APPENDIX L

PANDEMIC FORECAST ANALYSIS

14 CFR PART 150 UPDATE

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FINAL MEMORANDUM

Date: April 26, 2022

To: Kate Andrus
Mead & Hunt

From: Stephen Smith

Subject: RESPONSE TO FAA COMMENT REGARDING 2018 DATA AND EXISTING CONDITIONS

This memorandum addresses the Federal Aviation Administration's (FAA) comment on the San Diego International Airport (SAN) Title 14 Code of Federal Regulations (CFR) Part 150 Noise Exposure Map (NEM) and Noise Compatibility Plan (NCP) Study Update (14 CFR Part 150 Study Update) regarding the 2018 data used to calculate existing conditions and documentation to verify that the data is representative of existing conditions consistent with A150.105(a). The data collection and preliminary analysis for this NEM Update was initiated in 2019, and 2018 was the last full year of operations at the time this 14 CFR Part 150 Study began. Due to the Covid-19 pandemic and its impacts on and similarity between 2019 operation levels, the use of the 2018 data to represent typical existing conditions was determined to be appropriate. Existing year for NEMs is typically chosen based on representation of typical conditions at an airport. This means there is precedent for excluding abnormal events (such as runway closures, or in this case, a pandemic), because they are not a reasonable representation of existing conditions. In this case, the expected point of Covid-19 recovery to pre-pandemic conditions (return to typical operations) is anticipated to align closely with 2019 data. 2018 was used for this Study and a further comparison between 2018 and 2019 through the Area Equivalent Model (AEM) showed that there is no substantial difference between the two from a noise perspective. Therefore, the use of the 2018 data is a reasonable representation of existing conditions.

The aviation industry is in a state of recovery and substantial growth is expected each year until the system recovers; therefore, a reasonable conclusion can be made that operations occurring during the recovery years are not considered a reasonable representation of existing conditions. According to the FAA's 2021 Terminal Area Forecast (TAF) released in March 2022, forecast growth rates decrease after operations reach levels at or just above 2019 levels. The FAA stated the following in the *Terminal Area Forecast Executive Summary Fiscal Years 2021 to 2045*: "There is uncertainty associated with the forecasts because of the uncertainty regarding the path of the pandemic and its economic impacts. Particular attention was spent on forecasting the near-term recovery back to 2019 activity."[1] Because recovery occurs when 2019 operation levels are reached, operations and fleet mix that occurred during 2019 can be considered a reasonable representation of existing conditions under a normal operating environment. Comparative numbers of aircraft operations and fleet mix in 2018 and 2019 do not indicate a potential for a substantial change in the Community Noise Equivalent Levels (CNEL) 65 A-weighted decibel (dBA) exposure area; therefore, the 2018 data also provides an equivalent reasonable representation of existing conditions. The following documents the assessment related to total operations and the impact the Covid-19 pandemic had on

[1] Federal Aviation Administration. *Terminal Area Forecast Executive Summary Fiscal Years 2021 to 2045*. March 2022. Page 4.

operations and the expected timeframe and growth rate during recovery that is expected by the FAA, and the comparison between 2018 and 2019 operations and fleet mix.

Covid-19 Pandemic Recovery and Representation of Existing Conditions

The full year of data available at the time the Title 14 CFR Part 150 Study was initiated was 2018. Analysis was underway and temporarily interrupted when the Covid-19 pandemic was announced. The uncertainties related to the severity and duration of the contraction in aviation activity resulting from the Covid-19 pandemic remain pertinent and valid, but the application of 2018 data and the FAA-approved forecast were considered valid for purposes of assessing typical existing conditions and the return of normalized growth rates once the travel industry recovers from the impacts of the Covid-19 pandemic. While the United States has shown signs of recovery, other countries and economies in the world remain affected by widespread infections and slower vaccination rates.

Operations have dropped off substantially at SAN since the onset of the Covid-19 pandemic; however, this drop-off is assumed to be temporary, similar to the effects on the aviation industry following the terrorist attacks on September 11, 2001, and impacts on aircraft operations after the 2008 recession. As depicted in **Table 1**, the FAA's 2021 Terminal Area Forecast (TAF) expects a percent decrease compared to 2018 operation levels as the National Airspace System recovers from the impacts of the Covid-19 pandemic.

TABLE 1 SAN AIRPORT DEVELOPMENT PROGRAM (ADP) FORECAST AND 2021 FAA TERMINAL AREA FORECAST COMPARISON

YEAR	ANNUAL OPERATION LEVELS	VARIANCE (%)
2018[1]	225,570	n/a
2022[2,3]	172,563	-23

NOTES:
1/ LeighFisher, *Final Technical Memorandum Aviation Activity Forecast Update San Diego International Airport,* April 2019; Harris, Miller Miller and Hanson, Memorandum to Sjohnna Knack, *San Diego International Airport –Aircraft Noise Modeling Approach and Input Assumptions,* September 15, 2020 (extrapolated values from KBE Environmental based on ADP Forecast).
2/ Federal Aviation Administration, Terminal Area Forecast, March 2021 (accessed on March 31, 2022).
3/ Based on the federal fiscal year from October 1 to September 31st.
n/a – Not applicable

The FAA referenced the effects of both the September 11th terrorist attacks and 2008 recession events to support the near-term forecast recovery.[2] As reported in **Table 2**, the 2021 TAF for SAN reflects a reduction in operations from 2020 to 2021, then a 13 percent Compound Annual Growth Rate (CAGR) between 2021 and 2024, representing a high growth rate compared to typical historical growth rates after previous impactful events. Based on the 2021 TAF, operation levels are expected to reach and exceed 2019 levels during 2024, which indicates a 4-year recovery period. Due to the temporary effects of the Covid-19 pandemic and the potential for substantial growth to return to pre-pandemic levels between 2021 and

[2] Federal Aviation Administration. Terminal Area Forecast Executive Summary Fiscal Years 2021 to 2045. March 2022. Page 5.

2024, it was determined that 2019 serves as a reasonable representation of existing conditions for the purposes of an NEM assessment.

TABLE 2 2021 FAA TERMINAL AREA FORECAST

YEAR	ANNUAL OPERATIONS[1]	PERCENT CHANGE (%)
2020[2]	160,310	n/a
2021	147,571	-8
2022	172,563	17
2023	220,867	28
2024	244,388	11
2025	250,089	2
2026	256,355	3
2021 to 2024 CAGR		13.4

NOTES:
1/ Based on the federal fiscal year from October 1 to September 31st.
2/ Actual operations reported by FAA Airport Traffic Control Tower.
n/a – Not applicable
SOURCES: Federal Aviation Administration, Terminal Area Forecast, March 2021 (accessed on March 31, 2022).

Comparative Assessment between 2018 and 2019

The 14 CFR Part 150 Study used 2018 operations data to develop the NEM representing existing conditions. If 2018 operation conditions are not substantially different from 2019, it is also reasonable to conclude that 2018 and 2019 both serve as a reasonable representation of existing conditions. The FAA requested comparative numbers of aircraft operations and fleet mix in 2018 and in 2022 to support the statement that the existing condition in 2018 represents the conditions at the time of submission in 2022. For the reasons described above, a comparison between 2018 and 2022 is not appropriate due to the abnormal operation conditions and substantial growth in operations expected to occur each year during the recovery phase of the Covid-19 pandemic. A more appropriate comparison is between 2018 and 2019 operations and fleet mix data to determine if 2018 provides an equivalent representation of existing conditions that is not substantially different from 2019, which represents the operation levels expected at the point when the aviation industry has recovered from Covid-19 pandemic impacts.

A substantial change based on Title 14 CFR Part 150, Section 150.21(d)(1) is a change in the operation of an airport that "creates a substantial new noncompatible use if that change results in an increase in the yearly day-night average sound level of 1.5 dB or greater in either a land area which was formerly compatible but is thereby made noncompatible under Appendix A (Table 1), or in a land area which was previously determined to be noncompatible under that Table and whose non-compatibility is now significantly increased." The Airport has one runway that is predominantly operated in a westerly direction due to prevailing winds. The prevailing wind and weather did not substantially change between 2018 and 2019;

therefore, the average annual day use of the runway is not substantially different between 2018 and 2019. The FAA's Area Equivalent Model (AEM) was used to determine if the difference in fleet mix and operation levels are substantially different. The AEM uses landing-takeoff operations by each aircraft type and time of day for two scenarios to calculate if the alternative will increase the Day/Night Noise Level (DNL) 65 A-weighted decibel (dBA) exposure area. If the change is equal to or more than 17 percent, the alternative can potentially cause a DNL 1.5 dBA increase or more. For purposes of this screening assessment, a change of less than 17 percent in the DNL 65 dBA area will indicate that 2019 is not substantially different from 2018.

The operations and fleet mix data from the Part 150 Study 2018 AEDT input file ("Baseline") and the Airport Noise and Operations Management System (ANOMS) flight operations data for all of 2019 ("Alternative") were used to calculate the landing-takeoff operation (LTO) levels for each aircraft type by day and night. AEM does not provide an option to input evening (7:00 p.m.to 9:59 p.m.) LTOs; therefore, all evening LTOs were placed in the nighttime (10:00 p.m. to 6:59 a.m.) column. AEM is based on the FAA's AEDT version 2c whereas the Part 150 Study update used the current version at the time it commenced, which is AEDT version 2d. Some aircraft available in AEDT 2d are not available in AEDT 2c. Appropriate substitutions provided in the AEM were used and applied consistently between 2018 and 2019. According to the AEM assessment, the difference between 2018 and 2019 operation levels and the fleet mix does not result in a substantial change in the DNL 65 dBA area; therefore, both 2018 and 2019 operations serve as a reasonable representation of existing conditions. **Attachment 1** is the AEM spreadsheet that depicts the input for both 2018 and 2019 and the results.

Consistent with Best Practices

The approach of applying a different year from the year of submittal to represent existing conditions is not new and has been previously applied when an airport experienced long-term runway closures or other events that affected operation levels (i.e., the September 11th terrorist attacks), runway use, and flight track use (i.e., temporary airspace restrictions) throughout a given year. When abnormal events occurred for a long period of time in a year, the year was determined not to be a reasonable representation of existing conditions; therefore, a prior year was considered. This approach is consistent with best industry practices. The use of the 2018 data to represent existing conditions, instead of 2022 or any other year within the recovery period, follows the same logic.

Forecast Comparison to 2021 TAF

Although not requested by the FAA, a comparison between the SAN Airport Development Program (ADP) forecast (refer to **Appendix B** of the 14 CFR Part 150 Study report) and FAA's 2021 TAF was conducted to confirm that 2026 forecast operations remain appropriate after the most recent release to the TAF. A comparison of the SAN ADP forecast, previously approved by the FAA to reference for this Title 14 CFR Part 150 Update study, and the FAA 2021 TAF for 2026 indicates that the ADP forecast is within 10 percent of the FAA 2021 TAF. This difference is within the FAA's variance criteria for the five-year forecast period to be considered consistent with the FAA TAF. **Table 3** includes the ADP forecast and FAA 2021 TAF annual total operations and the variance between the two forecasts.

TABLE 3 SAN ADP FORECAST AND 2021 FAA TERMINAL AREA FORECAST COMPARISON

YEAR	ADP FORECAST	2021 FAA TAF	VARIANCE (%)
2026	258,785	256,355	1

SOURCES: LeighFisher, *Final Technical Memorandum Aviation Activity Forecast Update San Diego International Airport,* April 2019; Harris, Miller Miller and Hanson, Memorandum to Sjohnna Knack, *San Diego International Airport –Aircraft Noise Modeling Approach and Input Assumptions,* September 15, 2020 (extrapolated values from KBE Environmental based on ADP Forecast); Federal Aviation Administration, Terminal Area Forecast, March 2021 (accessed on March 31, 2022).

Based on the comparison between the ADP forecast and 2021 TAF, the operation levels modeled for 2026 continue to reasonably represent at least 5 years from the date of submittal of the NEM to the FAA (Checklist III[A] and III[B][3]); therefore, are considered appropriate for use in this 14 CFR Part 150 NEM Update Study. Due to the difficulty in forecasting the impacts caused by the Covid-19 pandemic, it is uncertain as to what year the forecast operation levels will actually occur, but based on both forecasts, it seems reasonable to assume the ADP forecast operation levels for 2026 represent operation levels at least five years from when the NEM Update report is submitted to FAA for review.

ENCLOSURES:

ATTACHMENT 1 – FAA AEM SPREADSHEET

cc: 18-14-1102.05

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ATTACHMENT 1 – FAA AEM SPREADSHEET

Federal Aviation Administration

Office of Environment and Energy

http://www.faa.gov/about/office_org/headquarters_offices/apl/research/models/aem_model/

Area Equivalent Method (AEM) Version 2c SP2

Airport Name/Code:	KSAN

DNL (dBA)	Baseline Area (Sq. Mi.)	Alternative Area (Sq. Mi.)	Percent Change in Area
65	4.7	5.0	5.3%
70	1.9	2.0	4.8%
75	0.8	0.8	4.4%
80	0.3	0.4	4.2%

	BASE Case (2018)		ALTERNATIVE Case (2019)	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
707				
720				
737				
7478				
707120				
707320				
717200	1.23	0.96	0.05	0.39
727100				
727200				
737300	0.02	0.01	0.14	0.01
737400	0.04	0.05	0.03	0.01
737500	0.00		0.01	
737700	62.92	19.24	59.65	25.31
737800	56.37	26.05	52.97	24.05
747100				
747200				
747400	0.19	0.21	0.23	0.18

	BASE Case (2018)		ALTERNATIVE Case (2019)	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
757300	0.68	0.24	1.13	0.20
767300	1.47	2.32	1.61	2.34
767400			0.01	
777200	0.02	0.02	0.02	0.01
777300	0.00			
1900D	0.01	0.00		
707QN				
720B				
727D15				
727D17				
727EM1				
727EM2			0.00	0.00
727Q15				
727Q7				
727Q9				
727QF				
7373B2				
737D17				
737N17				
737N9				
737QN				
74710Q				
74720A				
74720B				
747SP				
757PW	3.47	1.69	3.90	1.94
757RR				
767CF6	0.64	0.08	0.51	0.09
767JT9				
7773ER	0.23	0.35	0.21	0.34
7878R	1.01	0.00	1.01	0.00
A10A				
A3				
A300-622R				
A300B4-203			0.00	0.00
A310-304	0.00		0.01	
A319-131	5.28	1.35	6.43	3.15

	BASE Case (2018)		ALTERNATIVE Case (2019)	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
A320-211				
A320-232	13.99	6.00	18.91	6.64
A321-232	20.89	8.99	22.87	11.51
A330-301	0.51	0.51	0.51	0.50
A330-343				
A340-211	0.61	0.07	0.70	0.02
A340-642				
A37				
A380-841				
A380-861				
A4C				
A6A				
A7D				
A7E				
B1				
B2A				
B52BDE				
B52G				
B52H				
B57E				
BAC111				
BAE146				
BAE300				
BEC58P	0.25	0.01	0.35	0.09
C118				
C12				
C130				
C130AD				
C130E				
C-130E				
C130HP				
C131B				
C135A				
C135B				
C137				
C140				
C141A				

	BASE Case (2018)		ALTERNATIVE Case (2019)	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
C17				
C18A				
C-20				
C21A				
C22				
C23				
C5A				
C7A				
C9A				
CIT3	0.13	0.01	0.11	0.01
CL600	3.61	0.46	3.62	1.03
CL601	0.83	0.10	0.74	0.08
CNA172	0.21	0.04	0.16	0.04
CNA182	0.11	0.01	0.11	0.02
CNA182FLT				
CNA206	0.07		0.03	0.00
CNA208	2.55	0.24	2.48	0.23
CNA20T	0.05	0.00		
CNA441	0.04		0.02	0.00
CNA500			0.54	0.09
CNA510	0.71	0.12	0.55	0.07
CNA525C	0.93	0.10	0.40	0.05
CNA55B	1.29	0.13	1.74	0.18
CNA560E				
CNA560U	0.36	0.05	0.24	0.08
CNA560XL	1.59	0.13	1.63	0.14
CNA680	1.03	0.08	1.44	0.11
CNA750	2.92	0.37	2.93	0.36
COMJET				
COMSEP	0.35	0.05	0.27	0.07
CONCRD				
CRJ9-ER	5.53	1.97	3.78	1.16
CRJ9-LR				
CVR580				
DC1010				
DC1030	0.15	0.16	0.09	0.09
DC1040				

	BASE Case (2018)		ALTERNATIVE Case (2019)	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
DC3	0.00			
DC6				
DC820				
DC850				
DC860				
DC870	0.01	0.01	0.01	
DC8QN				
DC910				
DC930				
DC93LW				
DC950				
DC95HW				
DC9Q7				
DC9Q9				
DHC-2FLT				
DHC6	2.28	0.24	2.23	0.26
DHC6QP				
DHC7				
DHC8	0.00		0.01	0.00
DHC830	0.78	0.21	0.00	0.00
DO228				
DO328	0.01			
E3A				
E4				
EA6B				
ECLIPSE500	0.05	0.00	0.02	0.00
EMB120				
EMB145	0.07	0.01	0.09	0.01
EMB14L				
EMB170				
EMB175	27.29	6.83	26.82	8.34
EMB190	0.03	0.01	0.03	0.01
EMB195				
F10062				
F10065				
F100D				
F101B				

	BASE Case (2018)		ALTERNATIVE Case (2019)	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
F102				
F104G				
F105D				
F106				
F111AE				
F111D				
F-111F				
F117A				
F14A				
F15A				
F15E20				
F15E29				
F16A				
F16GE				
F16PW0				
F-18				
F28MK2				
F28MK4				
F4C				
F-4C				
F5AB				
F5E				
F8				
FAL20				
FB111A				
GASEPF	0.06	0.00	0.14	0.02
GASEPV	0.58	0.09	0.71	0.09
GII				
GIIB	0.01	0.00	0.00	0.00
GIV	1.04	0.16	1.05	0.19
GV	0.77	0.14	0.77	0.18
HS748A				
IA1125	0.34	0.04	0.40	0.03
JAGUAR				
KC10A				
KC135				
KC-135				

Aircraft Type	BASE Case (2018) Daytime LTO Cycles	BASE Case (2018) Nighttime LTO Cycles	ALTERNATIVE Case (2019) Daytime LTO Cycles	ALTERNATIVE Case (2019) Nighttime LTO Cycles
KC135B				
KC135R				
L1011				
L10115				
L188				
LEAR25	0.01	0.00		
LEAR35	2.15	0.26	1.92	0.24
MD11GE				
MD11PW	0.01	0.01	0.00	0.00
MD81				
MD82				
MD83	0.04		0.06	
MD9025	0.35	0.02		
MD9028				
MU3001	0.54	0.05	0.45	0.06
OV10A				
P3A				
PA28	0.05	0.00	0.03	0.00
PA30				
PA31				
PA42				
S3A&B				
SABR80				
SD330				
SF340				
SR71				
T1				
T29				
T-2C				
T3				
T33A				
T34				
T37B				
T-38A				
T39A				
T41				
T42				

	BASE Case (2018)		ALTERNATIVE Case (2019)	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
T-43A				
T44				
TORNAD				
TR1				
U2				
U21				
U6				
U8F				
Total LTOs	228.74	80.26	226.88	90.04

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