



Dublin Airport

Quarterly Noise and Flight Track Monitoring Report

April - June (Q2) 2024

- This report presents data from Dublin Airport's Noise and Flight Track Monitoring System.
- The publication of this quarterly report is a requirement under Condition 10 of North Runway's planning permission.
- The report is split into three parts:
 - Part 1: Noise Monitoring – Permanent monitors
 - Part 2: Noise Monitoring – Temporary monitors
 - Part 3: Flight Track Monitoring
- Noise data is presented in this report in five different metrics - Lden, Lnight, Leq16h, Lmax and SEL.
- Environmental noise from transport systems – airports, road and rail - is regulated by the EU Environmental Noise Directive (END). The END refers to the Lden and Lnight metrics to assess noise impact and to measure longer term improvements and goals. These two metrics are also used by the World Health Organisation (WHO).
- The Summer Leq16h is used at Dublin Airport for the Noise Insulation and Voluntary Dwelling Purchase Schemes and is widely used in the UK.
- Lmax and SEL are single event metrics and are not generally used on their own to assess noise impact by authorities. By including the number or frequency of events at different levels, they provide a different way of representing the noise situation.
- This report demonstrates good correlation between the noise measurements obtained from Noise Monitoring Terminals and the modelled noise contours. This should provide confidence in the accuracy of the contours. Noise contours cover the entire study area whereas noise monitors only report noise at the actual monitoring locations.
- Flight track monitoring data is used to separate aircraft noise events from non-aircraft (community) noise at the NMT.
- Modelling for the noise contour calculations also relies on the flight track monitoring.

Part 1: Noise Monitoring Data

Permanent NMT

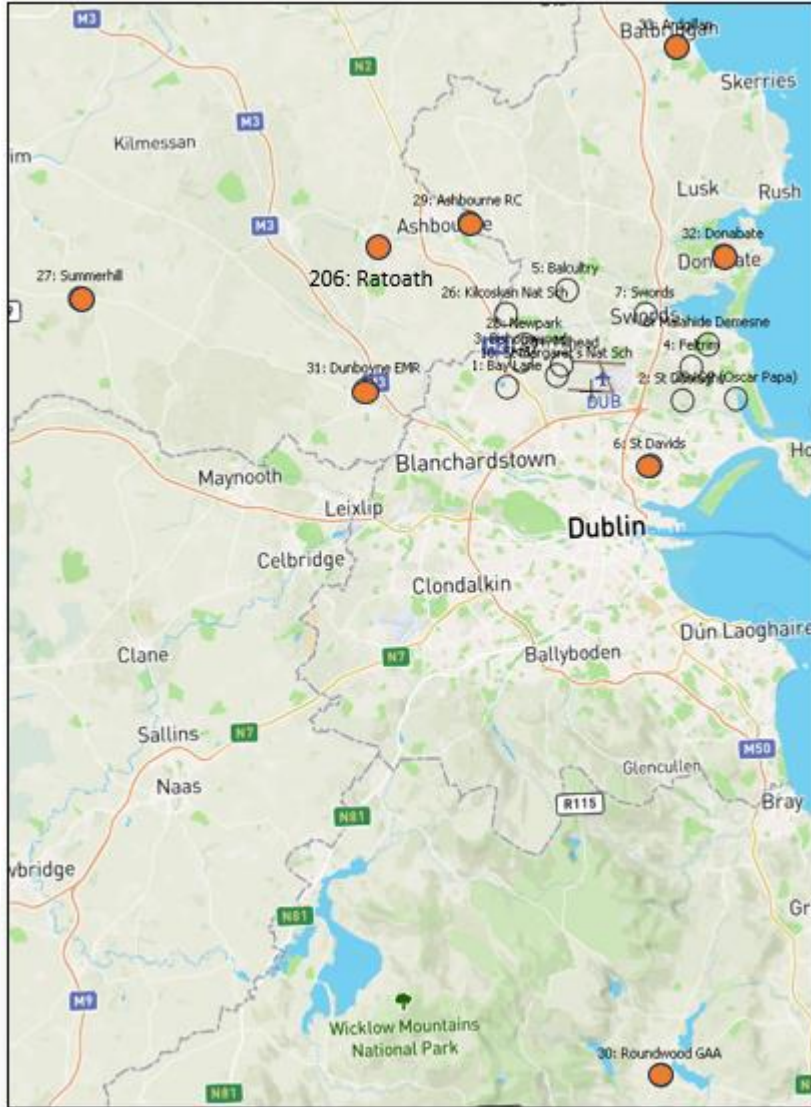


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7	Locations of Noise Monitoring Terminals (NMTs)	<ul style="list-style-type: none"> • Maps indicating locations of active Dublin Airport NMTs • Installation dates of NMTs
8	Modelled Lden Noise Contour Levels at NMT Locations	<ul style="list-style-type: none"> • Map of 2023 Lden Annual Aircraft Noise Contours • 2023 Lden noise levels at each NMT as indicated in the Noise Contour map.
9	NMT Operational Data and Number of Correlated Noise Events	<p>For each month in Q2:</p> <ul style="list-style-type: none"> • Uptime (%) at each NMT • Downtime (minutes) for each NMT • The number of correlated aircraft noise events at each NMT per month and in the quarter.
10	NMT – Q2 Monthly and Quarterly Lden, Lnight and Leq16hr Data	<p>For each month and over the quarter:</p> <ul style="list-style-type: none"> • Measured Aircraft Noise at each NMT displayed in Lden, Lnight and Leq16hr metrics.
11	NMT – Q2 Aircraft Noise Event and Measured Lden/ Lnight Data	Chart showing Q2 correlated aircraft noise events and the measured Lden and Lnight data at each NMT
12	NMT – 2023 and 2024 (YTD) Measured Lden, Lnight and Leq16hr Data	<ul style="list-style-type: none"> • 2023 Lden and Lnight Modelled Contour levels at each NMT location • 2023 annual measured aircraft noise levels in Lden and Lnight metrics at each NMT • Q1 and Q2 2024 measured aircraft noise levels in Lden, Lnight and Leq16hr metrics at each NMT
13	NMT – Total Noise vs Aircraft Noise Q4 2023 and Q1 and Q2 2024	<p>For Q4 2023 and each quarter this year:</p> <ul style="list-style-type: none"> • Measured Total and the Aircraft Lden levels at each NMT.
14	NMT – Q2 2024 Lmax and SEL (NA) Number Above (Daily Average)	<p>Measured Single Event data at each NMT:</p> <ul style="list-style-type: none"> • Daily Average of the Number of Aircraft Events over each Lmax value 60 to 85 [N60 to N85]. • Daily Average of the Number of Aircraft Events over each SEL value 70 to 95 [N(SEL)70 to N(SEL)95]
15	NMT – Q2 2024 Lmax and SEL Percentages (3 months)	<p>Measured Single Event data at each NMT:</p> <ul style="list-style-type: none"> • The distribution (%) of events over the quarter in each 5-decibel Lmax band (e.g. Lmax 60 - 65 dBA) and each SEL band (e.g. SEL 75 - 80 dBA).
17	Temporary NMT Introduction	
18	Temporary NMT 204 Milhead data	Measured time-averaged and single event metrics each month of the measurement duration.
19	Temporary NMT 205 Boroimhe	Measured time-averaged and single event metrics each month of the measurement duration.

Term	Definition
Aircraft Noise	The noise generated by aircraft operating to or from Dublin Airport. For our noise monitors, this excludes aircraft not travelling to or from Dublin Airport and noise from local activity such as road traffic, wind, birds, dogs and community activity. (These other noise sources are included in the measured Total Noise.)
(Correlated) Aircraft Noise Event	This is a noise event that is matched to an aircraft flight near the location of the NMT and the time of the noise event. Only correlated aircraft noise events are used to calculate the measured aircraft noise (e.g. Lden, Lnight, Leq16) at the NMT location.
Downtime (minutes)	The number of minutes during the period that each monitor was not operational.
Lden	Lden is the day-evening-night level. It is a descriptor of noise level based on energy equivalent noise level (Leq) over a whole day or longer, with a penalty of 5 dBA for evening noise (19:00-23:00h or 7-11pm) and a penalty of 10 dBA for night-time noise (23:00-7:00h or 11pm-7am). The 5-decibel penalty means that an evening flight is treated as the equivalent of three daytime flights. The 10-decibel penalty means that a night flight is the equivalent of 10 daytime flights.
Leq	Leq is the Equivalent Continuous Sound Level and is the average sound level, over the given period, that has the same total energy as the actual time-varying noise.
Leq16(hr)	Leq16h is the Leq over the 16-hour day-time period (7am-11pm). The Summer Leq16hr covers the 92 days from mid-June to mid-September and, at Dublin airport, is used for assessing the Residential Noise Insulation Scheme.
Leq8(hr)	Leq8h is the Leq over the 8-hour night-time period (11pm-7am). The Summer Leq16hr covers the 92 days from mid-June to mid-September. Leq8h and Lnight cover the same period, so monthly and quarterly values are identical. If the summer period is busier, the Summer Leq8h would be higher than the Annual Lnight.
Lmax	Lmax is the maximum instantaneous noise level recorded at an NMT during a noise event. Lmax is displayed at each NMT on the Dublin Airport WebTrak site however, it also <u>includes</u> non-aircraft noise.
Lnight	Lnight is the night-time (11pm-7am) Leq average noise indicator. Like Lden, in this document, Lnight is reported monthly, quarterly and annually.
Measured noise levels	This is the assessment of the noise level at an NMT derived from data from the NMT. Each measured noise level is only at the NMT point location.
Modelled noise levels	This is calculated using computer software which takes into account all Dublin Airport flight operational activity. It calculates the noise levels at thousands of points across the study area and is used to produce Noise Contours. The Modelled noise level can also be calculated at each NMT point location.
(Notes: Comparing Measured and Modelled Noise Levels)	Measured noise levels at each NMT location should be the same, or close to, the Modelled noise levels. Measured data may miss some less noisy aircraft noise events, especially if the NMT is far from the airport (the aircraft is higher) or if the aircraft track is far from the NMT. Modelled data includes all aircraft activity in the entire study area. This means that Measured data should be equal to, or slightly lower than, the Modelled data. Good agreement between the Measured and Modelled data gives confidence that the Modelled Noise Contours provide good information on actual noise levels, including at locations that do not have an NMT.

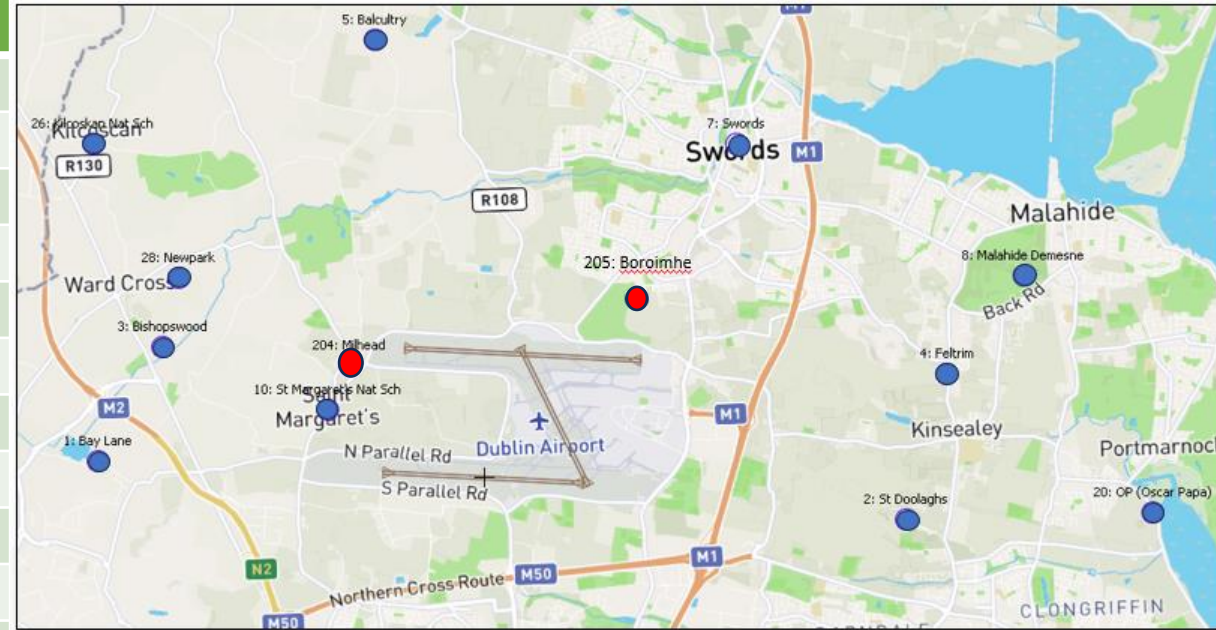
Term	Definition
NMT	NMT means Noise Monitoring Terminal. They are generally located in community areas. An NMT includes a high-quality, calibrated microphone and provides continuous noise level data at the location of the NMT.
Noise Contours	Contours are lines that join points of the same modelled noise level covering a study area. All noise contours are modelled. Each year Dublin Airport publishes Annual Lden and Lnight contours and Summer Leq16h and Leq8h contours.
Noise Event	A noise event is detected at an NMT location when the noise level rises above and then falls below a pre-set threshold level. This can be caused by many different sources including aircraft, vehicles on a road, dogs barking, wind, sirens etc.
Number Above	Number Above is a single event metric unlike Lden or Lnight which are time-averaged noise metrics. N60 is the number of (aircraft noise) events with $L_{max} \geq 60$ dBA. N(SEL)70 is the number of (aircraft noise) events with $SEL \geq 70$ dBA. Note that N60 value includes the events in N65, N70 and higher.
SEL	SEL or Sound Exposure Level represents the total noise energy contained in a noise event, as if the same noise energy were compressed into a single second. For a short event (like a single dog bark) the SEL is approximately the same value as the L_{max} . For an aircraft noise event, usually 10 to 30 seconds, the SEL value is typically about 10 decibels higher than the L_{max} . The SEL values of the Correlated Aircraft Noise Events are added up and used to calculate average noise level metrics over longer periods, including annual or monthly Lden & Lnight, or monthly or summer Leq16 & Leq8.
Single Event noise metrics	Including L_{max} and SEL, these measure the noise of individual events. Along with the (daily or hourly) number of events at each noise level, these metrics provide a different perspective attempting to quantify the various experiences of individuals near flight paths.
Time-Averaged noise levels	Including Annual Lden and Lnight and Summer Leq16/8h, averaged noise levels allow the comparison of different locations around an airport, (and also other airports) where aircraft types, power settings, overflight frequency, operational time of day, and tracks heights vary. The EU and WHO uses Lden and Lnight to assess the total impact on communities for road, rail and air transport noise.
Total Noise	Total Noise is a measure of noise from all noise sources (including aircraft and non-aircraft activity) during the period. This means that Aircraft Noise cannot exceed Total Noise.
Uptime (%)	The percentage of time that each monitor (NMT) was operational during the period.
YTD	Year to date

Noise Monitoring Terminal (NMT) Locations Q2 2024



Orange circle = NMTs located further out from Dublin Airport

#	Permanent NMT	Since
1	Bay Lane	2021
2	St. Doolaghs	2021
3	Bishopswood	2021
4	Feltrim	2021
5	Balcultry	2021
6	St.Davids	2021
7	Swords	Q2 2022
8	Malahide	Q2 2022
10	St.Margarets NS	Q3 2022
20	Coast Rd (OP)	2021
26	Kilcoskan NS	Q4 2022
27	Summerhill	Q3 2023
28	Newpark	Q3 2023
29	Ashbourne	Q3 2023
30	Roundwood	Q4 2023
31	Dunboyne	Q3 2023
32	Donabate	Q4 2023
33	Ardgillan	Q4 2023
206	Ratoath	Q1 2024



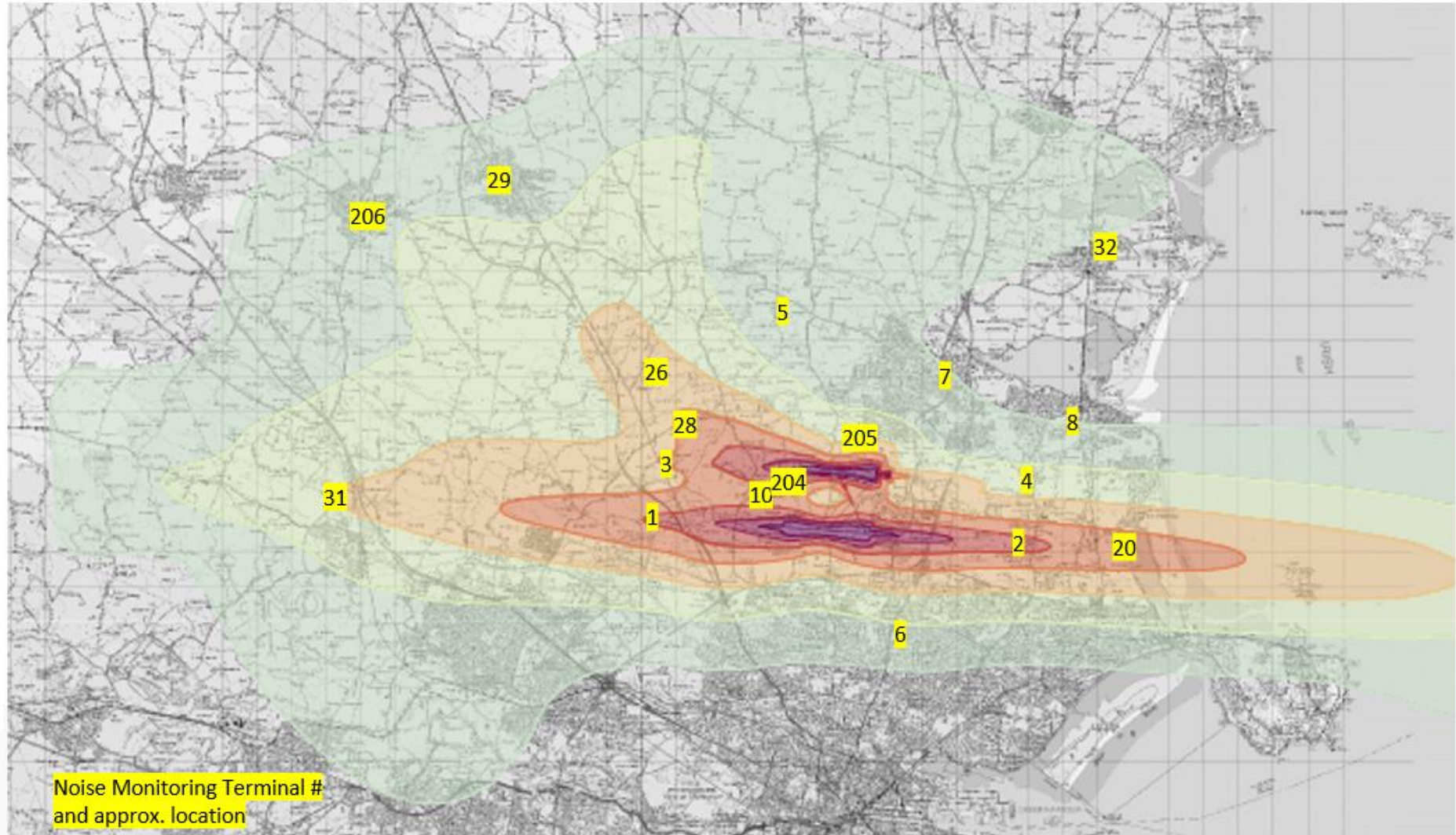
Blue circle = NMTs located near Dublin Airport

Red circle = Temporary NMT Installation

#	Portable Temporary NMT	From	Until
204	Milhead	Oct 2023	Jun 2024
205	Boroimhe	Mar 2024	July 2024

Modelled Lden Noise Contour Levels at NMT Locations

#	NMT Name	Lden 2023
1	Bay Lane	65
2	St. Doolaghs	65
3	Bishopswood	60
4	Feltrim	54
5	Balcultry	49
6	St.Davids	44
7	Swords	45
8	Malahide	46
10	St.Margarets NS	63
20	Coast Rd (OP)	63
26	Kilcoskan NS	58
27	Summerhill	38
28	Newpark	60
29	Ashbourne	49
30	Roundwood	36
31	Dunboyne	54
32	Donabate	45
33	Ardgillan	33
204	Milhead (Temp)	67
205	Boroimhe (Temp)	54
206	Ratoath	47

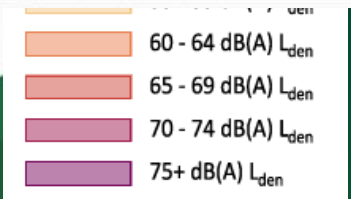


Noise Monitoring Terminal # and approx. location

Map of 2023 Lden Annual Noise contours

3 NMT (27, 30, 33) are located outside this map's boundaries

Including Permanent and Temporary NMT installations



NMT – Operational Uptime and Number of Correlated Aircraft Noise Events



NMT	Location	April			May			June			Q2 2024
		% Uptime	Downtime (mins)	# Aircraft Events	% Uptime	Downtime (mins)	# Aircraft Events	% Uptime	Downtime (mins)	# Aircraft Events	# Aircraft Events
1	Bay Lane	99.988%	5.00	1914	99.996%	2.00	1929	99.889%	48.13	1280	5123
2	St. Doolaghs	99.991%	4.00	9319	99.989%	5.00	11087	99.993%	3.00	10910	31316
3	Bishopswood	99.977%	10.00	5305	99.975%	11.00	7123	99.979%	9.00	5776	18204
4	Feltrim	99.995%	2.00	988	99.996%	2.00	1326	99.993%	3.00	566	2880
5	Balcultry	99.995%	2.00	122	99.888%	50.13	16	99.998%	1.00	16	154
6	St.Davids	99.910%	39.00	149	99.996%	2.00	93	99.995%	2.00	38	280
7	Swords	99.963%	15.80	35	99.961%	17.20	31	99.961%	16.70	25	91
8	Malahide	99.961%	17.03	41	99.962%	17.13	284	99.961%	16.65	182	507
10	St.Margarets NS	97.685%	1000.00	5964	97.685%	1033.33	6075	97.685%	1000.00	7593	19632
20	Coast Rd (OP)	99.993%	3.00	8724	99.996%	2.00	10167	99.995%	2.00	10344	29235
26	Kilcoskan NS	100.000%	0.00	5602	100.000%	0.00	5610	99.998%	1.00	7736	18948
27	Summerhill	99.962%	16.28	50	99.962%	17.17	109	99.902%	42.42	58	217
28	Newpark	99.962%	16.40	5840	99.962%	16.85	5815	99.962%	16.37	7632	19287
29	Ashbourne	99.962%	16.42	285	99.962%	17.13	362	99.962%	16.48	287	934
30	Roundwood	99.962%	16.35	1	99.961%	17.37	0	99.963%	16.10	0	1
31	Dunboyne	99.908%	39.87	862	99.813%	83.67	996	99.718%	121.73	365	2223
32	Donabate	99.873%	54.93	11	99.932%	30.20	10	99.962%	16.35	7	28
33	Ardgillan	99.963%	16.07	8	99.962%	16.95	12	99.961%	16.65	13	33
206	Ratoath	99.962%	16.27	1357	99.962%	16.77	1861	99.962%	16.60	2229	5447

Including Permanent NMT installations only

NMT – Q2 Monthly and Quarterly Lden, Lnight and Leq16hr



NMT	Location	# Correlated Aircraft Noise Events				Lden (dBA)				Lnight (=Leq 8h) (dBA)				Leq16h (dBA)			
		Apr	May	Jun	Q2	Apr	May	Jun	Q2	Apr	May	Jun	Q2	Apr	May	Jun	Q2
1	Bay Lane	1914	1929	1280	5123	63.9	64.3	62.1	63.6	58.1	58.8	56.7	57.9	54.9	52.8	46.3	52.6
2	St. Doolaghs	9319	11087	10910	31316	64.7	64.4	64.8	64.6	57.2	56.2	57.3	56.9	61.0	61.6	61.2	61.3
3	Bishopswood	5305	7123	5776	18204	58.5	59.7	57.9	58.8	45.9	43.2	44.2	44.6	58.2	60.0	57.9	58.8
4	Feltrim	988	1326	566	2880	47.5	54.2	53.3	52.5	38.4	48.6	47.8	46.7	45.9	44.2	42.6	44.4
5	Balcultry	122	16	16	154	50.6	31.7	35.2	45.9	41.8	0.0	26.8	37.1	45.6	31.8	31.6	41.2
6	St.Davids	149	93	38	280	49.4	40.2	36.3	45.2	41.5	21.7	0.0	36.8	43.9	39.8	35.1	41.0
7	Swords	35	31	25	91	38.8	41.0	39.4	39.8	26.0	33.8	24.4	30.2	36.9	36.2	36.6	36.6
8	Malahide	41	284	182	507	29.2	40.5	41.2	39.3	17.6	34.7	34.0	32.7	28.7	29.8	34.4	31.7
10	St.Margarets NS	5964	6075	7593	19632	63.8	63.1	64.5	63.8	56.4	55.6	57.1	56.4	60.1	59.5	60.9	60.2
20	Coast Rd (OP)	8724	10167	10344	29235	62.6	62.1	63.0	62.6	54.9	53.9	55.2	54.7	59.3	59.5	59.7	59.5
26	Kilcoskan NS	5602	5610	7736	18948	60.5	60.9	62.0	61.2	28.2	40.3	39.4	38.3	61.2	61.3	62.5	61.7
27	Summerhill	50	109	58	217	37.9	36.8	33.8	36.5	28.0	24.1	9.8	24.8	37.1	37.3	35.2	36.6
28	Newpark	5840	5815	7632	19287	61.4	61.7	62.9	62.1	20.1	41.1	40.0	38.9	62.0	62.1	63.4	62.6
29	Ashbourne	285	362	287	934	38.9	40.6	40.5	40.1	21.0	26.2	21.6	23.6	39.5	40.6	41.6	40.6
30	Roundwood	1	0	0	1	23.7	6.4	6.4	19.0	0.0	0.0	0.0	0.0	25.4	0.0	0.0	20.6
31	Dunboyne	862	996	365	2223	51.3	52.5	47.9	50.9	45.6	47.0	42.5	45.4	41.2	40.0	34.3	39.3
32	Donabate	11	10	7	28	26.4	28.8	29.1	28.2	0.0	0.0	17.1	12.4	27.6	29.0	26.3	27.8
33	Ardgillan	8	12	13	33	30.7	28.7	31.8	30.6	19.9	19.8	23.1	21.2	28.4	25.3	28.2	27.5
206	Ratoath	1357	1861	2229	5447	46.9	48.2	48.8	48.0	24.8	30.1	25.6	27.5	47.7	48.7	49.7	48.8

Including Permanent NMT installations only

NMT – Q2 2024 Aircraft Noise Events and Measured Lden/ Lnight

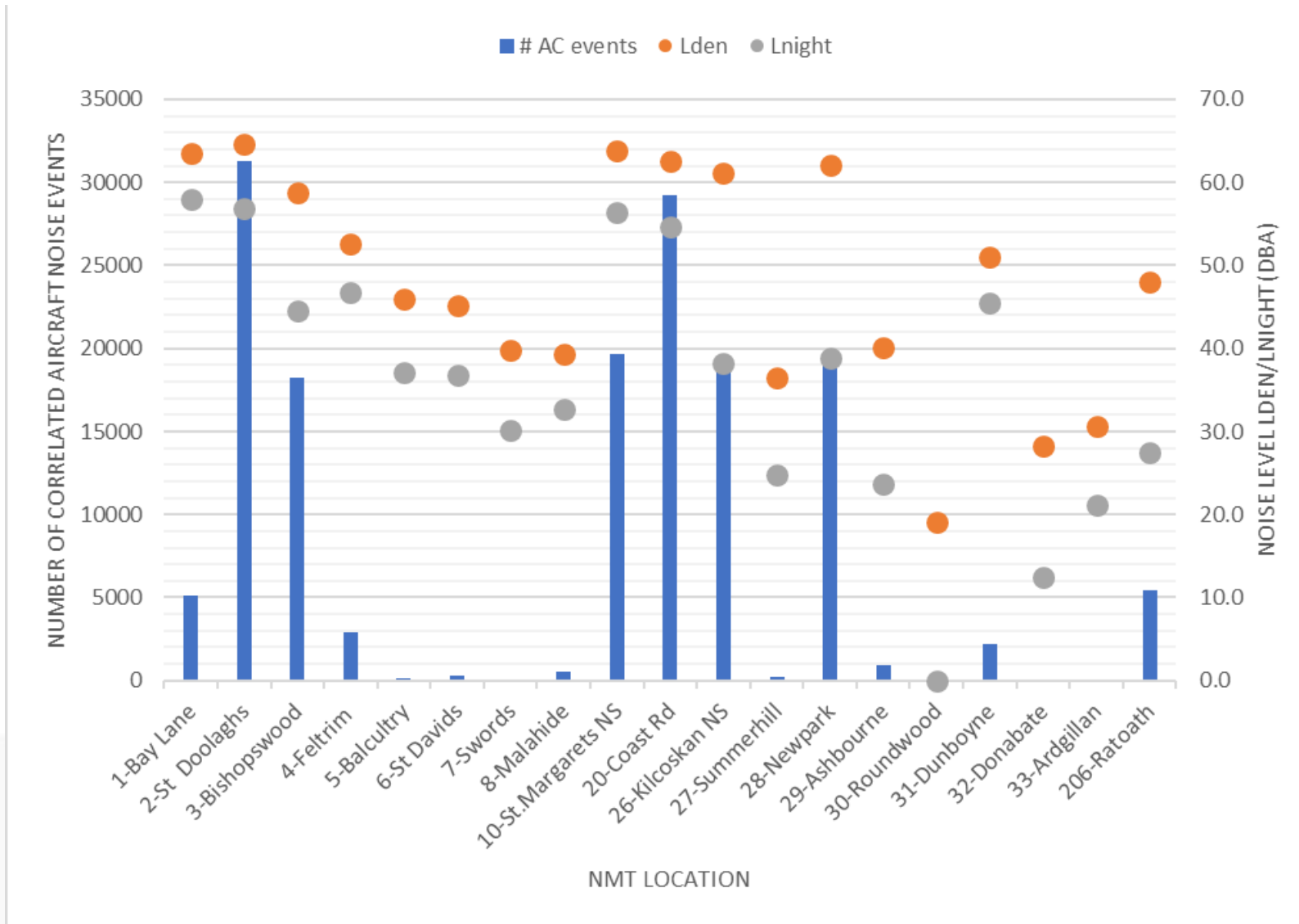


Chart Notes:

- Base (x-axis) shows the location of the NMT
- Blue Bar shows the number of correlated aircraft noise events.
- Orange Dot shows Lden at each monitor.
- Grey Dot shows Lnight at each monitor.

Including Permanent NMT installations only

NMT – 2023 and 2024 (YTD) Quarterly Measured Lden, Lnight & Leq16hr

NMT	Location	Lden (dBA) [Modelled Contour and Measured Noise]							Lnight (=Leq 8h) (dBA) [Modelled Contour and Measured]							Leq16h (dBA)				
		'23 Cont	'23 NMT	Q1 2024	Q2 2024	Q3 2024	Q4 2024	2024	'23 Cont	'23 NMT	Q1 2024	Q2 2024	Q3 2024	Q4 2024	2024	Q1 2024	Q2 2024	Q3 2024	Q4 2024	2024
1	Bay Lane	65	64.3	63.8	63.6				58	56.8	57.9	57.9				54.9	52.6			
2	St Doolaghs	65	64.5	63.9	64.6				57	56.9	55.9	56.9				60.7	61.3			
3	Bishopswood	60	57.5	58.0	58.8				49	46.1	46.6	44.6				57.5	58.8			
4	Feltrim	54	51.1	51.8	52.5				46	43.7	44.5	46.7				47.8	44.4			
5	Balcultry	49	46.6	39.2	45.9				39	18.8	27.1	37.1				37.1	41.2			
6	St.Davids	44	38.5	37.9	45.2				36	25.0	25.7	36.8				38.3	41.0			
7	Swords	45	44.7	37.1	39.8				37	17.7	18.5	30.2				36.8	36.6			
8	Malahide	46	38.4	39.6	39.3				38	26.2	32.8	32.7				33.8	31.7			
10	St.Margarets NS	63	63.5	63.2	63.8				55	56.5	56.2	56.4				59.0	60.2			
20	Coast Rd (OP)	63	62.5	62.0	62.6				55	54.9	53.7	54.7				59.3	59.5			
26	Kilcoskan NS	58	59.1	59.5	61.2				40	35.8	33.1	38.3				60.3	61.7			
27	Summerhill	38	31.7	33.1	36.5				31	24.9	22.7	24.8				32.9	36.6			
28	Newpark	60	61.9	60.5	62.1				45	34.5	34.2	38.9				61.2	62.6			
29	Ashbourne	49	45.9	38.6	40.1				39	23.9	22.6	23.6				39.1	40.6			
30	Roundwood	36	12.8	15.1	19.0				28	0.0	0.0	0.0				16.4	20.6			
31	Dunboyne	54	50.5	49.8	50.9				47	43.0	43.9	45.4				41.1	39.3			
32	Donabate	45	0.0	33.4	28.2				37	0.0	11.8	12.4				32.6	27.8			
33	Ardgillan	33	26.5	30.6	30.6				24	19.3	17.9	21.2				29.0	27.5			
206	Ratoath	47		44.9	48.0						26.8	27.5				45.9	48.8			

Column Notes:

- 2023 Contour data is taken from the Annual Noise Contour model.
- 2023 NMT data is the measured Aircraft Noise data.
- 2024 Quarterly data will be added here each quarter.
- There are no Leq16h annual contours (they are only modelled for the Summer period.)

Including Permanent NMT installations only

Total Noise versus Aircraft Noise Q4 2023 and Q1 and Q2 2024

NMT	Location	Lden Q4 2023			Lden Q1 2024			Lden Q2 2024		
		Total Noise (dBA)	Aircraft Noise (dBA)	# Aircraft Noise Events	Total Noise (dBA)	Aircraft Noise (dBA)	# Aircraft Noise Events	Total Noise (dBA)	Aircraft Noise (dBA)	# Aircraft Noise Events
1	Bay Lane	65.5	63.6	4769	65.8	63.8	5340	65.2	63.6	5123
2	St. Doolaghs	65.6	64.3	22706	65.1	63.9	24974	65.4	64.6	31316
3	Bishopswood	64.8	58.2	15473	65.4	58.0	13843	63.9	58.8	18204
4	Feltrim	61.9	52.1	3699	62.6	51.8	3993	59.7	52.5	2880
5	Balcultry	61.3	38.7	87	62.1	39.2	82	59.4	45.9	154
6	St.Davids	65.7	36.9	119	65.7	37.9	168	60.1	45.2	280
7	Swords	65.4	38.8	121	63.9	37.1	96	65.0	39.8	91
8	Malahide	60.3	36.6	260	61.8	39.6	259	60.0	39.3	507
10	St.Margarets NS	67.1	63.7	18270	67.5	63.2	13977	66.8	63.8	19632
20	Coast Rd (OP)	67.2	62.5	25153	66.7	62.0	23324	65.6	62.6	29235
26	Kilcoskan NS	63.7	60.2	17000	63.5	59.5	14799	63.7	61.2	18948
27	Summerhill	60.1	31.7	85	60.1	33.1	102	58.5	36.5	217
28	Newpark	65.8	61.4	19089	66.0	60.5	15369	64.0	62.1	19287
29	Ashbourne	61.5	47.2	925	60.4	38.6	695	59.1	40.1	934
30	Roundwood	62.8	12.3	1	60.4	15.1	2	57.7	19.0	1
31	Dunboyne	60.5	50.7	1852	60.5	49.8	2214	59.6	50.9	2223
32	Donabate	55.4	33.1	26	57.7	33.4	43	55.7	28.2	28
33	Ardgillan	58.5	26.5	6	57.7	30.6	28	54.3	30.6	33
206	Ratoath							58.6	48.0	5447

- **Total Noise** includes all noise sources detected at the NMT including non-aircraft noise.
- **Aircraft Noise** only includes noise events that are correlated with the flight radar and time of aircraft operational events – i.e. arrivals and departures at Dublin Airport.

Q2 2024 Lmax and SEL Number Above (NA) data (Daily Average)



NMT	Location	Average Number of Aircraft Noise Events per DAY Above Lmax (dBA) [e.g. N60 = Number of events above Lmax 60dBA]						# Aircraft N Events / DAY	Average Number of Aircraft Noise Events per DAY Above SEL [e.g. N(SEL)70 = Number of events above SEL 70dBA]						# Aircraft N Events
		N60	N65	N70	N75	N80	N85		(Av day Q2)	N(SEL)70	N(SEL)75	N(SEL)80	N(SEL)85	N(SEL)90	
1	Bay Lane	56.2	56.2	55.2	42.5	11.3	0.2	56.3	56.2	56.1	54.5	41.3	3.3	0.0	5123
2	St. Doolaghs	344.1	344.0	325.2	162.5	4.2	0.2	344.1	344.1	342.1	315.8	82.8	2.7	0.0	31316
3	Bishopswood	200.0	200.0	157.7	52.4	2.2	0.2	200.0	200.0	197.1	148.0	32.6	3.0	0.2	18204
4	Feltrim	31.6	24.6	8.6	2.9	0.1		31.6	31.3	20.6	8.4	1.4	0.1		2880
5	Balcultry	1.6	1.6	1.3	1.1	0.8	0.0	1.7	1.6	1.6	1.3	1.1	0.1		154
6	St.Davids	2.7	2.7	1.9	0.8	0.1	0.0	3.1	2.7	2.6	1.4	0.9	0.1	0.0	280
7	Swords	0.8	0.7	0.5	0.2	0.1	0.0	1.0	0.8	0.7	0.5	0.3	0.1		91
8	Malahide	2.1	0.6	0.1	0.0	0.0		5.6	2.8	0.5	0.1	0.0	0.0	0.0	507
10	St.Margarets NS	215.3	210.5	205.3	121.3	10.2	0.1	215.7	214.5	210.2	195.3	102.3	4.9	0.0	19632
20	Coast Rd (OP)	321.3	321.3	287.3	26.2	1.1	0.2	321.3	321.3	321.3	286.0	25.1	0.5	0.1	29235
26	Kilcoskan NS	208.2	205.5	194.0	113.7	10.0	0.1	208.2	207.8	205.0	194.9	118.8	12.9	0.1	18948
27	Summerhill	0.8	0.6	0.1	0.0	0.0		2.4	0.7	0.4	0.1	0.1	0.0		217
28	Newpark	211.9	211.2	188.7	144.1	20.8	0.9	211.9	211.8	202.8	186.0	145.5	14.8	0.4	19287
29	Ashbourne	10.2	8.7	2.4	0.2			10.3	10.0	6.4	1.4	0.2	0.0	0.0	934
30	Roundwood	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0			1
31	Dunboyne	24.4	20.5	3.5	0.2	0.0	0.0	24.4	24.1	17.8	3.1	0.2	0.0		2223
32	Donabate	0.3	0.3	0.1	0.0			0.3	0.3	0.3	0.1	0.0			28
33	Ardgillan	0.3	0.2	0.1	0.0			0.4	0.2	0.1	0.1	0.0			33
206	Ratoath	59.9	45.0	9.1	1.6	0.2		59.9	58.1	43.9	9.7	1.3	0.0	0.0	5447

Including Permanent NMT installations only

Q2 2024 Lmax and SEL Percentages in 5-decibel bands (3 months)



NMT	Location	Percentage of Aircraft Noise Events in each Lmax Range (dBA)						# Aircraft N Events /DAY	Percentage of Aircraft Noise Events in each SEL Range (dBA)						# Aircraft N Events
		60-64.9	65-69.9	70-74.9	75-79.9	80-84.9	85-89.9		(Av day Q1)	70-74.9	75-79.9	80-84.9	85-89.9	90-94.9	
1	Bay Lane		2%	22%	56%	20%	0%	56.3	0%	3%	23%	68%	5.8%	0.1%	5123
2	St. Doolaghs	0%	5%	47%	46%	1%	0%	344.1	1%	8%	68%	23%	0.8%	0.0%	31316
3	Bishopswood		21%	53%	25%	1%	0%	200.0	1%	25%	58%	15%	1.4%	0.1%	18204
4	Feltrim	22%	50%	18%	9%	0%		31.6	34%	39%	22%	4%	0.3%		2880
5	Balcultry	1%	17%	12%	21%	49%	1%	1.7	3%	14%	14%	62%	6.8%		154
6	St.Davids	0%	31%	39%	26%	2%	1%	3.1	4%	43%	21%	28%	3.6%	0.4%	280
7	Swords	10%	31%	29%	15%	14%	1%	1.0	6%	29%	31%	25%	6.9%		91
8	Malahide	27%	9%	1%	0%	0%		5.6	42%	9%	1%			0.2%	507
10	St.Margarets NS	2%	2%	39%	51%	5%	0%	215.7	2%	7%	43%	45%	2.3%	0.0%	19632
20	Coast Rd (OP)		11%	81%	8%	0%	0%	321.3		11%	81%	8%	0.1%	0.0%	29235
26	Kilcoskan NS	1%	5%	39%	50%	5%	0%	208.2	1%	5%	37%	51%	6.2%	0.0%	18948
27	Summerhill	23%	61%	15%		1%		2.4	38%	38%	7%	4%	4.1%		217
28	Newpark	0%	11%	21%	58%	9%	0%	211.9	4%	8%	19%	62%	6.8%	0.2%	19287
29	Ashbourne	14%	62%	22%	2%			10.3	36%	48%	12%	2%	0.1%	0.1%	934
30	Roundwood				100%			0.0				100%			1
31	Dunboyne	16%	70%	14%	0%	0%	0%	24.4	26%	61%	12%	1%	0.1%		2223
32	Donabate		61%	25%	14%			0.3	14%	43%	36%	7%			28
33	Ardgillan	21%	46%	29%	4%			0.4	38%	29%	17%	8%			33
206	Ratoath	25%	60%	13%	2%	0%		59.9	24%	57%	14%	2%	0.0%	0.0%	5447

Including Permanent NMT installations only



Part 2: Noise Monitoring Data Temporary NMT



Portable Temporary NMT

- Portable NMTs are installed at locations around Dublin Airport and are usually based on requests from the two community forums – St. Margaret's Community Liaison Group (CLG) and Dublin Airport Environmental Working Group (DAEWG).
- Locations can be seen on Page 7.

Milhead

- A NMT was installed at Milhead for nine months from October 2023 to June 2024.
- In 2023 the calculated noise contour Lden at this location was 67 dBA. The averaged Lden over the nine-month monitoring period was Lden 66.8 dBA.

Boroimhe

- A NMT was installed at Boroimhe for five months from February to July 2024.
- This location is 1km north of North Runway. The location is not typically subject to overflights.
- Residents have expressed concern over the noise from aircraft departing on this runway heading west. High engine power is required to accelerate an aircraft down the runway to achieve take-off speed. This is referred to as Start-of-Roll (SOR) noise. Unlike the noise from aircraft when taxiing on taxiways, SOR is included as part of the aircraft departure procedures. This means it is included in the aircraft noise modelling and the Annual and Summer noise contours.
- During its installation, NMT 205 at Boroimhe collected Noise Event data, but there was a problem with the noise data management system linking the aircraft departure events with the measured Noise Events. This means that there have not been as many Correlated Aircraft Noise Events at NMT 205 as might have been expected. The Noise Team at Dublin Airport has been investigating this issue. The NMT system is designed and fine-tuned for capturing aircraft noise from overhead flight movements, and not necessarily for SOR noise. The radar track data that needs to be matched to measured noise events does not commence until the aircraft has left the ground, and this may be why a significant number of departures are not being correlated.
- It should also be noted that the measurement location was subject to the noise from a barking dog. This resulted in a Total noise level of Lden 58.7 dBA over the five months compared to a measured aircraft noise level of Lden 51.5 dBA.
- While it could be the case that a proportion of the aircraft departure events were missed for technical reasons, it could indicate that the aircraft noise levels were not as high as modelled due to effects such as the absorption of noise by the terrain between the North Runway and the monitor at Boroimhe.
- In 2023 the calculated noise contour Lden at this location was 54 dBA. The measured aircraft noise Lden over the five-month monitoring period was Lden 51.5 dBA.

Portable Temporary NMT - #204 Milhead



	NMT 204 Milhead	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	June 24	9 Month Average
	Correlated Aircraft Noise Events	9034	7150	6664	6800	6808	6668	7570	9045	8636	
NMT Noise Levels	Total Lden (dBA)	67.7	67.9	67.7	67.6	67.5	67.7	68.4	69.1	69.3	68.1 dBA
	Aircraft Lden (dBA)	66.7	66.9	66.0	66.2	66.5	65.8	67.1	67.5	68.2	66.8 dBA
	Aircraft Lnight (dBA)	45.1	46.9	47.0	47.9	48.0	47.9	46.2	48.7	49.0	47.6 dBA
	Aircraft Leq16h (dBA)	67.1	67.5	66.9	66.8	66.9	66.3	67.6	67.8	68.6	67.3 dBA
Daily Number Above Lmax values	NA Lmax 60 (N60)	289	238	215	219	235	213	252	291	291	249
	NA Lmax 65 (N65)	287	237	214	219	233	212	250	290	289	248
	NA Lmax 70 (N70)	281	233	210	214	229	209	245	285	283	243
	NA Lmax 75 (N75)	218	201	177	177	192	168	208	218	245	200
	NA Lmax 80 (N80)	141	150	132	129	141	108	152	155	189	144
	NA Lmax 85 (N85)	51	56	46	47	44	47	68	81	77	57
											Aircraft/day
Daily Number Above SEL values	NA SEL 65	291	238	215	219	235	215	252	291	291	250
	NA SEL 70	289	238	214	219	234	213	252	291	291	249
	NA SEL 75	286	237	214	218	233	212	250	289	289	248
	NA SEL 80	265	225	202	204	220	198	236	265	270	232
	NA SEL 85	173	177	156	154	169	125	175	173	212	168
	NA SEL 90	112	126	113	109	119	93	130	130	157	121
	NA SEL 95	14	15	13	11	10	11	16	18	18	14
											Aircraft/day

Portable Temporary NMT - #205 Boraimhe

	NMT 204 Milhead	Mar 2024	Apr 2024	May 2024	June 2024	July 2024	5 Month Average
	Correlated Aircraft Noise Events	1427	1815	2833	3446	2185	
NMT Noise Levels	Total Lden (dBA)	58.1	58.7	58.0	61.0	56.6	58.7 dBA
	Aircraft Lden (dBA)	48.3	50.3	51.0	54.6	50.8	51.5 dBA
	Aircraft Lnight (dBA)	25.4	36.2	40.4	42.4	35.4	38.6 dBA
	Aircraft Leq16h (dBA)	48.3	49.7	50.3	52.9	50.6	50.6 dBA
Daily Number Above Lmax values	NA Lmax 60 (N60)	46	60	92	117	70	77
	NA Lmax 65 (N65)	21	29	28	51	35	33
	NA Lmax 70 (N70)	10	13	9	21	13	13
	NA Lmax 75 (N75)	2.3	3.0	1.7	4.6	2.4	2.8
	NA Lmax 80 (N80)	0.3	0.5	0.4	1.3	0.5	0.6
	NA Lmax 85 (N85)	0.1	0.1	0.1	0.2	0.2	0.1
							Aircraft/day
Daily Number Above SEL values	NA SEL 65	46	60	91	116	70	77
	NA SEL 70	38	51	67	100	59	63
	NA SEL 75	22	33	34	65	34	37
	NA SEL 80	11	16	10	26	11	15
	NA SEL 85	2.1	2.7	1.3	4.1	1.5	2.3
	NA SEL 90	0.3	0.4	0.4	1.5	0.3	0.6
	NA SEL 95	0.1	0.1	0.4	0.4	0.1	0.2
							Aircraft/day

Notes:

- A barking dog dominated the total noise level measured by the NMT including some interference with aircraft noise.
- The location is not overflown by aircraft but Start-of-Roll departure noise from aircraft on the North Runway is often audible.



Part 3: Flight Track Monitoring



Page	Page Heading	Page Content
22	Explanation of Terms	
23	Standard Instrument Departures (SID) North Runway	<ul style="list-style-type: none">• AirNav Ireland maps displaying the departure SIDs from North Runway towards the West and the East.
23	Standard Instrument Departures (SID) South Runway	<ul style="list-style-type: none">• AirNav Ireland maps displaying the departure SIDs from South Runway towards the West and the East.
25	Busy day Flight Tracks - Westerly and Easterly Operations	Examples of a typical 'busy day' flight pattern
25a	Cross Wind Operations	
26	Noise Contour Modelling (1) – Core Flight Tracks	Explanation of how noise contours are modelled using core flight tracks
27	Noise Contour Modelling (2) – Dispersed Flight Tracks	Explanation of how noise contours are modelled using dispersed flight tracks
28	Conclusion	

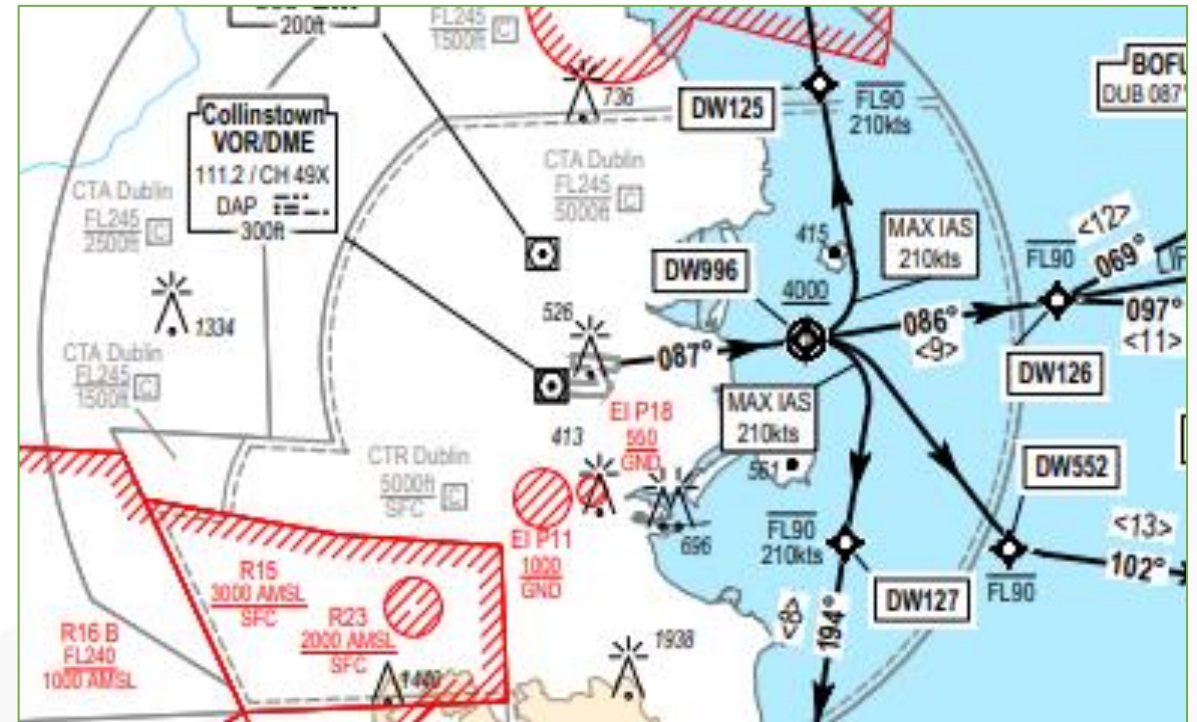
Term	Definition/ Explanation
Arrival Tracks	Arriving aircraft must fly in a straight line for at least the final 11km of their approach before landing on the runway. Aircraft approach the airport at a precise downward angle of 3 degrees, which means that they are at a height of 1,800ft when they join the final approach at the 11km point.
Departure Tracks	Departing jet aircraft are required to follow procedures defined by the SID and to stay within the Environmental Corridor, also called the Noise Preferential Route (NPR), below 3000ft for the South Runway and below 4000ft for the North Runway, unless directed by Air Traffic Control.
Easterly vs Westerly Operations	<p>In general, aircraft land and take-off facing into the wind.</p> <p>If the wind is easterly (blowing from the east), aircraft land from the west and take-off towards the east.</p> <p>If the wind is westerly (blowing from the west), aircraft land from the east (over the Irish Sea) and take-off towards the west.</p> <p>A moderate cross-wind component can be tolerated, but a strong north or south wind will require the use of the Crosswind Runway.</p>
Standard Instrument Departure (SID)	Depending on the departure runway and final destination, departing aircraft follow routes called Standard Instrument Departures (SID). SIDs allow aircraft to safely depart an airspace following pre-defined routes. (See Pages 20 and 21)
Flight Track	A flight track is the actual path flown by an aircraft (as opposed to a route or SID which indicate where an aircraft should go.) Flight track monitoring is based on flight radar data that is incorporated into the Noise and Flight Track Monitoring System.
Noise Modelling	A computer program is used to model airport operations and calculate the noise contours. Input data include all aircraft operations, aircraft types, runway use, time of day and flight tracks.
Modelled Flight Track	Arrival noise is dominated by the straight final approach which is relatively easy to model for the noise contour calculations. Departing aircraft generally follow the SID
Track Dispersion	In practice there is a spread or dispersion of actual tracks flown to either side of a main central track. This is modelled using a central flight track and secondary (dispersed) flight tracks to either side and the operations area divided between these tracks using a normal distribution.

Standard Instrument Departures (SID) North Runway

- Jet aircraft departures are required to follow these Standard Instrument Departures (SID).
- SIDs are developed taking into account various safety, operational and environmental considerations, amongst others.



SID for North Runway (28R) departures to the west (westerly operations in westerly winds)



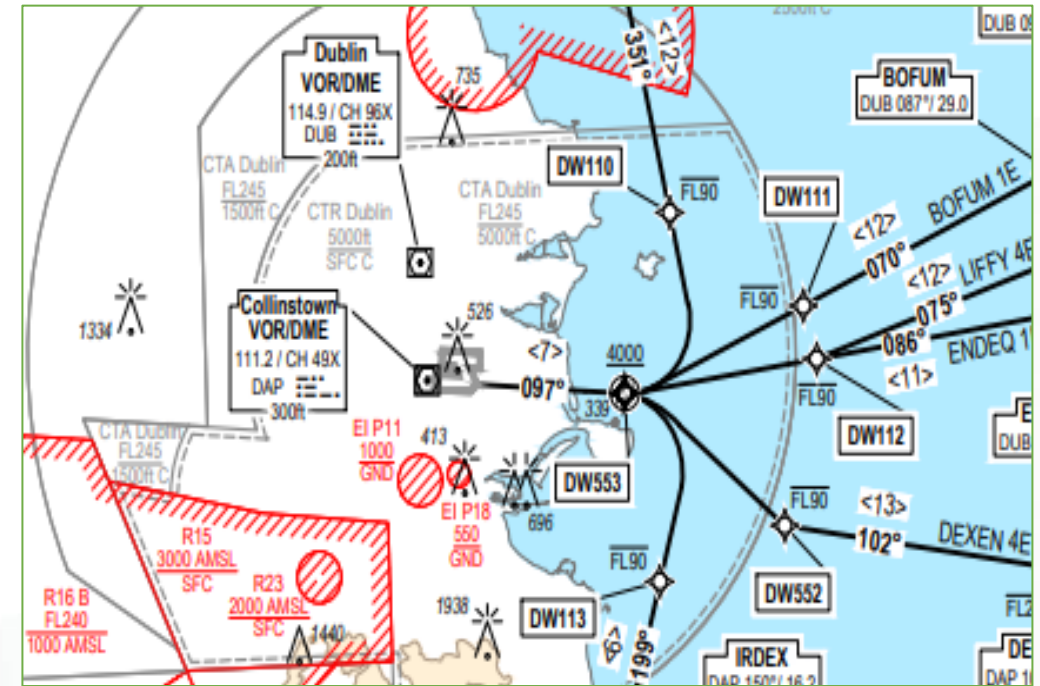
SID for North Runway (10L) departures to the east (easterly operations in easterly winds)

Standard Instrument Departures (SID) South Runway

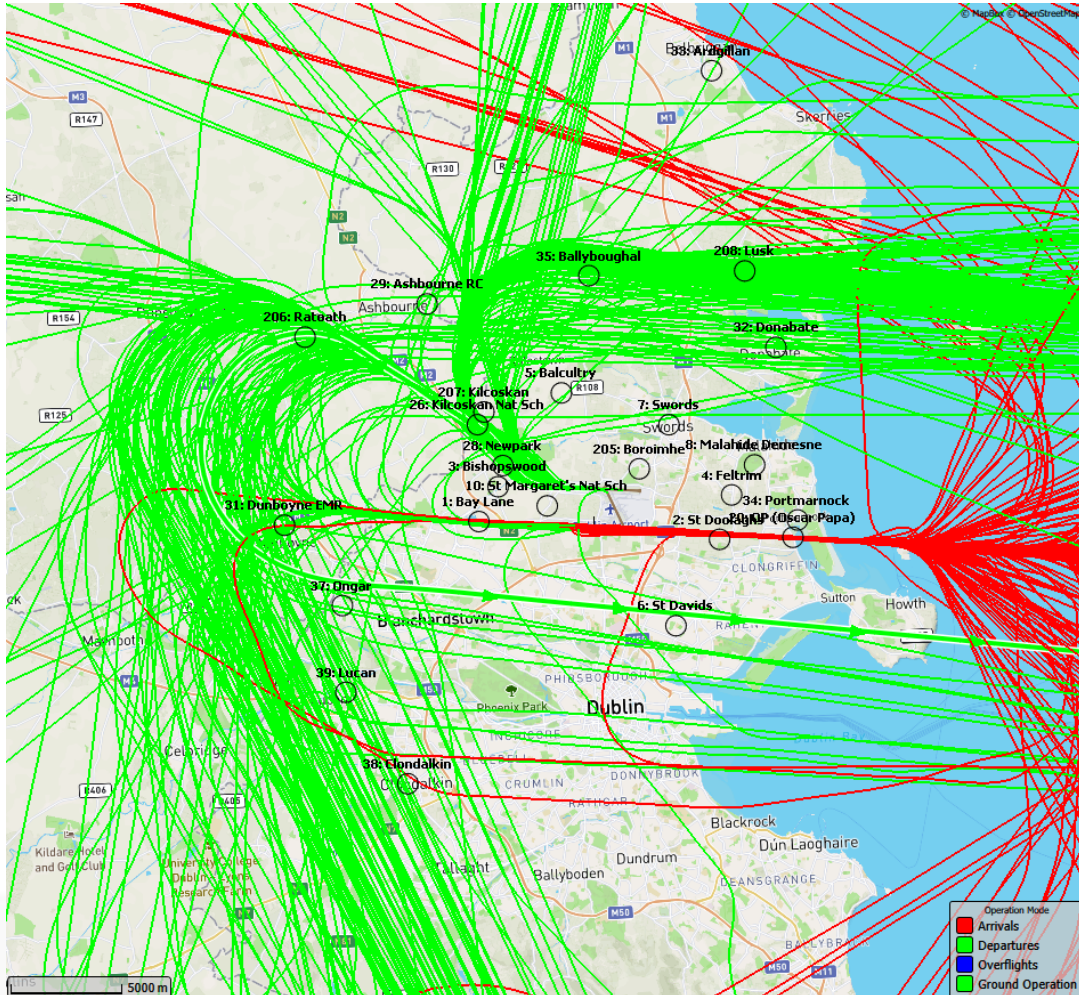
- Jet aircraft departures are required to follow Standard Instrument Departures (SID)



SID for South Runway (28L) Departures to the west (Westerly operations in westerly winds)

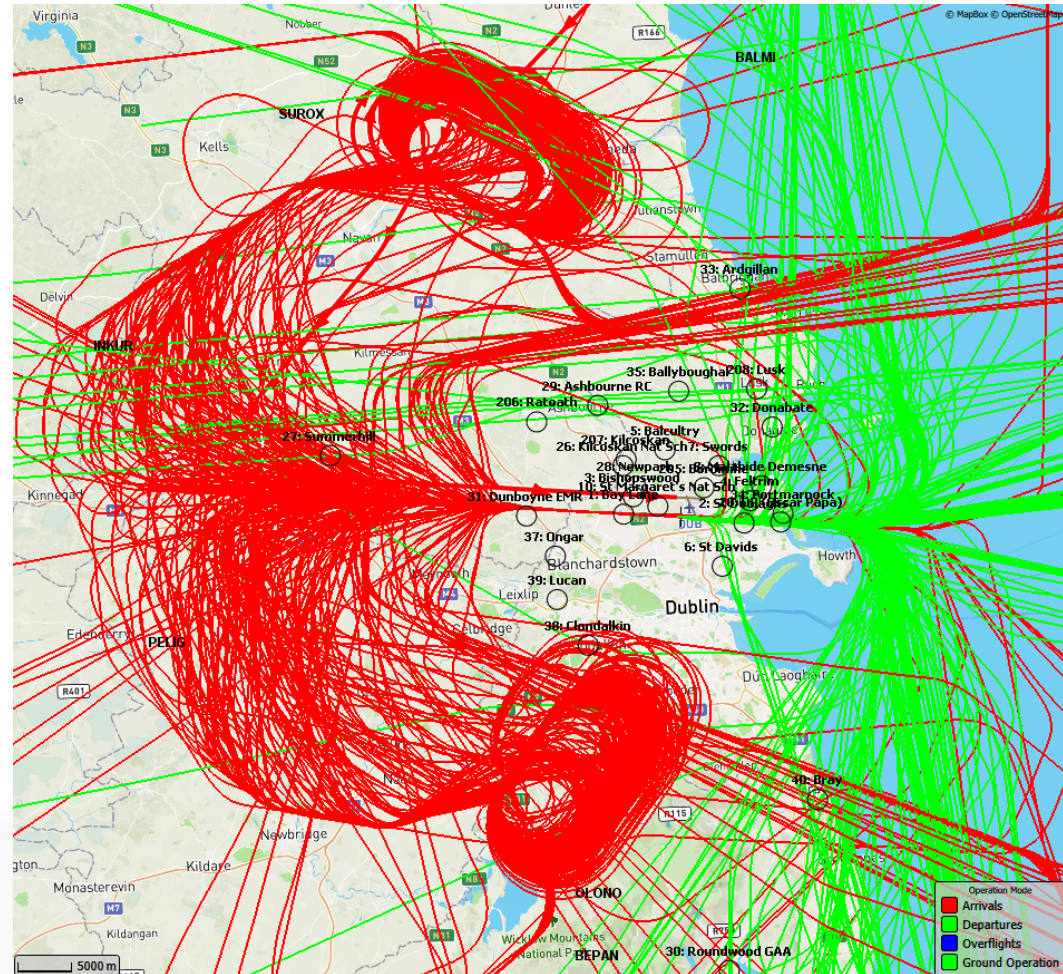


SID for South Runway (10R) Departures to the east (Easterly operations in easterly winds)



Operations on 30 May 2024

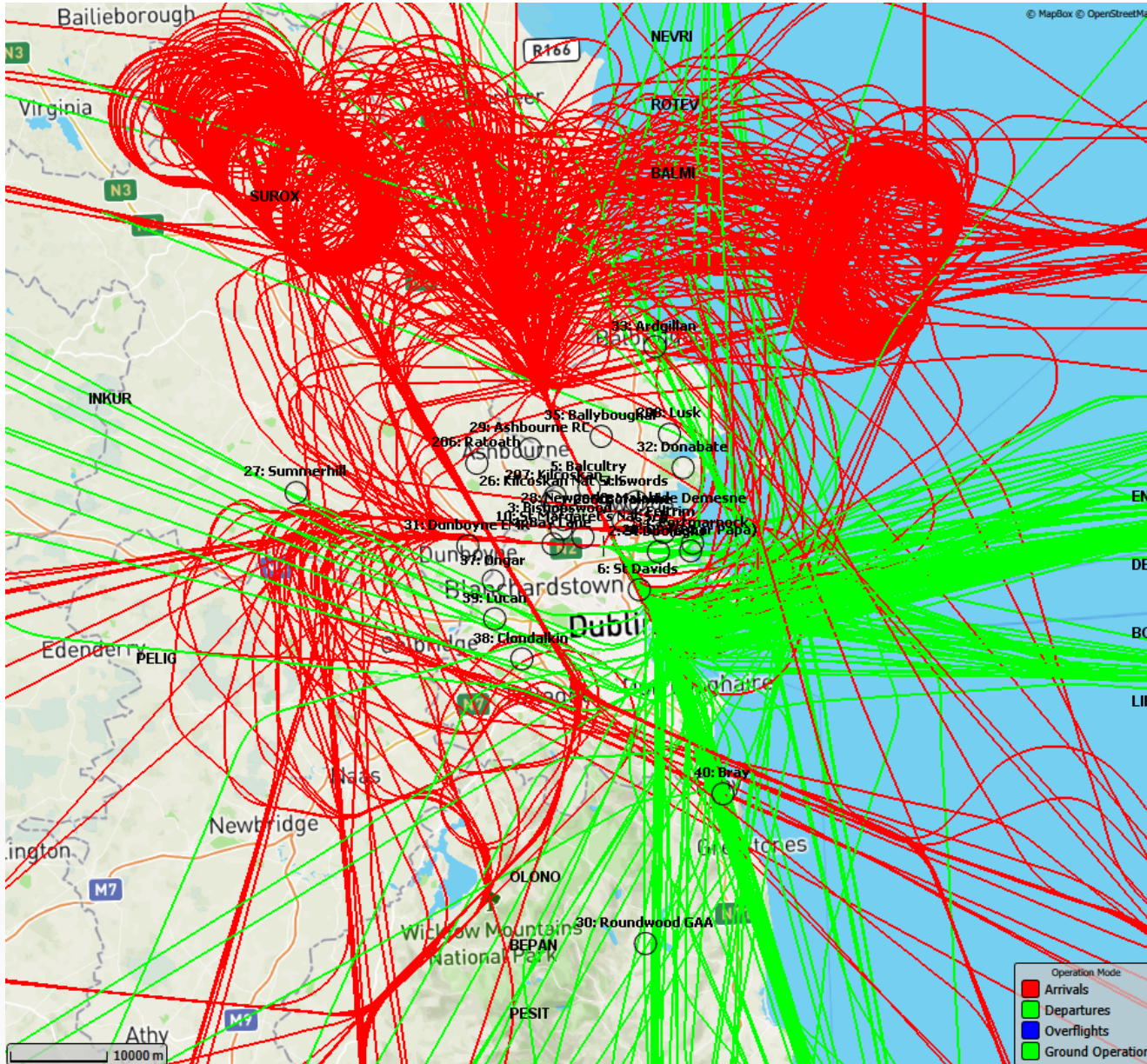
- 794 movements, westerly conditions
- Red = arrivals from the east
- Green = departures to the west



Operations on 13 May 2024

- 694 movements, easterly conditions
- Single runway (SR) due to low visibility conditions

Cross Wind Day Flight Tracks



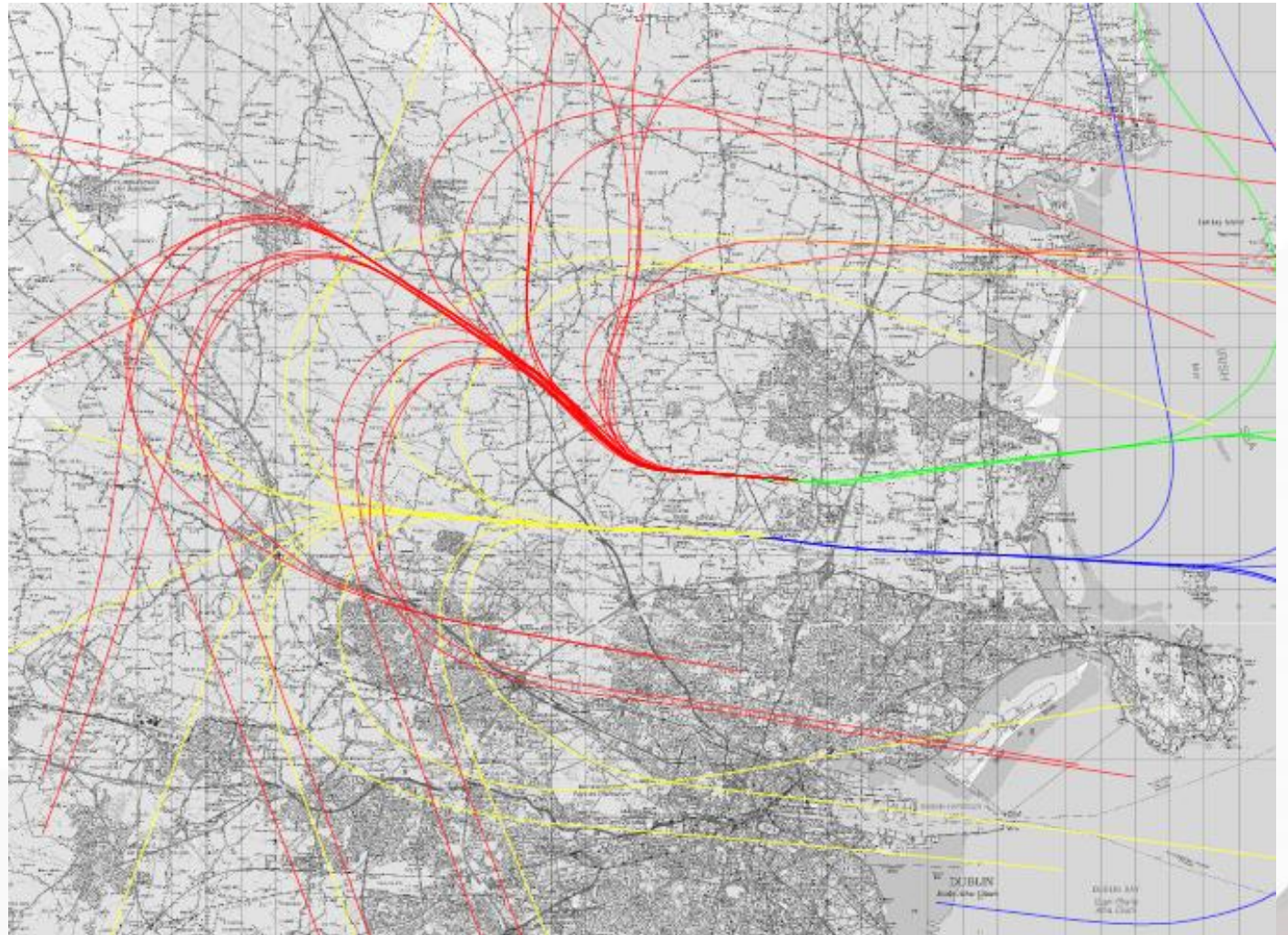
Operations on 6 April 2024

- 568 movements, southerly conditions
- Red = arrivals from the north (mostly)
- Green = departures to the south

Note that more holding patterns for arriving aircraft are required when only one runway is available.

Noise contours are calculated by a computer model based on input of the aircraft operations at the airport. This process includes certain steps including:

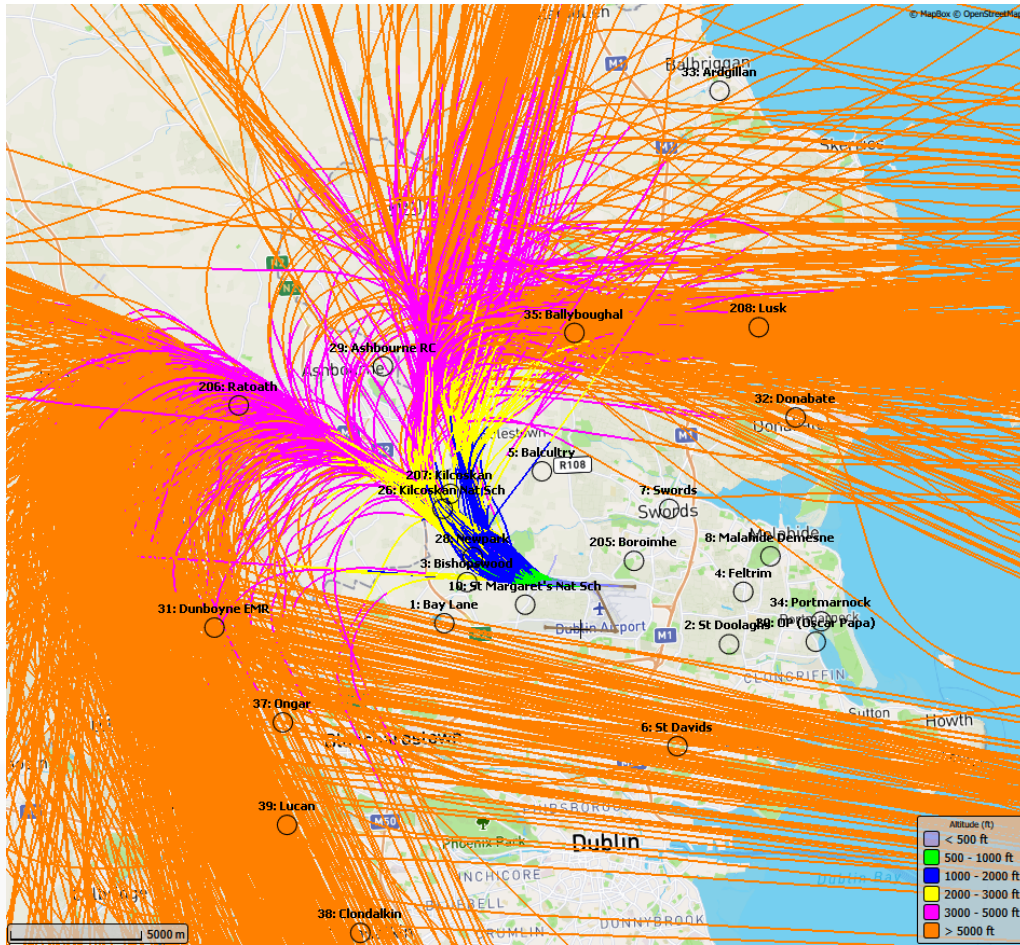
- Flight track data is extracted from the airport's Noise and Flight Track Monitoring system.
- Typical flight tracks are identified for each of the runways (as depicted here)
- Dispersed tracks are then created either side of the central lines to reflect actual operations (as depicted in the next page)



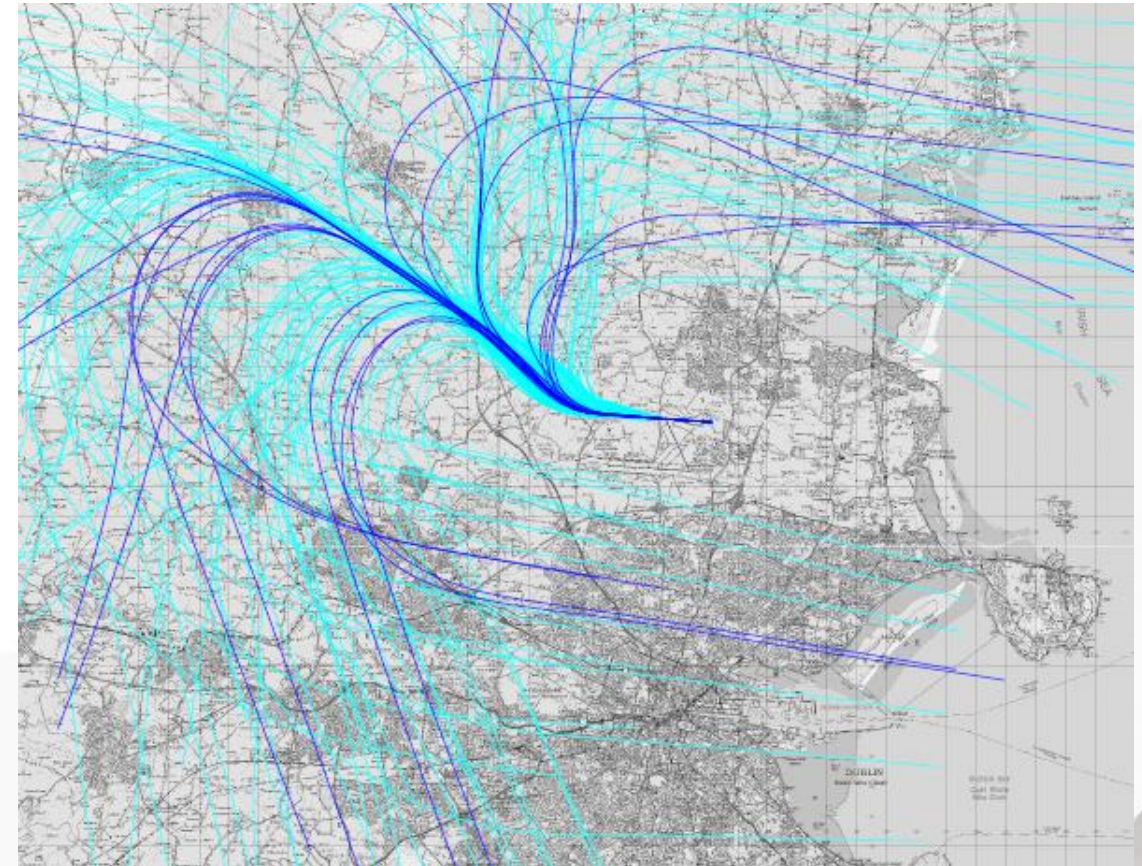
Main departure flight paths in calculation model for the two main runways – easterly and westerly departures

Noise Contour Modelling (2) – Dispersed Flight Tracks

In practice, the spread or scatter of actual flight tracks is modelled by creating dispersed tracks either side of the central or main track as shown.



Actual (Monitored) Flight Tracks (with altitude):
North Runway (28R) – westerly departures
1-14 May 2024



Modelled Departure Flight Paths:
North Runway (28R) – westerly operations
Dark blue = centreline flight paths
Light blue = dispersion flight paths

Noise Monitoring

- For the Q2 period, Dublin Airport had a network of 19 permanent and two mobile Noise Monitoring Terminals (NMT) at locations ranging from less than 1 km to over 30 km from the runways.
- NMT locations are selected across a wide area to cover the region including the nearest, most-impacted residences, heavily populated areas and less-impacted, further-out locations.
- Measured aircraft noise data is presented in both time-averaged and single-event noise metrics.
- Monthly data is provided for the two mobile NMTs at Milhead and Boroimhe, in place for nine and five months, respectively.

Flight Track Monitoring

- Flight track data is used to positively identify aircraft noise from the NMT data and filter out non-aircraft noise.
- Monitored flight tracks are also used to ensure that the operations in the noise contour model are representative of actual airport activity.
- Airline track adherence is reported in Dublin Airport's monthly operations reports.

Noise Contour Validation

- There is good correlation between the Measured and Modelled aircraft noise levels.
- This demonstrates that the noise modelling is sufficiently representative of the totality of aircraft operations at Dublin Airport and thus that the Modelled noise levels mapped in the Noise Contours accurately represent community noise exposure levels.
- This means that the contours can be used to assess the noise at locations which do not have an NMT in the immediate vicinity.
- In general, noise impact assessment and mitigations at the airport including Voluntary Noise Insulation and Dwelling Purchase Schemes are based on the modelled noise contours, so the Noise and Flight Track Monitoring, presented herein, provides support to the assessment and mitigation work at the airport.

End

**For further information, please visit
our website:**

www.dublinairport.com