

Aircraft Operations and Noise Exposure Monthly Report

July 2022



Project Overview

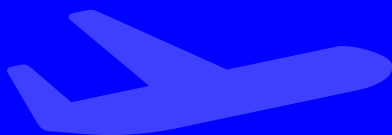
The growth in operations at BWI brings number social and economic impacts to communities surrounding the airport, however, this also results in significant noise impacts, especially for residents of Anne Arundel and Howard counties.

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



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

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.

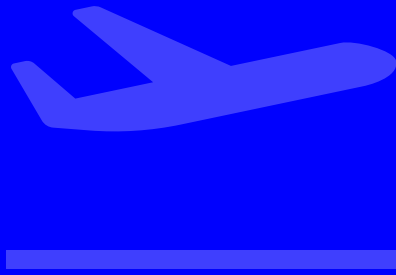
The red arrows in the graphic below depict the percentage of total arrivals for the month. The green arrows in the graphic indicate the percentage of total departures for the month.



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

AIRPORT OPERATIONS DATA

Monthly Data

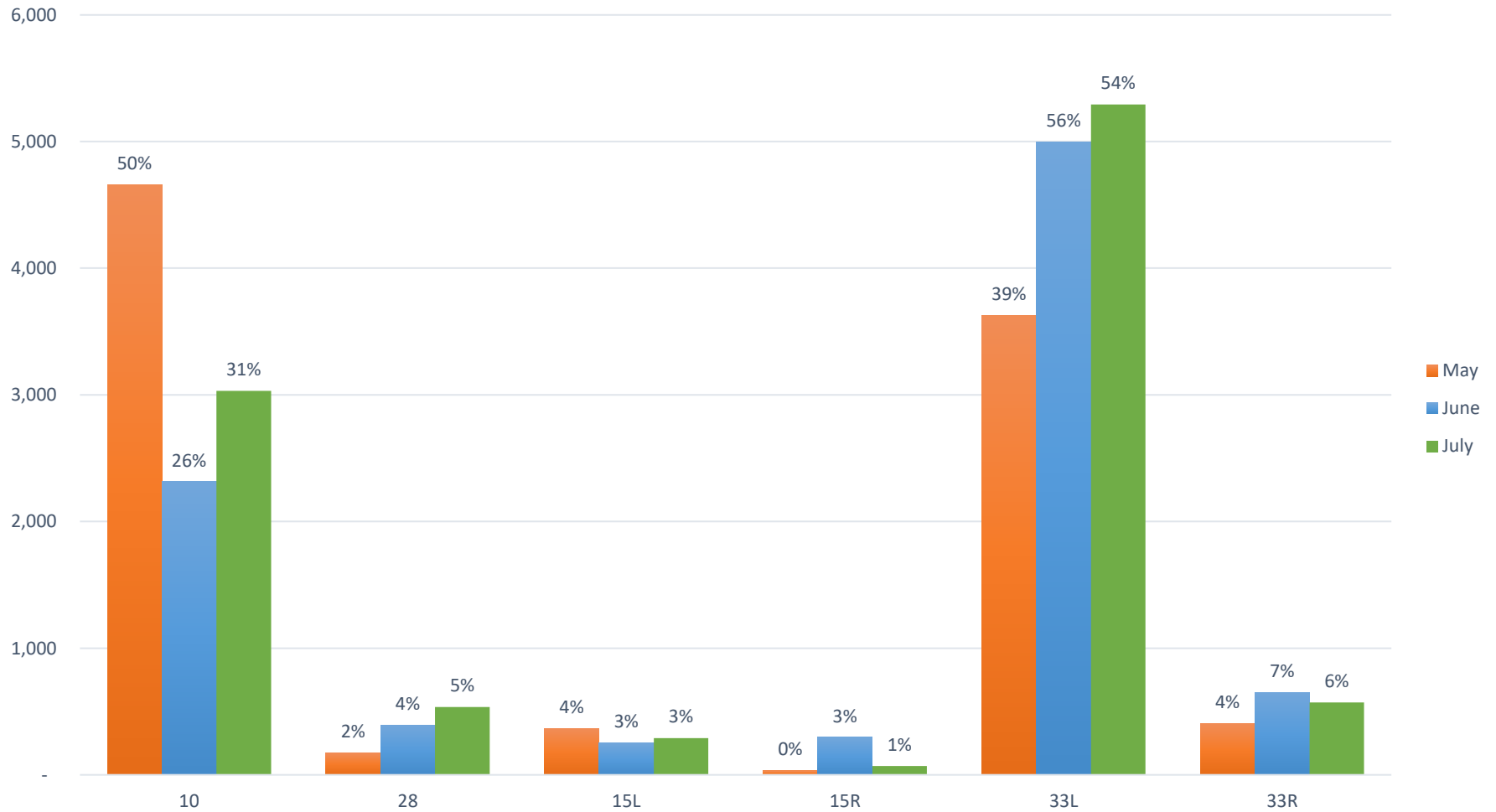


Runway Use - Arrivals



Runway Use - Arrivals

Operations by Runway - Arrivals

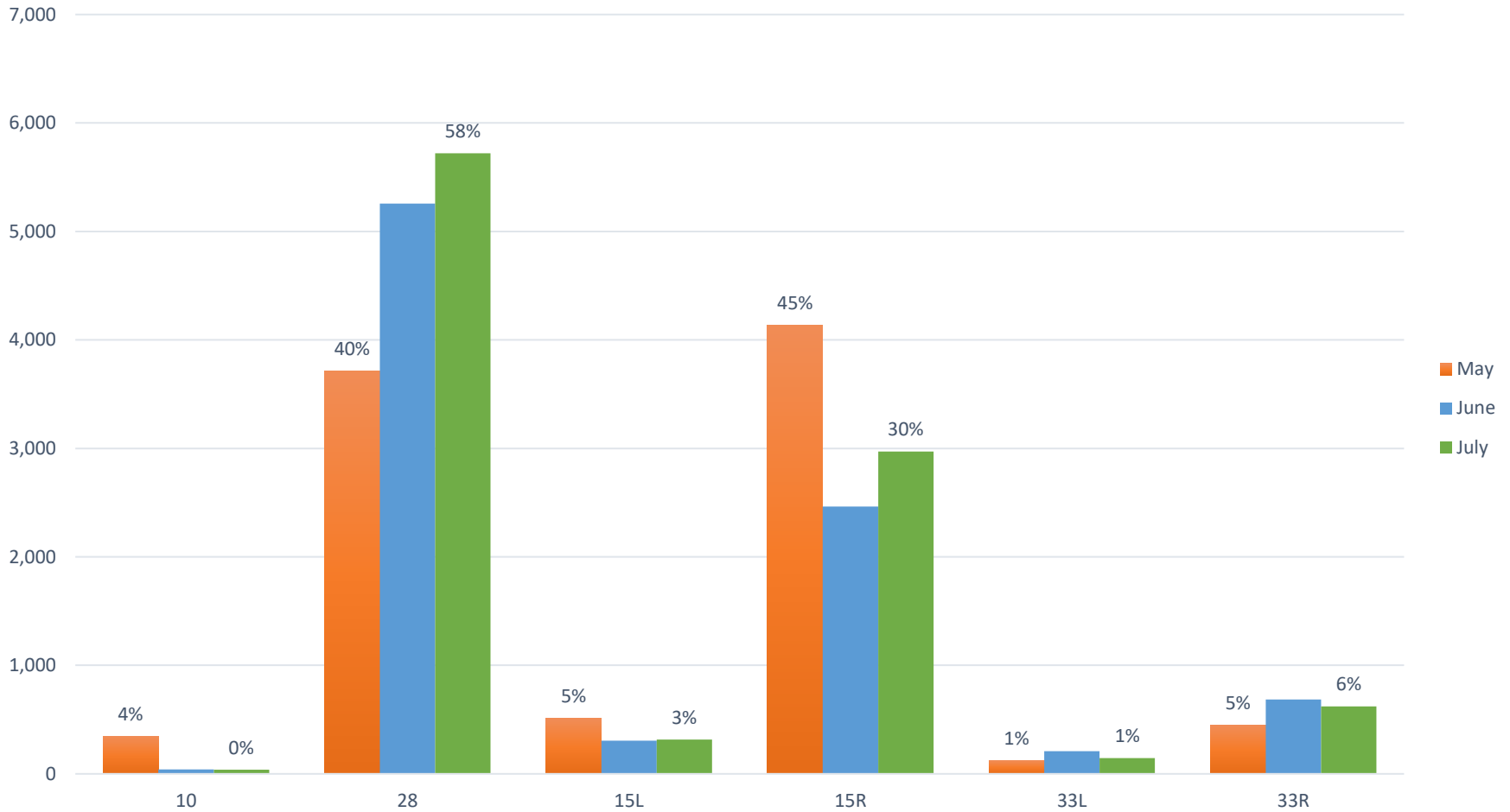


Runway Use - Departures



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.

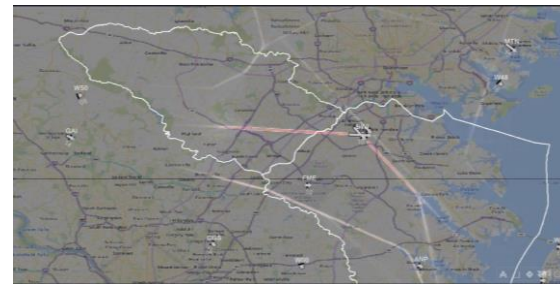
Noise data was added to the density analyses. The noise exposure is based on the “Number-of-Events-Above” metric, which is described in detail on Slides 28-29.



All Flight Tracks



Converting Tracks to Density



Density Analysis

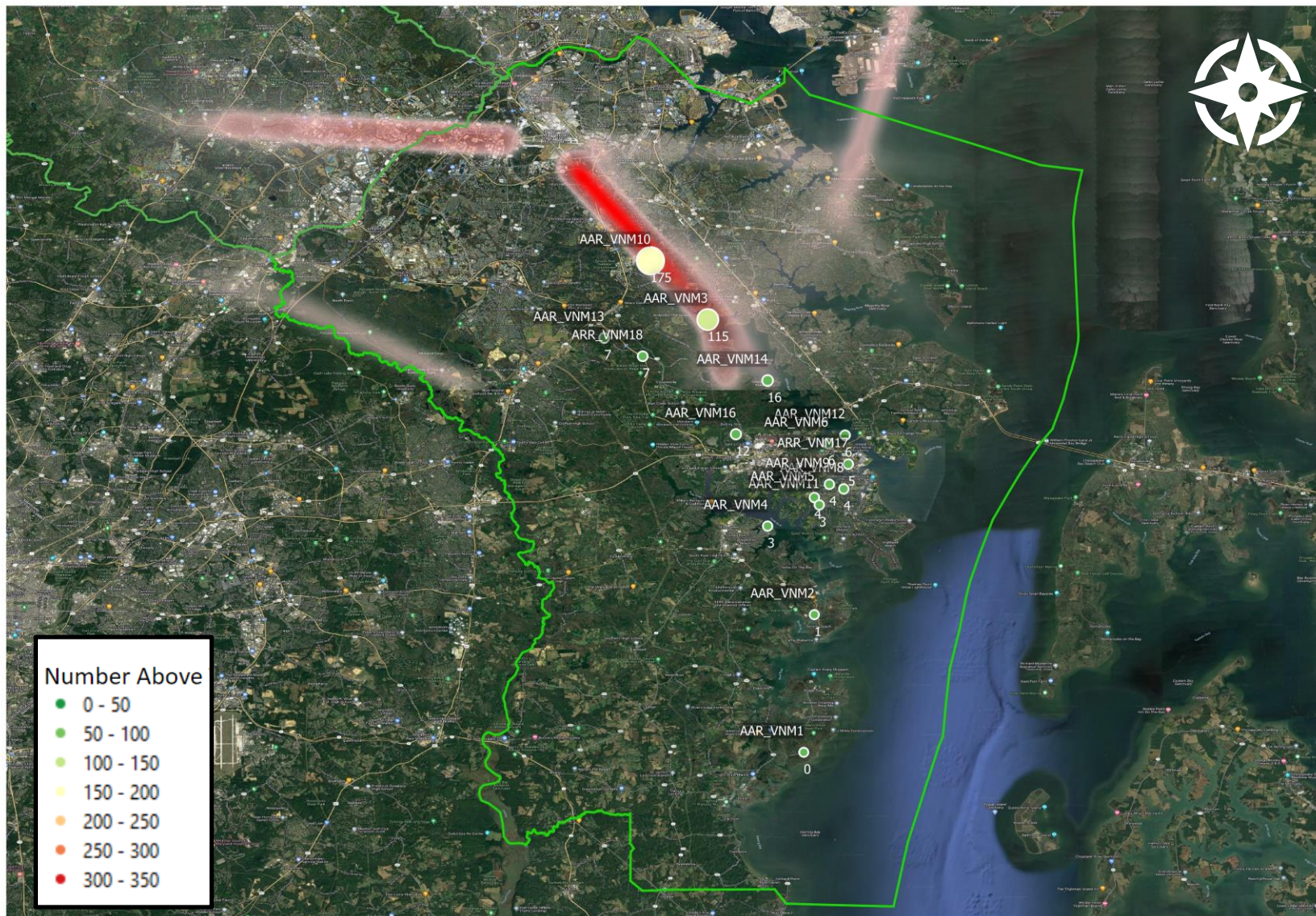
Flight Track Density Analysis – Arrivals (with NA55)

Anne Arundel County



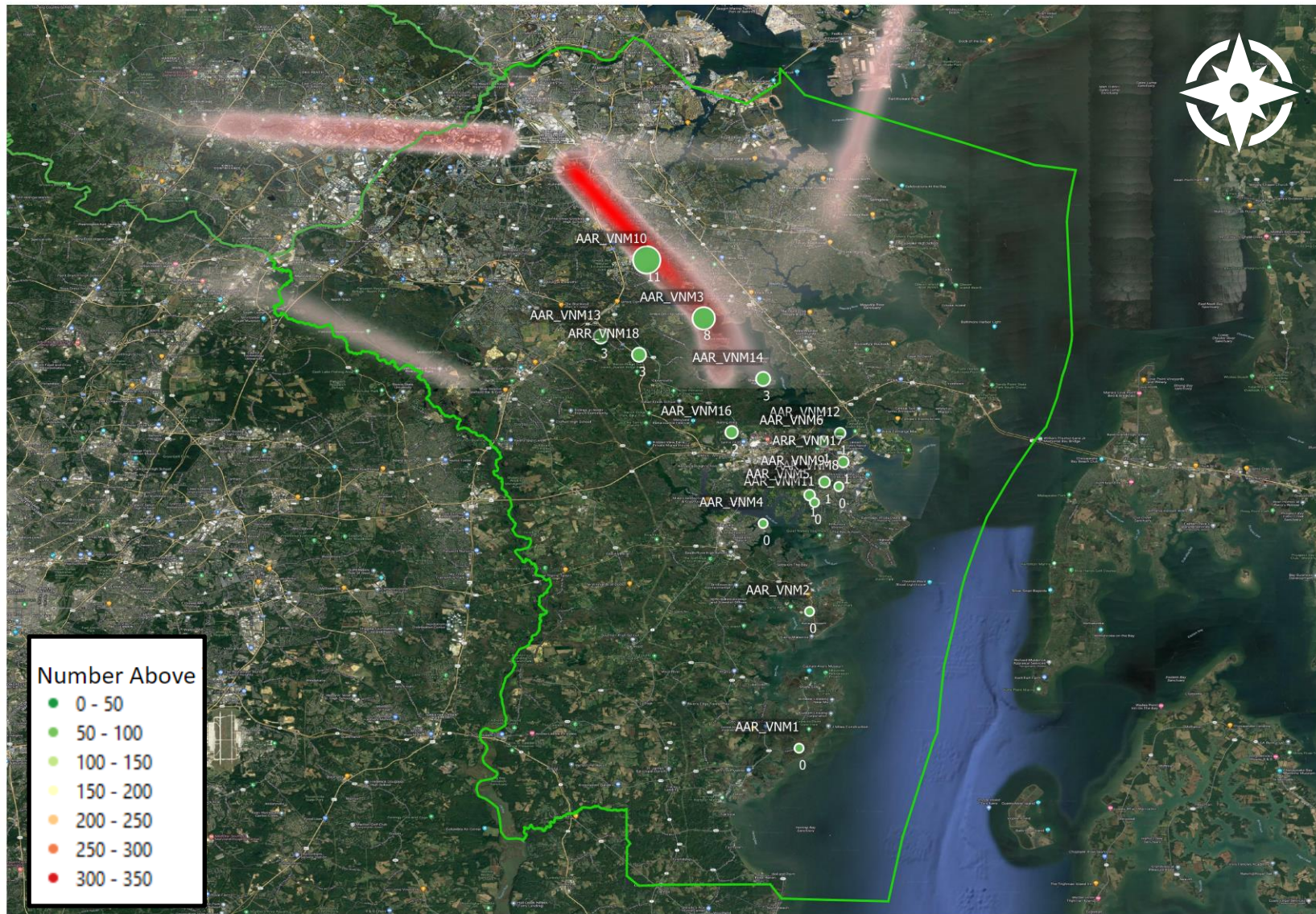
Flight Track Density Analysis – Arrivals (with NA65)

Anne Arundel County



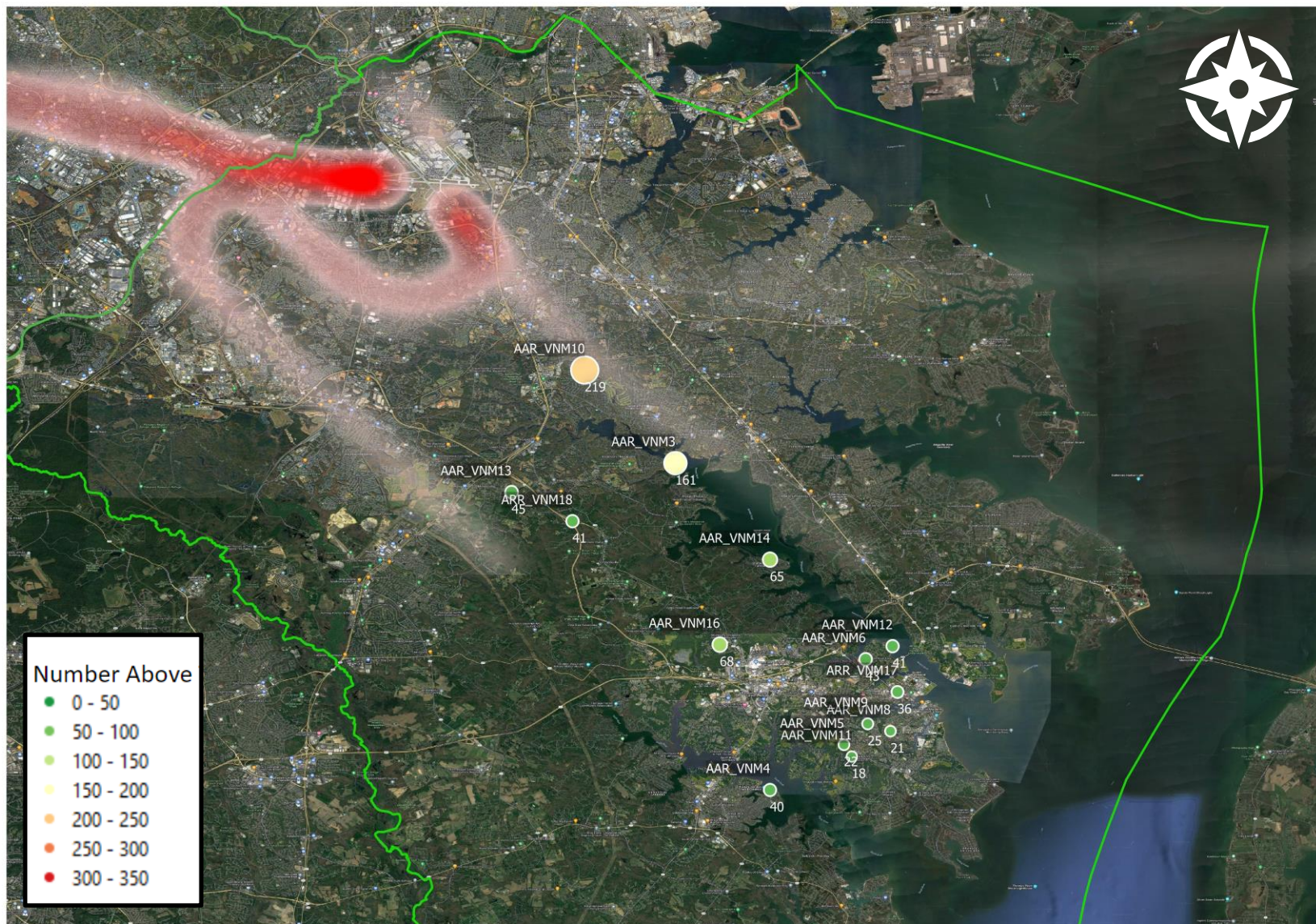
Flight Track Density Analysis – Arrivals (with NA75)

Anne Arundel County



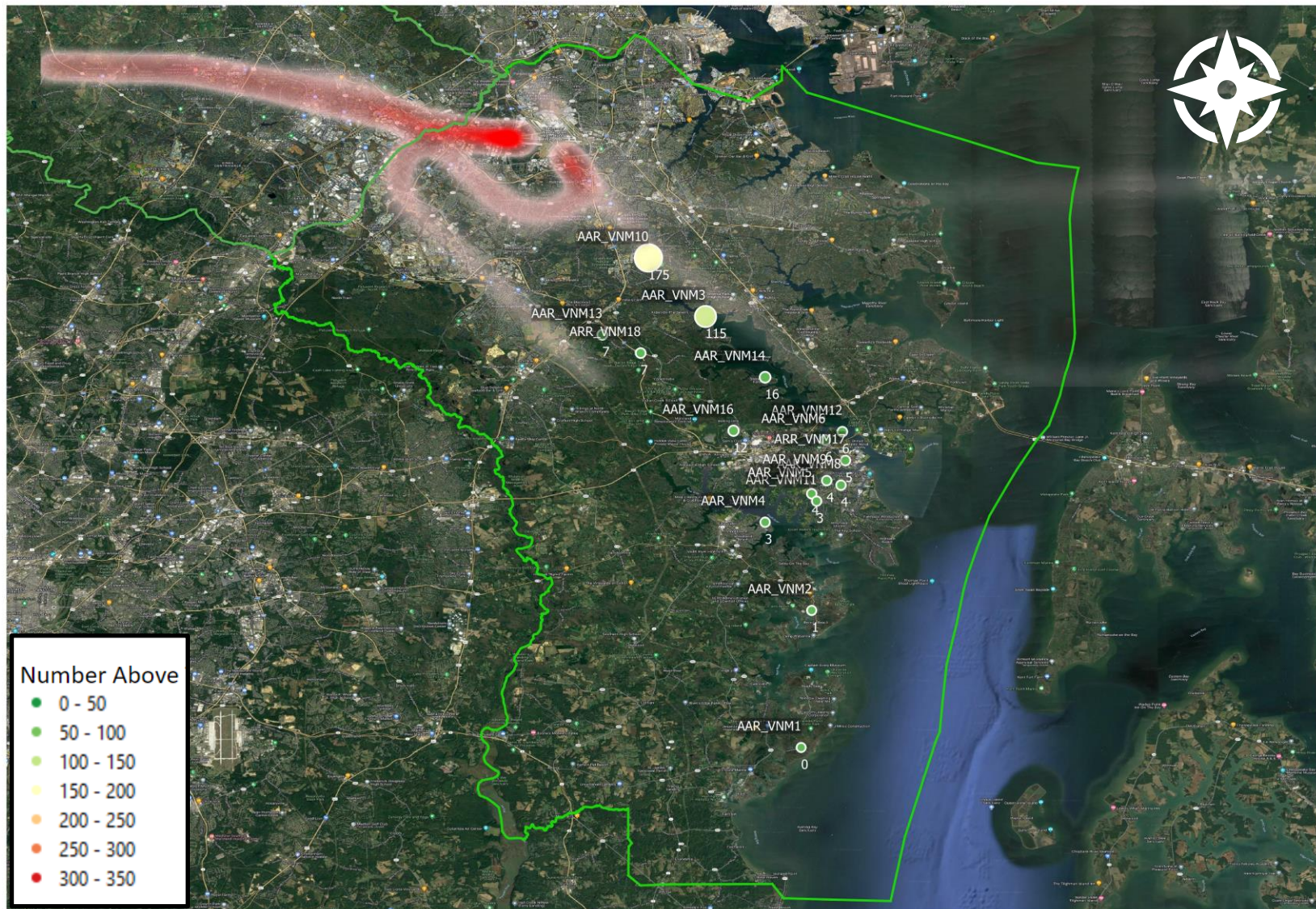
Flight Track Density Analysis – Departures (with NA55)

Anne Arundel County



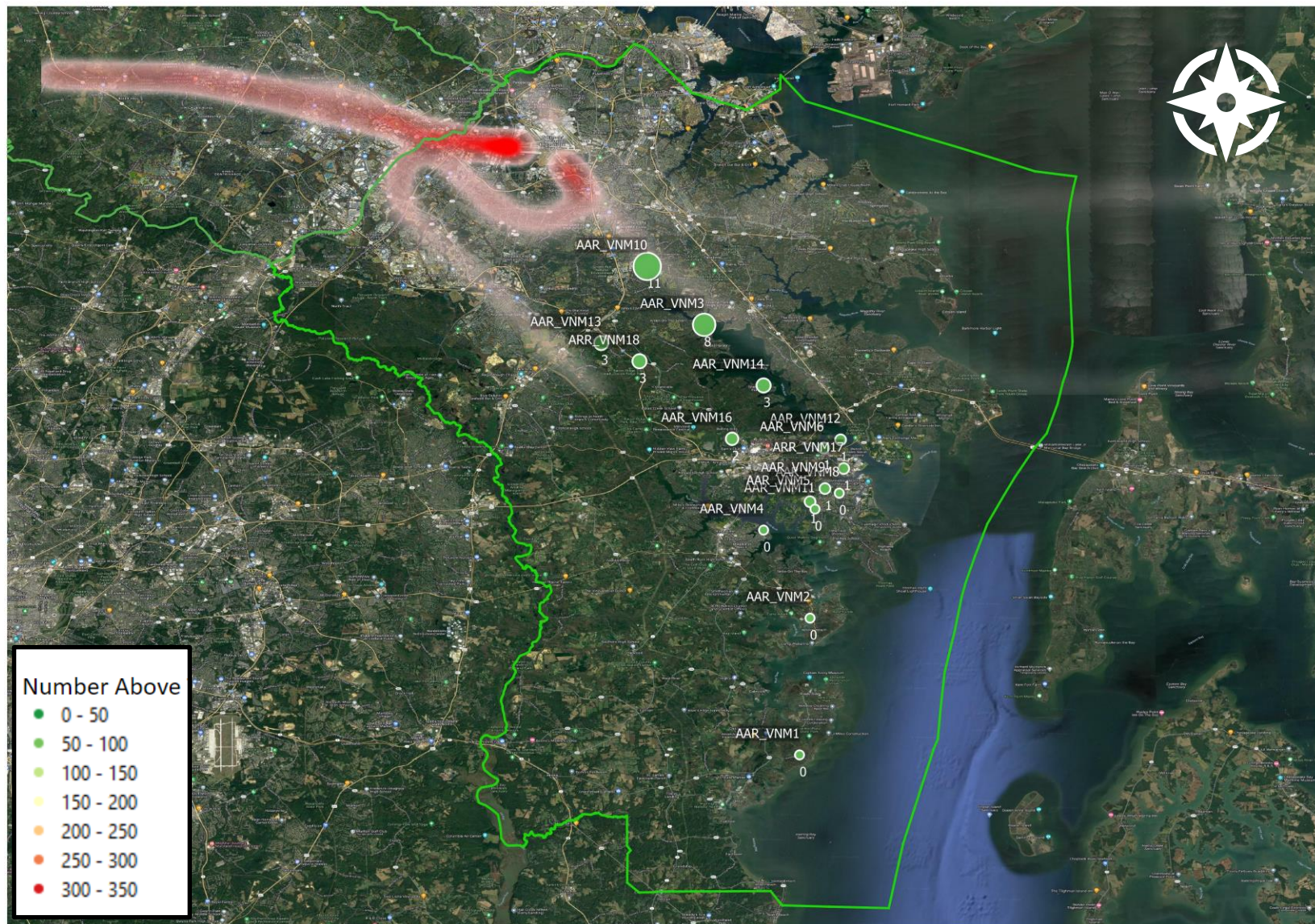
Flight Track Density Analysis – Departures (with NA65)

Anne Arundel County



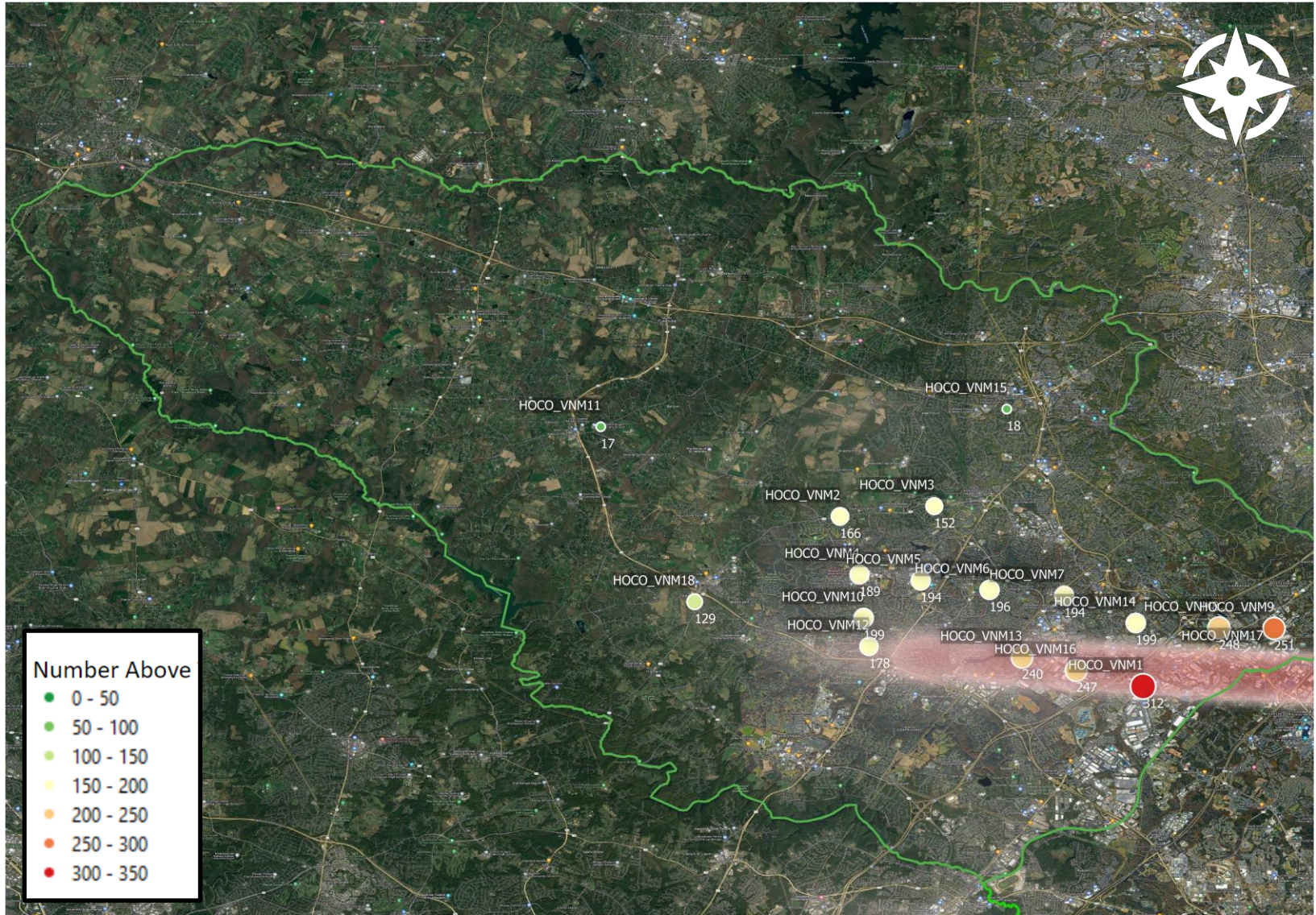
Flight Track Density Analysis – Departures (with NA75)

Anne Arundel County



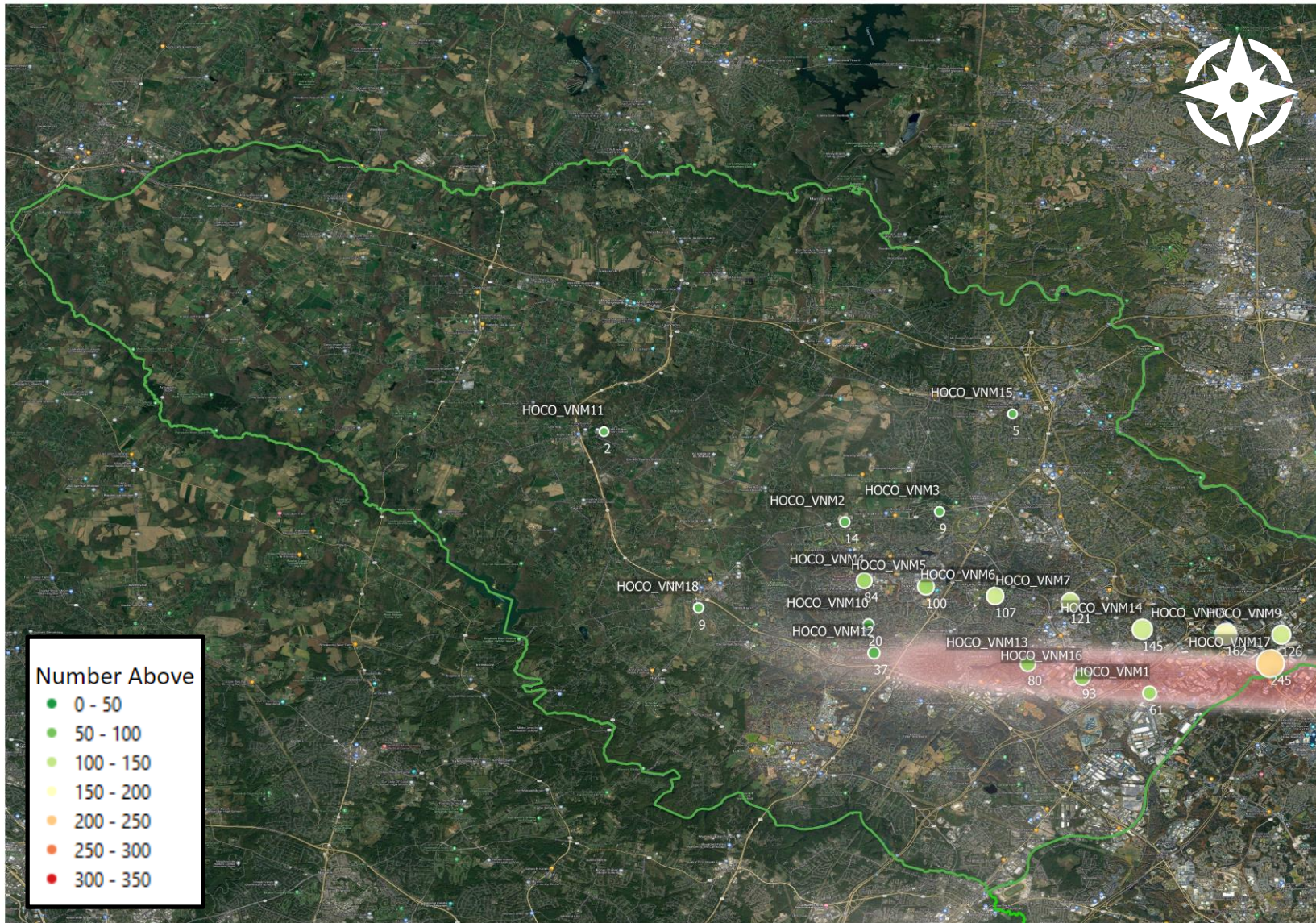
Flight Track Density Analysis – Arrivals (with NA55)

Howard County



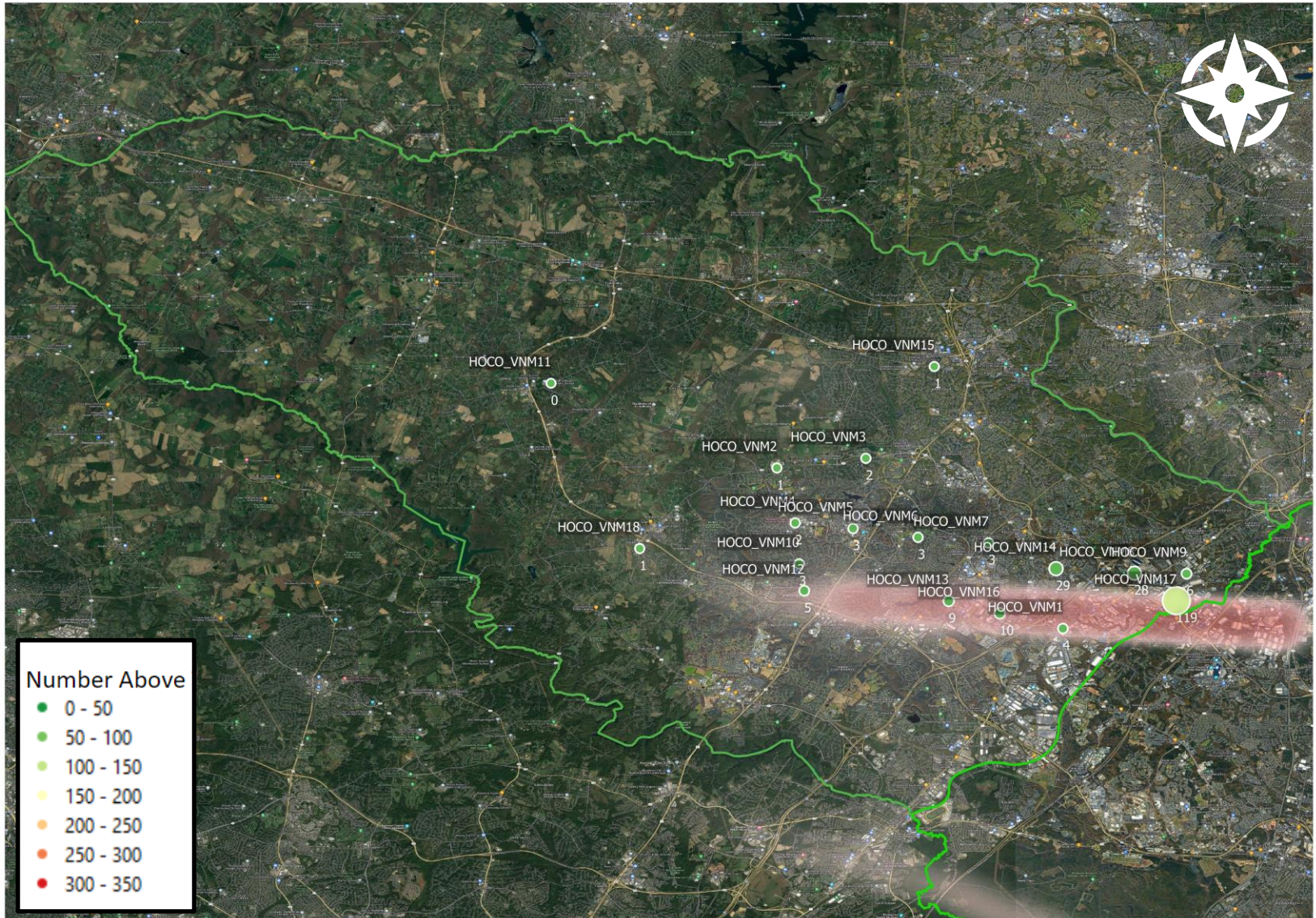
Flight Track Density Analysis – Arrivals (with NA65)

Howard County



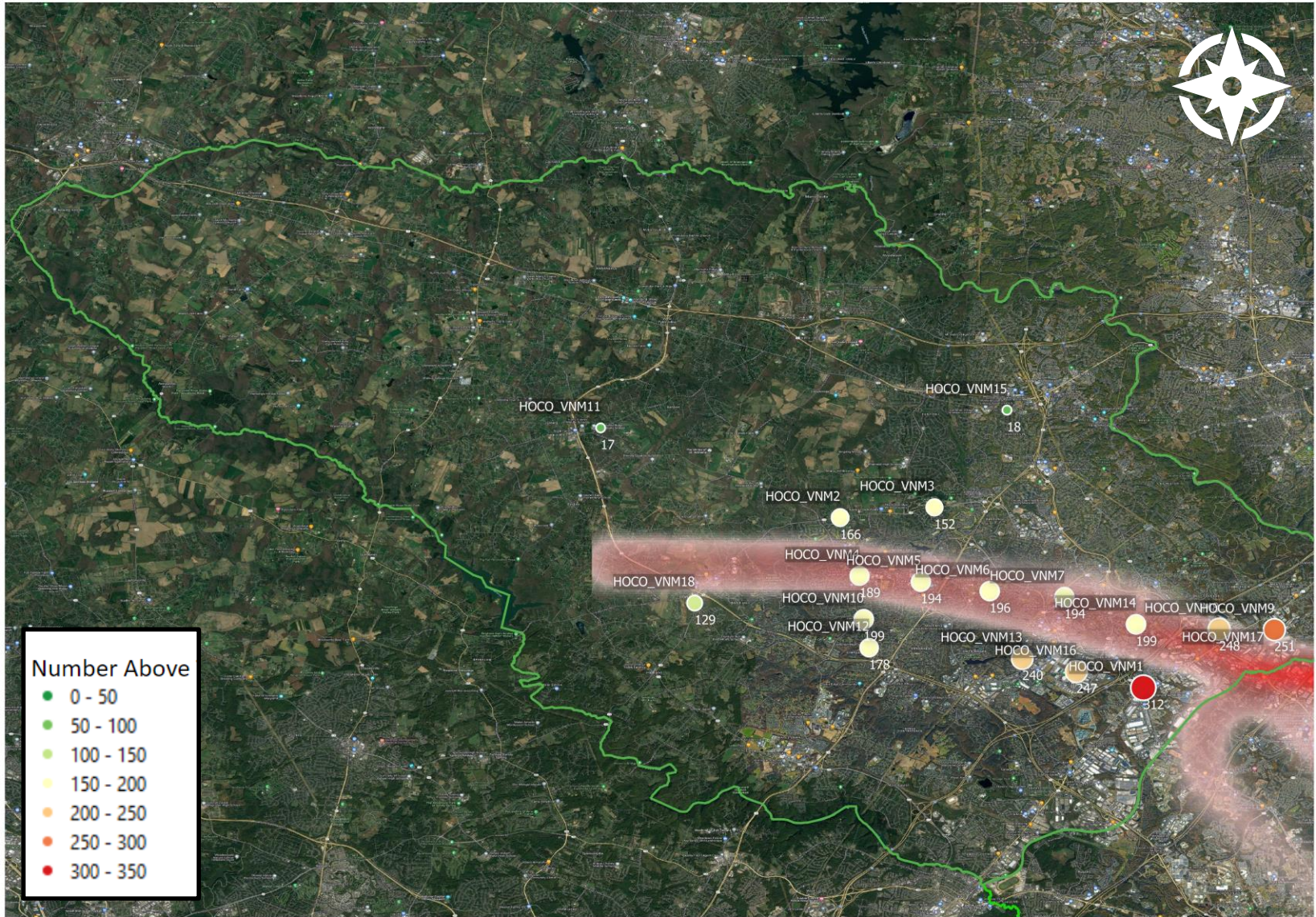
Flight Track Density Analysis – Arrivals (with NA75)

Howard County



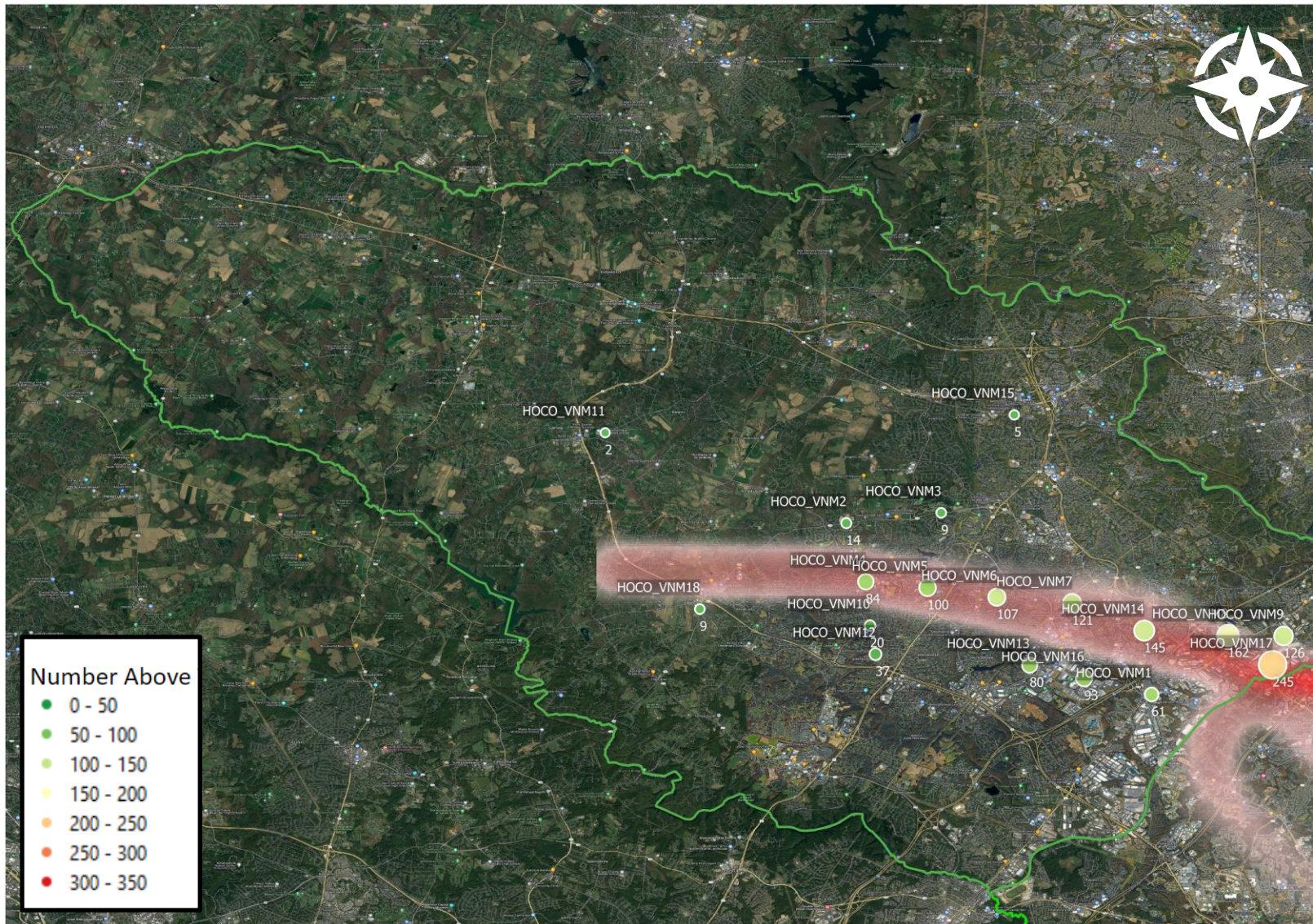
Flight Track Density Analysis – Departures (with NA55)

Howard County



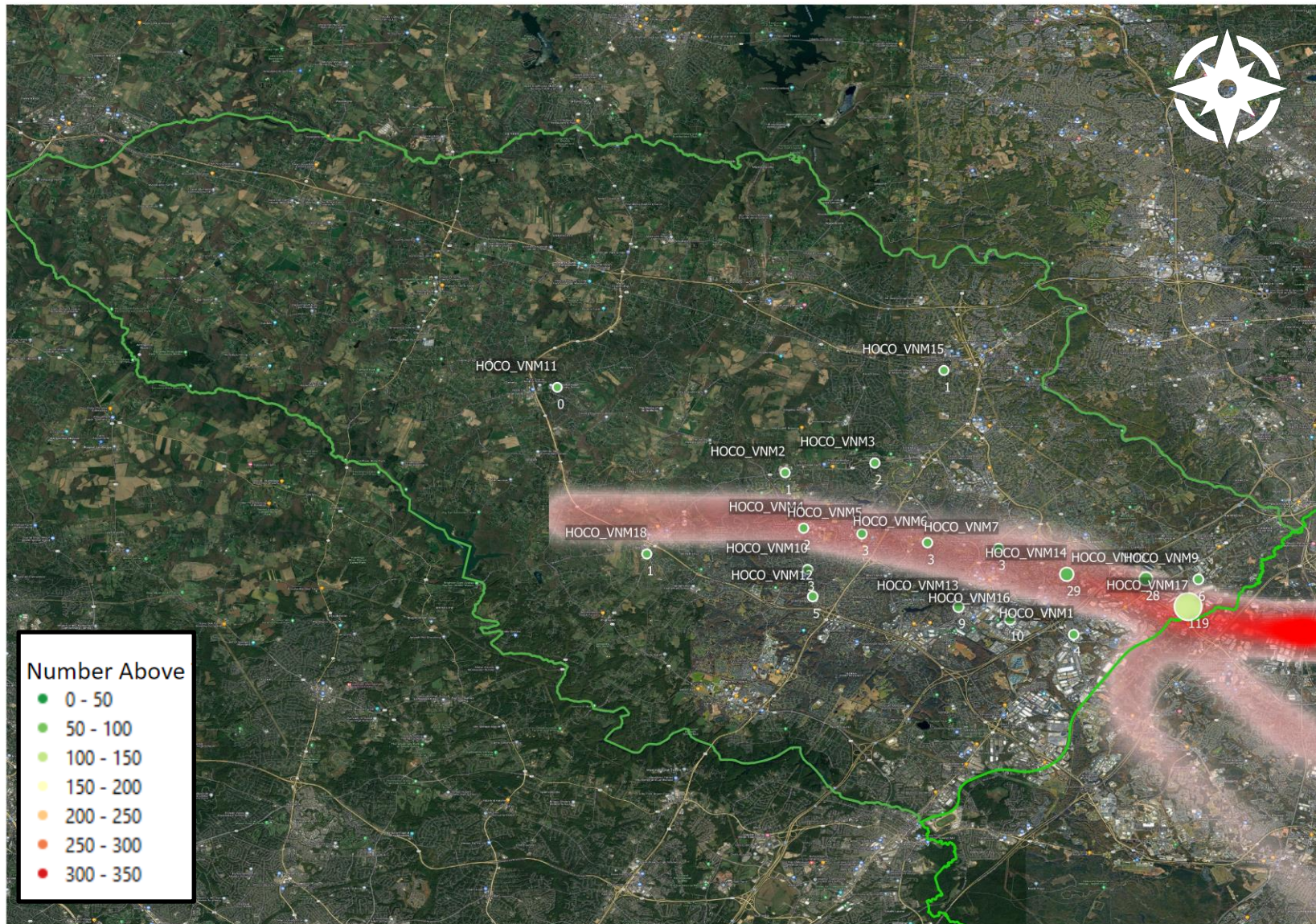
Flight Track Density Analysis – Departures (with NA65)

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

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).

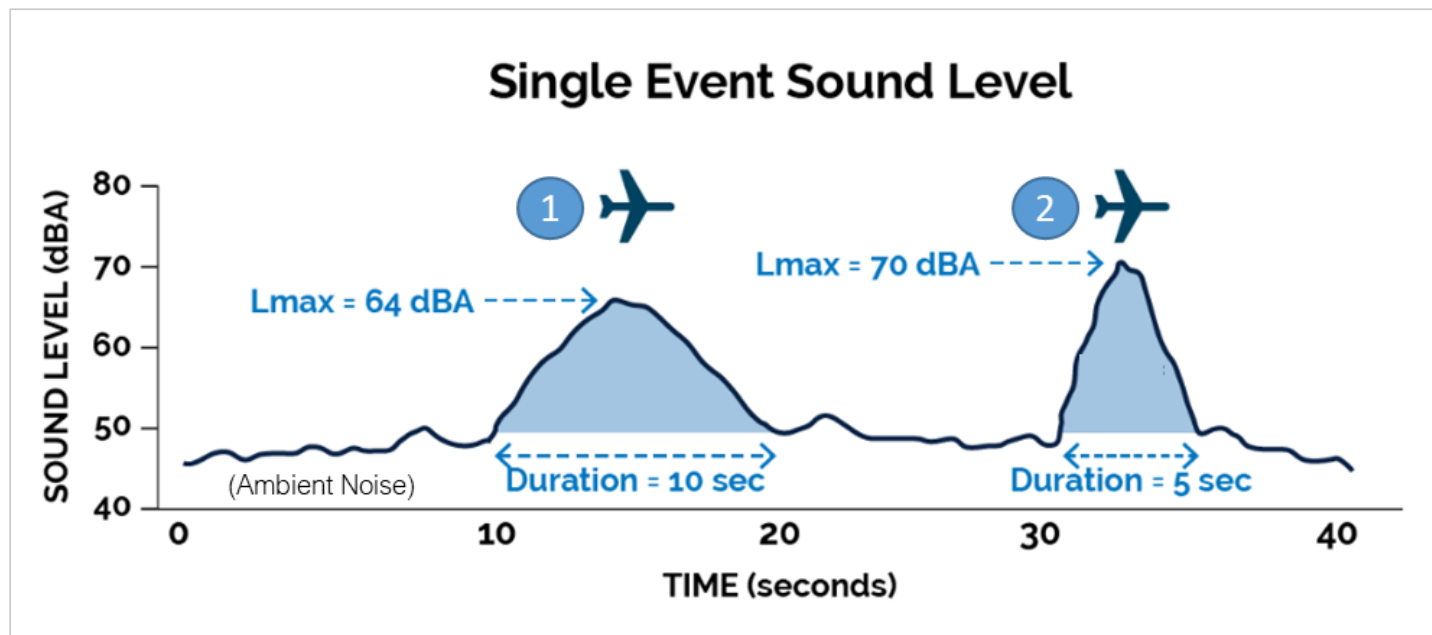
DNL is the standard metric used by the Federal Aviation Administration as required by federal regulation. The problem with DNL is it is difficult to understand and doesn't seem to reflect what residents experience on a daily basis.

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).

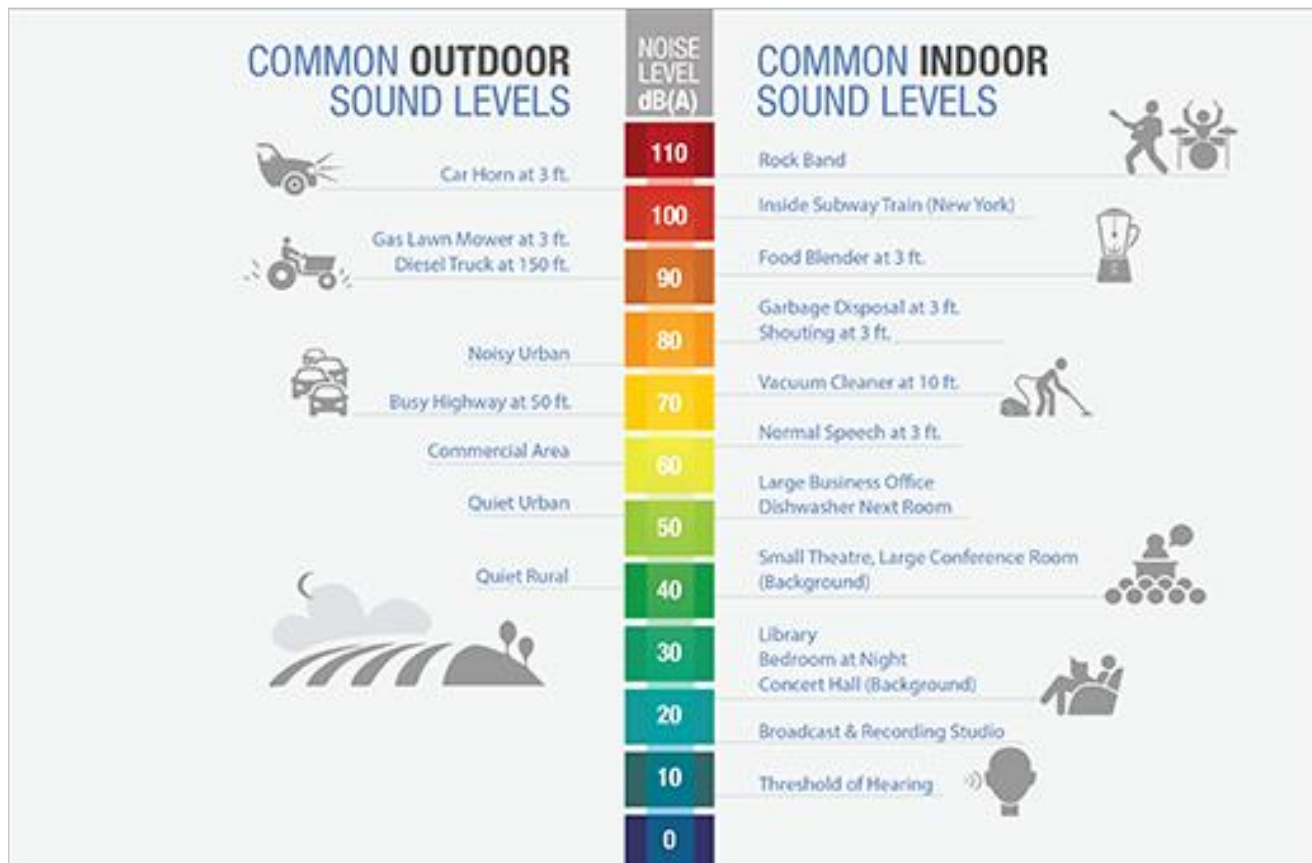
The NA noise metric counts the number of times the noise level exceeds a specific threshold. In this report, 55, 65, and 75 decibels was selected.



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

NOISE EXPOSURE

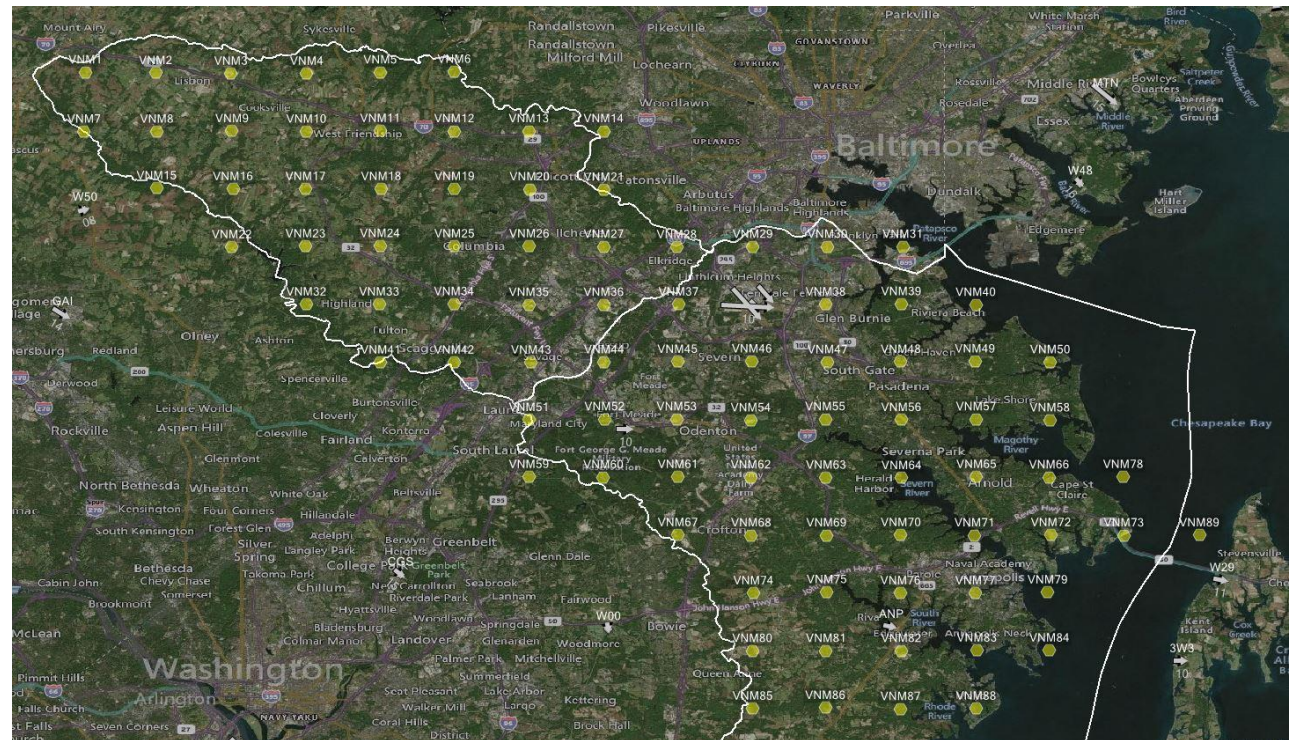
Virtual Noise Analysis – Monthly Data



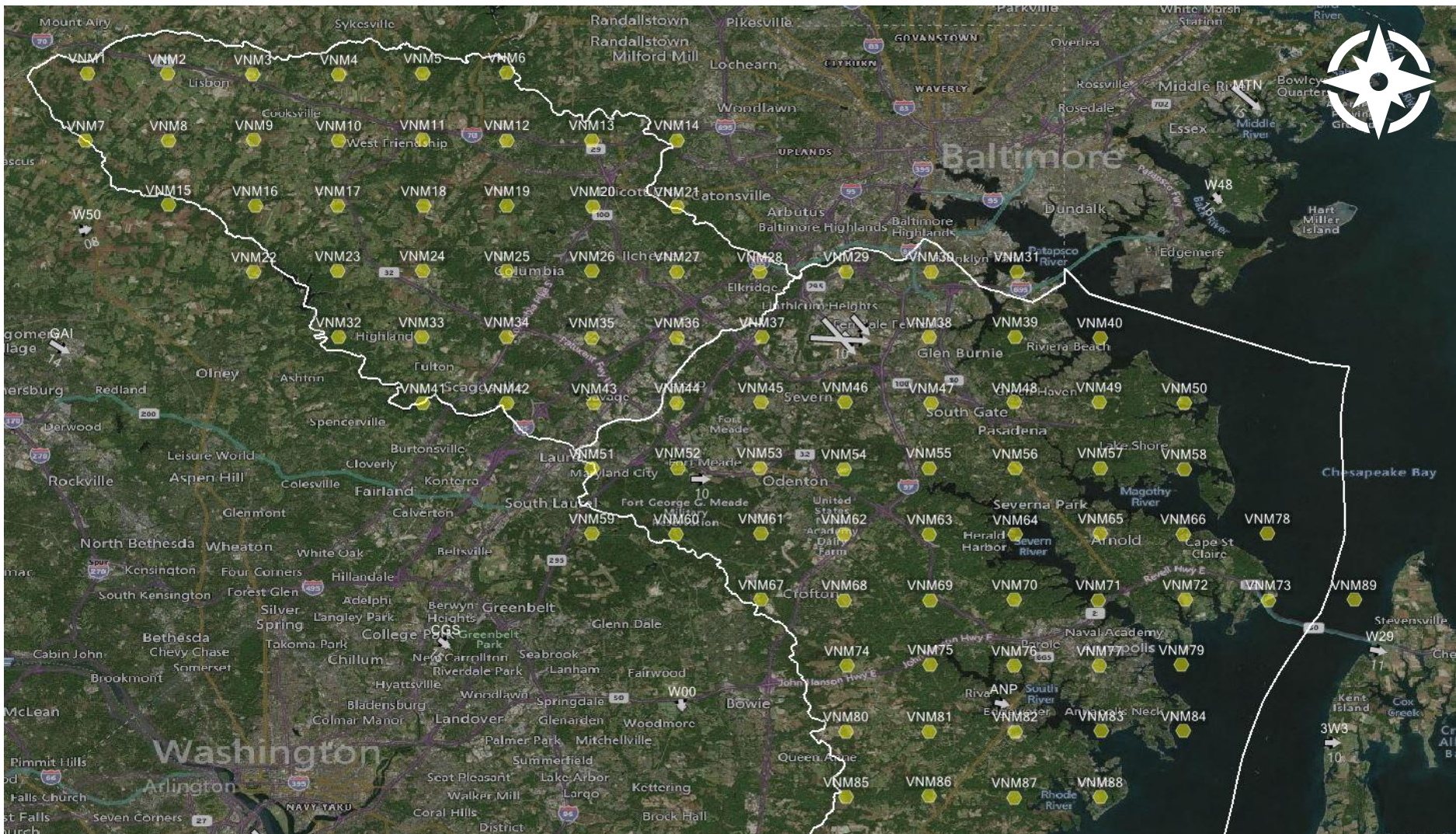
Noise Exposure – Virtual Noise Monitor Locations

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)

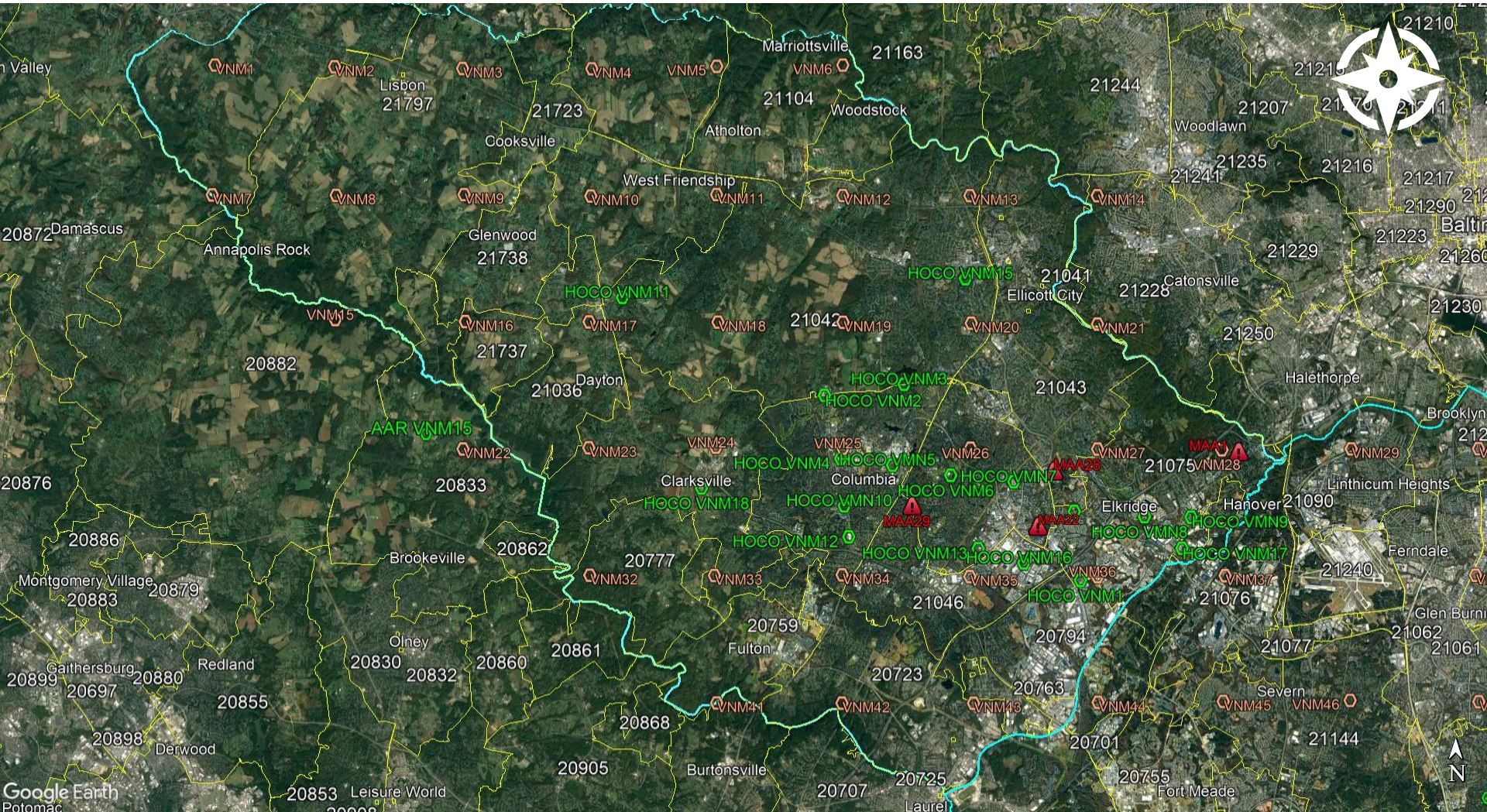
Howard County

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

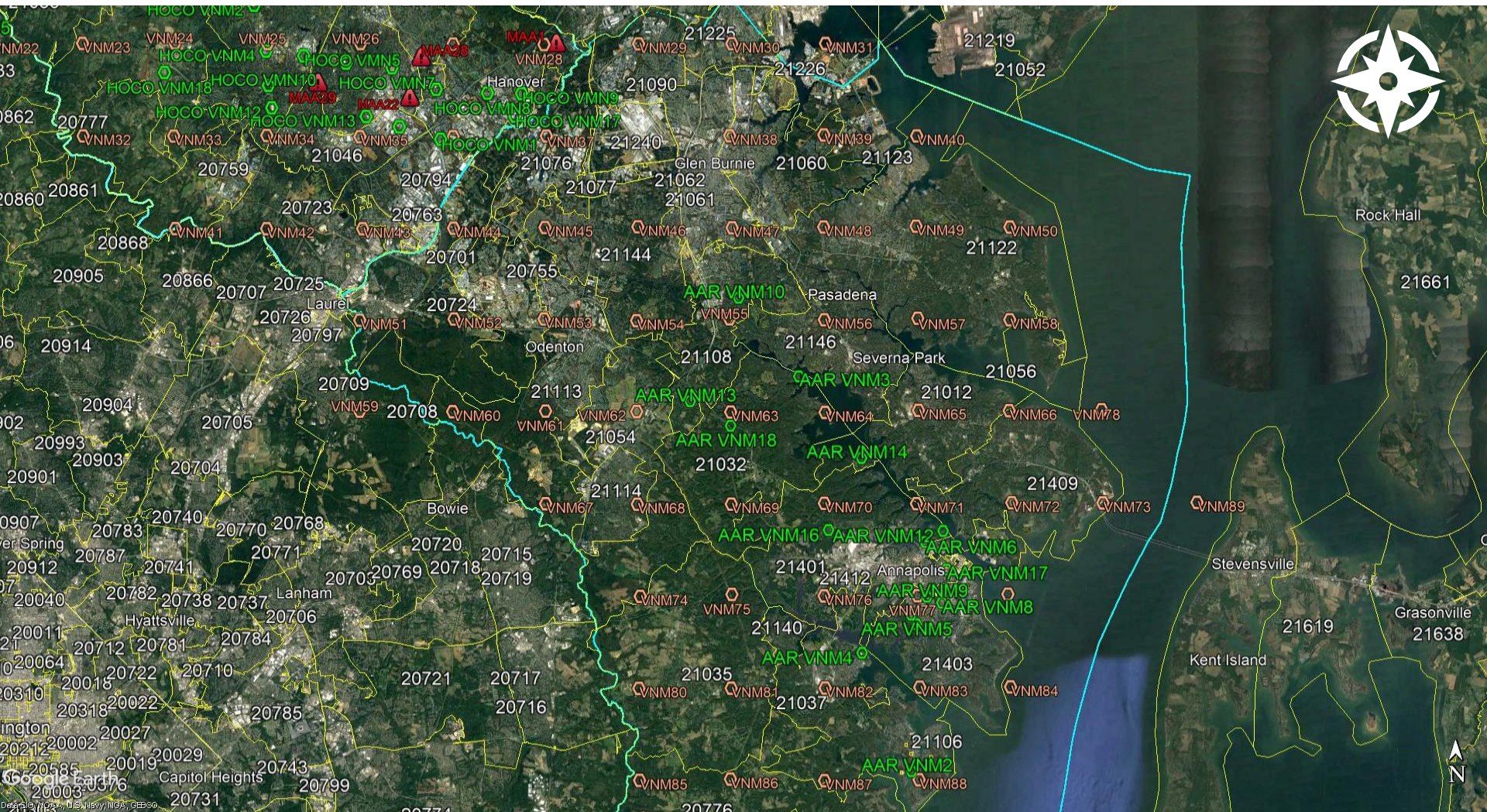
Anne Arundel County

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

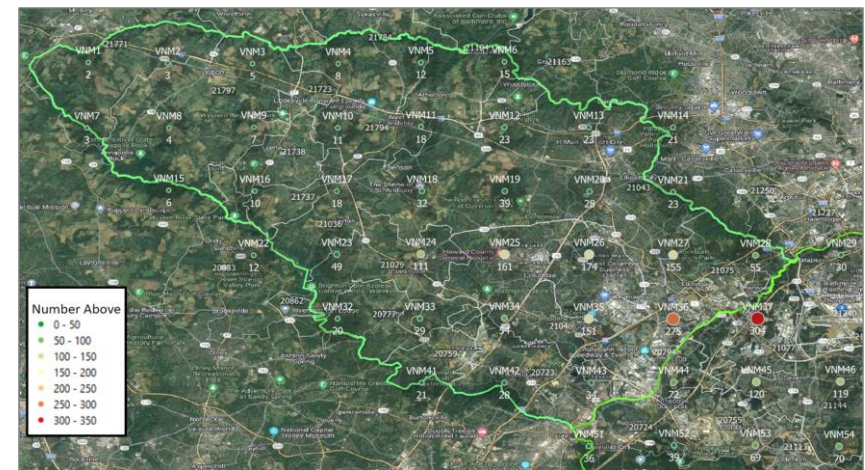
Number-of-Events-Above

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	56	2	6	0	0	0
VNM2	77	2	7	0	0	0
VNM3	96	3	10	0	0	0
VNM4	131	4	24	1	0	0
VNM5	167	5	31	1	0	0
VNM6	296	10	48	2	2	0
VNM7	66	2	8	0	0	0
VNM8	98	3	11	0	0	0
VNM9	118	4	22	1	0	0
VNM10	179	6	30	1	1	0
VNM11	335	11	51	2	3	0
VNM12	527	17	125	4	5	0
VNM13	553	18	117	4	12	0
VNM14	499	16	148	5	19	1
VNM15	113	4	18	1	0	0
VNM16	162	5	35	1	0	0
VNM17	472	15	56	2	5	0
VNM18	891	29	156	5	14	0
VNM19	1226	40	233	8	27	1
VNM20	614	20	191	6	36	1
VNM21	317	10	143	5	39	1
VNM22	209	7	37	1	1	0
VNM23	3057	99	151	5	6	0
VNM24	4534	146	480	15	23	1
VNM25	5846	189	2739	88	66	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	5760	186	1899	61	64	2
VNM27	4962	160	343	11	76	2
VNM28	1136	37	273	9	89	3
VNM29	764	25	263	8	89	3
VNM30	389	13	165	5	57	2
VNM31	486	16	157	5	40	1
VNM32	391	13	71	2	8	0
VNM33	791	26	186	6	34	1
VNM34	1927	62	542	17	82	3
VNM35	5523	178	833	27	95	3
VNM36	10187	329	5400	174	210	7
VNM37	10952	353	9761	315	8412	271
VNM38	1247	40	720	23	120	4
VNM39	995	32	216	7	70	2
VNM40	1303	42	251	8	45	1
VNM41	444	14	160	5	19	1
VNM42	697	22	302	10	53	2
VNM43	697	22	364	12	60	2
VNM44	2262	73	932	30	92	3
VNM45	4230	136	1581	51	112	4
VNM46	3898	126	2295	74	1513	49
VNM47	5534	179	1536	50	245	8
VNM48	1361	44	454	15	96	3
VNM49	2573	83	654	21	86	3
VNM50	1187	38	234	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	1068	34	309	10	33	1
VNM52	564	18	197	6	45	1
VNM53	2044	66	1130	36	60	2
VNM54	2129	69	270	9	91	3
VNM55	4966	160	721	23	84	3
VNM56	2691	87	919	30	109	4
VNM57	1692	55	547	18	107	3
VNM58	1109	36	255	8	55	2
VNM59	389	13	125	4	19	1
VNM60	1593	51	299	10	24	1
VNM61	562	18	167	5	34	1
VNM62	1567	51	357	12	58	2
VNM63	987	32	221	7	96	3
VNM64	4219	136	949	31	137	4
VNM65	1572	51	378	12	97	3
VNM66	824	27	190	6	44	1
VNM67	850	27	143	5	16	1
VNM68	1709	55	180	6	34	1
VNM69	1253	40	189	6	54	2
VNM70	2135	69	467	15	72	2
VNM71	1558	50	215	7	53	2
VNM72	800	26	145	5	24	1
VNM73	273	9	72	2	6	0
VNM74	747	24	110	4	12	0
VNM75	1468	47	155	5	29	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	1904	61	175	6	34	1
VNM77	761	25	132	4	21	1
VNM78	482	16	91	3	9	0
VNM79	528	17	82	3	11	0
VNM80	273	9	54	2	3	0
VNM81	456	15	63	2	6	0
VNM82	301	10	66	2	7	0
VNM83	208	7	61	2	4	0
VNM84	195	6	54	2	4	0
VNM85	161	5	41	1	3	0
VNM86	166	5	41	1	3	0
VNM87	172	6	44	1	3	0
VNM88	167	5	42	1	2	0
VNM89	191	6	50	2	3	0

Noise Exposure: Number-of-Events-Above (Anne Arundel County Landmark VNMs)

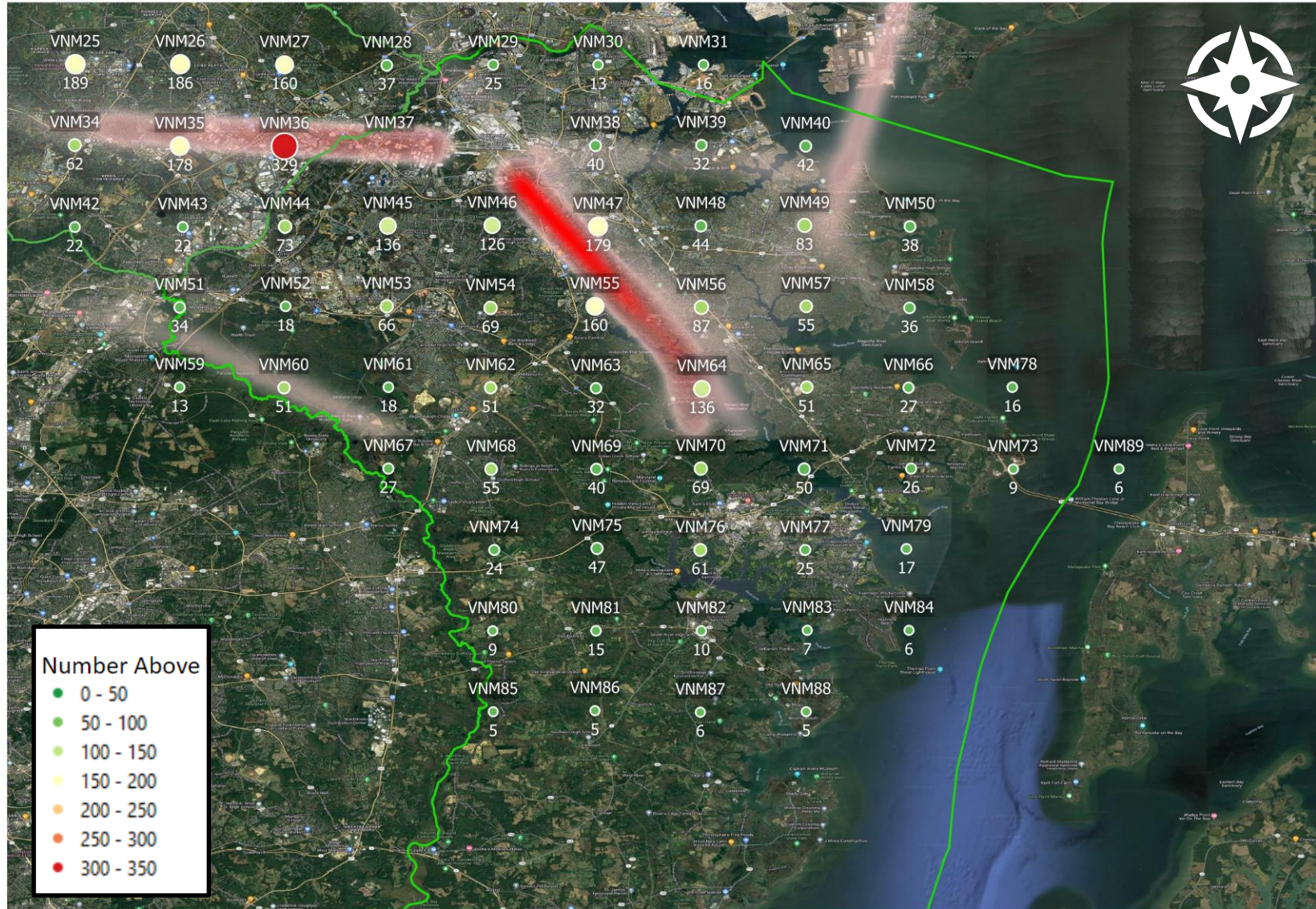
Name	Number-of-Events-Above 55 dBA		Number-of-Events-Above 65 dBA		Number-of-Events-Above 75 dBA	
	Total Events	Daily Average	Total Events	Daily Average	Total Events	Daily Average
AAR_VNM1	105	3	11	0	0	0
AAR_VNM2	171	6	41	1	2	0
AAR_VNM3	5,002	161	3,565	115	250	8
AAR_VNM4	1,231	40	103	3	9	0
AAR_VNM5	696	22	116	4	17	1
AAR_VNM6	1,330	43	197	6	42	1
AAR_VNM7	55	2	7	0	1	0
AAR_VNM8	649	21	109	4	15	0
AAR_VNM9	772	25	124	4	20	1
AAR_VNM10	6,777	219	5,420	175	337	11
AAR_VNM11	572	18	106	3	14	0
AAR_VNM12	1,266	41	179	6	37	1
AAR_VNM13	1,386	45	215	7	95	3
AAR_VNM14	2,019	65	497	16	94	3
ARR_VNM15	152	5	32	1	1	0
AAR_VNM16	2,104	68	367	12	62	2
ARR_VNM17	1,125	36	141	5	20	1
ARR_VNM18	1,259	41	214	7	95	3

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	9,677	312	1,899	61	115	4
HOCO_VNM2	5,137	166	419	14	46	1
HOCO_VNM3	4,707	152	274	9	53	2
HOCO_VNM4	5,847	189	2,608	84	65	2
HOCO_VNM5	6,007	194	3,115	100	88	3
HOCO_VNM6	6,073	196	3,315	107	93	3
HOCO_VNM7	6,005	194	3,749	121	102	3
HOCO_VNM8	7,687	248	5,030	162	854	28
HOCO_VNM9	7,789	251	3,918	126	192	6
HOCO_VNM10	6,159	199	616	20	81	3
HOCO_VNM11	515	17	65	2	4	0
HOCO_VNM12	5,511	178	1,153	37	147	5
HOCO_VNM13	7,455	240	2,471	80	282	9
HOCO_VNM14	6,155	199	4,503	145	902	29
HOCO_VNM15	548	18	157	5	25	1
HOCO_VNM16	7,661	247	2,897	93	305	10
HOCO_VNM17	10,915	352	7,589	245	3,677	119
HOCO_VNM18	3,984	129	284	9	25	1

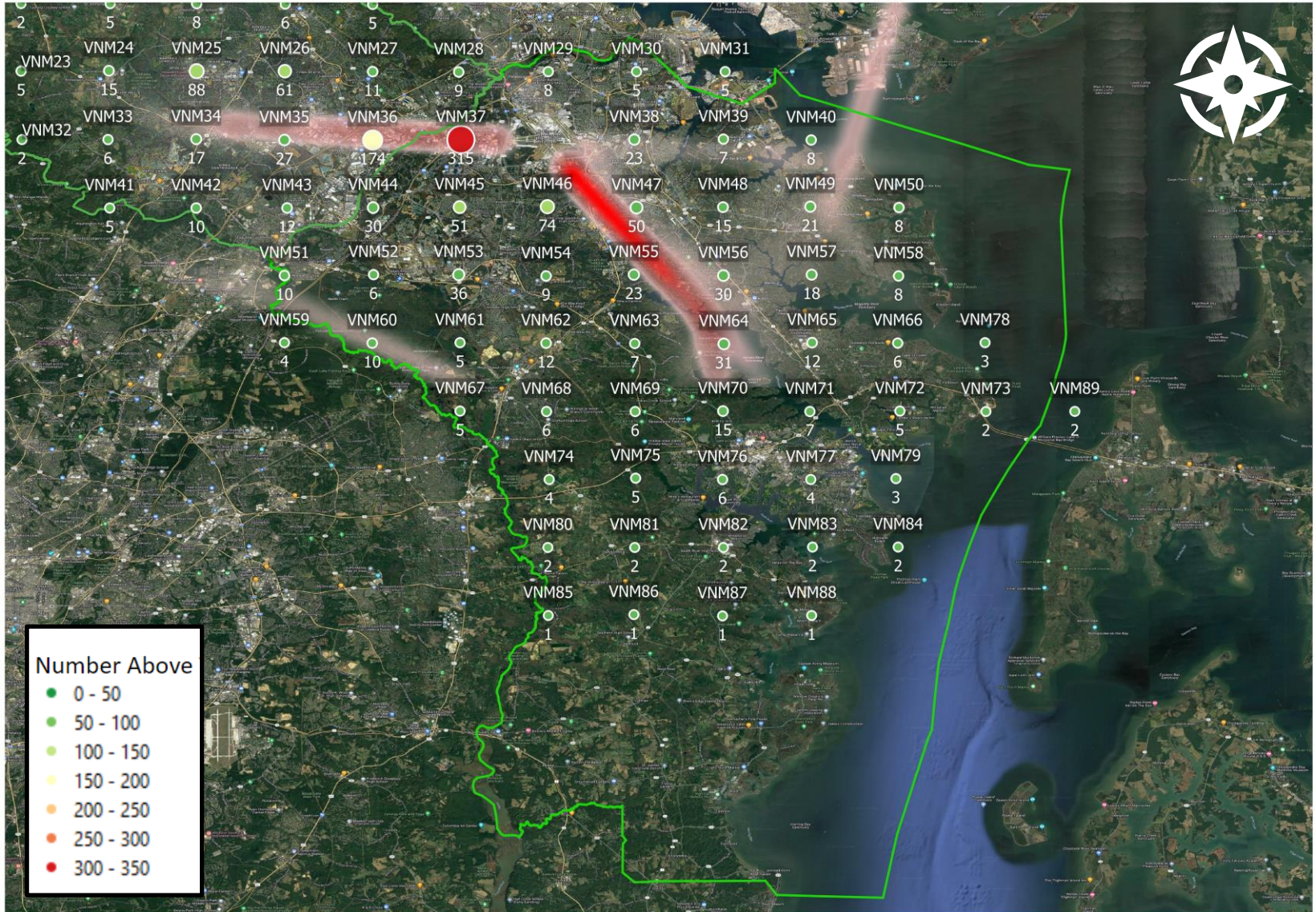
Noise Exposure: Number-of-Events-Above 55 dBA (Daily Average)

Anne Arundel County - Arrivals



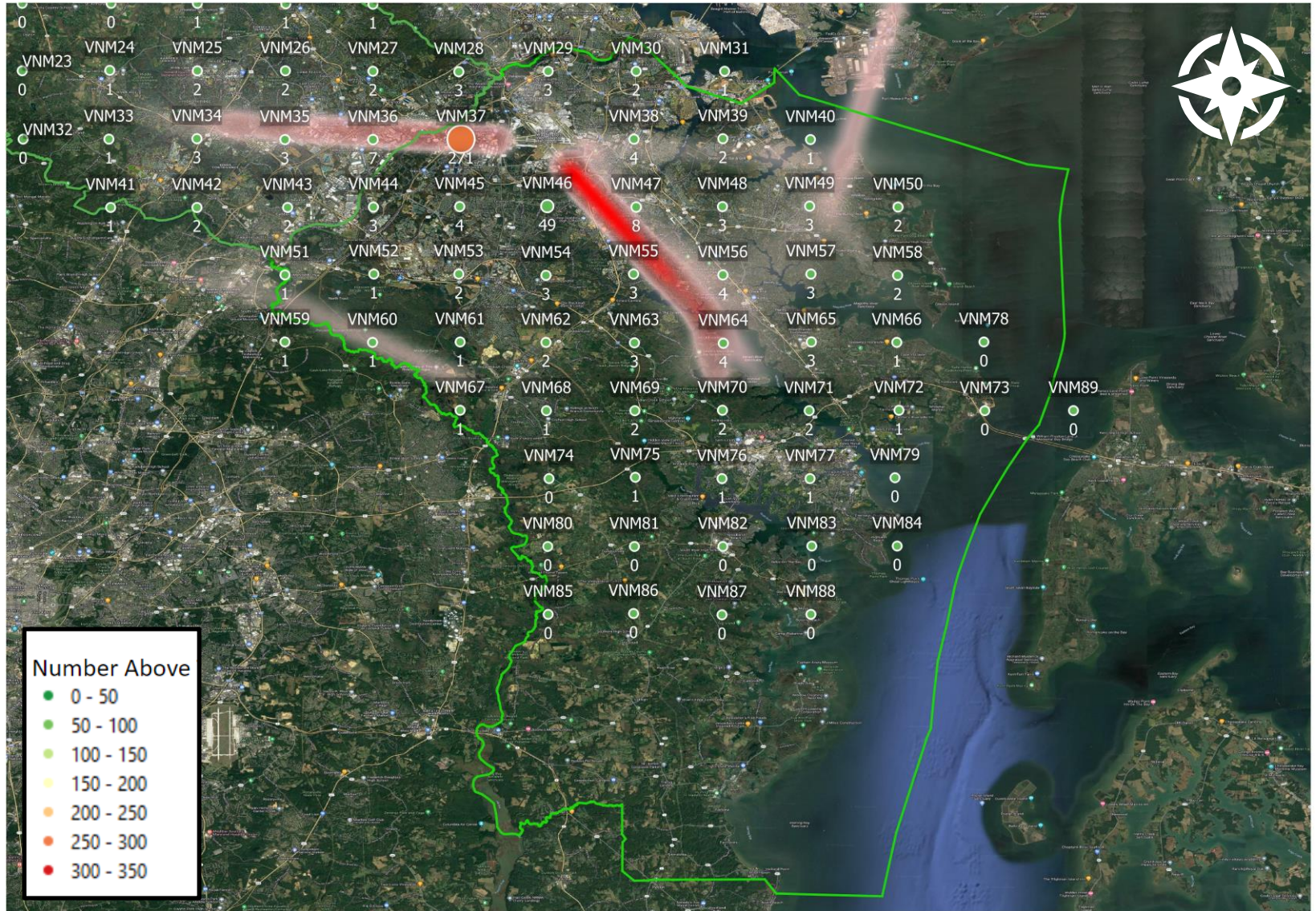
Noise Exposure: Number-of-Events-Above 65 dBA (Daily Average)

Anne Arundel County - Arrivals



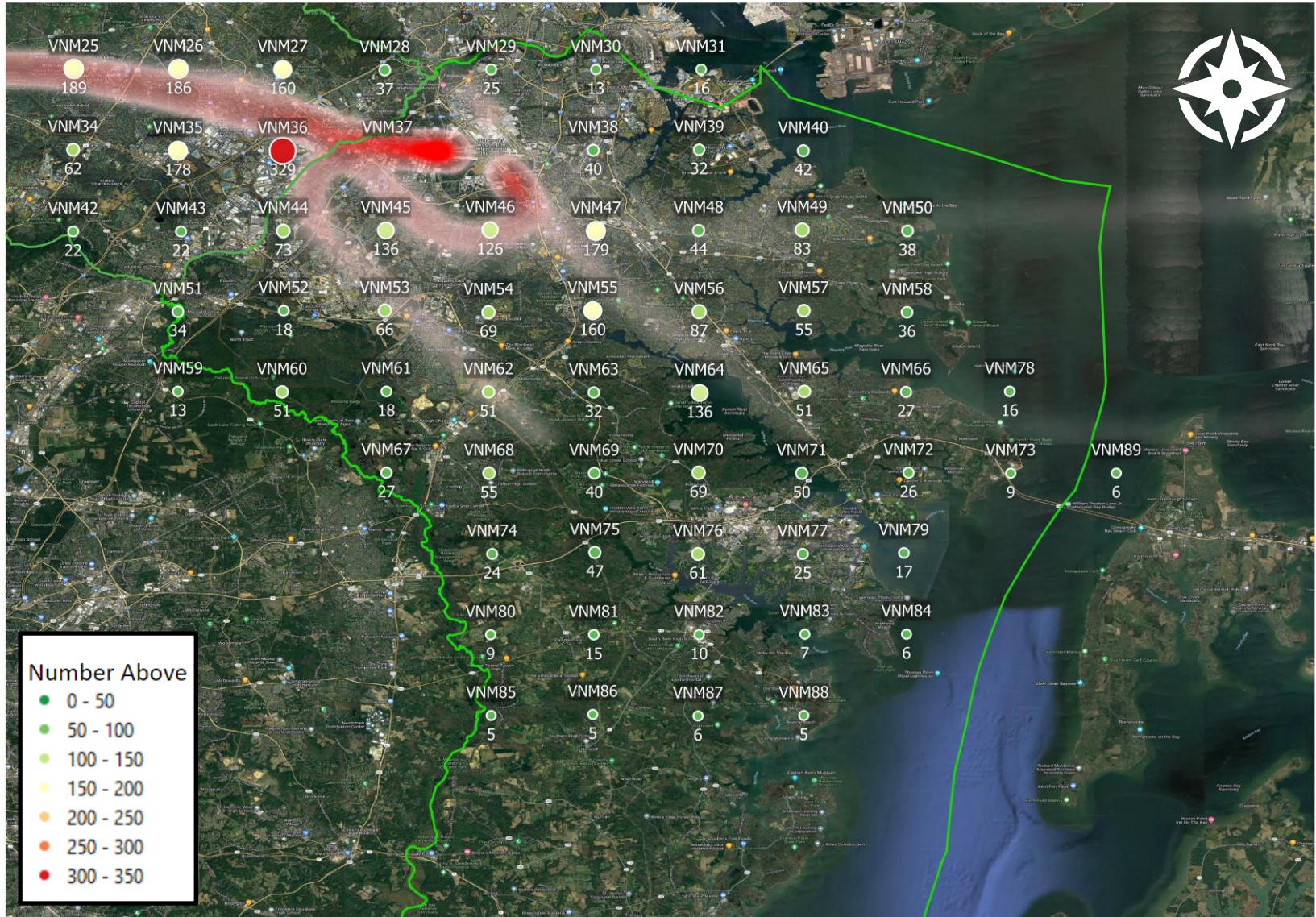
Noise Exposure: Number-of-Events-Above 75 dBA (Daily Average)

Anne Arundel County - Arrivals



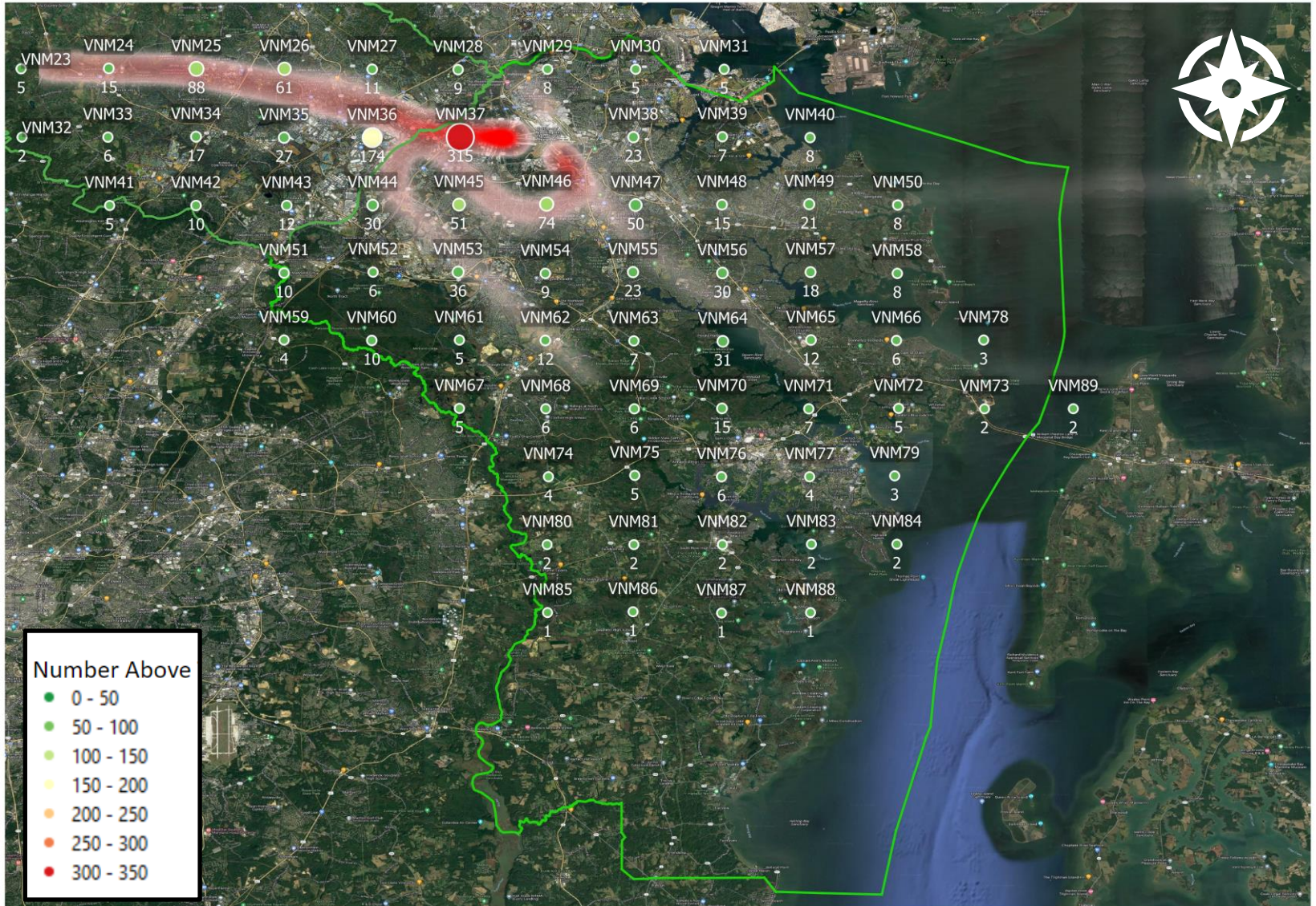
Noise Exposure: Number-of-Events-Above 55 dBA (Daily Average)

Anne Arundel County - Departures



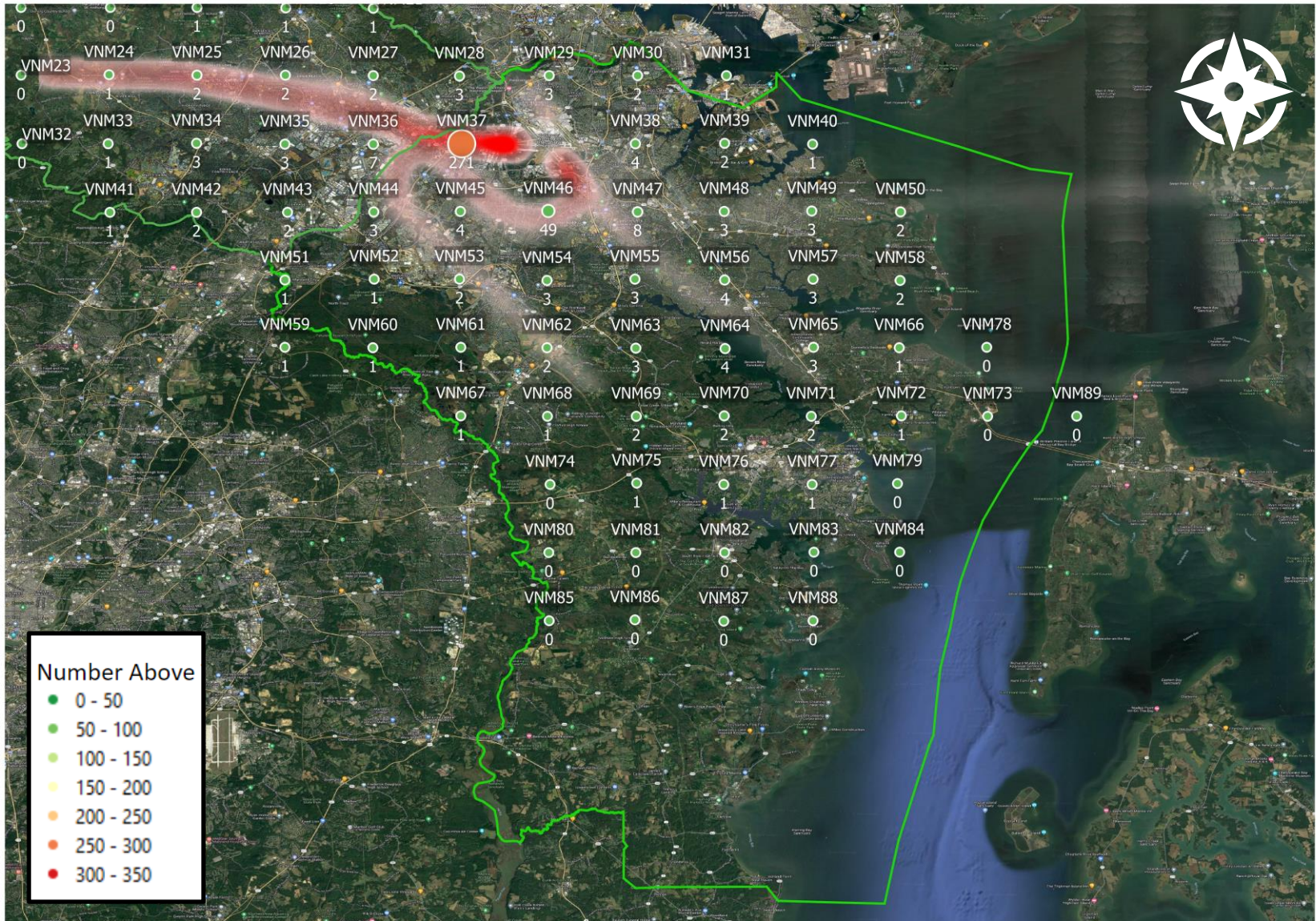
Noise Exposure: Number-of-Events-Above 65 dBA (Daily Average)

Anne Arundel County - Departures



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

Anne Arundel County - Departures



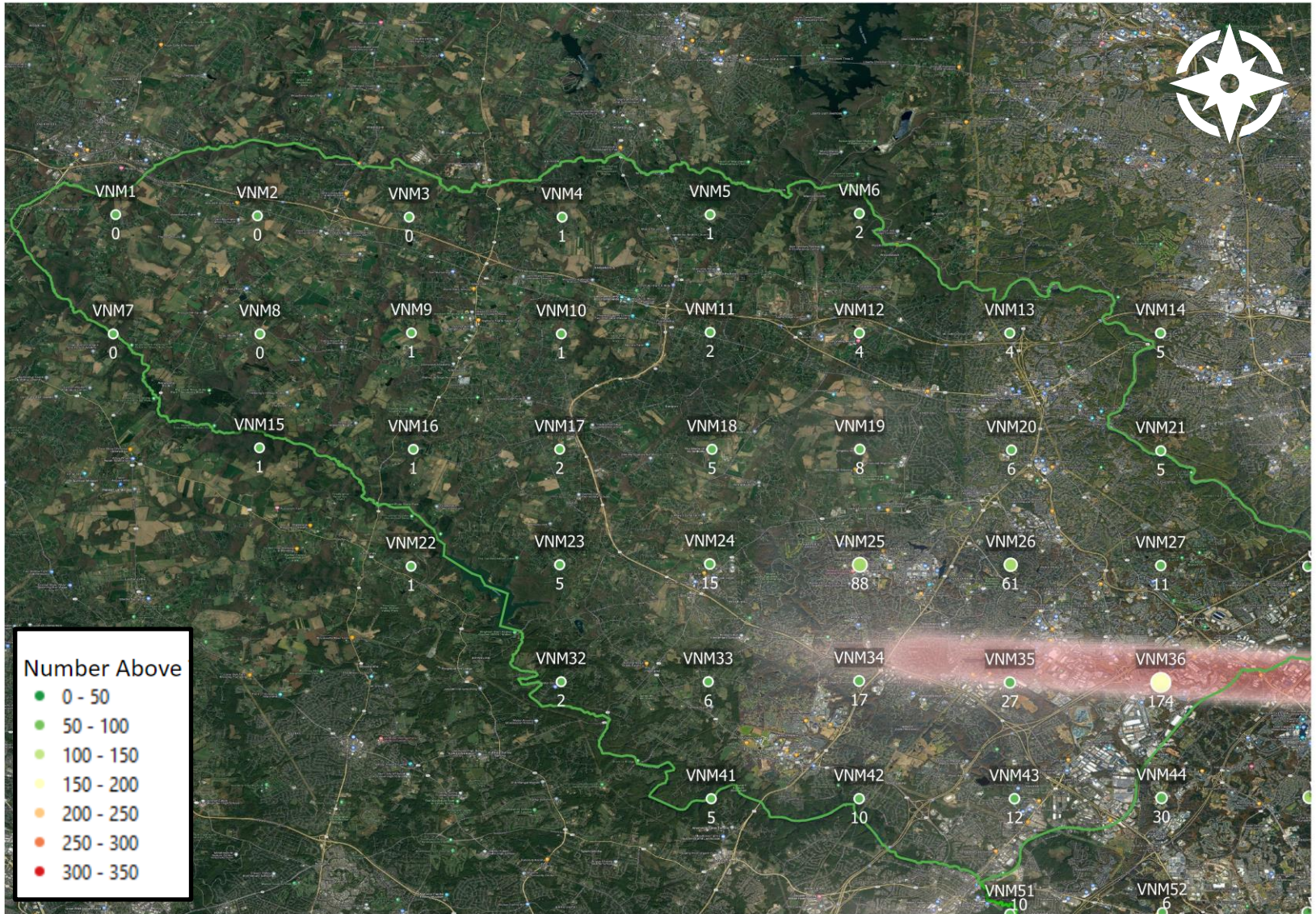
Noise Exposure: Number-of-Events-Above 55 dBA (Daily Average)

Howard County – Arrivals



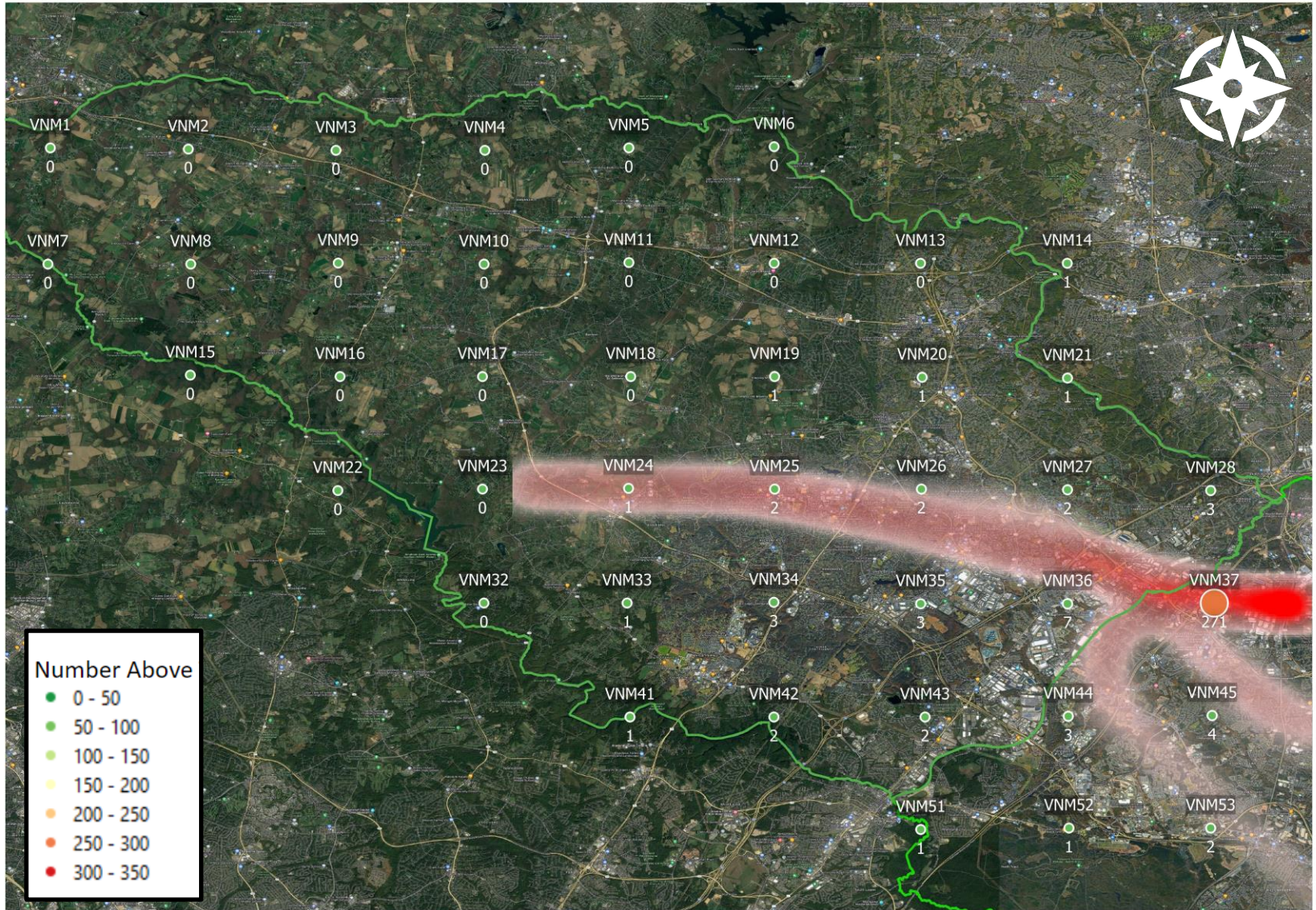
Noise Exposure: Number-of-Events-Above 65 dBA (Daily Average)

Howard County – Arrivals



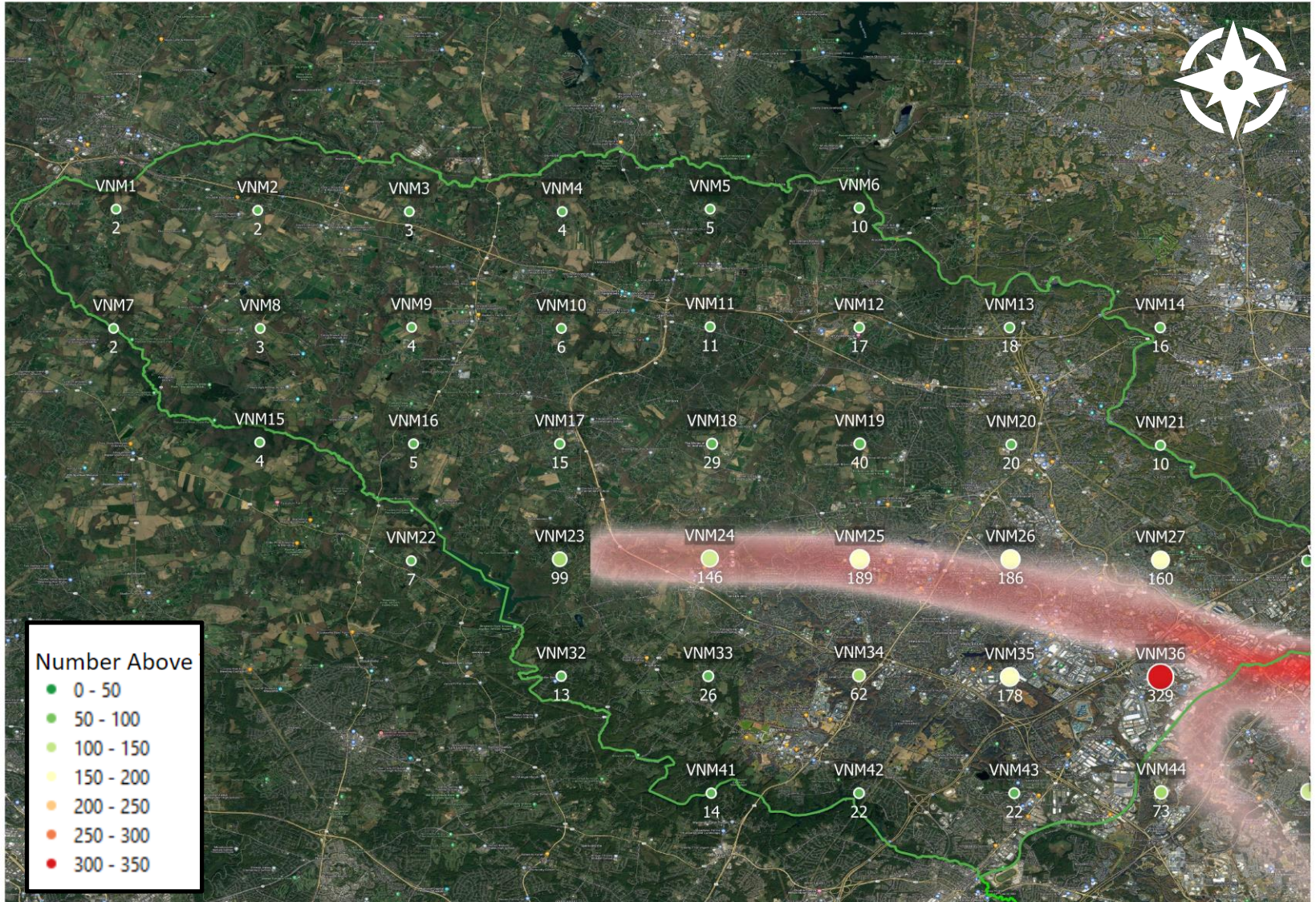
Noise Exposure: Number-of-Events-Above 75 dBA (Daily Average)

Howard County – Arrivals



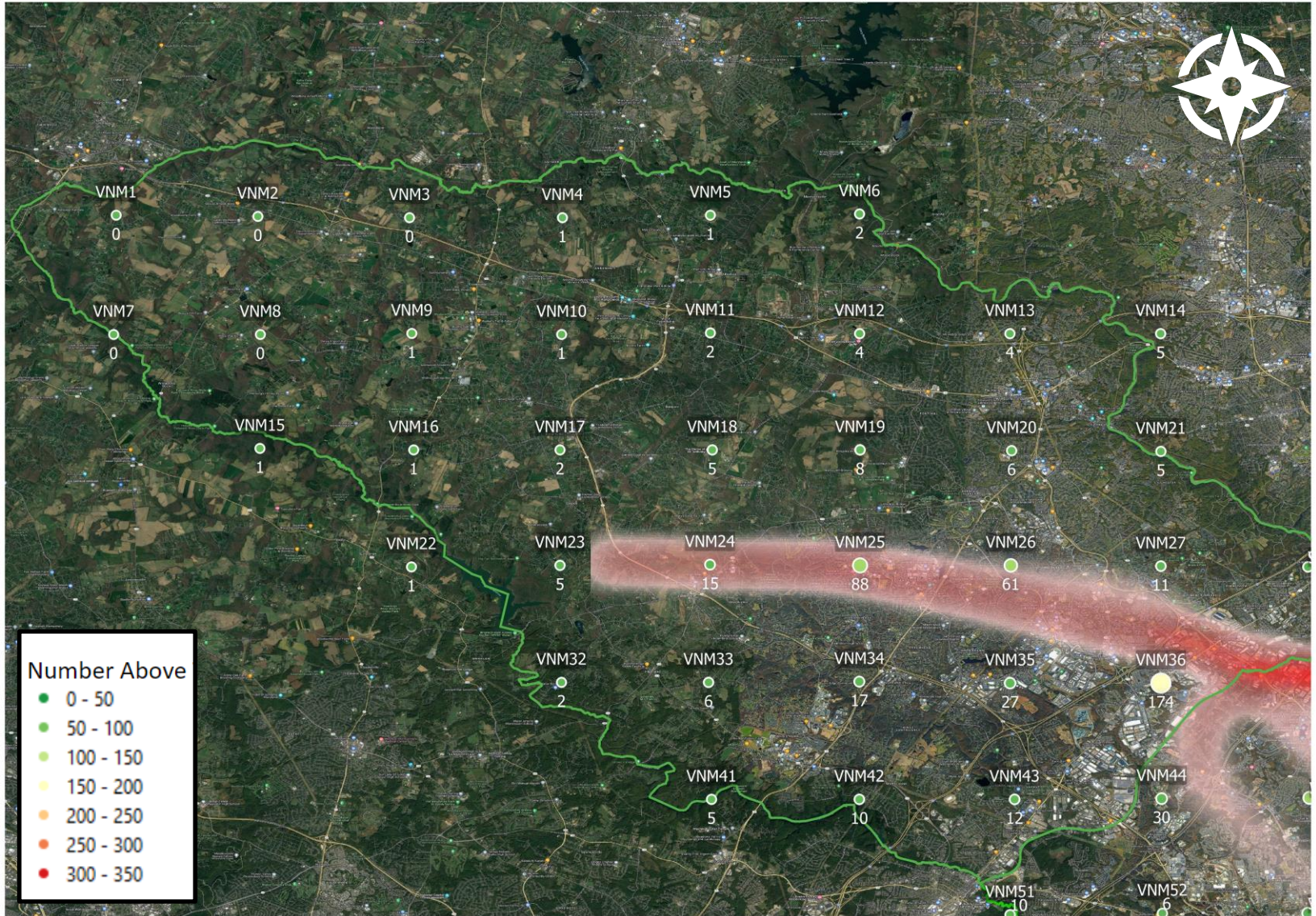
Noise Exposure: Number-of-Events-Above 55 dBA (Daily Average)

Howard County – Departures



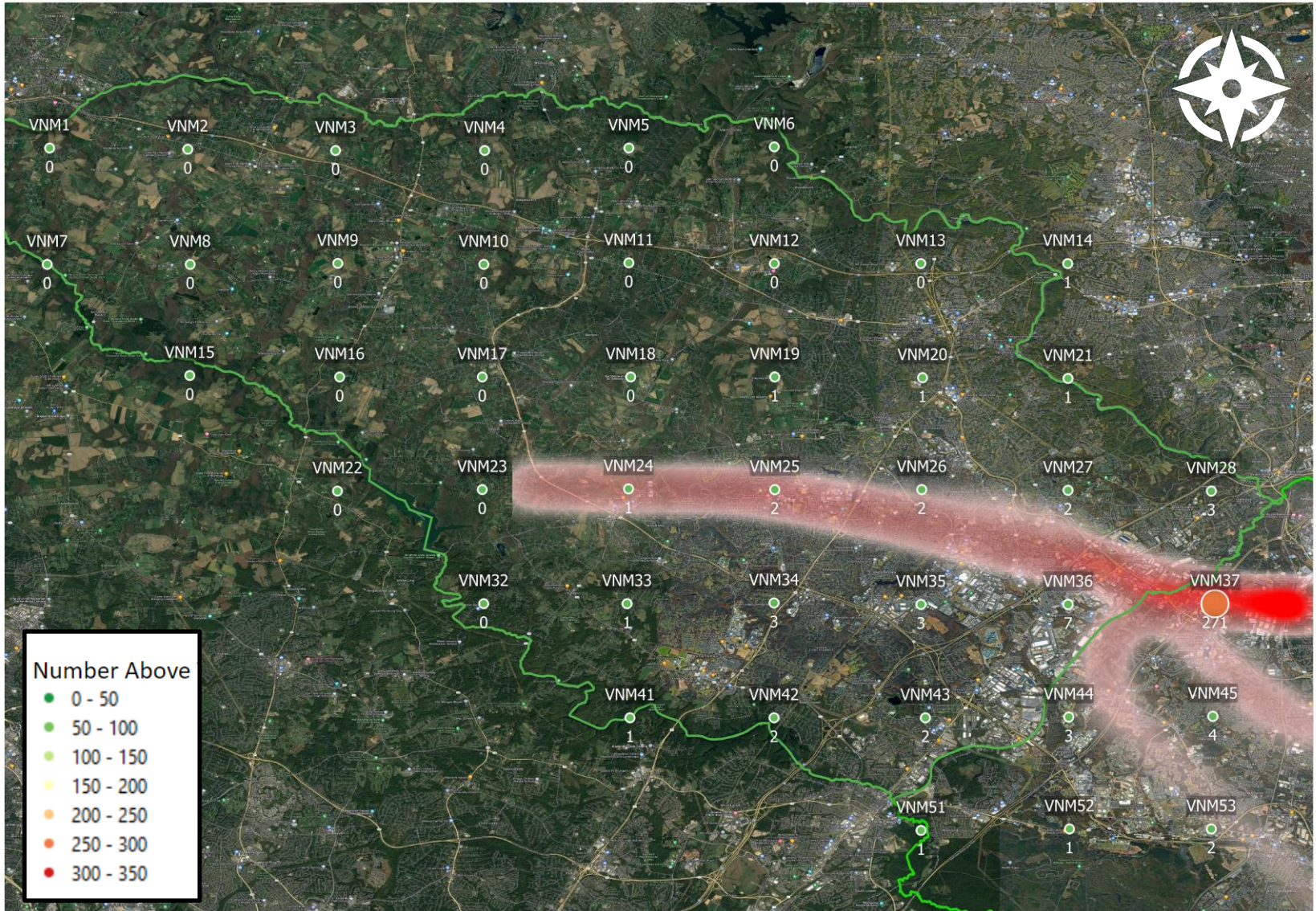
Noise Exposure: Number-of-Events-Above 65 dBA (Daily Average)

Howard County – Departures



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

Howard County – Departures



Noise Event Data

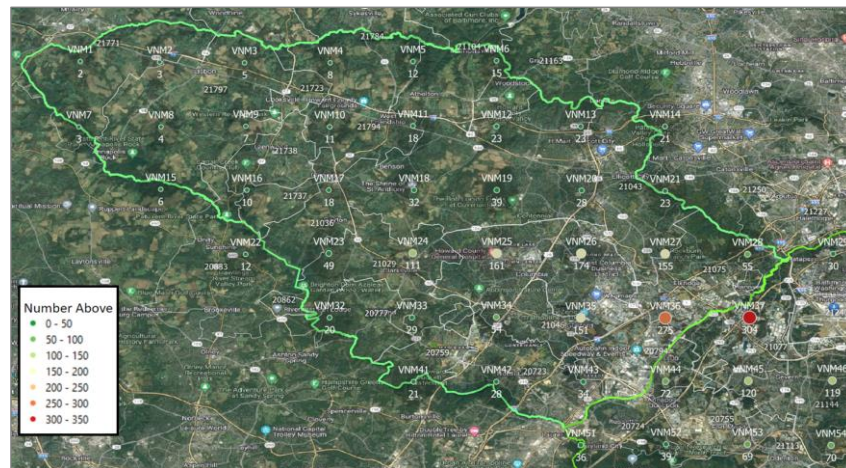
DNL

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	23.62
VNM2	26.06
VNM3	25.91
VNM4	28.89
VNM5	33.54
VNM6	39.8
VNM7	27.71
VNM8	29.98
VNM9	31.28
VNM10	33.65
VNM11	40.04
VNM12	44.75
VNM13	44.46
VNM14	44.7
VNM15	28.28
VNM16	33.95
VNM17	40.98
VNM18	47.77
VNM19	49.08
VNM20	47.4
VNM21	45.33
VNM22	33.69
VNM23	46.22
VNM24	54
VNM25	57.03

Name	DNL
VNM26	57.32
VNM27	54.44
VNM28	50.83
VNM29	48.31
VNM30	44.22
VNM31	43.08
VNM32	41.17
VNM33	47.98
VNM34	60.49
VNM35	57.73
VNM36	61.31
VNM37	73.94
VNM38	54.37
VNM39	48.24
VNM40	50.98
VNM41	47.22
VNM42	51.22
VNM43	50.76
VNM44	53.82
VNM45	56.99
VNM46	65.83
VNM47	60.23
VNM48	53.94
VNM49	54.84
VNM50	50.45

Name	DNL
VNM51	49.64
VNM52	45.49
VNM53	52.25
VNM54	49.77
VNM55	54.72
VNM56	55.4
VNM57	54.5
VNM58	49.16
VNM59	42.19
VNM60	50.07
VNM61	45.36
VNM62	49.71
VNM63	50.24
VNM64	57.38
VNM65	51.66
VNM66	46.47
VNM67	45.42
VNM68	48.43
VNM69	47.15
VNM70	52.55
VNM71	49.09
VNM72	44.73
VNM73	38.25
VNM74	43.58
VNM75	45.67

Name	DNL
VNM76	47.29
VNM77	43.37
VNM78	41.32
VNM79	39.4
VNM80	35.37
VNM81	36.69
VNM82	35.48
VNM83	31.92
VNM84	32.92
VNM85	27.45
VNM86	27.12
VNM87	26.64
VNM88	25.68
VNM89	33.18

Noise Exposure: DNL (Daily Average)

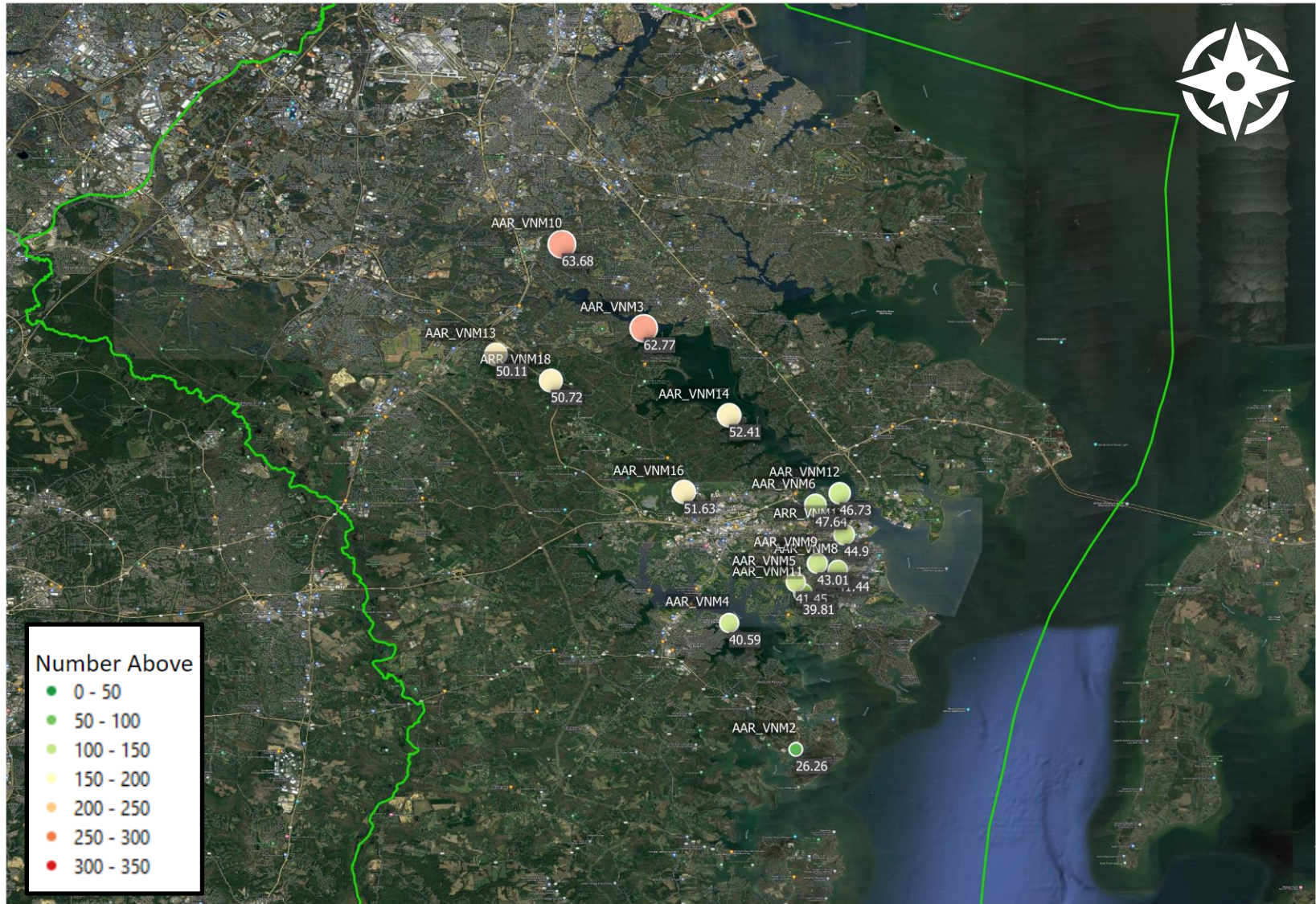
Landmark VNMs

Name	DNL
AAR_VNM1	19.5
AAR_VNM2	26.3
AAR_VNM3	62.8
AAR_VNM4	40.6
AAR_VNM5	41.5
AAR_VNM6	47.6
AAR_VNM7	15.1
AAR_VNM8	41.4
AAR_VNM9	43.0
AAR_VNM10	63.7
AAR_VNM11	39.8
AAR_VNM12	46.7
AAR_VNM13	50.1
AAR_VNM14	52.4
ARR_VNM15	31.2
AAR_VNM16	51.6
ARR_VNM17	44.9
ARR_VNM18	50.7

Name	DNL
HOCO_VNM1	59.9
HOCO_VNM2	53.3
HOCO_VNM3	52.1
HOCO_VNM4	57.0
HOCO_VNM5	58.2
HOCO_VNM6	59.2
HOCO_VNM7	59.9
HOCO_VNM8	62.4
HOCO_VNM9	61.0
HOCO_VNM10	56.1
HOCO_VNM11	41.5
HOCO_VNM12	58.7
HOCO_VNM13	63.0
HOCO_VNM14	62.7
HOCO_VNM15	45.5
HOCO_VNM16	62.7
HOCO_VNM17	69.3
HOCO_VNM18	52.1

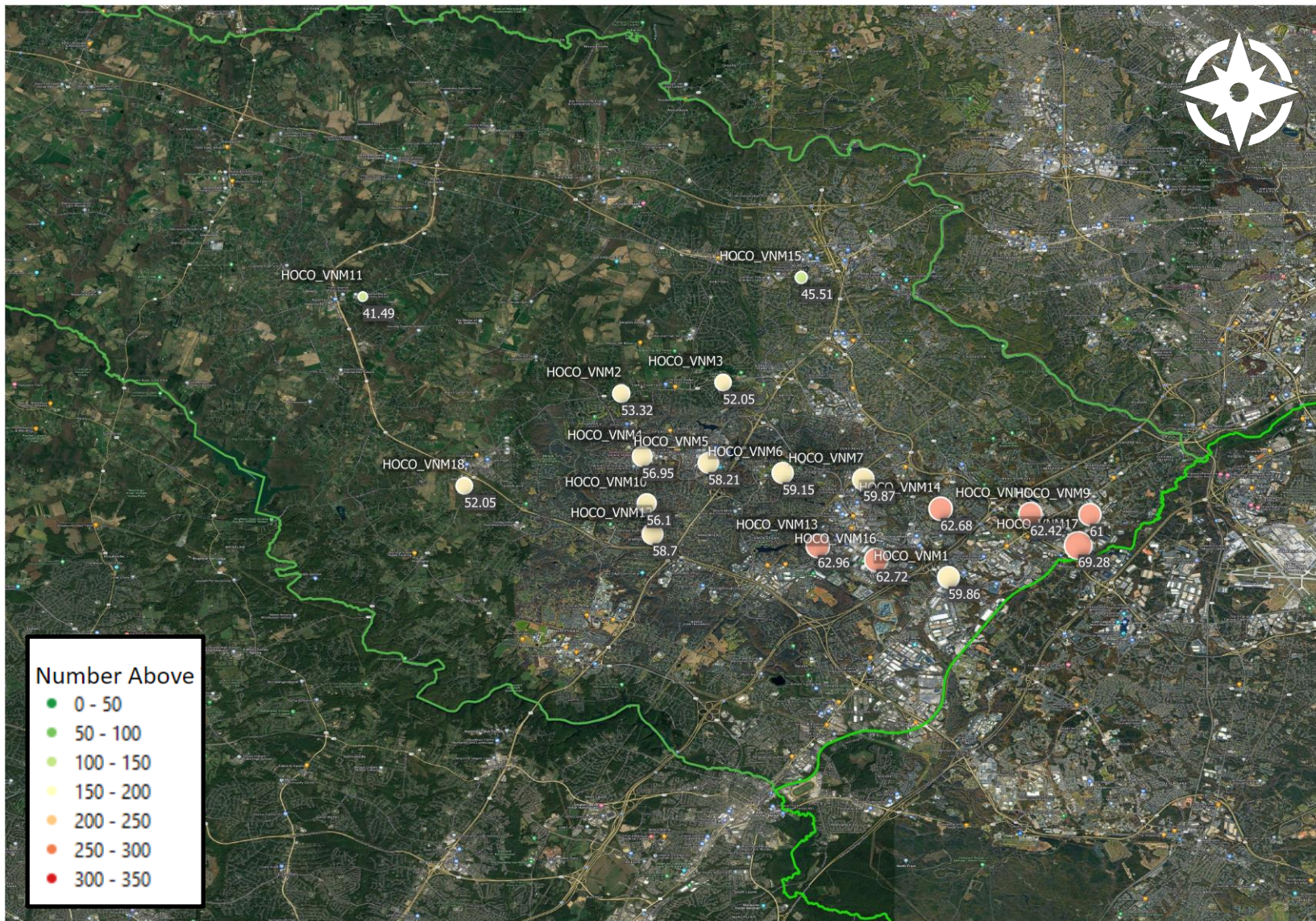
Noise Exposure: DNL (Daily Average)

Anne Arundel County – Landmark Locations



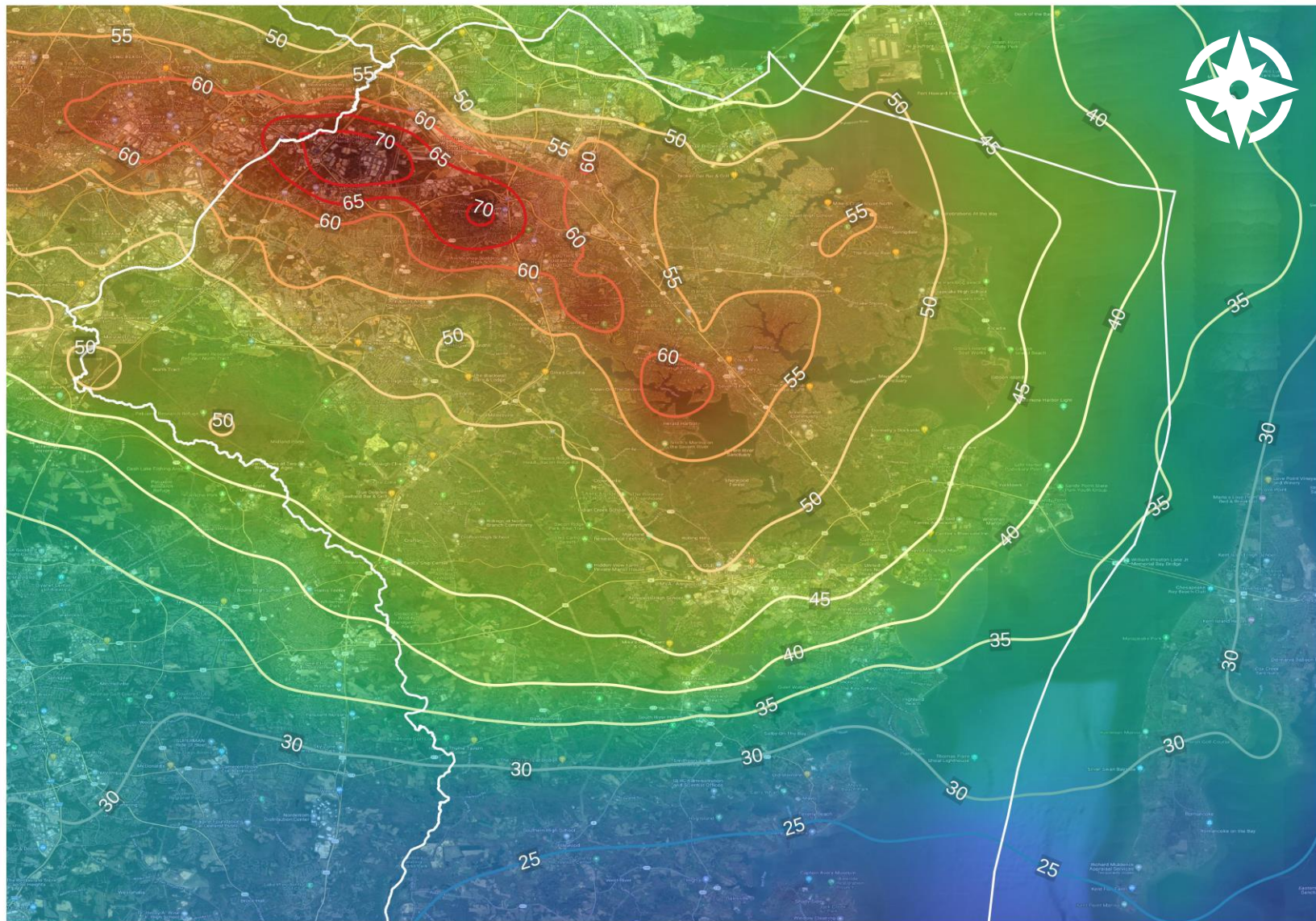
Noise Exposure: DNL (Daily Average)

Howard County – Landmark Locations



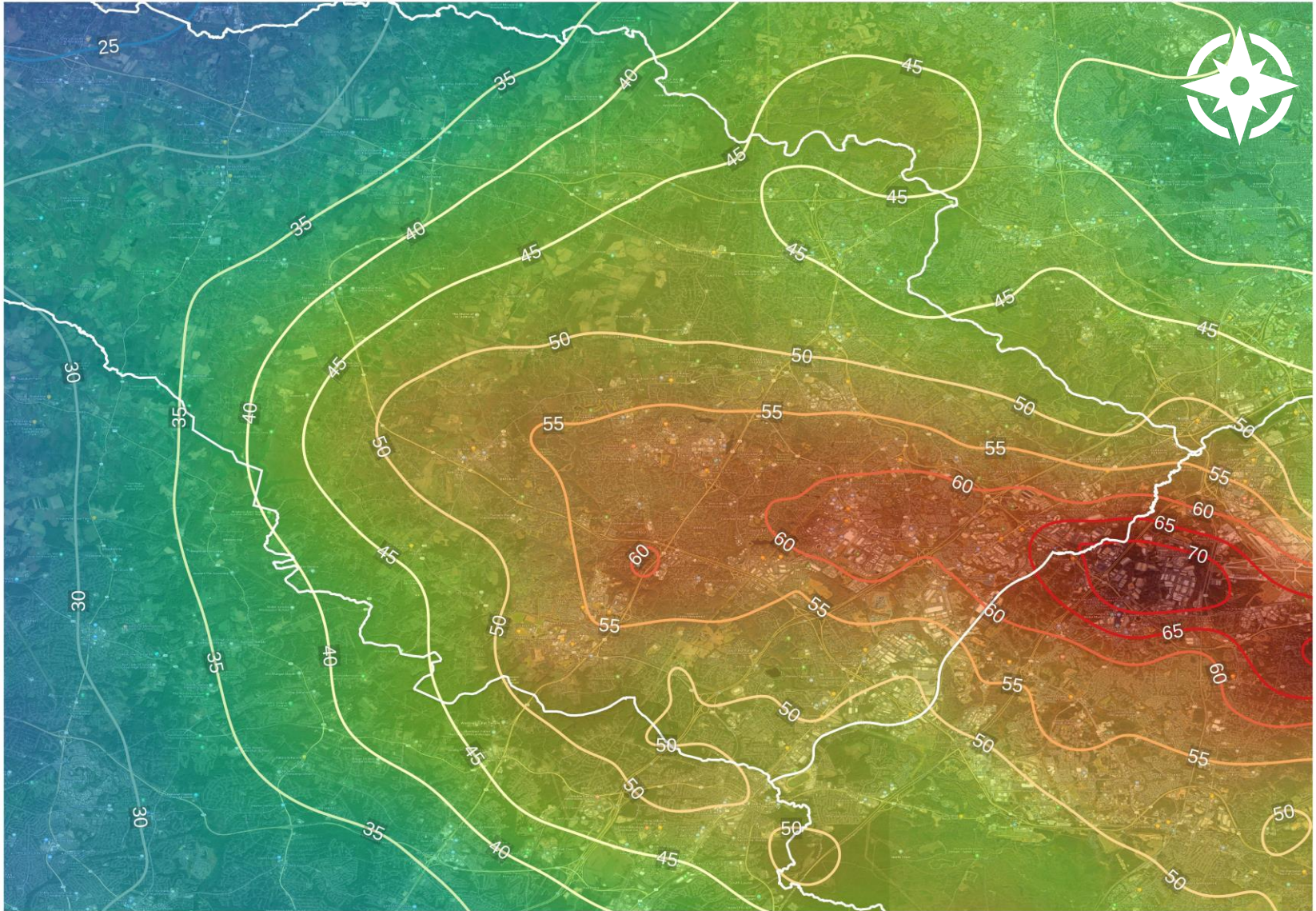
Noise Exposure: DNL Contours (Daily Average)

Anne Arundel County



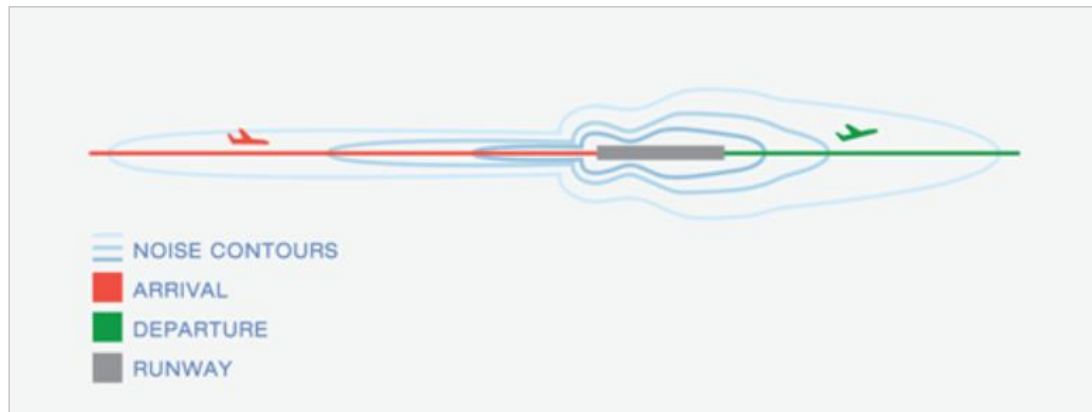
Noise Exposure: DNL Contours (Daily Average)

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).

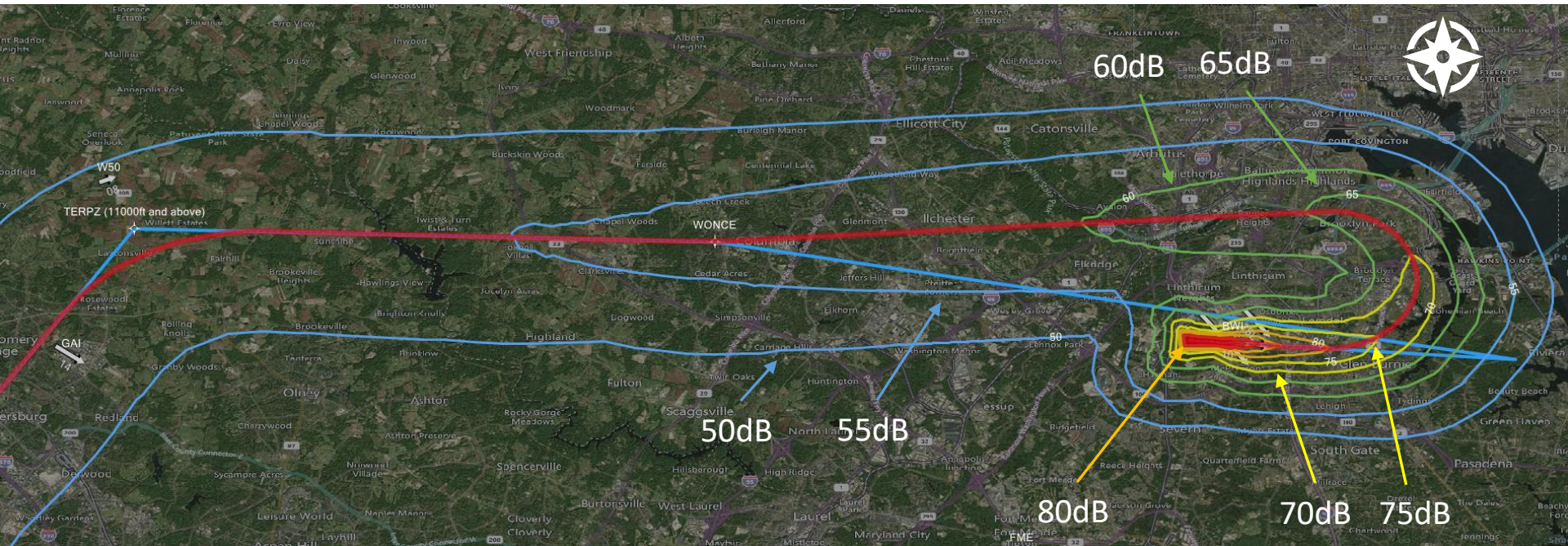


Source: Federal Aviation Administration (https://www.faa.gov/regulations_policies/policy_guidance/noise/basics)

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_{max} 737-700 Departure RWY 10



Aircraft Type: B737-700

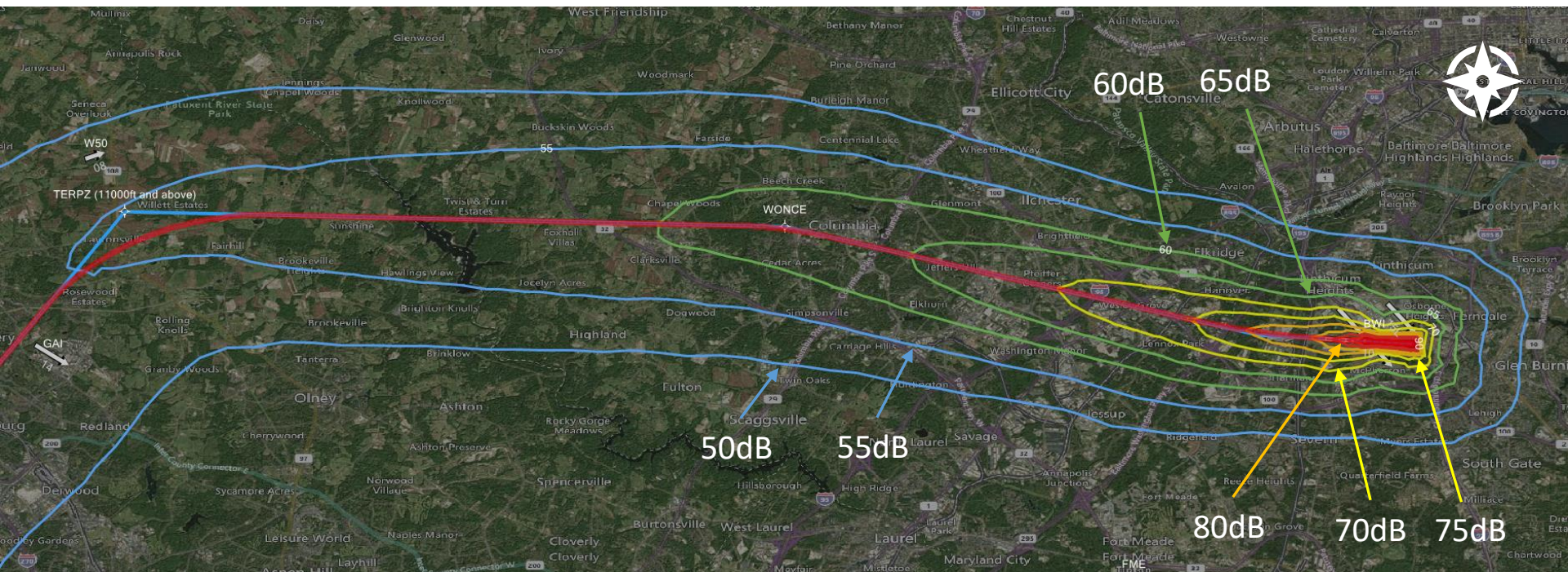
Stage Length: 3

Standard Profile

Noise contours based on A-weighted decibels (dBA)

Single Event Noise Contours

L_{max} 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

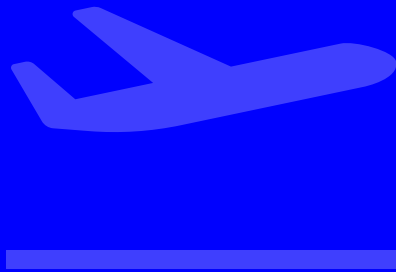


vianair

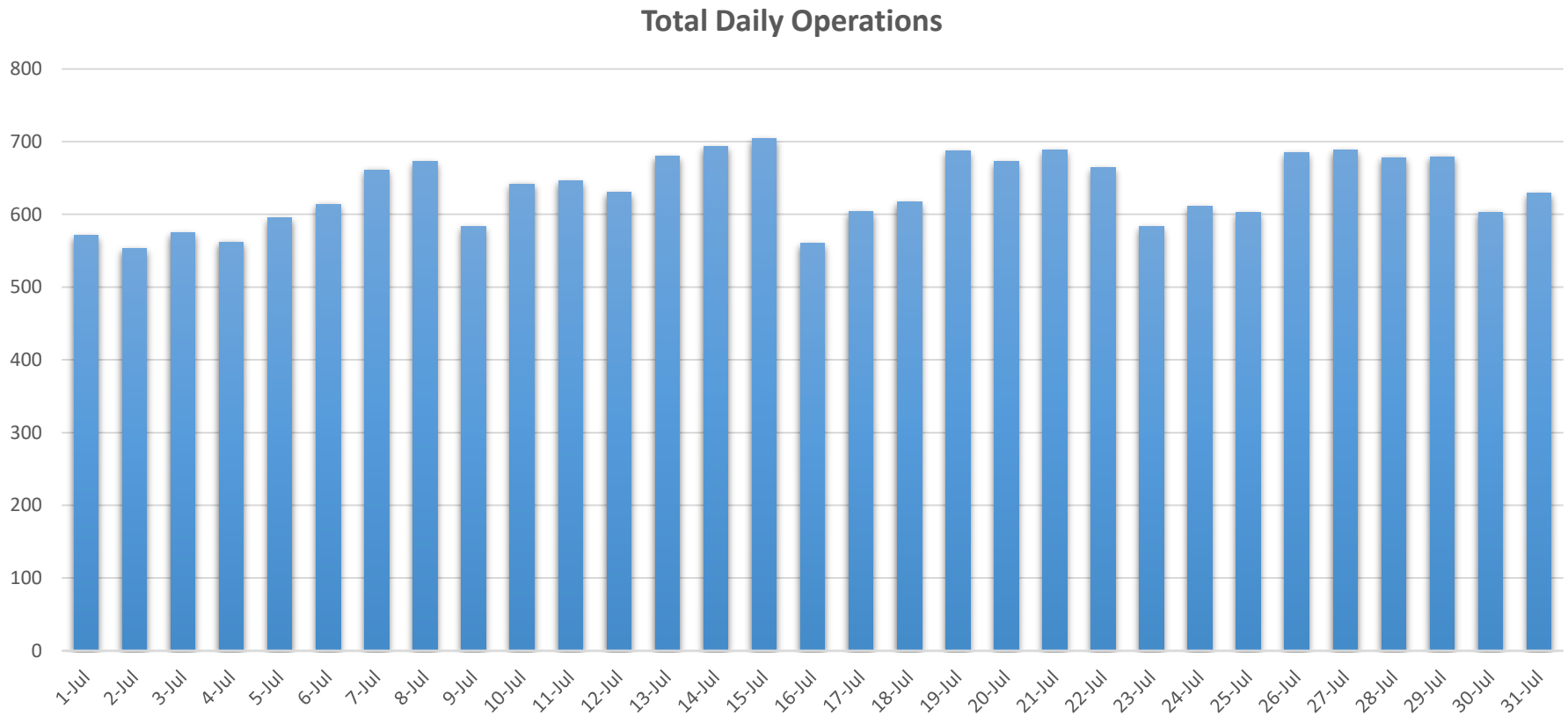
airspace design made easy

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APPENDIX I:
SUPPLEMENTAL
OPERATIONAL STATISTICS



Total Operations

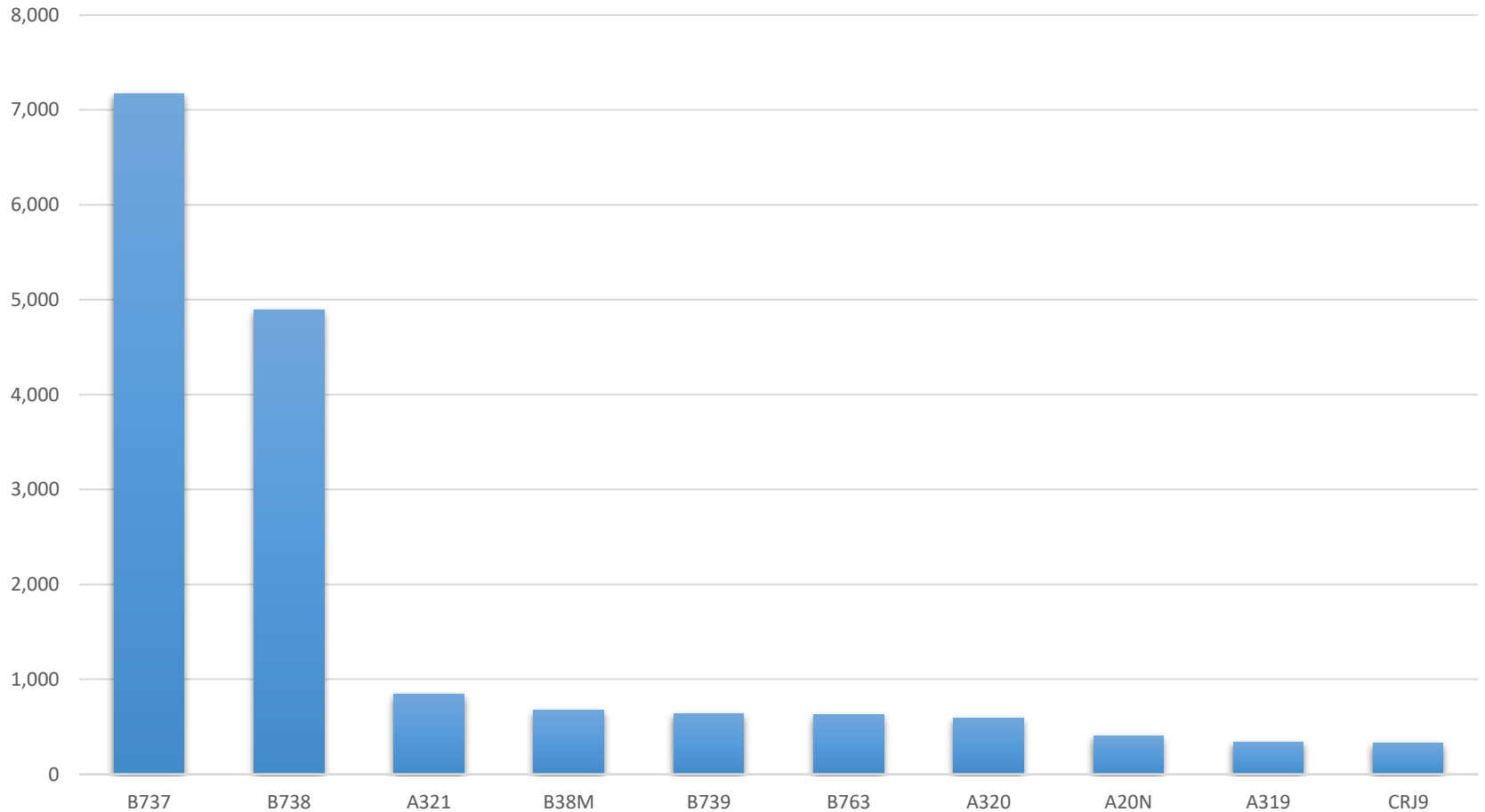


Total Monthly Operations 19,633

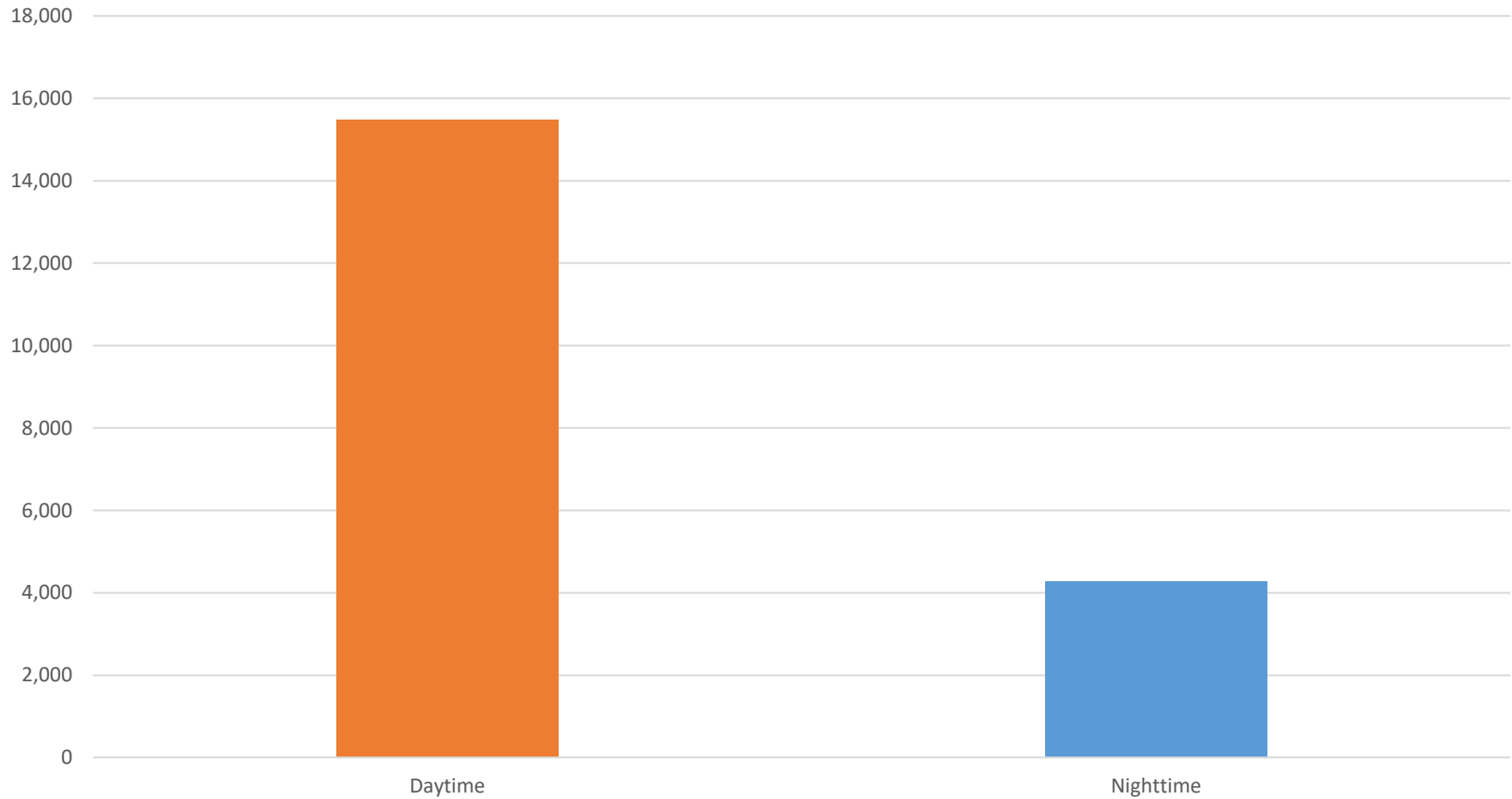
Average Daily Operations 633

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

Total Operations by Aircraft Type
(Top 10 Aircraft)

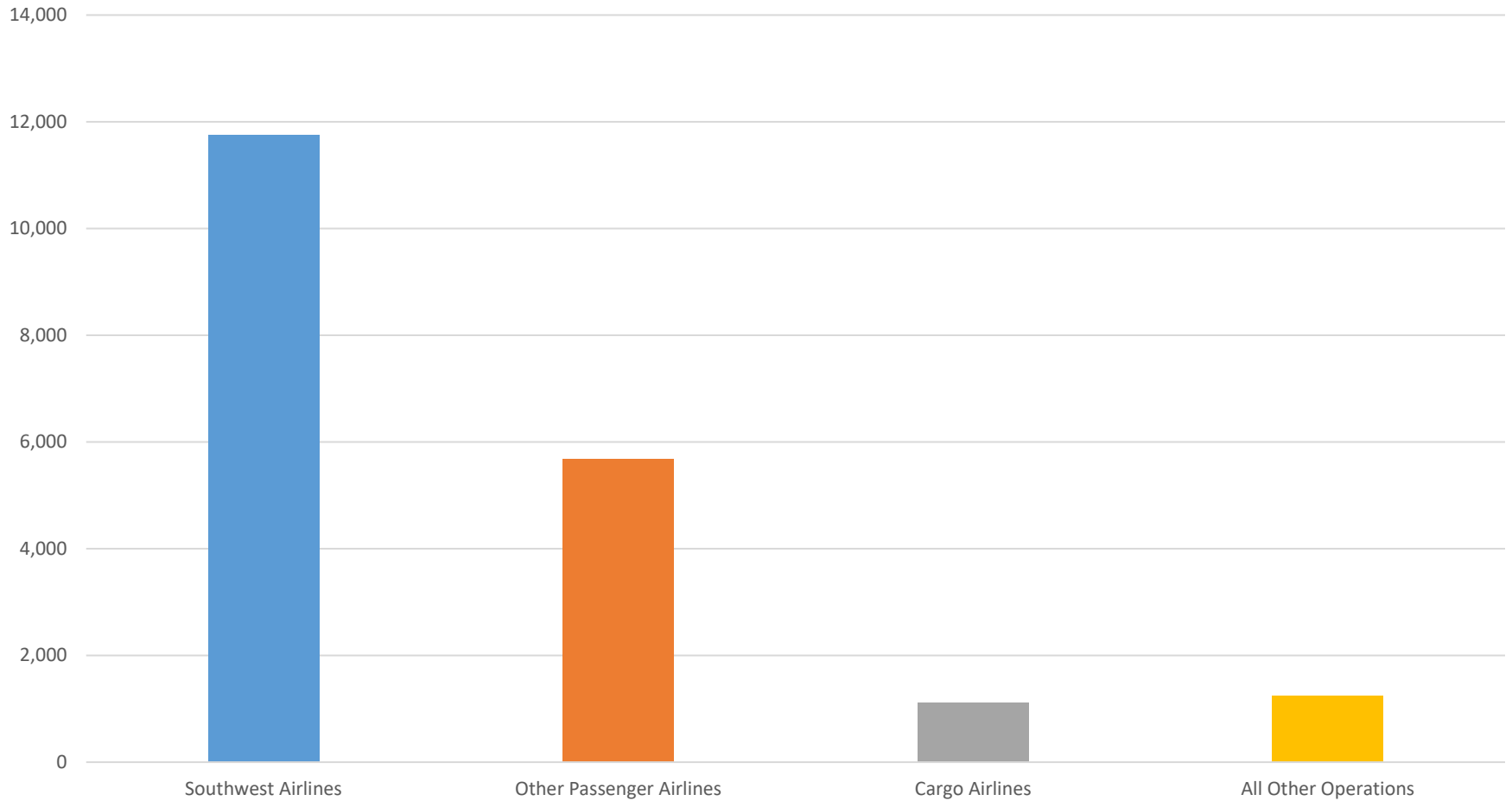


Total Operations: Daytime vs. Nighttime

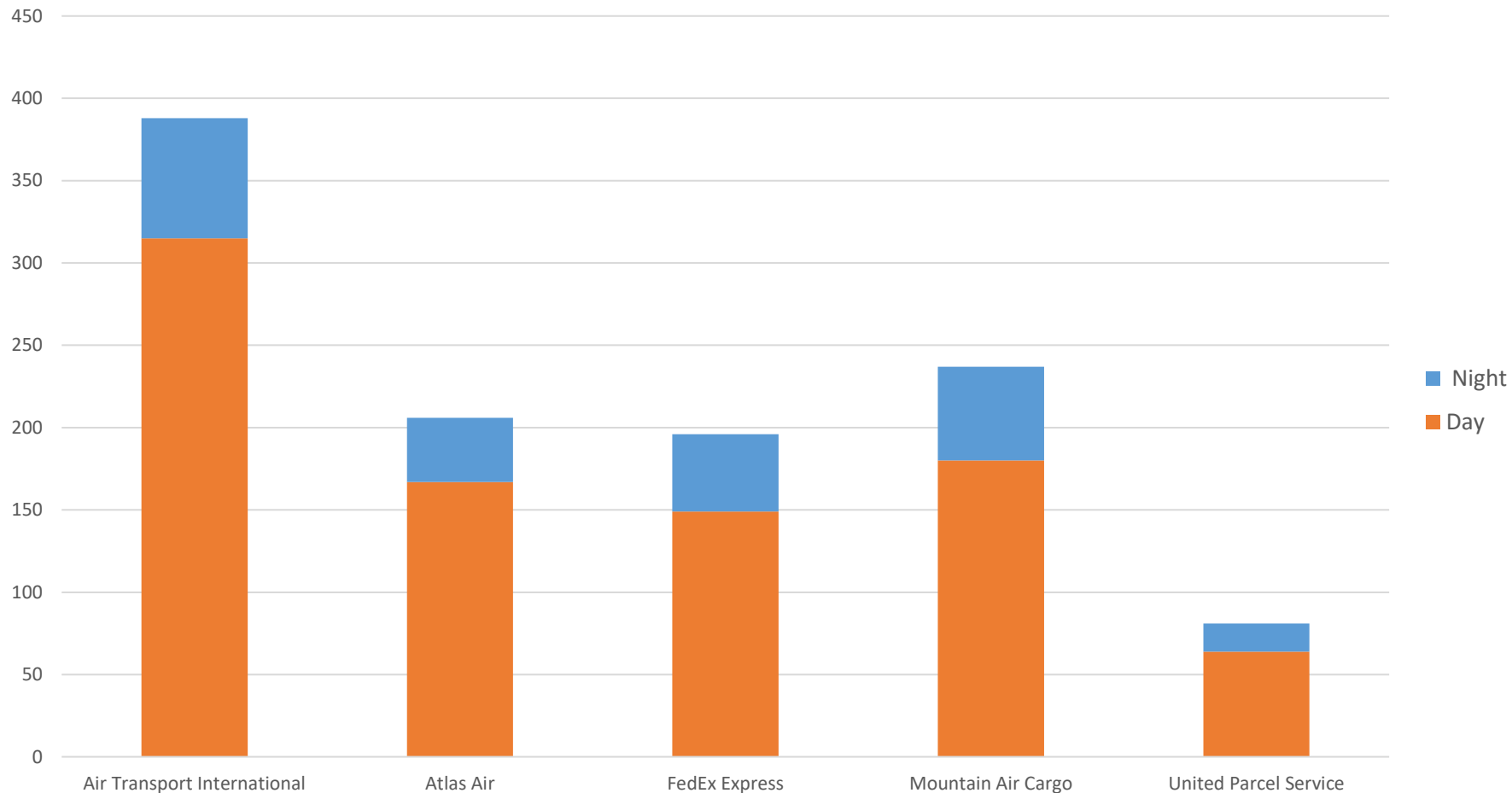


"Nighttime Hours" are from 10PM - 7AM

Total Operations: Southwest Airlines vs. Other



Cargo Operations: Daytime versus Nighttime



Nighttime hours are from 10PM-7AM.