

FINAL REPORT: **Noise Contours Study at Billy  
Bishop Toronto City Airport**  
PROJECT #T4005-100159



strategic  
transportation  
& tourism  
solutions



Prepared for  
**Transport Canada**

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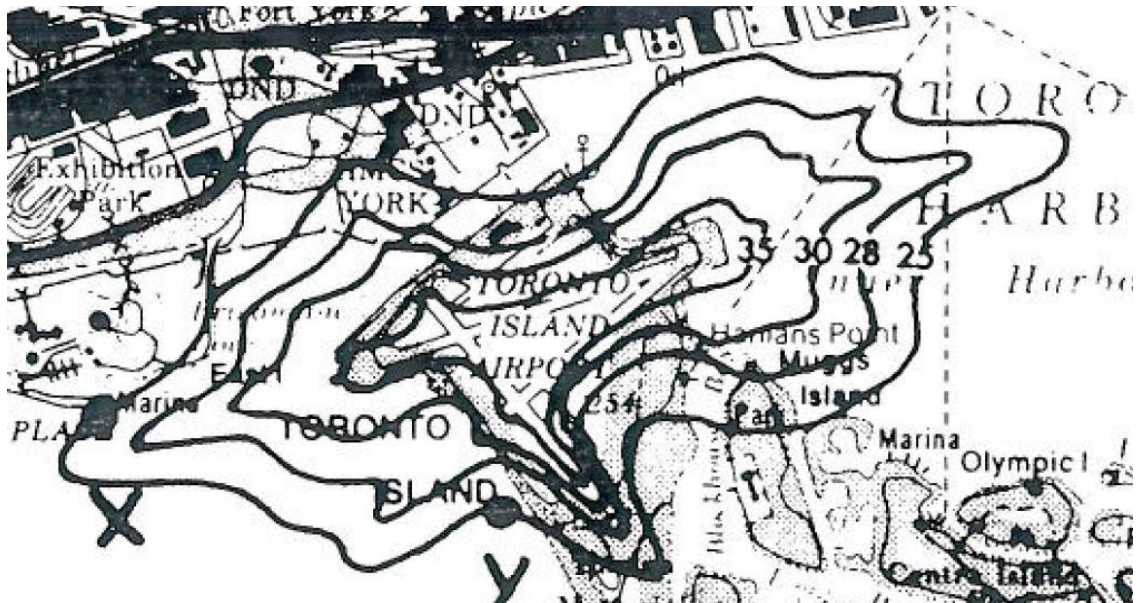
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# 1. Introduction

## 1.1 Background and Purpose of the Noise Contour Study

Noise limits for Billy Bishop Toronto City Airport (YTZ) were previously derived from 1990 air traffic forecast at the airport. The noise limits were specified using noise contours: 25 and 28 Noise Exposure Forecast (NEF) – calculated using the then-current Transport Canada NEFCAL model. **Figure 1** displays these contours, as referenced in the 2003 Tripartite Agreement.

**Figure 1: 1990 NEF contours.**



The noise exposure contours were developed using the 95<sup>th</sup> percentile level of all aircraft movements in 2009 and utilizing aircraft movement data from Statistics Canada. The data was reviewed to ascertain if the actual 28 NEF contour (current) was closer to any point, except in a direction westerly of the Airport, (between points “X” and “Y” as shown in Figure 1) to the official 25 NEF contour developed, than to the official 28 NEF contour (1990).

The contours were developed using the same method used by Transport Canada in 1983. The contours derived are representative of near-to-worst case scenario over a 24 hour period. This calculation is derived using the number of aircraft operations for a peak day. This is essentially a 95<sup>th</sup> percentile day, meaning that for only 5% of the time, there are more aircraft operations than this 95<sup>th</sup> percentile day. The number of aircraft operations for a peak day was determined by isolating the three busiest months during the year (usually summer months) and the seven busiest days in each of the three months, for a total of 21 days. The planning peak day is then calculated as an average number of movements over these 21 days.

A condition is also presented based on this comparison in the Agreement. If the actual 28 NEF contour is closer to the reference 25 NEF contour than to the reference 28 NEF contour, then seaplane traffic (aircraft arriving and/or departing on water instead of the airport's runways) must be included in the actual traffic.

## 1.2 The Need for Annual Noise Contours

This report highlights the methodology and findings of the 2009 noise contours for the airport and compares the contours to the official contours of 1990. The analysis of the contours will determine if the actual 28 NEF contour is closer to the reference 25 NEF contour than to the reference 28 NEF contour.

## 2. Methodology

The procedure required to produce noise contours from air traffic data are as follows:

- The traffic data is to be categorized to the number of each type of aircraft using each runway, arrivals are separated from departures, and day-time operations (0700 to 2200hrs) are separated from night-time operations.
- Destinations of the departing aircraft must be identified using aircrafts of the same type, utilizing the same runway and on the same day or night period. Departing for destinations within the same “range” of YTZ must also be grouped together.
- Finally, the aircraft types in these groupings must be identified in terms of aircraft designations used by the noise modelling program. These aircraft designations in the model may include several actual types of aircraft, or may be restricted to one type.

These groupings now include the total number of aircraft within each group that used the airport during the year. However, the NEF procedure is based on the 95th percentile of annual traffic, which is the daily number of aircraft that exceeds only 5% of the time during the year. This number is calculated by identifying three months of the year which had the greatest number of aircraft movements (arrivals and departures), seven busiest days during each of these months, and averaging the total traffic over these 21 days, to produce a one-day traffic volume.

For this study, the 2009 tower log data from YTZ was grouped as described above, to determine the 95th percentile traffic volume. The resulting one-day traffic record was then formatted to meet the requirements of input into the noise model, and the 28 NEF contour was then calculated by the model. The terms of the study requires the use of *NEF Calc Version 2.0.6*.

## 3. Findings and Recommendations

### 3.1 Findings

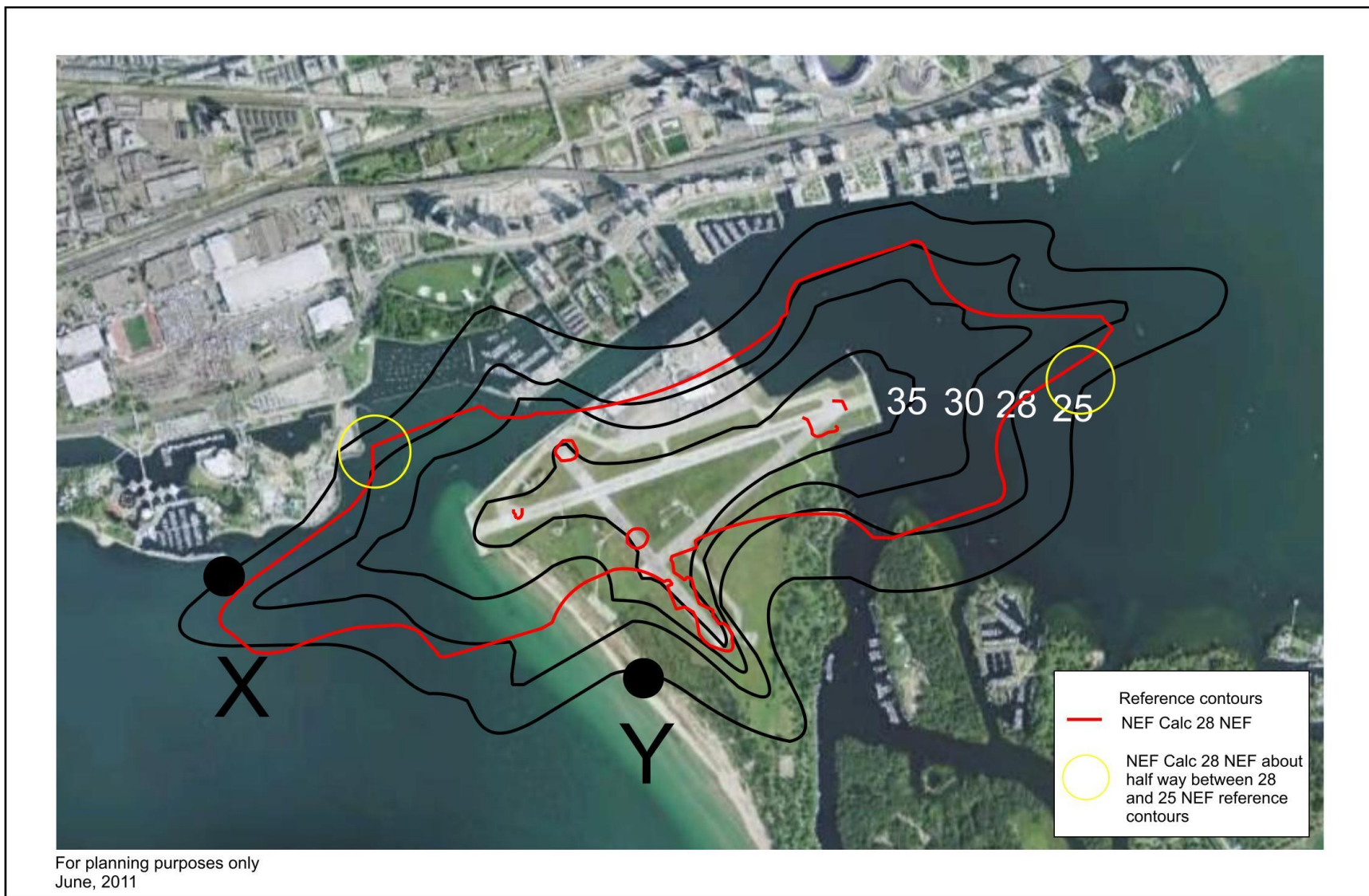
The actual 28 NEF contour does not pass beyond the halfway point between the reference 28 NEF contour and the reference 25 NEF contour at any point outside the X-Y region. Therefore, there is no requirement under this criterion to include seaplane traffic in the actual 2009 noise contours.

**Figure 2** highlights instances where the new 28 NEF, calculated by *NEF Calc*, is well within the limits of the reference 28 NEF contour. This includes a small portion to the North of the airport as well as areas located to the South and East.

It should be noted, however, there are two locations, highlighted with yellow circles in **Figure 2**, where the actual 28 NEF contour is approaching this half way point.



Figure 2: NEF Calc Model Contours with Reference Contours of the Tripartite Agreement with Google Earth Overlay



## Appendix A

### NEF Calc INPUT DATA

NEF Calc Code	Runway	Range No.	Number of Aircraft	
			Day	Night
BEC58P	08A	0	1.032211	0.470068
BEC58P	15A	0	0.004846	0
BEC58P	26A	0	1.444126	0.649372
BEC58P	33A	0	0.043615	0.004846
C130	08A	0	0.009692	0
C130	26A	0	0.009692	0.004846
CL601	33A	0	0.004846	0
CNA441	08A	0	0.004846	0.014538
CNA441	26A	0	0.009692	0.004846
CNA500	08A	0	0.004846	0.004846
CNA500	26A	0	0	0.004846
COMJET	08A	0	0.02423	0.004846
COMJET	26A	0	0.029076	0.02423
COMSEP	06A	0	0.02423	0.038768
COMSEP	08A	0	4.458375	1.264822
COMSEP	15A	0	0.019384	0.009692
COMSEP	24A	0	0.213227	0.009692
COMSEP	26A	0	6.983173	2.437568
COMSEP	33A	0	0.620296	0.13569
DC3	08A	0	0.009692	0
DHC6	06A	0	0.004846	0



			Day	Night
DHC6	08A	0	0.048461	0.029076
DHC6	26A	0	0.087229	0.067845
DHC7	08A	0	0.029076	0
DHC7	24A	0	0.004846	0
DHC7	26A	0	0.062999	0.004846
DHC8	08A	0	0.014538	0.004846
DHC8	26A	0	0	0.009692
DHC830	08A	0	15.41047	5.640814
DHC830	26A	0	27.11371	10.04588
DHC830	33A	0	0.009692	0.004846
GASEPF	06A	0	0.329532	0.067845
GASEPF	08A	0	13.83066	1.812427
GASEPF	15A	0	0.019384	0
GASEPF	24A	0	1.419896	0.169612
GASEPF	26A	0	22.28703	3.765389
GASEPF	33A	0	2.393954	0.494298
GASEPV	06A	0	0	0.004846
GASEPV	08A	0	0.470068	0.092075
GASEPV	15A	0	0.004846	0
GASEPV	24A	0	0.019384	0
GASEPV	26A	0	0.562143	0.145382
GASEPV	33A	0	0.072691	0.053307
SD330	08A	0	0.77537	0.125998
SD330	15A	0	0	0.004846

			Day	Night
SD330	24A	0	0.014538	0
SD330	26A	0	1.235745	0.251995
SD330	33A	0	0.082383	0
SF340	08A	0	0.014538	0.009692
BEC58P	08R	1	0.978904	0.18415
BEC58P	15S	1	0.014538	0
BEC58P	26L	1	1.284206	0.31984
BEC58P	33S	1	0.004846	0.004846
C130	08R	1	0.009692	0
C130	26L	1	0.014538	0
CL601	26L	1	0	0.004846
CNA441	08R	1	0.009692	0
CNA441	26L	1	0.014538	0
CNA500	08R	1	0.004846	0
COMJET	08R	1	0.02423	0.009692
COMJET	26L	1	0.019384	0.019384
COMSEP	06R	1	0.004846	0
COMSEP	08R	1	3.35832	0.886829
COMSEP	15S	1	0.125998	0.004846
COMSEP	24L	1	0.053307	0
COMSEP	26L	1	5.776504	1.749428
COMSEP	33S	1	0.092075	0.043615
DC3	08R	1	0.004846	0
DHC6	08R	1	0.053307	0.014538

			Day	Night
DHC6	15S	1	0	0.004846
DHC6	26L	1	0.101767	0.02423
DHC7	08R	1	0.029076	0
DHC7	26L	1	0.053307	0.009692
DHC8	08R	1	0.009692	0
DHC8	26L	1	0.009692	0
DHC830	06R	1	0.004846	0
DHC830	08R	1	12.39622	5.369435
DHC830	26L	1	22.00111	9.493432
DHC830	33S	1	0.009692	0
GASEPF	06R	1	0.082383	0.029076
GASEPF	08R	1	9.561277	2.088652
GASEPF	15S	1	0.29561	0.048461
GASEPF	24L	1	0.785062	0.169612
GASEPF	26L	1	16.07438	5.151362
GASEPF	33S	1	1.003134	0.31984
GASEPV	08R	1	0.203535	0.053307
GASEPV	15S	1	0.019384	0.009692
GASEPV	24L	1	0.004846	0
GASEPV	26L	1	0.310148	0.179304
GASEPV	33S	1	0.033922	0.004846
SD330	08R	1	0.440991	0.155074
SD330	15S	1	0.014538	0.004846

			Day	Night
SD330	24L	1	0.004846	0
SD330	26L	1	0.717217	0.242303
SD330	33S	1	0.009692	0.009692
SF340	08R	1	0.009692	0.004846
BEC58P	08R	1	0.150228	0.048461
BEC58P	26L	1	0.15992	0.038768
CNA441	26L	1	0.004846	0
CNA500	08R	1	0.004846	0
CNA500	26L	1	0.004846	0
COMJET	08R	1	0.004846	0
COMSEP	08R	1	0.082383	0.02423
COMSEP	26L	1	0.179304	0.087229
DC3	26L	2	0.004846	0
DHC6	08R	1	0.004846	0
DHC6	26L	1	0	0.004846
DHC830	08R	1	0.426453	0.222919
DHC830	26L	1	1.070979	0.450684
GASEPF	08R	1	0.014538	0.004846
GASEPF	26L	1	0.014538	0.02423
GASEPV	26L	1	0	0.004846
SD330	08R	1	0.033922	0.014538
SD330	26L	1	0.038768	0.004846
SF340	08R	2	0.009692	0
BEC58P	08R	1	0.009692	0

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			Day	Night
BEC58P	26L	1	0.014538	0
COMSEP	08R	1	0.004846	0.004846
COMSEP	26L	1	0.004846	0
DHC7	26L	1	0.004846	0
DHC830	26L	1	0	0.004846
SD330	26L	1	0.004846	0

## Appendix B

### NEF Calc MODEL REPORTS

#### Nef-Calc Runways

Runway	06R		
Start X	1.21 kFt	End X	3.85 kFt
Start Y	-1.02 kFt	End Y	0.00 kFt

Notes

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Runway	24L		
Start X	3.85 kFt	End X	1.21 kFt
Start Y	0.00 kFt	End Y	-1.02 kFt

Notes

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Runway	08R		
Start X	0.00 kFt	End X	3.85 kFt
Start Y	0.00 kFt	End Y	0.00 kFt

Notes

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Runway	26L		
Start X	3.85 kFt	End X	0.00 kFt
Start Y	0.00 kFt	End Y	0.00 kFt

Notes

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Runway	13S		
Start X	0.77 kFt	End X	1.77 kFt
Start Y	0.57 kFt	End Y	-1.98 kFt

Notes

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Runway	33S		
Start X	1.77 kFt	End X	0.77 kFt
Start Y	-1.98 kFt	End Y	0.57 kFt

Notes

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5/29/2011



## NEF Calc AIRCRAFT

ACODE	FLIGHTPATH	Range	DayTimeEvents	NightTimeEvents
<b>BEC58P</b>				
BEC58P	08A	0	1.03	0.47
BEC58P	15A	0	0.00	0.00
BEC58P	26A	0	1.44	0.65
BEC58P	33A	0	0.04	0.00
BEC58P	08R	1	0.98	0.18
BEC58P	15S	1	0.01	0.00
BEC58P	26L	1	1.28	0.32
BEC58P	33S	1	0.00	0.00
BEC58P	08R	1	0.15	0.05
BEC58P	26L	1	0.16	0.04
BEC58P	08R	1	0.01	0.00
BEC58P	26L	1	0.01	0.00
<b>BEC58P</b>			<b>5.11</b>	<b>1.71</b>
<b>C130</b>				
C130	08A	0	0.01	0.00
C130	26A	0	0.01	0.00
C130	08R	1	0.01	0.00
C130	26L	1	0.01	0.00
<b>C130</b>			<b>0.04</b>	<b>0.00</b>
<b>CL601</b>				
CL601	33A	0	0.00	0.00
CL601	26L	1	0.00	0.00
<b>CL601</b>			<b>0.00</b>	<b>0.00</b>
<b>CNA441</b>				
CNA441	08A	0	0.00	0.01
CNA441	26A	0	0.01	0.00
CNA441	08R	1	0.01	0.00
CNA441	26L	1	0.01	0.00
CNA441	26L	1	0.00	0.00
<b>CNA441</b>			<b>0.03</b>	<b>0.01</b>
<b>CNA500</b>				
CNA500	08A	0	0.00	0.00
CNA500	26A	0	0.00	0.00
CNA500	08R	1	0.00	0.00
CNA500	08R	1	0.00	0.00
CNA500	26L	1	0.00	0.00
<b>CNA500</b>			<b>0.00</b>	<b>0.00</b>
<b>COMJET</b>				
COMJET	08A	0	0.02	0.00
COMJET	26A	0	0.03	0.02
COMJET	08R	1	0.02	0.01
COMJET	26L	1	0.02	0.02
COMJET	08R	1	0.00	0.00
<b>COMJET</b>			<b>0.09</b>	<b>0.05</b>

ACODE	FLIGHTPATH	Range	DayTimeEvents	NightTimeEvents
<b>COMSEP</b>				
COMSEP	06A	0	0.02	0.04
COMSEP	08A	0	4.46	1.26
COMSEP	15A	0	0.02	0.01
COMSEP	24A	0	0.21	0.01
COMSEP	26A	0	6.98	2.44
COMSEP	33A	0	0.62	0.14
COMSEP	06R	1	0.00	0.00
COMSEP	08R	1	3.36	0.89
COMSEP	15S	1	0.13	0.00
COMSEP	24L	1	0.05	0.00
COMSEP	26L	1	5.78	1.75
COMSEP	33S	1	0.09	0.04
COMSEP	08R	1	0.08	0.02
COMSEP	26L	1	0.18	0.09
COMSEP	08R	1	0.00	0.00
COMSEP	26L	1	0.00	0.00
<b>COMSEP</b>			<b>21.98</b>	<b>6.69</b>
<b>DC3</b>				
DC3	08A	0	0.01	0.00
DC3	08R	1	0.00	0.00
DC3	26L	2	0.00	0.00
<b>DC3</b>			<b>0.01</b>	<b>0.00</b>
<b>DHC6</b>				
DHC6	06A	0	0.00	0.00
DHC6	08A	0	0.05	0.03
DHC6	26A	0	0.09	0.07
DHC6	08R	1	0.05	0.01
DHC6	15S	1	0.00	0.00
DHC6	26L	1	0.10	0.02
DHC6	08R	1	0.00	0.00
DHC6	26L	1	0.00	0.00
<b>DHC6</b>			<b>0.29</b>	<b>0.13</b>
<b>DHC7</b>				
DHC7	08A	0	0.03	0.00
DHC7	24A	0	0.00	0.00
DHC7	26A	0	0.06	0.00
DHC7	08R	1	0.03	0.00
DHC7	26L	1	0.05	0.01
DHC7	26L	1	0.00	0.00
<b>DHC7</b>			<b>0.17</b>	<b>0.01</b>
<b>DHC8</b>				
DHC8	08A	0	0.01	0.00
DHC8	26A	0	0.00	0.01
DHC8	08R	1	0.01	0.00
DHC8	26L	1	0.01	0.00
<b>DHC8</b>			<b>0.03</b>	<b>0.01</b>
<b>DHC830</b>				

ACODE	FLIGHTPATH	Range	DayTimeEvents	NightTimeEvents
DHC830	08A	0	15.41	5.64
DHC830	26A	0	27.11	10.05
DHC830	33A	0	0.01	0.00
DHC830	06R	1	0.00	0.00
DHC830	08R	1	12.40	5.37
DHC830	26L	1	22.00	9.49
DHC830	33S	1	0.01	0.00
DHC830	08R	1	0.43	0.22
DHC830	26L	1	1.07	0.45
DHC830	26L	1	0.00	0.00
<b>DHC830</b>			<b>78.44</b>	<b>31.22</b>
<b>GASEPF</b>				
GASEPF	06A	0	0.33	0.07
GASEPF	08A	0	13.83	1.81
GASEPF	15A	0	0.02	0.00
GASEPF	24A	0	1.42	0.17
GASEPF	26A	0	22.29	3.76
GASEPF	33A	0	2.39	0.49
GASEPF	06R	1	0.08	0.03
GASEPF	08R	1	9.56	2.09
GASEPF	15S	1	0.30	0.05
GASEPF	24L	1	0.79	0.17
GASEPF	26L	1	16.07	5.15
GASEPF	33S	1	1.00	0.32
GASEPF	08R	1	0.01	0.00
GASEPF	26L	1	0.01	0.02
<b>GASEPF</b>			<b>68.10</b>	<b>14.13</b>
<b>GASEPV</b>				
GASEPV	06A	0	0.00	0.00
GASEPV	08A	0	0.47	0.09
GASEPV	15A	0	0.00	0.00
GASEPV	24A	0	0.02	0.00
GASEPV	26A	0	0.56	0.15
GASEPV	33A	0	0.07	0.05
GASEPV	08R	1	0.20	0.05
GASEPV	15S	1	0.02	0.01
GASEPV	24L	1	0.00	0.00
GASEPV	26L	1	0.31	0.18
GASEPV	33S	1	0.03	0.00
GASEPV	26L	1	0.00	0.00
<b>GASEPV</b>			<b>1.68</b>	<b>0.53</b>
<b>SD330</b>				
SD330	08A	0	0.78	0.13
SD330	15A	0	0.00	0.00
SD330	24A	0	0.01	0.00
SD330	26A	0	1.24	0.25
SD330	33A	0	0.08	0.00
SD330	08R	1	0.44	0.15
SD330	15S	1	0.01	0.00
SD330	24L	1	0.00	0.00
SD330	26L	1	0.72	0.24
SD330	33S	1	0.01	0.01
SD330	08R	1	0.03	0.01
SD330	26L	1	0.04	0.00
<b>SD330</b>			<b>3.36</b>	<b>0.79</b>
<b>SF340</b>				
SF340	08A	0	0.01	0.01
SF340	08R	1	0.01	0.00
SF340	08R	2	0.01	0.00
<b>SF340</b>			<b>0.03</b>	<b>0.01</b>
<b>Grand Total:</b>			<b>179.36</b>	<b>55.29</b>

# Nef-Calc

## Airport Movements

FLIGHTPATH	Aircraft Code	DayTime Events	NightTime Events
<b>06A</b>			
06A	COMSEP	0.02	0.04
06A	DHC6	0.00	0.00
06A	GASEPF	0.33	0.07
06A	GASEPV	0.00	0.00
		0.35	0.11
<b>06R</b>			
06R	COMSEP	0.00	0.00
06R	DHC330	0.00	0.00
06R	GASEPF	0.08	0.03
		0.08	0.03
<b>08A</b>			
08A	BEC38P	1.03	0.47
08A	C130	0.01	0.00
08A	CNA441	0.00	0.01
08A	CNA500	0.00	0.00
08A	COMJET	0.02	0.00
08A	COMSEP	4.46	1.26
08A	DC3	0.01	0.00
08A	DHC6	0.05	0.03
08A	DHC7	0.03	0.00
08A	DHC8	0.01	0.00
08A	DHC830	15.41	5.64
08A	GASEPF	13.83	1.81
08A	GASEPV	0.47	0.09
08A	SD330	0.78	0.13
08A	SF340	0.01	0.01
		36.12	9.45
<b>08R</b>			
08R	BEC38P	0.98	0.18
08R	C130	0.01	0.00
08R	CNA441	0.01	0.00
08R	CNA500	0.00	0.00
08R	COMJET	0.02	0.01
08R	COMSEP	3.36	0.89
08R	DC3	0.00	0.00
08R	DHC6	0.05	0.01
08R	DHC7	0.03	0.00
08R	DHC8	0.01	0.00
08R	DHC830	12.40	5.37
08R	GASEPF	9.56	2.09
08R	GASEPV	0.20	0.05
08R	SD330	0.44	0.15
08R	SF340	0.01	0.00
08R	BEC38P	0.15	0.05
08R	CNA500	0.00	0.00
08R	COMJET	0.00	0.00

FLIGHTPATH	Aircraft Code	DayTime Events	NightTime Events
08R	COMSEP	0.08	0.02
08R	DHC6	0.00	0.00
08R	DHC830	0.43	0.22
08R	GASEPF	0.01	0.00
08R	SD330	0.03	0.01
08R	SF340	0.01	0.00
08R	BEC58P	0.01	0.00
08R	COMSEP	0.00	0.00
<b>08R</b>		<b>27.80</b>	<b>9.05</b>
<b>15A</b>			
15A	BEC58P	0.00	0.00
15A	COMSEP	0.02	0.01
15A	GASEPF	0.02	0.00
15A	GASEPV	0.00	0.00
15A	SD330	0.00	0.00
<b>15A</b>		<b>0.04</b>	<b>0.01</b>
<b>15S</b>			
15S	BEC58P	0.01	0.00
15S	COMSEP	0.13	0.00
15S	DHC6	0.00	0.00
15S	GASEPF	0.30	0.05
15S	GASEPV	0.02	0.01
15S	SD330	0.01	0.00
<b>15S</b>		<b>0.47</b>	<b>0.06</b>
<b>24A</b>			
24A	COMSEP	0.21	0.01
24A	DHC7	0.00	0.00
24A	GASEPF	1.42	0.17
24A	GASEPV	0.02	0.00
24A	SD330	0.01	0.00
<b>24A</b>		<b>1.66</b>	<b>0.18</b>
<b>24L</b>			
24L	COMSEP	0.05	0.00
24L	GASEPF	0.79	0.17
24L	GASEPV	0.00	0.00
24L	SD330	0.00	0.00
<b>24L</b>		<b>0.84</b>	<b>0.17</b>
<b>26A</b>			
26A	BEC58P	1.44	0.65
26A	C130	0.01	0.00
26A	CNA441	0.01	0.00
26A	CNA500	0.00	0.00
26A	COMJET	0.03	0.02

FLIGHTPATH	Aircraft Code	DayTime Events	NightTime Events
26A	COMSEP	6.98	2.44
26A	DHC6	0.09	0.07
26A	DHC7	0.06	0.00
26A	DHC8	0.00	0.01
26A	DHC830	27.11	10.05
26A	GASEPF	22.29	3.76
26A	GASEPV	0.56	0.15
26A	SD330	1.24	0.25
<b>26A</b>		<b>59.82</b>	<b>17.40</b>
<b>26L</b>			
26L	BEC38P	1.28	0.32
26L	C130	0.01	0.00
26L	CL601	0.00	0.00
26L	CNA441	0.01	0.00
26L	COMJET	0.02	0.02
26L	COMSEP	5.78	1.75
26L	DHC6	0.10	0.02
26L	DHC7	0.05	0.01
26L	DHC8	0.01	0.00
26L	DHC830	22.00	9.49
26L	GASEPF	16.07	3.15
26L	GASEPV	0.31	0.18
26L	SD330	0.72	0.24
26L	BEC38P	0.16	0.04
26L	CNA441	0.00	0.00
26L	CNA500	0.00	0.00
26L	COMSEP	0.18	0.09
26L	DC3	0.00	0.00
26L	DHC6	0.00	0.00
26L	DHC830	1.07	0.45
26L	GASEPF	0.01	0.02
26L	GASEPV	0.00	0.00
26L	SD330	0.04	0.00
26L	BEC38P	0.01	0.00
26L	COMSEP	0.00	0.00
26L	DHC7	0.00	0.00
26L	DHC830	0.00	0.00
26L	SD330	0.00	0.00
<b>26L</b>		<b>47.83</b>	<b>17.78</b>
<b>33A</b>			
33A	BEC38P	0.04	0.00
33A	CL601	0.00	0.00
33A	COMSEP	0.62	0.14
33A	DHC830	0.01	0.00
33A	GASEPF	2.39	0.49
33A	GASEPV	0.07	0.05
33A	SD330	0.08	0.00
<b>33A</b>		<b>3.21</b>	<b>0.68</b>
<b>FLIGHTPATH</b>	<b>Aircraft Code</b>	<b>DayTime Events</b>	<b>NightTime Events</b>
<b>33S</b>			
33S	BEC38P	0.00	0.00
33S	COMSEP	0.09	0.04
33S	DHC830	0.01	0.00
33S	GASEPF	1.00	0.32
33S	GASEPV	0.03	0.00
33S	SD330	0.01	0.01
<b>33S</b>		<b>1.14</b>	<b>0.37</b>
<b>Grand Total:</b>		<b>179.36</b>	<b>55.29</b>



# Nef-Calc

## Flightpaths

**FLIGHTPATH** 06R

**Runway** 06R

**Type** One Turn Departure

**1st Turn Direction** Right  
**Angle of Turn** 80.00 degs.  
**Criteria for Turn Start** Height 0.40 kFt  
**Turn Criteria** Rate 1.66 3 degs/Sec

Notes

**FLIGHTPATH** 06A

**Runway** 06R

**Type** Approach

**Glide Slope 1 (GS1)** 3.00 degs.  
**Altitude that GS1 starts** 3.00 kFt  
**Glide Slope 2 (GS2)** 3.00 degs.  
**Distance from runway when** 15.00 kFt

Notes

**FLIGHTPATH** 24L

**Runway** 24L

**Type** One Turn Departure

**1st Turn Direction** Right  
**Angle of Turn** 40.00 degs.  
**Criteria for Turn Start** Height 0.40 kFt  
**Turn Criteria** Rate 1.66 3 degs/Sec

Notes

**FLIGHTPATH 24A**  
**Runway** 24L  
**Type** Approach

Glide Slope 1 (GS1) 3.00 degs.  
 Altitude that GS1 starts 3.00 kFt  
 Glide Slope 2 (GS2) 3.00 degs.  
 Distance from runway when 15.00 kFt

Notes

**FLIGHTPATH 26L**  
**Runway** 26L  
**Type** One Turn Departure

1st Turn Direction Right  
 Angle of Turn 61.00 degs.  
 Criteria for Turn Start Height 0.40 kFt  
 Turn Criteria Rate 1.66 3 degs/Sec

Notes

**FLIGHTPATH 08R**  
**Runway** 08R  
**Type** One Turn Departure

1st Turn Direction Right  
 Angle of Turn 59.00 degs.  
 Criteria for Turn Start Height 0.40 kFt  
 Turn Criteria Rate 1.66 3 degs/Sec

Notes

**FLIGHTPATH 26A**  
**Runway** 26L  
**Type** Approach

Glide Slope 1 (GS1) 4.80 degs.  
 Altitude that GS1 starts 4.80 kFt  
 Glide Slope 2 (GS2) 4.80 degs.  
 Distance from runway when 15.00 kFt

Notes

**FLIGHTPATH 08A**  
**Runway** 08R  
**Type** Approach

Glide Slope 1 (GS1) 3.90 degs.  
 Altitude that GS1 starts 3.90 kFt  
 Glide Slope 2 (GS2) 3.90 degs.  
 Distance from runway when 15.00 kFt

Notes

**FLIGHTPATH 13S**  
**Runway** 13S  
**Type** One Turn Departure

1st Turn Direction Right  
 Angle of Turn 50.00 degs.  
 Criteria for Turn Start Height 0.40 kFt  
 Turn Criteria Rate 1.66 3 degs/Sec

Notes

**FLIGHTPATH 15A**  
**Runway** 15S  
**Type** Approach

Glide Slope 1 (GS1) 5.50 degs.  
 Altitude that GS1 starts 5.50 kFt  
 Glide Slope 2 (GS2) 5.50 degs.  
 Distance from runway when 15.00 kFt

Notes

**FLIGHTPATH 33A**  
**Runway** 33S  
**Type** Approach

Glide Slope 1 (GS1) 3.00 degs.  
 Altitude that GS1 starts 3.00 kFt  
 Glide Slope 2 (GS2) 3.00 degs.  
 Distance from runway when 15.00 kFt

Notes

**FLIGHTPATH 33S**  
**Runway** 33S  
**Type** Strait Departure



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