Edinburgh Airport
Where Scotland meets the world

Mobile Noise Monitoring Survey

Blackness Report – 24/09/2019 – 30/10/2019

Date: 28/03/2024

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Contents

REPORT OF NOISE MONITORING AT Blackness 24th September 2019 – 30th October 2019

1.0 Introduction

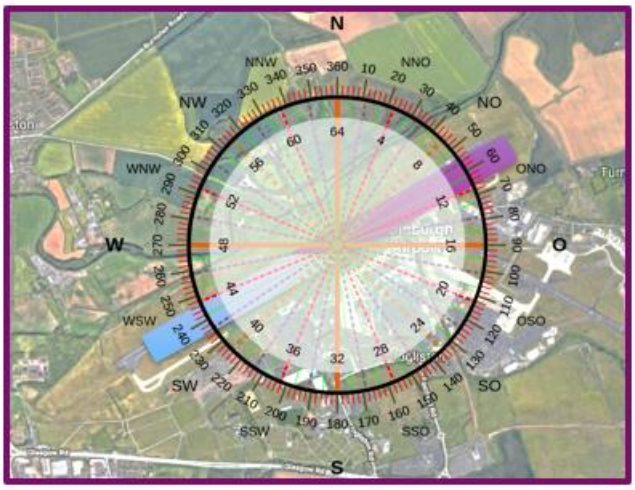
During discussions with our neighbouring communities, and in conversations with Edinburgh Airport Noise Advisory Board (EANAB) an interest, and need, to monitor noise out with our fixed noise monitoring stations was identified. With the introduction of our new Noise and Track system (NTK) it was decided that this would be the perfect time to acquire noise monitors which could be easily placed out in our communities and connected into the new NTK to provide extensive and robust data.

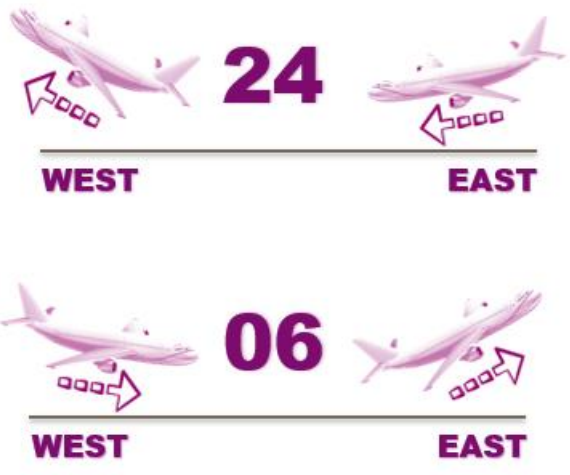
Edinburgh Airport have 3 permanent fixed noise monitors sited within proximity to the runway. The noise monitors at these sites are used for fining aircraft when the noise they make exceeds the levels we would expect for that time of day.

Mobile noise monitoring equipment however can be sited within garden areas of volunteer properties allowing us to monitor noise levels within neighbour hoods. The mobile Noise Monitors are installed at volunteer properties for between two to four weeks dependant on the number of noise measurements captured. Due to the location of the volunteer properties the number of noise measurements captured will vary. Many of the monitoring locations are not directly under a flight path and the further away from the airport the monitor is placed the more dispersed the aircraft become due to the design of our current flight paths.

Flight Paths

Edinburgh Airport has one primary runway (Runway 06/24), which operates in two directions. When Runway 06 is in operation, aircraft arrive from the west and depart to the east. When Runway 24 is in operation, aircraft arrive from the east and depart to the west.





conditions (south-westerly is the prevalent wind direction at Edinburgh Airport), R24 is in operation approximately 70% of the time and R06 is in operation approximately 30% of the time.

Arriving aircraft

Arriving aircraft do not have a specified route to follow before joining the Instrument Landing System (ILS). They will be advised, also known as 'vectored', by ATC, to follow a safe route on approach, this means there is more variation in the position of arriving aircraft.

Aircraft join the final approach at heights consistent with the use of the ILS, however, pilots are generally instructed to maintain an altitude of at least 2,500 feet until they are turned towards the ILS by ATC.

Departing aircraft

Standard Instrument Departure routes or SID's are a set of instructions which a pilot will refer to when departing from the airport. These routes are not compulsory, they are there to ensure that all departures are safe and efficient.

In the 1970s, when Runway 06/24 was designed and built, SID development was not as rigorous or sophisticated as it is today. There was limited technology, so instructions were simple, involving directions to be taken once an aircraft had reached a certain height or travelled a certain distance.

SIDs are depicted as lines on maps, however, recognising that aircraft are unable to follow this line exactly, aircraft fly within a corridor known as a Noise Preferential Route (NPR).

Noise Preferential Routes (NPR) are corridors, extending one mile in each direction from the centre of the SID line, which aircraft are expected to fly when departing from the airport. NPRs are not a statutory control but are used to reduce noise disturbance on our local communities.

Departing aircraft are required to follow the NPR until they reach an altitude of 3,000ft. When they reach 3,000ft they can depart these routes and fly towards their destination. Since July 2015, to alleviate noise intrusion in the Uphall area, we raised this height/turn level to 4,000ft for jet aircraft.
Further information on our current SID's may be found via our Noise Lab website below
https://noiselab.casper.aero/edi/#page=home

Runway Usage

Image 1

Runway 24

Shows typical runway usage spilt and the current Standard Instrument Departure's often shortened to SIDs for Runway 24 arrivals and departures

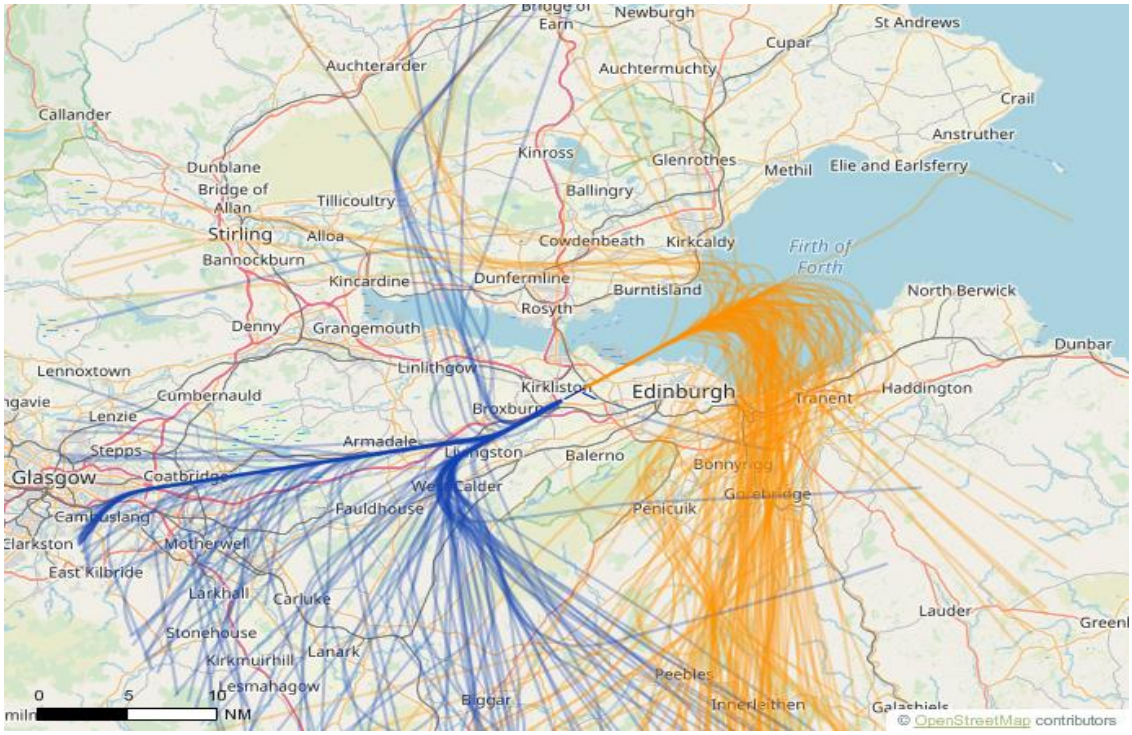
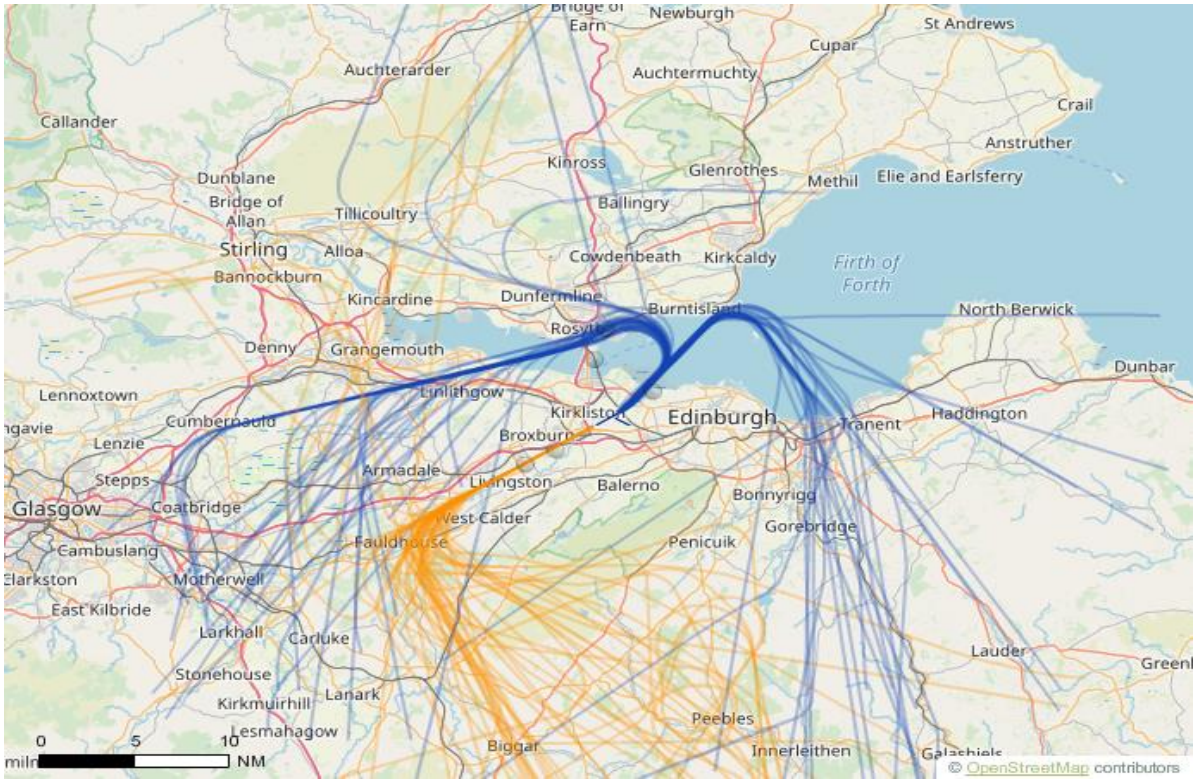


Image 2

Runway 06

Shows typical runway usage spilt and the current SIDs for Runway 06 arrivals and departures



2.0 Noise monitor siting

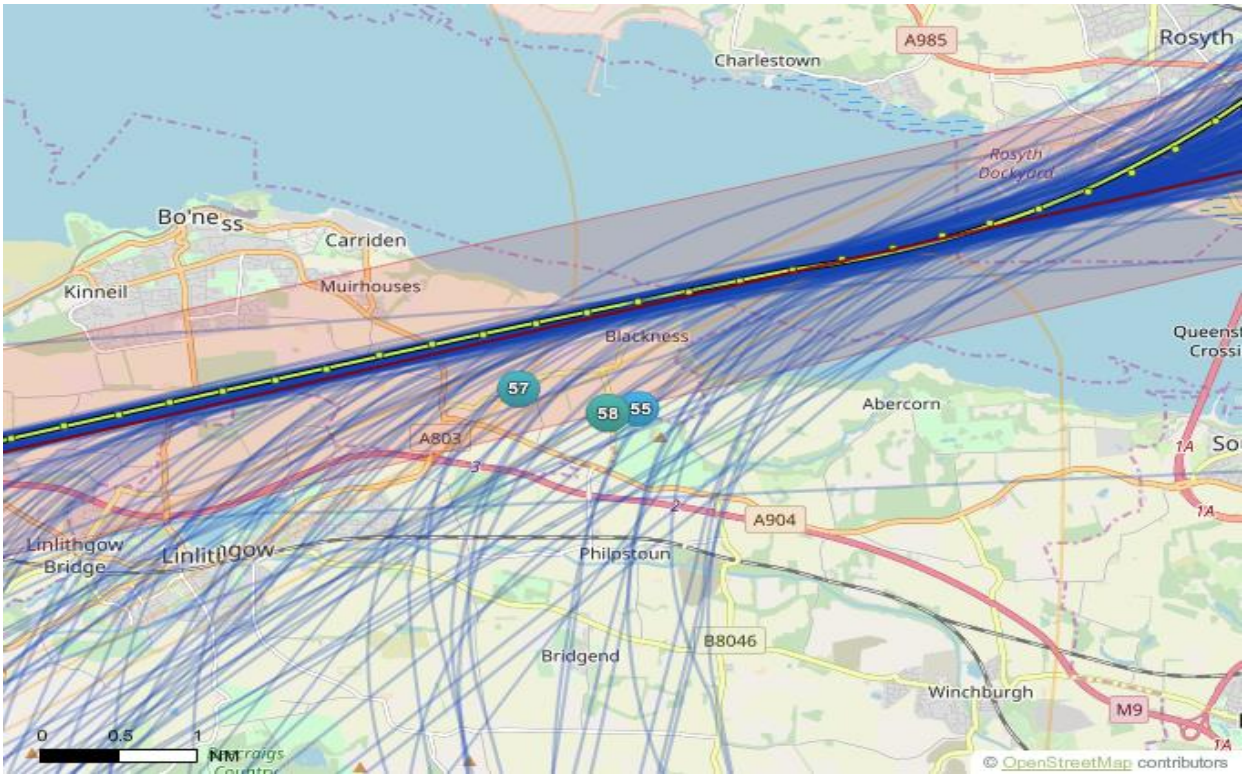
During this monitoring stage monitors were sited at the locations detailed below. The monitors measured noise from departures along the 06 departure routes 06 GOSAM Standard Instrument Departure Route (SID).

Dates of installation: 24th September 2019 – 30th October 2019

- Location 1 Property 1, Mannerston Holdings, Blackness, EH49 7ND, dates of installation, location specific noise climate
- Location 2 Cauldcoats, Linlithgow, Blackness, EH49 7NR, dates of installation location specific noise climate
- Location 3 Property 2, Mannerston Holdings, Blackness, EH49 7ND, dates of installation location specific noise climate

The sites were chosen for their location and the suitability of the garden area. However, sites were limited to those where the landowners who volunteered to host mobile noise monitoring equipment for the monitoring of aircraft noise.

Images 3 noise monitor locations.



3.0 Noise and Track System Data (NTK)

Noise data from mobile noise monitoring equipment. The mobile Noise Monitors (NMT) gather data in the same way as our fixed noise monitoring stations and use the same make and models of noise monitors to obtain the data. Further information on the NMT's is available within the appendix of this report.

Our Noise and Track System (NTK) has a direct connection to both our raw radar feed (as used by our Air Traffic Controllers) and to our operations data base which details each aircraft callsign, make model, airline, operator, etc. The mobile noise monitors connect into this NTK system, and this allows the NTK system to identify the aircraft with the noise created at the monitoring point and dismiss other noise sources. The NMTs collect data continuously and send this direct to the NTK system, updating it continuously.

Site location noise climates:
NMT position 1 – the noise monitor was located in the garden area of the property. This location was in a Quiet area, with background noise generated by B9109 and birdsong & wind.
NMT position 2 - The noise monitor was located in the garden area of the property. This location was in a Quiet area, with background noise generated by B9109, and farm operations in an adjacent field in addition to birdsong & wind.
NMT position 3 - The noise monitor was located in the garden area of the property. This location was in a Quiet area, with background noise generated by B903 and birdsong & wind.

4.0 Analysis of Noise Monitoring Survey Results

The data we obtained from the mobile NMTs enables us to assess the noise climate within an area even when aircraft are not overhead. In the following tables and graphs you will see noise represented in a number of different ways.

Average daily noise levels when aircraft are NOT overhead, or the 'Ambient' noise level, is averaged out over a time period in this case the period measured are day and night to give a continuous steady level of noise (LAeq), this is the most frequently used Environmental Noise measurement. The Average LAeq is the average LAeq when Aircraft ARE overhead.
Relating and comparing noise levels can be quite confusing. However, we have provided the average noise levels (LAeq) for some common everyday activities below to assist in giving you an understanding of this type of noise measurement.

- A whisper 20 – 30 dB
- A quiet Library – 35dB
- Normal conversation between two people – 55 – 60dB
- A lawn mower – 90dB
- Loud Rock music concert – 120dB
- Typical reduction in noise by double glazing 15 – 25 dBA

This type of noise measurement is similar to the one which the CAA instruct us to use in the development of contour mapping Our Noise Insulation Scheme uses this contour mapping assists us in determining if assistance should be offered to properties close to the Airport. However, for contour mapping, data from the full summertime period is used to calculate the LAeq, rather than a 2 – 3-

week period as used for our mobile noise monitoring LAeq. Unfortunately, the two types of LAeq measurements cannot be directly compared.

LAeq is a good way of understanding how noise is experienced in a community over a period and it is recognised internationally as the accepted method for measuring and quantifying environmental noise.

In addition to the LAeq, the maximum noise level of each individual aircraft is measured. As the aircraft fly's overhead, the noise level is measured at the monitoring station. Unlike average noise levels or LAeq or SEL's this type of measurement measures the noise from an individual aircraft as it passes over the microphone. It takes a measurement as the airplane reaches its loudest point and this is called the Lmax.

Sound exposure level (SEL) is a measure of energy that takes into account both received level and duration of exposure and it is also measured by the noise monitor this is a calculated measurement. The calculation is carried out by the noise monitor, the noise monitor uses the sound energy over the whole period where aircraft noise can be heard, for example during a 25 second period of time, the monitor then takes all of those sound energy measurements and squashes them in to a 1 second time period.

For example a noise level of 90 dBA lasting 1 second would have a SEL of 90 dBA but if the event lasted 2 seconds the SEL would be 93 dBA. Put another way if a second event of 80 dBA occurred it would have to last 10 seconds to register a 90 dBA SEL. SEL values are used as the basis for LAeq Contour mapping.

Although the average level of aircraft noise may be much lower than the average level of the total noise at a site, each individual aircraft noise event, whenever it occurs, is likely to be clearly audible, and distinguishable from the residual noise at the site. This is because, in addition to being different in character, it results in a noticeable increase in the level of noise over the ambient noise level during each event. A summary of the main noise related parameters for all three sites is given in the section below.

5.0 Noise Parameters detailed within this report.

Noise measurement is a complicated subject and measurements can be taken in a number of ways to represent different things as described in the previous section. Below is a technical description of the noise parameters used with in this report

Decibel dB: This is the unit of measurement used for sound pressure levels and noise levels are usually quoted in decibels (dB). The decibel scale is logarithmic rather than linear. The threshold of hearing is zero decibels while, at the other extreme, the threshold of pain is about 130 decibels. In practice these limits are seldom experienced and typical levels lie within the range of 30 dB(A) (a quiet night-time level in a bedroom) to 90 dB(A) (at the kerbside of a busy street).

A weighting: In addition to its non-linear amplitude response, the human ear has a non-linear frequency response; it is less sensitive at low and high frequencies and most sensitive in the range 1 kHz to 4 kHz

(cycles per second). The A-weighting is applied to measured sound pressure levels so that these levels correspond more closely to the subjective response. A-weighted noise levels are often expressed in

Lmax: The maximum A-weighted level measured during a given time period, T with the sound meter set on FAST response.

LAeq: The equivalent continuous sound level LAeq, T is the level of a notional steady sound, which at a given position and over a defined period of time, T, would have the same A-weighted acoustic energy as the fluctuating noise.

Ambient Noise level: Ambient noise is the total sound in a given situation at a given time usually composed of sound from many sources, near and far. In this instance the ambient level is the average over the time period of noise of any sound other than Aircraft noise.

SEL: Sound exposure level abbreviated as SEL, is the total noise energy produced from a single noise event. The Sound Exposure Level is a metric used to describe the amount of noise from an event such as an individual aircraft flyover. It is computed from measured dBA sound levels. The Sound Exposure Level is the integration of all the acoustic energy contained within the event. The dB(A) level which, if it lasted for one second, would produce the same A- weighted sound energy as the actual event

LA90 Background noise level: The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time period, T.

Lnight: The LAeq nighttime measurement, taken for the 8-hour period 23:00 – 07:00

Standard Deviation (Std Deviation): This is a statistical tool which quite simply shows how much variation or dispersal there is in a set of data or measurements. If there is a low spread of values, then the std deviation will be low. This is a tool mainly used by statisticians.

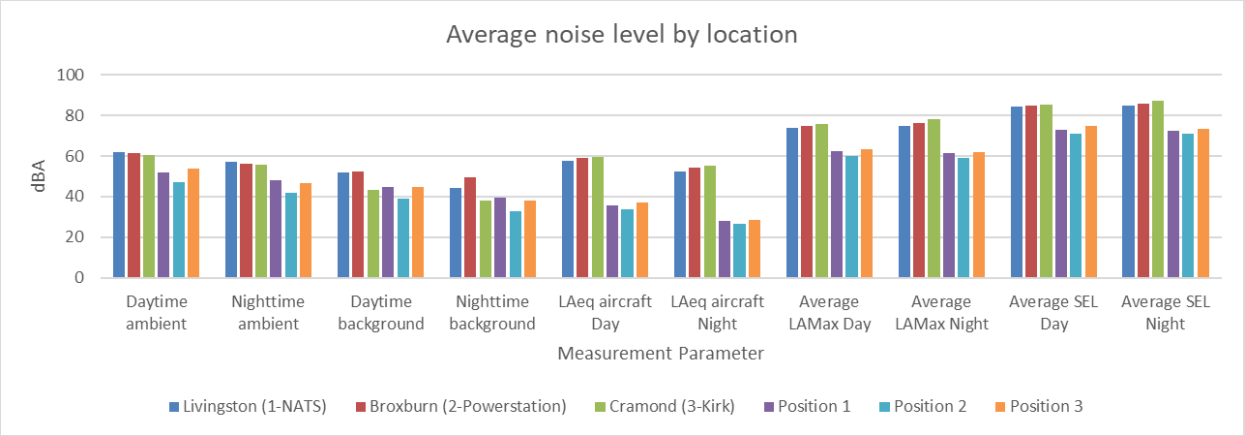
Measurement periods:
For this noise monitoring report, we have used the most common definitions of day and night as detailed below, these time periods are also used with in WHO recommendations.
Daytime Ambient LAeq (07:00 - 23:00)
Night-time Ambient LAeq (23:00 – 07:00)

The following sections of this report summarise the results of the noise monitoring readings obtained at each location. The results look at not only the different types of noise measurement at each location but also look at the noise levels for all aircraft types and the noisiest aircraft types flown from Edinburgh Airport.

6.0 Average values by Location

The below table and chart detail the average values average Lmax, L90 and LAeq measurements across the measurement period, at each location, in addition to those at our fixed noise monitoring positions at Livingston, Cramond and Broxburn. They provide an overview of the general noise climate in this location.

Noise monitor	Daytime ambient	Nighttime ambient	Daytime background	Nighttime background	LAeq aircraft Day	LAeq aircraft Night	Average LAMax Day	Average LAMax Night	Average SEL Day	Average SEL Night
Livingston (1-NATS)	62.1	56.9	51.9	44.1	57.8	52.5	73.6	74.7	84.1	84.6
Broxburn (2-Powersta	61.3	56.4	52.2	49.3	59.1	54.3	74.9	76.4	84.8	85.9
Cramond (3-Kirk)	60.5	55.8	43.2	38.2	59.7	55.3	75.5	78.1	85.1	87.3
Position 1	51.8	48.3	44.9	39.5	35.7	28.2	62.2	61.5	72.8	72.2
Position 2	47.2	42	38.9	32.8	33.6	26.7	60.2	59	71.2	70.8
Position 3	53.6	46.6	44.7	38.1	36.9	28.7	63.3	61.7	74.9	73.5



6.1 Aircraft Types B738 & A320, LA90, LAeq, SEL, Lnight

Between 24th September 2019 – 30th October 2019 there were 19784 Departures and Arrivals from and to Edinburgh Airport. Of this total number of departures 1349 departed via R06 GOSAM SID and 326 overflew the locations of the Mobile Noise Monitoring equipment.

The Runway split during this period was R24 60/R06 40 % see Appendix for table of runway usage.

Image 4 and Image 5 give a snapshot detailing the Flight track dispersion of flights and altitude of the aircraft respectively.

Image 4
Track dispersal

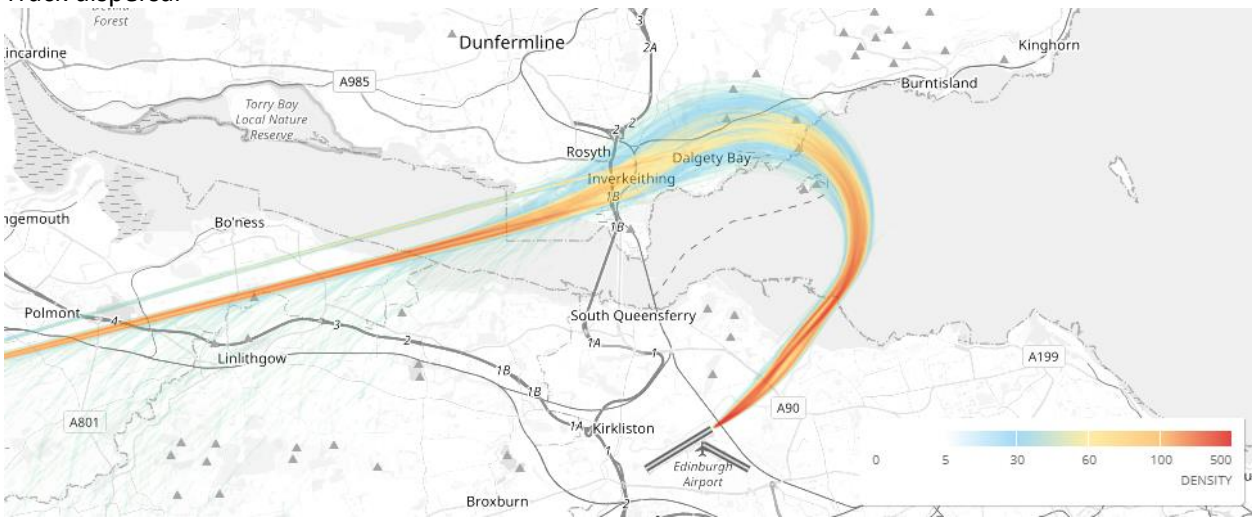
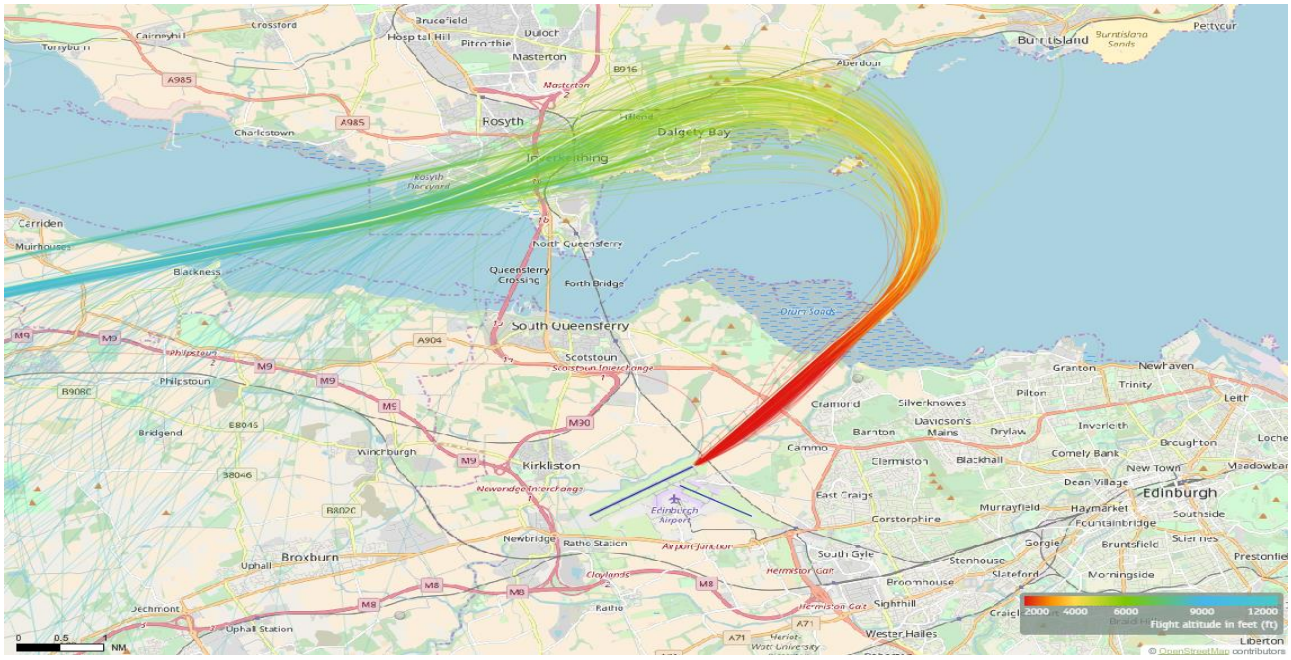


Image 5
Altitude of Aircraft



NMT Position 1

During the monitoring period, the monitor recorded 243 aircraft noise events. The most frequent aircraft on this flight path were Boeing B738 and Airbus A320. 131 B738 and 48 A320 aircraft on R06 GOSAM SID flew in the vicinity of the monitoring location and were recorded by the monitoring equipment. The average duration of each recording across positions was 48 seconds.

In addition to recording noise events from aircraft movements to or from Edinburgh Airport the mobile noise monitor recorded noise from Traffic, Birds, and other noise sources.
Noise Events not associated with air traffic – 6498.

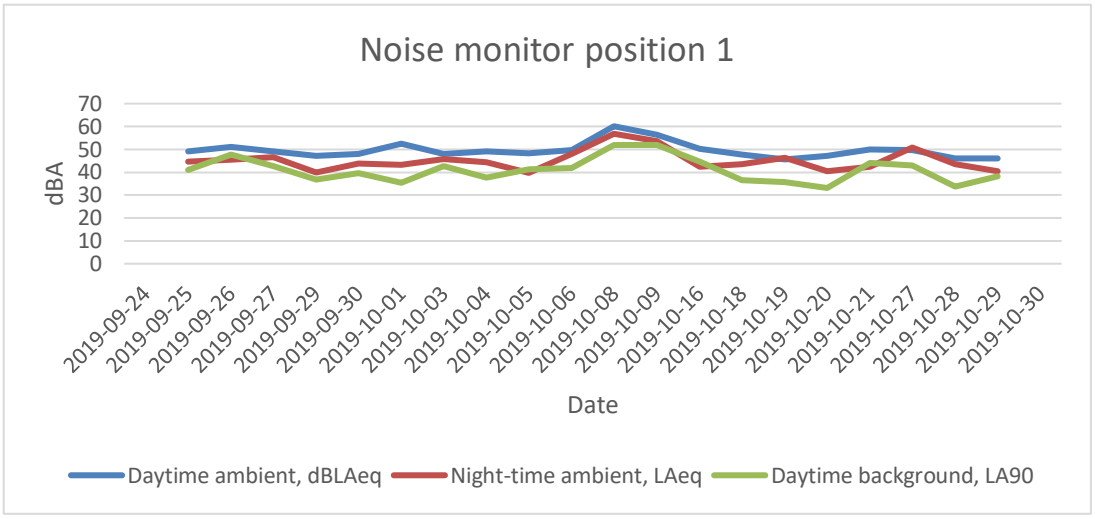
Noise recordings not associated to aircraft were discounted from the analysis of the results below.

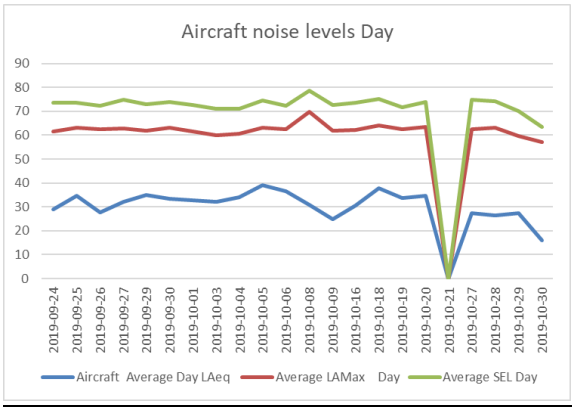
Table 2

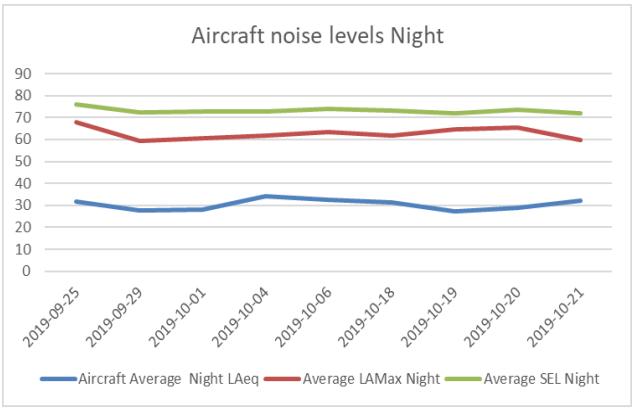
B738

The Graph and Tables below details the average Lmax, L90 and LAeq measurements across the measurement period, for this aircraft type.

B738	Daytime ambient, dBLAeq	Night-time ambient, LAeq	Daytime background, LA90	Night-time background, LA90	Aircraft Average Day LAeq	Aircraft Average Night LAeq	Average LAMax Day	Average LAMax Night	Average SEL Day	Average SEL Night
2019-09-24				N/A	29.1	N/A	61.6	N/A	73.7	N/A
2019-09-25	49	44.7	40.9	28.8	34.6	31.6	63.1	68	73.7	76.2
2019-09-26	51.1	45.4	47.6	35.1	27.8	N/A	62.4	N/A	72.4	N/A
2019-09-27	49.1	46.5	42.8	39.7	32.1	N/A	62.7	N/A	74.9	N/A
2019-09-29	47.1	39.8	36.7	31.3	35	27.6	61.9	59.4	73.1	72.2
2019-09-30	47.9	43.7	39.5	32.7	33.3	N/A	63	N/A	73.9	N/A
2019-10-01	52.6	43.1	35.4	36.1	32.8	28.1	61.6	60.5	72.6	72.7
2019-10-03	47.9	45.8	42.8	33.5	32	N/A	60.1	N/A	71.1	N/A
2019-10-04	49.1	44.4	37.5	36.8	34	34.1	60.5	62	71.2	72.7
2019-10-05	48.4	39.7	41.3	31.2	39	N/A	63.2	N/A	74.5	N/A
2019-10-06	49.6	47.9	41.9	39.1	36.6	32.4	62.4	63.4	72.4	74
2019-10-08	60.1	56.8	51.9	49.6	30.9	N/A	69.8	N/A	78.5	N/A
2019-10-09	56.4	53.6	51.8	46.6	24.9	N/A	61.8	N/A	72.5	N/A
2019-10-16	50.2	42.4	44.5	31.7	30.7	N/A	62.1	N/A	73.6	N/A
2019-10-18	47.8	43.6	36.5	32.1	37.9	31.5	64.1	61.6	75.1	73.1
2019-10-19	45.6	46.3	35.8	37	33.8	27.4	62.6	64.6	71.8	72
2019-10-20	47.2	40.3	33.1	32	34.7	28.8	63.3	65.6	73.8	73.4
2019-10-21	50	42.4	44.1	29.3	N/A	32.1	N/A	59.6	N/A	72
2019-10-27	49.8	50.7	42.9	42.4	27.4	N/A	62.5	N/A	75	N/A
2019-10-28	45.9	43.4	33.6	30	26.5	N/A	63	N/A	74.1	N/A
2019-10-29	46.1	40.5	38.1	29.6	27.4	N/A	59.5	N/A	70.2	N/A
2019-10-30				N/A	16	N/A	57	N/A	63.6	N/A
Average	51.8	48.3	44.9	39.5	31.7	25.6	62.6	62.9	73.4	73.1


Noise monitor position 1
dBA
70
60
50
40
30
20
10
0
2019-09-24
2019-09-25
2019-09-26
2019-09-27
2019-09-29
2019-09-30
2019-10-01
2019-10-03
2019-10-04
2019-10-05
2019-10-06
2019-10-08
2019-10-09
2019-10-16
2019-10-18
2019-10-19
2019-10-20
2019-10-21
2019-10-27
2019-10-28
2019-10-29
2019-10-30
Date
Daytime ambient, dBLAeq
Night-time ambient, LAeq
Daytime background, LA90


Aircraft noise levels Day
90
80
70
60
50
40
30
20
10
0
2019-09-24
2019-09-25
2019-09-26
2019-09-27
2019-09-29
2019-09-30
2019-10-01
2019-10-03
2019-10-04
2019-10-05
2019-10-06
2019-10-08
2019-10-09
2019-10-16
2019-10-18
2019-10-19
2019-10-20
2019-10-21
2019-10-27
2019-10-28
2019-10-29
2019-10-30
Aircraft Average Day LAeq
Average LAMax Day
Average SEL Day

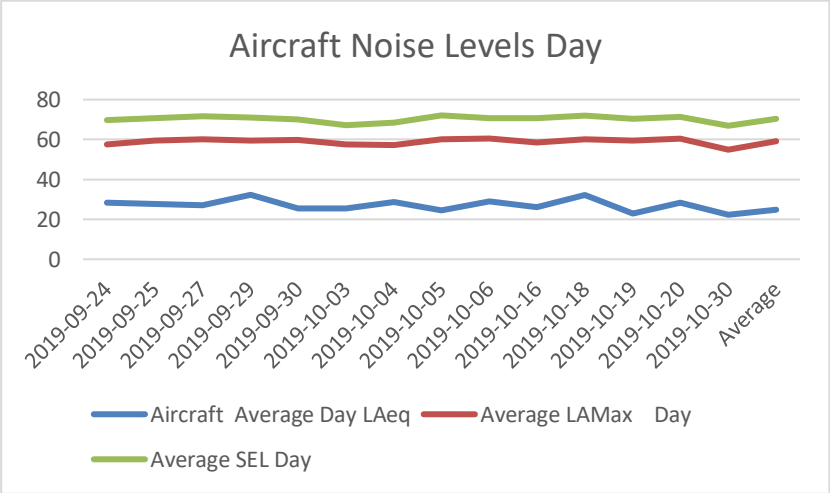

Aircraft noise levels Night
90
80
70
60
50
40
30
20
10
0
2019-09-25
2019-09-29
2019-10-01
2019-10-04
2019-10-06
2019-10-18
2019-10-19
2019-10-20
2019-10-21
Aircraft Average Night LAeq
Average LAMax Night
Average SEL Night

A320

The Graph below details the average Lmax, L90 and LAeq measurements across the measurement period, for this aircraft type.

Table 3

A320	Daytime ambient, dBLAeq	Night-time ambient, LAeq	Daytime background, LA90	Night-time background, LA90	Aircraft Average Day LAeq	Aircraft Average Night LAeq	Average LAMax Day	Average LAMax Night	Average SEL Day	Average SEL Night
2019-09-24		N/A	N/A	N/A	28.2	N/A	57.6	N/A	69.8	N/A
2019-09-25	49	44.7	40.9	28.8	27.8	N/A	59.4	N/A	70.6	N/A
2019-09-27	49.1	46.5	42.8	39.7	27.1	N/A	60.2	N/A	71.7	N/A
2019-09-29	47.1	39.8	36.7	31.3	32.3	N/A	59.6	N/A	70.9	N/A
2019-09-30	47.9	43.7	39.5	32.7	25.6	N/A	59.7	N/A	70.2	N/A
2019-10-03	47.9	45.8	42.8	33.5	25.6	N/A	57.6	N/A	67.2	N/A
2019-10-04	49.1	44.4	37.5	36.8	28.6	N/A	57.2	N/A	68.5	N/A
2019-10-05	48.4	39.7	41.3	31.2	24.5	N/A	60	N/A	72.1	N/A
2019-10-06	49.6	47.9	41.9	39.1	29.1	N/A	60.5	N/A	70.7	N/A
2019-10-16	50.2	42.4	44.5	31.7	26.1	N/A	58.6	N/A	70.7	N/A
2019-10-18	47.8	43.6	36.5	32.1	32.1	N/A	60.2	N/A	71.9	N/A
2019-10-19	45.6	46.3	35.8	37	22.8	N/A	59.4	N/A	70.4	N/A
2019-10-20	47.2	40.3	33.1	32	28.4	N/A	60.3	N/A	71.2	N/A
2019-10-30		N/A	N/A	N/A	22.3	N/A	54.9	N/A	66.9	N/A
Average	51.8	48.3	44.9	39.5	24.7	N/A	59.2	N/A	70.4	N/A



No nighttime measurements were taken of this aircraft type during the measurement period at this location

NMT Position 2

During the monitoring period, the monitor recorded 198 aircraft noise events. The most frequent aircraft on this flight path were the Boeing B738 and Airbus A320. 105 B738 and 34 A320 aircraft on R06 GOSAM SID flew in the vicinity of the monitoring location and were recorded by the monitoring equipment. The average duration of each recording across positions was 48 seconds.

In addition to recording noise events from aircraft movements to or from Edinburgh Airport the mobile noise monitor recorded noise from Traffic, Birds, and other noise sources.
Noise Events not associated with air traffic – 3771.

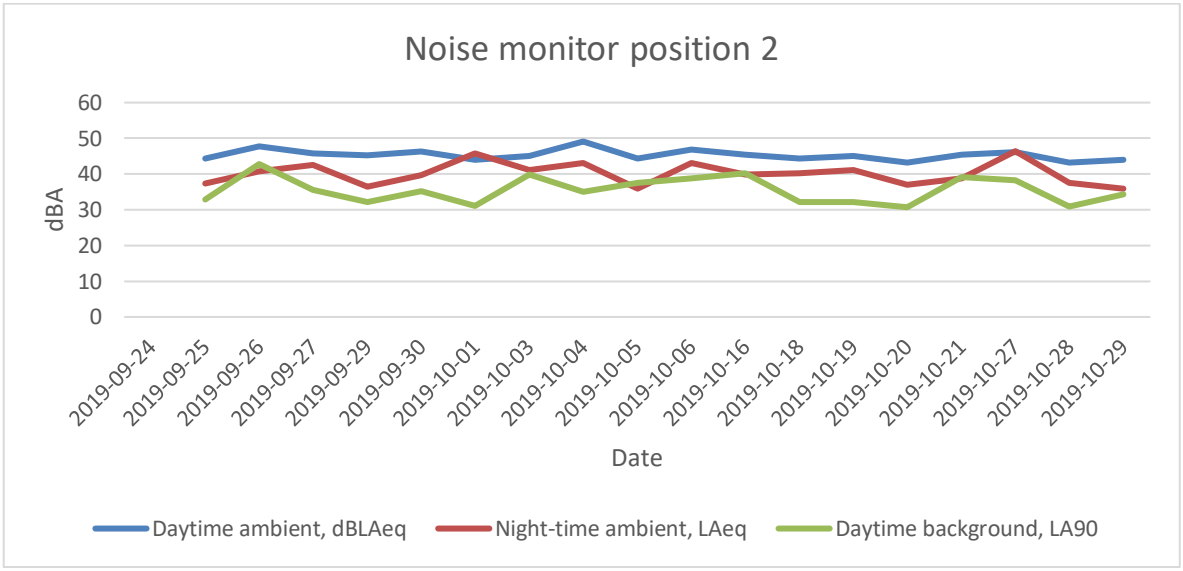
Noise recordings not associated to aircraft were discounted from the analysis of the results below.

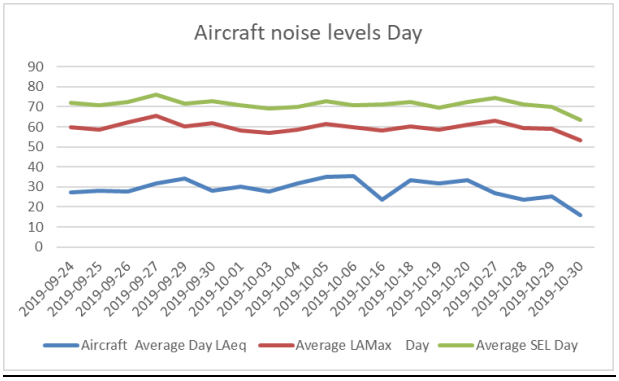
B738

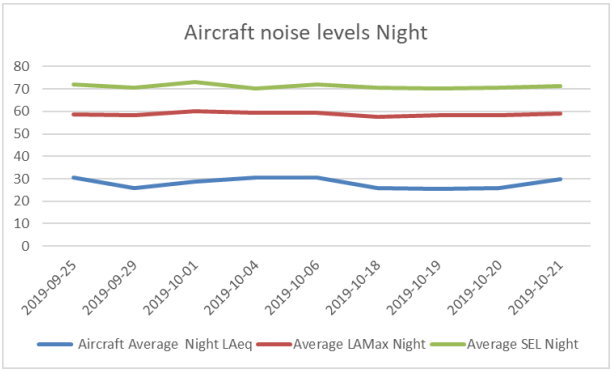
The Graph and Tables below details the average Lmax, L90 and LAeq measurements across the measurement period, for this aircraft type.

Table 4

B738	Daytime ambient, dBLAeq	Night-time ambient, LAeq	Daytime background, LA90	Night-time background, LA90	Aircraft Average Day LAeq	Aircraft Average Night LAeq	Average LAMax Day	Average LAMax Night	Average SEL Day	Average SEL Night
2019-09-24					27.2	N/A	59.6	N/A	71.8	N/A
2019-09-25	44.3	37.4	32.9	27.1	28	30.4	58.6	58.7	70.8	72
2019-09-26	47.8	40.8	42.8	33.1	27.8	N/A	62.1	N/A	72.4	N/A
2019-09-27	45.7	42.5	35.6	35.3	31.6	N/A	65.6	N/A	76.2	N/A
2019-09-29	45.3	36.4	32.2	28.7	34.1	25.9	60.3	58.5	71.7	70.5
2019-09-30	46.4	39.7	35.2	28.8	28.1	N/A	61.7	N/A	72.7	N/A
2019-10-01	44	45.8	31	31.7	30.1	28.7	58.2	60.1	70.7	73.3
2019-10-03	45.1	41.2	39.8	29.5	27.6	N/A	57.1	N/A	69.2	N/A
2019-10-04	49.1	43	35.1	34.5	31.9	30.6	58.4	59.3	70	70.4
2019-10-05	44.3	36	37.5	28.4	35.2	N/A	61.3	N/A	72.8	N/A
2019-10-06	46.9	43	38.7	35.4	35.3	30.6	59.7	59.5	70.9	72.2
2019-10-16	45.4	39.9	40.3	30.5	23.5	N/A	58.2	N/A	71.1	N/A
2019-10-18	44.4	40.2	32.2	30.3	33.2	25.9	60.1	57.6	72.3	70.5
2019-10-19	45	41.2	32.2	33	31.7	25.5	58.5	58.5	69.7	70.1
2019-10-20	43.2	37	30.7	29.2	33.4	26	61	58.2	72.5	70.6
2019-10-21	45.5	38.8	39.2	28.5	N/A	29.8	N/A	59.1	N/A	71.4
2019-10-27	46.1	46.4	38.3	37.7	27	N/A	63	N/A	74.6	N/A
2019-10-28	43.2	37.5	30.9	28.3	23.7	N/A	59.2	N/A	71.3	N/A
2019-10-29	44	35.9	34.3	28.2	25.2	N/A	59	N/A	69.8	N/A
2019-10-30					15.8	N/A	53.5	N/A	63.4	N/A
Average	47.2	42	38.9	32.8	29.1	23.6	60.1	59	71.6	71.3


Noise monitor position 2
dBA
60
50
40
30
20
10
0
2019-09-24
2019-09-25
2019-09-26
2019-09-27
2019-09-29
2019-09-30
2019-10-01
2019-10-03
2019-10-04
2019-10-05
2019-10-06
2019-10-16
2019-10-18
2019-10-19
2019-10-20
2019-10-21
2019-10-27
2019-10-28
2019-10-29
Date
Daytime ambient, dBLAeq
Night-time ambient, LAeq
Daytime background, LA90


Aircraft noise levels Day
90
80
70
60
50
40
30
20
10
0
2019-09-24
2019-09-25
2019-09-26
2019-09-27
2019-09-29
2019-09-30
2019-10-01
2019-10-03
2019-10-04
2019-10-05
2019-10-06
2019-10-16
2019-10-18
2019-10-19
2019-10-20
2019-10-27
2019-10-28
2019-10-29
2019-10-30
Aircraft Average Day LAeq
Average LAMax Day
Average SEL Day

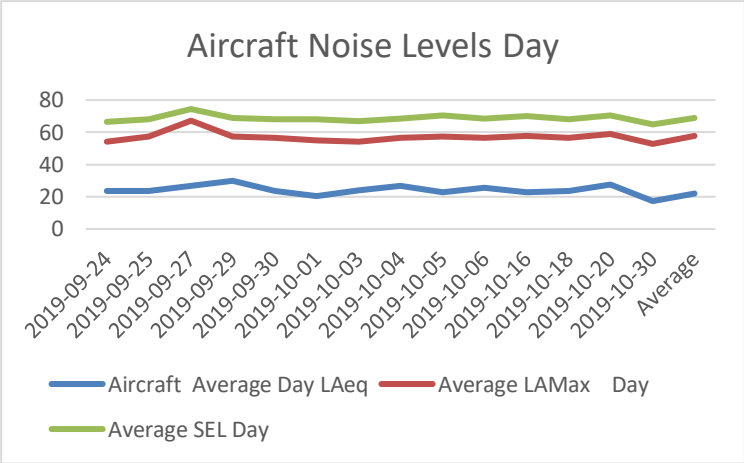

Aircraft noise levels Night
80
70
60
50
40
30
20
10
0
2019-09-25
2019-09-29
2019-10-01
2019-10-04
2019-10-06
2019-10-18
2019-10-19
2019-10-20
2019-10-21
Aircraft Average Night LAeq
Average LAMax Night
Average SEL Night

A320

The Graph and Tables below details the average Lmax, L90 and LAeq measurements across the measurement period, for this aircraft type.

Table 5

A320	Daytime ambient, dBLAeq	Night-time ambient, LAeq	Daytime background, LA90	Night-time background, LA90	Aircraft Average Day LAeq	Aircraft Average Night LAeq	Average LAMax Day	Average LAMax Night	Average SEL Day	Average SEL Night
2019-09-24	N/A	N/A	N/A	N/A	23.7	N/A	54.2	N/A	66.5	N/A
2019-09-25	44.3	37.4	32.9	27.1	23.6	N/A	57.3	N/A	68.2	N/A
2019-09-27	45.7	42.5	35.6	35.3	26.8	N/A	67.2	N/A	74.4	N/A
2019-09-29	45.3	36.4	32.2	28.7	29.9	N/A	57.2	N/A	69	N/A
2019-09-30	46.4	39.7	35.2	28.8	23.5	N/A	56.4	N/A	68.1	N/A
2019-10-01	44	45.8	31	31.7	20.6	N/A	54.9	N/A	68.2	N/A
2019-10-03	45.1	41.2	39.8	29.5	23.9	N/A	54	N/A	66.8	N/A
2019-10-04	49.1	43	35.1	34.5	26.7	N/A	56.5	N/A	68.3	N/A
2019-10-05	44.3	36	37.5	28.4	22.8	N/A	57.2	N/A	70.4	N/A
2019-10-06	46.9	43	38.7	35.4	25.5	N/A	56.4	N/A	68.4	N/A
2019-10-16	45.4	39.9	40.3	30.5	22.6	N/A	57.6	N/A	70.2	N/A
2019-10-18	44.4	40.2	32.2	30.3	23.6	N/A	56.7	N/A	68.2	N/A
2019-10-20	43.2	37	30.7	29.2	27.7	N/A	58.9	N/A	70.5	N/A
2019-10-30	N/A	N/A	N/A	N/A	17.3	N/A	52.8	N/A	64.9	N/A
Average	47.2	42	38.9	32.8	22	N/A	57.8	N/A	68.9	N/A



No nighttime measurements were taken of this aircraft type during the measurement period at this location

NMT Position 3

During the monitoring period, the monitor recorded 168 aircraft noise events. The most frequent aircraft on this flight path were the Boeing B738 and Airbus A320. 98 B738 and 25 A320 aircraft on R06 GOSAM SID flew in the vicinity of the monitoring location and were recorded by the monitoring equipment. The average duration of each recording across positions was 48 seconds

In addition to recording noise events from aircraft movements to or from Edinburgh Airport the mobile noise monitor recorded noise from Traffic, Birds, and other noise sources.
Noise Events not associated with air traffic – 3333

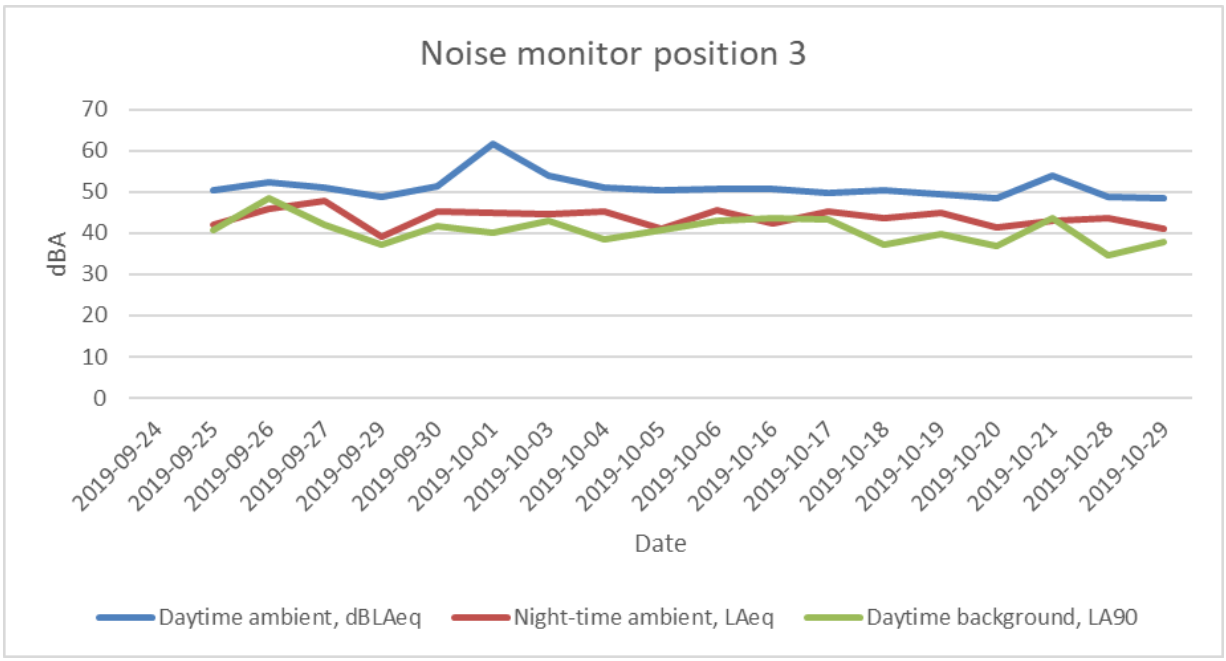
Noise recordings not associated to aircraft were discounted from the analysis of the results below.

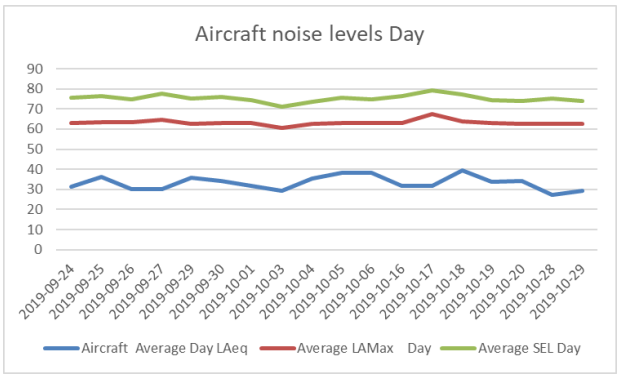
B738

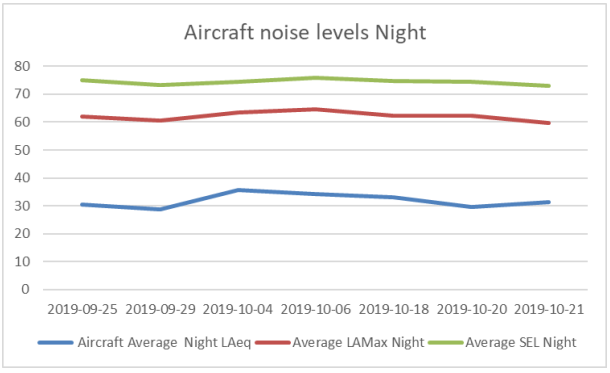
The table and graph below detail the average Lmax, L90 and LAeq measurements across the measurement period, for this aircraft type.

Table 6

B738	Daytime ambient, dBL$_{Aeq}$	Night-time ambient, L$_{Aeq}$	Daytime background, L$_{A90}$	Night-time background, L$_{A90}$	Aircraft Average Day L$_{Aeq}$	Aircraft Average Night L$_{Aeq}$	Average L$_{AMax}$ Day	Average L$_{AMax}$ Night	Average SEL Day	Average SEL Night
2019-09-24					31.2	N/A	63.2	N/A	75.8	N/A
2019-09-25	50.5	42.1	40.7	35.6	36.4	30.4	63.3	62.1	76.3	75
2019-09-26	52.4	45.9	48.6	37.3	30.1	N/A	63.6	N/A	74.7	N/A
2019-09-27	51.1	47.7	41.9	39.8	30.2	N/A	64.7	N/A	77.8	N/A
2019-09-29	48.9	39.2	37.2	33.3	35.9	28.7	62.6	60.5	75	73.3
2019-09-30	51.5	45.4	41.6	34.9	34.3	N/A	63.2	N/A	75.9	N/A
2019-10-01	61.6	44.9	40.2	37	31.6	N/A	63.1	N/A	74.4	N/A
2019-10-03	54	44.7	42.9	34.7	29.5	N/A	60.4	N/A	71.1	N/A
2019-10-04	51.1	45.2	38.6	37.1	35.5	35.8	62.8	63.5	73.6	74.4
2019-10-05	50.4	41.2	40.7	33.1	38.3	N/A	63.1	N/A	75.5	N/A
2019-10-06	50.7	45.5	43	38.7	38.2	34.3	63.2	64.7	74.7	75.9
2019-10-16	50.8	42.4	43.6	33.3	31.8	N/A	63.1	N/A	76.4	N/A
2019-10-17	49.9	45.3	43.2	36.7	31.6	N/A	67.5	N/A	79.2	N/A
2019-10-18	50.5	43.6	37.3	33.2	39.5	33.1	63.7	62.2	77.1	74.7
2019-10-19	49.6	45	39.8	39.4	33.6	N/A	62.9	N/A	74.2	N/A
2019-10-20	48.6	41.4	36.8	36.6	34.3	29.7	62.5	62.2	74.1	74.3
2019-10-21	53.9	43	43.6	33.8	N/A	31.4	N/A	59.8	N/A	73
2019-10-28	48.7	43.5	34.7	32.5	27.4	N/A	62.7	N/A	75	N/A
2019-10-29	48.6	41.2	38	29.8	29.5	N/A	62.8	N/A	74.1	N/A
Average	53.6	46.6	44.7	38.1	32.2	26.1	63.1	62.8	75.3	74.5


Noise monitor position 3
70
60
50
40
30
20
10
0
dBA
2019-09-24
2019-09-25
2019-09-26
2019-09-27
2019-09-29
2019-09-30
2019-10-01
2019-10-03
2019-10-04
2019-10-05
2019-10-06
2019-10-16
2019-10-17
2019-10-18
2019-10-19
2019-10-20
2019-10-21
2019-10-28
2019-10-29
Date
Daytime ambient, dBLAeq
Night-time ambient, LAeq
Daytime background, LA90


Aircraft noise levels Day
90
80
70
60
50
40
30
20
10
0
2019-09-24
2019-09-25
2019-09-26
2019-09-27
2019-09-29
2019-09-30
2019-10-01
2019-10-03
2019-10-04
2019-10-05
2019-10-06
2019-10-16
2019-10-17
2019-10-18
2019-10-19
2019-10-20
2019-10-28
2019-10-29
Aircraft Average Day LAeq
Average LAMax Day
Average SEL Day

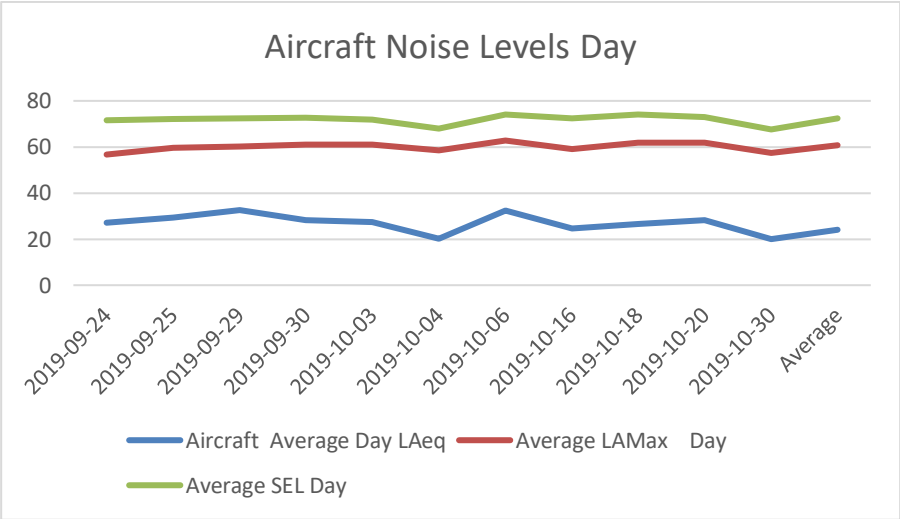

Aircraft noise levels Night
80
70
60
50
40
30
20
10
0
2019-09-25
2019-09-29
2019-10-04
2019-10-06
2019-10-18
2019-10-20
2019-10-21
Aircraft Average Night LAeq
Average LAMax Night
Average SEL Night

A320

The Graph below details the average Lmax, L90 and LAeq measurements across the measurement period, for this aircraft type.

Table 7

	Daytime ambient, dBL$_{Aeq}$	Night-time ambient, L$_{Aeq}$	Daytime background, L$_{A90}$	Night-time background, L$_{A90}$	Aircraft Average Day L$_{Aeq}$	Aircraft Average Night L$_{Aeq}$	Average L$_{AMax}$ Day	Average L$_{AMax}$ Night	Average SEL Day	Average SEL Night
2019-09-24	N/A	N/A	N/A	N/A	27	N/A	56.7	N/A	71.6	N/A
2019-09-25	50.5	42.1	40.7	35.6	29.3	N/A	59.5	N/A	72.1	N/A
2019-09-29	48.9	39.2	37.2	33.3	32.6	N/A	60.3	N/A	72.5	N/A
2019-09-30	51.5	45.4	41.6	34.9	28.2	N/A	60.9	N/A	72.8	N/A
2019-10-03	54	44.7	42.9	34.7	27.4	N/A	60.9	N/A	72	N/A
2019-10-04	51.1	45.2	38.6	37.1	20.3	N/A	58.5	N/A	67.9	N/A
2019-10-06	50.7	45.5	43	38.7	32.5	N/A	62.8	N/A	74	N/A
2019-10-16	50.8	42.4	43.6	33.3	24.7	N/A	59.2	N/A	72.3	N/A
2019-10-18	50.5	43.6	37.3	33.2	26.5	N/A	61.9	N/A	74.1	N/A
2019-10-20	48.6	41.4	36.8	36.6	28.3	N/A	61.8	N/A	72.9	N/A
2019-10-30	N/A	N/A	N/A	N/A	20	N/A	57.3	N/A	67.6	N/A
Average	53.6	46.6	44.7	38.1	24	N/A	60.7	N/A	72.5	N/A



No nighttime measurements were taken of this aircraft type during the measurement period at this location

7.0 Summary

The table provides further information on the aircraft types analysed for each location. Due to the dispersed nature of the monitoring sites it is not possible to directly compare the data for each location as the noise climate, aircraft type and altitude of the aircraft in each location can be quite different from site to site.

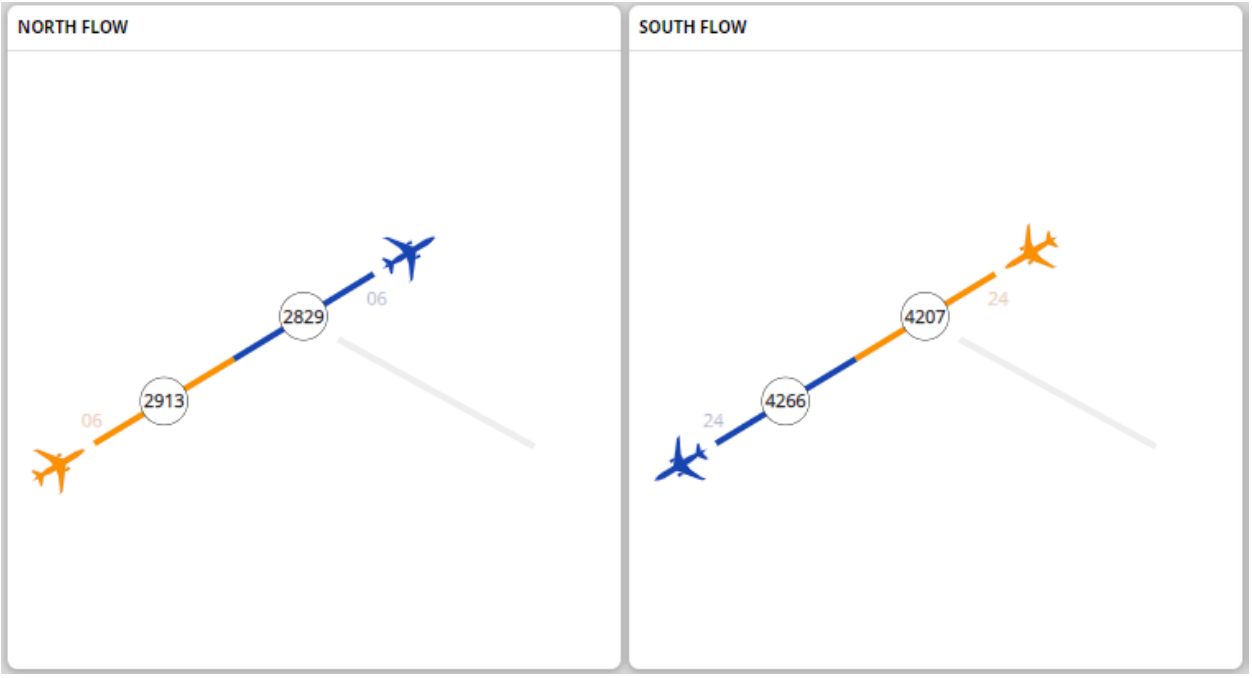
Table 8

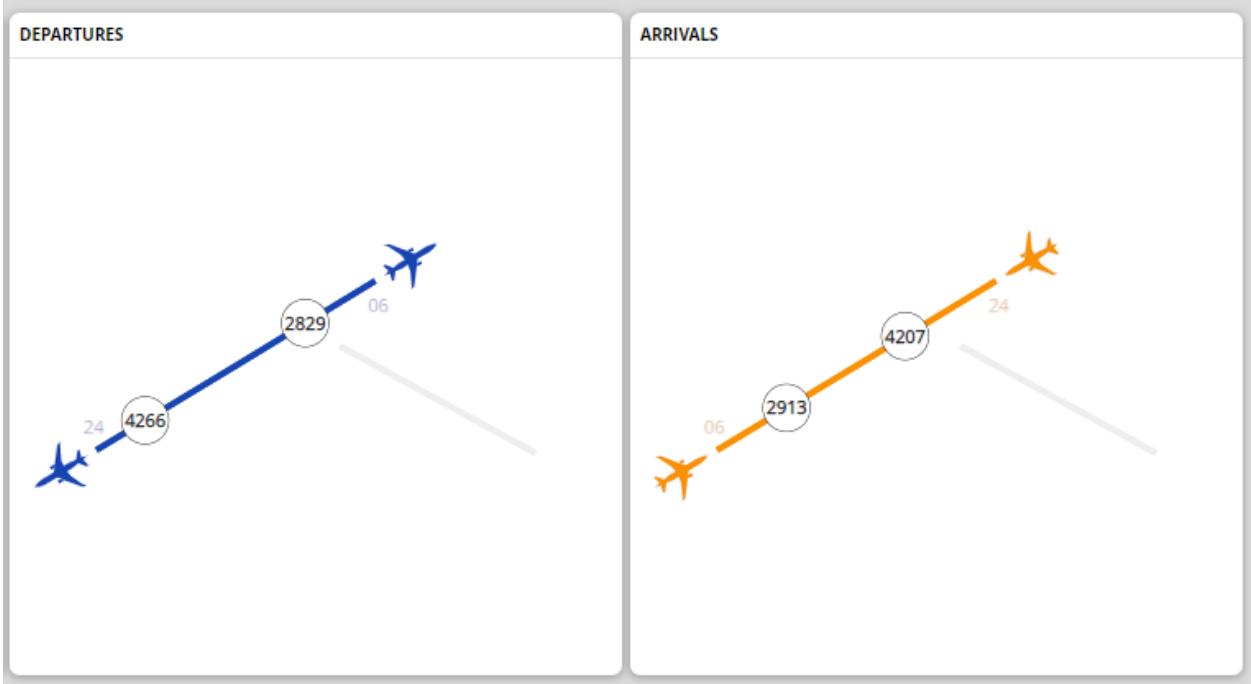
Monitoring Position	Position 1	Position 2	Position 3
Noise Monitoring Period	2019/09/24 13:00 - 2019/10/30 17:00	2019/09/24 14:00 - 2019/10/30 17:00	2019/09/24 14:00 - 2019/10/30 18:00
Average maximum noise level of aircraft noise events (LAmax) Aircraft type A319	61.4	59.8	65.6
Average maximum noise level of aircraft noise events (LAmax) Aircraft type SF34	64.2	62.8	65.2
Average noise duration of aircraft noise events Aircraft type A319	46.1	42.7	45
Average noise duration of aircraft noise events Aircraft type SF34	32.3	41.8	42.7
Average Altitude Aircraft type A319	8012.2	8128.4	7303.2
Average Altitude Aircraft type SF34	5843.2	5983.4	5901.8
Average SEL Aircraft type A319	69.7	68.2	73.3
Average SEL Aircraft type SF34	72.2	70.4	73.5
Average daily NON Aircraft noise level LAeq	70.4	64.9	71.5
Average daily ambient noise level LAeq	70.5	65.1	71.6
Average Background level (LA90)	62.3	55.6	61.5

Appendix

Appendix A

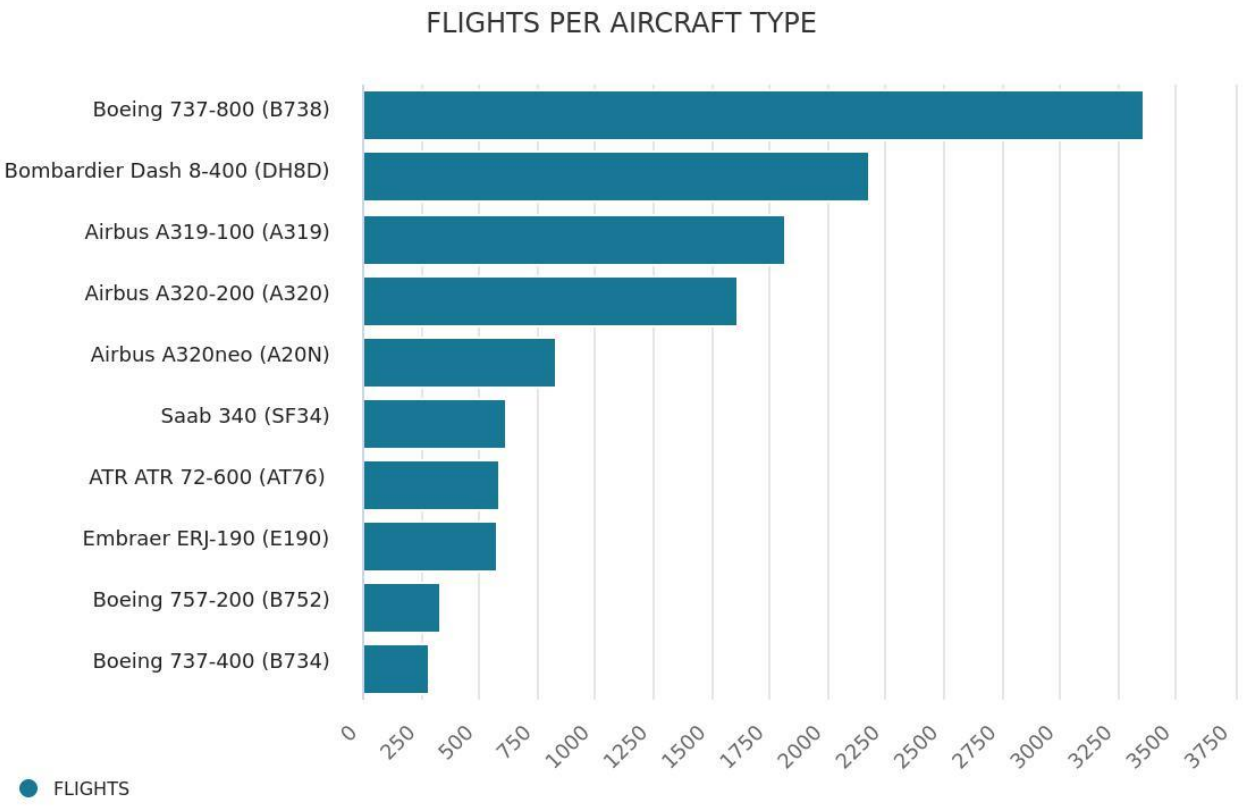
Runway utilization for time period





Appendix B

Flights per aircraft Type



Appendix C

Departures and Arrivals per Period per Runway