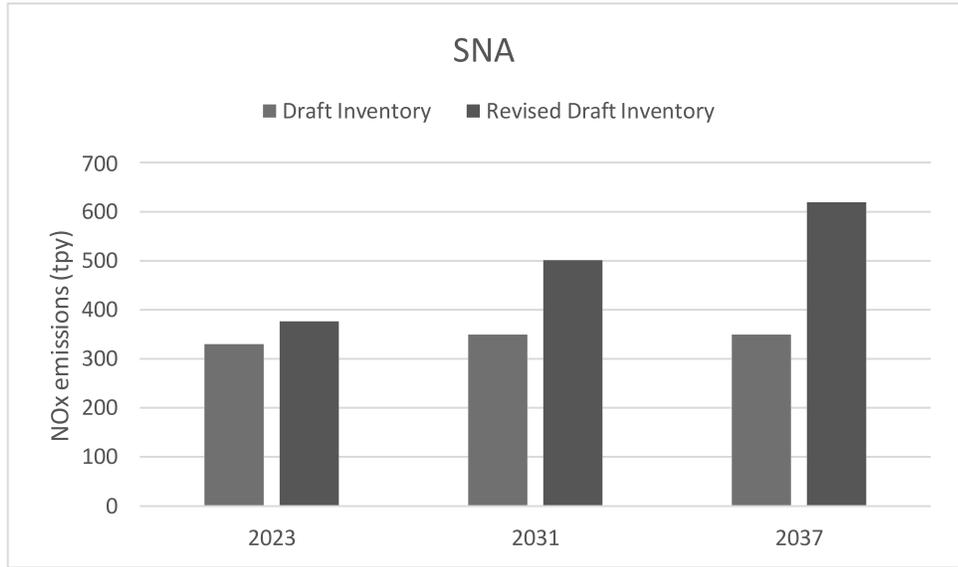


Figure B-5. NOx emissions comparison at SNA.

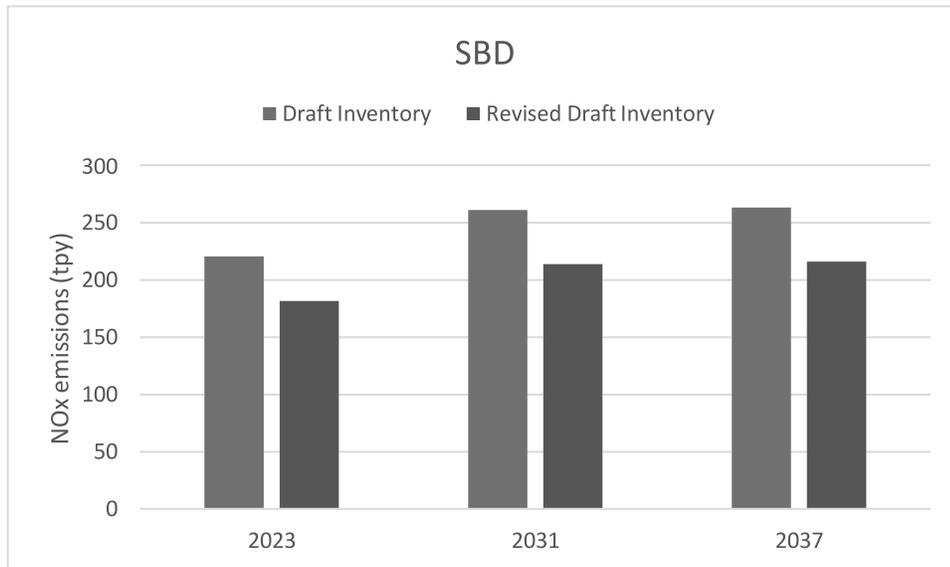


Figure B-6. NOx emissions comparison at SBD.

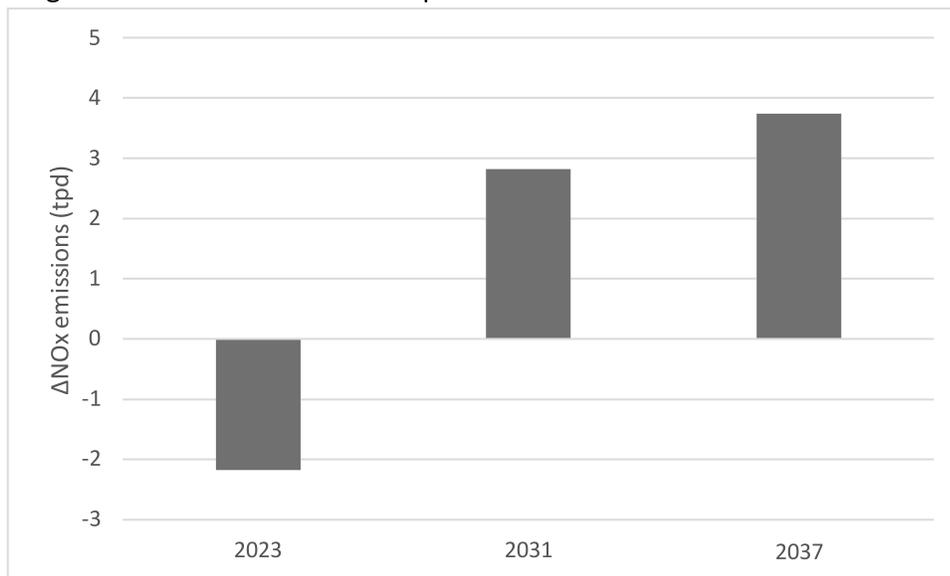


Figure B-7. Difference in total NOx emissions compared to the draft inventory.

Table B-1. Comparison of LTO fuel and NOx emissions for aircraft representative of fleet turnover at commercial airports.

Existing/Older			Replacement/Newer		
Aircraft/Engine	LTO NOx (g)	LTO Fuel (kg)	Aircraft/Engine	LTO NOx (g)	LTO Fuel (kg)
Boeing 737-800 CFM56-7B27E	5,231	444	Boeing 737-MAX8 LEAP-1B25	5,417	348
Boeing 737-700 CMF56-7B24	5,149	412	Boeing 737-8MAX LEAP-1B28	7,534	378
Airbus A319-100 CFM56-5B7/3	4,511	407	Airbus A220-100 PW1519G	2,656	246

Appendix C

Number of Aircraft Operations by Aircraft and Engine Model for Commercial Airports

Tables 1 - 11 provide the operations by aircraft and engine model in AEDT for commercial airports.

Table 1. General aviation operations by aircraft and engine model at BUR.

Aircraft and Engine Model	Operations (all years)
Aerospatiale SA-350D Astar (AS-350)	212
TPE331-3	212
Aerospatiale SA-355F Twin Star (AS-355)	19
250B17B	19
Aerostar PA-60	13
TIO-540-J2B2	13
Agusta A-109	33
250B17B	33
Bell 206B-3	14
250B17B	14
Boeing MD520N	30
TPE331-6	30
Bombardier Challenger 300	701
AE3007A1	304
AS907-2-1A (HTF7350)	248
HTF7000 (AS907-1-1A)	149
Bombardier Challenger 350	322
AS907-2-1A (HTF7350)	322
Bombardier Challenger 600	643
ALF 502L-2	416
CF34-3B/-3B1	227
Bombardier Challenger 604	102
CF34-3B/-3B1	102
Bombardier Challenger 650	95
CF34-3B/-3B1	95
Bombardier Global 5000	106
BR700-710A2-20	106
Bombardier Global 6000	8
BR700-710A2-20	8
Bombardier Global Express	565
BR700-710A1-10	418
BR700-715B1-30	147
Bombardier Learjet 31	33
TFE731-3	33
Bombardier Learjet 35	179
TFE731-3	179
Bombardier Learjet 35A/36A (C-21A)	106
TFE731-2/2A	106

Bombardier Learjet 40	20
TFE731-2/2A	20
Bombardier Learjet 45	68
TFE731-2/2A	68
Bombardier Learjet 55	21
TFE731-3	21
Bombardier Learjet 60	131
AE3007C	131
Bombardier Learjet 75	37
TFE731-3	37
Cessna 150 Series	44
O-200	44
Cessna 172 Skyhawk	820
IO-320-D1AD	8
O-320	192
TSIO-360C	620
Cessna 182	481
IO-360-B	481
Cessna 206	15
TIO-540-J2B2	15
Cessna 208 Caravan	297
PT6A-114	10
PT6A-114A	42
TPE331-12	245
Cessna 210 Centurion	153
TIO-540-J2B2	153
Cessna 310	36
TIO-540-J2B2	36
Cessna 340	61
TIO-540-J2B2	61
Cessna 402	59
TIO-540-J2B2	59
Cessna 414	33
TIO-540-J2B2	33
Cessna 421 Piston	19
TIO-540-J2B2	19
Cessna 425 Conquest I	9
PT6A-112	9
Cessna 441 Conquest II	28
TPE331-10GT	28
Cessna 500 Citation I	10
PW530	10
Cessna 501 Citation ISP	12
JT15D-4 series	12

Cessna 525 CitationJet	197
PW4090	197
Cessna 525C CitationJet	99
PW610F	99
Cessna 550 Citation Bravo	9
PW530	9
Cessna 550 Citation II	101
JT15D-4 series	101
Cessna 551 Citation IISP	8
JT15D-4 series	8
Cessna 560 Citation Encore	142
PW530	142
Cessna 560 Citation Excel	961
PW530	961
Cessna 560 Citation XLS	35
PW530	35
Cessna 680 Citation Sovereign	164
PW308C Build Spec 1289	164
Cessna 680-A Citation Latitude	156
PW306B	156
Cessna 750 Citation X	228
AE3007A	228
CESSNA CITATION 510	60
PW610F	60
Cessna CitationJet CJ2 (Cessna 525A)	182
PW610F	182
Cessna CitationJet CJ3 (Cessna 525B)	262
JT15D-4 series	262
Cirrus SR20	69
IO-360-B	69
Cirrus SR22	673
TIO-540-J2B2	673
DAHER TBM 900/930	7
PT6A-66	7
Dassault Falcon 2000	378
PW308C Build Spec 1289	378
Dassault Falcon 2000-EX	138
PW308C Build Spec 1289	138
Dassault Falcon 50	196
TFE731-2/2A	21
TFE731-3	175
Dassault Falcon 50-EX	16
TFE731-3	16
Dassault Falcon 900	174

TFE731-3	174
Dassault Falcon 900-EX	79
TFE731-3	79
EADS Socata TB-20 Trinidad	26
TIO-540-J2B2	26
EADS Socata TBM-700	50
PT6A-60	50
Eclipse 500 / PW610F	51
PW610F	21
PW610F-A	30
Embraer 500	641
AS907-3-1E-A3 (HTF7500E)	641
Embraer 505	564
PW530	564
Embraer EMB120 Brasilia	16
PW118A	16
Embraer ERJ135	72
AE3007A1P	72
Embraer ERJ135-LR	4234
AE3007A1/3	557
AE3007A3	3677
Embraer Legacy	187
AE3007A1P	187
Embraer Legacy 450 (EMB-545)	37
AS907-3-1E-A1 (HTF7500E)	37
Embraer Legacy 500 (EMB-550)	162
AS907-3-1E-A2 (HTF7500E)	162
Eurocopter EC-130	5426
TPE331-3	5426
Extra EA-500	14
250B17B	14
Falcon 7X	35
PW307A	35
Gulfstream G100	17
TFE731-3	17
Gulfstream G150	280
TFE731-3	280
Gulfstream G200	59
PW306A	59
Gulfstream G280	73
AS907-2-1G (HTF7250G)	73
Gulfstream G300	84
F113-RR-100	84
Gulfstream G350	79

TAY Mk611-8	79
Gulfstream G400	7
TAY 611-8C	7
Gulfstream G450	291
TAY 611-8C	212
TAY Mk611-8	79
Gulfstream G550	94
BR700-710C4-11	94
Gulfstream G600	28
PW815GA	28
Gulfstream G650	405
BR700-725A1-12	405
Gulfstream IV-SP	1009
TAY Mk611-8	1009
Gulfstream V-SP	1292
TAY Mk611-8	1292
Hawker 900XP	55
TFE731-2/2A	55
Hawker HS-125 Series 400	11
TAY Mk611-8	11
Honda HA-420 Hondajet	25
PW610F	25
Israel IAI-1125 Astra	12
TFE731-3	12
Israel IAI-1126 Galaxy	226
PW306A	226
Mooney M20-K	91
TSIO-360C	91
Piaggio P.180 Avanti	72
PT6A-60	36
PT6A-66	36
Pilatus PC-12	3767
PT6A-67	1509
PT6A-67B	2258
Piper PA-24 Comanche	18
TIO-540-J2B2	18
Piper PA-27 Aztec	32
TIO-540-J2B2	32
Piper PA-28 Cherokee Series	370
IO-360-B	278
O-320	92
Piper PA-30 Twin Comanche	7
IO-320-D1AD	7
Piper PA-31T Cheyenne	20

PT6A-135A	8
PT6A-28	12
Piper PA-32 Cherokee Six	102
TIO-540-J2B2	102
Piper PA-34 Seneca	15
TSIO-360C	15
Piper PA-42 Cheyenne Series	98
TPE331-10GT	98
Piper PA46-TP Meridian	177
PT6A-42	177
Rans S7S	49
O-200	49
Raytheon Beech 1900-C	608
PT6A-67B	90
PT6A-67D	518
Raytheon Beech 55 Baron	39
TIO-540-J2B2	39
Raytheon Beech 60 Duke	8
TIO-540-J2B2	8
Raytheon Beech Baron 58	114
TIO-540-J2B2	114
Raytheon Beech Bonanza 36	393
TIO-540-J2B2	393
Raytheon Beechjet 400	152
JT15D-4 series	29
JT15D-5, -5A, -5B	116
JT15D-5C	7
Raytheon Hawker 1000	7
PW306B	7
Raytheon Hawker 4000 Horizon	17
PW308A	17
Raytheon Hawker 800	754
TFE731-3	754
Raytheon King Air 100	58
TPE331-6	58
Raytheon King Air 90	180
PT6A-135A	21
PT6A-21	132
PT6A-28	13
PT6A-60	14
Raytheon Premier I	67
PW610F	67
Raytheon Super King Air 200	695
PT6A-41	72

PT6A-42	623
Raytheon Super King Air 300	442
PT6A-42	442
Robinson R22B	246
IO-320-D1AD	246
Robinson R44 Raven / Lycoming O-540-F1B5	1042
TIO-540-J2B2	1042
Sikorsky S-76 Spirit	20
T700-GE-700	20
SOCATA TBM 850	22
PT6A-66	22
Grand Total	35113

Table 2. Air carrier and air taxi operations by aircraft and engine model at BUR.

Aircraft and Engine Model	2023	2031/2037
Airbus A220-100	57	
PW1521G	57	
Airbus A300F4-600 Series	886	886
CF6-80C2A5F	318	318
PW4158	568	568
Airbus A319-100 Series	57	
CFM56-5B6/P	57	
Airbus A320-200 Series	292	292
CFM56-5B4	292	292
Airbus A320-NEO	76	76
PW1127G-JM	76	76
Airbus A321-NEO	38	38
PW1133G-JM	38	38
Boeing 737-700 Series	2781	
CFM56-7B24	2781	
Boeing 737-8	3965	7820
LEAP-1B28B	3965	7820
BOEING 737-800 Poseidon	1074	
CFM56-7B27E	1074	
Boeing 737-900-ER	768	768
CFM56-7B27E	768	768
Boeing 767-300BCF		114
PW1521G		114
Bombardier CRJ-200-ER	164	164
CF34-3B1	164	164
Bombardier CRJ-700	1004	1004
CF34-8C5B1	1004	1004
Bombardier CRJ-900	64	64
CF34-8C5	64	64
Embraer ERJ170-LR	1732	1732
CF34-8E5	1732	1732
Fairchild SA-227-AC Metro III	954	954
TPE331-11U-601G	954	954
Raytheon Beech 99	200	200
PT6A-60	200	200
Grand Total	14112	14112

Table 3. Operations by aircraft and engine model at SNA.

Aircraft and Engine Model	2018	2023	2031	2037
Airbus A220-100			7206	7206
PW1521GA			7206	<u>7206</u>
Airbus A300F4-600 Series	530	608	646	646
PW4x58	530	608	646	<u>646</u>
Airbus A319-100 Series	3958	6786		
CFM56-5B9/2P	3958	6786		
Airbus A320-200 Series	4930	3252	2664	1964
CFM56-5B2/2P		814	1070	788
CFM56-5B4/2	4930			
CFM56-5B4/P		812		
V2524-A5		814	1594	1176
V2527-A5		812		
Airbus A320-NEO	600	1570	2456	3158
LEAP-1A26/26E1	600			
PW1127G-JM		1570	2456	3158
Airbus A321-100 Series	4			
V2530-A5	4			
Airbus A321-200 Series		322	218	166
CFM56-5B1/P		108	218	166
CFM56-5B3/P		108		
V2533-A5 SelectOne™ Upgrade Package		106		
Airbus A321-NEO		310	454	504
LEAP-1A35A/33/33B2/32/30		154	226	252
PW1133G-JM		156	228	252
Boeing 717-200 Series	3378			
BR700-715A1-30	3378			
Boeing 737-600 Series	10			
CFM56-3C-1	10			
Boeing 737-700 Freighter		27660	15806	
CFM56-7B24E		27660	15806	
Boeing 737-700 Series	36602	27660	15806	
CFM56-3C-1	36602			
CFM56-7B24		27660	15806	
Boeing 737-8	14		32344	69340
LEAP-1B27	14		16172	34670
LEAP-1B28/28B2/28B1/28B3			16172	34670
BOEING 737-800 Poseidon		9426	7406	4714
CFM56-7B27E		9426	7406	4714
Boeing 737-800 Series	24952	9426	7406	4712
CFM56-7B27	24952	9426	7406	4712
Boeing 737-900 Series	2			

CFM56-7B27	2			
Boeing 757-200 Series	2898	2792	2966	2966
PW2040	2898	2792	2966	<u>2966</u>
Boeing 757-200 Series Freighter	394			
RB211-535E4	394			
Boeing DC-9-30 Series	2			
JT8D-9 series	2			
Bombardier Challenger 300		4248	4440	4440
AE3007A1		4248	4440	<u>4440</u>
Bombardier Challenger 600		2474	2586	2586
CF34-3A		2474	2586	<u>2586</u>
Bombardier Challenger 602		2474	2586	2586
CF34-3B		2474	2586	<u>2586</u>
Bombardier CRJ-400				
CF34-3B				
Bombardier CRJ-700	730			
CF34-3B	730			
Bombardier CRJ-900	6	3576	3796	3796
CF34-8C5	6	3576	3796	3796
Bombardier de Havilland Dash 8 Q100	728			
PW120A	728			
Bombardier Learjet 55		3822	3996	3996
TFE731-3		3822	3996	<u>3996</u>
Britten-Norman BN-2 Islander		228	228	228
250B17B		228	228	<u>228</u>
Cessna 140 (FAS)		68820	61174	61174
O-200		68820	61174	<u>61174</u>
Cessna 150 Series		23394	20794	20794
O-200		23394	20794	<u>20794</u>
Cessna 172 Skyhawk		7468	6638	6638
IO-360-B		7468	6638	<u>6638</u>
Cessna 182		1722	1530	1530
IO-360-B		1722	1530	<u>1530</u>
Cessna 206		1130	1004	1004
TIO-540-J2B2		1130	1004	<u>1004</u>
Cessna 208 Caravan		2990	2658	2658
PT6A-114		2990	2658	<u>2658</u>
Cessna 210 Centurion		5208	4628	4628
TIO-540-J2B2		5208	4628	<u>4628</u>
Cessna 441 Conquest II		3450	3066	3066
TPE331-8		3450	3066	<u>3066</u>
Cessna 525 CitationJet		4046	4046	4046
PW4090		4046	4046	<u>4046</u>

Cessna 550 Citation II	5538	5538	5538
JT15D-4 series	5538	5538	5538
Cessna 560 Citation V	1850	1850	1850
JT15D-5, -5A, -5B	1850	1850	1850
Cessna 560 Citation XLS	2952	2952	2952
PW306B	2952	2952	2952
Cessna 650 Citation III	1004	1050	1050
TFE731-2-2B	1004	1050	1050
Cessna 680 Citation Sovereign	1448	1448	1448
PW306B	1448	1448	1448
Cessna 750 Citation X	1936	2024	2024
AE3007C	1936	2024	2024
CESSNA CITATION 510	1068	1116	1116
PW610F	1068	1116	1116
DeHavilland DHC-6-300 Twin Otter	3452	3068	3068
PT6A-42	3452	3068	3068
DeHavilland DHC-8-200	1380	1380	1380
PW123	1380	1380	1380
Dornier 228-200 Series	430	430	430
TPE331-5A	430	430	430
Eclipse 500 / PW610F	302	314	314
PW610F-A	302	314	314
Embraer ERJ135	1056		
AE3007A1/3	1056		
Embraer ERJ170	5822	6182	6182
CF34-8E2	5822	6182	6182
Embraer ERJ175	12864	4248	4440
CF34-8E5A1	12864	4248	4440
Fokker F100	1220	1220	1220
TAY Mk620-15	1220	1220	1220
Gulfstream G100	624	652	652
TFE731-3	624	652	652
Gulfstream G300	3644	3810	3810
TAY Mk611-8	3644	3810	3810
Gulfstream G500	2386	2494	2494
BR700-710A1-10	2386	2494	2494
Piper PA-28 Cherokee Series	728	648	648
IO-320-D1AD	728	648	648
Raytheon Beech 55 Baron	2306	2048	2048
TIO-540-J2B2	2306	2048	2048
Raytheon Beechjet 400	1846	1928	1928
JT15D-1 series	1846	1928	1928
Grand Total	93658	269046	263140

Table 4. Operations by aircraft and engine model at ONT.

Aircraft and Engine Model	2018	2023	2031	2037
Aerospatiale Caravelle 10	488	592	684	758
JT8D-7 series	488	592	684	758
Airbus A220-100		232	4604	6106
PW1519G		232	4604	6106
Airbus A300C4-600 Series	4514	2734	3154	3496
CF6-80C2A5	4514	2734	3154	3496
Airbus A300F4-600 Series		2734	3154	3496
PW4158		2734	3154	3496
Airbus A319-100 Series	2224	3010		
CFM56-5B7/3		3010		
CFM56-5B9/2P	2224			
Airbus A320-200 Series	3808	3476	3808	3720
CFM56-5B1/2P		870	952	930
CFM56-5B4/2	2630			
CFM56-5B4/P		870	952	930
V2527-A5		868	952	930
V2527-A5 SelectOne™ Upgrade Package		868	952	930
V2527E-A5	1178			
Airbus A320-NEO		1678	3508	5984
PW1127G-JM		1678	3508	5984
Airbus A321-100 Series	1454	1002	452	456
CFM56-5B1	1454			
CFM56-5B2/P		1002	452	456
Airbus A321-200 Series			452	456
CFM56-5B2/P			152	152
CFM56-5B3/P			150	152
V2533-A5			150	152
Airbus A321-NEO		966	1890	2796
LEAP-1A35A/33/33B2/32/30		482	944	1398
PW1133G-JM		484	946	1398
Airbus A350-1000 Series	146	198	283	374
Trent XWB-97	146	198	283	374
Boeing 717-200 Series	172			
BR700-715A1-30	172			
Boeing 727-200 Series	184			
JT8D-7 series	184			
Boeing 737-300 Series	14			
CFM56-3C-1	14			
Boeing 737-400 Series	12			
CFM56-3C-1	12			
Boeing 737-400 Series Freighter		250	356	470

CFM56-7B26		250	356	470
Boeing 737-700 Freighter		16004	9146	
CFM56-7B24E		16004	9146	
Boeing 737-700 Series	23636	16004	9146	
CFM56-3C-1	23636			
CFM56-7B24		16004	9146	
Boeing 737-8	108	148	33500	73928
LEAP-1B27	108	74	16750	36964
LEAP-1B28/28B2/28B1/28B3		74	16750	36964
BOEING 737-800 Poseidon		9636	7572	4818
CFM56-7B27E		9636	7572	4818
Boeing 737-800 Series	7122			
CFM56-7B27	7122			
Boeing 737-900 Series	590	798	1134	1504
CFM56-7B27	590			
CFM56-7B27/3		798	1134	1504
Boeing 737-900-ER	2222	3006	4270	5664
CFM56-7B27	2222			
CFM56-7B27/3		3006	4270	5664
Boeing 747-400 Series Freighter	884	1072	1236	1370
CF6-80C2B1F		536	618	684
RB211-524G-T	884	536	618	686
Boeing 747-8	266	322	372	412
CF6-80C2B1F	266			
GENX-2B67		322	372	412
Boeing 757-200 Series Freighter	4842	5868	6768	7504
PW2037		2934	3384	3752
RB211-535E4	4842	2934	3384	3752
Boeing 767-200 Series Freighter	5572	6750	7786	8632
CF6-80A	5572			
CF6-80C2B4F		6750	7786	8632
Boeing 767-300 Freighter	6334	7676	8856	9816
CF6-80C2B6F		3838	4428	4908
CF6-80C2B7F	6334	3838	4428	4908
Boeing 777-300 Series	446	604	856	1136
GE90-85B	446	604	856	1136
Boeing 777-9	12	14	16	18
GE90-94B	12	14	16	18
Boeing DC-10-10 Series	288	350	404	446
CF6-50E1	288	350	404	446
Boeing DC-10-30 Series	58	72	82	92
CF6-50E2	58	72	82	92

Boeing DC-9-30 Series	14	16	20	22
JT8D-9 series	14	16	20	22
Boeing MD-11	6174	7480	8632	9568
CF6-80CB42	6174	3740	4316	4784
PW4460		3740	4316	4784
Bombardier CRJ-200-ER	2298			
CF34-3B	2298			
Bombardier CRJ-700	520	704	1000	1326
CF34-3B	520	704	1000	1326
Bombardier CRJ-900	2248	3042	4322	5732
CF34-8C5	2248	3042	4322	5732
Embraer ERJ175	3170	7386	10490	13916
CF34-8E5A1	3170	7386	10490	13916
Raytheon Beech 18	556	752	1068	1418
R-1820	556	752	1068	1418
Raytheon Super King Air 200	20	28	40	52
PT6A-40	20	28	40	52
Grand Total	80396	104604	139061	175486

Table 5. Operations by aircraft and engine model at SBD.

Aircraft and Engine Model	2017	2023	2024	2031	2037
Airbus A320-200 Series	44	32	32	34	34
CFM56-5B4/2	44	32	32	<u>34</u>	<u>34</u>
Airbus A320-NEO		16	16	17	17
PW1127G-JM		16	16	<u>17</u>	<u>17</u>
Antonov 124 Ruslan	16	18	18	19	19
D-36	16	18	18	<u>19</u>	<u>19</u>
BAE 146-RJ85	82	86	86	92	92
LF507-1F, -1H	82	86	86	<u>92</u>	<u>92</u>
Boeing 737-400 Series Freighter	90	2,430	2,650	2,822	2,847
CFM56-3-B1	90	2,430	2,650	<u>2,822</u>	<u>2,847</u>
Boeing 757-200 Series Freighter	178	188	190	202	204
RB211-535E4	178	188	190	<u>202</u>	<u>204</u>
Boeing 767-300 Freighter	232	14,844	16,672	17,754	17,911
CF6-80C2B7F	232	14,844	16,672	<u>17,754</u>	<u>17,911</u>
Boeing 777-200 Series	16	18	18	19	19
PW4056	16	18	18	<u>19</u>	<u>19</u>
Boeing DC-10-30 Series	26	28	28	30	30
CF6-50E2	26	28	28	<u>30</u>	<u>30</u>
Boeing MD-83	65			0	0
JT8D-217	65			<u>0</u>	<u>0</u>
Bombardier Challenger 600	1,164	1,228	1,240	1,320	1,332
CF34-3B	1,164	1,228	1,240	<u>1,320</u>	<u>1,332</u>
Bombardier CRJ-200	18			0	0
CF34-3A1	18			<u>0</u>	<u>0</u>
Bombardier de Havilland Dash 8 Q400	2	2	2	2	2
PW127C	2	2	2	<u>2</u>	<u>2</u>
Bombardier Global Express	146	154	156	166	168
BR700-715A1-30	146	154	156	<u>166</u>	<u>168</u>
Embraer ERJ135-LR	12			0	0
AE3007A1/1	12			<u>0</u>	<u>0</u>
Embraer ERJ175		812	812	865	872
CF34-8E5A1		812	812	<u>865</u>	<u>872</u>
Embraer Legacy 500 (EMB-550)	676			0	0
HTF7500E (AS907-3-1E-A3)	676			<u>0</u>	<u>0</u>
Fairchild SA-226-T Merlin III	52	54	54	58	58
TPE331-2	52	54	54	<u>58</u>	<u>58</u>
Grand Total	2,819	19,910	21,974	23,400	23,606

Table 6. Operations by aircraft and engine model at PSP.

Aircraft and Engine Model	2018	2023	2031	2037
Airbus A319-100 Series	2,548	3,195	4,153	4,934
CFM56-5B9/2P	2,548	3,195	4,153	4,934
Airbus A320-100 Series	1,860	2,332	3,031	3,601
CFM56-5B2/2	1,860	2,332	3,031	3,601
Airbus A320-200 Series	46	58	75	89
CFM56-5B4/2	46	58	75	89
Airbus A321-100 Series	94	118	153	182
CFM56-5B1	94	118	153	182
Airbus A321-200 Series	66	83	108	128
CFM56-5B1/P	66	83	108	128
Boeing 717-200 Series	80	100	130	155
BR700-715A1-30	80	100	130	155
Boeing 737-400 Series	7	9	11	14
CFM56-3C-1	7	9	11	14
Boeing 737-600 Series	88	110	143	170
CFM56-3C-1	88	110	143	170
Boeing 737-700 Series	1,182	1,482	1,926	2,289
CFM56-3C-1	1,182	1,482	1,926	2,289
Boeing 737-800 Series	5,608	7,031	9,140	10,859
CFM56-7B27	5,494	6,888	8,954	10,638
LEAP-1B25	114	143	186	221
Boeing 737-900 Series	514	644	838	995
CFM56-7B27	514	644	838	995
Boeing 737-900-ER	2,030	2,545	3,308	3,931
CFM56-7B27	2,030	2,545	3,308	3,931
Boeing 767-300 Series	70	0	0	0
PW4060	70	0	0	0
Bombardier (Canadair) CRJ200 ExecLiner	3,646	4,001	4,625	5,146
CF34-3A1	3,646	4,001	4,625	5,146
Bombardier Challenger 300	2	2	3	3
AE3007A1	2	2	3	3
Bombardier Challenger 350	6	7	8	8
HTF7350 (AS907-2-1A)	6	7	8	8
Bombardier Challenger 604	238	261	302	336
CF34-3B	238	261	302	336
Bombardier CRJ-700	4,238	4,651	5,376	5,982
CF34-3B	4,238	4,651	5,376	5,982

Aircraft and Engine Model	2018	2023	2031	2037
Bombardier CRJ-900	1,346	1,477	1,708	1,900
CF34-8C5	1,346	1,477	1,708	1,900
Bombardier Global 5000 Business	16	18	20	23
BR700-710A2-20	16	18	20	23
Bombardier Global 6000 Business	4	4	5	6
BR700-710A2-20	4	4	5	6
Bombardier Global Express	2	2	3	3
BR700-715A1-30	2	2	3	3
Embraer ERJ135	2	2	3	3
AE3007A1/3	2	2	3	3
Embraer ERJ175	1,834	2,013	2,327	2,589
CF34-8E5A1	1,834	2,013	2,327	2,589
Raytheon Super King Air 200	8	9	10	11
PT6A-41	8	9	10	11
Grand Total	25,535	30,155	37,405	43,355

Table 7. Operations by aircraft and engine model at LAX in 2018.

Airframe Make and Model	Engine Model	Ops
Airbus A300B4-600 Series	CF6-80C2A3	754
Airbus A300B4-600 Series	PW4158	466
Airbus A300B4-600 Series	CF6-80C2A5	92
Airbus A300F4-600 Series	CF6-80C2A8	1,148
Airbus A300F4-600 Series	CF6-80C2A5F	156
Airbus A300F4-600 Series	PW4158	28
Airbus A318-100 Series	CFM56-5B8/P	2
Airbus A319-100 Series	CFM56-5B5/P	15,876
Airbus A319-100 Series	V2524-A5	14,221
Airbus A319-100 Series	V2527-A5	313
Airbus A319-100 Series	CFM56-5B6/P	6,313
Airbus A319-100 Series	CFM56-5B4/2P	977
Airbus A319-100 Series	CFM56-5B6/3	878
Airbus A319-100 Series	CFM56-5B7/3	672
Airbus A319-100 Series	V2527M-A5	37
Airbus A320-200 Series	CFM56-5B4/P	26,575
Airbus A320-200 Series	CFM56-5B4	17,625
Airbus A320-200 Series	CFM56-5B4/3	8,998
Airbus A320-200 Series	V2527-A5	9,115
Airbus A320-200 Series	V2500-A1	8,023
Airbus A320-200 Series	V2527E-A5	2,354
Airbus A320-200 Series	V2522-D5	149
Airbus A320-NEO	LEAP-1A26/26E1	772
Airbus A320-NEO	PW1127G-JM	601
Airbus A321-200 Series	CFM56-5B3/P	6,934
Airbus A321-200 Series	V2533-A5	71,304
Airbus A321-200 Series	CFM56-5B3/3	671
Airbus A321-NEO	PW1133G-JM	5
Airbus A330-200 Series	PW4168A	3,897
Airbus A330-200 Series	Trent 772	3,824
Airbus A330-300 Series	Trent 772	1,282
Airbus A330-300 Series	CF6-80E1A4	590
Airbus A330-300 Series	PW4168A	361
Airbus A340-300 Series	CFM56-5C4	2,392
Airbus A340-600 Series	Trent 556-61	973
Airbus A350-900 series	Trent 772	20
Airbus A380-800 Series	Trent 970-84	10,401
Raytheon Beech 1900-C	PT6A-65B	5
Raytheon Beech 1900-D	PT6A-67D	1,243
Raytheon Super King Air 300	PT6A-60A	3,997
Raytheon Super King Air 300	PT6A-60	3
Boeing 717-200 Series	BR700-715A1-30	5,507

Airframe Make and Model	Engine Model	Ops
Boeing 717-200 Series	BR700-715A1-30	502
Boeing 717-200 Series	BR700-715B1-30	149
Boeing 717-200 Series	BR700-715C1-30	58
Boeing 737-400 Series	CFM56-3C-1	565
Boeing 737-600 Series	CFM56-7B20	261
Boeing 737-700 Series	CFM56-7B20	54,367
Boeing 737-700 Series	CFM56-7B24	29,538
Boeing 737-700 Series	CFM56-7B24/3	6,275
Boeing 737-700 Series	CFM56-7B24E	1,069
Boeing 737-700 Series	CFM56-3C-1	179
Boeing 737-700 Series	CFM56-7B22	6,723
Boeing 737-700 Series	CFM56-7B22/2	169
Boeing 737-700 Series	CFM56-7B26E/B2	1
Boeing 737-700 Series	CFM56-7B27/3	6
Boeing 737-800 Series	CFM56-7B27	55,303
Boeing 737-800 Series	CFM56-7B24E	18,444
Boeing 737-800 Series	CFM56-7B24/3	5,318
Boeing 737-800 Series	CFM56-7B24	602
Boeing 737-800 Series	CFM56-7B26/3	4,918
Boeing 737-800 Series	CFM56-7B26	2,836
Boeing 737-800 Series	CFM56-7B27E	12,710
Boeing 737-800 Series	CFM56-7B26E	914
Boeing 737-800 Series	CFM56-7B27/3	427
Boeing 737-10	LEAP-1A35A/33/33B2/32/30	298
Boeing 737-900 Series	CFM56-7B26	3,394
Boeing 737-900 Series	CFM56-7B27	437
Boeing 737-900-ER	CFM56-7B27E	40,715
Boeing 737-900-ER	CFM56-7B26E	3,221
Boeing 737-900-ER	CFM56-7B26/3	3,104
Boeing 737-900-ER	CFM56-7B26	1,470
Boeing 737-900-ER	CFM56-7B27E/B3	527
Boeing 737-900-ER	CFM56-7B26/2	350
Boeing 737-900-ER	CFM56-7B26	672
Boeing 747-400 Series	CF6-80C2B1F	6,662
Boeing 747-400 Series	PW4056	469
Boeing 747-400 Series	CF6-80C2B1F	212
Boeing 747-400 Series Freighter	CF6-80C2B1F	1,342
Boeing 747-400 Series Freighter	PW4062	72
Boeing 747-400 Series Freighter	CF6-80C2B5F	33
Boeing 747-8F	GEnx-2B67B	567
Boeing 747-8F	GENX-2B67	54

Airframe Make and Model	Engine Model	Ops
Boeing 757-200 Series	RB211-535E4	8,535
Boeing 757-200 Series	PW2037	21,904
Boeing 757-200 Series	PW2040	2,688
Boeing 757-300 Series	PW2040	5,074
Boeing 757-300 Series	RB211-535E4	6,374
Boeing 757-300 Series	RB211-535E4B	289
Boeing 767-200 Series	CF6-80A2	504
Boeing 767-200 Series	JT9D-7R4D, -7R4D1	448
Boeing 767-200 Series	CF6-80A	299
Boeing 767-200 Series	CF6-80C2B7F	5
Boeing 767-200 ER	CF6-80C2B8F	38
Boeing 767-300 Series	PW4060	5,252
Boeing 767-300 Series	CF6-80C2B6	1,487
Boeing 767-300 ER	CF6-80C2B6F	5,224
Boeing 767-300 ER	PW4060	588
Boeing 767-300 ER	CF6-80C2B7F	2
Boeing 767-400 ER	CF6-80C2B8FA	1,297
Boeing 777-200 Series	GE90-90B	2,466
Boeing 777-200 Series	Trent 892	4,550
Boeing 777-200 Series	PW4090	3,245
Boeing 777-200 Series	GE90-94B	7
Boeing 777-200 Series	GE90-90B	2
Boeing 777-200-LR	GE90-110B1	8,975
Boeing 777-300 Series	GE90-115B	795
Boeing 777-300 ER	GE90-115B	27,446
Boeing 787-8 Dreamliner	Trent 1000-J2	4,307
Boeing 787-8 Dreamliner	GEnx-1B70/P2	2,019
Boeing 787-8 Dreamliner	Trent 1000-C2	602
Boeing 787-8 Dreamliner	GEnx-1B70/75/P1	158
Boeing 787-8 Dreamliner	GENX-1B70	71
Boeing 787-9 Dreamliner	Trent 1000-J2	5,259
Boeing 787-9 Dreamliner	GEnx-1B74/75/P1	5,751
Boeing 787-9 Dreamliner	GEnx-1B74/75/P2	236
Raytheon Beechjet 400	JT15D-5, -5A, -5B	596
Cessna 525B CitationJet	BIZLIGHTJET_F	881
Cessna 525C CitationJet	BIZLIGHTJET_F	169
Cessna 560 Citation V	JT15D-5, -5A, -5B	349
Cessna 560 Citation V	PW530	273
Cessna 560 Citation V	JT15D-5C	27
Cessna 560 Citation Excel	JT15D-5, -5A, -5B	80
Cessna 560 Citation XLS	BIZMEDIUMJET_F	3,518
Cessna 750 Citation X	AE3007C	64
Cessna 750 Citation X	AE3007C	80
Cessna 750 Citation X	AE3007C1	50

Airframe Make and Model	Engine Model	Ops
Cessna 750 Citation X	AE3007C2	30
Bombardier CRJ-200	CF34-3B	22,739
Bombardier CRJ-200	CF34-3A1	35
Bombardier CRJ-700-ER	CF34-8C1	15,731
Bombardier CRJ-700-ER	CF34-8C5B1	9,022
Bombardier CRJ-900	CF34-8C5	1,102
Bombardier CRJ-900	CF34-8C5A1	42
Boeing MD-10-30	CF6-50C2	393
Boeing MD-10-1 Freighter	CF6-6D	937
Bombardier de Havilland Dash 8 Q400	PW150A	6,057
Embraer EMB120 Brasilia	PW118	569
Embraer ERJ135	AE3007A1E	5
Embraer ERJ135 Legacy Business	AE3007A1E	194
Embraer ERJ135 Legacy Business	AE3007A2	19
Embraer ERJ170	CF34-8E5	12
Embraer ERJ190	CF34-10E	542
Embraer ERJ190	CF34-10E7-B	318
Embraer 500	BIZLIGHTJET_F	16
Embraer Legacy 450 (EMB-545)	HTF7500E (AS907-3-1E-A2)	336
Dassault Falcon 2000	PW308C Build Spec 1289	89
Dassault Falcon 2000	CF700-2D	868
Dassault Falcon 2000-EX	PW308C Build Spec 1289	1,310
Falcon 7X	PW307A	562
Israel IAI-1126 Galaxy	PW306A	166
Bombardier Global Express	BR700-710A2-20	1,339
Bombardier Global 5000 Business	BR700-710A2-20	587
Gulfstream G300	SPEY MK511	70
Gulfstream G300	TAY Mk611-8	9
Gulfstream G400	TAY Mk611-8	636
Gulfstream G400	TAY 611-8C	1,225
Gulfstream G500	BR700-710A1-10	557
Gulfstream G650ER	BR700-725A1-12	1,007
Raytheon Hawker 4000 Horizon	PW308A	180
Bombardier Learjet 45	TFE731-2-2B	276
Bombardier Learjet 45	BIZMEDIUMJET_F	551
Bombardier Learjet 60	TFE731-2/2A	40
Bombardier Learjet 60	BIZMEDIUMJET_F	851
Boeing MD-11	CF6-80C2D1F	177
Boeing MD-11	CF6-80C2D1F	2
Boeing MD-11 Freighter	CF6-80C2D1F	4,370
Boeing MD-11 Freighter	PW4062	1,105
Boeing MD-11 Freighter	CF6-6D1A	124
Boeing MD-11 Freighter	PW4460	77

Airframe Make and Model	Engine Model	Ops
Pilatus PC-12	PT6A-67B	6,572
Pilatus PC-12	PT6A-67	24
Total Operations		707,342

Table 8. Operations by aircraft and engine model at LAX in 2023.

Airframe Make and Model	Engine Model	Ops
Airbus A220-100	PW1524G	10,207
Airbus A300B4-600 Series	CF6-80C2A3	377
Airbus A300B4-600 Series	PW4158	245
Airbus A300F4-600 Series	CF6-80C2A8	1,460
Airbus A318-100 Series	CFM56-5B8/3	0
Airbus A319-100 Series	CFM56-5B5/3	10,472
Airbus A319-100 Series	CFM56-5B5/P	7,938
Airbus A319-100 Series	V2524-A5	7,110
Airbus A319-100 Series	V2527-A5	156
Airbus A319-100 Series	CFM56-5B6/P	3,156
Airbus A319-100 Series	CFM56-5B4/2P	488
Airbus A319-100 Series	CFM56-5B6/3	438
Airbus A319-100 Series	CFM56-5B7/3	336
Airbus A319-100 Series	V2527M-A5	18
Airbus A320-200 Series	CFM56-5B4/3	44,552
Airbus A320-200 Series	CFM56-5B4/P	0
Airbus A320-200 Series	CFM56-5B4	0
Airbus A320-200 Series	V2527-A5	0
Airbus A320-200 Series	V2500-A1	0
Airbus A320-200 Series	V2527E-A5	0
Airbus A320-200 Series	V2522-D5	0
Airbus A320-NEO	LEAP-1A26/26E1	0
Airbus A320neo Series	PW1133G-JM	21,483
Airbus A321-200 Series	V2533-A5 SelectOne™ Upgrade Package	0
Airbus A321-200 Series	CFM56-5B3/P	0
Airbus A321-200 Series	V2533-A5	0
Airbus A321-200 Series	CFM56-5B3/3	52,444
Airbus A321neo Series	PW1133G-JM	50,556
Airbus A330-200 Series	PW4168A	2,658
Airbus A330-200 Series	Trent 772	1,911
Airbus A330-300 Series	Trent 772	1,883
Airbus A330-300 Series	CF6-80E1A4	295
Airbus A330-300 Series	PW4168A	180
Airbus A330-800-NEO	Trent7000-72	2,485
Airbus A330-900N Series (Neo)	Trent7000-72	7,100
Airbus A340-300 Series	CFM56-5C4	0
Airbus A340-600 Series	Trent 556-61	0
Airbus A350-900 series	Trent XWB-84	15,041
Airbus A350-900 series	Trent 772	10
Airbus A350-1000 Series	Trent XWB-97	1,196
Airbus A380-800 Series	Trent 970-84	12,655
Raytheon Super King Air 300	PT6A-60A	4,305
Boeing 717-200 Series	BR700-715A1-30	0
Boeing 717-200 Series	BR700-715B1-30	0
Boeing 717-200 Series	BR700-715C1-30	0

Airframe Make and Model	Engine Model	Ops
Boeing 737-700 Series	CFM56-7B26	19,170
Boeing 737-700 Series	CFM56-7B20	27,183
Boeing 737-700 Series	CFM56-7B24	14,768
Boeing 737-700 Series	CFM56-7B24/3	3,137
Boeing 737-700 Series	CFM56-7B24E	534
Boeing 737-700 Series	CFM56-7B22	3,361
Boeing 737-700 Series	CFM56-7B22/2	84
Boeing 737-800 Series	CFM56-7B27/3	67,310
Boeing 737-800 Series	CFM56-7B27	27,651
Boeing 737-800 Series	CFM56-7B24E	9,221
Boeing 737-800 Series	CFM56-7B24/3	2,659
Boeing 737-800 Series	CFM56-7B24	300
Boeing 737-800 Series	CFM56-7B26/3	2,459
Boeing 737-800 Series	CFM56-7B26	1,418
Boeing 737-800 Series	CFM56-7B27E	6,354
Boeing 737-800 Series	CFM56-7B26E	456
Boeing 737-10	LEAP-1A35A/33/33B2/32/30	148
Boeing 737-900 Series	CFM56-7B26	2,767
Boeing 737-900 Series	CFM56-7B27	218
Boeing 737-900-ER	CFM56-7B27E/B1	32,306
Boeing 737-900-ER	CFM56-7B27E	20,357
Boeing 737-900-ER	CFM56-7B26E	1,610
Boeing 737-900-ER	CFM56-7B26/3	1,552
Boeing 737-900-ER	CFM56-7B27E/B3	263
Boeing 737-900-ER	CFM56-7B26/2	174
Boeing 747-400 Series	CF6-80C2B1F	0
Boeing 747-400 Series	PW4056	0
Boeing 747-400 Series Freighter	PW4062	35
Boeing 747-400 Series Freighter	CF6-80C2B5F	16
Boeing 747-8F	GEEx-2B67	1,979
Boeing 747-8F	GEEx-2B67B	283
Boeing 757-200 Series	PW2037	11,306
Boeing 757-200 Series	RB211-535E4	4,267
Boeing 757-300 Series	RB211-535E4	9,222
Boeing 757-300 Series	PW2040	2,536
Boeing 757-300 Series	RB211-535E4B	144
Boeing 767-200 Series	CF6-80C2B7F	1,067
Boeing 767-300 Series	PW4060	7,889
Boeing 767-300 Series	CF6-80C2B6	743
Boeing 767-300 ER	CF6-80C2B6F	2,612
Boeing 767-400 ER	CF6-80C2B8FA	648
Boeing 777-200 Series	GE90-90B	1,233

Airframe Make and Model	Engine Model	Ops
Boeing 777-200 Series	Trent 892	2,275
Boeing 777-200 Series	PW4090	1,622
Boeing 777-200-LR	GE90-110B1	9,102
Boeing 777-300 ER	GE90-115B	22,010
Boeing 777-9X	GE90-115B	2,485
Boeing 787-8 Dreamliner	GENx-1B70/75/P2	1,775
Boeing 787-8 Dreamliner	Trent 1000-J2	2,153
Boeing 787-8 Dreamliner	GENx-1B70/P2	1,009
Boeing 787-8 Dreamliner	Trent 1000-C2	300
Boeing 787-8 Dreamliner	GENx-1B70/75/P1	78
Boeing 787-8 Dreamliner	GENX-1B70	35
Boeing 787-9 Dreamliner	Trent 1000-K2	11,005
Boeing 787-9 Dreamliner	GENx-1B76A/P2	9,585
Boeing 787-9 Dreamliner	Trent 1000-J2	2,629
Boeing 787-9 Dreamliner	GENx-1B74/75/P1	2,875
Boeing 787-9 Dreamliner	GENx-1B74/75/P2	118
Boeing 787-10 Dreamliner	GENx-1B76A/P2	1,065
Raytheon Beechjet 400	JT15D-5, -5A, -5B	652
Cessna 525B CitationJet	PW610F	710
Cessna 525B CitationJet	BIZLIGHTJET_F	440
Cessna 525C CitationJet	PW610F	1,065
Cessna 525C CitationJet	BIZLIGHTJET_F	84
Cessna 402	TIO-540-J2B2	1,775
Cessna 560 Citation V	JT15D-5, -5A, -5B	174
Cessna 560 Citation V	PW530	136
Cessna 560 Citation V	JT15D-5C	13
Cessna 560 Citation Excel	JT15D-5, -5A, -5B	39
Cessna 560 Citation XLS	BIZMEDIUMJET_F	1,758
Cessna 750 Citation X	AE3007C	602
Cessna 750 Citation X	AE3007C1	24
Cessna 750 Citation X	AE3007C2	15
Bombardier CRJ-200	CF34-3B	0
Bombardier CRJ-700-ER	CF34-8C1	14,965
Bombardier CRJ-700-ER	CF34-8C5B1	4,511
Bombardier CRJ-900	CF34-8C5	3,745
Boeing MD-10-1 Freighter	CF6-6D	1,355

Airframe Make and Model	Engine Model	Ops
Bombardier de Havilland Dash 8 Q400	PW150A	5,158
Embraer EMB120 Brasilia	PW118	994
Embraer ERJ135 Legacy Business	AE3007A1E	454
Embraer ERJ135 Legacy Business	AE3007A2	9
Embraer ERJ170	CF34-8E5	0
Embraer ERJ175	CF34-8E5A1	65,766
Embraer ERJ190	CF34-10E	1,336
Embraer ERJ190	CF34-10E7-B	159
Embraer 500	HTF7500E (AS907-3-1E-A3)	355
Embraer 500	BIZLIGHTJET_F	7
Embraer Legacy 450 (EMB-545)	HTF7500E (AS907-3-1E-A2)	345
Dassault Falcon 2000	CF700-2D	434
Dassault Falcon 2000-EX	PW308C Build Spec 1289	1,053
Falcon 7X	PW307A	458
Israel IAI-1126 Galaxy	PW306A	792
Bombardier Global Express	BR700-710A2-20	1,849
Gulfstream G400	TAY 611-8C	2,032
Gulfstream G500	BR700-710A1-10	1,698
Gulfstream G650	BR700-725A1-12	680
Raytheon Hawker 4000 Horizon	PW308A	266
Bombardier Learjet 45	TFE731-2/2A	177
Bombardier Learjet 45	TFE731-2-2B	137
Bombardier Learjet 45	BIZMEDIUMJET_F	275
Bombardier Learjet 60	AE3007C	355
Bombardier Learjet 60	TFE731-2/2A	19
Bombardier Learjet 60	BIZMEDIUMJET_F	425
Boeing MD-11 Freighter	CF6-80C2D1F	4,935
Boeing MD-11 Freighter	PW4062	552
Boeing MD-11 Freighter	CF6-6D1A	61
Boeing MD-11 Freighter	PW4460	38
Pilatus PC-12	PT6A-67B	4,351
Pilatus PC-12	PT6A-67	11
Total Operations		747,960

Table 9. Operations by aircraft and engine model at LAX in 2031.

Airframe Make and Model	Engine Model	Ops
Airbus A220-100	PW1524G	35,813
Airbus A300F4-600 Series	CF6-80C2A8	3,617
Airbus A318-100 Series	CFM56-5B8/3	0
Airbus A319-100 Series	CFM56-5B5/3	0
Airbus A320-200 Series	CFM56-5B4/3	30,685
Airbus A320neo Series	PW1133G-JM	28,280
Airbus A321-200 Series	V2533-A5 SelectOne™ Upgrade Package	41,888
Airbus A321neo Series	PW1133G-JM	100,641
Airbus A330-200 Series	PW4168A	1,447
Airbus A330-300 Series	Trent 772	2,532
Airbus A330-800-NEO	Trent7000-72	5,064
Airbus A330-900N Series (Neo)	Trent7000-72	14,470
Airbus A340-300 Series	CFM56-5C4	0
Airbus A350-900 series	Trent XWB-84	28,216
Airbus A350-1000 Series	Trent XWB-97	1,447
Airbus A380-800 Series	Trent 970-84	15,193
Raytheon Super King Air 300	PT6A-60A	4,259
Boeing 717-200 Series	BR700-715A1-30	0
Boeing 737-700 Series	CFM56-7B26	38,993
Boeing 737-800 Series	CFM56-7B27/3	92,579
Boeing 737-MAX Series	LEAP-1B23	44,237
Boeing 737-900-ER	CFM56-7B27E/B1	65,838
Boeing 747-400 Series	CF6-80C2B1F	0
Boeing 747-8F	GENx-2B67	3,979
Boeing 757-200 Series	PW2037	0
Boeing 757-300 Series	RB211-535E4	0
Boeing 767-200 Series	CF6-80C2B7F	0
Boeing 767-300 Series	PW4060	10,129
Boeing 777-200-LR	GE90-110B1	16,640
Boeing 777-9X	GE90-115B	5,064
Boeing 787-8 Dreamliner	GENx-1B70/75/P2	5,788
Boeing 787-9 Dreamliner	Trent 1000-K2	22,428
Boeing 787-9 Dreamliner	GENx-1B76A/P2	19,534
Boeing 787-10 Dreamliner	GENx-1B76A/P2	2,170

Airframe Make and Model	Engine Model	Ops
Raytheon Beechjet 400	JT15D-5, -5A, -5B	858
Cessna 525B CitationJet	PW610F	1,715
Cessna 525C CitationJet	PW610F	2,573
Cessna 402	TIO-540-J2B2	4,288
Cessna 750 Citation X	AE3007C	1,286
Bombardier CRJ-200	CF34-3B	0
Bombardier CRJ-700-ER	CF34-8C1	14,470
Bombardier CRJ-900	CF34-8C5	6,511
Boeing MD-10-1 Freighter	CF6-6D	0
Bombardier de Havilland Dash 8 Q400	PW150A	3,932
Embraer EMB120 Brasilia	PW118	1,311
Embraer ERJ135 Legacy Business	AE3007A1E	655
Embraer ERJ170	CF34-8E5	0
Embraer ERJ175	CF34-8E5A1	113,222
Embraer ERJ190	CF34-10E	2,170
Embraer 500	HTF7500E (AS907-3-1E-A3)	723
Embraer Legacy 450 (EMB-545)	HTF7500E (AS907-3-1E-A2)	429
Dassault Falcon 2000-EX	PW308C Build Spec 1289	858
Falcon 7X	PW307A	429
Israel IAI-1126 Galaxy	PW306A	1,715
Bombardier Global Express	BR700-710A2-20	1,638
Gulfstream G400	TAY 611-8C	2,621
Gulfstream G500	BR700-710A1-10	2,621
Gulfstream G650	BR700-725A1-12	328
Raytheon Hawker 4000 Horizon	PW308A	429
Bombardier Learjet 45	TFE731-2/2A	429
Bombardier Learjet 60	AE3007C	858
Boeing MD-11 Freighter	CF6-80C2D1F	5,426
Pilatus PC-12	PT6A-67B	2,573
Total Operations		815,000

Table 10. Operations by aircraft and engine model at LAX in 2037.

Airframe Make and Model	Engine Model	Ops
Airbus A220-100	PW1524G	36,873
Airbus A300F4-600 Series	CF6-80C2A8	3,725
Airbus A318-100 Series	CFM56-5B8/3	0
Airbus A319-100 Series	CFM56-5B5/3	0
Airbus A320-200 Series	CFM56-5B4/3	23,275
Airbus A320neo Series	PW1133G-JM	37,436
Airbus A321-200 Series	V2533-A5 SelectOne™ Upgrade Package	32,794
Airbus A321neo Series	PW1133G-JM	113,954
Airbus A330-200 Series	PW4168A	1,490
Airbus A330-300 Series	Trent 772	2,607
Airbus A330-800-NEO	Trent7000-72	5,214
Airbus A330-900N Series (Neo)	Trent7000-72	14,898
Airbus A340-300 Series	CFM56-5C4	0
Airbus A350-900 series	Trent XWB-84	29,052
Airbus A350-1000 Series	Trent XWB-97	1,490
Airbus A380-800 Series	Trent 970-84	15,643
Raytheon Super King Air 300	PT6A-60A	4,110
Boeing 717-200 Series	BR700-715A1-30	0
Boeing 737-700 Series	CFM56-7B26	0
Boeing 737-800 Series	CFM56-7B27/3	70,394
Boeing 737-MAX Series	LEAP-1B23	110,619
Boeing 737-900-ER	CFM56-7B27E/B1	67,787
Boeing 747-400 Series	CF6-80C2B1F	0
Boeing 747-8F	GEEx-2B67	4,097
Boeing 757-200 Series	PW2037	0
Boeing 757-300 Series	RB211-535E4	0
Boeing 767-200 Series	CF6-80C2B7F	0
Boeing 767-300 Series	PW4060	10,429
Boeing 777-200-LR	GE90-110B1	9,684
Boeing 777-9X	GE90-115B	12,664
Boeing 787-8 Dreamliner	GEEx-1B70/75/P2	5,959
Boeing 787-9 Dreamliner	Trent 1000-K2	23,092
Boeing 787-9 Dreamliner	GEEx-1B76A/P2	20,113
Boeing 787-10 Dreamliner	GEEx-1B76A/P2	2,235
Raytheon Beechjet 400	JT15D-5, -5A, -5B	798
Cessna 525B CitationJet	PW610F	1,596
Cessna 525C CitationJet	PW610F	2,394
Cessna 402	TIO-540-J2B2	3,990
Cessna 750 Citation X	AE3007C	1,197
Bombardier CRJ-200	CF34-3B	0
Bombardier CRJ-700-ER	CF34-8C1	14,898
Bombardier CRJ-900	CF34-8C5	6,704
Boeing MD-10-1 Freighter	CF6-6D	0

Airframe Make and Model	Engine Model	Ops
Bombardier de Havilland Dash 8 Q400	PW150A	3,794
Embraer EMB120 Brasilia	PW118	1,265
Embraer ERJ135 Legacy Business	AE3007A1E	632
Embraer ERJ170	CF34-8E5	0
Embraer ERJ175	CF34-8E5A1	115,895
Embraer ERJ190	CF34-10E	2,235
Embraer 500	HTF7500E (AS907-3-1E-A3)	745
Embraer Legacy 450 (EMB-545)	HTF7500E (AS907-3-1E-A2)	399
Dassault Falcon 2000-EX	PW308C Build Spec 1289	798
Falcon 7X	PW307A	399
Israel IAI-1126 Galaxy	PW306A	1,596
Bombardier Global Express	BR700-710A2-20	1,581
Gulfstream G400	TAY 611-8C	2,529
Gulfstream G500	BR700-710A1-10	2,529
Gulfstream G650	BR700-725A1-12	316
Raytheon Hawker 4000 Horizon	PW308A	399
Bombardier Learjet 45	TFE731-2/2A	399
Bombardier Learjet 60	AE3007C	798
Boeing MD-11 Freighter	CF6-80C2D1F	5,587
Pilatus PC-12	PT6A-67B	2,394
Total Operations		835,500

Table 11. Operations by aircraft and engine model at LGB.

Airframe Make and Model	Engine Model	2018	2023	2031	2037
Aerospatiale SA-350D Astar (AS-350)	TPE331-3	308	369	372	373
Airbus A300B4-600 Series	CF6-80C2B5F	117	124	141	156
Airbus A300B4-600 Series	CF6-80C2A5	23	24	27	30
Airbus A300F4-600 Series	CF6-80E1A4	306	325	368	409
Airbus A300F4-600 Series	CF6-80C2A1	54	57	65	72
Airbus A320-200 Series	V2527-A5 SelectOne? Upgrade Package	16,838	12,083	10,553	8,628
Airbus A320-200 Series	V2527E-A5	868	623	544	445
Airbus A320-200 Series	CFM56-5B6/3	9,808	7,039	6,148	5,026
Airbus A320neo	PW1133G-JM		9,521	15,895	22,679
Aviat Husky A1B	IO-360-B	136	163	164	165
BEECH MENTOR (BE45) PT6A-25 NM	PT6A-34	1,192	1,427	1,436	1,443
Bell 206 JetRanger	250B17B	273	327	329	330
Bell 407 / Rolls-Royce 250-C47B	250B17B	231	277	279	280
Boeing 737-300 Series	CFM56-3B-2	106	0	0	0
Boeing 737-700 Freighter	CFM56-7B24E	3,116	3,314	3,753	4,165
Boeing 737-700 Series	CFM56-7B27	528	561	321	0
Boeing 737-700 Series	CFM56-7B22/2	272	290	166	0
Boeing 737-700 Series	CFM56-7B20	238	253	145	0
Boeing 737-700 Series	CFM56-3C-1	204	217	124	0
Boeing 737-700 Series	CFM56-7B26/2	35	37	21	0
Boeing 737-MAX Series	LEAP-1B23		113	888	1,848
Boeing 767-300 ER	PW4060	188	200	227	251
Boeing 767-300 ER	CF6-80C2B6F	356	378	428	475
Bombardier Challenger 300	AE3007A1	1,542	1,846	1,858	1,867
Bombardier Challenger 600	ALF 502L-2	24,439	29,258	29,449	29,594
Bombardier Challenger 600	CF34-3B	397	476	479	481
Bombardier CRJ-100	CF34-3A1	1,029	0	0	0
Bombardier CRJ-700	CF34-8C1	74	78	89	98
Bombardier CRJ-900	CF34-8C5	1,134	1,206	1,366	1,516
Bombardier Global Express	BR700-710A1-10	217	227	246	261
Bombardier Learjet 35A/36A (C-21A)	TFE731-2/2A	116	89	89	89
Bombardier Learjet 45	BIZMEDIUMJET_F	759	909	915	919
Bombardier Learjet 60	AE3007C	1,192	1,427	1,436	1,443
Canada Air CL-215	PW123	559	584	632	671
Cessna 150 Series	O-200	14,458	17,309	17,422	17,508
Cessna 172 Skyhawk	TSIO-360C	51,475	61,626	62,028	62,332
Cessna 182	IO-360-B	4,068	4,870	4,902	4,926
Cessna 206	IO-360-B	1,560	1,867	1,879	1,889
Cessna 208 Caravan	TPE331-12	9,061	10,848	10,919	10,973
Cessna 208 Caravan	PT6A-114	237	284	286	287
Cessna 210 Centurion	TIO-540-J2B2	1,127	1,349	1,358	1,364
Cessna 310	TIO-540-J2B2	439	525	529	531
Cessna 337 Skymaster	TSIO-360C	107	128	129	129

Airframe Make and Model	Engine Model	2018	2023	2031	2037
Cessna 340	TIO-540-J2B2	1,394	1,668	1,679	1,688
Cessna 402	TIO-540-J2B2	380	454	457	460
Cessna 414	TIO-540-J2B2	338	405	407	409
Cessna 421 Golden Eagle	TIO-540-J2B2	830	994	1,000	1,005
Cessna 425 Conquest I	PT6A-135A	196	234	236	237
Cessna 441 Conquest II	TPE331-10GT	202	241	243	244
Cessna 500 Citation I	PW530	3,173	3,798	3,823	3,842
Cessna 525 CitationJet	PW4090	2,912	3,486	3,509	3,526
Cessna 525A CitationJet	BIZLIGHTJET_F	148	177	179	180
Cessna 525B CitationJet	BIZLIGHTJET_F	2,277	2,726	2,744	2,758
Cessna 525C CitationJet	BIZLIGHTJET	729	873	879	883
Cessna 550 Citation II	BIZLIGHTJET_F	1,856	2,222	2,237	2,248
Cessna 560 Citation Excel	JT15D-5, -5A, -5B	931	1,115	1,122	1,127
Cessna 560 Citation XLS	PW307B	2,811	3,365	3,387	3,404
Cessna 650 Citation III	TFE731-3	629	753	757	761
Cessna 680 Citation Sovereign	PW308C	1,228	1,470	1,479	1,487
Cessna 680-A Citation Latitude	BIZMEDIUMJET_F	125	149	150	151
Cessna 750 Citation X	AE3007A	824	987	993	998
Cessna T-37 Tweet	J69-25A	353	271	271	271
Cirrus SR20	IO-360-B	688	824	829	833
Cirrus SR22	TIO-540-J2B2	3,718	4,452	4,481	4,503
Dassault Falcon 2000	PW308C Build Spec 1289	95	114	114	115
Dassault Falcon 2000-EX	PW308C Build Spec 1289	492	589	593	596
Dassault Falcon 50	TFE731-3	160	192	193	194
Dassault Falcon 900	TFE731-3	735	880	886	890
Douglas A-3 Skywarrior	J57-P-10	117	90	90	90
EADS Socata TB-20 Trinidad	TIO-540-J2B2	107	128	129	129
EADS Socata TBM-700	PT6A-60	1,524	1,825	1,837	1,846
EADS Socata TBM-700	PT6A-64	107	128	129	129
Eclipse 500 / PW610F	PW610F-A	587	613	664	704
Embraer 500	HTF7500E (AS907-3-1E-A2)	96	102	116	129
Embraer 505	BIZLIGHTJET_F	394	419	474	526
Embraer ERJ175	CF34-8E5A1		1,074	1,163	1,235
Embraer Legacy 650	AE3007A2	172	206	207	208
EPIC LT/Dynasty	PT6A-67A	213	256	257	259
Eurocopter AS 355NP	250B17B	4,821	5,772	5,810	5,838
Evektor EV-55	PT6A-21	83	99	100	101
Extra EA-500	250B17B	125	149	150	151
Fairchild SA-227-AC Metro III	PW127-A	1,326	1,384	1,499	1,591
Grumman G-21G Goose	TPE331-2UA	117	123	133	141
GULFSTREAM AEROSPACE Gulfstream G650	BR-700-725A1-12	1,595	1,665	1,803	1,915
Gulfstream G150	TFE731-3	575	689	693	697
Gulfstream G200	PW306A	397	476	479	481
Gulfstream G280	HTF7250G (AS907-2-1G)	67	71	81	90
Gulfstream G400	TAY611-8C	1,081	1,128	1,222	1,297

Airframe Make and Model	Engine Model	2018	2023	2031	2037
Gulfstream G450	TAY611-8C	1,714	2,052	2,065	2,075
Gulfstream G550	BR700-710C4-11	2,544	3,046	3,066	3,081
Gulfstream II	SPEY Mk511	55	58	62	66
Gulfstream IV-SP	TAY Mk611-8	48	50	55	58
Gulfstream V-SP	TAY Mk611-8	706	845	850	855
Hawker 900XP	BIZMEDIUMJET_F	373	389	422	448
Hawker HS-125 Series 700	TFE731-3	119	142	143	144
Lancair 360	IO-360-B	190	227	229	230
Lockheed F-117 Nighthawk	F404-GE-F1D2	27	20	20	20
Lockheed Martin F-16 Fighting Falcon	F110-GE-129	150	115	115	115
McDonnell Douglas F-4 Phantom II	J79-GE-10B	46	35	35	35
Mitsubishi MU-300 Diamond	JT15D-5, -5A, -5B	9,050	10,834	10,905	10,958
Mooney M20-K	TSIO-360C	2,390	2,861	2,880	2,894
Northrop F-5E/F Tiger II	J85-GE-5H	56	43	43	43
Partenavia P.68 Victor	IO-360-B	249	298	300	302
Pilatus PC-12	PT6A-67	2,651	3,174	3,194	3,210
Piper PA-23 Apache/Aztec	TIO-540-J2B2	640	767	772	776
Piper PA-24 Comanche	TIO-540-J2B2	593	710	715	718
Piper PA-28 Cherokee Series	IO-360-B	10,176	12,183	12,263	12,323
Piper PA-30 Twin Comanche	IO-320-D1AD	208	248	250	251
Piper PA-31 Navajo	TIO-540-J2B2	314	376	379	381
Piper PA-31T Cheyenne	PT6A-135A	83	99	100	101
Piper PA-32 Cherokee Six	TIO-540-J2B2	1,453	1,739	1,751	1,759
Piper PA-34 Seneca	TSIO-360C	433	518	522	524
Piper PA-42 Cheyenne Series	TPE331-10GT	9,210	11,026	11,098	11,152
Piper PA46-TP Meridian	PT6A-42	706	845	850	855
Rans S7S	O-200	777	930	936	941
Raytheon Beech 55 Baron	TIO-540-J2B2	1,109	1,328	1,336	1,343
Raytheon Beech 60 Duke	TIO-540-J2B2	557	667	672	675
Raytheon Beech Baron 58	TIO-540-J2B2	836	1,001	1,008	1,013
Raytheon Beech Bonanza 36	TIO-540-J2B2	4,649	5,566	5,603	5,630
Raytheon Beechjet 400	JT15D-5, -5A, -5B	1,085	1,299	1,308	1,314
Raytheon King Air 90	PT6A-21	1,376	1,647	1,658	1,666
Raytheon King Air 90	PT6A-135A	101	121	121	122
Raytheon Premier I	BIZLIGHTJET_F	113	135	136	136
Raytheon Super King Air 200	PT6A-42	397	415	449	477
Raytheon Super King Air 300	PT6A-42	835	872	945	1,003
Robin R 2160 Alpha Sport	O-320	89	106	107	108
Robinson R22	O-320	409	490	493	496
Robinson R22B	IO-320-D1AD	2,977	3,564	3,587	3,605
Robinson R44 Raven / Lycoming O-540-F1B5	TIO-540-J2B2	3,386	4,054	4,080	4,100
Schweizer S269D/330	T63-A-5A	3,001	3,592	3,616	3,634
Sikorsky S-76 Spirit	T700-GE-700	463	554	557	560
Total Operations		256,259	300,505	307,785	314,217