

# Aircraft Operations and Noise Exposure Monthly Report

*August 2022*



# Project Overview

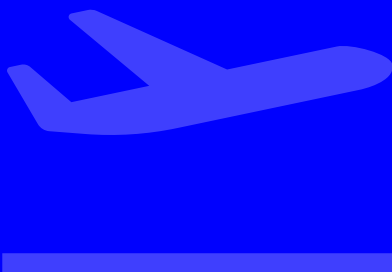
The growth in operations at BWI brings number social and economic impacts to communities surrounding the airport, however, this also results in significant noise impacts, especially for residents of Anne Arundel and Howard counties.

Howard and Anne Arundel Counties hired Vianair to help analyze flight activity in and out of Baltimore/Washington International Airport (BWI). In coordination with representatives from the two counties and support from the BWI Roundtable, Vianair developed the following report which includes the analysis of key elements (operational and acoustic elements) to help the community understand the existing noise exposure and to provide the ability to track changes over time.

While comprehensive, the elements in the report were selected by those who contributed to the report development (representatives from the two counties and the BWI Roundtable).

This report will be published monthly, beginning with March 2022. Report content may change based on input from the contributors and/or the community.

# AIRPORT OPERATIONS DATA



# Airport Operations Data

Aircraft operations (arrivals and departures) are the source for aircraft noise exposure for communities around BWI. While aircraft noise is the primary concern for most residents, it is important to understand aircraft operations in addition to analyzing aircraft noise. Changes in airport operations (which runways are used, predominant flight paths and routes, etc.), affect community noise exposure and these can change over time.

The core operational data sets analyzed in this report include Runway Use and Flight Track Density. Additional, or supplemental operational analyses are included in Appendix I. These include total (daily) operations, operations by aircraft type, daytime versus nighttime operations, and total operations.

# Runway Use

BWI has six runways: 10, 15R, 15L, 28, 33R, and 33L. Runway selection is based primarily on wind direction. BWI operates in two flows. When winds are out of the east, aircraft will arrive and depart in an EAST FLOW and when winds are out of the west, aircraft will arrive and depart in a WEST FLOW. Aircraft noise levels vary when below an aircraft landing or taking-off. Runway use also influences routes to and from the airport, which also affects aircraft noise for communities below.



EAST FLOW



WEST FLOW

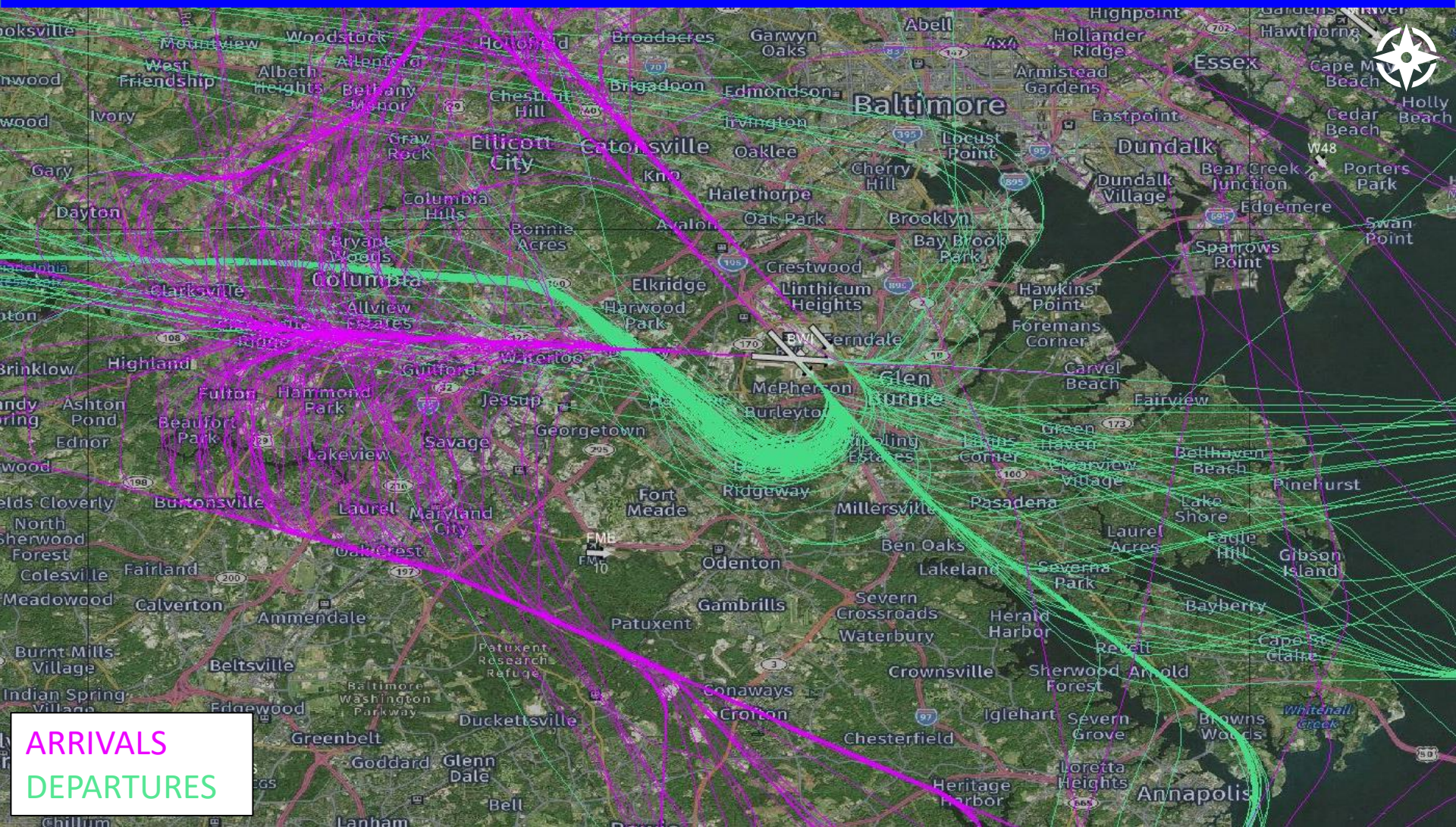
# EAST FLOW versus WEST FLOW

During EAST FLOW conditions, aircraft arrive and depart toward the east. This includes runways 15L, 15R, and 10.

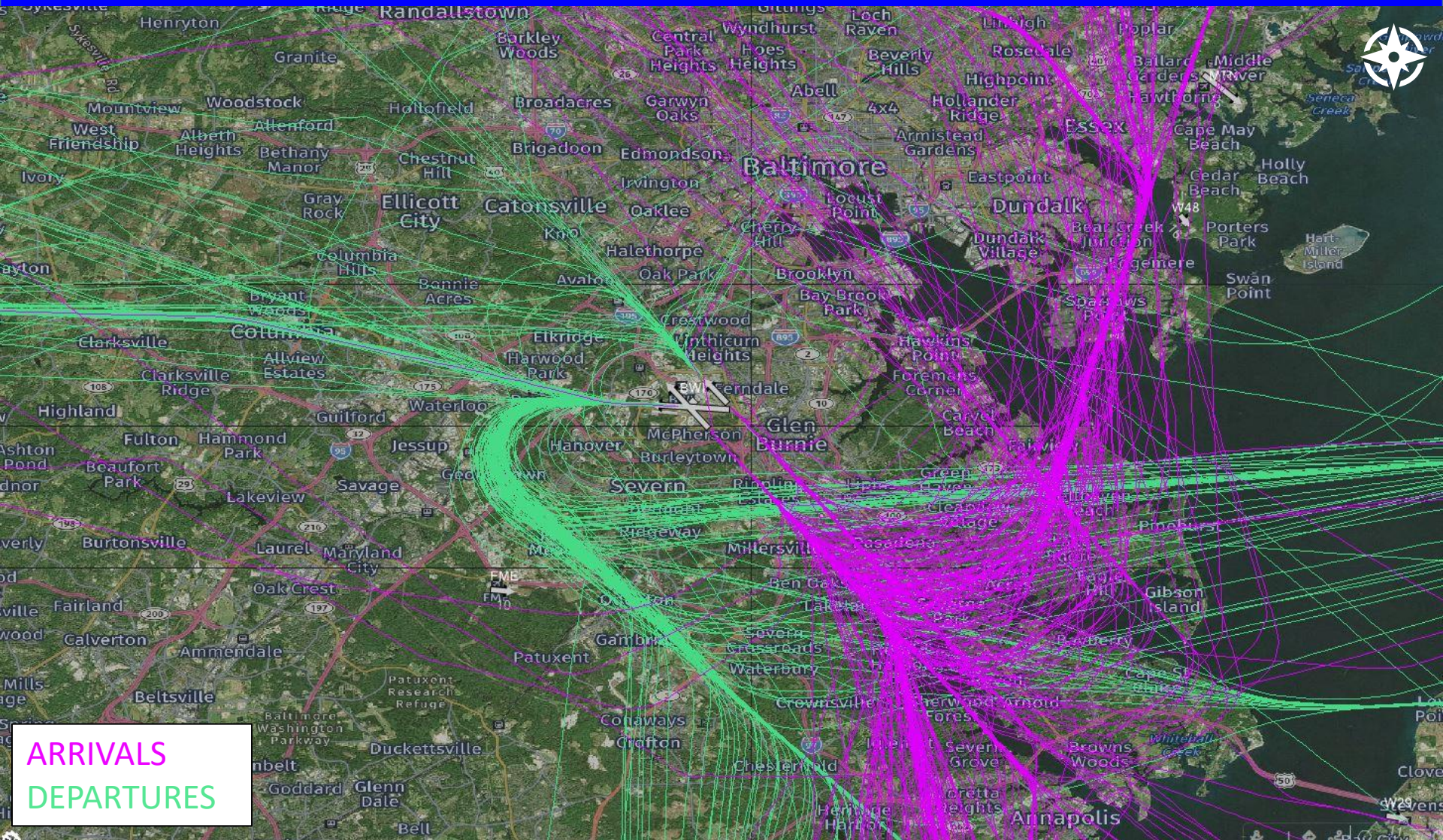
During WEST Flow conditions, aircraft arrive and depart toward the west. This includes runways 33L, 33R, and 28. The following slides are intended to illustrate arrival and departure flight paths during EAST and WEST flows.

For illustrative purposes, sample days were analyzed and depict arrivals and departures consistent with a specific flow. While these flight patterns are typical, they may vary on other days based on operational conditions.

# East Flow (Sample Day - June 05, 2022)



# West Flow (Sample Day - Aug 24, 2022)



ARRIVALS  
DEPARTURES



# Runway Use

Runway use is analyzed each month. Operations are broken up into arrivals (landings) and departures (take-offs). This information is presented in two ways, first over an airport aerial map, then using bar graphs.

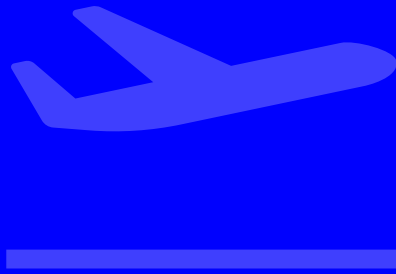
The red arrows in the graphic below depict the percentage of total arrivals for the month. The green arrows in the graphic indicate the percentage of total departures for the month.



*The graphics above are for illustrative purposes only. The actual monthly data will be presented later in the report.*

# AIRPORT OPERATIONS DATA

*Monthly Data*

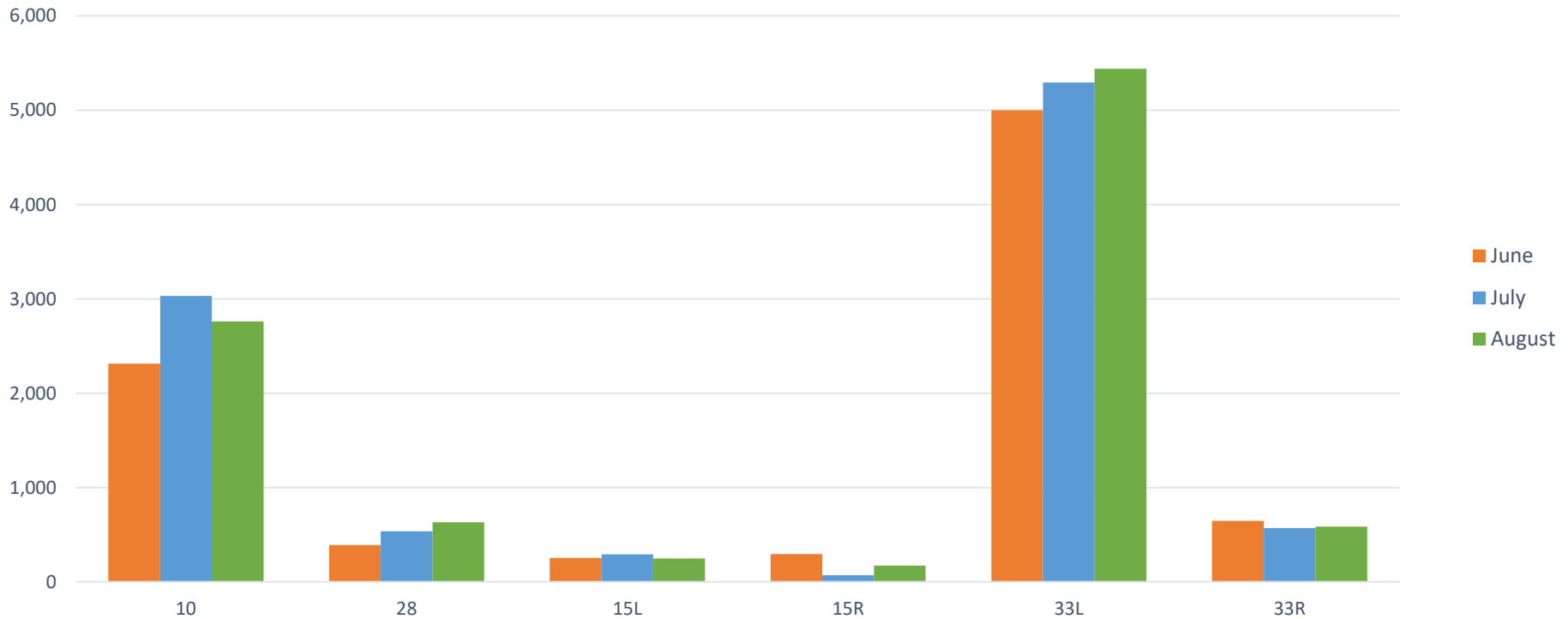


# Runway Use - Arrivals



# Runway Use - Arrivals

## Operations by Runway - Arrivals

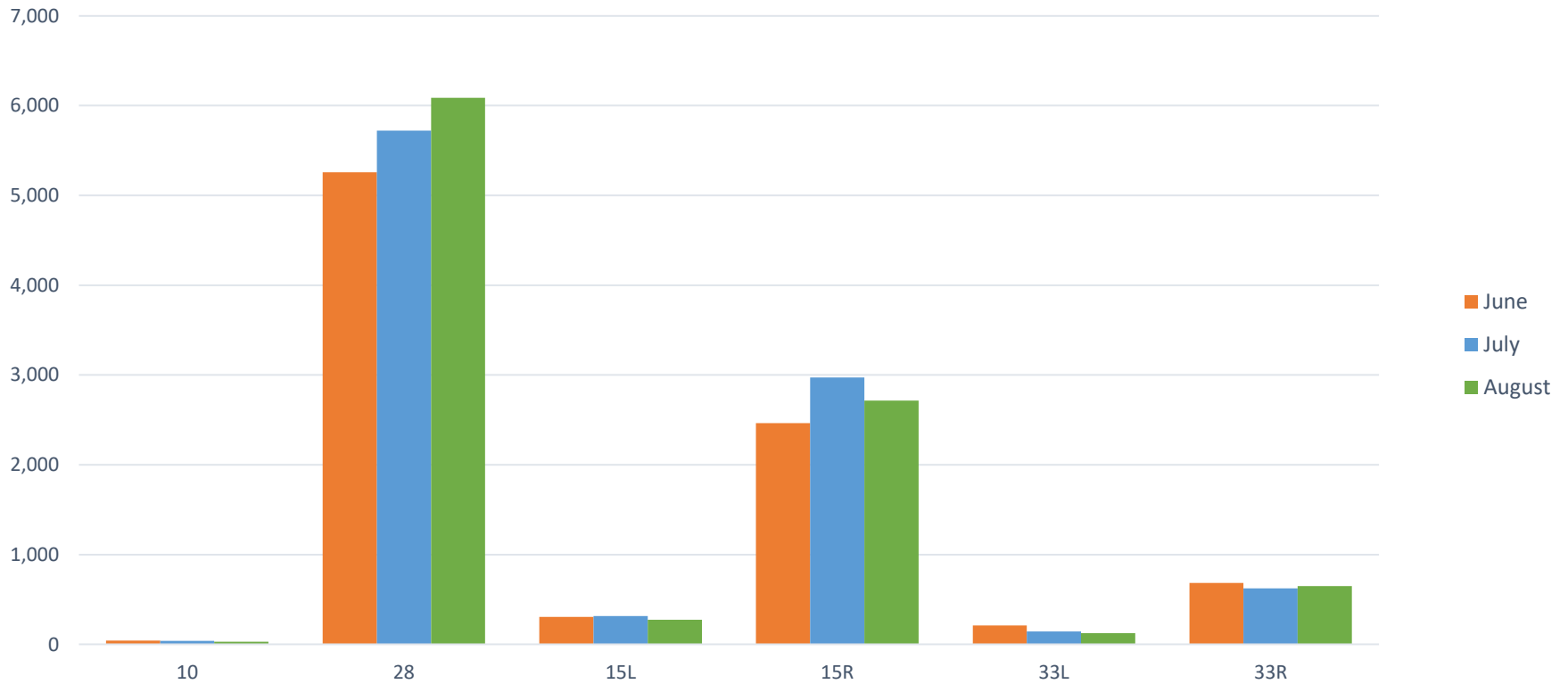


# Runway Use - Arrivals



# Runway Use - Departures

## Operations by Runway - Departures



# Density Analyses

Flight paths to and from the airport will vary based on a number of factors, including weather conditions, runway, flight procedure, aircraft type, and air traffic conditions.

Flight track density analyzes the concentrations of flight activity in and out of BWI. Flight track density is calculated based on reviewing all flights for the month, then analyzing the concentration of flights within the study area. Concentration (or density) is then depicted using color. Red represents the highest density, fading to white as density lowers.

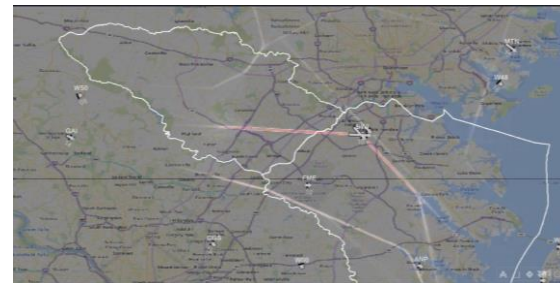
Noise data was added to the density analyses. The noise exposure is based on the “Number-of-Events-Above” metric, which is described in detail on Slides 28-29.



All Flight Tracks



Converting Tracks to Density



Density Analysis

# Flight Track Density Analysis – Arrivals (with NA55)

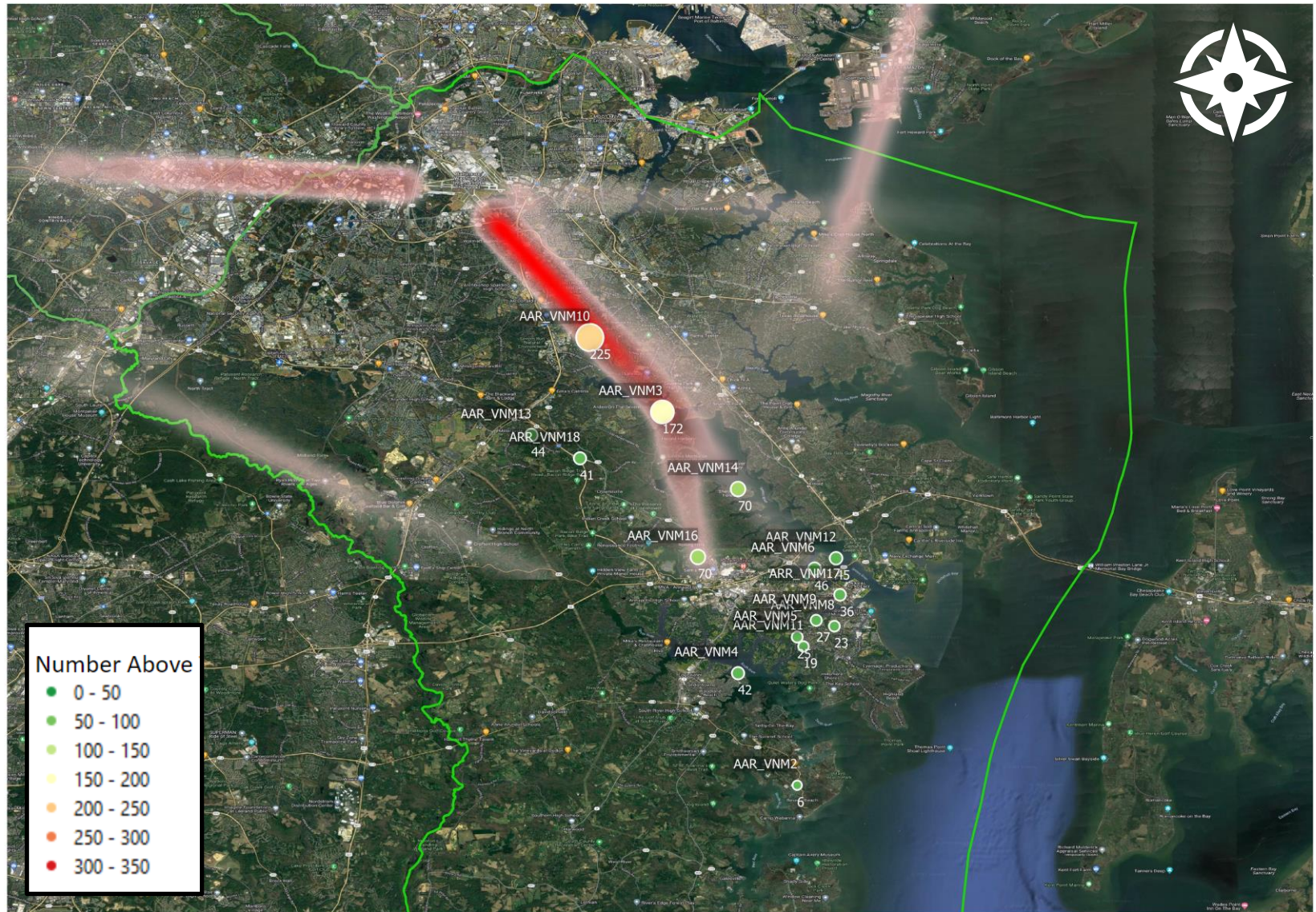
Anne Arundel County





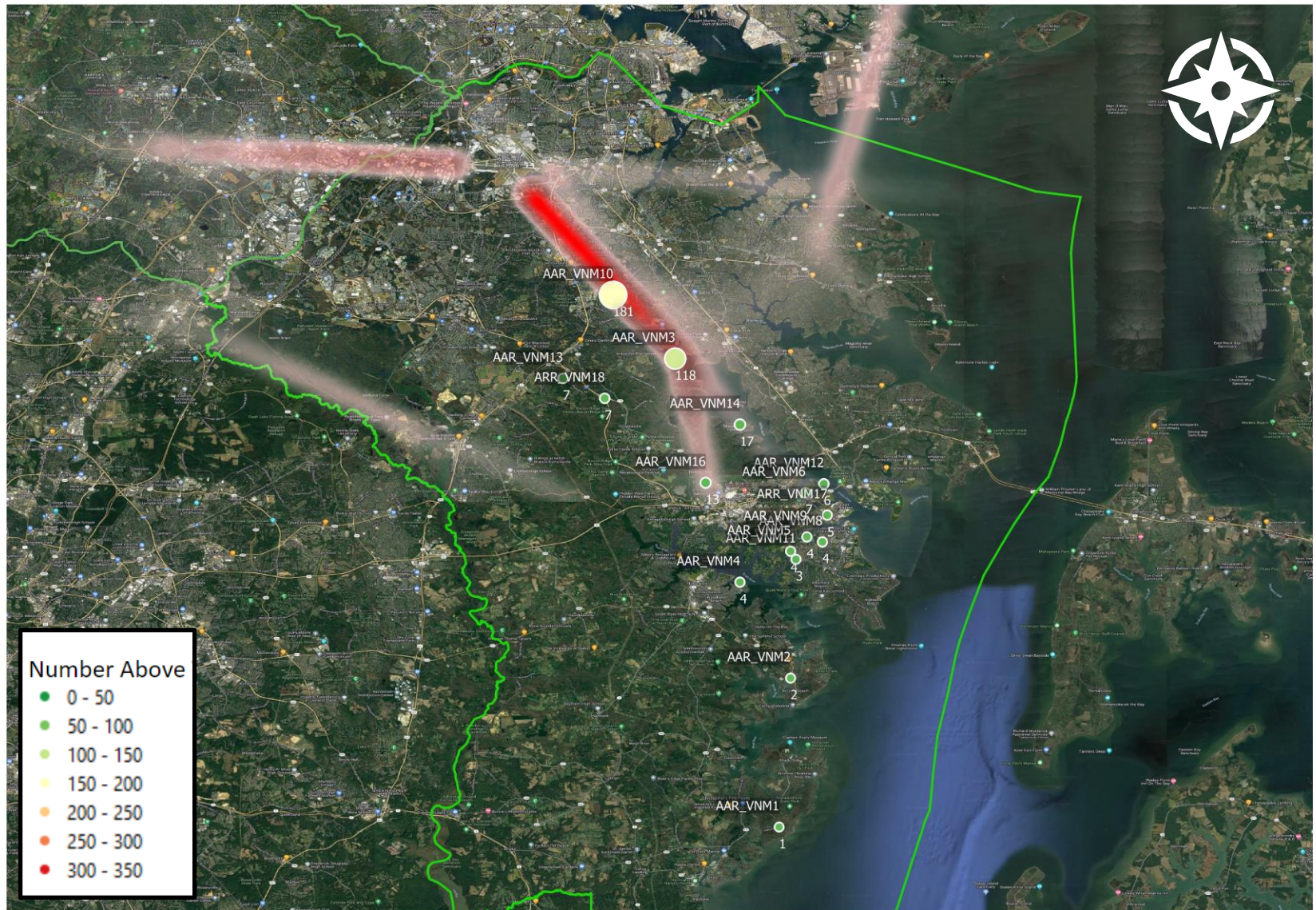
# Flight Track Density Analysis – Arrivals (with NA55)

## Anne Arundel County



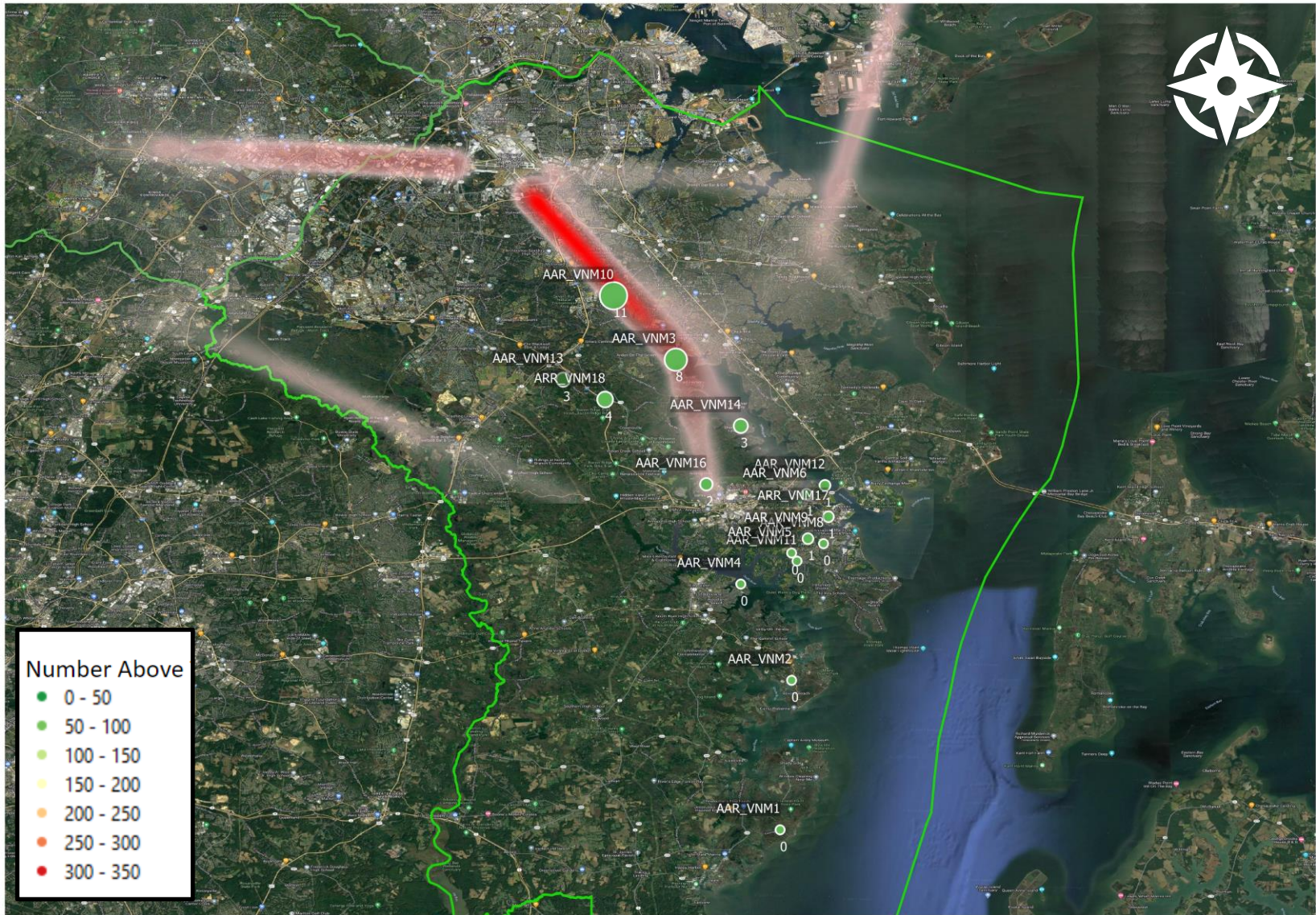
# Flight Track Density Analysis – Arrivals (with NA65)

Anne Arundel County



# Flight Track Density Analysis – Arrivals (with NA75)

Anne Arundel County



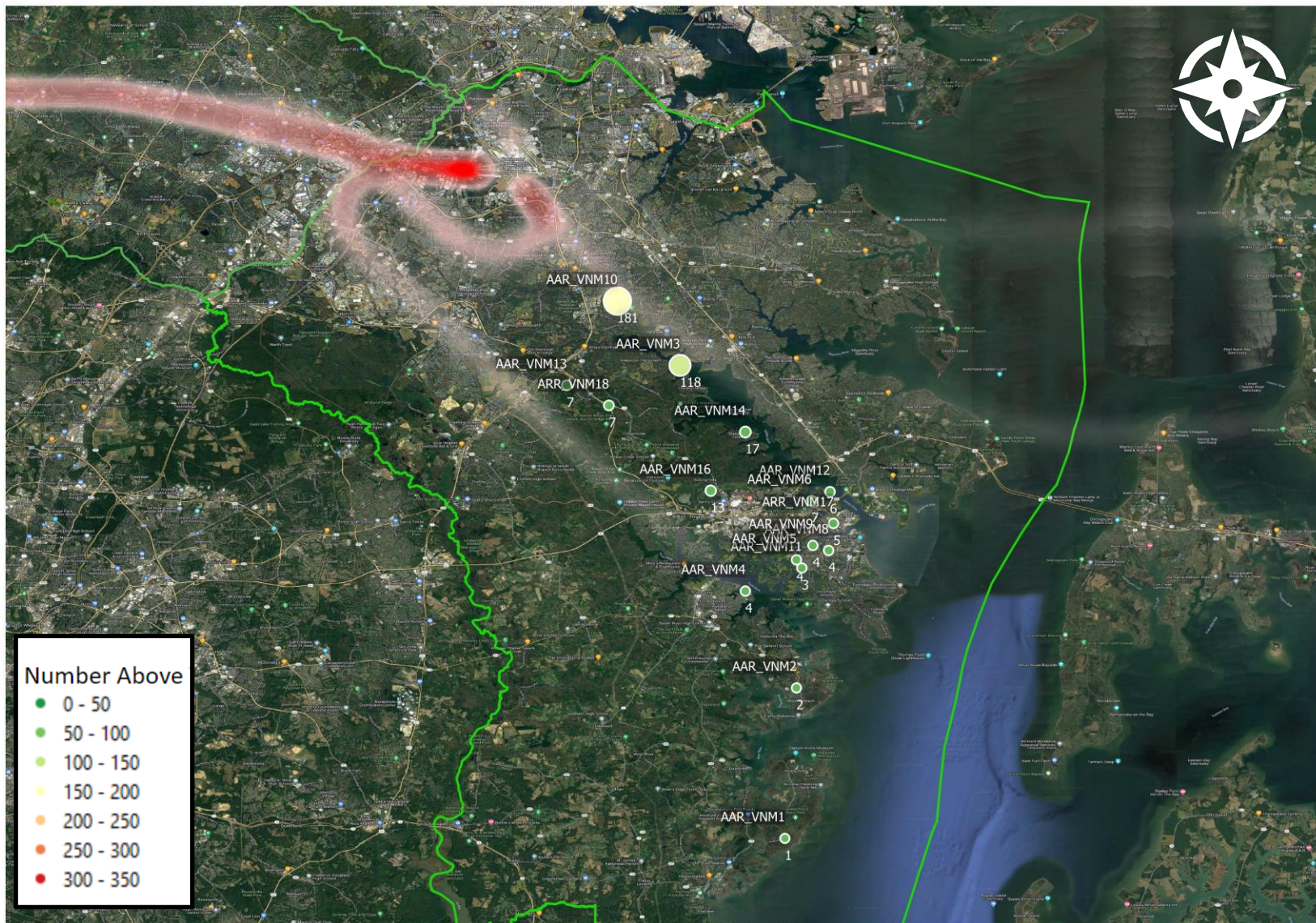
# Flight Track Density Analysis – Departures (with NA55)

## Anne Arundel County



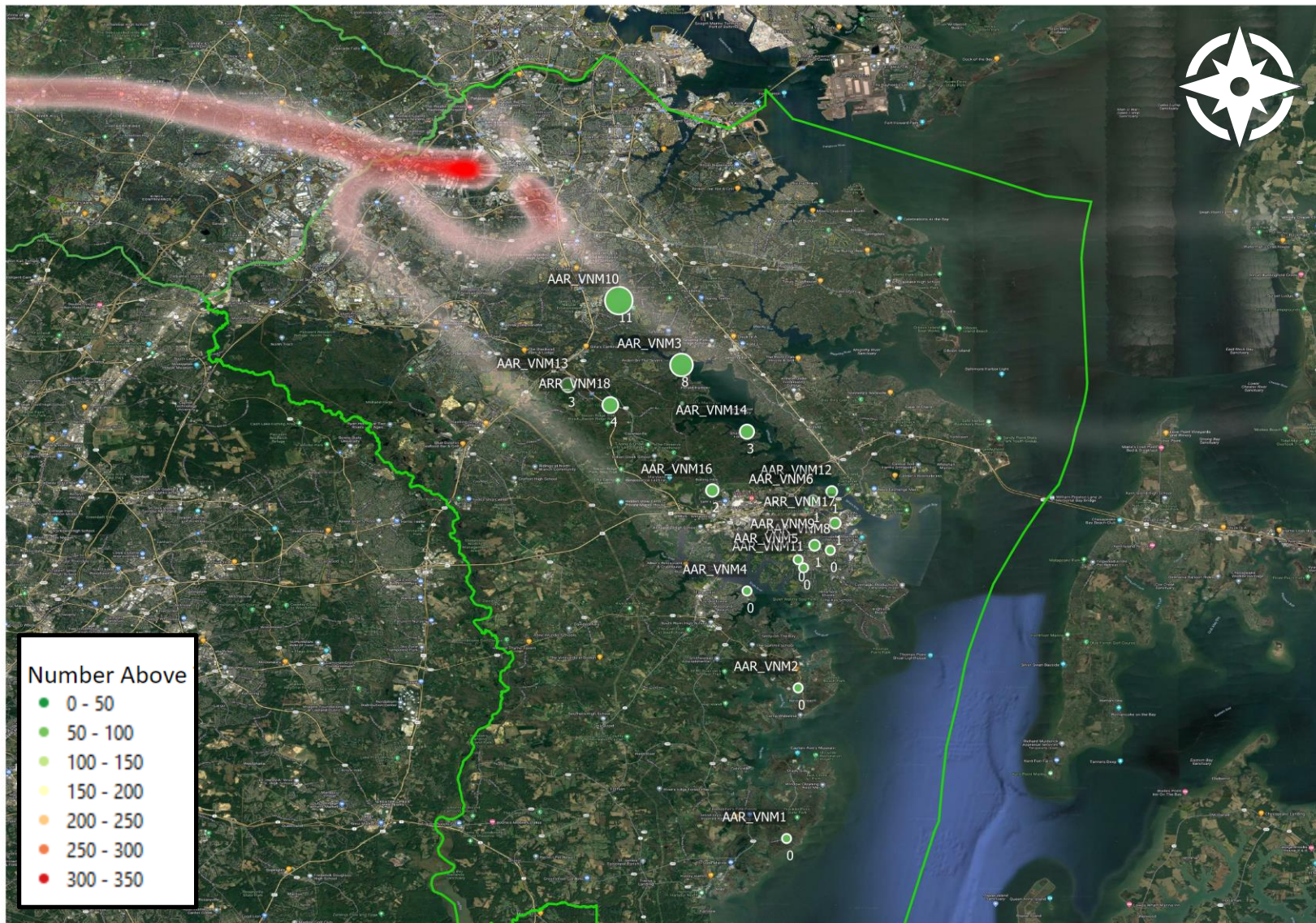
# Flight Track Density Analysis – Departures (with NA65)

Anne Arundel County



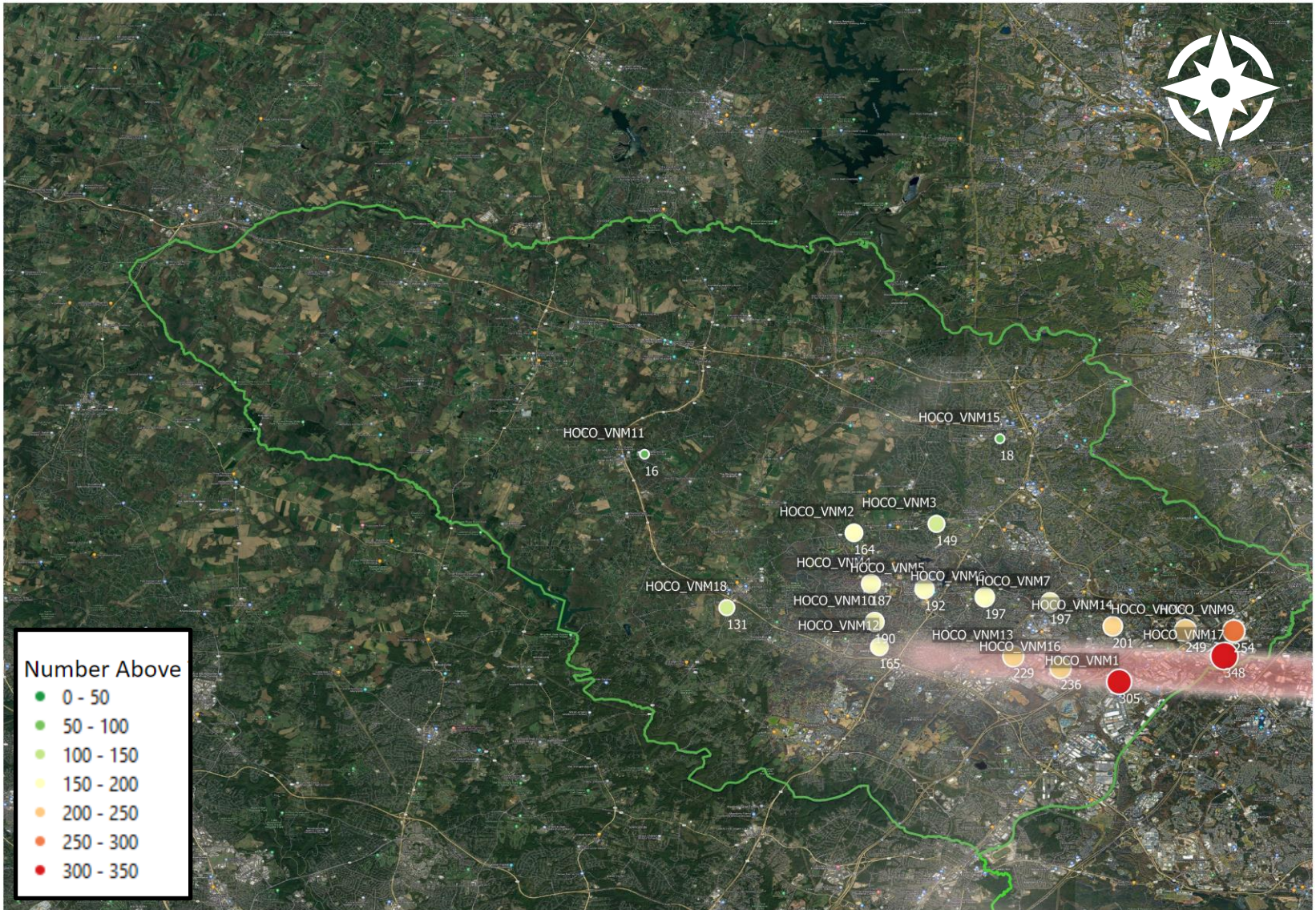
# Flight Track Density Analysis – Departures (with NA75)

Anne Arundel County



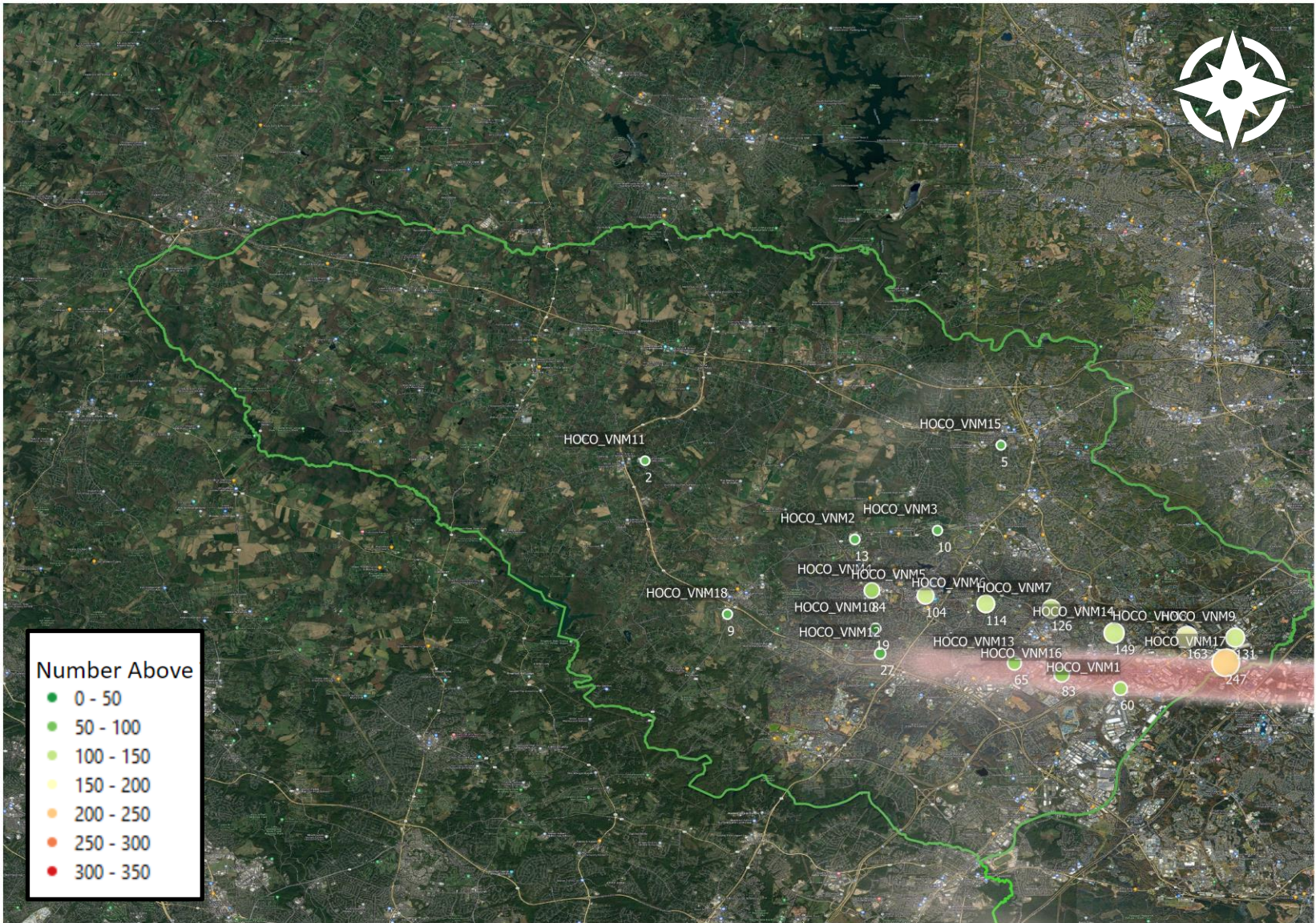
# Flight Track Density Analysis – Arrivals (with NA55)

Howard County



# Flight Track Density Analysis – Arrivals (with NA65)

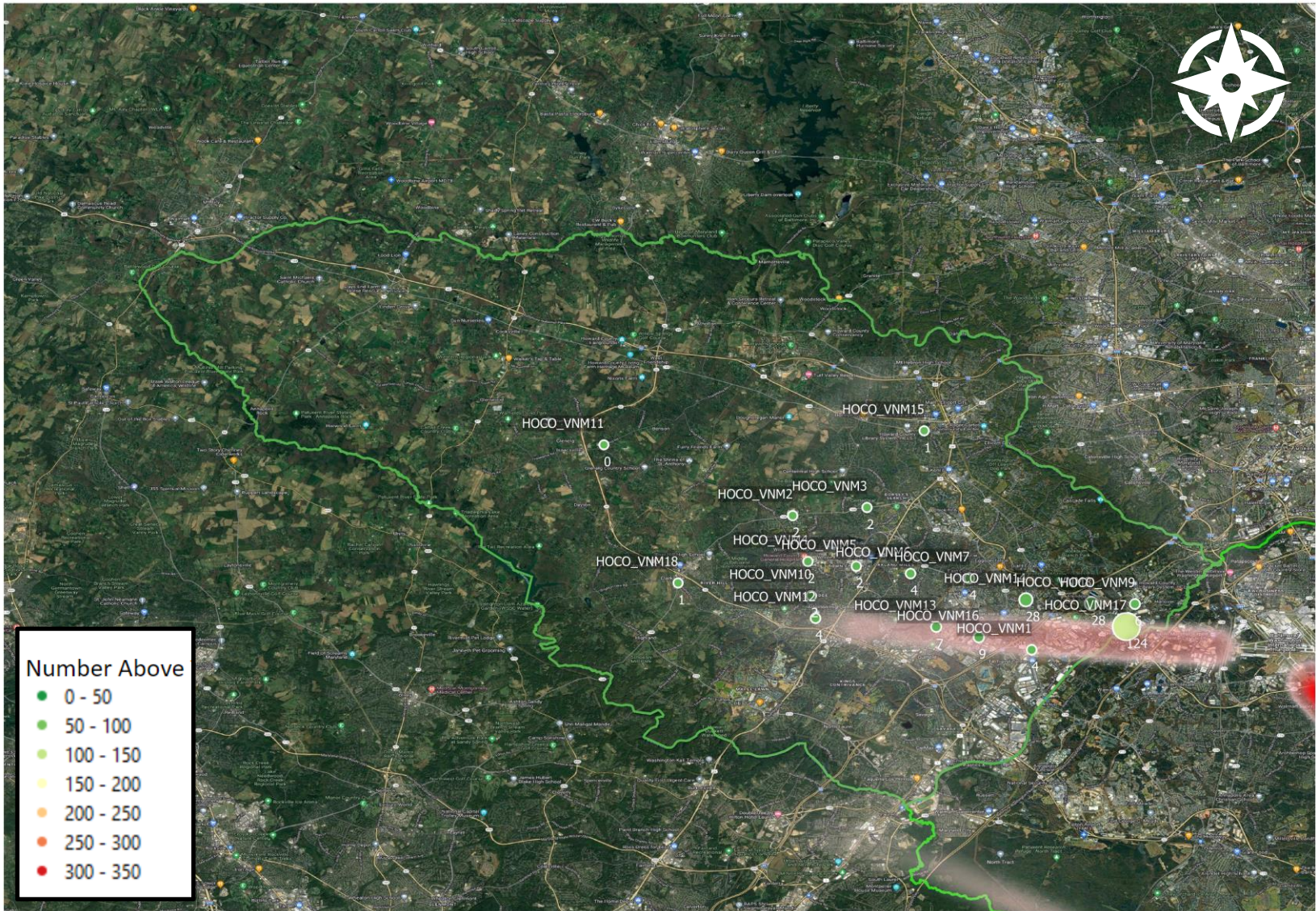
Howard County





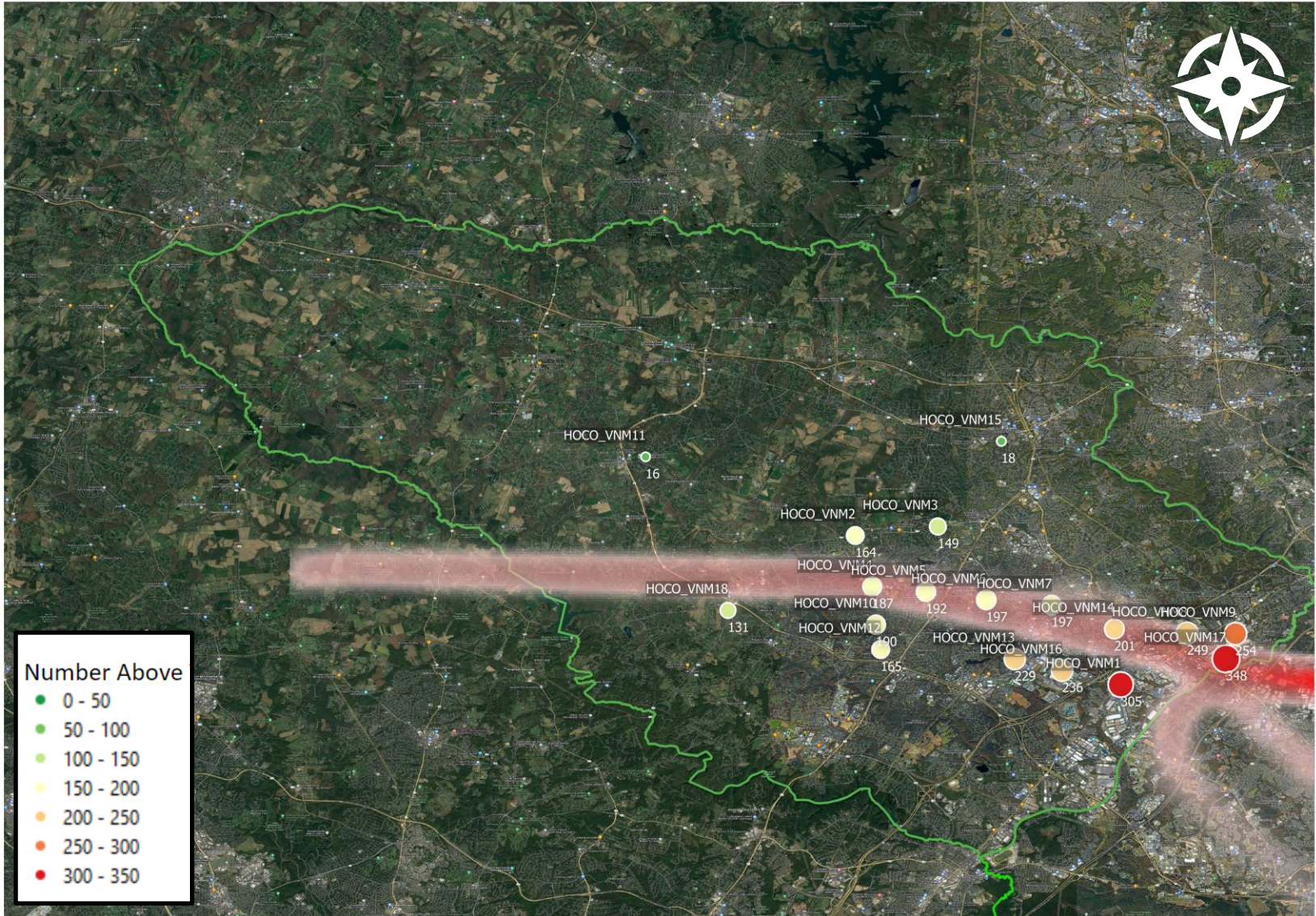
# Flight Track Density Analysis – Arrivals (with NA75)

## Howard County



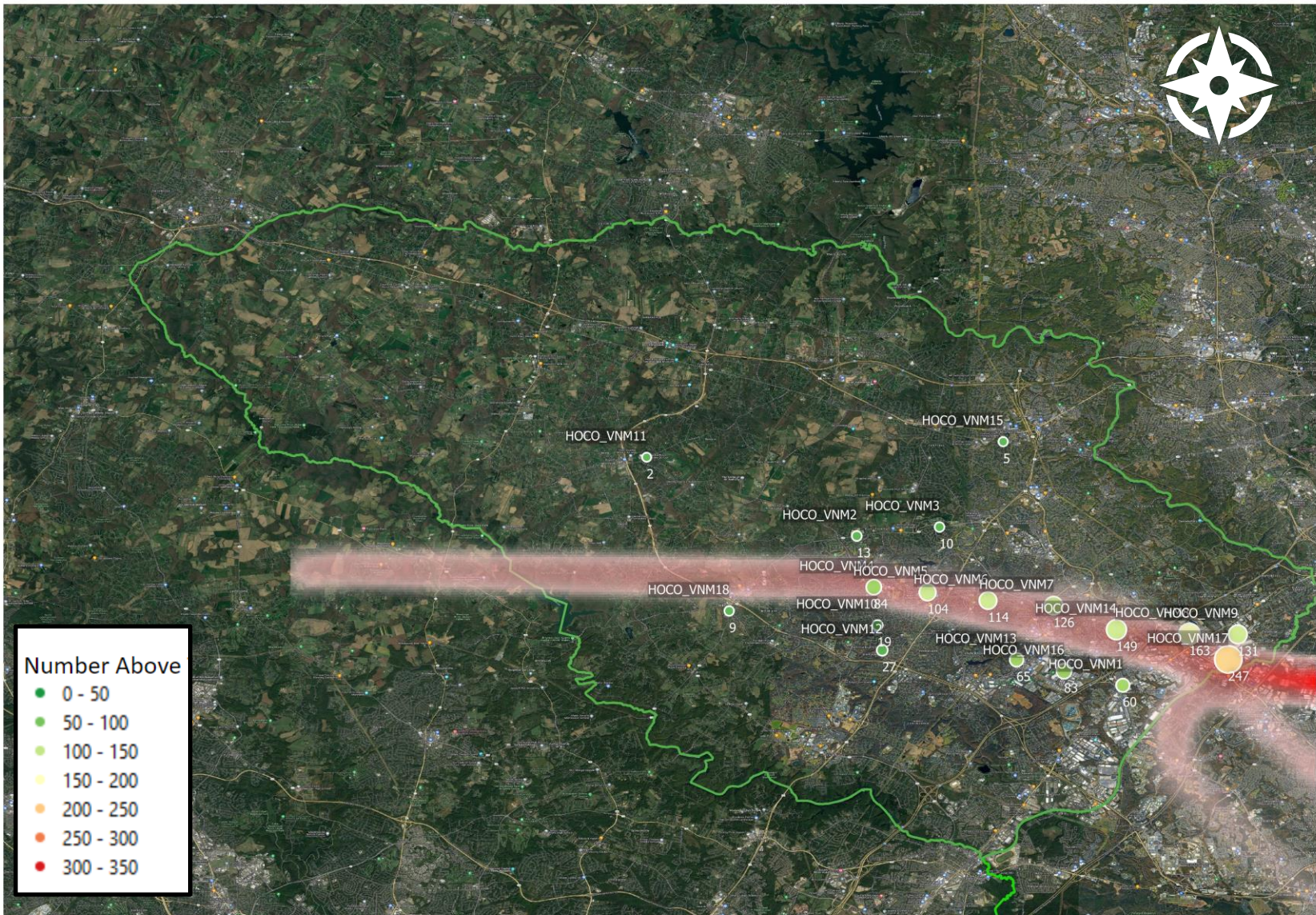
# Flight Track Density Analysis – Departures (with NA55)

Howard County



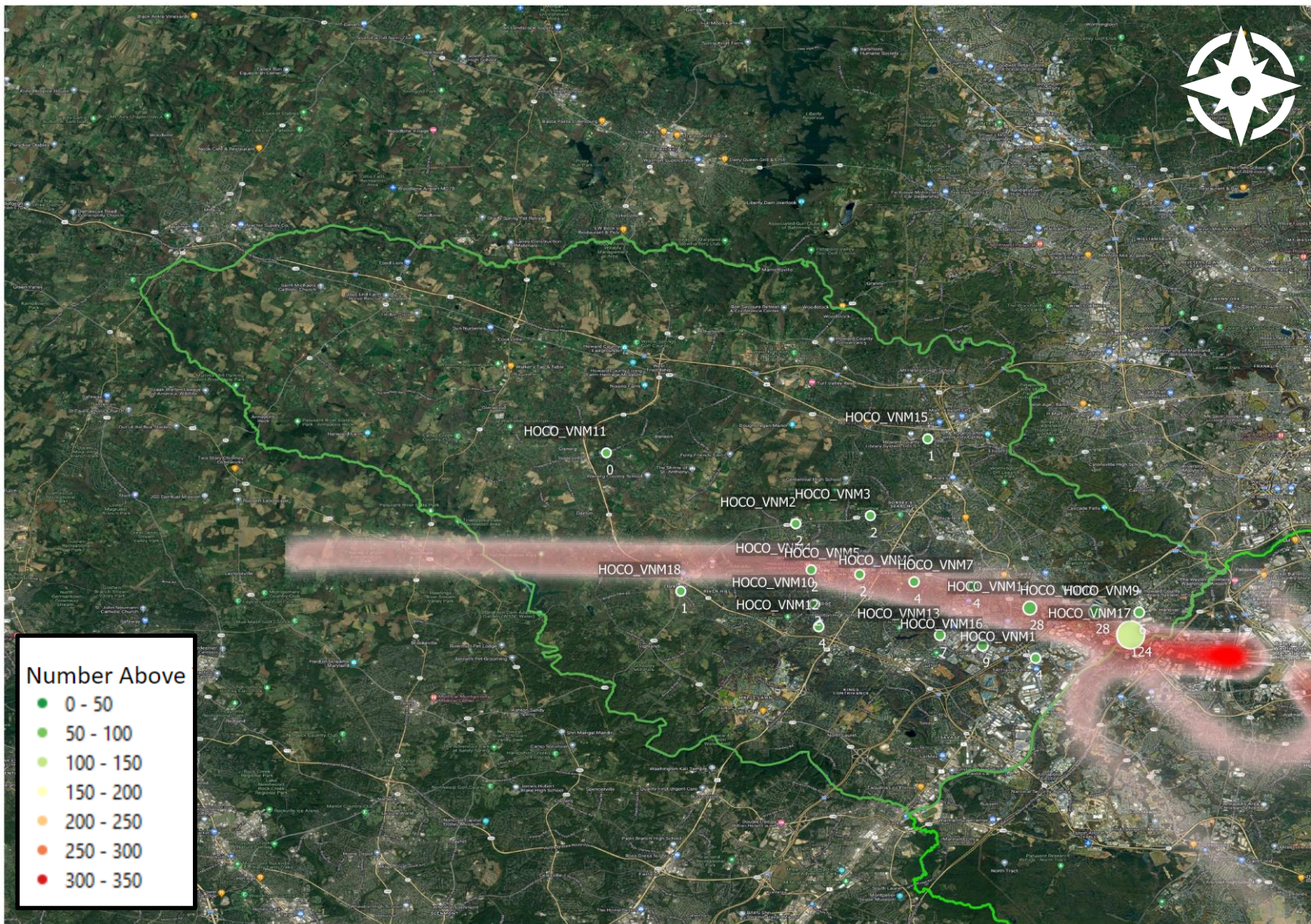
# Flight Track Density Analysis – Departures (with NA65)

Howard County



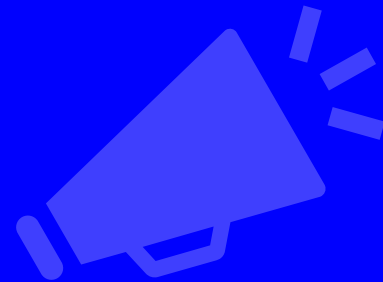
# Flight Track Density Analysis – Departures (with NA75)

## Howard County



# NOISE EXPOSURE

## *Virtual Noise Analysis - Introduction*



# Noise Analysis - Overview

BWI maintains noise monitors deployed in communities surrounding the airport. Noise monitors are very effective at collecting aircraft noise data, however, there are limitations.

For this project, Vianair is using noise modelling technology that calculates noise based on aircraft operations. Flight data is collected from the Federal Aviation Administration. This data (primarily radar data) is processed by the Vianair software platform and computes the noise exposure along the flight path. Calculations incorporate aircraft type, altitude, airspeed, etc. The noise modelling and analysis technology used by Vianair is consistent with that used by the Federal Aviation Administration and aviation regulators worldwide. The Vianair software platform uses the same algorithms used by the FAA's Aviation Environmental Design Tool (AEDT) which is a global standard for aircraft noise modelling and analyses.

# Noise Analysis - Overview

Virtual Noise monitoring allows more flexibility and the selection of locations for which to analyze aircraft noise. While BWI hosts 16 monitors, for this analysis, a grid was established with a total of 89 monitors covering most of Anne Arundel and Howard Counties. An additional 36 locations were selected, representing specific areas of interest or “landmarks”. This results in a total of 125 discrete locations for which aircraft noise data is collected and analyzed. These locations are referred to as “virtual noise monitor locations” in this report.

# Noise Exposure - Overview

Noise is defined as “unwanted sound.” There are many ways to measure noise. Two common metrics will be used in these reports: Day-Night Level (DNL) and Number-of-Events-Above (NA).

DNL is the standard metric used by the Federal Aviation Administration as required by federal regulation. The problem with DNL is it is difficult to understand and doesn't seem to reflect what residents experience on a daily basis.

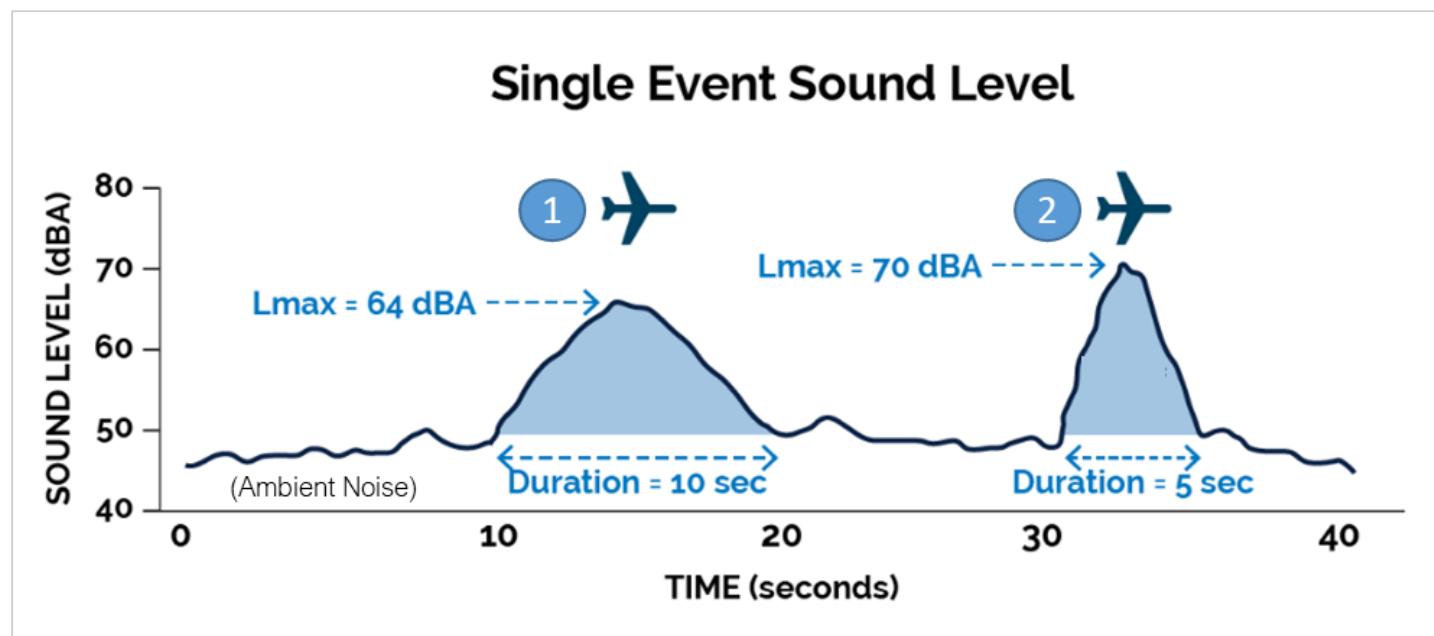
The Number-of-Events-Above metric calculates the number of times an aircraft overflight exceeds a specific maximum noise level. For this report, events above 55 decibels, 65 decibels, and 75 decibels were selected. This will indicate how many times aircraft noise exceeded 55, 65, or 75 decibels. These are calculated for the reporting month and daily average.



# Number-of-Events-Above (NA) Metric

The graphic below represents two aircraft overflights/noise events. The maximum noise level of the first overflight was 64 decibels (shown as 64 dBA). The maximum noise level of the second event was 70 decibels (shown as 70 dBA).

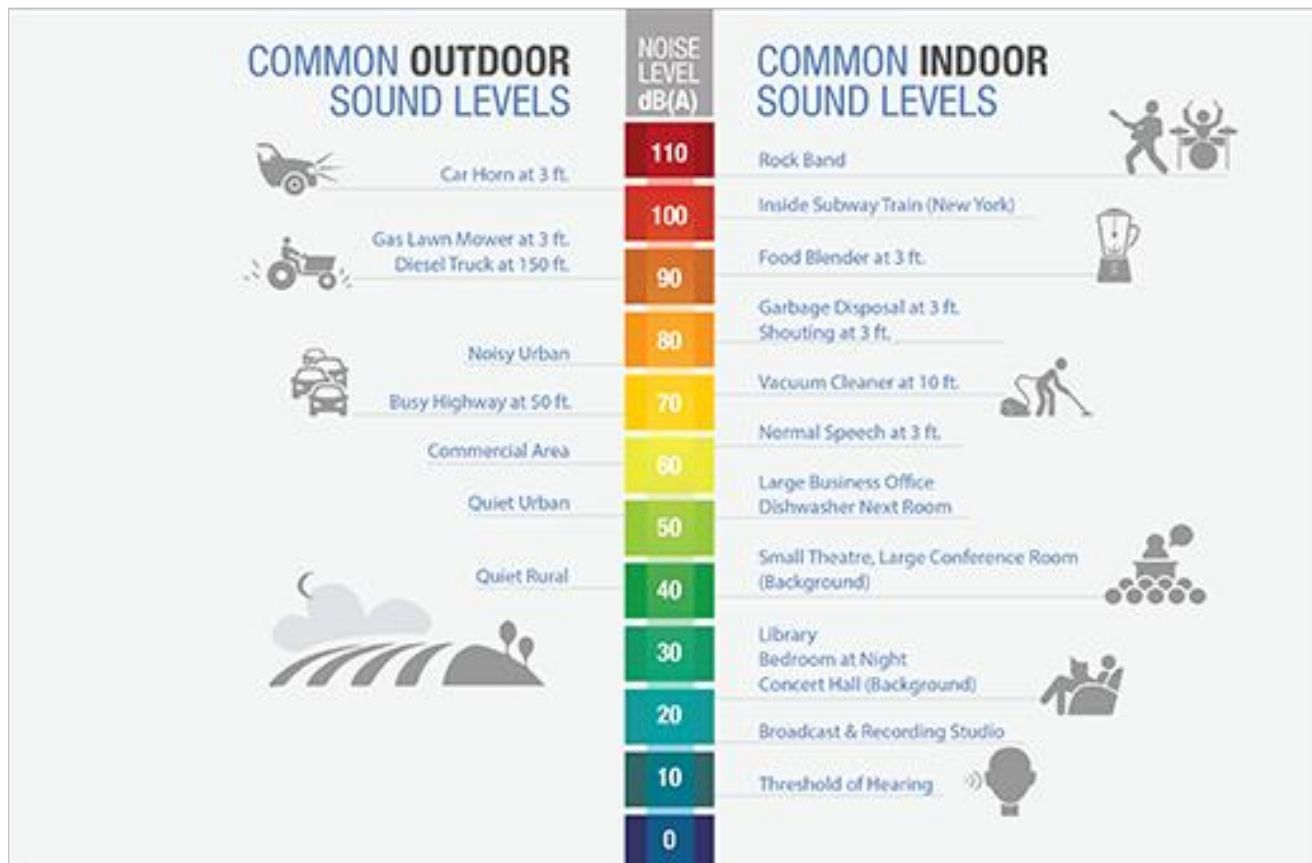
The NA noise metric counts the number of times the noise level exceeds a specific threshold. In this report, 55, 65, and 75 decibels was selected.



Graphic adapted from *Aircraft Noise Overview*. Boston Logan RNAV (GPS) RWY 4L Environmental Assessment. March 2021. <https://faabostonworkshops.com/project-information/aircraft-noise-overview/>

# Noise Levels

The scale below is intended to provide a basic understand of noise levels which are expressed in decibels (dB or dBA). As indicated, the typical sound level for people speaking (3 ft apart) is 64-65 decibels. Other common noise sources are also listed.



Source: Fundamentals of Noise and Sound. (n.d.). Retrieved July 2022, from [https://www.faa.gov/regulations\\_policies/policy\\_guidance/noise/basics](https://www.faa.gov/regulations_policies/policy_guidance/noise/basics)

# NOISE EXPOSURE

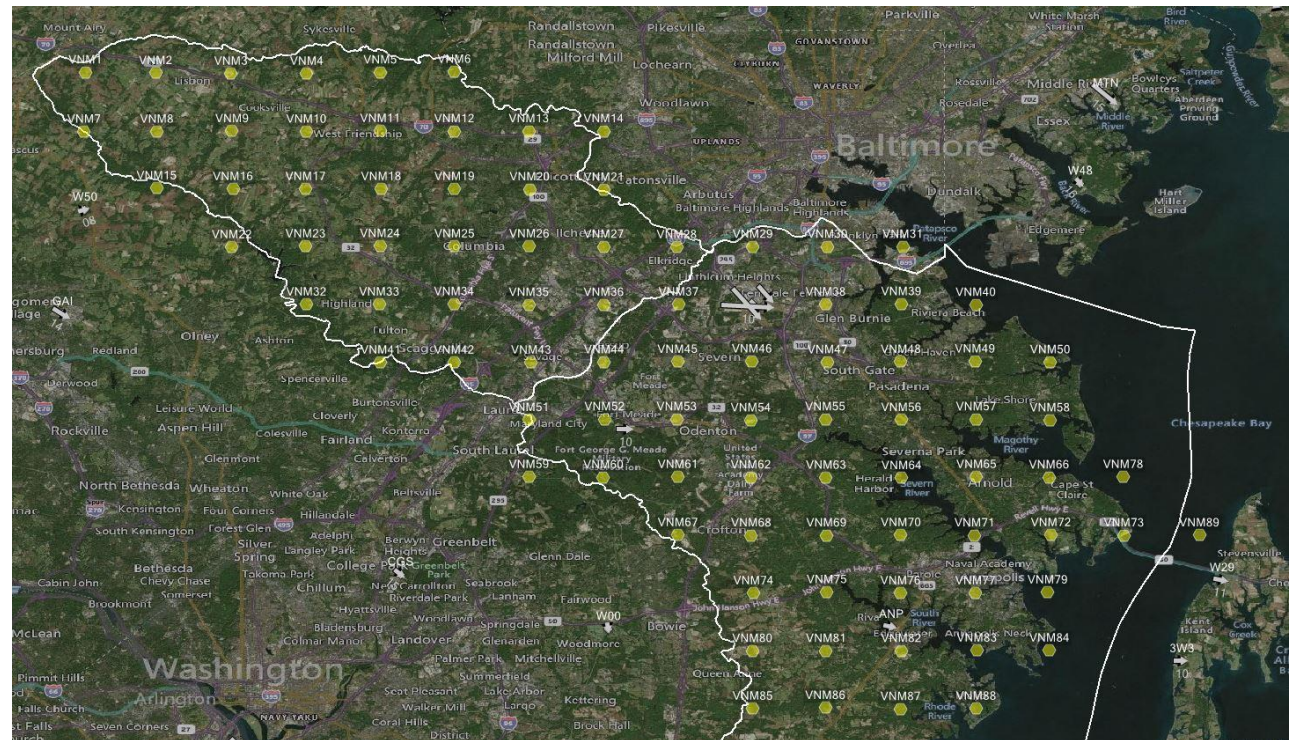
## *Virtual Noise Analysis – Monthly Data*



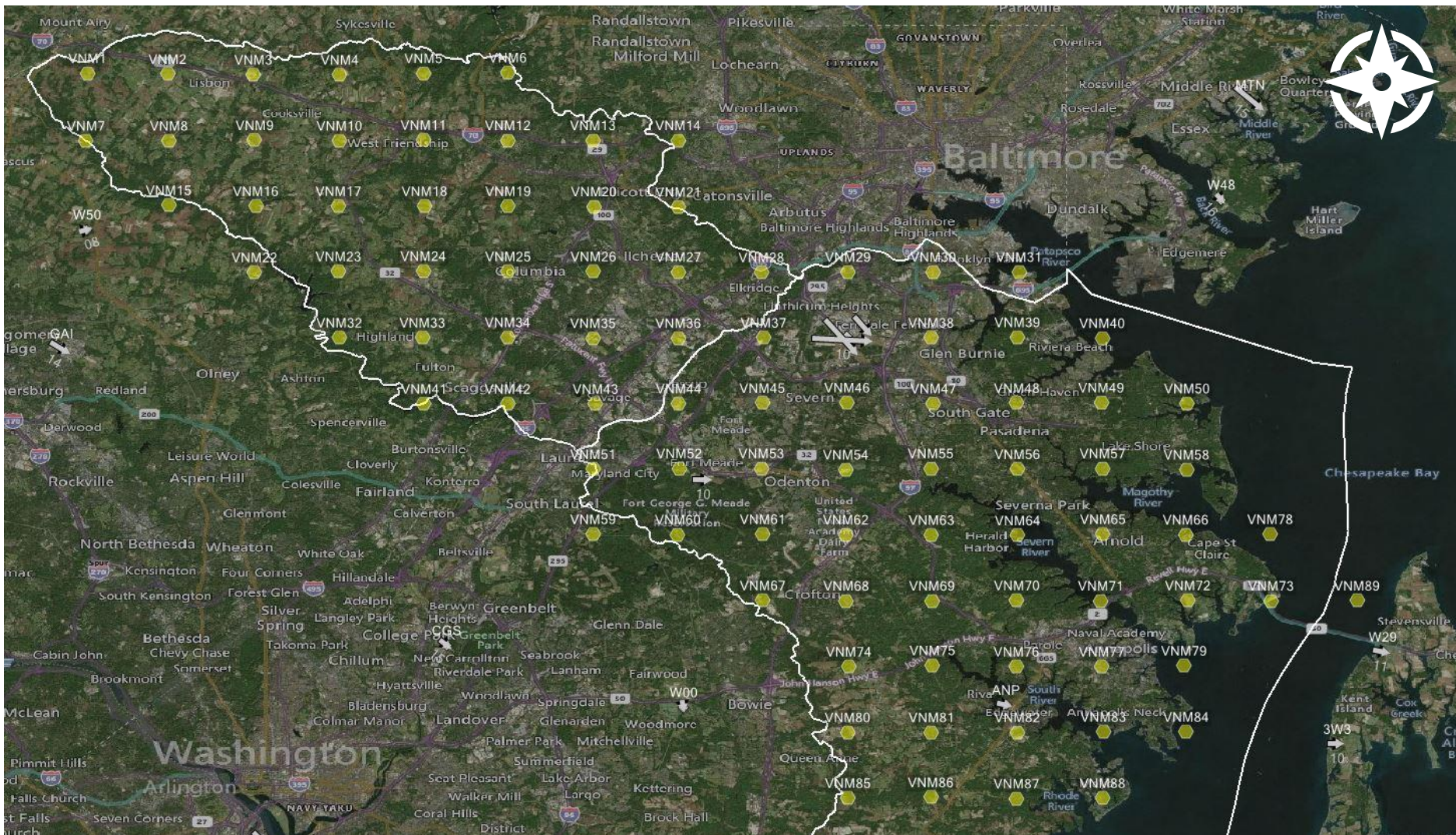
# Noise Exposure – Virtual Noise Monitor Locations

In order to provide ample coverage of the communities in both Anne Arundel and Howard Counties, a large grid was developed and applied to the two-county area. This resulted in complete coverage of the study area.

A map with the study grid, and the additional selected (landmark) locations are described in the following tables and graphics.



# Noise Exposure – Virtual Noise Monitor Locations



# Noise Exposure – Virtual Noise Monitor Locations

(89 Monitor Points - Two-County, 2.5 mile grid)

ID	Latitude	Longitude	Elevation
VNM1	39.342462	-77.149704	879
VNM2	39.342017	-77.098984	784
VNM3	39.341572	-77.044704	680
VNM4	39.341572	-76.98998	583
VNM5	39.342462	-76.937035	629
VNM6	39.342907	-76.883645	652
VNM7	39.29975	-77.150594	759
VNM8	39.29975	-77.098094	520
VNM9	39.300127	-77.04389	680
VNM10	39.29975	-76.990272	583
VNM11	39.300315	-76.937031	629
VNM12	39.300051	-76.883621	629
VNM13	39.300051	-76.829825	408
VNM14	39.300051	-76.775888	538
VNM15	39.258958	-77.098251	520
VNM16	39.258421	-77.043211	500
VNM17	39.258421	-76.990856	564
VNM18	39.258421	-76.936353	443
VNM19	39.258421	-76.883461	448
VNM20	39.258152	-76.829227	415

ID	Latitude	Longitude	Elevation
VNM21	39.257884	-76.775798	309
VNM22	39.216537	-77.044017	500
VNM23	39.217074	-76.990856	596
VNM24	39.217342	-76.937159	596
VNM25	39.217074	-76.883461	399
VNM26	39.217074	-76.829495	515
VNM27	39.216805	-76.775798	458
VNM28	39.216537	-76.723174	177
VNM29	39.216805	-76.668403	32
VNM30	39.216805	-76.614437	142
VNM31	39.216805	-76.560203	28
VNM32	39.17519	-76.990319	527
VNM33	39.17519	-76.937696	400
VNM34	39.175458	-76.88373	369
VNM35	39.174921	-76.829764	320
VNM36	39.174921	-76.775798	220
VNM37	39.17519	-76.721832	144
VNM38	39.17519	-76.61578	26
VNM39	39.175458	-76.561277	68
VNM40	39.174921	-76.507579	13

ID	Latitude	Longitude	Elevation
VNM41	39.133306	-76.936622	442
VNM42	39.133306	-76.88373	303
VNM43	39.133306	-76.828153	247
VNM44	39.133574	-76.775529	237
VNM45	39.133843	-76.722637	166
VNM46	39.134111	-76.66894	137
VNM47	39.133574	-76.614437	60
VNM48	39.133843	-76.561545	45
VNM49	39.134111	-76.508116	120
VNM50	39.133574	-76.453882	24
VNM51	39.091959	-76.829764	113
VNM52	39.092496	-76.775261	117
VNM53	39.092496	-76.723174	181
VNM54	39.09169	-76.669745	193
VNM55	39.092496	-76.616048	101
VNM56	39.091959	-76.561277	37
VNM57	39.092496	-76.507311	70
VNM58	39.09169	-76.45415	24
VNM59	39.05088	-76.829764	118
VNM60	39.050612	-76.776066	152

# Noise Exposure – Virtual Noise Monitor Locations

(89 Monitor Points - Two-County, 2.5 mile grid)

ID	Latitude	Longitude	Elevation
VNM61	39.05088	-76.722369	160
VNM62	39.050612	-76.669745	135
VNM63	39.050343	-76.615511	161
VNM64	39.050075	-76.561008	37
VNM65	39.05088	-76.507042	123
VNM66	39.050612	-76.454687	78
VNM67	39.008996	-76.722369	59
VNM68	39.008728	-76.669477	125
VNM69	39.008728	-76.615243	146
VNM70	39.008996	-76.561545	87
VNM71	39.008728	-76.508385	59
VNM72	39.008996	-76.453345	11
VNM73	39.008728	-76.400721	0
VNM74	38.967112	-76.667866	115
VNM75	38.967918	-76.614974	55
VNM76	38.967112	-76.561814	87
VNM77	38.967112	-76.507848	20
VNM78	39.05088	-76.401258	78
VNM79	38.967649	-76.455761	20
VNM80	38.925497	-76.668672	110

ID	Latitude	Longitude	Elevation
VNM81	38.925497	-76.615511	55
VNM82	38.925497	-76.561277	89
VNM83	38.925765	-76.506774	57
VNM84	38.925765	-76.454419	32
VNM85	38.883881	-76.668403	129
VNM86	38.884418	-76.616048	228
VNM87	38.883613	-76.561814	32
VNM88	38.883881	-76.507311	32
VNM89	39.008795	-76.346353	12

# Noise Exposure – Virtual Noise Monitor Locations (Landmark Locations)

## Howard County

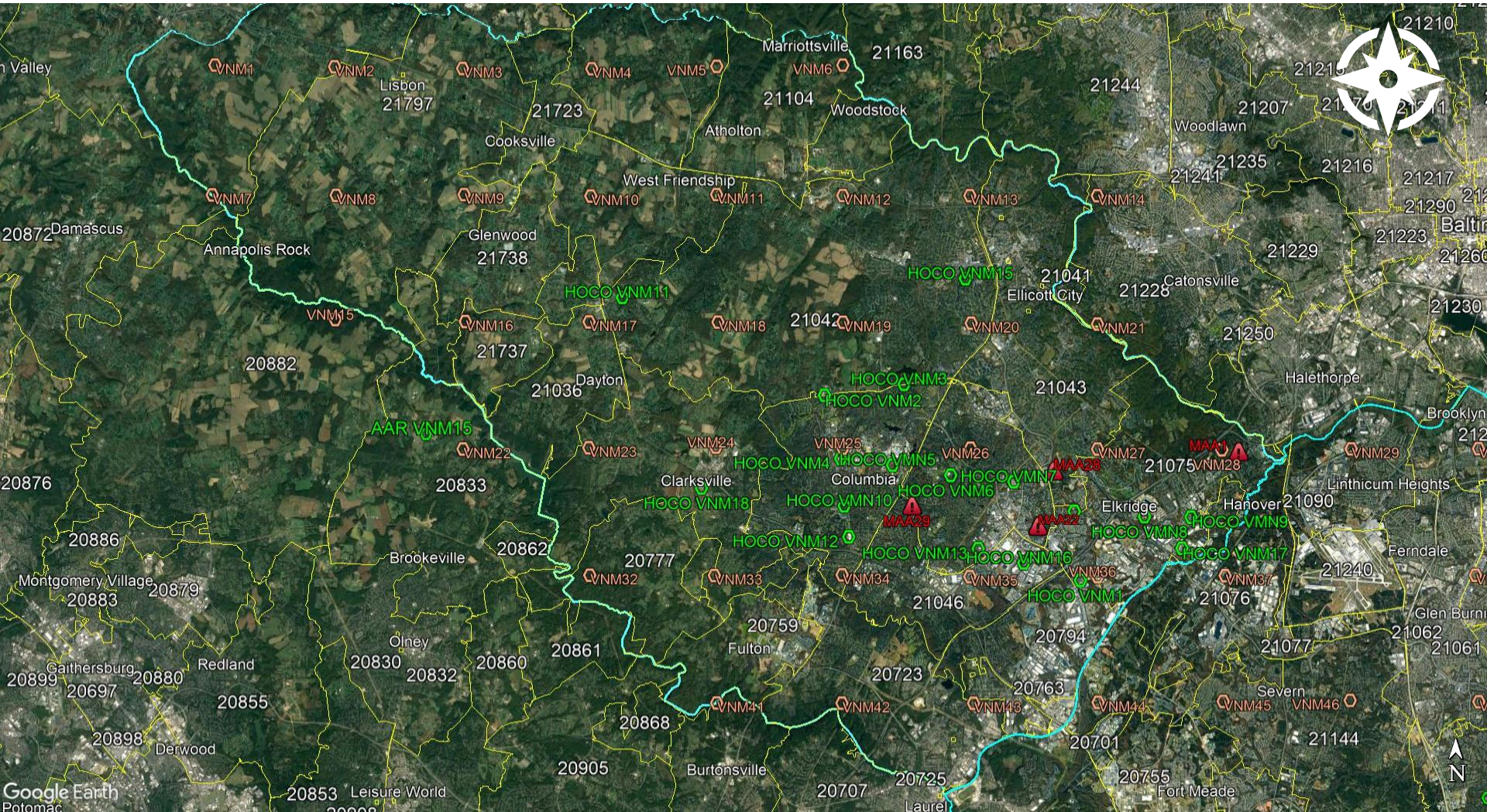
Name	Latitude	Longitude	Elevation	Location
HOCO_VNM1	39.17369	-76.78301	270	Howard Square Apartments
HOCO_VNM2	39.234427	-76.891275	458	HCPSS Administration Campus
HOCO_VNM3	39.238088	-76.857598	448	Centennial Park
HOCO_VNM4	39.213634	-76.884347	327	HoCo General Hospital
HOCO_VNM5	39.211508	-76.862455	399	Merriweather Post Pavilion
HOCO_VNM6	39.208174	-76.837858	327	Oakland Mills HS
HOCO_VNM7	39.206077	-76.81119	327	Long Reach HS
HOCO_VNM8	39.194622	-76.755931	427	Troy Park
HOCO_VNM9	39.194418	-76.736216	139	Harwood Park N'hood
HOCO_VNM10	39.198125	-76.88285	218	Abiding Savior Lutheran
HOCO_VNM11	39.266476	-76.97678	448	Tridelphia Ridge ES
HOCO_VNM12	39.187977	-76.880921	596	Atholton HS
HOCO_VNM13	39.184075	-76.82624	369	Christ Church Episcopal
HOCO_VNM14	39.196329	-76.785616	427	Mayfield Woods MS
HOCO_VNM15	39.272817	-76.831701	309	Manor Woods ES
HOCO_VNM16	39.179411	-76.806934	320	Gateway Site
HOCO_VNM17	39.184212	-76.740088	327	Oxford Square Neighborhood
HOCO_VNM18	39.203936	-76.9432	218	St. Louis Catholic

## Anne Arundel County

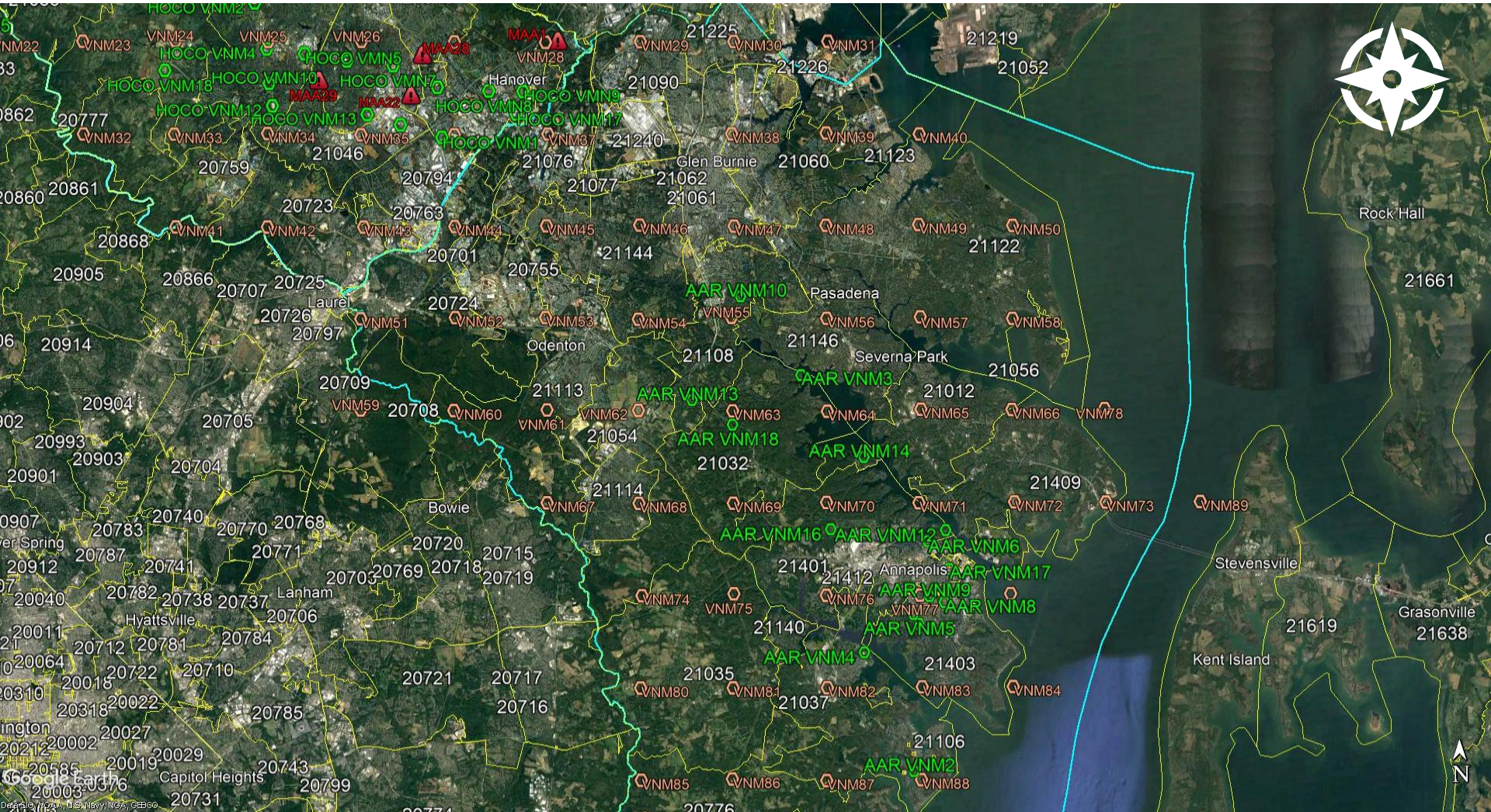
Name	Latitude	Longitude	Elevation	Location
AAR_VNM1	38.8044	-76.518	145	RAVNN
AAR_VNM2	38.8877	-76.5116	32	JETNA
AAR_VNM3	39.0663	-76.5761	123	Arden on the Severn
AAR_VNM4	38.9413	-76.5399	36	London Public House
AAR_VNM5	38.9586	-76.5116	24	Annapolis Middle School
AAR_VNM6	38.9913	-76.5033	59	West Annapolis Elementary
AAR_VNM7	39.0538	-76.0688	23	Herald Harbor
AAR_VNM8	38.9638	-76.4938	57	Eastport Terrace
AAR_VNM9	38.9666	-76.5025	20	Truxton Park
AAR_VNM10	39.1019	-76.6108	121	Shipleys Choice Elementary
AAR_VNM11	38.9541	-76.5086	24	Robinwood
AAR_VNM12	38.9963	-76.493	20	Wardour Bluffs
AAR_VNM13	39.0552	-76.6388	118	Millersville Elementary School
AAR_VNM14	39.0294	-76.5399	123	Sherwood Forest
ARR_VNM15	39.2213	-77.0597	500	Brookeville, Montgomery County
AAR_VNM16	38.9969	-76.5591	87	Rolling Knolls
ARR_VNM17	38.9788	-76.4911	20	Maryland State House
ARR_VNM18	39.0441	-76.6155	161	I-97 and MD 178 Crownsville



# Virtual Noise Monitor Locations – Howard County



# Virtual Noise Monitor Locations – Anne Arundel County



# Noise Event Data

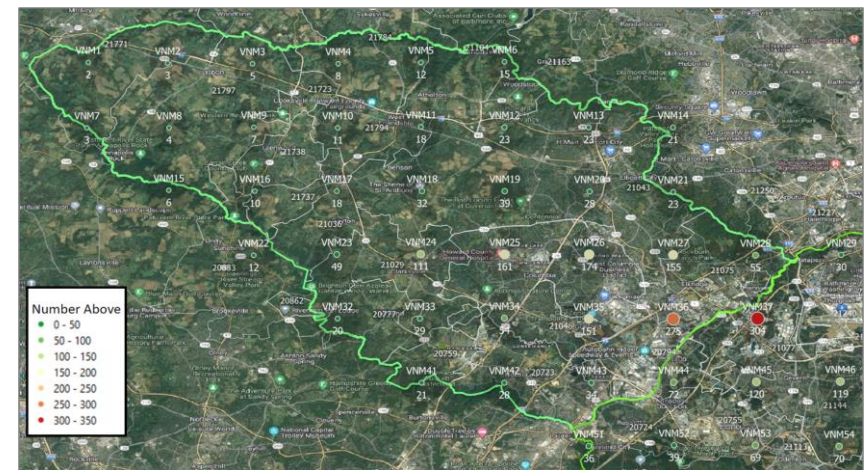
## Number-of-Events-Above

The following slides include aircraft noise exposure levels at each of the 125 locations based on the Number-of-Events-Above metric (NA), and thresholds of 55 decibels, 65 decibels, and 75 decibels. The tables include both a total count for the reporting period (month) as well as the daily average for the month.

In addition to providing the data in tabular form, it is also provided in a map-based, graphical format.

Locations closest to the airport and/or concentrated flight corridors will typically see the highest noise exposure, in this case, highest DNL levels.

Name	Number-of-Events-Above 55 dBA		Number-of-Events-Above 65 dBA		Number-of-Events-Above 75 dBA	
	Total Events	Daily Average	Total Events	Daily Average	Total Events	Daily Average
VNM1	65	2	2	0	0	0
VNM2	82	3	4	0	1	0
VNM3	144	5	6	0	1	0
VNM4	259	8	9	0	2	0
VNM5	380	12	38	1	2	0
VNM6	460	15	122	4	8	0
VNM7	78	3	2	0	0	0
VNM8	135	4	4	0	1	0
VNM9	226	7	9	0	1	0
VNM10	349	11	29	1	3	0
VNM11	547	18	111	4	7	0
VNM12	699	23	174	6	18	1
VNM13	710	23	153	5	16	1
VNM14	666	21	114	4	21	1
VNM15	171	6	6	0	0	0
VNM16	297	10	24	1	2	0
VNM17	569	18	73	2	5	0
VNM18	985	32	195	6	13	0
VNM19	1,204	39	314	10	23	1
VNM20	859	28	303	10	26	1
VNM21	706	23	186	6	14	0
VNM22	377	12	31	1	1	0
VNM23	1,510	49	173	6	7	0
VNM24	3,433	111	442	14	43	1
VNM25	4,976	161	1,279	41	79	3



# Noise Exposure: Number-of-Events-Above

(89 Monitor Points - Two-County, 2.5 mile grid)

Name	Number-of-Events-Above 55 dBA		Number-of-Events-Above 65 dBA		Number-of-Events-Above 75 dBA	
	Total Events	Daily Average	Total Events	Daily Average	Total Events	Daily Average
VNM1	61	2	13	0	4	0
VNM2	75	2	17	1	4	0
VNM3	111	4	23	1	4	0
VNM4	152	5	31	1	4	0
VNM5	175	6	42	1	4	0
VNM6	292	9	67	2	4	0
VNM7	70	2	16	1	4	0
VNM8	115	4	20	1	4	0
VNM9	134	4	27	1	4	0
VNM10	180	6	42	1	4	0
VNM11	323	10	67	2	6	0
VNM12	486	16	123	4	16	1
VNM13	542	17	128	4	14	0
VNM14	587	19	163	5	25	1
VNM15	126	4	24	1	3	0
VNM16	163	5	40	1	5	0
VNM17	455	15	64	2	6	0
VNM18	790	25	118	4	10	0
VNM19	1,128	36	226	7	29	1
VNM20	643	21	193	6	42	1
VNM21	370	12	154	5	43	1
VNM22	232	7	45	1	4	0
VNM23	3,224	104	170	5	6	0
VNM24	4,645	150	472	15	26	1
VNM25	5,782	187	2,731	88	60	2

# Noise Exposure: Number-of-Events-Above

(89 Monitor Points - Two-County, 2.5 mile grid)

Name	Number-of-Events-Above 55 dBA		Number-of-Events-Above 65 dBA		Number-of-Events-Above 75 dBA	
	Total Events	Daily Average	Total Events	Daily Average	Total Events	Daily Average
VNM26	5,825	188	1,862	60	75	2
VNM27	4,942	159	313	10	62	2
VNM28	1,269	41	259	8	68	2
VNM29	772	25	255	8	67	2
VNM30	454	15	180	6	35	1
VNM31	558	18	160	5	31	1
VNM32	394	13	73	2	8	0
VNM33	654	21	155	5	32	1
VNM34	1,617	52	444	14	76	2
VNM35	5,321	172	819	26	109	4
VNM36	9,993	322	5,088	164	192	6
VNM37	10,829	349	9,722	314	8,431	272
VNM38	1,279	41	830	27	124	4
VNM39	1,114	36	253	8	66	2
VNM40	1,456	47	316	10	50	2
VNM41	361	12	133	4	21	1
VNM42	755	24	306	10	43	1
VNM43	808	26	394	13	74	2
VNM44	2,319	75	982	32	83	3
VNM45	4,050	131	1,405	45	115	4
VNM46	3,645	118	2,064	67	1,307	42
VNM47	5,526	178	1,495	48	224	7
VNM48	1,243	40	390	13	122	4
VNM49	2,493	80	594	19	110	4
VNM50	1,099	35	247	8	51	2

# Noise Exposure: Number-of-Events-Above

(89 Monitor Points - Two-County, 2.5 mile grid)

Name	Number-of-Events-Above 55 dBA		Number-of-Events-Above 65 dBA		Number-of-Events-Above 75 dBA	
	Total Events	Daily Average	Total Events	Daily Average	Total Events	Daily Average
VNM51	1,232	40	309	10	40	1
VNM52	604	19	203	7	45	1
VNM53	2,086	67	1,147	37	63	2
VNM54	2,111	68	268	9	99	3
VNM55	5,247	169	740	24	79	3
VNM56	2,880	93	947	31	133	4
VNM57	1,799	58	595	19	134	4
VNM58	1,150	37	273	9	56	2
VNM59	394	13	136	4	9	0
VNM60	1,716	55	315	10	20	1
VNM61	597	19	191	6	39	1
VNM62	1,593	51	328	11	71	2
VNM63	970	31	226	7	107	3
VNM64	4,431	143	1,032	33	132	4
VNM65	1,748	56	419	14	101	3
VNM66	847	27	217	7	46	1
VNM67	1,012	33	148	5	23	1
VNM68	1,648	53	210	7	41	1
VNM69	1,341	43	188	6	68	2
VNM70	2,182	70	512	17	83	3
VNM71	1,641	53	249	8	61	2
VNM72	838	27	159	5	24	1
VNM73	309	10	91	3	6	0
VNM74	837	27	114	4	16	1
VNM75	1,421	46	163	5	30	1

# Noise Exposure: Number-of-Events-Above

(89 Monitor Points - Two-County, 2.5 mile grid)

Name	Number-of-Events-Above 55 dBA		Number-of-Events-Above 65 dBA		Number-of-Events-Above 75 dBA	
	Total Events	Daily Average	Total Events	Daily Average	Total Events	Daily Average
VNM76	1,949	63	192	6	27	1
VNM77	851	27	137	4	17	1
VNM78	546	18	115	4	8	0
VNM79	525	17	95	3	9	0
VNM80	314	10	71	2	6	0
VNM81	532	17	79	3	5	0
VNM82	354	11	79	3	5	0
VNM83	218	7	71	2	4	0
VNM84	201	6	61	2	4	0
VNM85	187	6	51	2	3	0
VNM86	183	6	53	2	3	0
VNM87	187	6	53	2	4	0
VNM88	184	6	52	2	4	0
VNM89	219	7	61	2	5	0

# Noise Exposure: Number-of-Events-Above (Anne Arundel County Landmark VNM's)

Name	Number-of-Events-Above 55 dBA		Number-of-Events-Above 65 dBA		Number-of-Events-Above 75 dBA	
	Total Events	Daily Average	Total Events	Daily Average	Total Events	Daily Average
AAR_VNM1	110	4	22	1	4	0
AAR_VNM2	187	6	52	2	4	0
AAR_VNM3	5,325	172	3,656	118	248	8
AAR_VNM4	1,306	42	113	4	9	0
AAR_VNM5	764	25	115	4	13	0
AAR_VNM6	1,412	46	221	7	40	1
AAR_VNM7	68	2	12	0	0	0
AAR_VNM8	713	23	119	4	11	0
AAR_VNM9	833	27	135	4	17	1
AAR_VNM10	6,964	225	5,602	181	356	11
AAR_VNM11	599	19	104	3	11	0
AAR_VNM12	1,382	45	196	6	36	1
AAR_VNM13	1,378	44	204	7	108	3
AAR_VNM14	2,162	70	512	17	105	3
ARR_VNM15	162	5	42	1	3	0
AAR_VNM16	2,185	70	389	13	58	2
ARR_VNM17	1,130	36	167	5	23	1
ARR_VNM18	1,275	41	214	7	111	4

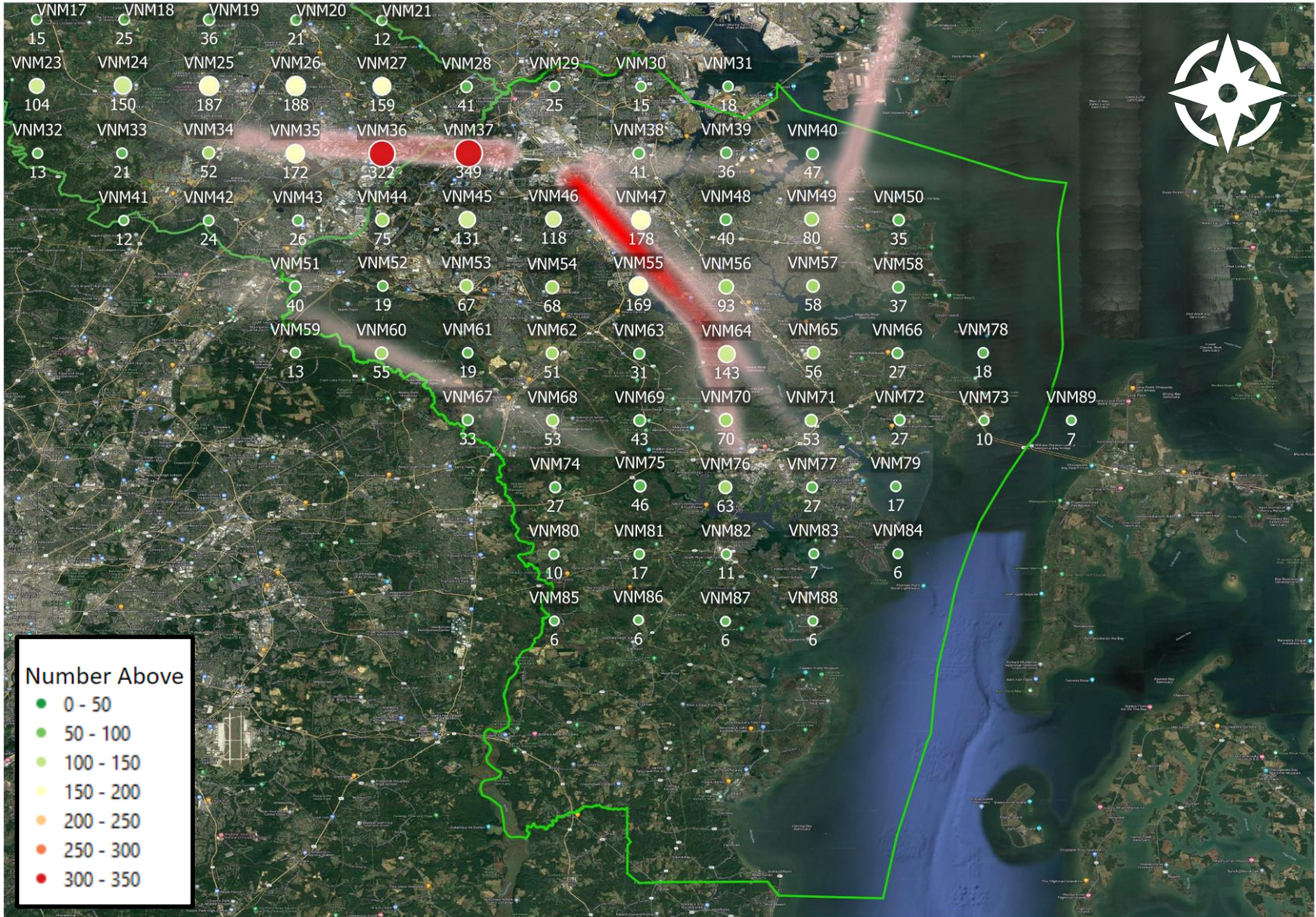


# Noise Exposure: Number-of-Events-Above (Howard County Landmark VNMs)

Name	Number-of-Events-Above 55 dBA		Number-of-Events-Above 65 dBA		Number-of-Events-Above 75 dBA	
	Total Events	Daily Average	Total Events	Daily Average	Total Events	Daily Average
HOCO_VNM1	9,450	305	1,855	60	119	4
HOCO_VNM2	5,075	164	416	13	49	2
HOCO_VNM3	4,622	149	305	10	59	2
HOCO_VNM4	5,795	187	2,603	84	59	2
HOCO_VNM5	5,966	192	3,230	104	75	2
HOCO_VNM6	6,106	197	3,531	114	117	4
HOCO_VNM7	6,109	197	3,911	126	113	4
HOCO_VNM8	7,706	249	5,068	163	857	28
HOCO_VNM9	7,880	254	4,057	131	192	6
HOCO_VNM10	5,877	190	596	19	75	2
HOCO_VNM11	499	16	65	2	4	0
HOCO_VNM12	5,107	165	849	27	116	4
HOCO_VNM13	7,084	229	2,029	65	221	7
HOCO_VNM14	6,238	201	4,619	149	858	28
HOCO_VNM15	572	18	161	5	33	1
HOCO_VNM16	7,331	236	2,560	83	290	9
HOCO_VNM17	10,793	348	7,672	247	3,831	124
HOCO_VNM18	4,060	131	268	9	25	1

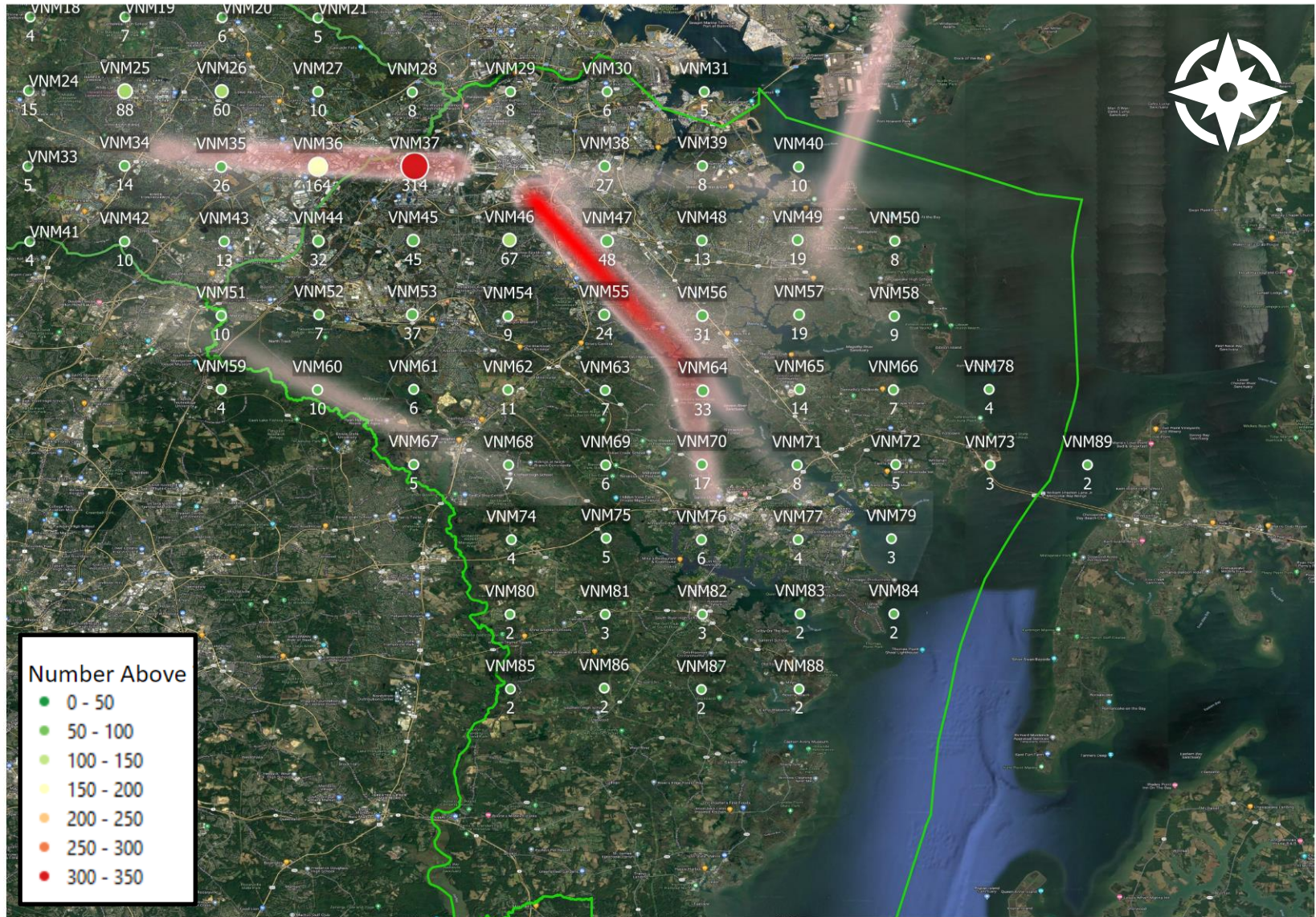
# Noise Exposure: Number-of-Events-Above 55 dBA (Daily Average)

## Anne Arundel County - Arrivals



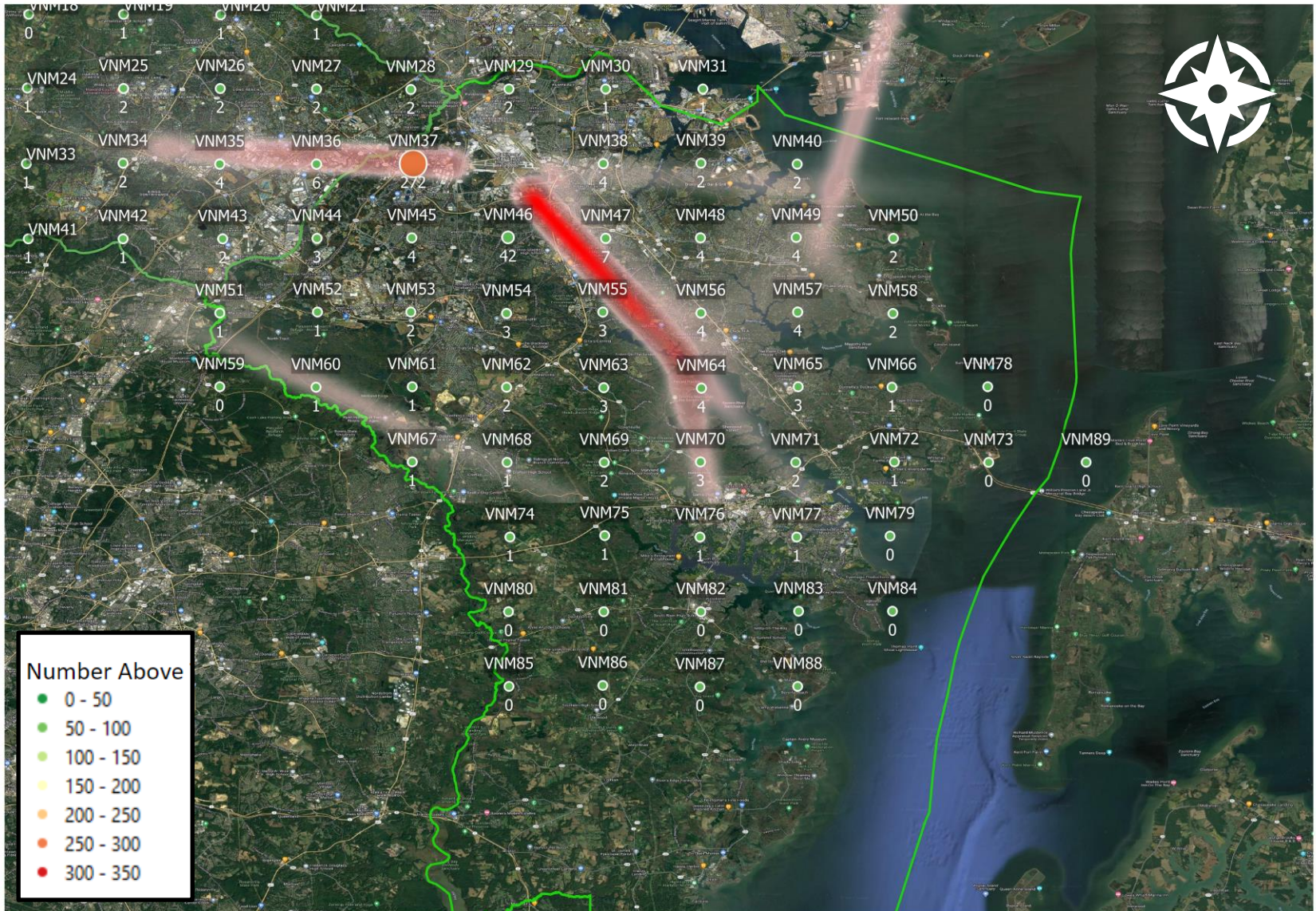
# Noise Exposure: Number-of-Events-Above 65 dBA (Daily Average)

## Anne Arundel County - Arrivals



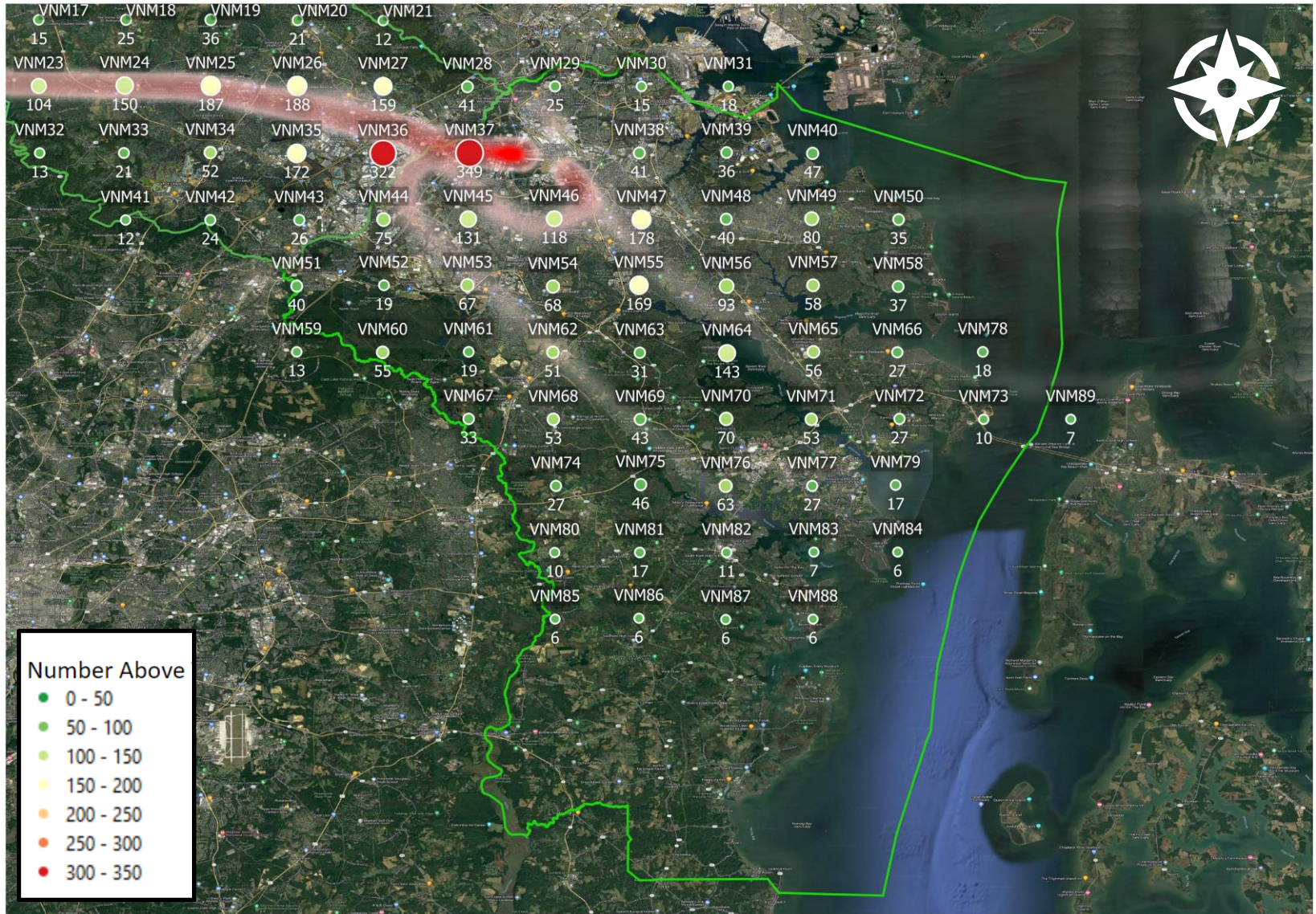
# Noise Exposure: Number-of-Events-Above 75 dBA (Daily Average)

## Anne Arundel County - Arrivals



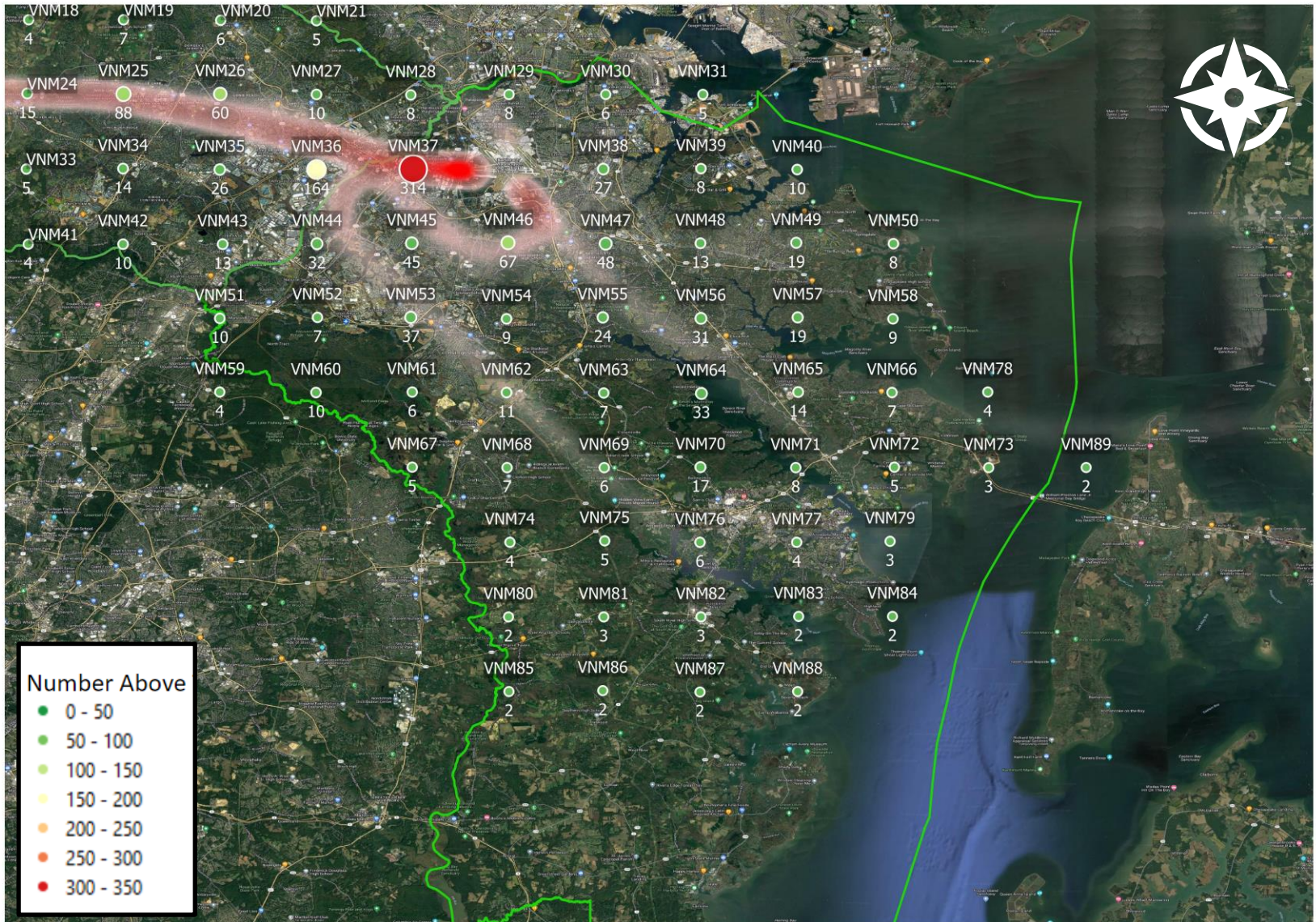
# Noise Exposure: Number-of-Events-Above 55 dBA (Daily Average)

## Anne Arundel County - Departures



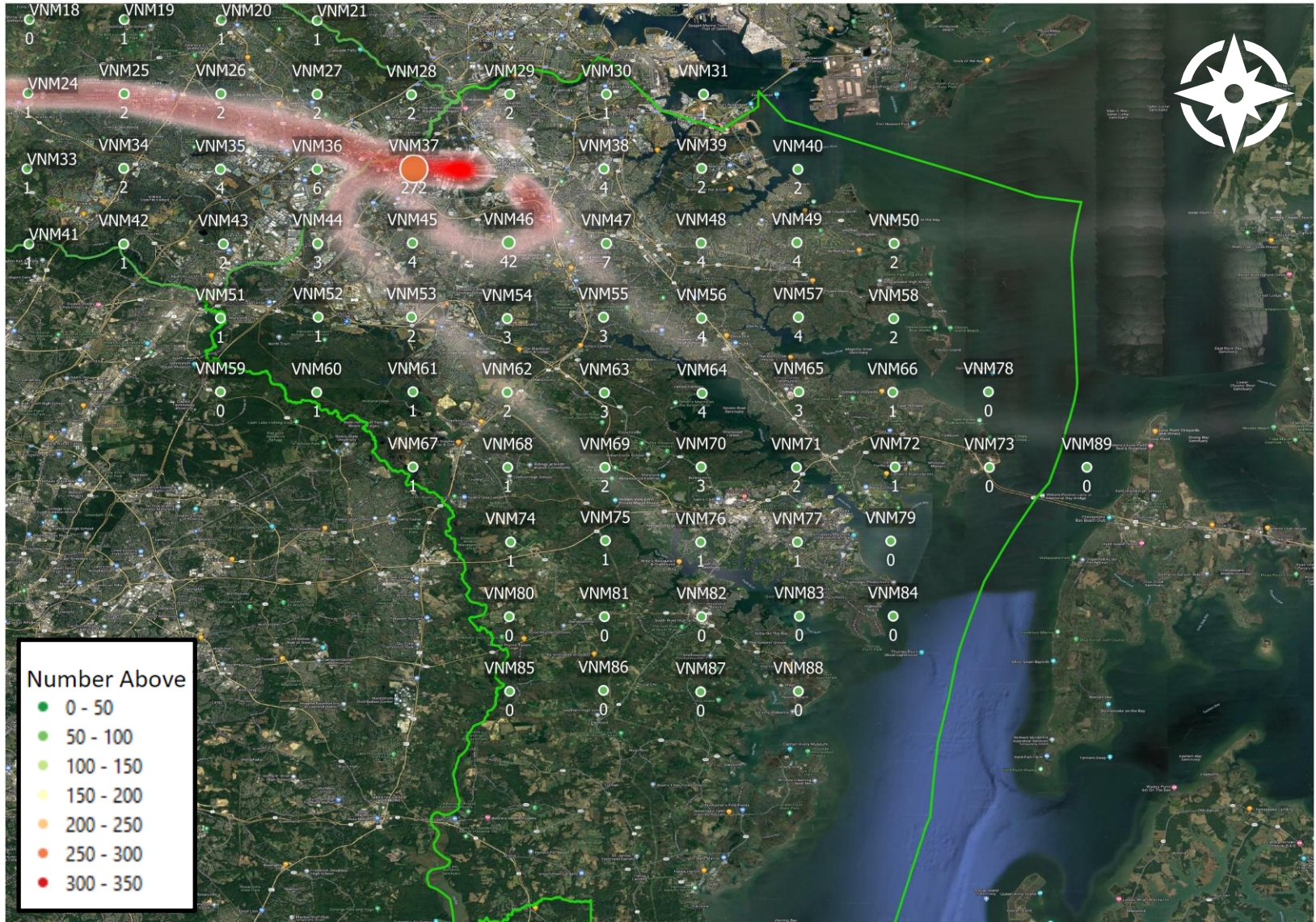
# Noise Exposure: Number-of-Events-Above 65 dBA (Daily Average)

## Anne Arundel County - Departures



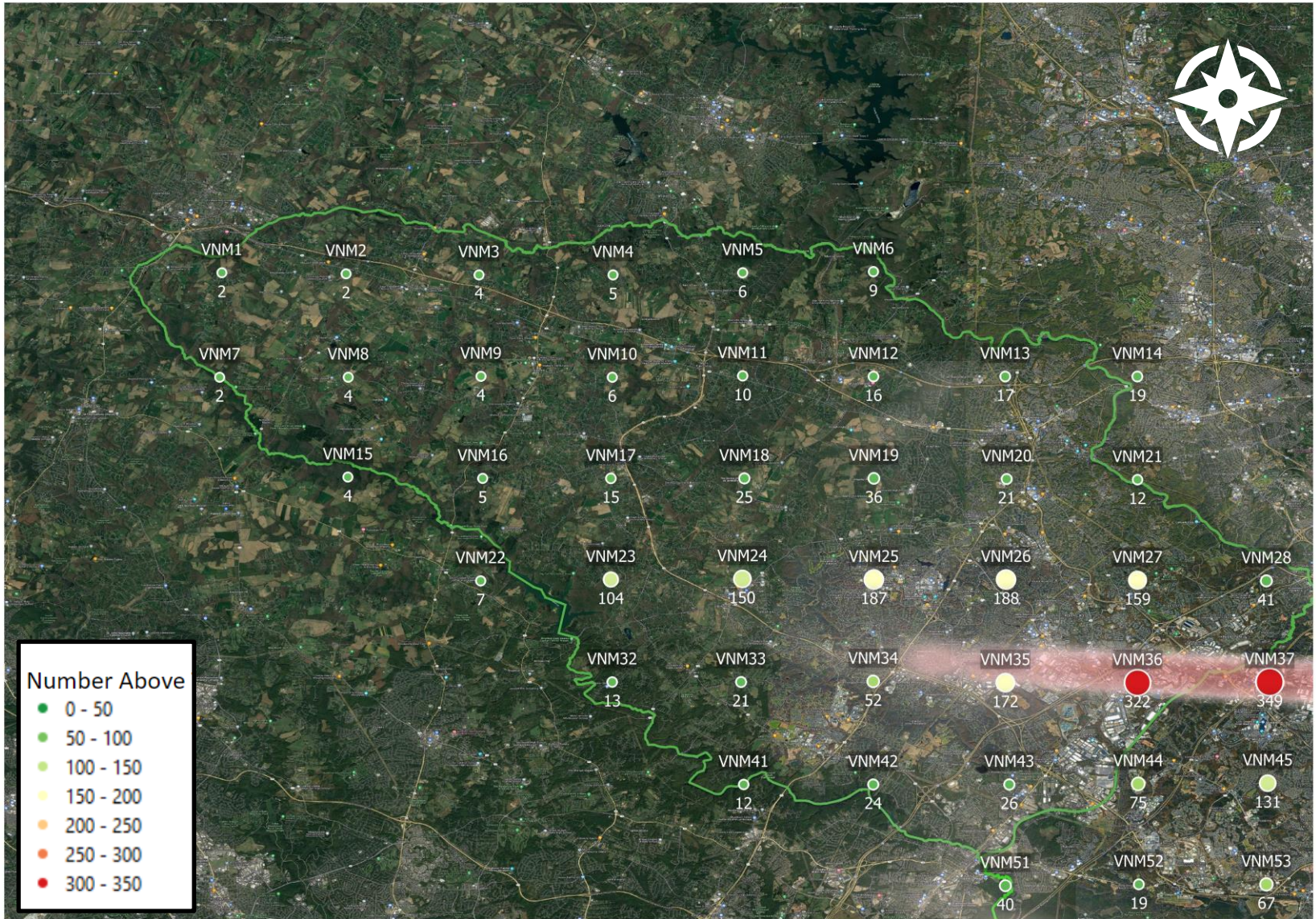
# Noise Exposure: Number-of-Events-Above 75 dBA (Daily Average)

## Anne Arundel County - Departures



# Noise Exposure: Number-of-Events-Above 55 dBA (Daily Average)

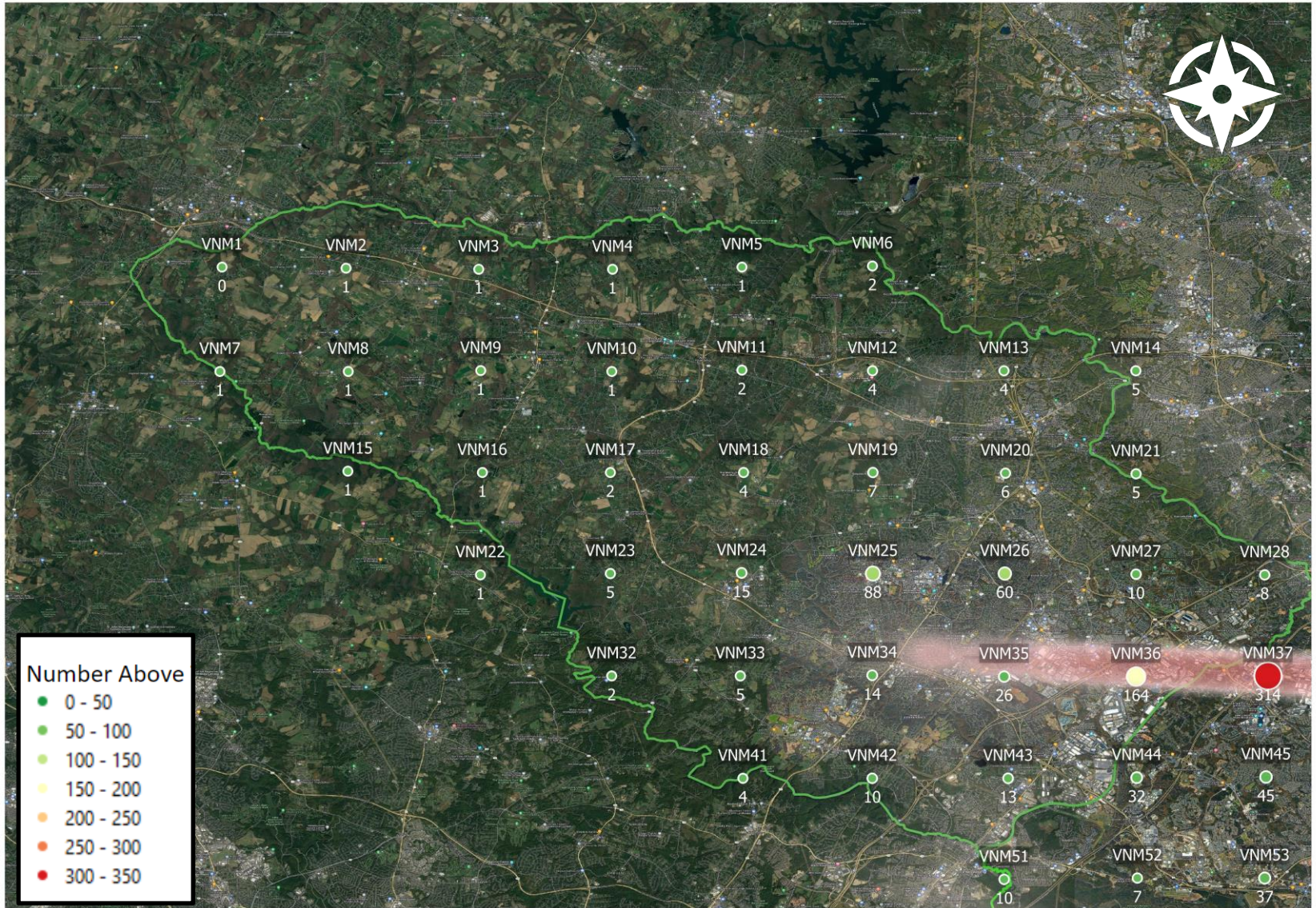
## Howard County – Arrivals





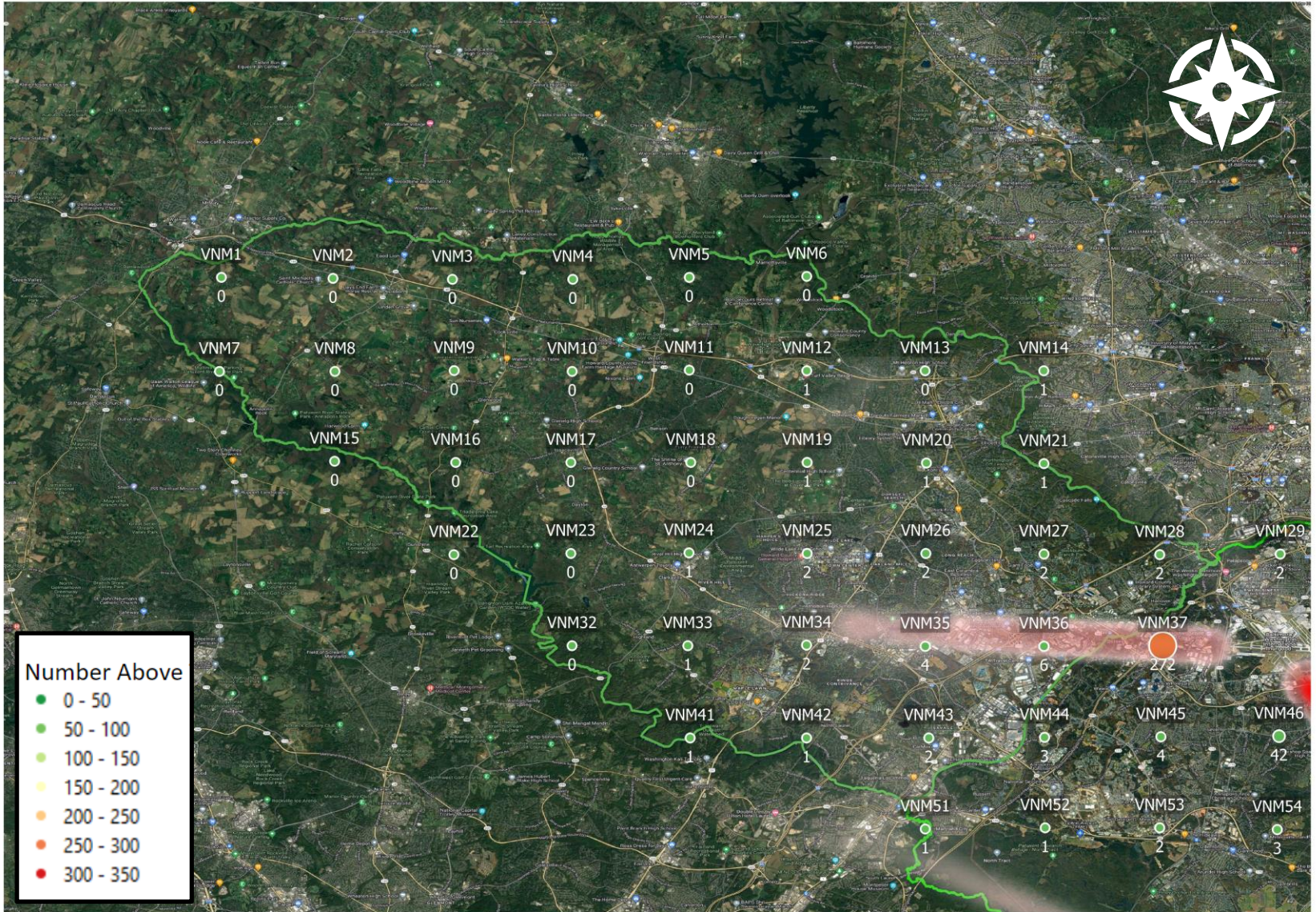
# Noise Exposure: Number-of-Events-Above 65 dBA (Daily Average)

## Howard County – Arrivals



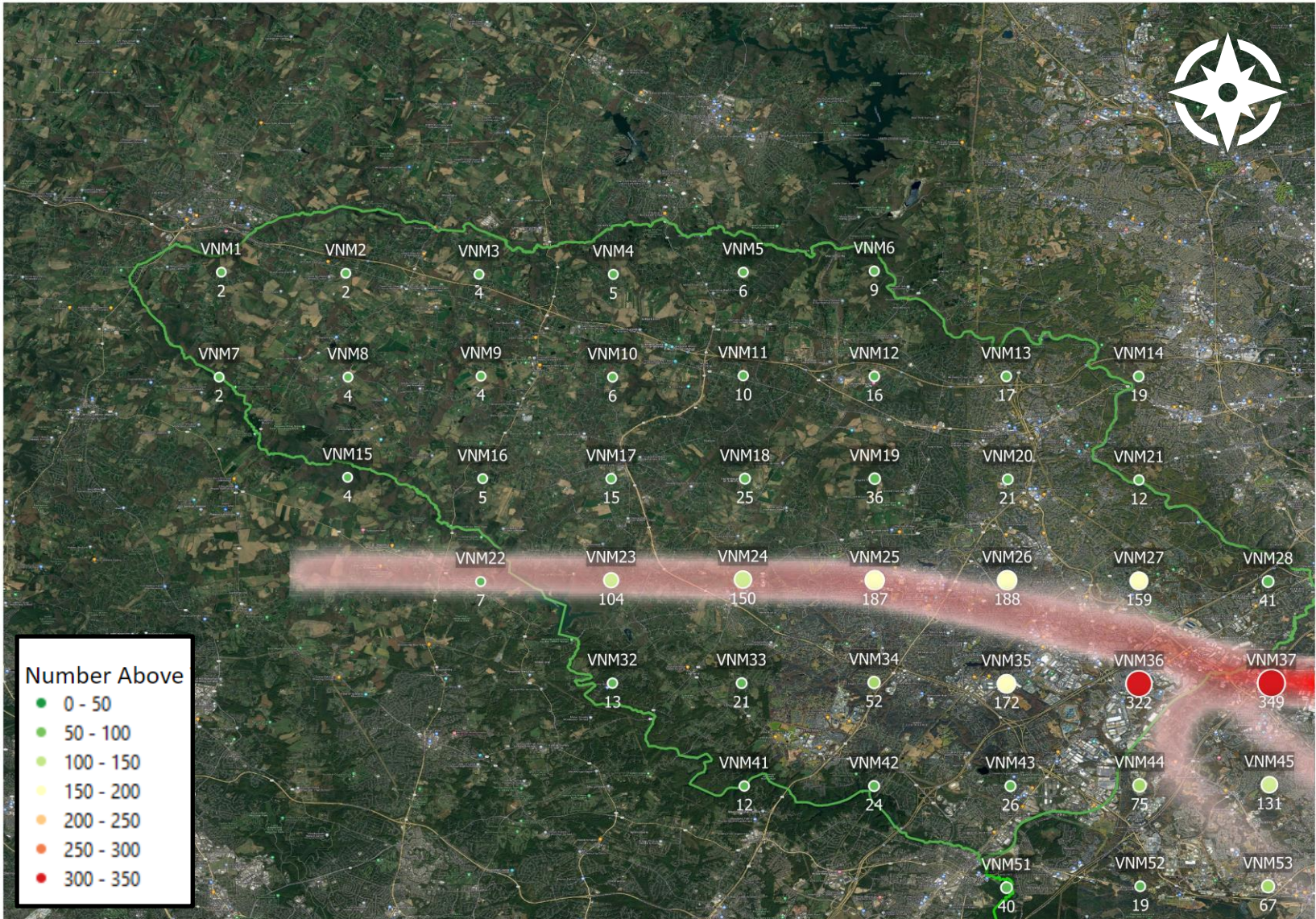
# Noise Exposure: Number-of-Events-Above 75 dBA (Daily Average)

## Howard County – Arrivals



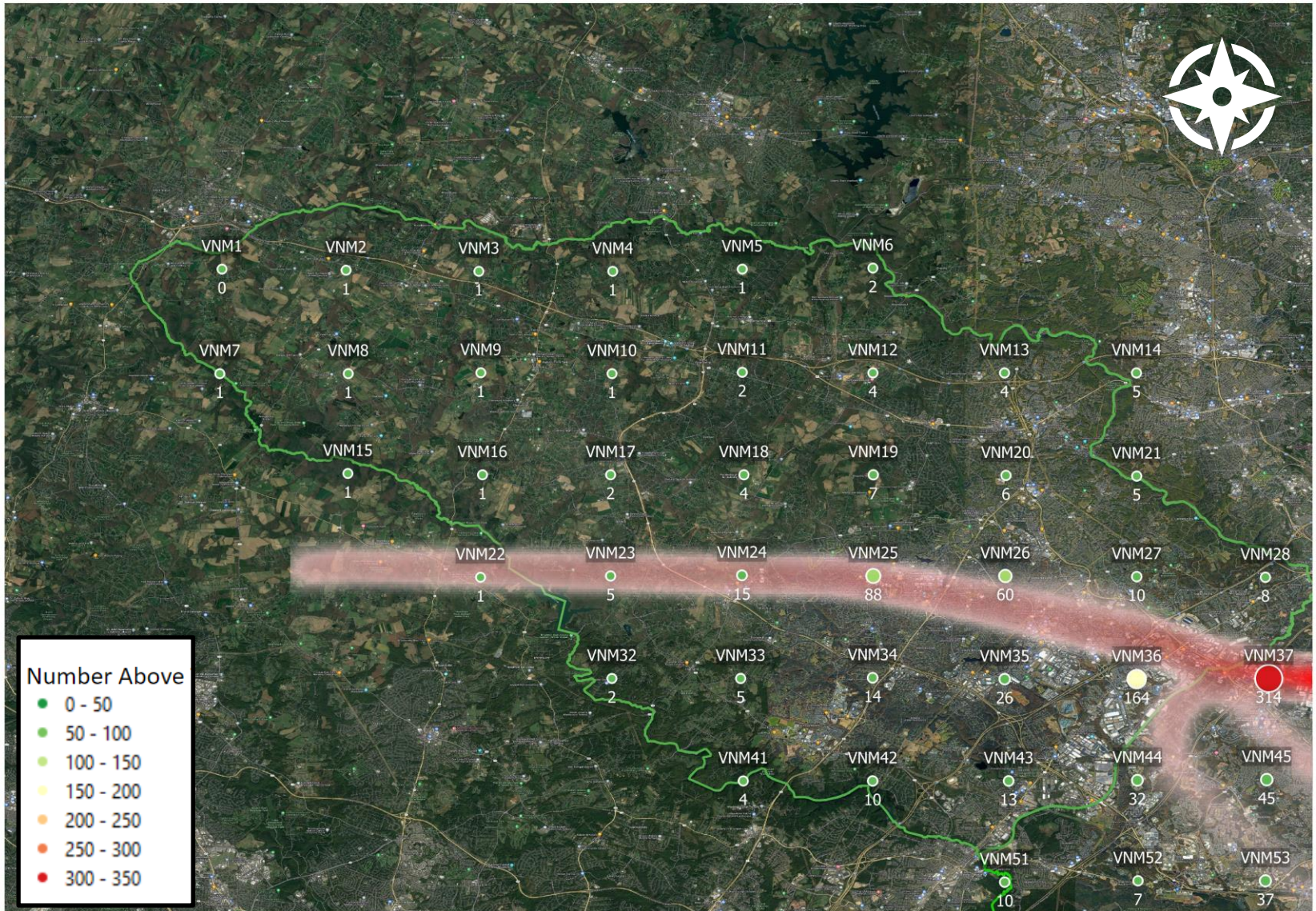
# Noise Exposure: Number-of-Events-Above 55 dBA (Daily Average)

## Howard County – Departures



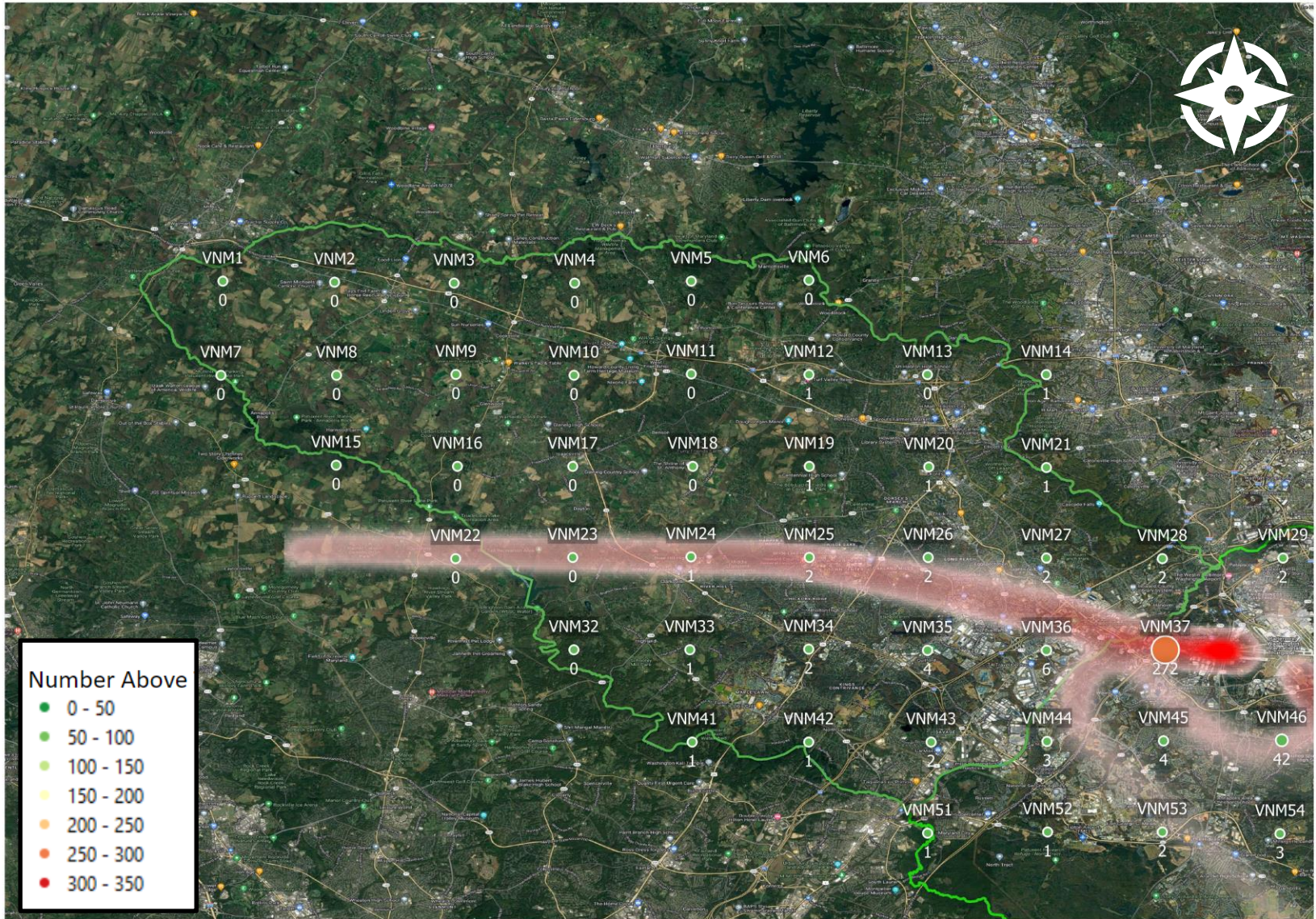
# Noise Exposure: Number-of-Events-Above 65 dBA (Daily Average)

## Howard County – Departures



# Noise Exposure: Number-of-Events-Above 75 dBA (Daily Average)

## Howard County – Departures



# Noise Event Data

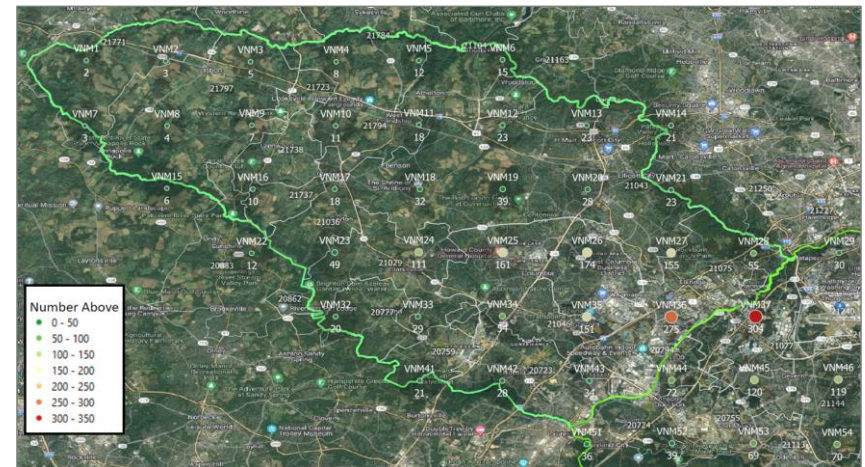
## DNL

The following slides include aircraft noise exposure levels at each of the 125 locations based on the Day-Night Level (DNL) metric. The average daily DNL level for each location is included in the tables.

In addition to providing this data in tabular form, it is also provided in a map-based format. The maps include DNL values at the “Landmark” locations identified by the Roundtable and DNL contour maps which represent the noise exposure for the counties.

Locations closest to the airport and/or concentrated flight corridors will typically see the highest noise exposure, in this case, highest DNL levels while the contour maps provide DNL levels for the county.

Name	Number-of-Events-Above 55 dBA		Number-of-Events-Above 65 dBA		Number-of-Events-Above 75 dBA	
	Total Events	Daily Average	Total Events	Daily Average	Total Events	Daily Average
VNM1	65	2	2	0	0	0
VNM2	82	3	4	0	1	0
VNM3	144	5	6	0	1	0
VNM4	259	8	9	0	2	0
VNM5	380	12	38	1	2	0
VNM6	460	15	122	4	8	0
VNM7	78	3	2	0	0	0
VNM8	135	4	4	0	1	0
VNM9	226	7	9	0	1	0
VNM10	349	11	29	1	3	0
VNM11	547	18	111	4	7	0
VNM12	699	23	174	6	18	1
VNM13	710	23	153	5	16	1
VNM14	666	21	114	4	21	1
VNM15	171	6	6	0	0	0
VNM16	297	10	24	1	2	0
VNM17	569	18	73	2	5	0
VNM18	985	32	195	6	13	0
VNM19	1,204	39	314	10	23	1
VNM20	859	28	303	10	26	1
VNM21	706	23	186	6	14	0
VNM22	377	12	31	1	1	0
VNM23	1,510	49	173	6	7	0
VNM24	3,433	111	442	14	43	1
VNM25	4,976	161	1,279	41	79	3



# Noise Exposure: DNL (Daily Average)

(89 Monitor Points - Two-County, 2.5 mile grid)

Name	DNL
VNM1	26.9
VNM2	29.0
VNM3	30.3
VNM4	31.0
VNM5	33.5
VNM6	39.8
VNM7	26.1
VNM8	28.3
VNM9	30.7
VNM10	34.2
VNM11	40.8
VNM12	44.7
VNM13	44.1
VNM14	46.2
VNM15	29.2
VNM16	36.7
VNM17	41.8
VNM18	47.1
VNM19	49.0
VNM20	48.4
VNM21	46.8
VNM22	36.3
VNM23	46.4
VNM24	54.0
VNM25	57.0

Name	DNL
VNM26	57.4
VNM27	53.7
VNM28	51.8
VNM29	51.0
VNM30	43.9
VNM31	42.2
VNM32	41.2
VNM33	46.9
VNM34	52.0
VNM35	56.2
VNM36	61.2
VNM37	73.8
VNM38	54.7
VNM39	50.1
VNM40	48.9
VNM41	42.2
VNM42	47.6
VNM43	50.3
VNM44	54.8
VNM45	56.9
VNM46	64.6
VNM47	68.5
VNM48	62.8
VNM49	58.4
VNM50	48.1

Name	DNL
VNM51	50.3
VNM52	47.9
VNM53	52.3
VNM54	50.6
VNM55	54.9
VNM56	58.1
VNM57	52.1
VNM58	49.5
VNM59	45.3
VNM60	50.5
VNM61	47.0
VNM62	49.5
VNM63	49.9
VNM64	55.6
VNM65	51.5
VNM66	47.6
VNM67	45.4
VNM68	48.2
VNM69	46.6
VNM70	50.7
VNM71	49.1
VNM72	44.2
VNM73	39.2
VNM74	44.4
VNM75	46.0

Name	DNL
VNM76	47.3
VNM77	43.7
VNM78	42.1
VNM79	39.4
VNM80	37.4
VNM81	38.7
VNM82	37.9
VNM83	35.1
VNM84	32.9
VNM85	31.6
VNM86	31.5
VNM87	31.0
VNM88	29.5
VNM89	34.3

# Noise Exposure: DNL (Daily Average)

## Landmark VNMs

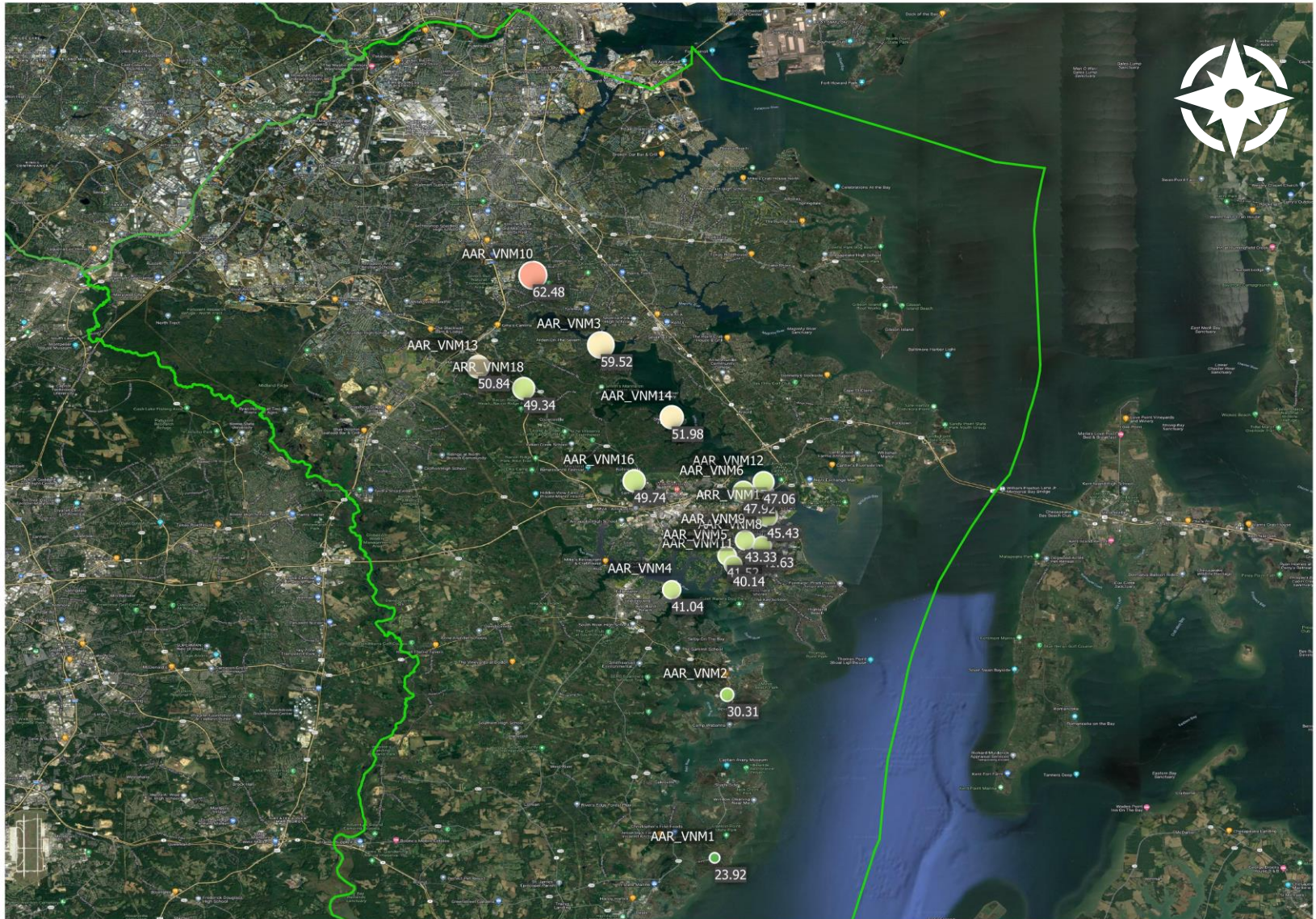
Name	DNL
HOCO_VNM1	59.6
HOCO_VNM2	53.5
HOCO_VNM3	52.7
HOCO_VNM4	56.9
HOCO_VNM5	58.1
HOCO_VNM6	58.9
HOCO_VNM7	59.5
HOCO_VNM8	62.1
HOCO_VNM9	60.6
HOCO_VNM10	55.5
HOCO_VNM11	41.0
HOCO_VNM12	55.9
HOCO_VNM13	60.1
HOCO_VNM14	62.3
HOCO_VNM15	46.6
HOCO_VNM16	61.1
HOCO_VNM17	68.8
HOCO_VNM18	51.9

Name	DNL
AAR_VNM1	23.9
AAR_VNM2	30.3
AAR_VNM3	59.5
AAR_VNM4	41.0
AAR_VNM5	41.5
AAR_VNM6	47.9
AAR_VNM7	21.7
AAR_VNM8	41.6
AAR_VNM9	43.3
AAR_VNM10	62.5
AAR_VNM11	40.1
AAR_VNM12	47.1
AAR_VNM13	50.8
AAR_VNM14	52.0
ARR_VNM15	34.7
AAR_VNM16	49.7
ARR_VNM17	45.4
ARR_VNM18	49.3



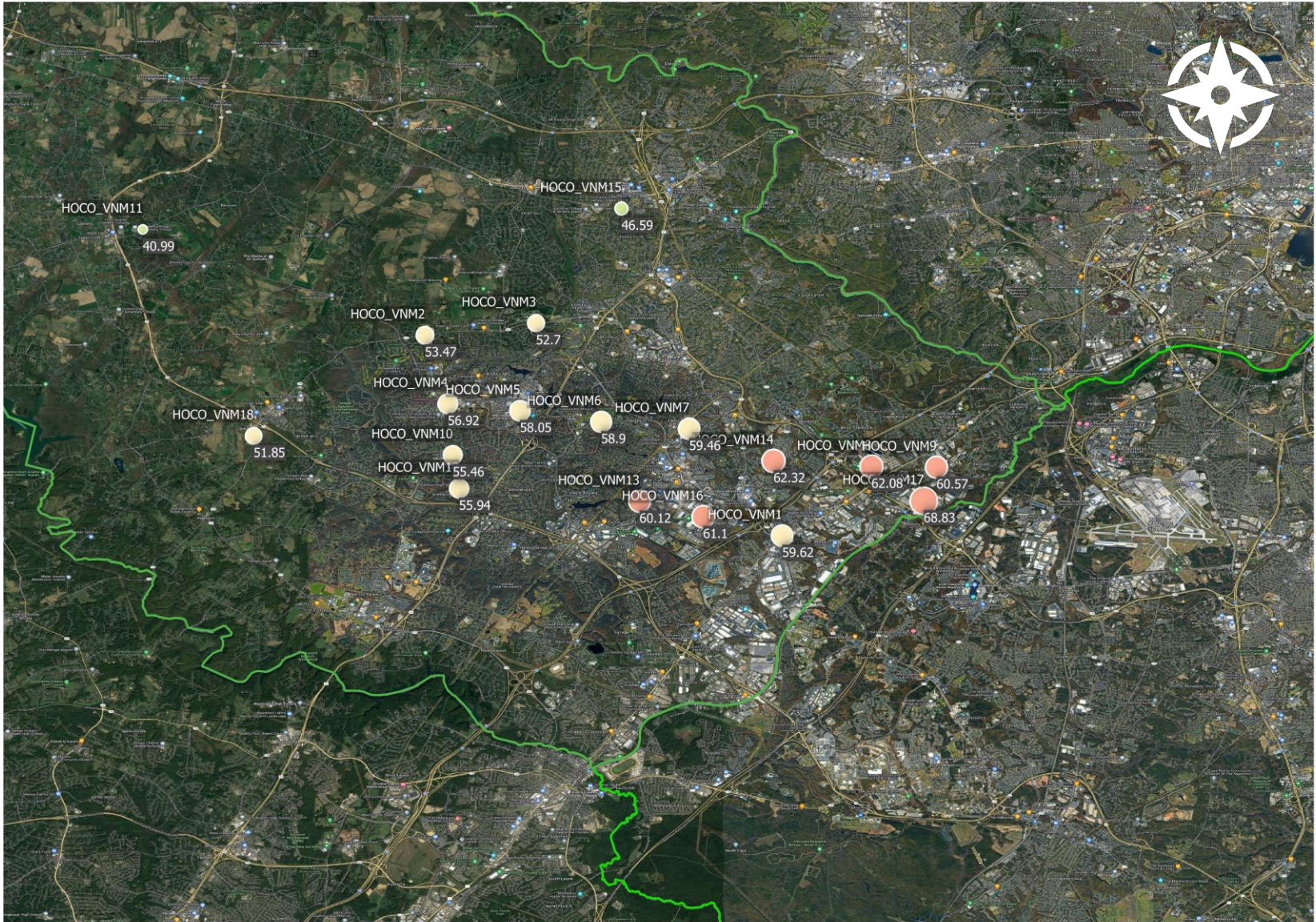
# Noise Exposure: DNL (Daily Average)

## Anne Arundel County – Landmark Locations



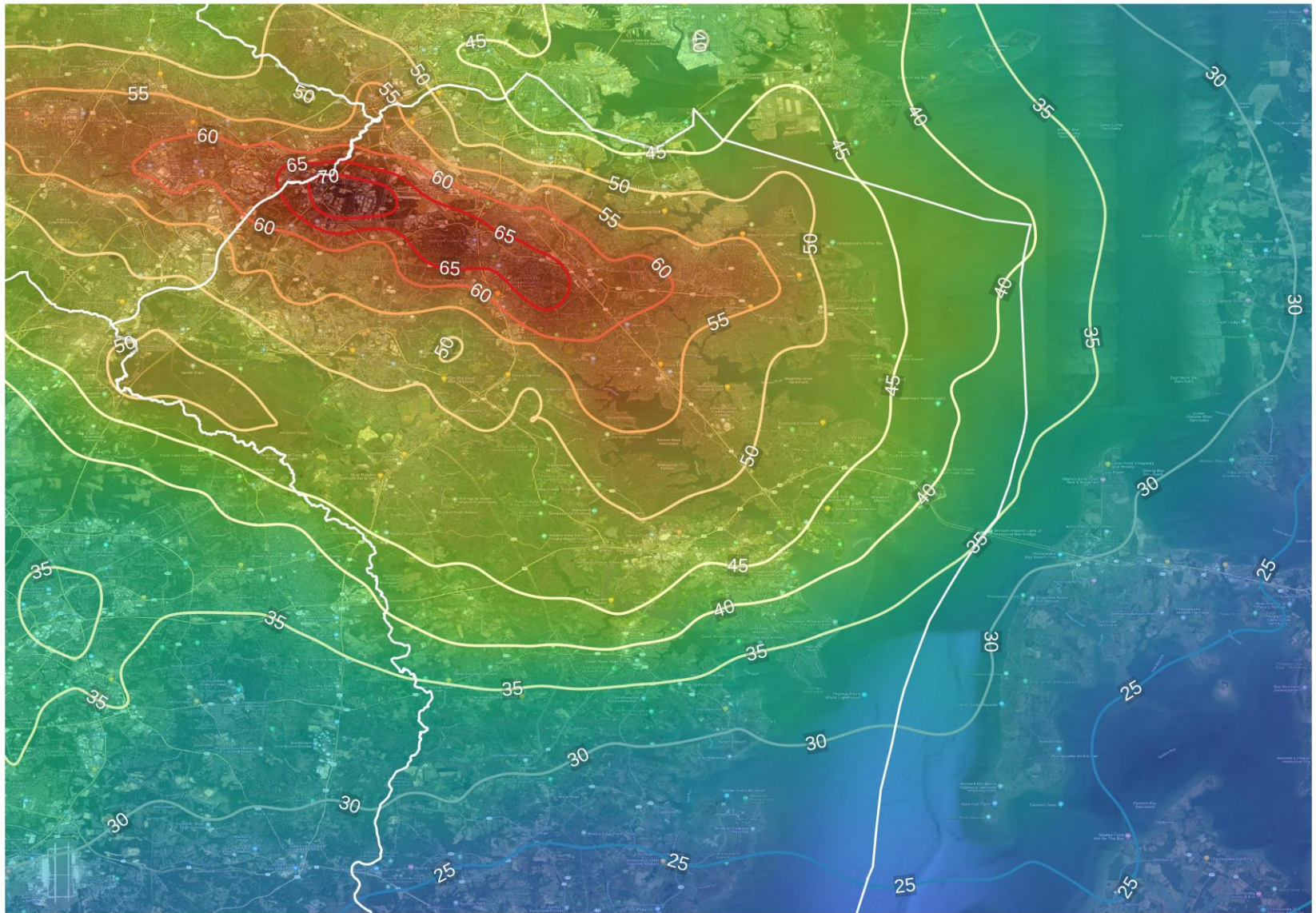
# Noise Exposure: DNL (Daily Average)

## Howard County – Landmark Locations



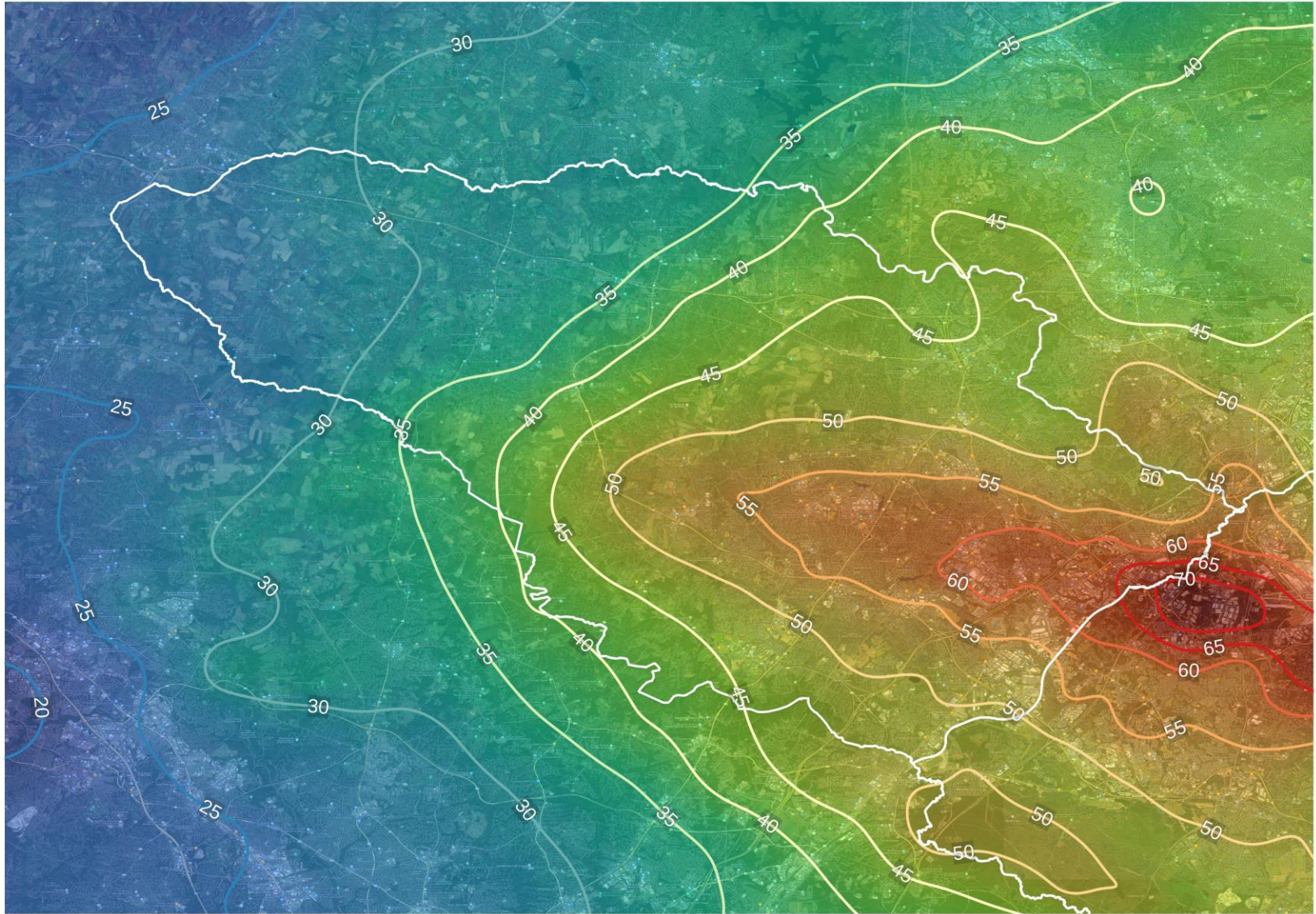
# Noise Exposure: DNL Contours (Daily Average)

*Anne Arundel County*



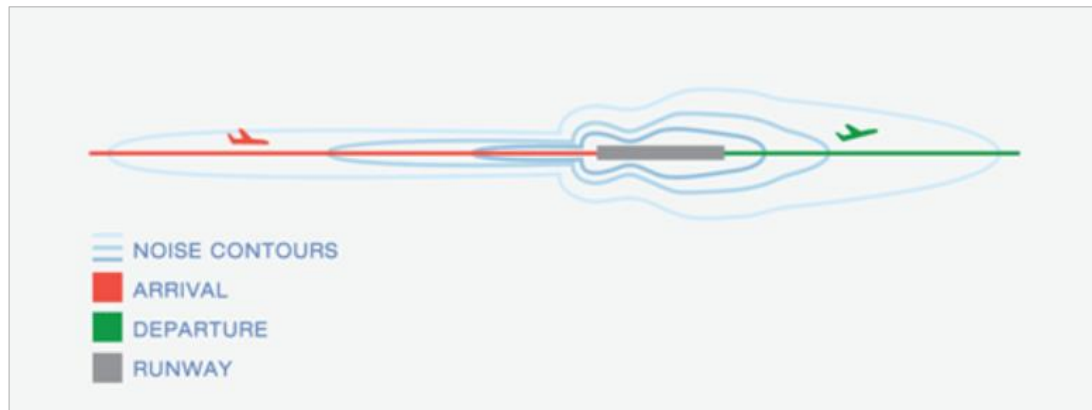
# Noise Exposure: DNL Contours (Daily Average)

Howard County



# Noise Exposure – Single Event Noise Contours

There was interest in understanding the noise exposure associated with single flights as opposed to the daily/monthly data provided in the original report. Single event contours can be produced, which illustrate the noise exposure associated with an aircraft landing or taking off. The graphic below is an example of noise exposure (shown in contours) of an aircraft arrival (red) and departure (green).

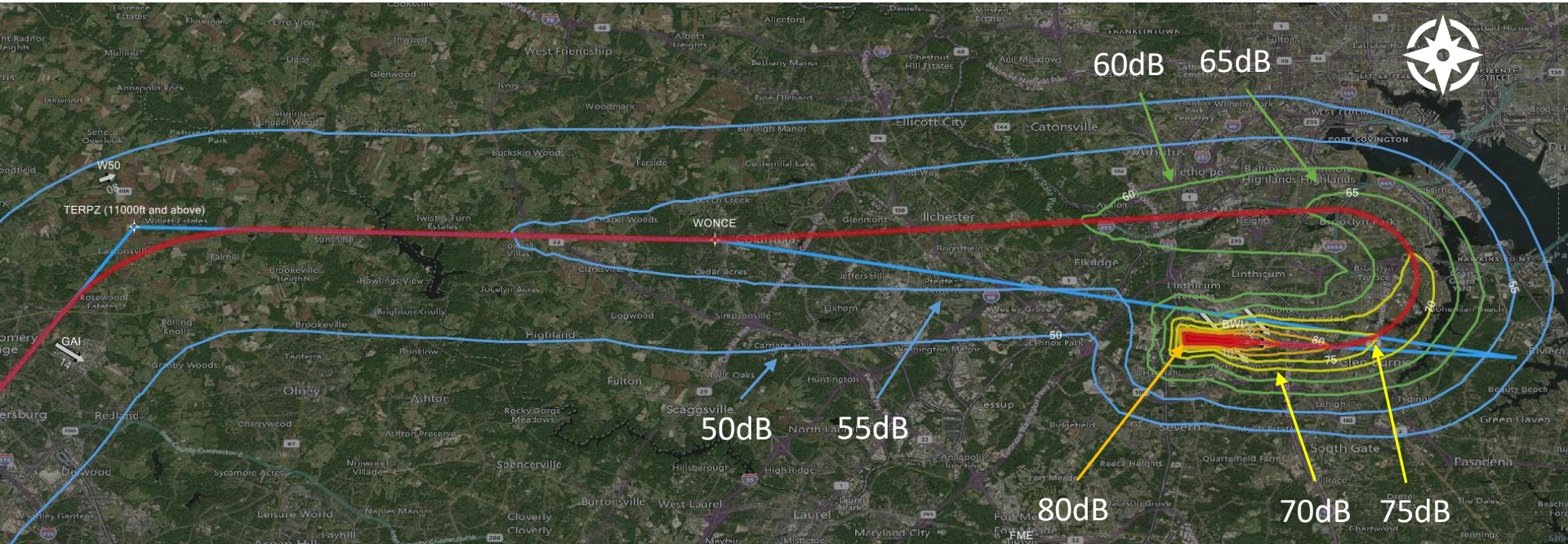


Source: Federal Aviation Administration ([https://www.faa.gov/regulations\\_policies/policy\\_guidance/noise/basics](https://www.faa.gov/regulations_policies/policy_guidance/noise/basics))

The most common aircraft (based on total operations) at BWI is the Boeing 737-700. Vianair calculated the noise exposure for a single departure from both Runway 10 and Runway 28, illustrating the typical noise exposure experienced for communities below. This is shown on the next two slides.

# Single Event Noise Contours

L<sub>max</sub> 737-700 Departure RWY 10



Aircraft Type: B737-700

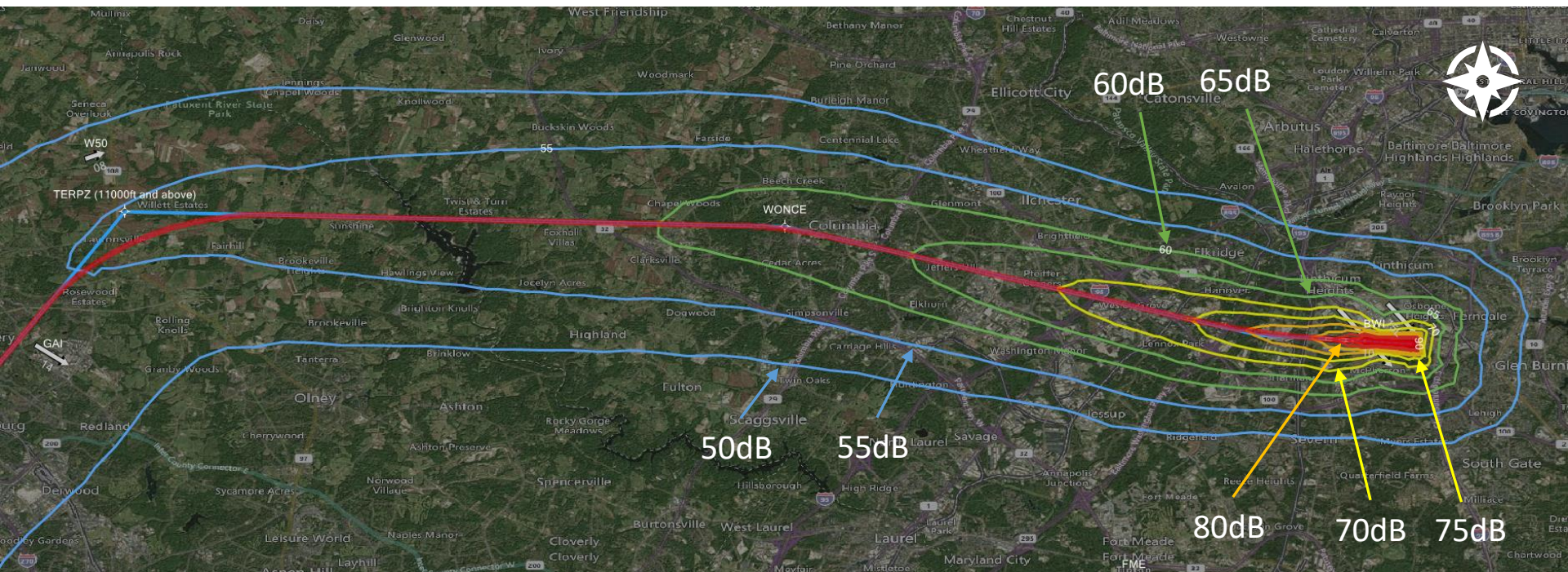
Stage Length: 3

Standard Profile

Noise contours based on A-weighted decibels (dBA)

# Single Event Noise Contours

L<sub>max</sub> 737-700 Departure RWY 28



Aircraft Type: B737-700

Stage Length: 3

Standard Profile

Noise contours based on A-weighted decibels (dBA)

For More Information...

*If you have questions about this report,  
please contact Howard County at:*

[transportation@howardcountymd.gov](mailto:transportation@howardcountymd.gov)



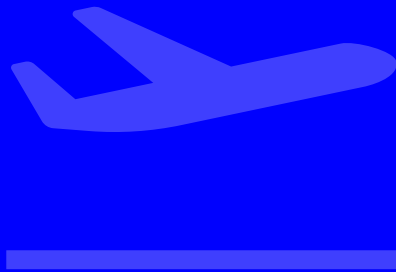
vianair

airspace design made easy

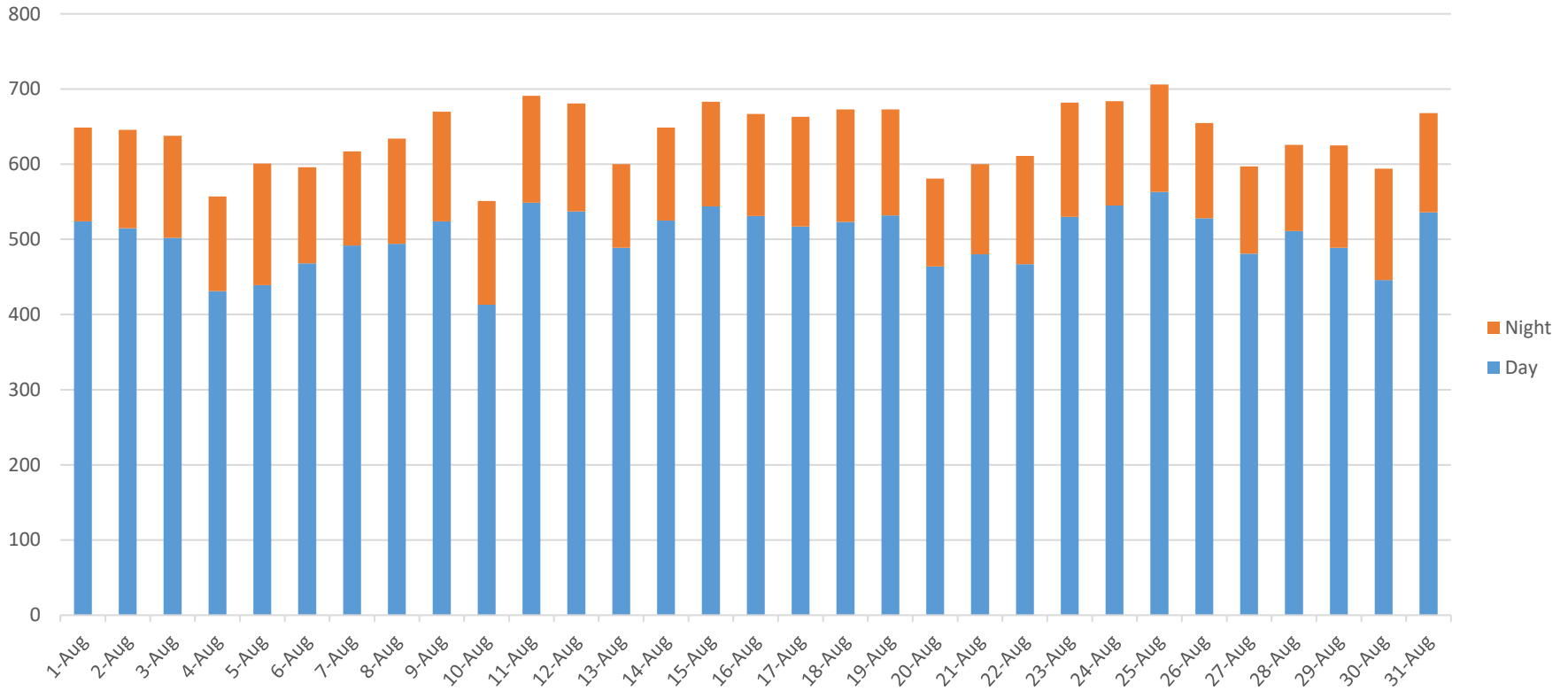
[www.vianair.com](http://www.vianair.com)



APPENDIX I:  
SUPPLEMENTAL  
OPERATIONAL STATISTICS



# Total Operations

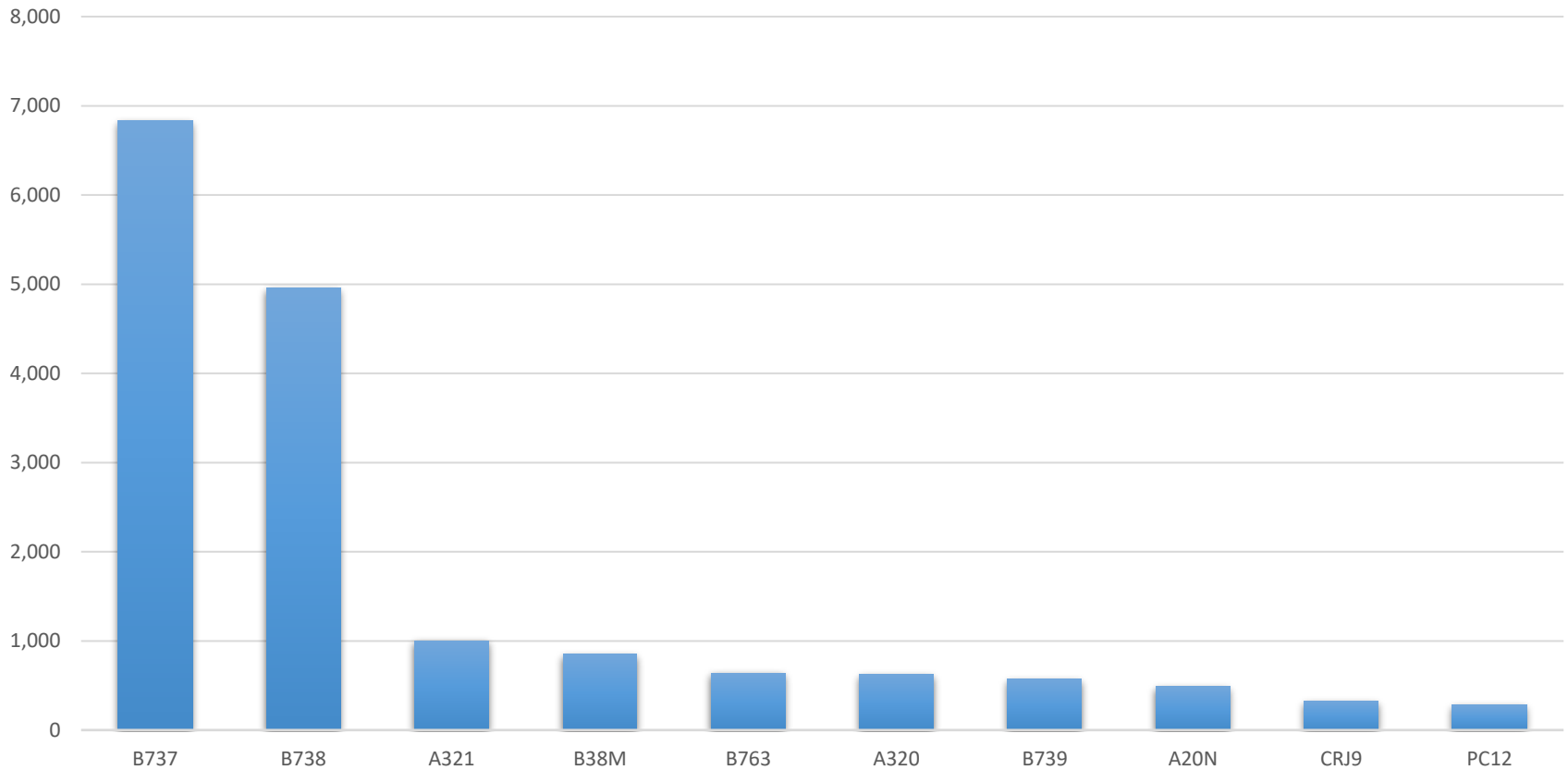


Total Monthly Operations 19,768

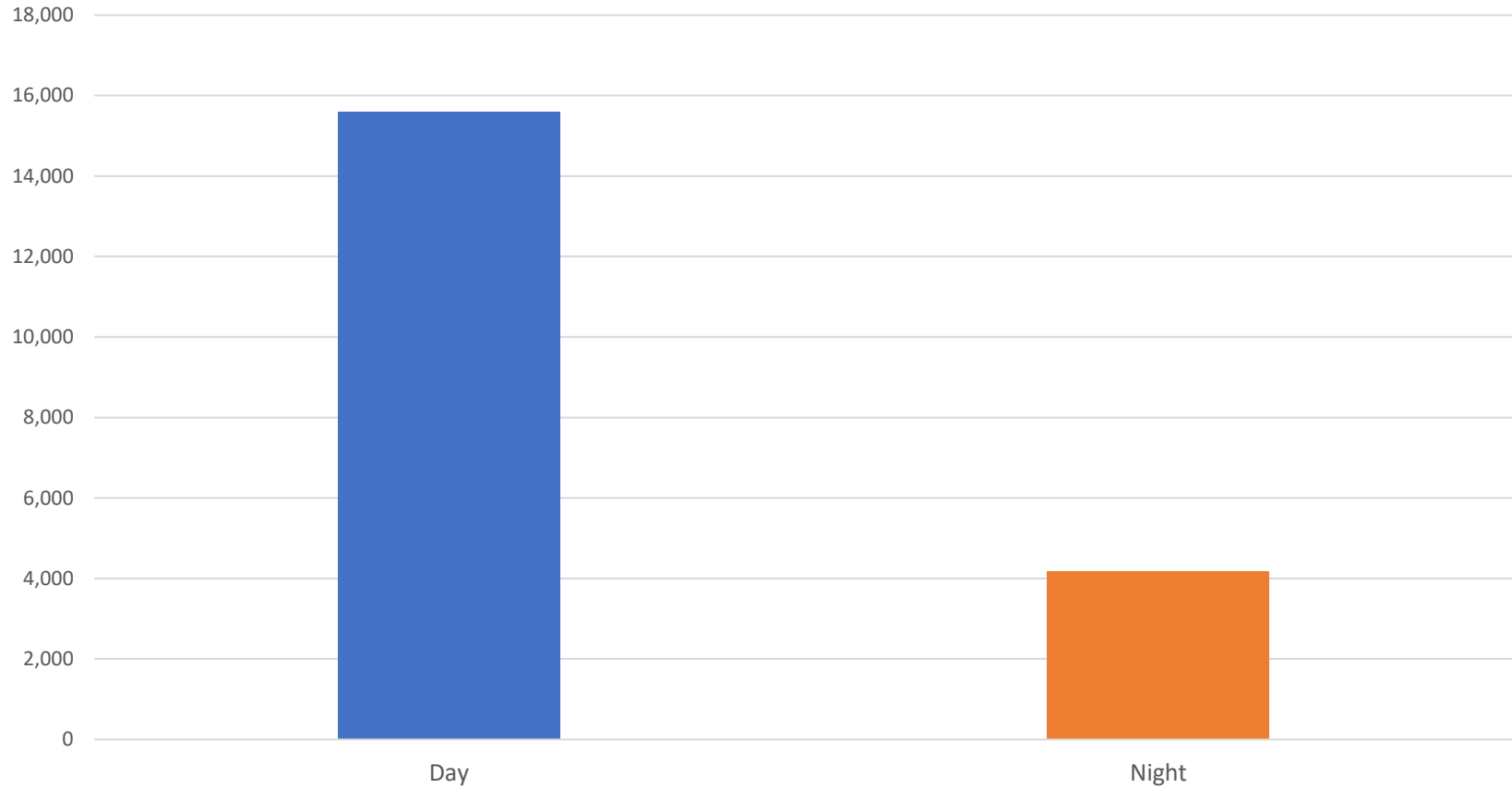
Average Daily Operations 638

# Fleet Mix: Operations by Aircraft Type (Top 10 Aircraft Types)

**Total Operations by Aircraft Type**  
*(Top 10 Aircraft)*

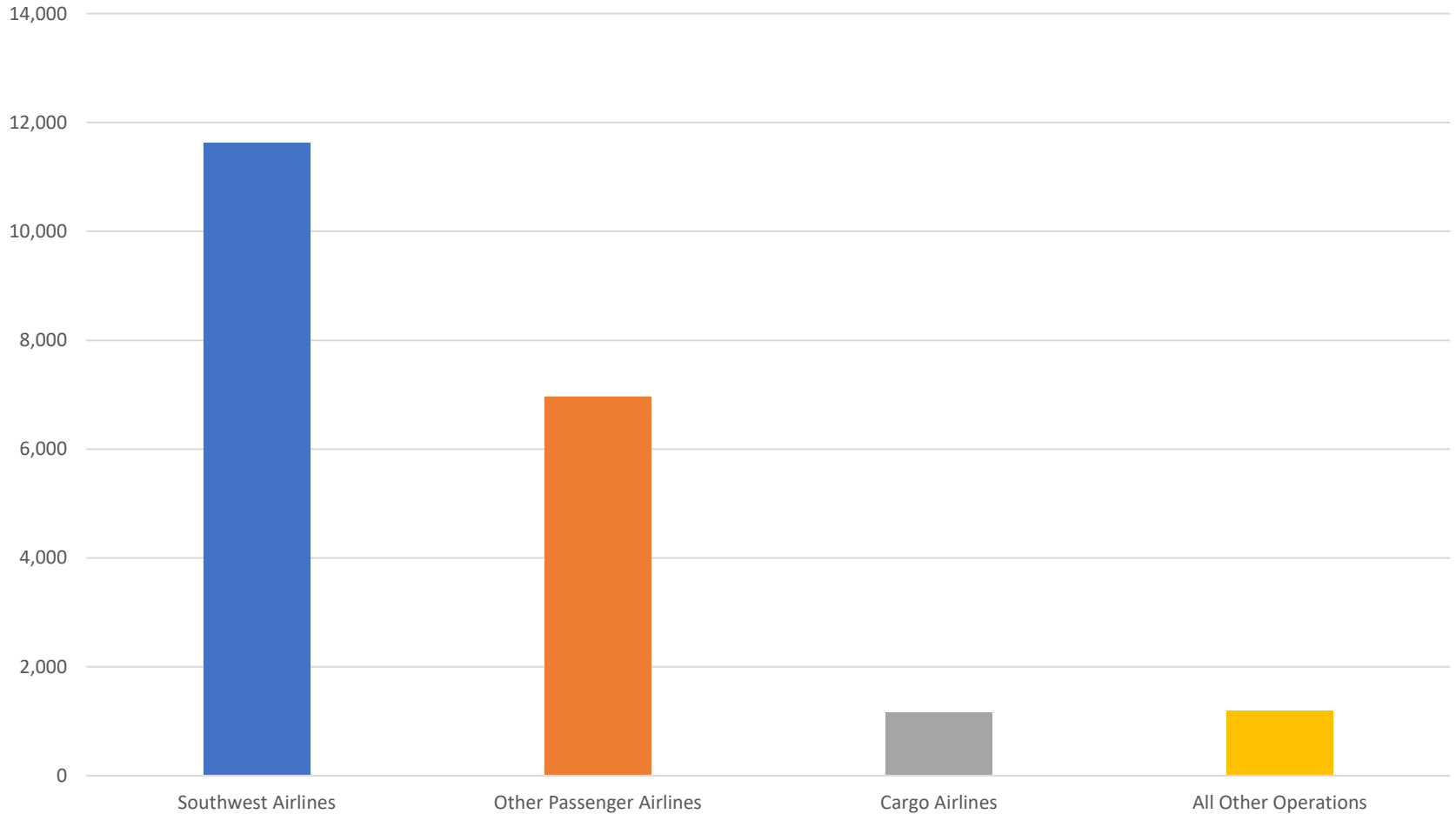


# Total Operations: Daytime vs. Nighttime

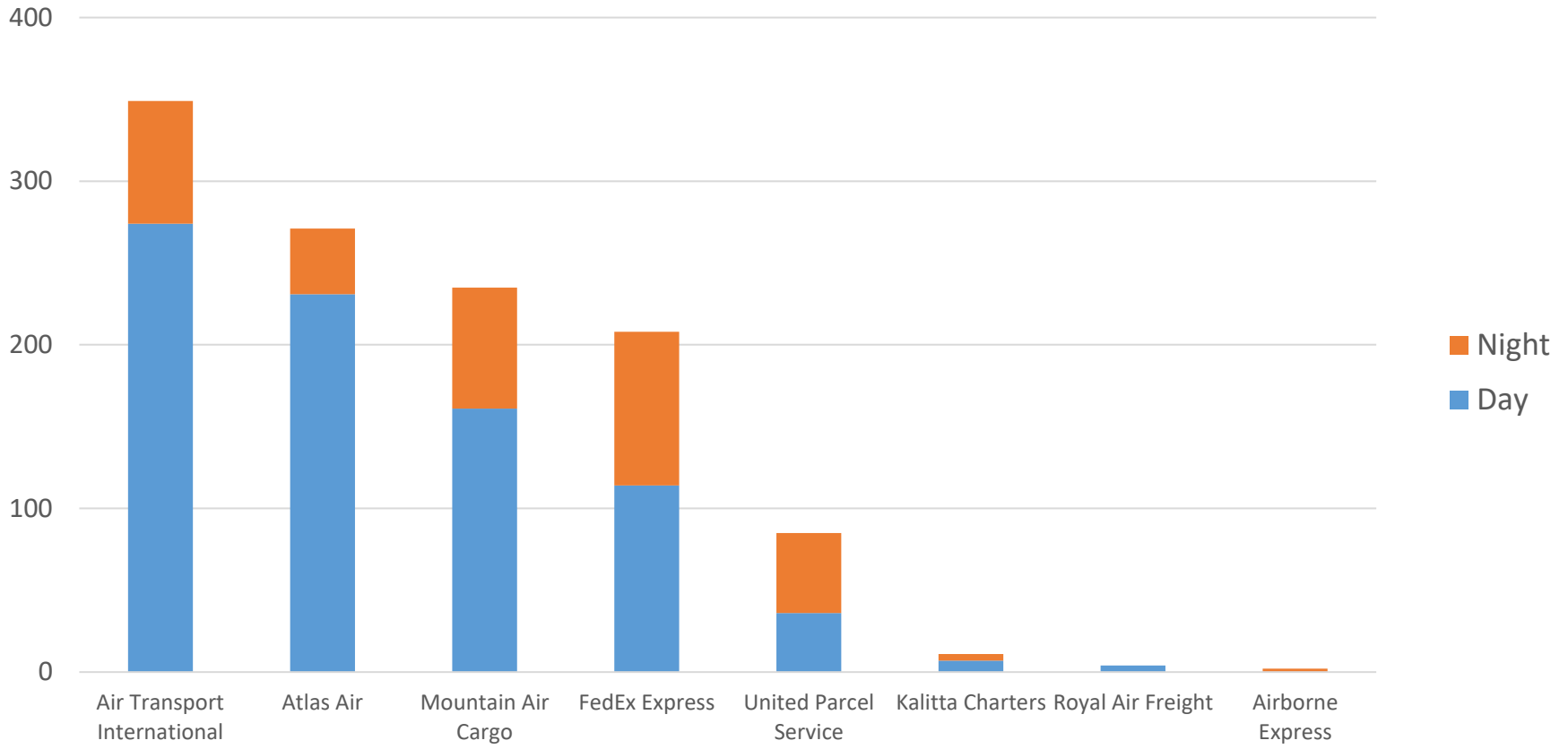


*"Nighttime Hours" are from 10PM - 7AM*

# Total Operations: Southwest Airlines vs. Other



# Cargo Operations: Daytime versus Nighttime



*Nighttime hours are from 10PM-7AM.*