F Aviation and Noise Modeling Assumptions

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Introduction

Day-night average sound level (DNL) noise contours were modeled using the Federal Aviation Administration's (FAA's) Integrated Noise Model (INM) version 7.0d. The modeling was performed as part of the environmental consequences analysis for Alternative 3 at the former NAS JRB Willow Grove installation.

INM 7.0d, which was released in May 2013, is planned to be the final version of this program before INM is replaced by the Aviation Environmental Design Tool (AEDT) in 2014. This version of INM does not incorporate any significant computational improvements over earlier versions; however, some databases have been updated. Some of the factors considered in the noise model include:

- Type of operation (e.g., arrival, departure, pattern);
- Number of operations per day of aircraft types;
- Time of operation;
- Flight tracks;
- Aircraft power settings, speeds, and altitudes;
- Number, duration, power setting, and heading of maintenance run-ups; and
- Environmental data (temperature and humidity).

Two scenarios were modeled: (1) 2010 Baseline Conditions, which included military fixed-wing and rotary-wing aircraft, general aviation (GA) fixed-wing and rotary-wing aircraft, and military ground run-ups; and (2) 2034 Projected Conditions, which included only GA fixed-wing and rotary-wing aircraft.

The following describes the major elements of the model and any adjustments/approximations made.

Study Aircraft

Military fixed-wing: A-10A, C-12, P-3C, C-130E, C-9A, C-17, and F/A-18

Military rotary-wing: CH-53E (INM substitute used is a S65), UH-1N (INM substitute used is a B212), AH-1W

General Aviation fixed-wing: GASEPV, BEC58P, Lear 60 (INM substitute used is a CNA55B), EMB145

General Aviation rotary-wing: SA350D

Study Parameters

Standard day temperature (59 degrees Fahrenheit [F]) and pressure (29.92 inches of mercury [in-Hg]) were used in the model along with a headwind of 8 knots (standard in INM). INM permits just these three values as weather/atmospheric inputs, not monthly data. In comparison, actual historical monthly data for NAS JRB Willow Grove, which was considered for input to the model, had an average temperature, over a 12-month period, of 52 degrees F; a single barometric pressure data point of 29.8 in-Hg was recorded from actual data. Use of the standard day values proved to be a reasonable estimate for the weather conditions at NAS JRB Willow Grove; running the model with 52 degrees F and 29.8 in-Hg produced no significant changes in the contours, compared with those run with standard day values.

Flight Tracks

Sixty-two flight tracks were measured and formatted for use with INM. The INM tracks have a close resemblance to the original tracks depicted in the 1999 Air Installations Compatible Use Zones (AICUZ) Study for NAS JRB Willow Grove (The Onyx Group 1999). Minor modifications were made to the GCA Box flight tracks 15G1, 15G4, 33G1, and 33G4 to get these to close completely, a requirement of INM. Figure F-1 presents representative arrival and departure flight tracks adapted from the 1999 AICUZ and used for modeling the existing environment noise conditions; Figure F-2 presents the representative pattern (i.e., touch-and-go and GCA Box pattern) flight tracks used in the noise model.

Flight Profiles

Custom flight profiles for arrivals and departures were used for the military fixed-wing flight profiles instead of the Noisemap standard profiles (which are available in INM). These custom profiles are commonly used in noise modeling to support Navy AICUZ studies and other studies for the military, because they have been generated more recently and, in some cases, are believed to be more representative of typical flight operations than the standard profiles. INM runs were conducted using both sets of profiles, and no significant differences were noted in the DNL contours. This is because neither scenario involves a large number of flight operations, and the noise contours of interest (60 to 80 DNL) are located close to the airfield. Noise differences between the custom and standard flight profiles would be more noticeable farther away from the airfield, where there would be a wider spread between these two types of profiles.

INM does not have the capability to model touch-and-go patterns for rotary-wing aircraft; therefore, all pattern operations for military and GA rotary-wing aircraft were distributed onto arrivals and departures that have track turn points located as close as possible to where the touch-and-go pattern turns are located. This is one example of an operations adjustment that was necessary due to INM limitations. However, touch-and-go operation numbers were small in the overall mix of operations, so it is expected that no significant changes to the noise results occurred due to these adjustments. Furthermore, the DNL contours of interest (60 to 80 DNL) are located close to the airfield, where the influence of the touch-and-go patterns tends to diminish, and a potential effect would be more noticeable for the outer contours (55 DNL and lower).

INM standard flight profiles were used for all GA fixed-wing aircraft.

Flight Operations

The flight operations are described in detail in the Tables F-1 through F-6. Some of the important modeling assumptions made for the purpose of this analysis are also noted below.

The 2010 military fixed-wing aircraft operations are based on the same percentage distribution of operations as indicated in the 1999 AICUZ Study (The Onyx Group 1999). Raw control tower operations data were assigned to the military aircraft types using this percentage distribution, which was also applied to the military rotary-wing operations.

The 2010 and 2034 GA aircraft operations and day/night splits were assigned based on typical percentages for GA airports (95 percent daytime to 5 percent nighttime).

Single Engine Maintenance Run-Up Operations

Maintenance run-ups were modeled for all the aircraft types indicated in the 1999 AICUZ Study (The Onyx Group 1999). The run-up operations used for 2010 were scaled down from those represented in the AICUZ Study to reflect the decrease in military flight operations from 1999 to 2010. This scaling was done separately for each aircraft type; however, the scaling resulted in essentially the same effect for all aircraft types (i.e., the 2010 military flight operations are 23.5 percent of the 1999 military flight

operations, and this percentage applies to all military aircraft). Therefore, the 2010 military aircraft run-up operations represent 23.5 percent of the 1999 military aircraft run-ups.

It is likely that some GA run-ups will occur in 2034, but no readily available information exists on location, schedule, etc.; therefore, no GA run-up operations were modeled.

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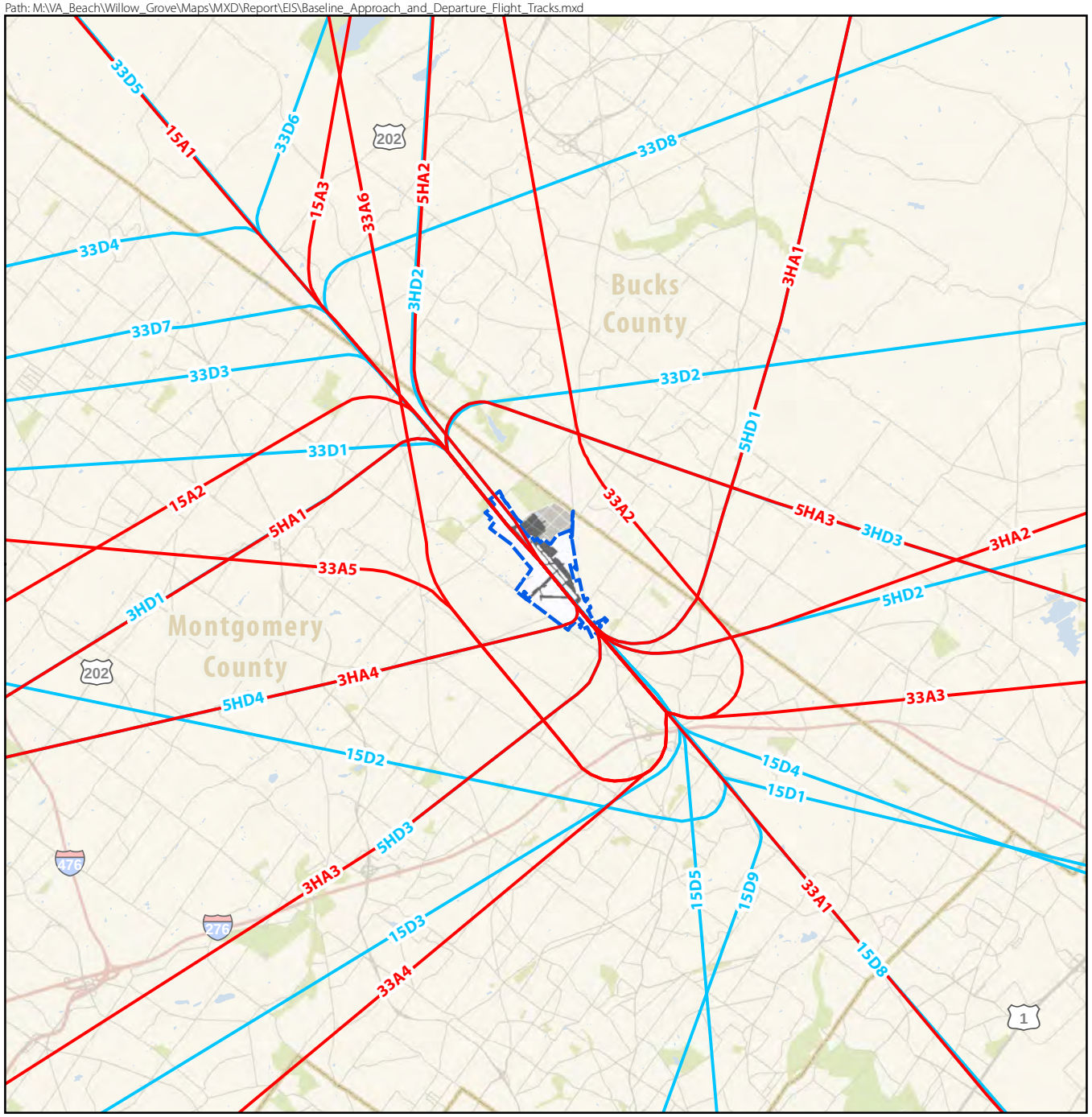

Figure F-1

Baseline Approach and Departure Flight Tracks

NAS JRB Willow Grove

Horsham, PA

Legend

- Freeway
- Major Road

Representative Flight Tracks

- Arrival
- Departure
- NAS JRB Willow Grove
- FAA Tower and Horsham Air Guard Station (not included in redevelopment)
- Runways, Taxiways, Parking Aprons
- County Boundary
- Town/City Boundary
- Park
- Waterbody

N

SCALE

0 1 2 Miles

SOURCE: Ecology and Environment Inc 2013; ESRI 2010; Northern Division Naval Facilities Engineering Command and The Onyx Group 1999; Tetra Tech 2012.

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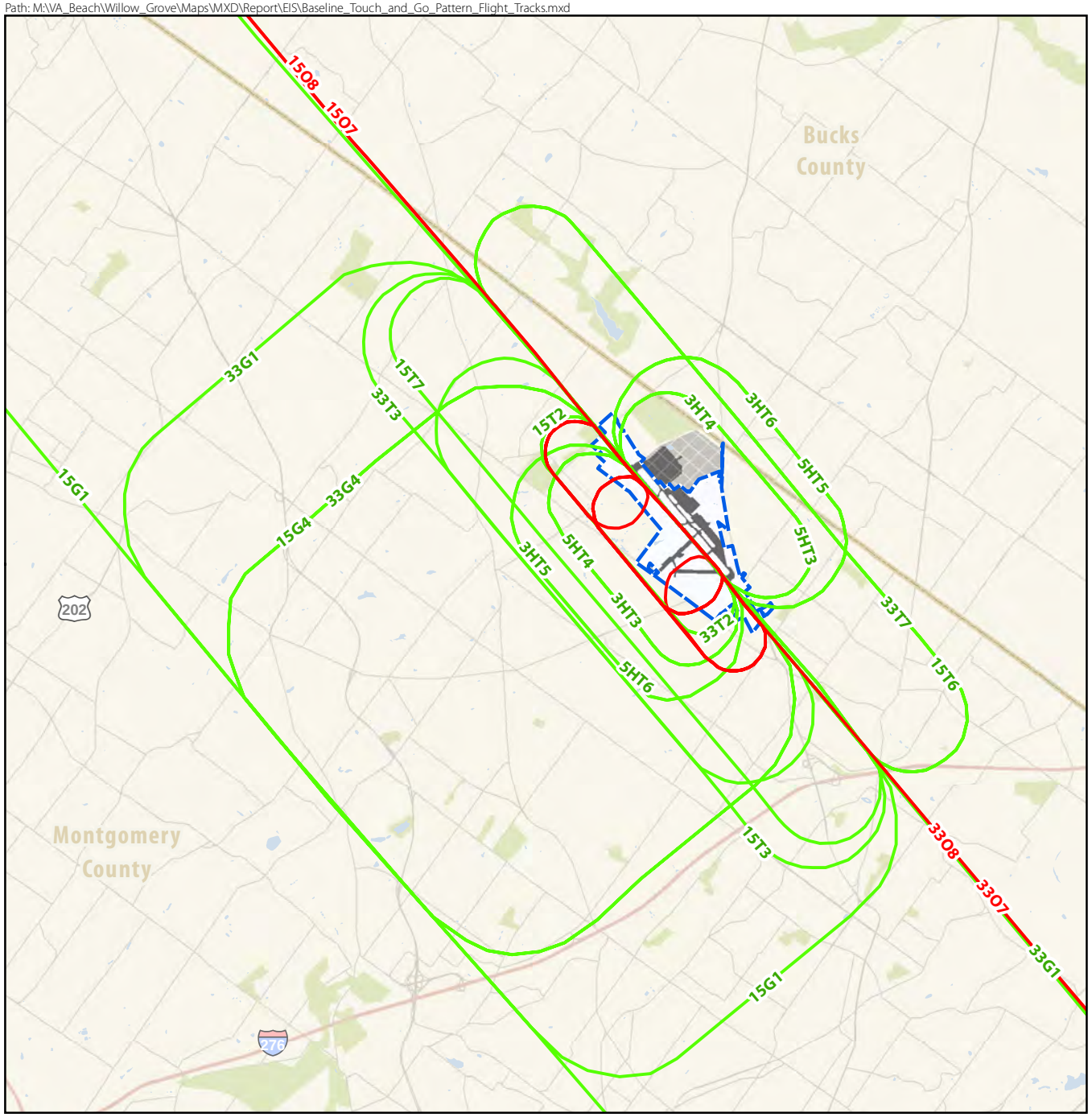

Figure F-2

Baseline Touch-and-Go and GCA Box Pattern Flight Tracks

NAS JRB Willow Grove

Horsham, PA

Legend

- Freeway
- Major Road

Representative Flight Tracks

- Arrival
- Pattern
- NAS JRB Willow Grove
- FAA Tower and Horsham Air Guard Station (not included in redevelopment)
- Runways, Taxiways, Parking Aprons
- County Boundary
- Town/City Boundary
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- Waterbody

N

SCALE

0 1 2 Miles

SOURCE: Ecology and Environment Inc 2013; ESRI 2010; Northern Division Naval Facilities Engineering Command and The Onyx Group 1999; Tetra Tech 2012.

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Table F-1 Estimated 2010 Baseline Aircraft Oerations at NAS JRB Willow Grove

Group	Avg. Annual Operations	Group %	Representative Aircraft	INM Designator	Within Group %	Total ATC Ops	Day %	Night %
Civil								
General Aviation	7,468	100%	Single Prop (General)	GASEPV	0.81	6,027	95	5
			Twin Prop (Beech Baron)	BEC58P	0.10	747	95	5
			Business Jet (Lear 60)	CNA55B (sub)	0.04	299	95	5
			Regional Jet (Embraer 145)	EMB145	0.00	22	95	5
			Rotary Wing (Aerospatiale AS-350)	SA350D	0.05	373	95	5
Military								
Fixed-Wing	5,141	97%	A-10A	A10A	0.52	2,655	100	0
			C-12	C12	0.16	838	95	5
			P-3C	P3C	0.12	602	97	3
			C-130E	C-130E	0.12	593	100	0
			C-9A	C9A	0.06	324	90	10
			C-17	C17	0.01	68	100	0
			F/A-18	F-18	0.01	61	100	0
Rotary-Wing	172	3%	CH-53E	S65	0.60	103	100	0
			UH-1N	B212	0.24	41	100	0
			AH-1W	B212	0.16	28	100	0
Total	**12,781**	**100%**	**Total Modeled**			**12,781**		

Table F-2 Projected 2034 Annual Air Operations at Willow Grove Airport

Group	Avg. Annual Operations	Representative	Aircraft	INM Designator	Within Group %	Total ATC Ops	Day %	Night %
Civil								
General Aviation	48,511	Single Prop (General)		GASEPV	0.80	38,810	95	5
		Twin Prop (Beech Baron)		BEC58P	0.10	4,850	95	5
		Business Jet (Lear 60)		CNA55B (sub)	0.04	1,940	95	5
		Regional Jet (Embraer 145)		EMB145	0.01	485	95	5
		Rotary Wing (Aerospatiale AS-350)		SA350D	0.05	2,426	95	5
Total	**48,511**	**Total Modeled**				**48,511**		

Table F-3 2010 Modeled Military Fixed Wing Flight Tracks and Operations

			Group Military Fixed-Wing		A-10A			C-12			P-3C			C-130E			C-9A			C-17			F/A-18		
Operation Type	Runway ID	Runway Utilization	Flight Track ID	Flight Track Utilization	Average Annual Day Events day	night	Total	Average Annual Day Events day	night	Total	Average Annual Day Events day	night	Total	Average Annual Day Events day	night	Total	Average Annual Day Events day	night	Total	Average Annual Day Events day	night	Total	Average Annual Day Events day	night	Total
Departures	33	78.9%	33D1	17.5%	0.419	0.000	0.419	0.126	0.007	0.132	0.092	0.003	0.095	0.094	0.000	0.094	0.046	0.005	0.051	0.011	0.000	0.011	0.010	0.000	0.010
			33D2	17.5%	0.419	0.000	0.419	0.126	0.007	0.132	0.092	0.003	0.095	0.094	0.000	0.094	0.046	0.005	0.051	0.011	0.000	0.011	0.010	0.000	0.010
			33D3	6.3%	0.151	0.000	0.151	0.045	0.002	0.048	0.033	0.001	0.034	0.034	0.000	0.034	0.017	0.002	0.018	0.004	0.000	0.004	0.003	0.000	0.003
			33D4	0.7%	0.017	0.000	0.017	0.005	0.000	0.005	0.004	0.000	0.004	0.004	0.000	0.004	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
			33D5	19.0%	0.455	0.000	0.455	0.136	0.007	0.144	0.100	0.003	0.103	0.102	0.000	0.102	0.050	0.006	0.055	0.012	0.000	0.012	0.010	0.000	0.010
			33D6	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			33D7	17.9%	0.428	0.000	0.428	0.128	0.007	0.135	0.094	0.003	0.097	0.096	0.000	0.096	0.047	0.005	0.052	0.011	0.000	0.011	0.010	0.000	0.010
			33D8	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	15	21.1%	15D1	7.5%	0.179	0.000	0.179	0.054	0.003	0.057	0.039	0.001	0.041	0.040	0.000	0.040	0.020	0.002	0.022	0.005	0.000	0.005	0.004	0.000	0.004
			15D2	7.5%	0.179	0.000	0.179	0.054	0.003	0.057	0.039	0.001	0.041	0.040	0.000	0.040	0.020	0.002	0.022	0.005	0.000	0.005	0.004	0.000	0.004
			15D3	2.7%	0.065	0.000	0.065	0.019	0.001	0.020	0.014	0.000	0.015	0.014	0.000	0.014	0.007	0.001	0.008	0.002	0.000	0.002	0.001	0.000	0.001
			15D4	1.1%	0.026	0.000	0.026	0.008	0.000	0.008	0.006	0.000	0.006	0.006	0.000	0.006	0.003	0.000	0.003	0.001	0.000	0.001	0.001	0.000	0.001
			15D5	2.3%	0.055	0.000	0.055	0.017	0.001	0.017	0.012	0.000	0.012	0.012	0.000	0.012	0.006	0.001	0.007	0.001	0.000	0.001	0.001	0.000	0.001
			15D8	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			15D9	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Arrivals	33	73.2%	33A1	44.9%	1.338	0.000	1.338	0.401	0.021	0.422	0.294	0.009	0.304	0.299	0.000	0.299	0.147	0.016	0.163	0.034	0.000	0.034	0.031	0.000	0.031
			33A2	1.2%	0.036	0.000	0.036	0.011	0.001	0.011	0.008	0.000	0.008	0.008	0.000	0.008	0.004	0.000	0.004	0.001	0.000	0.001	0.001	0.000	0.001
			33A3	2.7%	0.081	0.000	0.081	0.024	0.001	0.026	0.018	0.001	0.018	0.018	0.000	0.018	0.009	0.001	0.010	0.002	0.000	0.002	0.002	0.000	0.002
			33A4	3.9%	0.117	0.000	0.117	0.035	0.002	0.037	0.026	0.001	0.027	0.026	0.000	0.026	0.013	0.001	0.014	0.003	0.000	0.003	0.003	0.000	0.003
			33A5	5.5%	0.163	0.000	0.163	0.049	0.003	0.051	0.036	0.001	0.037	0.036	0.000	0.036	0.018	0.002	0.020	0.004	0.000	0.004	0.004	0.000	0.004
			33A6	1.2%	0.036	0.000	0.036	0.011	0.001	0.011	0.008	0.000	0.008	0.008	0.000	0.008	0.004	0.000	0.004	0.001	0.000	0.001	0.001	0.000	0.001
			33O7	12.4%	0.370	0.000	0.370	0.111	0.006	0.117	0.081	0.003	0.084	0.083	0.000	0.083	0.041	0.005	0.045	0.009	0.000	0.009	0.008	0.000	0.008
			33O8	1.3%	0.040	0.000	0.040	0.012	0.001	0.013	0.009	0.000	0.009	0.009	0.000	0.009	0.004	0.000	0.005	0.001	0.000	0.001	0.001	0.000	0.001
	15	26.8%	15A1	16.2%	0.481	0.000	0.481	0.144	0.008	0.152	0.106	0.003	0.109	0.107	0.000	0.107	0.053	0.006	0.059	0.012	0.000	0.012	0.011	0.000	0.011
			15A2	2.6%	0.077	0.000	0.077	0.023	0.001	0.024	0.017	0.001	0.017	0.017	0.000	0.017	0.008	0.001	0.009	0.002	0.000	0.002	0.002	0.000	0.002
			15A3	2.2%	0.065	0.000	0.065	0.019	0.001	0.020	0.014	0.000	0.015	0.014	0.000	0.014	0.007	0.001	0.008	0.002	0.000	0.002	0.001	0.000	0.001
			15O7	5.3%	0.158	0.000	0.158	0.047	0.002	0.050	0.035	0.001	0.036	0.035	0.000	0.035	0.017	0.002	0.019	0.004	0.000	0.004	0.004	0.000	0.004
			15O8	0.6%	0.017	0.000	0.017	0.005	0.000	0.005	0.004	0.000	0.004	0.004	0.000	0.004	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Touch and Go's	33	69.8%	33T2	59.3%	0.783	0.000	0.783	0.235	0.012	0.247	0.172	0.005	0.177	0.175	0.000	0.175	0.086	0.010	0.096	0.020	0.000	0.020	0.018	0.000	0.018
			33T3	6.8%	0.090	0.000	0.090	0.027	0.001	0.028	0.020	0.001	0.020	0.020	0.000	0.020	0.010	0.001	0.011	0.002	0.000	0.002	0.002	0.000	0.002
			33T7	3.8%	0.050	0.000	0.050	0.015	0.001	0.016	0.011	0.000	0.011	0.011	0.000	0.011	0.005	0.001	0.006	0.001	0.000	0.001	0.001	0.000	0.001
	15	30.2%	15T2	25.5%	0.337	0.000	0.337	0.101	0.005	0.106	0.074	0.002	0.076	0.075	0.000	0.075	0.037	0.004	0.041	0.009	0.000	0.009	0.008	0.000	0.008
			15T3	2.9%	0.038	0.000	0.038	0.011	0.001	0.012	0.008	0.000	0.009	0.009	0.000	0.009	0.004	0.000	0.005	0.001	0.000	0.001	0.001	0.000	0.001
			15T6	0.1%	0.002	0.000	0.002	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			15T7	1.6%	0.021	0.000	0.021	0.006	0.000	0.007	0.005	0.000	0.005	0.005	0.000	0.005	0.002	0.000	0.003	0.001	0.000	0.001	0.000	0.000	0.000
GCA Patterns	33	72.6%	33G1	42.7%	0.248	0.000	0.248	0.075	0.004	0.078	0.055	0.002	0.056	0.055	0.000	0.055	0.027	0.003	0.030	0.006	0.000	0.006	0.006	0.000	0.006
			33G4	29.9%	0.174	0.000	0.174	0.052	0.003	0.055	0.038	0.001	0.039	0.039	0.000	0.039	0.019	0.002	0.021	0.004	0.000	0.004	0.004	0.000	0.004
	15	27.4%	15G1	13.9%	0.081	0.000	0.081	0.024	0.001	0.026	0.018	0.001	0.018	0.018	0.000	0.018	0.009	0.001	0.010	0.002	0.000	0.002	0.002	0.000	0.002
			15G4	13.5%	0.079	0.000	0.079	0.024	0.001	0.025	0.017	0.001	0.018	0.018	0.000	0.018	0.009	0.001	0.010	0.002	0.000	0.002	0.002	0.000	0.002
							TOTAL 7.274			TOTAL 2.296			TOTAL 1.649			TOTAL 1.625			TOTAL 0.888			TOTAL 0.186			TOTAL 0.167

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Table F-4 2010 Modeled Military Rotary Wing Flight Tracks and Operations

Group: Military Rotary-Wing					CH-53E			UH-1N			AH-1W		
Operation Type	Runway ID	Runway Utilization	Flight Track ID	Flight Track Utilization	Average Annual Day Events day	night	Total	Average Annual Day Events day	night	Total	Average Annual Day Events day	night	Total
Departures	33	67.1%	3HD1	19.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			3HD2	29.8%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			3HD3	17.9%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	15	32.9%	5HD1	10.5%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			5HD2	1.5%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			5HD3	1.5%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			5HD4	19.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Arrivals	33	67.2%	3HA1	6.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			3HA2	13.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			3HA3	13.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			3HA4	34.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	15	32.8%	5HA1	16.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			5HA2	13.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			5HA3	3.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Touch and Go's	33	36.0%	3HT3	8.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			3HT4	16.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			3HT5	4.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			3HT6	8.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	15	64.0%	5HT3	12.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			5HT4	28.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			5HT5	8.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			5HT6	16.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GCA Patterns	33	72.6%	33HG1	42.7%	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.002	0.000
			33HG4	29.9%	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.001	0.000
	15	27.4%	15HG1	13.9%	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000
			15HG4	13.5%	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000
						TOTAL	0.000		TOTAL	0.000		TOTAL	0.000

Table F-5 2010 Modeled General Aviation Fixed Wing Flight Tracks and Operations

			Group General Aviation Fixed-Wing		GASEPV			BEC58P			CNA55B			EMB145		
Operation	Runway		Flight Track		Average Annual Day Events			Average Annual Day Events			Average Annual Day Events			Average Annual Day Events		
Type	ID	Utilization	ID	Utilization	day	night	Total	day	night	Total	day	night	Total	day	night	Total
Departures	33	78.9%	33D1	17.5%	0.578	0.144	0.722	0.120	0.018	0.138	0.065	0.007	0.072	0.004	0.001	0.005
			33D2	17.5%	0.578	0.144	0.722	0.120	0.018	0.138	0.065	0.007	0.072	0.004	0.001	0.005
			33D3	6.3%	0.208	0.052	0.260	0.043	0.006	0.050	0.023	0.003	0.026	0.002	0.000	0.002
			33D4	0.7%	0.023	0.006	0.029	0.005	0.001	0.006	0.003	0.000	0.003	0.000	0.000	0.000
			33D5	19.0%	0.627	0.157	0.784	0.130	0.019	0.150	0.070	0.008	0.078	0.005	0.001	0.005
			33D6	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			33D7	17.9%	0.591	0.148	0.739	0.123	0.018	0.141	0.066	0.007	0.073	0.005	0.001	0.005
			33D8	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	15	21.1%	15D1	7.5%	0.248	0.062	0.310	0.051	0.008	0.059	0.028	0.003	0.031	0.002	0.000	0.002
			15D2	7.5%	0.248	0.062	0.310	0.051	0.008	0.059	0.028	0.003	0.031	0.002	0.000	0.002
			15D3	2.7%	0.089	0.022	0.111	0.019	0.003	0.021	0.010	0.001	0.011	0.001	0.000	0.001
			15D4	1.1%	0.036	0.009	0.045	0.008	0.001	0.009	0.004	0.000	0.005	0.000	0.000	0.000
			15D5	2.3%	0.076	0.019	0.095	0.016	0.002	0.018	0.008	0.001	0.009	0.001	0.000	0.001
			15D8	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			15D9	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Arrivals	33	72.5%	33A1	34.6%	1.846	0.462	2.308	0.383	0.057	0.440	0.206	0.023	0.229	0.014	0.002	0.016
			33A2	0.9%	0.050	0.012	0.062	0.010	0.002	0.012	0.006	0.001	0.006	0.000	0.000	0.000
			33A3	2.1%	0.112	0.028	0.140	0.023	0.003	0.027	0.013	0.001	0.014	0.001	0.000	0.001
			33A4	3.0%	0.162	0.040	0.202	0.034	0.005	0.039	0.018	0.002	0.020	0.001	0.000	0.001
			33A5	4.2%	0.225	0.056	0.281	0.047	0.007	0.054	0.025	0.003	0.028	0.002	0.000	0.002
			33A6	0.9%	0.050	0.012	0.062	0.010	0.002	0.012	0.006	0.001	0.006	0.000	0.000	0.000
			33O7	24.0%	1.602	0.000	1.602	0.091	0.000	0.091	0.000	0.000	0.000	0.001	0.000	0.001
			33O8	2.6%	0.173	0.000	0.173	0.010	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000
	15	27.5%	15A1	12.5%	0.664	0.166	0.830	0.138	0.021	0.158	0.074	0.008	0.082	0.005	0.001	0.006
			15A2	2.0%	0.106	0.026	0.132	0.022	0.003	0.025	0.012	0.001	0.013	0.001	0.000	0.001
			15A3	1.7%	0.089	0.022	0.111	0.019	0.003	0.021	0.010	0.001	0.011	0.001	0.000	0.001
			15O7	10.3%	0.685	0.000	0.685	0.039	0.000	0.039	0.000	0.000	0.000	0.000	0.000	0.000
			15O8	1.1%	0.074	0.000	0.074	0.004	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000
Touch and Go's	33	69.8%	33T2	59.3%	3.393	0.000	3.393	0.193	0.000	0.193	0.000	0.000	0.000	0.001	0.000	0.001
			33T3	6.8%	0.388	0.000	0.388	0.022	0.000	0.022	0.000	0.000	0.000	0.000	0.000	0.000
			33T7	3.8%	0.215	0.000	0.215	0.012	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000
	15	30.2%	15T2	25.5%	1.461	0.000	1.461	0.083	0.000	0.083	0.000	0.000	0.000	0.001	0.000	0.001
			15T3	2.9%	0.165	0.000	0.165	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000
			15T6	0.1%	0.008	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			15T7	1.6%	0.091	0.000	0.091	0.005	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000
						TOTAL	16.512		TOTAL	2.047		TOTAL	0.819		TOTAL	0.060

Table F-6 2010 Modeled General Aviation Rotary Wing Flight Tracks

Group: General Aviation Rotary-Wing					SA350D		
Operation Type	Runway		Flight Track		Average Annual Day Events		
	ID	Utilization	ID	Utilization	day	night	Total
Departures	33	50.0%	3HD1	5.0%	0.011	0.001	0.013
			3HD2	22.5%	0.052	0.006	0.057
			3HD3	22.5%	0.052	0.006	0.057
	15	50.0%	5HD1	10.0%	0.023	0.003	0.026
			5HD2	30.0%	0.069	0.008	0.077
			5HD3	0.0%	0.000	0.000	0.000
			5HD4	10.0%	0.023	0.003	0.026
Arrivals	33	71.0%	3HA1	0.0%	0.000	0.000	0.000
			3HA2	43.0%	0.099	0.011	0.110
			3HA3	28.0%	0.064	0.007	0.072
			3HA4	0.0%	0.000	0.000	0.000
	15	29.0%	5HA1	17.0%	0.039	0.004	0.043
			5HA2	0.0%	0.000	0.000	0.000
			5HA3	12.0%	0.028	0.003	0.031
Touch and Go's	33	60.0%	3HT3	30.0%	0.153	0.000	0.153
			3HT4	30.0%	0.153	0.000	0.153
			3HT5	0.0%	0.000	0.000	0.000
			3HT6	0.0%	0.000	0.000	0.000
	15	40.0%	5HT3	20.0%	0.102	0.000	0.102
			5HT4	20.0%	0.102	0.000	0.102
			5HT5	0.0%	0.000	0.000	0.000
			5HT6	0.0%	0.000	0.000	0.000
						TOTAL	1.022

Table F-7 2034 Modeled General Aviation Fixed Wing Flight Tracks and Operations

Group General Aviation Fixed-Wing					GASEPV			BEC58P			CNA55B			EMB145		
Operation Type	Runway ID	Runway Utilization	Flight Track ID	Flight Track Utilization	Average Annual Day Events day	night	Total	Average Annual Day Events day	night	Total	Average Annual Day Events day	night	Total	Average Annual Day Events day	night	Total
Departures	33	78.9%	33D1	17.5%	3.722	0.930	4.652	0.779	0.116	0.895	0.419	0.047	0.465	0.099	0.012	0.110
			33D2	17.5%	3.722	0.930	4.652	0.779	0.116	0.895	0.419	0.047	0.465	0.099	0.012	0.110
			33D3	6.3%	1.340	0.335	1.675	0.280	0.042	0.322	0.151	0.017	0.167	0.036	0.004	0.040
			33D4	0.7%	0.149	0.037	0.186	0.031	0.005	0.036	0.017	0.002	0.019	0.004	0.000	0.004
			33D5	19.0%	4.040	1.010	5.051	0.846	0.126	0.972	0.454	0.050	0.505	0.107	0.013	0.120
			33D6	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			33D7	17.9%	3.807	0.952	4.758	0.797	0.119	0.916	0.428	0.048	0.476	0.101	0.012	0.113
			33D8	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	15	21.1%	15D1	7.5%	1.595	0.399	1.994	0.334	0.050	0.384	0.179	0.020	0.199	0.042	0.005	0.047
			15D2	7.5%	1.595	0.399	1.994	0.334	0.050	0.384	0.179	0.020	0.199	0.042	0.005	0.047
			15D3	2.7%	0.574	0.144	0.718	0.120	0.018	0.138	0.065	0.007	0.072	0.015	0.002	0.017
			15D4	1.1%	0.234	0.058	0.292	0.049	0.007	0.056	0.026	0.003	0.029	0.006	0.001	0.007
			15D5	2.3%	0.489	0.122	0.611	0.102	0.015	0.118	0.055	0.006	0.061	0.013	0.002	0.015
			15D8	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			15D9	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Arrivals	33	72.5%	33A1	34.6%	11.888	2.972	14.859	2.488	0.371	2.860	1.337	0.149	1.486	0.316	0.037	0.353
			33A2	0.9%	0.319	0.080	0.399	0.067	0.010	0.077	0.036	0.004	0.040	0.008	0.001	0.009
			33A3	2.1%	0.723	0.181	0.904	0.151	0.023	0.174	0.081	0.009	0.090	0.019	0.002	0.021
			33A4	3.0%	1.042	0.261	1.303	0.218	0.033	0.251	0.117	0.013	0.130	0.028	0.003	0.031
			33A5	4.2%	1.446	0.362	1.808	0.303	0.045	0.348	0.163	0.018	0.181	0.038	0.005	0.043
			33A6	0.9%	0.319	0.080	0.399	0.067	0.010	0.077	0.036	0.004	0.040	0.008	0.001	0.009
			33O7	24.0%	10.314	0.000	10.314	0.593	0.000	0.593	0.000	0.000	0.000	0.013	0.000	0.013
			33O8	2.6%	1.116	0.000	1.116	0.064	0.000	0.064	0.000	0.000	0.000	0.001	0.000	0.001
	15	27.5%	15A1	12.5%	4.274	1.069	5.343	0.895	0.134	1.028	0.481	0.053	0.534	0.114	0.013	0.127
			15A2	2.0%	0.681	0.170	0.851	0.142	0.021	0.164	0.077	0.009	0.085	0.018	0.002	0.020
			15A3	1.7%	0.574	0.144	0.718	0.120	0.018	0.138	0.065	0.007	0.072	0.015	0.002	0.017
			15O7	10.3%	4.413	0.000	4.413	0.254	0.000	0.254	0.000	0.000	0.000	0.006	0.000	0.006
			15O8	1.1%	0.478	0.000	0.478	0.028	0.000	0.028	0.000	0.000	0.000	0.001	0.000	0.001
Touch and Go's	33	69.8%	33T2	59.3%	21.851	0.000	21.851	1.256	0.000	1.256	0.000	0.000	0.000	0.027	0.000	0.027
			33T3	6.8%	2.499	0.000	2.499	0.144	0.000	0.144	0.000	0.000	0.000	0.003	0.000	0.003
			33T7	3.8%	1.382	0.000	1.382	0.079	0.000	0.079	0.000	0.000	0.000	0.002	0.000	0.002
	15	30.2%	15T2	25.5%	9.410	0.000	9.410	0.541	0.000	0.541	0.000	0.000	0.000	0.012	0.000	0.012
			15T3	2.9%	1.063	0.000	1.063	0.061	0.000	0.061	0.000	0.000	0.000	0.001	0.000	0.001
			15T6	0.1%	0.053	0.000	0.053	0.003	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000
			15T7	1.6%	0.585	0.000	0.585	0.034	0.000	0.034	0.000	0.000	0.000	0.001	0.000	0.001
						TOTAL	106.329		TOTAL	13.288		TOTAL	5.315		TOTAL	1.329

Table F-8 2034 Modeled General Aviation Rotary Wing Flight Tracks

Group: General Aviation Rotary-Wing					SA350D		
Operation Type	Runway		Flight Track		Average Annual Day Events		
	ID	Utilization	ID	Utilization	day	night	Total
Departures	33	50.0%	3HD1	5.0%	0.075	0.008	0.083
			3HD2	22.5%	0.336	0.037	0.374
			3HD3	22.5%	0.336	0.037	0.374
	15	50.0%	5HD1	10.0%	0.150	0.017	0.166
			5HD2	30.0%	0.449	0.050	0.498
			5HD3	0.0%	0.000	0.000	0.000
			5HD4	10.0%	0.150	0.017	0.166
Arrivals	33	71.0%	3HA1	0.0%	0.000	0.000	0.000
			3HA2	43.0%	0.643	0.071	0.715
			3HA3	28.0%	0.419	0.047	0.465
			3HA4	0.0%	0.000	0.000	0.000
	15	29.0%	5HA1	17.0%	0.254	0.028	0.282
			5HA2	0.0%	0.000	0.000	0.000
			5HA3	12.0%	0.179	0.020	0.199
Touch and Go's	33	60.0%	3HT3	30.0%	0.997	0.000	0.997
			3HT4	30.0%	0.997	0.000	0.997
			3HT5	0.0%	0.000	0.000	0.000
			3HT6	0.0%	0.000	0.000	0.000
	15	40.0%	5HT3	20.0%	0.665	0.000	0.665
			5HT4	20.0%	0.665	0.000	0.665
			5HT5	0.0%	0.000	0.000	0.000
			5HT6	0.0%	0.000	0.000	0.000
						TOTAL	6.647

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