2018 Noise Exposure Contours

Billy Bishop Toronto City Airport

Transport Canada

Environment & Geoscience

18 | 12 | 2020

Report > FINAL
Internal ref. 676431-EG-L01-00

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December 18, 2020

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By email: Stephan.Gagnon@tc.gc.ca

Subject: Final Report
2018 Noise Exposure Contours – Billy Bishop Toronto City Airport
O/Ref.: 676431-EG-L01-00

Dear Mr. Gagnon,

We are pleased to submit our final report following the realization of the above-mentioned mandate.

Please do not hesitate to contact us should you have any question or need additional information.

Best regards,

Jacques Savard, M.Sc.
Team Leader, Acoustics and vibration
Environment & Geoscience

/dg

Encl.

c.c. Gene Cabral, Bryan Bowen

2018 Noise Exposure Contours

Billy Bishop Toronto City Airport

Final Report

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O/Reference No.: 676431
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Executive Summary

The noise exposure contours for Billy Bishop Toronto City Airport (the Airport) have been computed in accordance with Transport Canada's methodology (the methodology) for Noise Exposure Forecast (NEF), along with the surface area within contours.

The Tripartite Agreement (Agreement) imposes a limit on the expansion of the NEF contours. Sections 14 and 27 of the Agreement require that the 28 NEF contour does not expand beyond the official 25 NEF contour for 1990, except between points "X" and "Y". If the 28 NEF contour does expand beyond the official 25 NEF contour for 1990, aircraft movements have to be controlled in a way to bring back the 28 NEF contour within the official 25 NEF contour for 1990.

The analysis shows that the 28 NEF Contour for 2018, including helicopters in the calculation, does not expand beyond the official 25 NEF Contour for 1990 but precisely join to the northwest of the airport. There is no margin left for the 28 NEF Contour to expand from the current one.

When helicopters are excluded from the calculation, the NEF contours shrink slightly, achieving a better compliance within the limit of the Agreement.

Table i Surface area inside 2018 noise contours

NEF	Surface area (km^2)	
	With helicopters	Without helicopters
35 +	0.4	0.3
30 - 35	0.8	0.7
28 - 30	0.6	0.6
25 - 28	1.6	1.5
Total	**3.5**	**3.1**

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1 Introduction

This document presents the noise contours for the year 2018 for the Billy Bishop Toronto City Airport (Airport).

Environmental noise or community noise, including airport activities, is not regulated by Canada's government, nevertheless Transport Canada's methodology (the methodology) is the standard for assessing the perceived noise in the vicinity of airports. This methodology is established across Canada and is used for this study. The interpretation of the results produced will be used to establish the magnitude (intensity of noise) and extent (surface area) of areas affected by airport noise.

2 Methodology

2.1 Metrics and parameters

The representation of noise generated by airport operations has been normalized by Transport Canada using Noise Exposure Forecast (NEF) contours. The NEF methodology is not by itself a forecast, but a noise calculation based either on a forecast of future movements or by actual movements. The noise contours for 2018, presented in this report, have been produced using the NEF methodology on the basis of actual movement data from Transport Canada. The original data is provided to Transport Canada by Nav Canada, the country's civil air navigation services provider, for all airports where Nav Canada operates a control tower.

The index provided by the noise contours is used to show areas affected by airport noise. This single number rating is easy to interpret, but nevertheless, requires a complex evaluation process. It takes into account for each movement of the whole year, the type of aircrafts, the runway use, the flight path, the flight distance, and the period of day. Note that the night period is defined from 10 p.m. to 7 a.m.

Flight distances and departure flight path directions have been determined according to geographic coordinates of destination airports drawn from Transport Canada database and specialized publications.

The "Air Traffic Designators" entitled TP 143 published by Transport Canada, specialized databases published by aeronautical sector companies, as well as internal corporate databases, have been used to determine the aircraft characteristics.

2.2 Method of calculation

NEF-Calc 2.0.6.1 software was used to produce the noise contours. It has been developed by the National Research Council for Transport Canada. Nef-Calc 2.0.6.1 processes operation-related data from airports and calculates noise levels for the receptor grid. Noise exposure contours are then drawn for the whole study area.

The software does not include sound data for the aircraft DASH-8 Q400. Noise and performance data of DASH-8-300 were used as surrogate. This hypothesis may have a major impact on the noise contours, especially considering that DASH-8 Q400 is the most represented aircraft in terms of the annual number of movements with 43% of all 2018 movements.

The NEF methodology developed by Transport Canada uses the parameter “Peak Planning Day”, which will be used to calculate the noise contours. The number of movements of the Peak Planning Day is estimated by averaging the seven busiest days of the three busiest months of the year. The detailed calculation of the Peak Planning Day is presented in Section 3.1.1. The calculated noise contours are representative of a near to worst case 24-hour period.

3 Noise contours

3.1 Calculation assumptions

The database of aircraft movements for 2018 from Transport Canada for the Airport was used to calculate the Peak Planning Day. The composition of the fleet and the average annual runway use have also been computed from the Transport Canada database.

3.1.1 Calculation of peak planning day

Tables 1 and 2 below present the results of the calculation of the Peak Planning Day for itinerant and local movements for 2018 for the Airport.

The number of movements of the Peak Planning Day is found to be 403 for itinerant movements and 232 for local movements. In comparison, the averages for 2018 are 269 for itinerant movements and 100 for local movements per day.

The number of circuits is half the number of local movements. A movement is either an arrival or a departure; overflights are excluded from the calculation. Overflights are flights transiting in the control zone of the control tower, going to another destination without landing at the airport. Since overflights have no real operation at the airport, they are excluded from the calculations. Local movements show much more daily variability than itinerant movements.

The calculation of the noise contours has been made for 403 itinerant movements and 232 local movements (116 circuits), with a total of 635 aircraft movements.

Helicopters accounted for 8,590 movements in 2018, of which 1,780 were runway operations, mostly Ornge flights using AgustaWestland AW139 helicopters, and 6,810 were helipad operations, mostly Heli Tours with Robinson R44 helicopters.

Excluding helicopter movements, the number of movements of the Peak Planning Day is found to be 350 for itinerant movements, and 232 for local movements. In comparison, the averages for 2018 are 246 for itinerant movements, and 100 for local movements per day.

Table 1 Peak planning day with helicopters

Itinerant		Local	
Date	Movements	Date	Movements
July 8	421	July 12	322
July 27	414	July 9	282
July 20	414	July 3	266
July 13	413	July 4	266
July 29	404	July 8	244
July 15	394	July 13	228
July 19	394	July 29	224
August 24	461	June 6	286
August 10	431	June 2	246
August 19	420	June 12	226
August 23	394	June 25	220
August 26	385	June 19	194
August 3	380	June 11	190
August 12	372	June 20	188
June 29	421	May 5	270
June 15	402	May 13	232
June 8	398	May 25	216
June 21	395	May 7	216
June 22	386	May 21	200
June 10	385	May 23	184
June 12	370	May 29	182

Table 2 Peak planning day without helicopters

Itinerant		Local	
Date	Movements	Date	Movements
July 13	365	July 12	322
July 20	361	July 9	282
July 27	351	July 3	266
July 12	350	July 4	266
July 4	350	July 8	244
July 3	347	July 13	228
July 8	345	July 29	224
August 24	376	June 6	286
August 10	365	June 2	246
August 23	363	June 12	226
August 19	351	June 25	220
August 20	336	June 19	194
August 2	334	June 11	190
August 13	327	June 20	188
June 29	363	May 5	270
June 15	354	May 13	232
June 26	354	May 25	216
June 8	351	May 7	216
June 12	350	May 21	200
June 21	341	May 23	184
June 7	326	May 29	182

3.1.2 Fleet composition and runway use

The data on the composition of the fleet of all operations at the Airport in 2018 including helicopters is presented in Appendix A. The document TP-143 – Air Traffic Designators from Transport Canada is the primary source of information for the identification of aircraft types. Other sources, such as Transport Canada's aircraft registration database and commercial databases, were also referenced.

Figure 1 illustrates the configuration of runways, taken from the Canada Air Pilot. Figure 2 and Figure 3 summarize the composition of fleet and runway use for the airport in 2018, compiled from the itinerant movements database from Transport Canada. Detailed data is presented in Appendix B.

The total number of movements in 2018 was 134,854, divided into 98,356 itinerant movements and 36,498 local movements.

Figure 1 Runway identification

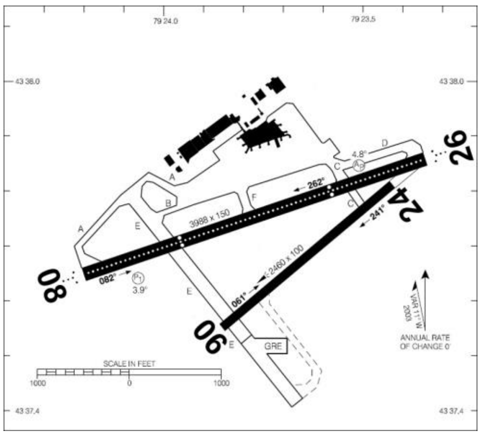
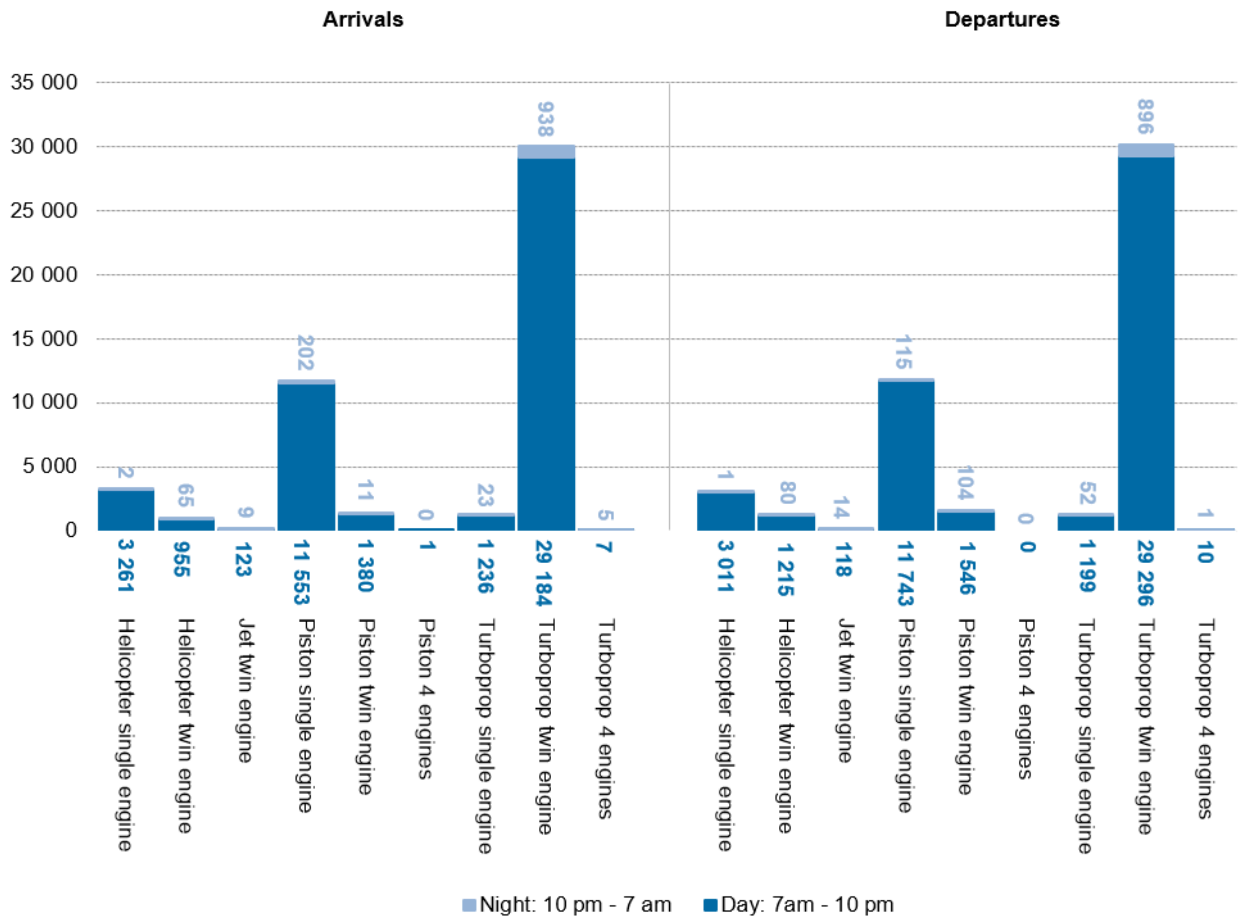


Figure 2 Summary of fleet composition



The movements during the night (10 p.m. to 7 a.m.) accounted for 2.4% of total movements in 2018. For the calculation of noise contours, using the methodology, each night-time movement is equivalent to 16.67 daytime movements. The 3,286 night-time movements recorded in 2018 are equivalent to 54,778 daytime movements. The night-time movements represent an important contribution to the noise contours.

Overall, twin-engine turboprops (mostly DASH-8) are the most frequent aircraft at the Airport with 45% of all movements. The DASH-8 Q400 alone accounts for 43% of all movements of 2018. They are followed by single engine piston aircraft with 44% of operations.

Figure 3 illustrates the summary of runway use and Table 2 shows the runway use by aircraft types.

Figure 3 Summary of runway use

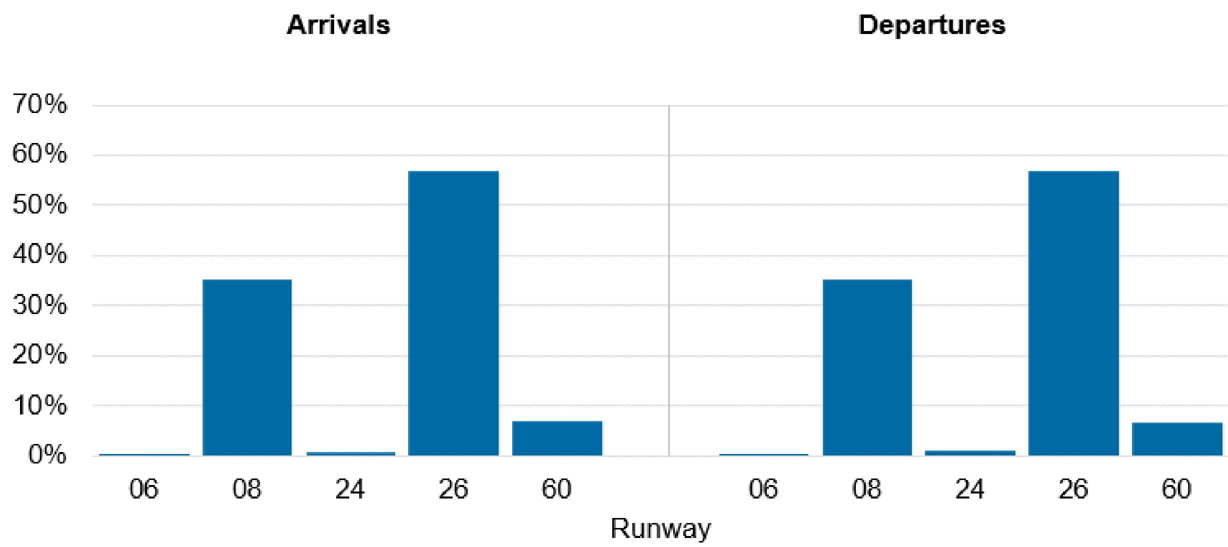


Table 3 Runway use by aircraft category

Runway	Global		Helicopters		Jets		Pistons		Turboprops	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
06	84	13	2	3	0	0	81	10	1	0
	0.2%	0.03%	0.05%	0.07%	0%	0%	1%	0.07%	0.003%	0%
08	17,178	17,460	282	361	35	38	5,004	5,167	11,857	11,894
	35%	35%	7%	8%	27%	29%	38%	38%	38%	38%
24	435	582	1	1	0	0	428	579	6	2
	0.9%	1%	0.02%	0.02%	0%	0%	3%	4%	0.02%	0.01%
26	27,777	28,017	517	613	97	94	7,634	7,752	19,529	19,558
	57%	57%	12%	14%	73%	71%	58%	57%	62%	62%
60	3,481	3,329	3,481	3,329	0	0	0	0	0	0
	7%	7%	81%	77%	0%	0%	0%	0%	0%	0%
Total	48,955	49,401	4,283	4,307	132	132	13,147	13,508	31,393	31,454
	100%	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 4 indicates the aircraft used in the represented categories defined in the calculation. Aircrafts with a small number of movements in 2018 are not shown in this table; they are listed in detail in Appendix A.

Table 4 Aircraft categories

Aircraft categories	Aircraft types
Helicopter single engine	Robinson R44, etc.
Helicopter twin engine	Agusta Westland AW139, etc.
Piston single engine	Cessna series 150/172, Beech 36, Gippsaero GA8 Airvan, Piper PA-28, etc.
Piston twin engine	Piper PA-23/31, Cessna 400, etc.
Turboprop single engine	Pilatus PC-12, Cessna 208 Caravan, etc.
Turboprop twin engine	Dash 8, Beech 300, etc.
Jet twin engine	Dassault Falcon 10, etc.

3.1.3 Flight paths

Flight paths for departures, arrivals and circuits have been modelled from information gathered from the Canada Air Pilot, the Canada Flight Supplement, Porter Airlines and NAV CANADA.

Departure flight paths:

› Runway 08: right turn at waypoint LODRA (N43 38.31 W79 21.52), heading 090°;

› Runway 26: left turn at 800’ ASL, to waypoint EMDOS (N43 31.08 W79 19.28).

Approach slopes:

› Runways 06, 08, and 24: 3.5°;

› Runway 26: 3.5° (visual) or 4.8° (instrument).

Runways 24 and 26 have left hand circuits while runways 06 and 08 have right hand circuits.

3.2 Results

Figure 4 illustrates the Airport's noise contours for 2018 actual movements including helicopters, along with the 1990 NEF contours. The 1990 NEF contours were prepared in April 1978 by the Canadian Air Transport Administration of the Ministry of Transport for the Canada Mortgage and Housing Corporation. The noise contours excluding helicopters are shown in Figure 5.

The Agreement imposes a limit on the expansion of NEF contours. Section 27 of the Agreement requires that the 28 NEF contour does not expand beyond the official 25 NEF contour for 1990, except between points "X" and "Y". If the 28 NEF contour does expand beyond the official 25 NEF contour for 1990, aircraft movements have to be controlled in such a way to bring back the 28 NEF contour within the official 25 NEF contour for 1990.

The analysis shows that the 28 NEF Contour for 2018, including helicopters in the calculation, does not expand beyond the official 25 NEF Contour for 1990 but precisely join to the northwest of the airport. There is no margin left for the 28 NEF Contour to expand from the current one.

When helicopters are excluded from the calculation, the NEF contours shrink slightly, achieving a better compliance within the limit in the Agreement.

Figure 4 NEF contours with helicopters

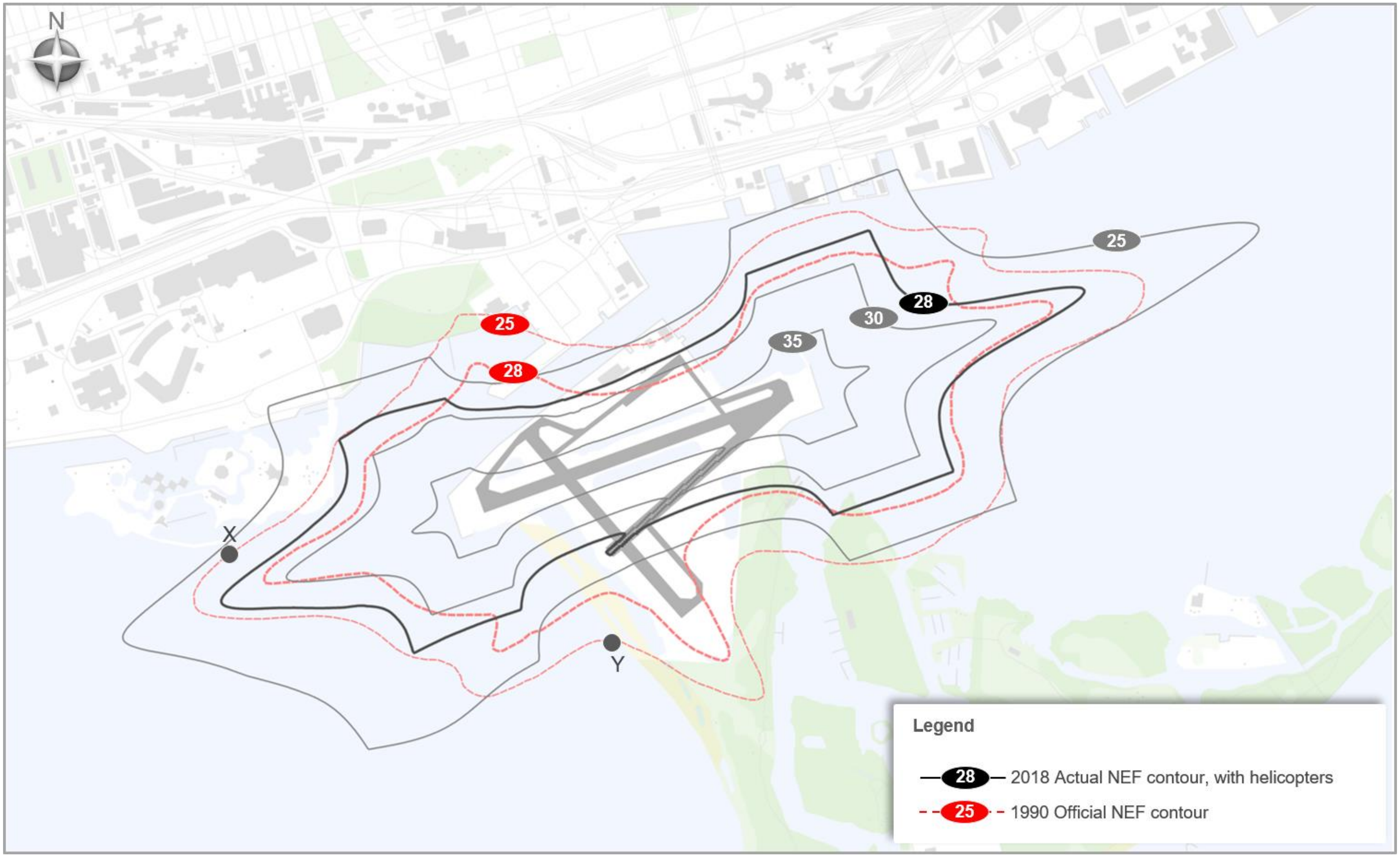


Figure 5 NEF contours without helicopters

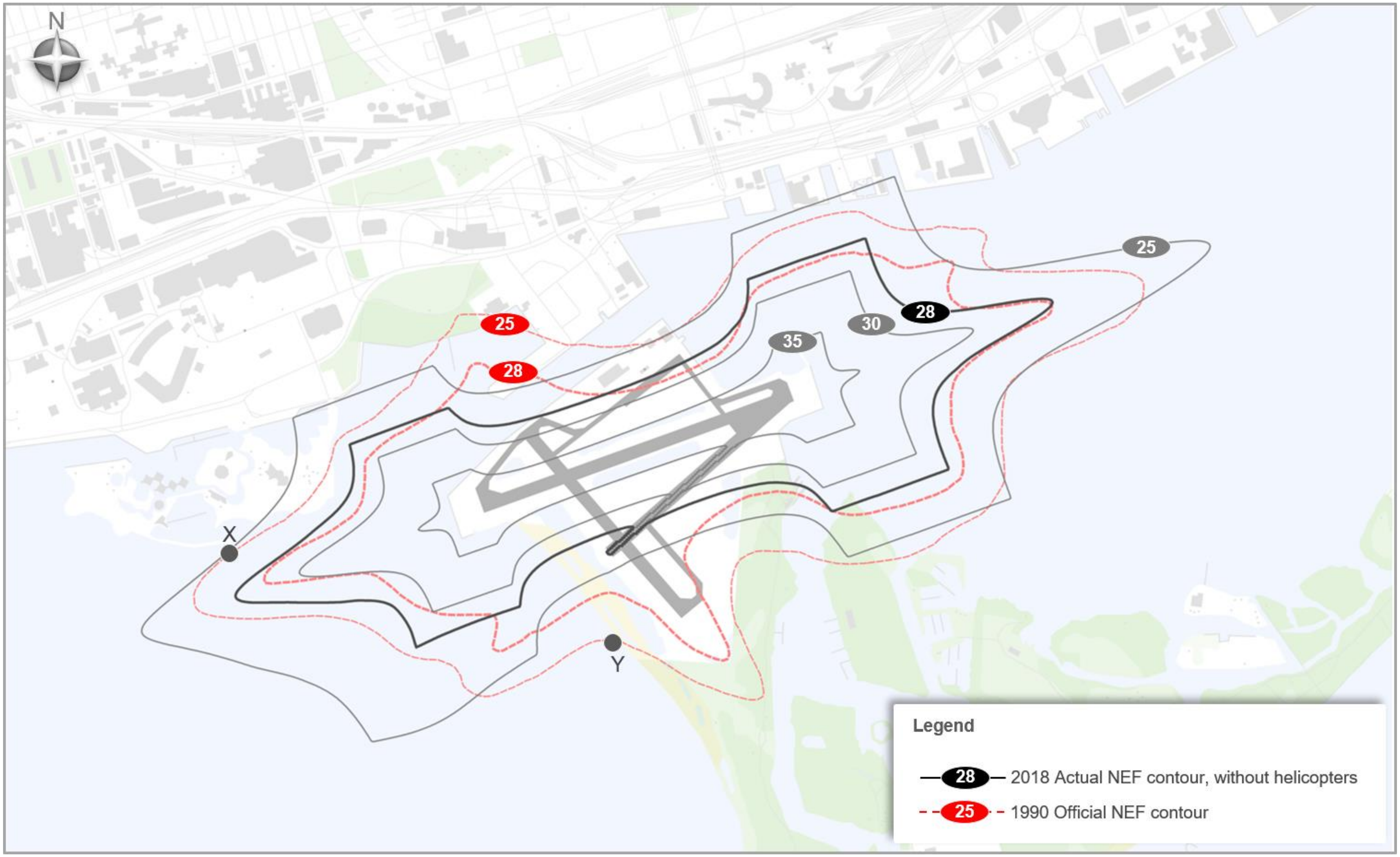


Table 5 shows the surface area within the contours in 2018. It is the total surface area in each range of NEF values.

Table 5 Surface area (km^2)

NEF	Surface area (km^2)	
	With helicopters	Without helicopters
35 +	0.4	0.3
30 - 35	0.8	0.7
28 - 30	0.6	0.6
25 - 28	1.6	1.5
Total	**3.5**	**3.1**

4 Conclusion

The 2018 noise exposure contours for the Airport have been computed in accordance with Transport Canada methodology. The surface area within contours was also compiled. These contours cover a total area of 3.5 square kilometers (km^2) including helicopters, and 3.1 km^2 excluding helicopters. The NEF 28 contour covers an area of 1.8 km^2 including helicopters, and 1.6 km^2 excluding helicopters.

The 28 NEF contours for 2018, with and without helicopters, do not expand beyond the official 25 NEF contour for 1990, the limit set by the Agreement for the expansion of the NEF contour.

5 Bibliography

INTERNATIONAL CIVIL AVIATION ORGANIZATION, Standards and Recommended Practices, Protection of the Environment, Annex 16 to the convention relative to international civil aviation, Volume 1, “Aircraft Noise”, second edition, 1988.

TRANSPORT CANADA, Aviation Group, “NEF micro computer system user manual”, June 1990, TP 6907.

TRANSPORT CANADA, “Land Use Planning in the Vicinity of Airports”, 9th edition, 2013/14, TP 1247.

TRANSPORT CANADA, “Air Traffic Designators”, TP 143, 2009.

FAA, U.S. Department of transportation, Advisory Circular, “Noise Levels for U.S. Certificated and Foreign Aircraft”, 2001.

Appendix A

Fleet composition

Aircraft	D1*	D2*	D3*	D4*	MTOW	Manufacturer	Model	Equivalent	Number
A109	L	2	T	R	3,000	AGUSTA	A-109, Power	B222	27
A139	M	2	T	R	6,400	AGUSTAWESTLAND	AW-139	BH12/CH135MAN	2,091
A319	M	2	J	R	76,000	AIRBUS	A-319	A319	1
AA5	L	1	P	F	1,000	AMERICAN	AA-5 Traveler	GASEPF	21
AC11	L	1	P	R	2,000	ROCKWELL	112, 114 Commander, Alpine Commander	RWCM14	38
AC90	L	2	T	R	5,000	ROCKWELL	690 Turbo Commander, Jetprop Commander 840	RWCM69	1
AC95	L	2	T	R	6,000	ROCKWELL	695 Jetprop Commander 980/1000	RWCM69	5
AEST	L	2	P	R	3,000	PIPER	PA-60, Aerostar	PA60	18
AS50	L	1	T	F	3,000	AEROSPATIALE	AS-350/550 Ecureuil, Astar, SuperStar, Fennec	AS350	4
AS55	L	2	T	F	3,000	AEROSPATIALE	AS-355/555 Ecureuil 2, TwinStar, Fennec	B222	30
B06	L	1	T	F	2,000	BELL	206A/B/L, 406, LongRanger (CH-139 JetRanger)	BH06MAN	84
B190	M	2	T	R	8,000	BEECH	1900 Airliner (C-12J)	BEC190	4
B350	M	2	T	R	6,000	BEECH	B300 Super King Air 350	DHC6	592
B427	L	2	T	F	3,000	BELL	427	B222	2
B429	L	2	T	F	3,175	BELL	GlobalRanger	B222	27
B430	L	2	T	R	5,000	BELL	430	B222	31
B738	M	2	J	R	77,000	BOEING	737-800	737800	1
BE10	L	2	T	R	6,000	BEECH	100 King Air (U-21F)	BEC100	109
BE20	L	2	T	R	6,000	BEECH	200, 1300 Super King Air, Commuter (C-12A)	BEC200	243
BE23	L	1	P	F	2,000	BEECH	23 Musketeer, Sundowner	GASEPF	6
BE24	L	1	P	R	2,000	BEECH	24 Musketeer Super, Sierra	GASEPF	4
BE30	M	2	T	R	7,000	BEECH	300 Super King Air	BEC300	70
BE33	L	1	P	R	2,000	BEECH	33 Bonanza (E-24)	BEC33	12
BE35	L	1	P	R	2,000	BEECH	35 Bonanza	GASEPV	40
BE36	L	1	P	R	2,000	BEECH	36 Bonanza	GASEPV	3,094
BE55	L	2	P	R	3,000	BEECH	55 Baron (T-42)	BEC55	9
BE58	L	2	P	R	3,000	BEECH	58 Baron	BEC58	37
BE60	L	2	P	R	4,000	BEECH	60 Duke	BEC60	4
BE9L	L	2	T	R	5,000	BEECH	90, A90-E90 King Air (T-44, VC-6)	BEC90	24
BE9T	L	2	T	R	5,000	BEECH	F-90 King Air	BEC9F	17
BL17	L	1	P	R	2,000	BELLANCA	17 Viking, Super Viking, Turbo Viking	BL26	2
BL8	L	1	P	F	2,000	BELLANCA	8 Decathlon, Scout	GASEPF	6

Aircraft	D1*	D2*	D3*	D4*	MTOW	Manufacturer	Model	Equivalent	Number
C140	L	1	P	F	1,000	CESSNA	140	CNA150	1
C150	L	1	P	F	1,000	CESSNA	150, A150, Commuter, Aerobat	CNA150	17,605
C152	L	1	P	F	1,000	CESSNA	152, A152, Aerobat	CNA152	1,512
C170	L	1	P	F	1,000	CESSNA	170	CNA170	3
C172	L	1	P	F	2,000	CESSNA	172, P172, R172, Skyhawk, Cutlass (T-41)	CNA172	29,890
C177	L	1	P	F	2,000	CESSNA	177, Cardinal	CNA177	41
C180	L	1	P	F	2,000	CESSNA	180, Skywagon 180 (U-17C)	CNA180	85
C182	L	1	P	F	2,000	CESSNA	182, Skylane	CNA182	559
C185	L	1	P	F	2,000	CESSNA	185, A185 Skywagon, Skywagon 185 (U-17A/B)	CNA185	73
C205	L	1	P	F	2,000	CESSNA	205	CNA205	2
C206	L	1	P	F	2,000	CESSNA	206, P206, T206, TP206, (Turbo) Super Skywagon	CNA206	718
C208	L	1	T	F	4,000	CESSNA	208 Caravan 1, (Super)Cargomaster (C-98, U-27)	CNA208	806
C210	L	1	P	R	2,000	CESSNA	210, T210, (Turbo)Centurion	CNA210	35
C240	L	1	P	F	1,600	CESSNA	TTx Model T240	GASEPV	10
C310	L	2	P	R	3,000	CESSNA	310, T310 (U-3, L-27)	CNA310	88
C337	L	2	P	R	2,000	CESSNA	337, M337 (Turbo)Super Skymaster (O-2)	CNA337	42
C340	L	2	P	R	3,000	CESSNA	340	CNA340	50
C404	L	2	P	R	4,000	CESSNA	404 Titan	CNA404	4
C414	L	2	P	R	3,000	CESSNA	414, Chancellor	CNA414	52
C421	L	2	P	R	4,000	CESSNA	421, Golden Eagle, Executive Commuter	CNA421	38
C425	L	2	T	R	4,000	CESSNA	425 Corsair, Conquest 1	CNA425	4
C441	L	2	T	R	5,000	CESSNA	441 Conquest, Conquest 2	CNA441	34
C550	M	2	J	R	7,000	CESSNA	550, S550, 552 Citation 2/S2/Bravo (T-47, U-20)	CNA550	56
C72R	L	1	P	R	2,000	CESSNA	172RG Cutlass RG	GASEPV	6
C77R	L	1	P	R	2,000	CESSNA	177RG Cardinal RG	CNA17B	16
C82R	L	1	P	R	2,000	CESSNA	R182, TR182 (Turbo)Skylane RG	CNA182	6
CL30	M	2	J	R	17,000	BOMBARDIER	BD-100 Challenger 300	CL601	1
COL3	L	1	P	F	1,500	Lancair	LC40-550FG	BEC58P	2
COL4	L	1	P	F	1,633	CESSNA AIRCRAFT CO.	400 Corvalis TT	BEC58P	1,100
DA40	L	1	P	F	1,800	DIAMOND AIRCRAFT IND INC	DA 40	GASEPF	89
DA42	L	2	P	R	1,700	DIAMOND	DA42	GASEPV	101
DA62	L	2	P	R	2,300	DIAMOND	DA62	BEC58P	10

Aircraft	D1*	D2*	D3*	D4*	MTOW	Manufacturer	Model	Equivalent	Number
DC3	M	2	P	R	13,000	DOUGLAS	DC-3 (C-41, C-47 Skytrain, Skytrooper, Dakota)	DC3	6
DH2T	L	1	T	F	3,000	DE HAVILLAND	DHC-2 Mk3 Turbo Beaver	CNA441	3
DH8A	M	2	T	R	16,000	DE HAVILLAND	DHC-8-100 Dash 8 (E-9, CT-142, CC-142)	DHC8	7
DH8B	M	2	T	R	16,000	DE HAVILLAND	DHC-8-200 Dash 8	DHC8	1
DH8D	M	2	T	R	26,000	DE HAVILLAND	DHC-8-400 Dash 8	DHC830	58,357
DHC2	L	1	P	F	3,000	DE HAVILLAND	DHC-2 Mk1 Beaver (U-6, L-20)	DHC2	17
DHC7	M	4	T	R	20,000	DE HAVILLAND	DHC-7 Dash 7 (O-5, EO-5)	DHC7	23
DV20	L	1	P	F	1,000	DIAMOND	DA-20/22, DV-20 Katana, Speed Katana	GASEPF	53
E300	L	1	P	F	1,000	EXTRA	300, 350	GASEPV	2
EC20	L	1	T	F	2,000	EUROCOPTER	EC-120 Colibri	BH06MAN	11
EC30	L	1	T	F	2,400	EUROCOPTER	EC130B4	AS350	29
ERCO	L	1	P	F	1,000	ALON	A-2 Aircoupe	GASEPF	1
EVOL	L	1	T	R	2,000	LANCAIR	Lancair Evolution	GASEPV	2
EVSS	L	1	P	F	600	AEROTECHNIC	Sportstar	GASEPF	2
EXPR	L	1	P	F	1,400	AURIGA	Phoenix	GASEPF	6
F2TH	M	3	J	R	17,000	DASSAULT	Falcon 2000	FAL20A	1
FA10	M	2	J	R	9,000	DASSAULT	Falcon 10, Mystere 10	FAL10	161
FA20	M	2	J	R	15,000	DASSAULT	Falcon 20, Mystere 20 (T-11, TM-11)	FAL20	43
GA8	L	1	P	F	1,800	GIPPSAERO	GA8 Airvan	CNA206	2,000
GB6T	L	1	T	A	2,000	BERNIER	G-bair 6T (dérivé de CNA206)	CNA206	54
GLAS	L	1	P	F	1,088	STODDARD-HAMILTON	(INDICATIF SUPPRIMÉ EN 2005) Glasair	GASEPF	2
GLST	L	1	P	F	890	Glasair	Glastar	GASEPF	1
HUSK	L	1	P	F	1,000	CHRISTEN	A-1 Husky	GASEPV	2
J3	L	1	P	F	1,000	PIPER	J-3 Cub (L-4, NE)	GASEPF	1
JS32	M	2	T	R	8,000	BRITISH AEROSPACE	BAe-3200 Jetsream Super 31	BAEJ31	2
KODI	M	1	T	F	3,290	Quest kodiak	kodiak aircraft	CNA20T	4
L8	L	1	P	F	1,000	LUSCOMBE	8, T8, 50, Master, Silvaire, Observer	GASEPF	10
LA25	L	1	P	A	2,000	LAKE	LA-250/270 (Turbo)Renegade, Seawolf, Seafury	GASEPF	4
LA4	L	1	P	A	2,000	LAKE	LA-4/200, Buccaneer	LA42	47
LANC	M	4	P	R	23,000	AVRO	683 Lancaster	L188	1
LNC2	L	1	P	R	1,000	LANCAIR	Lancair 200/235/320/360	GASEPV	4
LNC4	L	1	P	R	2,000	LANCAIR	Lancair 4	GASEPV	17

Aircraft	D1*	D2*	D3*	D4*	MTOW	Manufacturer	Model	Equivalent	Number
M20P	L	1	P	R	2,000	MOONEY	M-20, M-20A-J/L/R (non-turbocharged)	M20J	148
M20T	L	1	P	R	2,000	MOONEY	M-20K/M, Bravo, Encore (turbocharged)	M20K	21
M5	L	1	P	F	2,000	MAULE	M-5, Strata Rocket, Lunar Rocket, Patroller	GASEPF	2
MU2	L	2	T	R	5,000	MITSUBISHI	MU-2, Marquise, Solitaire (LR-1)	MU2	400
NAVI	L	1	P	R	2,000	NORTH AMERICAN	NA-145/154 Navion (L-17, U-18)	GASEPV	2
P180	L	2	T	R	6,000	PIAGGIO	P-180 Avanti	SD330	24
P210	L	1	P	R	2,000	CESSNA	P210 Pressurized Centurion	CNA206	37
P28A	L	1	P	F	2,000	PIPER	PA-28-140/150/160/180 Archer, Cadet, Cherokee	PA28CA	1,670
P28B	L	1	P	F	2,000	PIPER	PA-28-201T/235/236 Cherokee, Dakota	PA28CA	19
P28R	L	1	P	R	2,000	PIPER	PA-28R-180/200/201 Cherokee Arrow, Turbo Arrow	PA28CA	78
P28T	L	1	P	R	2,000	PIPER	PA-28RT Arrow 4, Turbo Arrow 4	PA28CA	10
P32R	L	1	P	R	2,000	PIPER	PA-32R Cherokee Lance, Saratoga SP, Turbo	GASEPV	24
P32T	L	1	P	R	2,000	PIPER	PA-32RT Lance 2, Turbo Lance 2	GASEPV	4
P337	L	2	P	R	3,000	CESSNA	T337G, P337 Pressurized Skymaster	CNA337	8
P46T	L	1	T	R	2,000	PIPER	PA-46T Malibu Meridian	PA46	107
PA12	L	1	P	F	1,000	PIPER	PA-12 Super Cruiser	GASEPF	1
PA18	L	1	P	F	1,000	PIPER	PA-18 Super Cub (L-18C, L-21, U-7)	PA18	2
PA22	L	1	P	F	1,000	PIPER	PA-22 Tri-Pacer, Caribbean, Colt	PA22CO	12
PA24	L	1	P	R	2,000	PIPER	PA-24 Comanche	PA24	51
PA27	L	2	P	R	3,000	PIPER	PA-23-235/250 Aztec, Turbo Aztec (U-11)	PA23AZ	267
PA30	L	2	P	R	2,000	PIPER	PA-30/39 Twin Comanche, Turbo Twin Comanche	PA30	91
PA31	L	2	P	R	4,000	PIPER	PA-31/31P Navajo, Chieftain, Mojave, T-1020	PA31	2,283
PA32	L	1	P	F	2,000	PIPER	PA-32 Cherokee Six, Saratoga, Turbo Saratoga	GASEPV	63
PA34	L	2	P	R	3,000	PIPER	PA-34 Seneca	PA34	28
PA44	L	2	P	R	2,000	PIPER	PA-44 Seminole, Turbo Seminole	PA44	6
PA46	L	1	P	R	2,000	PIPER	PA-46 Malibu, Malibu Mirage	PA46	114
PAY1	L	2	T	R	5,000	PIPER	PA-31T1-500 Cheyenne 1	PA31T	6
PAY2	L	2	T	R	5,000	PIPER	PA-31T-620/T2-620 Cheyenne, Cheyenne 2	CNA441	9
PAY3	L	2	T	R	6,000	PIPER	PA-42-720 Cheyenne 3	CNA441	16
PAY4	L	2	T	R	6,000	PIPER	PA-42-1000 Cheyenne 400	CNA441	2
PC12	L	1	T	R	5,000	PILATUS	PC-12, Eagle	CNA20T	1,630

Aircraft	D1*	D2*	D3*	D4*	MTOW	Manufacturer	Model	Equivalent	Number
PTS2	L	1	P	F	1,000	PITTS	S-2 Special	GASEPF	2
R44	L	1	P	F	2,000	ROBINSON	R-44 Astro	HU30	6,102
R66	L	1	T	F	1,225	Robinson	R66	BH06MAN	45
RV10	L	1	P	F	1,200	VAN'S	RV-10	GASEPV	10
RV6	L	1	P	F	1,000	VAN'S	RV-6	GASEPF	14
RV7	L	1	P	F	815	VAN'S	RV-7	GASEPV	12
RV8	L	1	P	F	815	VAN'S	RV-8	GASEPF	8
RV9	L	1	P	F	793	VAN'S	RV9/9A	GASEPF	4
S76	L	2	T	R	5,000	SIKORSKY	S-76, H-76, AUH-76, Spirit, Eagle (HE-24)	S76	55
S92	M	2	T	R	12,000	SIKORSKY	S-92 Helibus	AS332	52
SR20	L	1	P	F	2,000	CIRRUS	SR-20	GASEPF	17
SR22	L	1	P	F	1,500	CIRRUS	SR22	GASEPF	404
SW4	M	2	T	R	7,000	FAIRCHILD SWEARINGEN	Merlin 4C, Metro2/2A, Metro 3, Metro 3A, Expediter, Merlin 23, 4	SAMER4	286
T18	L	1	P	F	800	THROP	Throp T-18	GASEPV	2
TAMP	L	1	P	F	2,000	SOCATA	TB-9 Tampico	GASEPF	2
TBM7	L	1	T	R	3,000	SOCATA	TBM-700	CNA441	39
TBM8	L	1	T	R	7,400	Socata	TBM850	CNA441	18
TBM9	L	1	T	R	3,300	SOCATA	TBM 900	CNA441	10
TOBA	L	1	P	F	2,000	AEROSPATIALE	Tobago	GASEPF	4
TRIN	L	1	P	R	2,000	SOCATA	TB-20/21 Trinidad	GASEPF	16
ULAC	L	1	P	F	500	ULTRA LIGHT	Ultra Light	GASEPF	1
VTUR	L	1	P	F	900	QUESTAIR	Venture	GASEPV	2
Z42	L	1	P	F	2,000	ZLIN	Z-42/142/242	GASEPV	47

*D1: Weight:
L – light
M – medium
H – heavy

*D2: Number of engine

*D3: Engine type:
P – pistons
T – turboprops
J – jets

*D4: Landing gear:
F – fixed
R – removable
A – amphibious

Appendix B

Summary of movements

Fleet summary of itinerant movements

Aircraft	Arrivals			Departures			Total
	Day	Night	Total	Day	Night	Total	
Helicopter single engine	3,261	2	3,263	3,011	1	3,012	6,275
Helicopter twin engine	955	65	1,020	1,215	80	1,295	2,315
Jet twin engine	123	9	132	118	14	132	264
Piston single engine	11,553	202	11,755	11,743	115	11,858	23,613
Piston twin engine	1,380	11	1,391	1,546	104	1,650	3,041
Piston 4 engines	1	0	1	0	0	0	1
Turboprop single engine	1,236	23	1,259	1,199	52	1,251	2,510
Turboprop twin engine	29,184	938	30,122	29,296	896	30,192	60,314
Turboprop 4 engines	7	5	12	10	1	11	23
Total	**47,700**	**1,255**	**48,955**	**48,138**	**1,263**	**49,401**	**98,356**

- Day: 7 a.m. - 10 p.m.
- Night: 10 p.m. - 7 a.m.

Runway use - Arrivals

Aircraft	06		08		24		26		60	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Helicopter single engine			3				2		3,256	2
Helicopter twin engine	2		261	18	1		476	39	215	8
Jet twin engine			33	2			90	7		
Piston single engine	81		4,368	80	422	3	6,682	119		
Piston twin engine			552	3	3		825	8		
Piston 4 engines			1							
Turboprop single engine			477	6	5		754	17		
Turboprop twin engine	1		11,050	320	1		18,132	618		
Turboprop 4 engines			2	2			5	3		
Total	**84**	**0**	**16,747**	**431**	**432**	**3**	**26,966**	**811**	**3,471**	**10**

Runway use - Departures

Aircraft	06		08		24		26		60	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Helicopter single engine			7				6		2,998	1
Helicopter twin engine	3		320	34	1		568	39	323	7
Jet twin engine			31	7			87	7		
Piston single engine	10		4,495	36	576		6,662	79		
Piston twin engine			597	39	3		946	65		
Turboprop single engine			471	20	2		726	32		
Turboprop twin engine			11,074	325			18,222	571		
Turboprop 4 engines			4				6	1		
Total	**13**	**0**	**16,999**	**461**	**582**	**0**	**27,223**	**794**	**3,321**	**8**

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