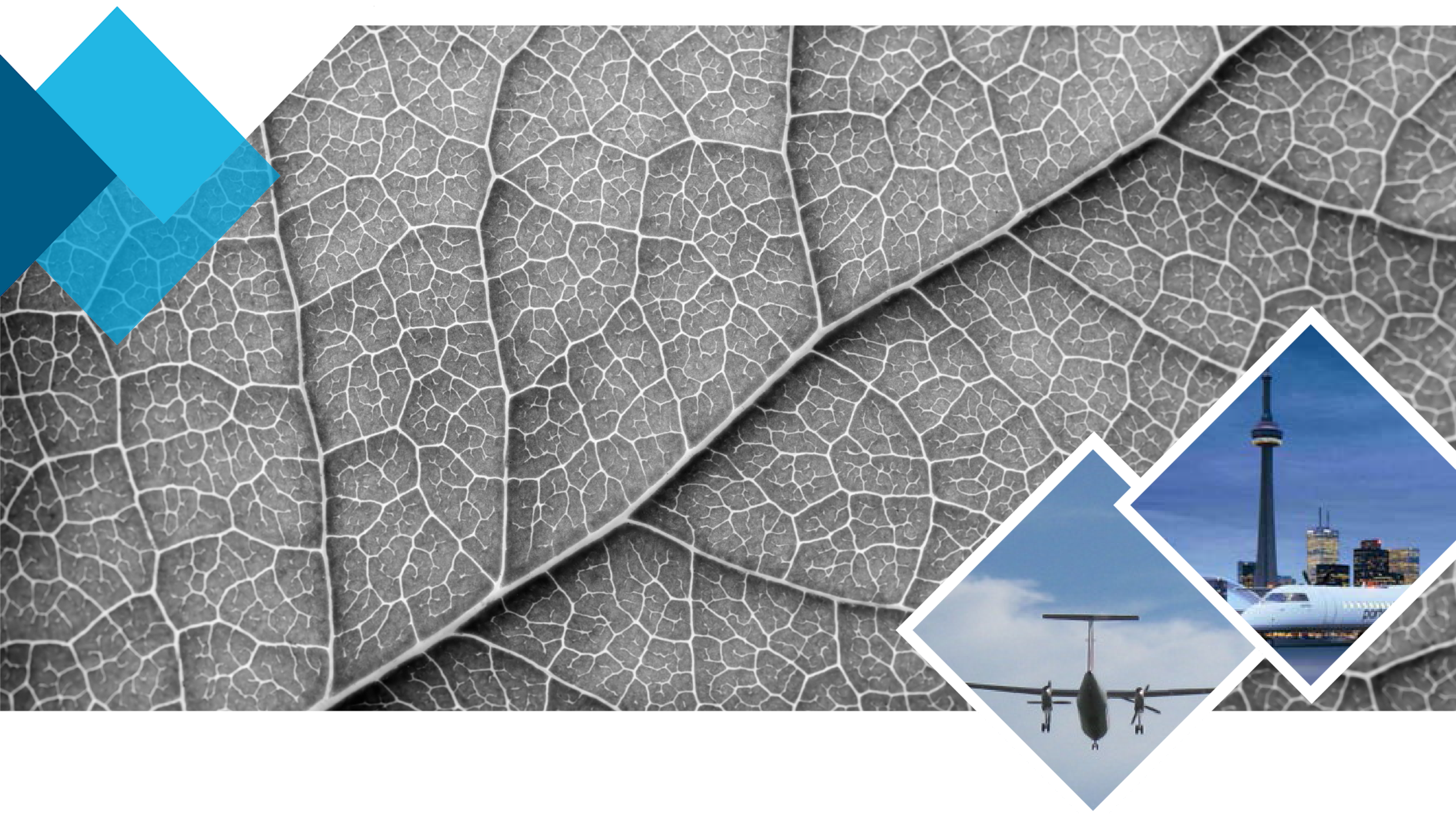
2015 Noise Exposure Contours

Billy Bishop Toronto City Airport

TRANSPORT CANADA



Environment & Geoscience

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Final Report > Rev. V-00
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January 23, 2017

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Subject: Final Report
2015 Noise Exposure Contours – Billy Bishop Toronto City Airport
O/Ref.: 641915

Dear Mr. Daniel,

We are pleased to submit by email our final report following the realization of the abovementioned mandate.

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

Best regards,

Jacques Savard, M.Sc.
Deputy Director, Acoustics and vibration
Environment & Geoscience
Infrastructure

/sc

Encl.

2015 Noise Exposure Contours

Billy Bishop Toronto City Airport

Final Report

TRANSPORT CANADA

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Infrastructure

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O/Document : Final Report VF-00

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The findings, conclusions and recommendations in this report (i) have been developed in a manner consistent with the level of skill normally exercised by professionals currently practising under similar conditions in the area, and (ii) reflect SNC-Lavalin Inc.'s, best judgment based on information available at the time of preparation of this report. No other warranties, either expressed or implied, are made with respect to the professional services provided to Client or the findings, conclusions and recommendations contained in this report. The findings and conclusions contained in this report are valid only as of the date of this report and may be based, in part, upon information provided by others. If any of the information is inaccurate, new information is discovered or project parameters change, modifications to this report may be necessary.

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Executive Summary

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

The analysis of the contours involved a review of the data to ascertain if the actual 28 Noise Exposure Contour is closer at any point, except in a direction westerly of the Billy Bishop Toronto City Airport between points "X" and "Y", to the official 25 NEF Contour for 1990, than to the official 28 NEF Contour for 1990 (reference Schedule F of the Tripartite Agreement). This condition pertains to Section 34 of the Tripartite Agreement on the preparation of NEF contours.

The Tripartite Agreement imposes a limit on the expansion of NEF contours. Section 27 of the Tripartite Agreement requires that the actual 28 NEF contour does not expand beyond the official 25 NEF contour for 1990, except between points "X" and "Y".

The analysis shows that the 28 NEF contour for calendar year 2015, with helicopters included in the calculation, slightly exceeds the 28 NEF Contour for 1990 for small sections of the contour to the north of the main runway. However, the extent of the actual 28 NEF contour is not sufficient to bring it closer at any point to the 25 NEF Contour for 1990, than to the 28 NEF Contour for 1990. The 28 NEF contour for calendar year 2015 does not expand beyond the official 25 NEF contour for 1990 and remains well within the limit set by the Tripartite Agreement for the expansion of the NEF contour.

When helicopters are excluded from the calculation, the NEF contours shrink slightly, achieving an even better compliance with the limits set in the Tripartite Agreement.

Table i Surface area inside 2015 noise contours

NEF	Surface area (km^2)	
	With helicopters	Without helicopters
35 +	0.35	0.32
30 - 35	0.64	0.58
28 - 30	0.50	0.47
25 - 28	1.30	1.23
Total	**2.78**	**2.60**

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1 Introduction

This document presents the noise contours for the year 2015 for Billy Bishop Toronto City Airport.

Environmental noise or community noise, including airports activities, is not regulated by Canada's government. Nevertheless Transport Canada has developed a methodology for assessing the perceived noise in the vicinity of airports. This method is established across Canada and is used for this study. The interpretation of results it produces 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 NEF or "Noise Exposure Forecast" contours. The NEF methodology is not by itself a forecast, but a noise calculation based either on a forecast of future movements or on actual movements. The noise contours for 2015, presented in this report, have been produced using the NEF methodology on the basis of actual movements 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 the public 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 aircraft, the runway used, the flight path, the flight distance, and the period of day. Note that the night period is defined from 10 pm to 7 am.

Flight distances and departure flight path directions have been determined according to geographic coordinates of destination airports; themselves 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 airport and calculates noise levels for the receptor grid. Noise exposure contours are then drawn for the whole study area.

NEF-Calc 2.0.6.1 doesn't include sound data for aircraft DASH-8 Q400. Therefore, sound data of DASH-8-300, which is included in NEF-Calc 2.0.6.1, is used to model aircraft Q400. This hypothesis has a major impact on the noise contours, especially considering that Q400 is the most represented aircraft in terms of the number of movements with 48% of all movements in 2015.

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 aircraft movements’ database from Transport Canada for Billy Bishop Toronto City Airport for 2015 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 in 2015 for Billy Bishop Toronto City Airport.

The number of movements of the Peak Planning Day is found to be 354 for itinerant movements and 232 for local movements. In comparison, the averages for 2015 are 246 itinerant movements and 89 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 they 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 354 itinerant movements and 232 local movements (116 circuits), with a total of 586 aircraft movements.

Helicopters accounted for 6,880 movements in 2015, of which 2,195 were runway operations, mostly Ornge flights using AgustaWestland AW139 helicopters, and 4,685 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 313 for itinerant movements, and 232 for local movements. In comparison, the averages for 2015 are 227 itinerant movements, and 89 local movements per day.

Table 1 Peak planning day with helicopters

Itinerant		Local	
Date	**Movements**	**Date**	**Movements**
June 19	423	June 25	292
June 26	410	June 24	262
June 11	372	June 18	224
June 17	345	June 29	214
June 5	325	June 19	206
June 3	322	June 26	204
June 29	320	June 17	182
July 3	367	July 9	318
July 31	359	July 10	298
July 24	358	July 8	296
July 10	353	July 3	250
July 23	345	July 2	250
July 5	344	July 24	238
July 16	339	July 27	222
August 21	361	August 13	248
August 16	361	August 8	216
August 28	354	August 26	208
August 13	351	August 7	190
August 7	347	August 28	188
August 6	338	August 1	184
August 17	336	August 31	182

Table 2 Peak planning day without helicopters

Itinerant		Local	
Date	**Movements**	**Date**	**Movements**
July 10	333	June 25	292
July 23	328	June 24	262
July 28	325	June 18	224
July 24	325	June 29	214
July 31	318	June 19	206
July 15	317	June 26	204
July 3	315	June 17	182
August 13	330	July 9	318
August 7	321	July 10	298
August 5	313	July 8	296
August 17	310	July 3	250
August 6	309	July 2	250
August 28	307	July 24	238
August 27	300	July 27	222
September 10	332	August 13	248
September 14	300	August 8	216
September 16	299	August 26	208
September 25	298	August 7	190
September 4	297	August 28	188
September 17	295	August 1	184
September 27	294	August 31	182

3.1.2 Fleet composition and runway use

The data on the composition of the fleet of all operations at Billy Bishop Toronto City Airport in 2015 is presented in Appendix A, including helicopters. 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 have also been used.

Figure 1 shows the configuration of runways, taken from the Canada Air Pilot. Figures 2 and 3 summarize the composition of fleet and runway use for the airport in 2015, compiled from the itinerant movements database from Transport Canada. Detailed data is presented in Appendix B.

The total number of movements in 2015 was 122,354, divided into 89,774 itinerant movements and 32,580 local movements.

Figure 1 Runway identification

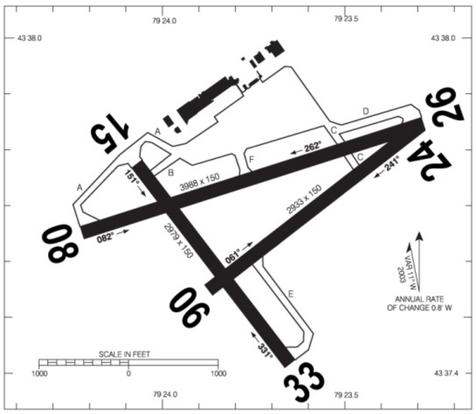
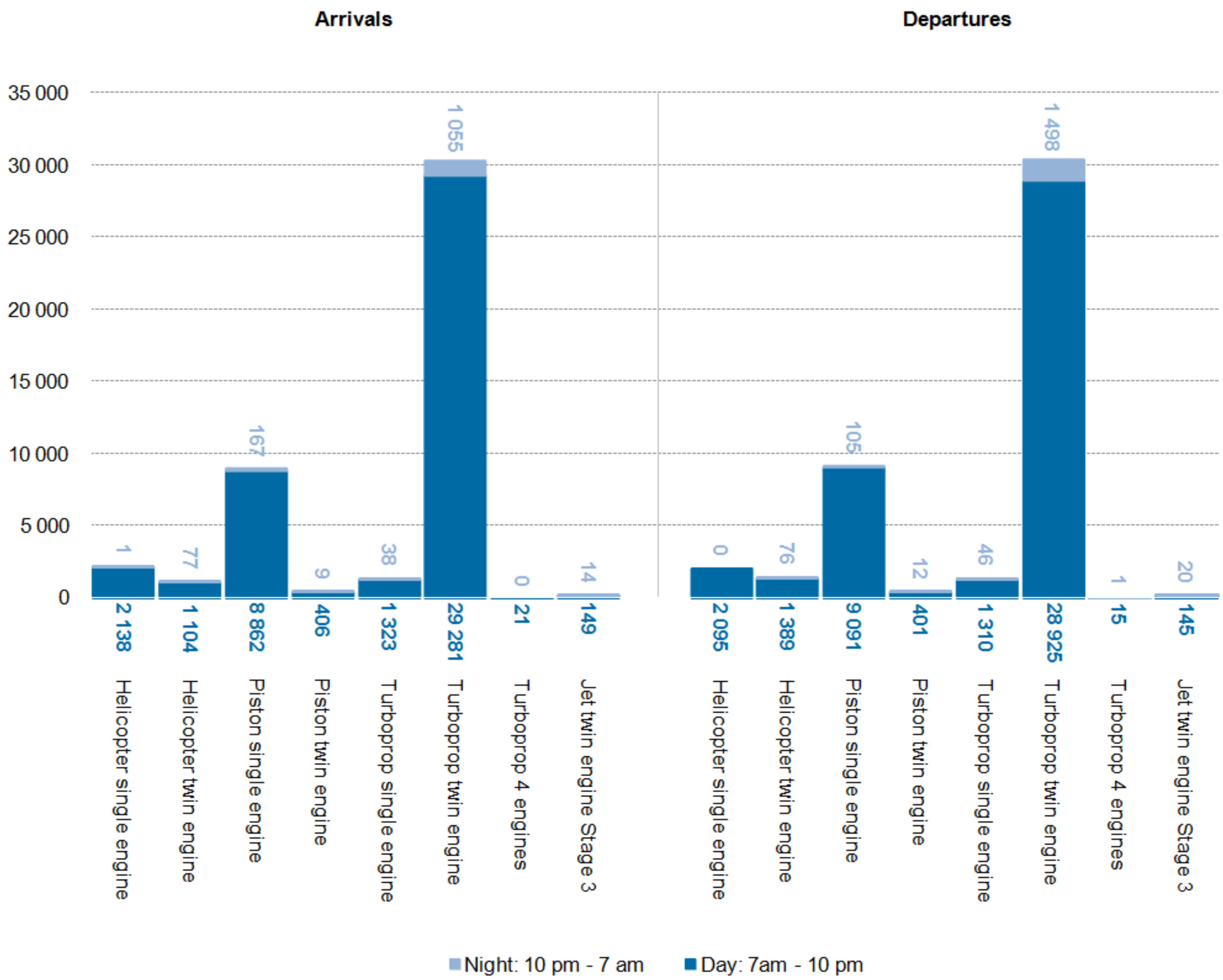


Figure 2 Summary of fleet composition



The movements during the night (10 pm to 7 am) accounted for 3.0% of total movements in 2015. For the calculation of noise contours, using the methodology of Transport Canada, each night-time movement is equivalent to 16.67 daytime movements. The 3,627 night-time movements recorded in 2015 are equivalent to 60,450 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 aircrafts at Billy Bishop Toronto City Airport with 50% of all movements. The DASH-8 Q400 alone accounts for 48% of all movements of 2015. They are followed by single engine piston aircrafts with 41% of operations.

Figure 3 shows the summary of runway use and Table 2 presents the runway use by aircraft type.

Figure 3 Summary of runway use

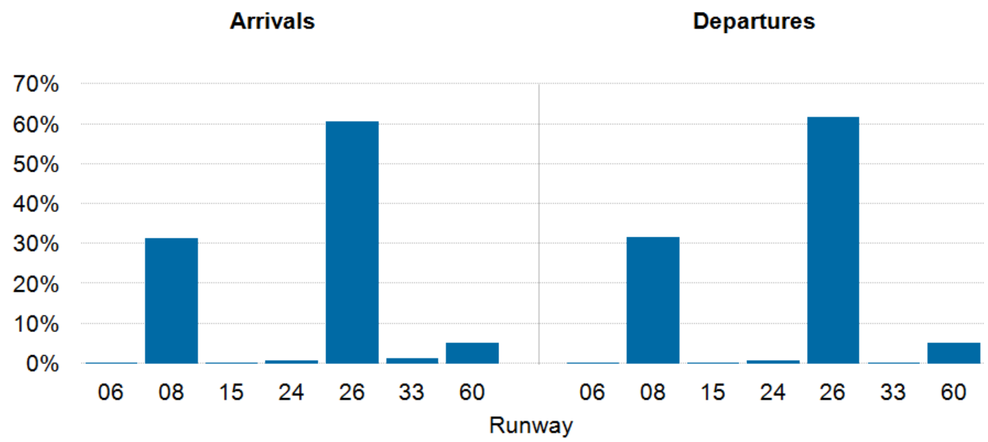


Table 3 Runway use by aircraft category

Runway	Global		Jets		Pistons		Turboprops	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
06	82	6	0	0	79	4	3	2
	0.2%	0.01%	0%	0%	0.7%	0.03%	0.01%	0.01%
08	14 095	14 274	66	66	3 146	3 241	10 883	10 967
	32%	32%	40%	40%	27%	28%	33%	33%
15	62	171	0	0	4	142	58	29
	0.1%	0.4%	0%	0%	0.03%	1%	0.2%	0.1%
24	340	347	1	0	318	340	21	7
	0.8%	0.8%	0.6%	0%	3%	3%	0.1%	0.02%
26	27 134	27 881	96	99	5 328	5 842	21 710	21 940
	61%	62%	59%	60%	46%	50%	66%	66%
33	647	50	0	0	574	43	73	7
	1%	0.1%	0%	0%	5%	0.4%	0.2%	0.02%
60	2 285	2 400	0	0	2 054	2 016	231	384
	5%	5%	0%	0%	18%	17%	0.7%	1%
Total	**44 645**	**45 129**	**163**	**165**	**11 503**	**11 628**	**32 979**	**33 336**
	100%	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 4 shows the main types of aircraft in most represented categories defined in the calculation. Aircraft with a small number of movements in 2015 are not shown in this table; they can be found in detail in Appendix A.

Table 4 Aircraft categories

Aircraft categories	Aircraft types
Helicopter single engine	Robinson R44, etc.
Helicopter twin engine	AgustaWestland AW139, etc.
Piston single engine	Cessna series 150/152/172/182/206, Piper PA-28, Cirrus SR22, Diamond DA40, etc.
Piston twin engine	Piper PA-27/30, etc.
Turboprop single engine	Pilatus PC-12, Cessna 208, etc.
Turboprop twin engine	Dash 8, Mitsubishi MU-2, Beech 200/350, Jetstream 31, etc.
Jet twin engine Stage 3	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 and Porter Airlines.

Departure flight paths:

> Runways 06 and 08: right turn at 1.9 DME, heading 141
> Runway 15: right turn at 650’ ASL, heading 201
> Runways 24, 26 and 33: left turn at 650’ ASL, heading 201

Approach slopes:

> Runways 06, 08, 15, 24 and 33: 3.5°
> Runway 26: 3.5° (visual) or 4.8° (instrument)

Runways 24, 26, and 33 have left hand circuits while runways 06, 08, and 15 have right hand circuits.

3.2 Results

Figure 4 shows the noise contours for Billy Bishop Toronto City Airport, year 2015 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 without helicopters are shown on Figure 5.

The analysis of the contours involved a review of the data to, in the language of the Tripartite Agreement, ascertain if the actual 28 Noise Exposure Contour is closer at any point, except in a direction westerly of the Billy Bishop Toronto City Airport between points “X” and “Y”, to the official 25 NEF Contour for 1990, than to the official 28 NEF Contour for 1990 (reference Schedule F of the Tripartite Agreement).

The analysis shows that the 28 NEF Contour for calendar year 2015, with helicopters included in the calculation, slightly exceeds the 28 NEF Contour for 1990 for small sections of the contour to the north of the main runway. However, the extent of the actual 28 NEF contour is not sufficient to bring it closer at any point to the 25 NEF Contour for 1990, than to the 28 NEF Contour for 1990. The 28 NEF contour for calendar year 2015 does not expand beyond the official 25 NEF contour for 1990 and remains well within the limits set by the Tripartite Agreement for the expansion of the NEF contour.

When helicopters are excluded from the calculation, the NEF contours shrink slightly, achieving an even better compliance with the limits set in the Tripartite Agreement.

Figure 4 NEF contours with helicopters

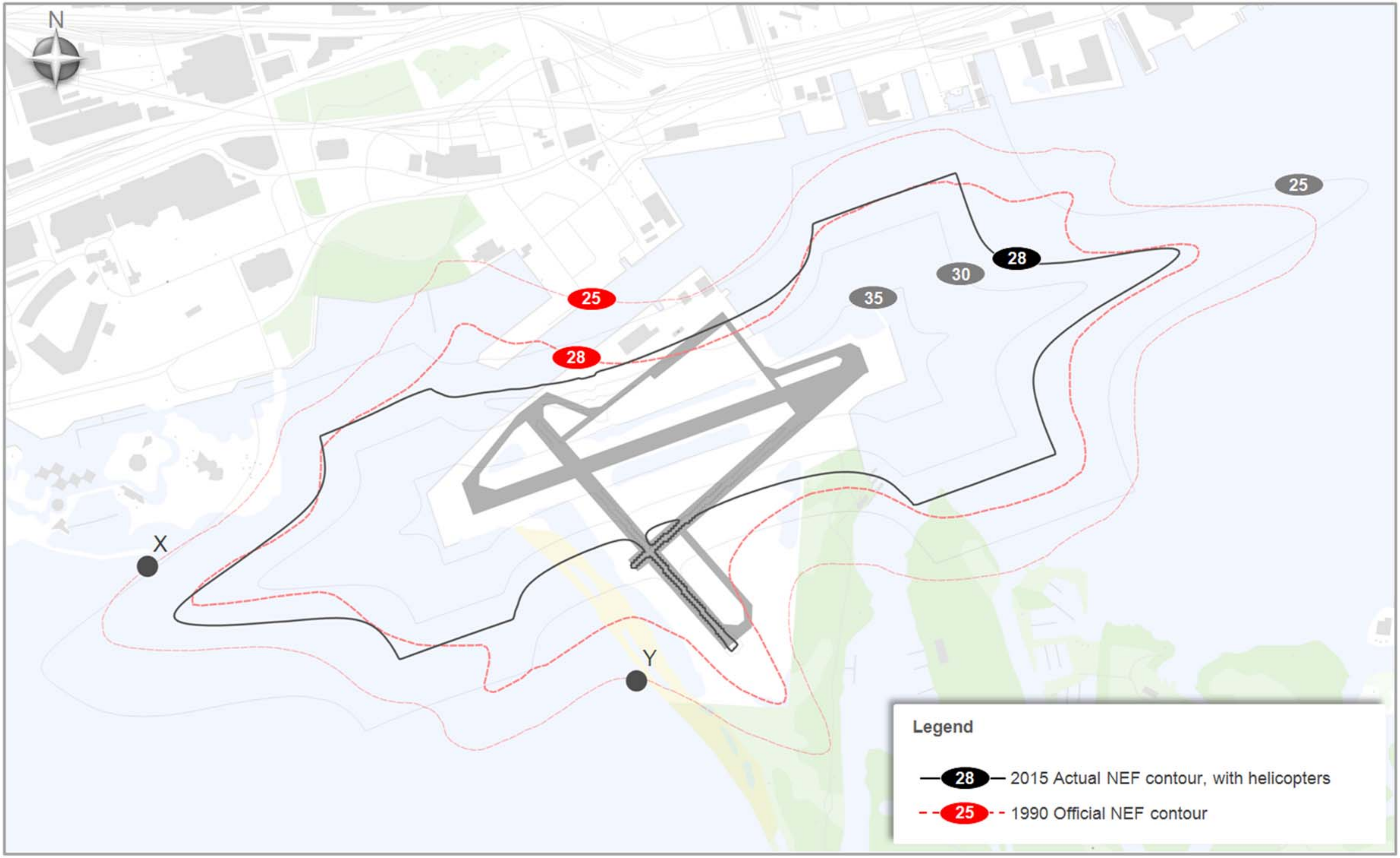


Figure 5 NEF contours without helicopters

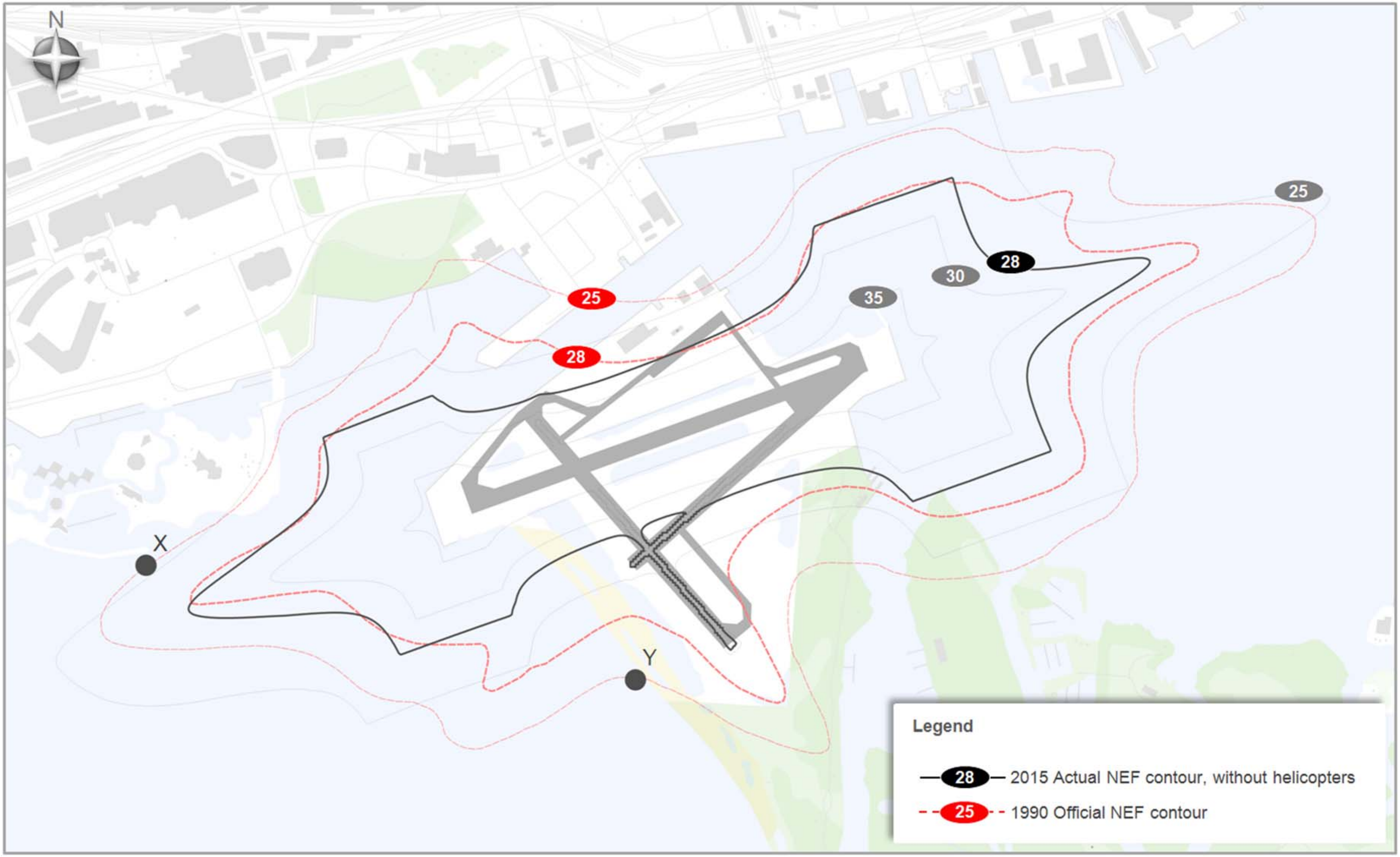


Table 5 shows the surface area within the contours in 2015. It is the total surface area in each range of NEF values.

Table 5 Surface area (km^2)

NEF	Surface area (km^2)	
	With helicopters	Without helicopters
35 +	0.35	0.32
30 - 35	0.64	0.58
28 - 30	0.50	0.47
25 - 28	1.30	1.23
Total	**2.78**	**2.60**

4 Conclusion

The 2015 noise exposure contours for Billy Bishop Toronto City 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 2.78 square kilometers if helicopters are included in the calculation, and 2.60 square kilometers if helicopters are excluded. NEF 28 contour covers an area of 1.49 square kilometers if helicopters are included in the calculation, and 1.37 square kilometers if helicopters are excluded.

The actual (2015) 28 Noise Exposure Contours, with and without helicopters, are not closer at any point, excepting in a direction westerly of the Toronto City Centre Airport between points "X" and "Y", to the 25 NEF Contour for 1990 than to the 28 NEF Contour for 1990.

The 28 NEF contours for calendar year 2015, with and without helicopters, do not expand beyond the official 25 NEF contour for 1990 and remains well within the limit set by the Tripartite Agreement for the expansion of the NEF contour.

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TRANSPORT CANADA, “Land Use Planning in the Vicinity of Airports”, 8th edition, 2006, 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*	Chap.	MTOW	Manufacturer	Model	Equivalent	Number
A109	L	2	T	R		3,000	AGUSTA	A-109, Power	AS332	28
A119	L	2	T	R		2,850	AGUSTA	AW119 MK II	AS350	6
A139	M	2	T	R		6,800	AGUSTA	AW139	AS332	2,409
AA5	L	1	P	F		1,000	AMERICAN	AA-5 Traveler	GASEPF	32
AC11	L	1	P	R		2,000	ROCKWELL	112, 114 Commander, Alpine Commander	RWCM14	13
AC95	L	2	T	R		6,000	ROCKWELL	695 Jetprop Commander 980/1000	RWCM69	2
AEST	L	2	P	R		3,000	PIPER	PA-60, Aerostar	PA60	1
AS50	L	1	T	F		3,000	AEROSPATIALE	AS-350/550 Ecureuil, Astar, SuperStar, Fennec	AS350	6
AS55	L	2	T	F		3,000	AEROSPATIALE	AS-355/555 Ecureuil 2, TwinStar, Fennec	AS350	5
B06	L	1	T	F		2,000	BELL	206A/B/L, 406, LongRanger (CH-139 JetRanger)	AS350	67
B190	M	2	T	R		8,000	BEECH	1900 Airliner (C-12J)	BEC190	14
B350	M	2	T	R		6,000	BEECH	B300 Super King Air 350	DHC6	286
B407	L	1	T	F		3,000	BELL	407	AS350	2
B412	L	2	T	F		6,000	BELL	412, Griffon (CH-146)	AS350	72
B429	L	2	T	F		3,175	BELL	429	AS332	19
B430	L	2	T	R		5,000	BELL	430	AS350	15
BE10	L	2	T	R		6,000	BEECH	100 King Air (U-21F)	BEC100	153
BE18	L	2	P	R		4,000	BEECH	18 (C-45 Expeditor)	BEC18	4
BE20	L	2	T	R		6,000	BEECH	200, 1300 Super King Air, Commuter (C-12A)	BEC200	264
BE23	L	1	P	F		2,000	BEECH	23 Musketeer, Sundowner	GASEPF	21
BE24	L	1	P	R		2,000	BEECH	24 Musketeer Super, Sierra	GASEPF	8
BE30	M	2	T	R		7,000	BEECH	300 Super King Air	BEC300	79
BE33	L	1	P	R		2,000	BEECH	33 Bonanza (E-24)	BEC33	35
BE35	L	1	P	R		2,000	BEECH	35 Bonanza	GASEPV	178
BE36	L	1	P	R		2,000	BEECH	36 Bonanza	GASEPV	98
BE55	L	2	P	R		3,000	BEECH	55 Baron (T-42)	BEC55	8
BE58	L	2	P	R		3,000	BEECH	58 Baron	BEC58	60
BE60	L	2	P	R		4,000	BEECH	60 Duke	BEC60	10
BE76	L	2	P	R		2,000	BEECH	76 Duchess	BEC76	11
BE9L	L	2	T	R		5,000	BEECH	90, A90-E90 King Air (T-44, VC-6)	BEC90	174
BE9T	L	2	T	R		5,000	BEECH	F-90 King Air	BEC9F	46

Aircraft	D1*	D2*	D3*	D4*	Chap.	MTOW	Manufacturer	Model	Equivalent	Number
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	26
C120	L	1	P	F		1,000	CESSNA	120	GASEPF	1
C130	M	4	T	R		71,000	LOCKHEED	C-130	C130	14
C140	L	1	P	F		1,000	CESSNA	140	CNA150	2
C150	L	1	P	F		1,000	CESSNA	150, A150, Commuter, Aerobat	CNA150	13,864
C152	L	1	P	F		1,000	CESSNA	152, A152, Aerobat	CNA152	1,034
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	28,043
C175	L	1	P	F		2,000	CESSNA	175, Skylark	GASEPV	1
C177	L	1	P	F		2,000	CESSNA	177, Cardinal	CNA177	27
C180	L	1	P	F		2,000	CESSNA	180, Skywagon 180 (U-17C)	CNA180	28
C182	L	1	P	F		2,000	CESSNA	182, Skylane	CNA182	2,211
C185	L	1	P	F		2,000	CESSNA	185, A185 Skywagon, Skywagon 185 (U-17A/B)	CNA185	64
C195	L	1	P	F		2,000	CESSNA	195 (LC-126)	GASEPV	20
C205	L	1	P	F		2,000	CESSNA	205	CNA205	3
C206	L	1	P	F		2,000	CESSNA	206, P206, T206, TP206, (Turbo) Super Skywagon	CNA206	1,315
C208	L	1	T	F		4,000	CESSNA	208 Caravan 1, (Super)Cargomaster (C-98, U-27)	CNA208	614
C210	L	1	P	R		2,000	CESSNA	210, T210, (Turbo)Centurion	CNA210	45
C310	L	2	P	R		3,000	CESSNA	310, T310 (U-3, L-27)	CNA310	39
C320	L	2	P	R		3,000	CESSNA	320 (Executive)Skynight	CNA320	1
C337	L	2	P	R		2,000	CESSNA	337, M337 (Turbo)Super Skymaster (O-2)	CNA337	8
C340	L	2	P	R		3,000	CESSNA	340	CNA340	77
C414	L	2	P	R		3,000	CESSNA	414, Chancellor	CNA414	48
C421	L	2	P	R		4,000	CESSNA	421, Golden Eagle, Executive Commuter	CNA421	66
C425	L	2	T	R		4,000	CESSNA	425 Corsair, Conquest 1	CNA425	5
C441	L	2	T	R		5,000	CESSNA	441 Conquest, Conquest 2	CNA441	45
C550	M	2	J	R	3	7,000	CESSNA	550, S550, 552 Citation 2/S2/Bravo (T-47, U-20)	CNA550	64
C560	M	2	J	R	3	8,000	CESSNA	560 Citation 5	CNA560	2
C72R	L	1	P	R		2,000	CESSNA	172RG Cutlass RG	GASEPV	8

Aircraft	D1*	D2*	D3*	D4*	Chap.	MTOW	Manufacturer	Model	Equivalent	Number
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	13
CAMP	L	1	P	F		490	PIETENPOL	Air Camper	GASEPF	1
CH60	L	1	P	F		1,000	ZENAIR	CH-600/601 Zodiac, Super Zodiac	GASEPV	5
CH70	L	1	P	F		544	ZENAIR	ZENITH CH 701	GASEPF	1
CJ6	L	1	P	R		1,400	NANCHANG	CJ6A	GASEPV	2
COL3	L	1	P	F		1,542	LANCAIR	LC42-550FG	BEC58P	9
COL4	L	1	P	F		1,633	LANCAIR	LC41-550FG	BEC58P	174
COLV	L	1	P	A		766	BEAULIEU	COLVERT	GASEPF	1
CVLT	M	2	T	R		25,000	CONVAIR	CV-540/580/600/640 (VC-131H)	CVR580	4
D328	M	2	T	R		13,000	DORNIER	328	DO328	2
DA40	L	1	P	F		1,200	DIAMOND	DA40	GASEPF	200
DA42	L	2	P	R		1,900	DIAMOND	DA 42 M-NG	GASEPV	9
DH2T	L	1	T	F		3,000	DE HAVILLAND	DHC-2 Mk3 Turbo Beaver	CNA441	41
DH3T	L	1	T	R		4,000	DE HAVILLAND	DHC-3 Turbo Otter	CNA441	1
DH82	L	1	P	F		1,000	DE HAVILLAND	DH-82 Tiger Moth, Queen Bee	GASEPF	1
DH8A	M	2	T	R		16,000	DE HAVILLAND	DHC-8-100 Dash 8 (E-9, CT-142, CC-142)	DHC8	8
DH8C	M	2	T	R		20,000	DE HAVILLAND	DHC-8-300 Dash 8	DHC830	366
DH8D	M	2	T	R		26,000	DE HAVILLAND	DHC-8-400 Dash 8	DHC830	58,851
DHC2	L	1	P	F		3,000	DE HAVILLAND	DHC-2 Mk1 Beaver (U-6, L-20)	DHC2	4
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	14
E300	L	1	P	F		1,000	EXTRA	300, 350	GASEPV	7
E50P	L	2	J	R	3	4,750	EMBRAER	EMB-500	CNA501	20
EC20	L	1	T	F		2,000	EUROCOPTER	EC-120 Colibri	AS350	52
EC45	L	2	T	F		3,500	EUROCOPTER	EC145 (BK117C-2)	AS350	29
EUPA	L	1	P	F		590	EUROPA	EUROPA MONOWHEEL	GASEPF	6
EVOL	L	1	T	R		2,000	LANCAIR	Lancair Evolution	GASEPV	2
EVSS	L	1	P	F		558	AEROTECHNIK	SPORTSTAR	GASEPF	4
EXPR	L	1	P	F		1,406	AURIGA	PHOENIX	GASEPF	6
FA10	M	2	J	R	3	9,000	DASSAULT	Falcon 10, Mystere 10	FAL10	242

Aircraft	D1*	D2*	D3*	D4*	Chap.	MTOW	Manufacturer	Model	Equivalent	Number
G115	L	1	P	R		2,000	GROB	G-115A/B/C/D/E, Bavarian (Heron, Tutor)	GASEPF	2
G159	M	2	T	R		16,000	GRUMMAN	G-159 Gulfstream 1 (TC-4 Academe, VC-4)	GULF1	2
GA7	L	2	P	R		2,000	GRUMMAN AMERICAN	GA-7 Cougar	GA7	2
GB6T	L	1	T	A		1,996	BERNIER	G-BAIR 6T	CNA206	20
GLAS	L	1	P	F		1,066	GLASAIR	SPORTSMAN	GASEPF	2
GLST	L	1	P	F		889	GLASTAR	GLASTAR	GASEPF	2
H500	L	1	T	F		2,000	MCDONNELL DOUGLAS	MD-500, MD-530F/MG, Defender, Nightfox	AS350	4
HUSK	L	1	P	F		1,000	CHRISTEN	A-1 Husky	GASEPV	8
J3	L	1	P	F		1,000	PIPER	J-3 Cub (L-4, NE)	GASEPF	2
JS31	M	2	T	R		7,000	BRITISH AEROSPACE	BAe-3100 Jetstream 31 (T.Mk.3)	BAEJ31	202
JS32	M	2	T	R		8,000	BRITISH AEROSPACE	BAe-3200 Jetsream Super 31	BAEJ31	1
KODI	M	1	T	F		3,291	QUEST	KODIAK 100	CNA20T	3
LA25	L	1	P	A		2,000	LAKE	LA-250/270 (Turbo)Renegade, Seawolf, Seafury	GASEPF	8
LA4	L	1	P	A		2,000	LAKE	LA-4/200, Buccaneer	LA42	65
LNC2	L	1	P	R		1,000	LANCAIR	Lancair 200/235/320/360	GASEPV	4
M20P	L	1	P	R		2,000	MOONEY	M-20, M-20A-J/L/R (non-turbocharged)	M20J	172
M20T	L	1	P	R		2,000	MOONEY	M-20K/M, Bravo, Encore (turbocharged)	M20K	58
M4	L	1	P	F		2,000	MAULE	M-4 Bee Dee, Jetasen, Rocket, Astro Rocket	GASEPF	4
M7	L	1	P	F		2,000	MAULE	M-7-235, MT-7 Super Rocket, Star Rocket	GASEPF	2
MU2	L	2	T	R		5,000	MITSUBISHI	MU-2, Marquise, Solitaire (LR-1)	MU2	463
MX2	L	1	P	F		1,043	GREG POE	MX2	GASEPV	21
P180	L	2	T	R		6,000	PIAGGIO	P-180 Avanti	SD330	54
P210	L	1	P	R		2,000	CESSNA	P210 Pressurized Centurion	CNA206	52
P28A	L	1	P	F		2,000	PIPER	PA-28-140/150/160/180 Archer, Cadet, Cherokee	PA28CA	598
P28B	L	1	P	F		2,000	PIPER	PA-28-201T/235/236 Cherokee, Dakota	PA28CA	6
P28R	L	1	P	R		2,000	PIPER	PA-28R-180/200/201 Cherokee Arrow, Turbo Arrow	PA28CA	63
P28T	L	1	P	R		2,000	PIPER	PA-28RT Arrow 4, Turbo Arrow 4	PA28CA	1
P32R	L	1	P	R		2,000	PIPER	PA-32R Cherokee Lance, Saratoga SP, Turbo	GASEPV	18
P32T	L	1	P	R		2,000	PIPER	PA-32RT Lance 2, Turbo Lance 2	GASEPV	66

Aircraft	D1*	D2*	D3*	D4*	Chap.	MTOW	Manufacturer	Model	Equivalent	Number
P46T	L	1	T	R		2,000	PIPER	PA-46T Malibu Meridian	PA46	76
P51	L	1	P	R		5,000	NORTH AMERICAN	P-51, F-51, A-36 Mustang	GASEPV	10
PA18	L	1	P	F		1,000	PIPER	PA-18 Super Cub (L-18C, L-21, U-7)	PA18	10
PA20	L	1	P	F		1,000	PIPER	PA-20 Pacer	PA22CO	3
PA22	L	1	P	F		1,000	PIPER	PA-22 Tri-Pacer, Caribbean, Colt	PA22CO	1
PA23	L	2	P	R		2,000	PIPER	PA-23-150/160 Apache	PA23AZ	672
PA24	L	1	P	R		2,000	PIPER	PA-24 Comanche	PA24	116
PA27	L	2	P	R		3,000	PIPER	PA-23-235/250 Aztec, Turbo Aztec (U-11)	PA23AZ	257
PA30	L	2	P	R		2,000	PIPER	PA-30/39 Twin Comanche, Turbo Twin Comanche	PA30	60
PA31	L	2	P	R		4,000	PIPER	PA-31/31P Navajo, Chieftain, Mojave, T-1020	PA31	64
PA32	L	1	P	F		2,000	PIPER	PA-32 Cherokee Six, Saratoga, Turbo Saratoga	GASEPV	64
PA34	L	2	P	R		3,000	PIPER	PA-34 Seneca	PA34	90
PA38	L	1	P	F		1,000	PIPER	PA-38 Tomahawk	PA38	2
PA44	L	2	P	R		2,000	PIPER	PA-44 Seminole, Turbo Seminole	PA44	9
PA46	L	1	P	R		2,000	PIPER	PA-46 Malibu, Malibu Mirage	PA46	112
PAY1	L	2	T	R		5,000	PIPER	PA-31T1-500 Cheyenne 1	PA31T	9
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	10
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	1,887
PELI	L	1	P	F		559	ULTRAVIA	PELICAN 'SPORT'	GASEPV	2
PTS1	L	1	P	F		1,000	PITTS	S-1 Special	GASEPF	1
PTS2	L	1	P	F		1,000	PITTS	S-2 Special	GASEPF	14
PTSS	L	1	P	F		700	PITTS	Super Stinker	GASEPV	8
R22	L	1	P	F		1,000	ROBINSON	R-22	AS350	3
R44	L	1	P	F		2,000	ROBINSON	R-44 Astro	AS350	4,075
R66	L	1	T	F		1,225	ROBINSON	R66	AS350	19
RV10	L	1	P	F		1,225	VAN'S	VANS RV 10	GASEPV	2
RV4	L	1	P	F		1,000	VAN'S	RV-4	GASEPF	18
RV6	L	1	P	F		1,000	VAN'S	RV-6	GASEPF	16

Aircraft	D1*	D2*	D3*	D4*	Chap.	MTOW	Manufacturer	Model	Equivalent	Number
RV7	L	1	P	F		816	VAN'S	Van's RV7	GASEPV	10
RV8	L	1	P	F		816	VAN'S	Van's RV 8	GASEPF	14
RV9	L	1	P	F		794	VAN'S	RV-9A	GASEPF	2
S76	L	2	T	R		5,000	SIKORSKY	S-76, H-76, AUH-76, Spirit, Eagle (HE-24)	AS332	38
S92	M	2	T	R		12,000	SIKORSKY	S-92 Helibus	AS332	31
SC7	L	2	T	F		6,000	SHORT	SC-7 Skyvan, Skyliner	CNA441	2
SPIT	L	1	P	F		2,300	VICKERS SUPERMARINE	Spitfire	BEC58P	2
SR20	L	1	P	F		2,000	CIRRUS	SR-20	GASEPF	102
SR22	L	1	P	F		1,632	CIRRUS	SR22T	GASEPF	488
SREY	L	1	P	F		650	PROGESSIVE AERODYNE	SeaRay	GASEPF	2
SW3	M	2	T	R		6,000	FAIRCHILD SWEARINGEN	SA-226TB, SA-227TT Merlin 3	SAMER3	28
SW4	M	2	T	R		7,000	FAIRCHILD SWEARINGEN	Merlin 4C, Metro2/2A, Metro 3, Metro 3A, Expediter, Merlin 23, 4	SAMER4	32
T6	L	1	P	R		4,000	NORTH AMERICAN	T-6, AT-6, BC-1, SNJ, Texan, Harvard	GASEPF	8
TBM7	L	1	T	R		3,000	SOCATA	TBM-700	CNA441	39
TBM8	L	1	T	R		7,400	SOCATA	TBM850	CNA441	28
TEX2	L	1	T	R		4,000	RAYTHEON	T-6 Texan 2, CT-156 Harvard 2	GASEPV	6
TOBA	L	1	P	F		1,150	SOCATA	TB 200	GASEPF	4
TRIN	L	1	P	R		2,000	SOCATA	TB-20/21 Trinidad	GASEPF	26
WACO	L	1	P	F		2,000	WACO	O, E, GXE, CTO	BEC58P	9
YK52	L	1	P	R		2,000	YAKOVLEV	Yak-52	GASEPV	2
Z42	L	1	P	F		2,000	ZLIN	Z-42/142/242	GASEPV	36

*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

Movements' summary

Fleet summary

Aircraft	Arrivals			Departures			Total
	Day	Night	Total	Day	Night	Total	
Helicopter single engine	2,138	1	2,139	2,095		2,095	4,234
Helicopter twin engine	1,104	77	1,181	1,389	76	1,465	2,646
Piston single engine	8,862	167	9,029	9,091	105	9,196	18,225
Piston twin engine	406	9	415	401	12	413	828
Turboprop single engine	1,323	38	1,361	1,310	46	1,356	2,717
Turboprop twin engine	29,281	1,055	30,336	28,925	1,498	30,423	60,759
Turboprop 4 engines	21		21	15	1	16	37
Jet twin engine Stage 3	149	14	163	145	20	165	328
Total	**43,284**	**1,361**	**44,645**	**43,371**	**1,758**	**45,129**	**89,774**

- Day: 7 am - 10 pm
- Night: 10 pm - 7 am

Runway use - Arrivals

Aircraft	06		08		15		24		26		33		60	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Helicopter single engine			4				4		2	1			2 128	
Helicopter twin engine	2		278	27	51		5	1	612	44	4		152	5
Piston single engine	79		2 944	67	4		308	1	4 970	98	557	1		
Piston twin engine			132	3			5		253	6	16			
Turboprop single engine	1		442	10			2		823	28	55			
Turboprop twin engine			9 800	318	7		13		19 448	737	13			
Turboprop 4 engines			4						16		1			
Jet twin engine Stage 3			60	6			1		88	8				
Total	**82**		**13,664**	**431**	**62**		**338**	**2**	**26,212**	**922**	**646**	**1**	**2,280**	**5**

Runway use - Departures

Aircraft	06		08		15		24		26		33		60	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Helicopter single engine							1		4				2,090	
Helicopter twin engine	2		367	27	12		3		696	44	4		305	5
Piston single engine	4		3,073	33	139	1	335		5,497	71	43			
Piston twin engine			132	3	2		4		263	9				
Turboprop single engine			438	8	16		4		851	38	1			
Turboprop twin engine			9,676	449	1				19,247	1,048	1	1		
Turboprop 4 engines			1	1					14					
Jet twin engine Stage 3			59	7					86	13				
Total	**6**		**13,746**	**528**	**170**	**1**	**347**		**26,658**	**1,223**	**49**	**1**	**2,395**	**5**

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