



Welcome!

Noise Compatibility Study (Part 150) Update Piedmont Triad International Airport Technical Advisory Committee Meeting #2 October 2, 2019



Meeting Agenda

- Welcome and introductions
- Aircraft operations forecast
- Land use
- Noise model inputs
- Noise measurement program
- TAC member discussion
- Adjournment

Piedmont Triad Airport Authority

- **Kevin Baker, Executive Director**
 - Part 150 Airport Sponsor
- **Alex Rosser, Deputy Executive Director**
 - Part 150 Program Manager
- **Suzanne Akkoush, Project Manager – Noise Program**
 - Part 150 Project Manager



Part 150 Consultant Team

- **Gene Reindel, HMMH Vice President**
 - Part 150 Principal
- **Bob Mentzer, HMMH Principal Consultant**
 - Part 150 Project Manager
- **Kate Larson, HMMH Senior Consultant**
 - Part 150 Assistant Project Manager
- **Ron Miller, Ron Miller & Associates**
 - Part 150 Public Outreach



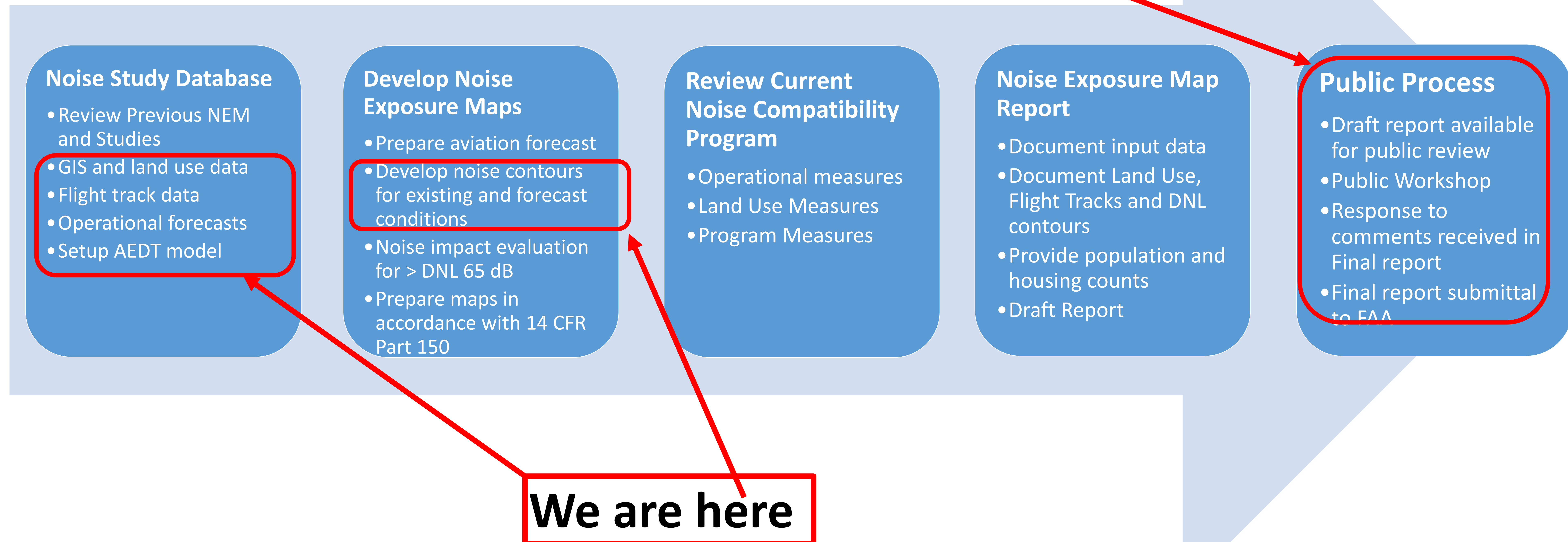
TAC Members

Name	Affiliation	Name	Affiliation	Name	Affiliation
Lisa Cooke	FAA, Memphis ADO	Jim Messura	FedEx	Steve Galanti	Greensboro
Felicia Reeves	FAA, Southern Region	Michael Robertson	DHL	Lee Burnette	High Point
Charlie Dale	FAA, ATCT/TRACON - FAA	David Daubenmire	UPS	Matthew Johnson	Jamestown
Ryan Hampton	FAA, ATCT/TRACON - NATCA	Brian Hofheins	HAECO Americas	Rochelle Joseph	Kernersville
John Parker	FAA, FSDO	Israel Stolze	Cessna/Textron	Chris York	Summerfield
Jose Rullan	American Airlines	Nathan Wilsford	GTCC	Sean Taylor	Oak Ridge
Bryan Street	Delta Airlines	Bernie Dalere	US Customs and Border Protection	Ted Kaplan	Forsyth County
Erica Simmons	Spirit Airlines	Jason Dean	Honda Aircraft Company	Joe Saldarini	CAC Chair
Donald Brookshire	Signature Flight Support	Rachel Wall	Samaritan's Purse	Janet Mazzurco	CAC Co-Chair
Scott Stuart	Koury Aviation	Kaye Graybeal	Guilford County		



Part 150 Update Status

Spring, 2020



Part 150 Update Public Process

- First Round of TAC/CAC meetings held in June 2019 at the airport
- Presentations for both meetings available at <https://ptipart150update.com/public-outreach/>



Part 150 Update Public Process

- First Public Workshop held in June 2019 at the Airport Marriott
- About 140 people participated
- The Workshop Boards are available at <https://ptipart150update.com/public-outreach/>
- Public Comments were collected and helped to develop the website FAQs page <https://ptipart150update.com/faqs/>



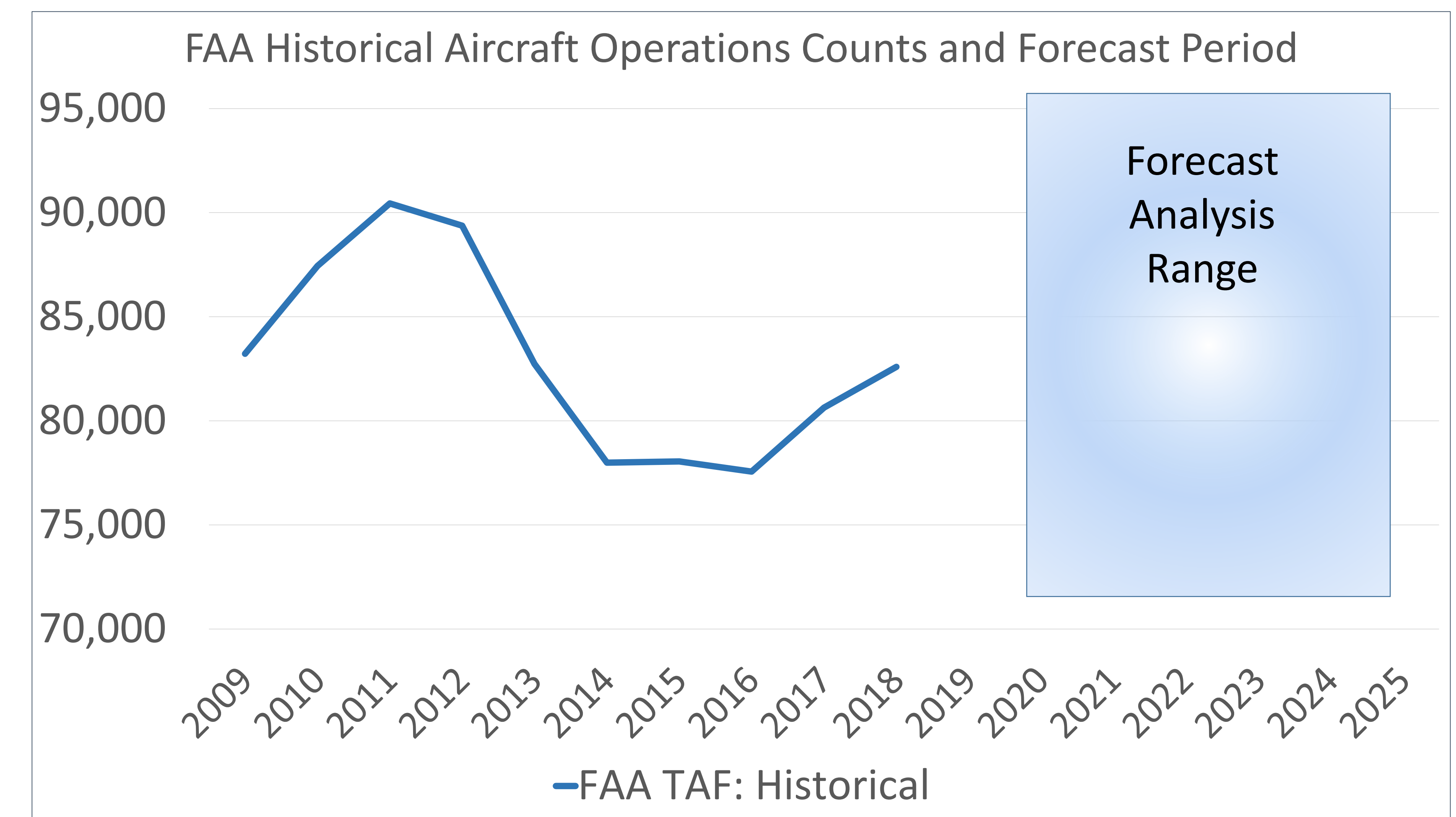
Aircraft Operations Forecast

- Forecast Data collection:
 - Over a year of operational data collected by the PTAA NOIARS
 - PTAA and Study Team met with airport tenants over a two-day period on-site
 - PTAA provided historical passenger and cargo data
 - FAA OPSNET data (Tower Operations)
 - FAA Terminal Area Forecast (TAF)
 - Various other historical and forecast data sets and documents
- The FAA approves all aviation forecasts for use in any planning study.
 - FAA's 2018 Terminal Area Forecast (TAF), published Feb 2019, is the primary reference
 - 2020 is the forecast year for the existing condition Noise Exposure Map
 - 2025 is the forecast year for the five-year forecast condition Noise Exposure Map



Aircraft Operations Forecast

- Aviation forecasts for Part 150 represent average annual day of aircraft operations by aircraft type and time of day including:
 - Commercial (passenger)
 - Air taxi (passenger)
 - Air cargo (freight)
 - General aviation (private)
 - Military
- Forecast development includes:
 - Analysis of socioeconomic, demographics, and recent airport trends
 - Projections using statistical econometric models



Passenger Flight Market Analysis

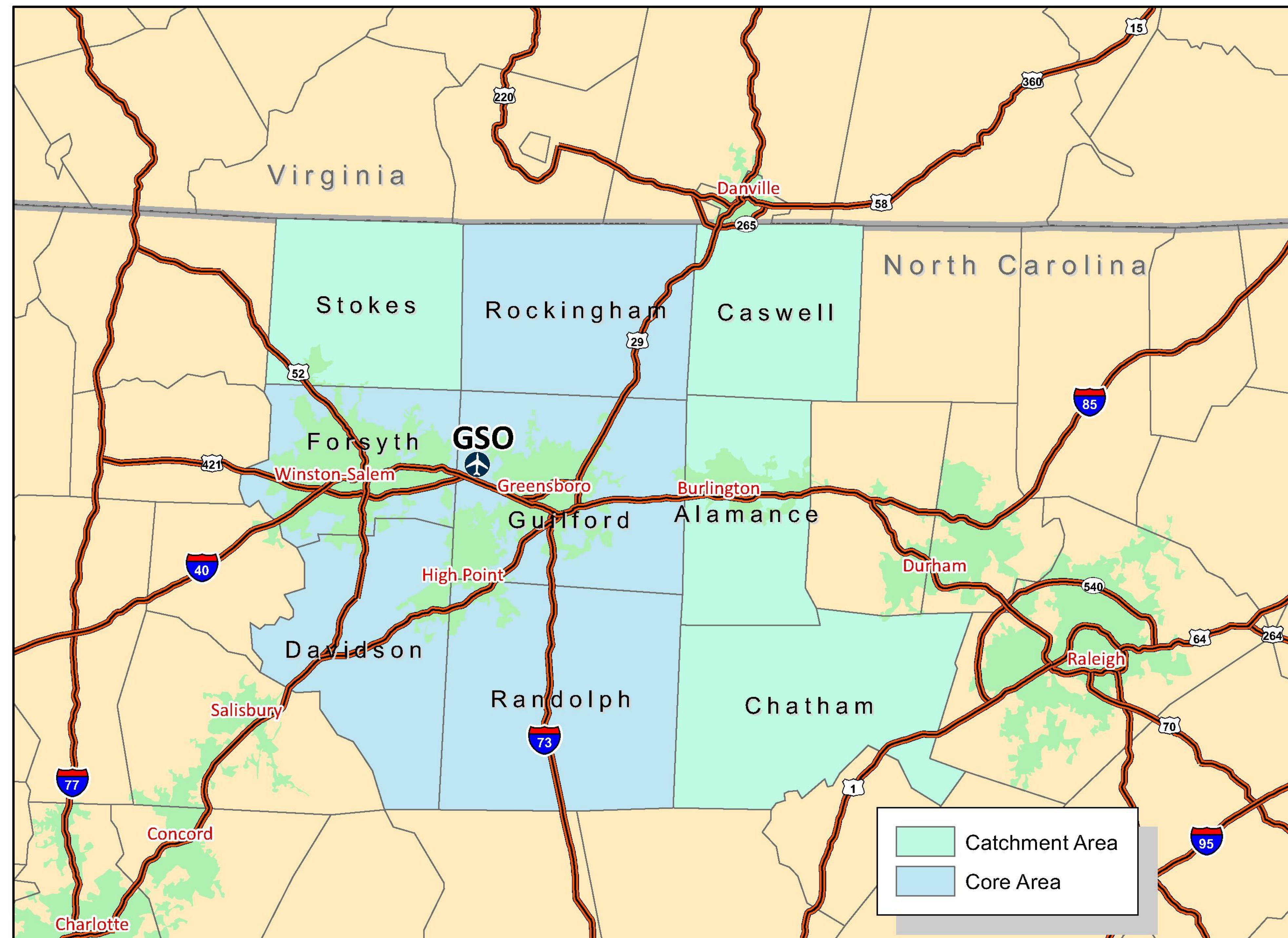


Figure 1-2
GSO Catchment and Core Areas

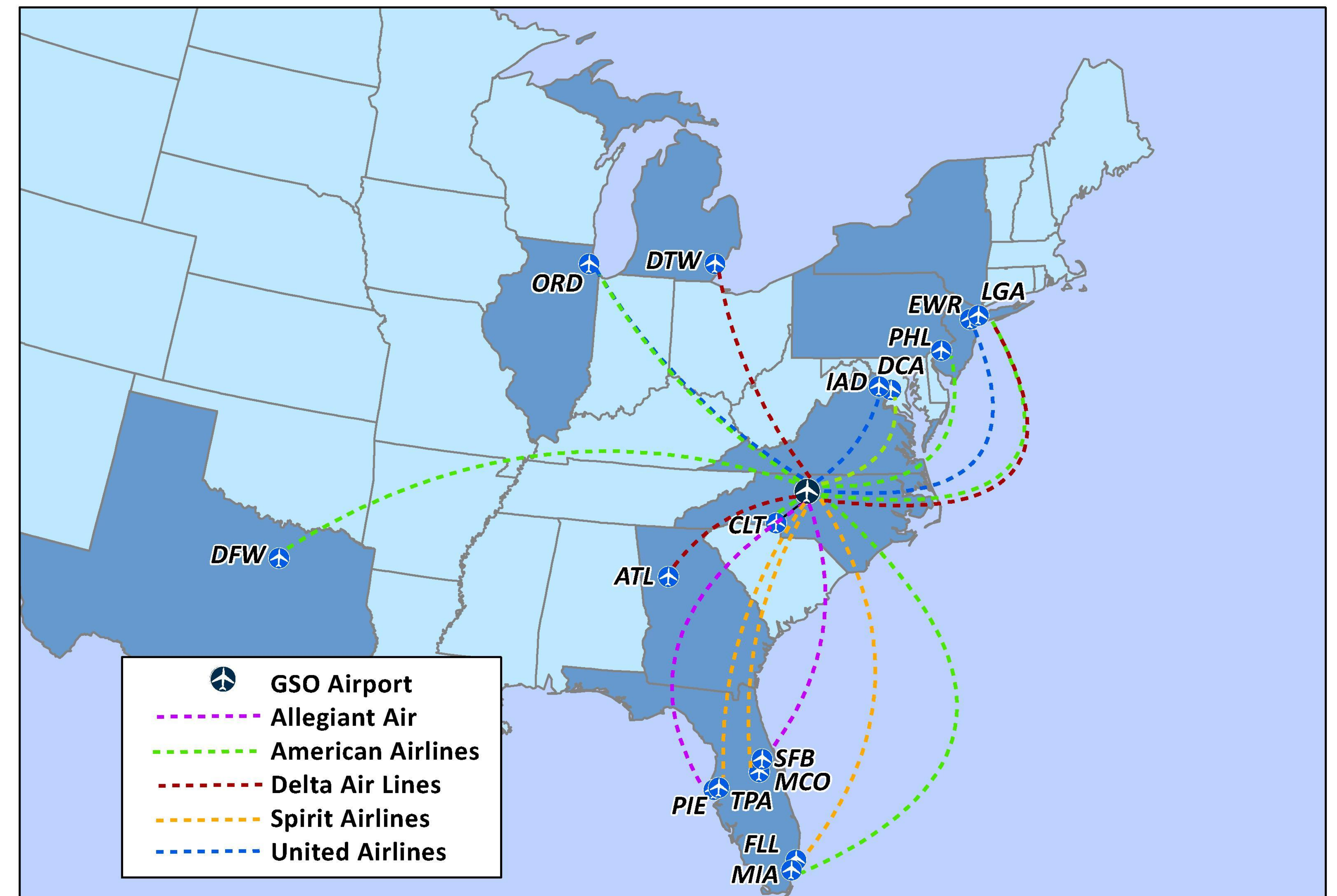
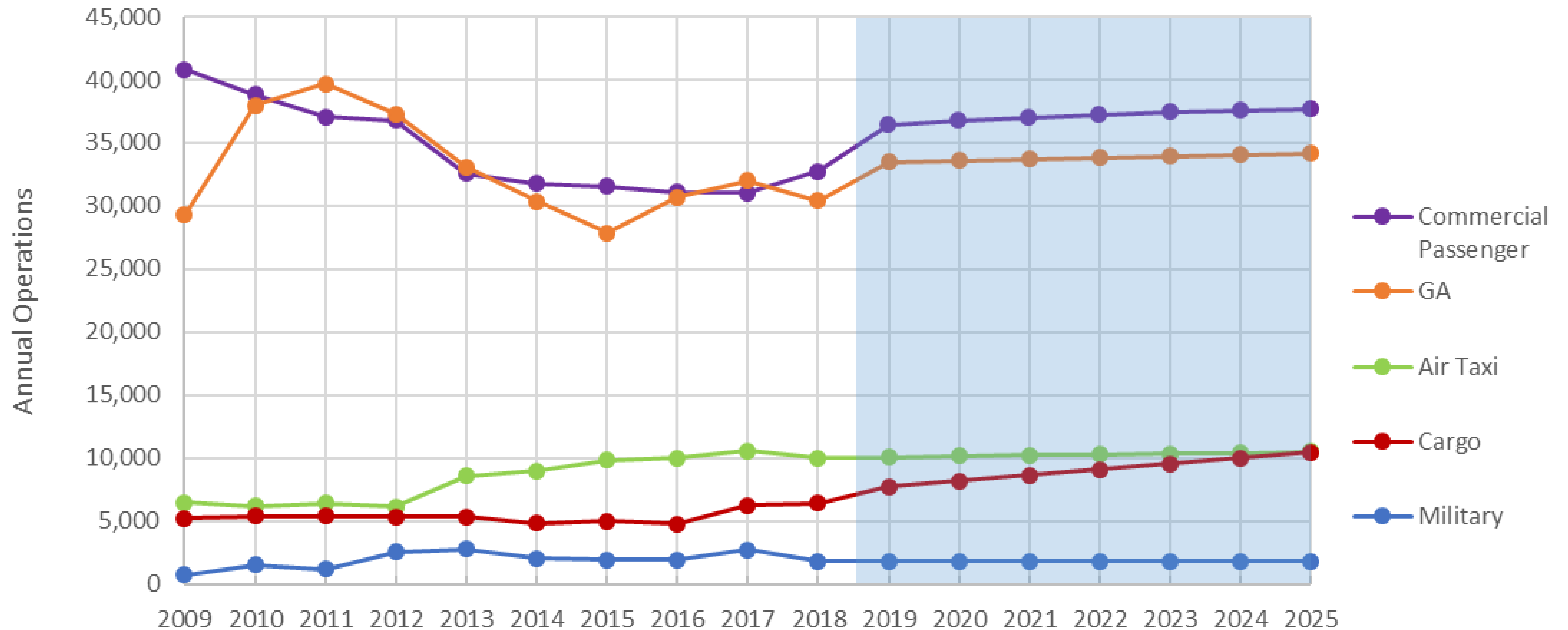


Figure 1-1
GSO Non-Stop Route Map

Aircraft Operations, Historical and Draft Forecast



Draft Aircraft Operations Forecast

Year	Based Aircraft	Enplanements	Itinerant Operations						Local Operations			Total Airport Operations
			Air Carrier	Air Taxi	Cargo	GA	Military	Total Itinerant	Civil	Military	Total Local	
2018	99	941,025	32,774	10,034	6,458	24,596	1,453	75,315	5,816	383	6,199	81,514
2019	99	1,040,213	36,012	10,043	7,756	26,878	1,453	82,143	6,635	383	7,018	89,160
2020	99	1,067,533	36,359	10,053	8,204	26,964	1,453	83,033	6,656	383	7,039	90,072
2021	99	1,092,636	36,614	10,062	8,653	27,052	1,453	83,833	6,677	383	7,060	90,894
2022	98	1,116,240	36,806	10,071	9,102	27,140	1,453	84,573	6,699	383	7,082	91,656
2023	98	1,139,401	36,987	10,080	9,553	27,230	1,453	85,304	6,722	383	7,105	92,408
2024	98	1,161,533	37,124	10,090	10,004	27,321	1,453	85,992	6,744	383	7,127	93,119
2025	98	1,183,603	37,265	10,099	10,456	27,413	1,453	86,686	6,767	383	7,150	93,836
AAGR 2019-2025	-0.2%	2.2%	0.6%	0.1%	5.1%	0.3%	0.0%	0.9%	0.3%	0.0%	0.3%	0.9%
Growth 2019-2025	-1.1%	13.8%	3.5%	0.6%	34.8%	2.0%	0.0%	5.5%	2.0%	0.0%	1.9%	5.2%

Source: FAA TAF, FAA OPSNET, BTS, FAA Aerospace Forecast (FY 2019-2039), Boeing World Air Cargo Forecast (2018-2037), Airbus Global Market Forecast (2018-2037), FedEx, Koury Aviation, Signature Flight Support, Triad Aviation Academy (website), GSO Control Tower Statistics, PTAA, CHA, 2019.

NOTE: the forecast is currently pending FAA review and approval



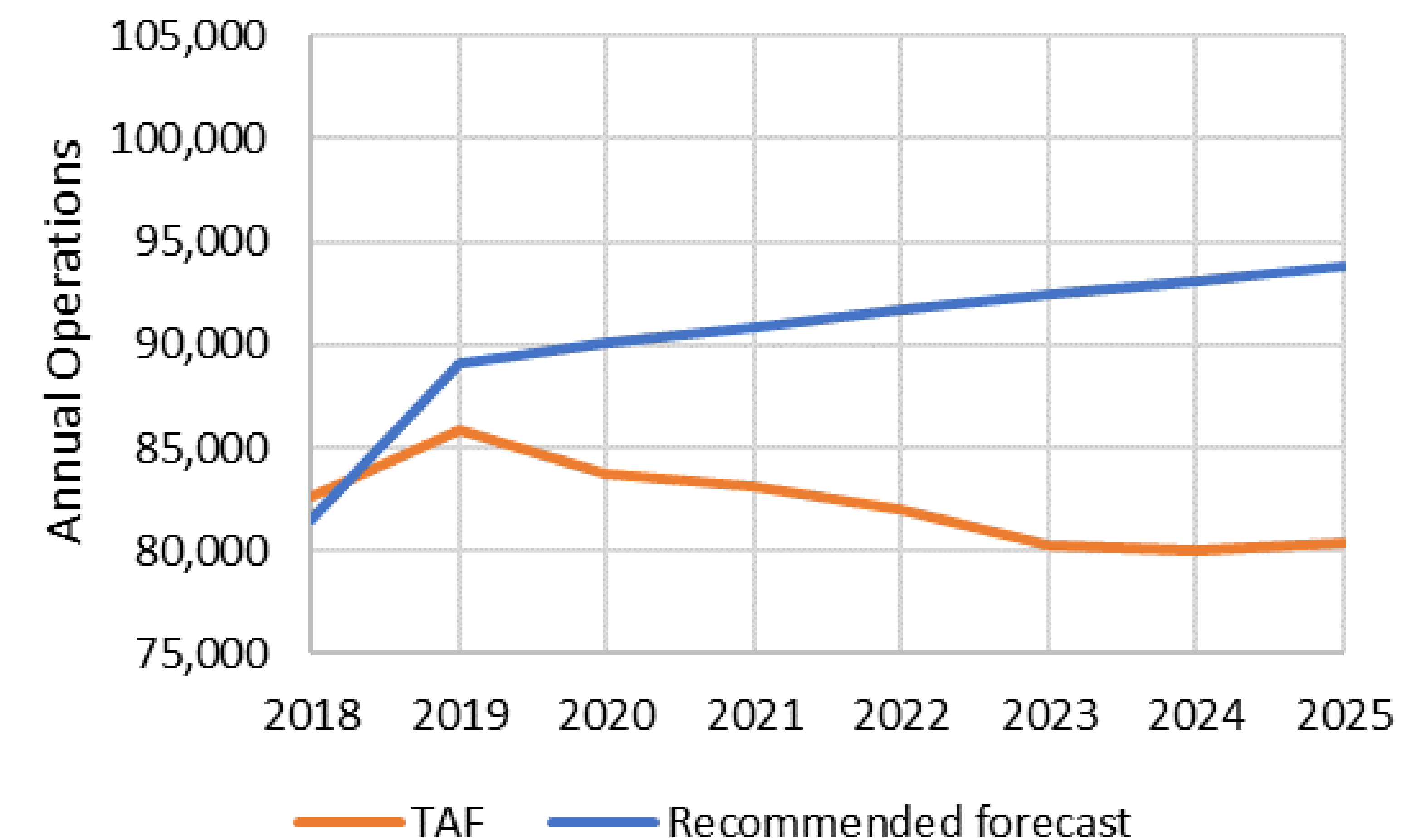
Comparing Draft Forecast to FAA's TAF (Terminal Area Forecast)

Year	Enplanements			Operations		
	GSO TAF	Recommended Forecast	Recommended Forecast vs. TAF	GSO TAF	Recommended Forecast	Recommended Forecast vs. TAF
2018	919,089	941,025	2.4%	82,593	81,514	-1.3%
2019	1,064,858	1,040,213	-2.3%	85,895	89,160	3.8%
2020	1,070,938	1,067,533	-0.3%	83,804	90,072	7.5%
2021	1,076,167	1,092,636	1.5%	83,160	90,894	9.3%
2022	1,080,834	1,116,240	3.3%	81,967	91,656	11.8%
2023	1,085,249	1,139,401	5.0%	80,251	92,408	15.1%
2024	1,089,329	1,161,533	6.6%	79,982	93,119	16.4%
2025	1,093,328	1,183,603	8.3%	80,368	93,836	16.8%
AAGR 2019-2025	0.4%	2.2%	-	-1.1%	0.9%	-
Growth 2019-2025	2.7%	13.8%	-	-6.4%	5.2%	-

Source: FAA TAF, FAA OPSNET, BTS Office of Airline Information (T-100 Data), FAA Aerospace Forecast (FY 2019-2039), Boeing World Air Cargo Forecast (2018-2037), Airbus Global Market Forecast (2018-2037), FedEx, Koury Aviation, Signature Flight Support, Triad Aviation Academy (website), PTAA, CHA, 2019.

Note: FAA TAF presented as Federal Fiscal Year, and Recommended Forecast presented as Calendar Year.

Comparison of Recommended Forecast to TAF



NOTE: the forecast is currently pending FAA review and approval

Forecast Operations for Noise Modeling - Draft

Annual Operations

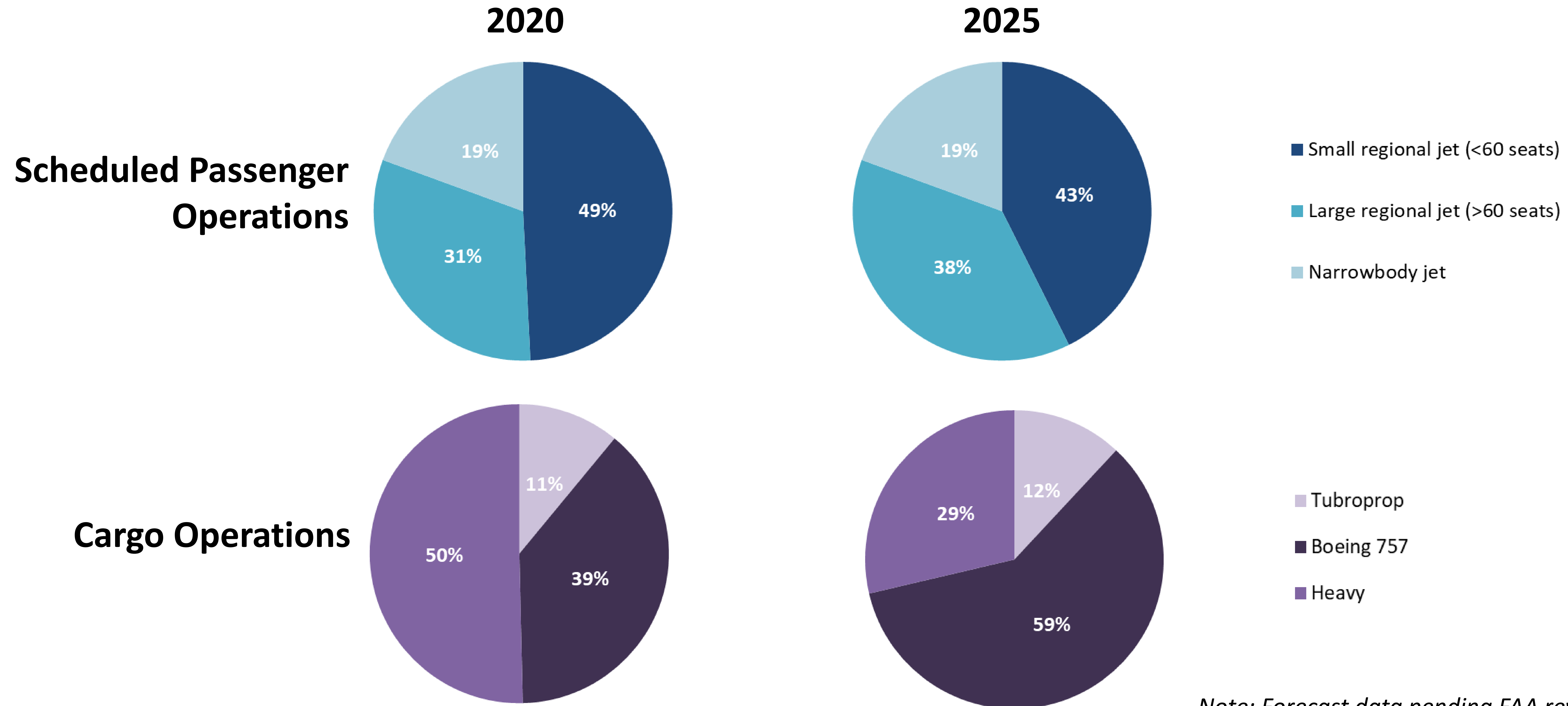
Year	Commercial				General Aviation			Military			Total Operations
	Passenger	Air Taxi	Cargo	Total	Itinerant	Local (T&G)	Total	Itinerant	Local (T&G)	Total	
2018	32,775	10,034	6,458	49,267	24,596	5,816	30,412	1,453	383	1,836	81,515
2020	36,359	10,053	8,204	54,616	26,964	6,656	33,620	1,453	383	1,836	90,072
2025	37,266	10,099	10,456	57,821	27,413	6,767	34,180	1,453	383	1,836	93,837

Average Annual Daily Operations

Average Day in	Commercial				General Aviation			Military			Total Operations
	Passenger	Air Taxi	Cargo	Total	Itinerant	Local (T&G)	Total	Itinerant	Local (T&G)	Total	
2018	89.8	27.5	17.7	135.0	67.4	15.9	83.3	4.0	1.0	5.0	223.3
2020	99.6	27.5	22.5	149.6	73.9	18.2	92.1	4.0	1.0	5.0	246.8
2025	102.1	27.7	28.6	158.4	75.1	18.5	93.6	4.0	1.0	5.0	257.1



Fleet Mix Summary, Passenger and Cargo



Note: Forecast data pending FAA review and approval



Forecast Day/Night Split - Draft

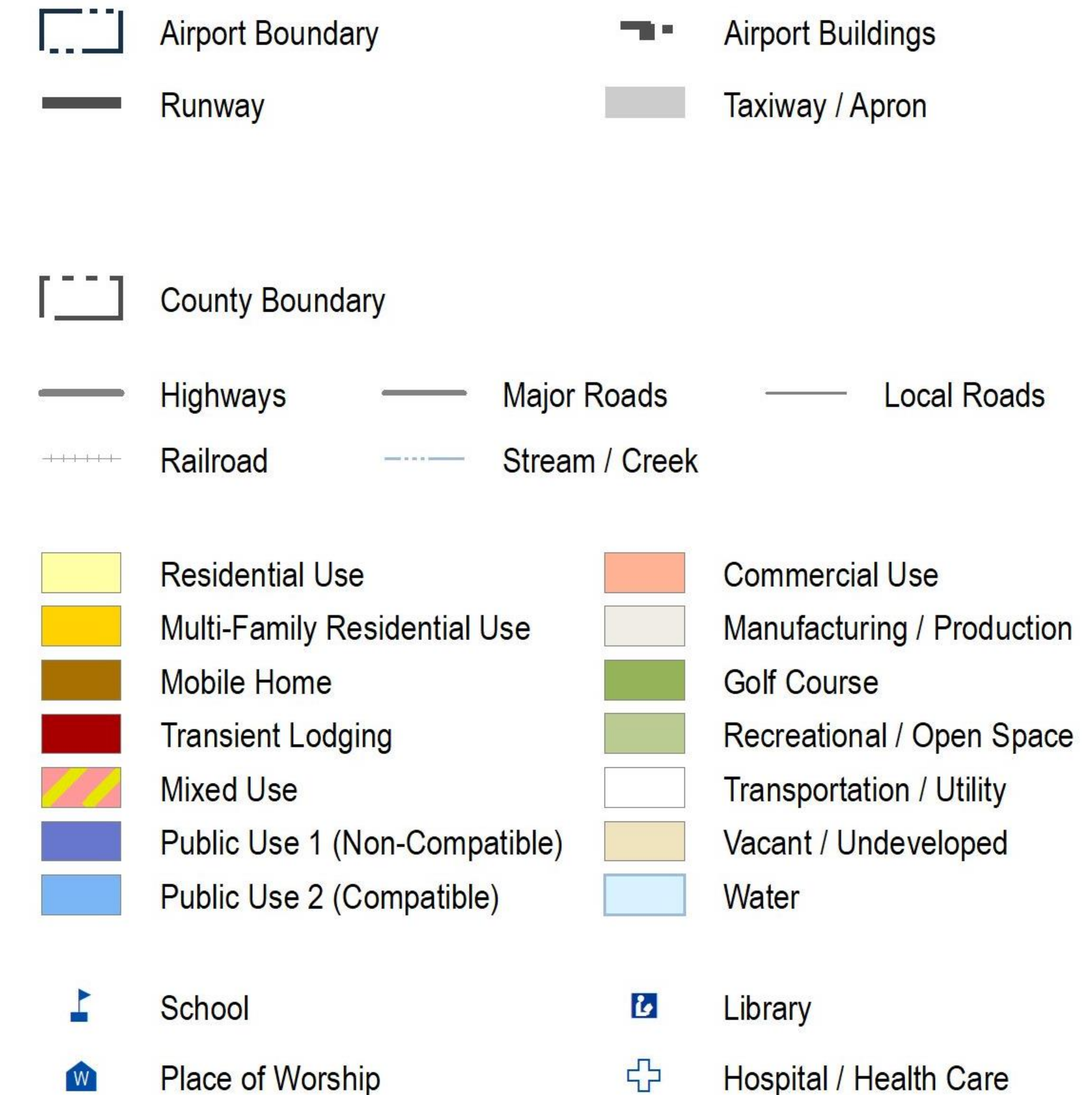
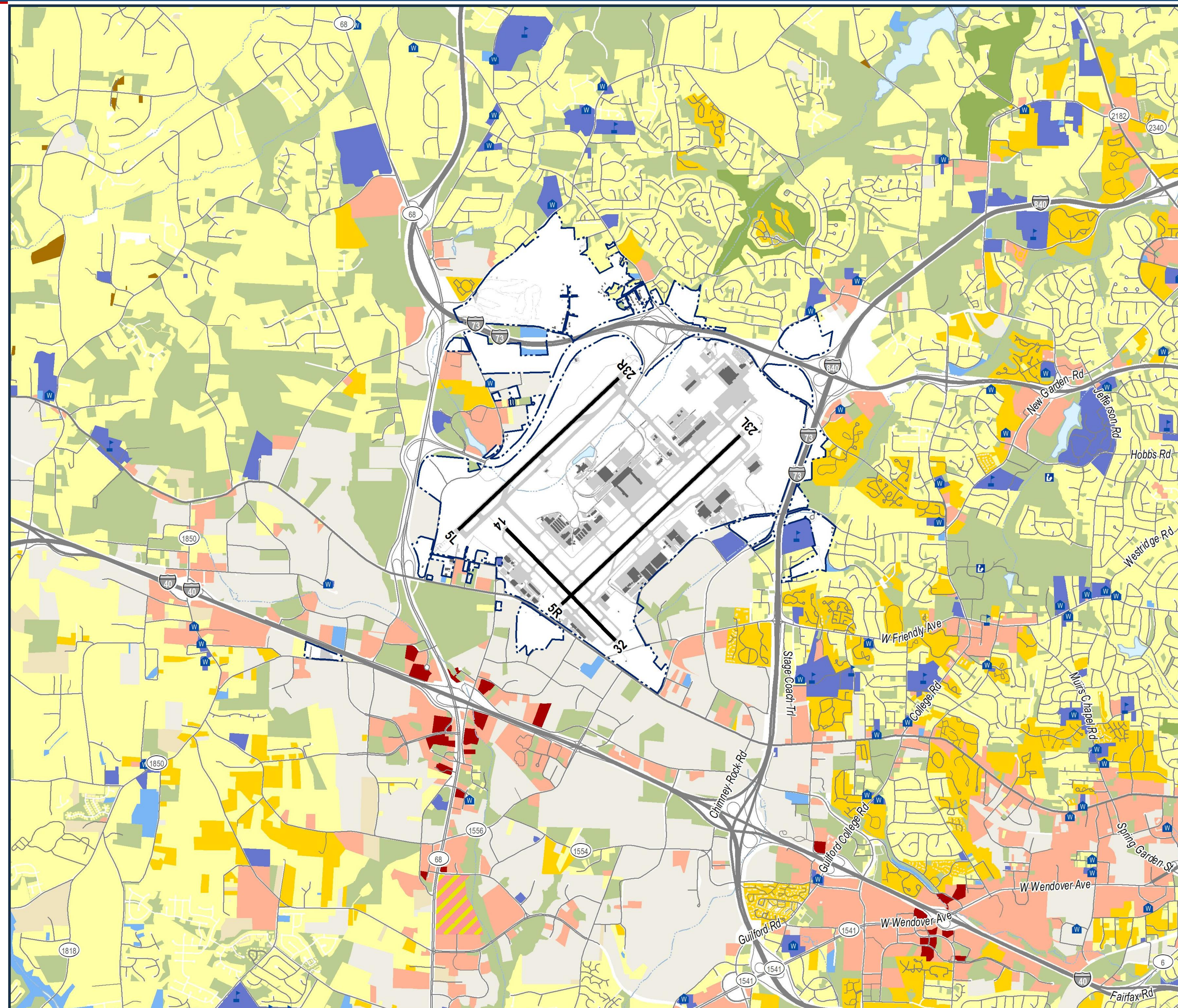
- Slight increase in the proportion of nighttime cargo flights
- All other aircraft categories assumed to remain at the same proportions between day and night

Aircraft Category	2020		2025	
	Day	Night	Day	Night
Scheduled Passenger	85.7%	14.3%	85.7%	14.3%
Cargo	14.8%	85.2%	12.0%	88.0%
<i>Cargo Jets</i>	15.1%	84.9%	12.4%	87.6%
<i>Cargo Turboprops</i>	12.1%	87.9%	9.1%	90.9%
Air Taxi & General Aviation	90.0%	10.0%	90.0%	10.0%
Military	95.0%	5.0%	95.0%	5.0%
Overall	81.5%	18.5%	79.7%	20.3%

Land Use Mapping

- Primary data collection steps include:
 - Assemble and review land use, zoning, and population data
 - Identify any local land use policies that address airport operations
 - Create existing land use maps
- Locations of noise sensitive sites (churches and schools) are noted
- Local jurisdictions to look over the maps and let us know of necessary corrections
 - Assess any deficiencies of land use data and corrective approaches
- Once the draft DNL contours are created, the study team will survey and confirm land use within the 65 DNL contours

Land Use Close to the Airport – Draft



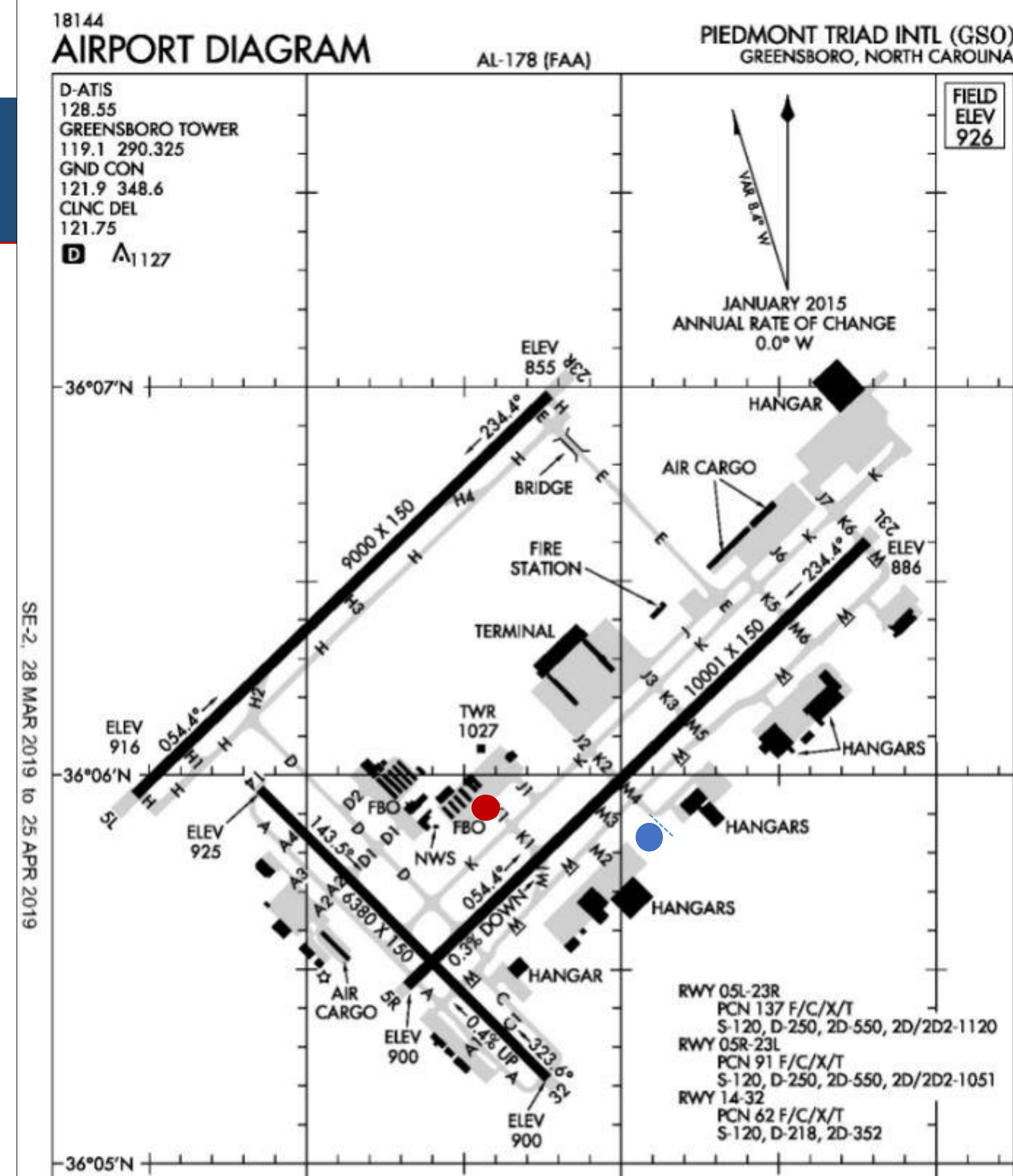
Data Sources: Guilford County GIS; Davidson County GIS; Forsyth County GIS; NC OneMap GeoSpatial Portal; Environmental Systems Research Institute (ESRI); AirNav.com; HMMH Inc.

Noise Model Inputs

- We must use FAA-approved model
 - FAA's Aviation Environmental Design Tool (AEDT)
- Required noise modeling inputs
 - Airport layout
 - Aircraft operations by day/night for existing year 2020 and forecast 2025
 - Arrivals, departures, runups, touch & go operations
 - Runway utilization rates by aircraft categories
 - Flight track geometry and use by aircraft categories
 - Annual average meteorological data
 - Terrain

Airport Layout Inputs

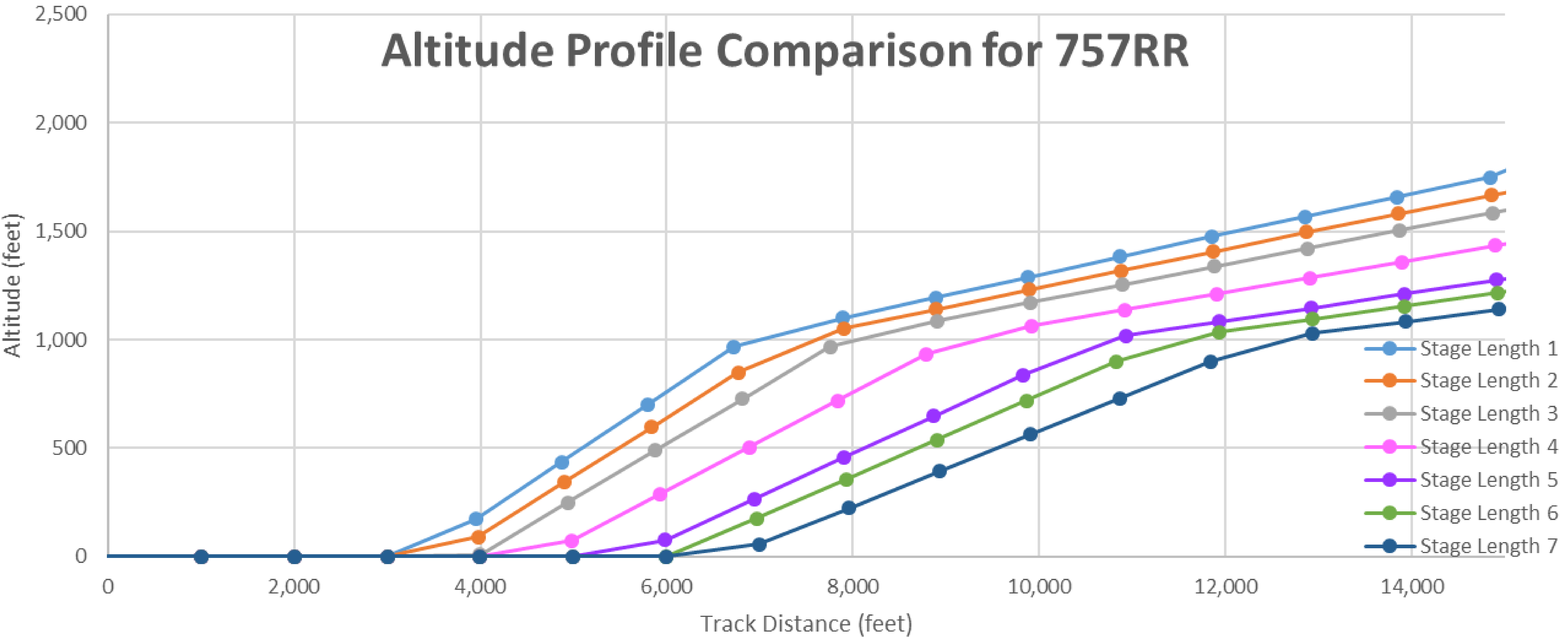
- Runway End data
 - 6 Runway Ends: 5L-23R, 5R-23L, and 14-32
 - Latitude/longitude coordinates
 - Elevation
 - Approach glide slope
 - Any displaced thresholds (list if there are any at GSO)
- “Helipad” at apron in front of Signature Aviation (red dot on diagram)
- Engine Run-up location by blast fence (blue dot on diagram)



Aircraft Operations

- Arrivals
 - 3-degree approach profile
- Departures
 - Stage length based on city-pairs
 - 0-500 nmi = Stage length 1 (ex: GSO-ATL = 266 nmi)
 - 500-1000 nmi = Stage length 2 (ex: GSO-DFW = 868 nmi)
 - Corresponds to fuel load, and therefore to aircraft weight
 - AEDT noise and performance database has departure profiles by stage length
- Touch & go patterns
- Engine Run-ups
 - Location, duration, power setting, heading, time of day




Sample Departure Profile Data – Cargo Jet

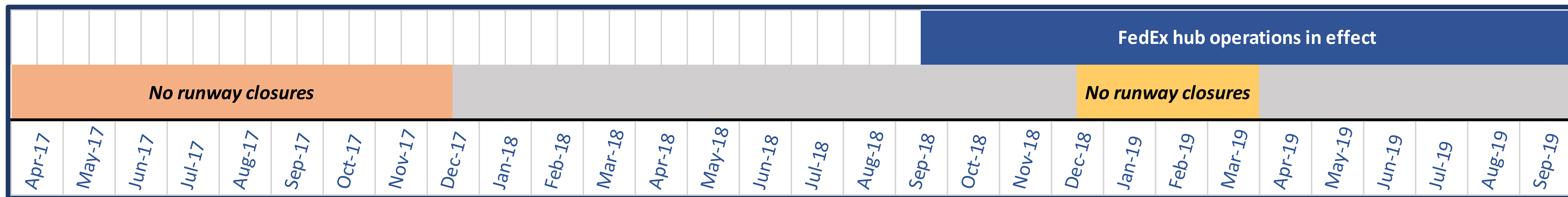


Runway 05L/23R is 9,000' long
Runway 05R/23L is 10,001' long



Runway Use

- Daytime runway use is calculated from radar data, using 12 months (two periods) without runway closures 
- Nighttime runway use is based on a full year of radar data since the FedEx hub operation commenced, providing information on nighttime flow direction 
- A 3.5-month sample without runway closures provided proportional information on nighttime left/right splits in each direction 

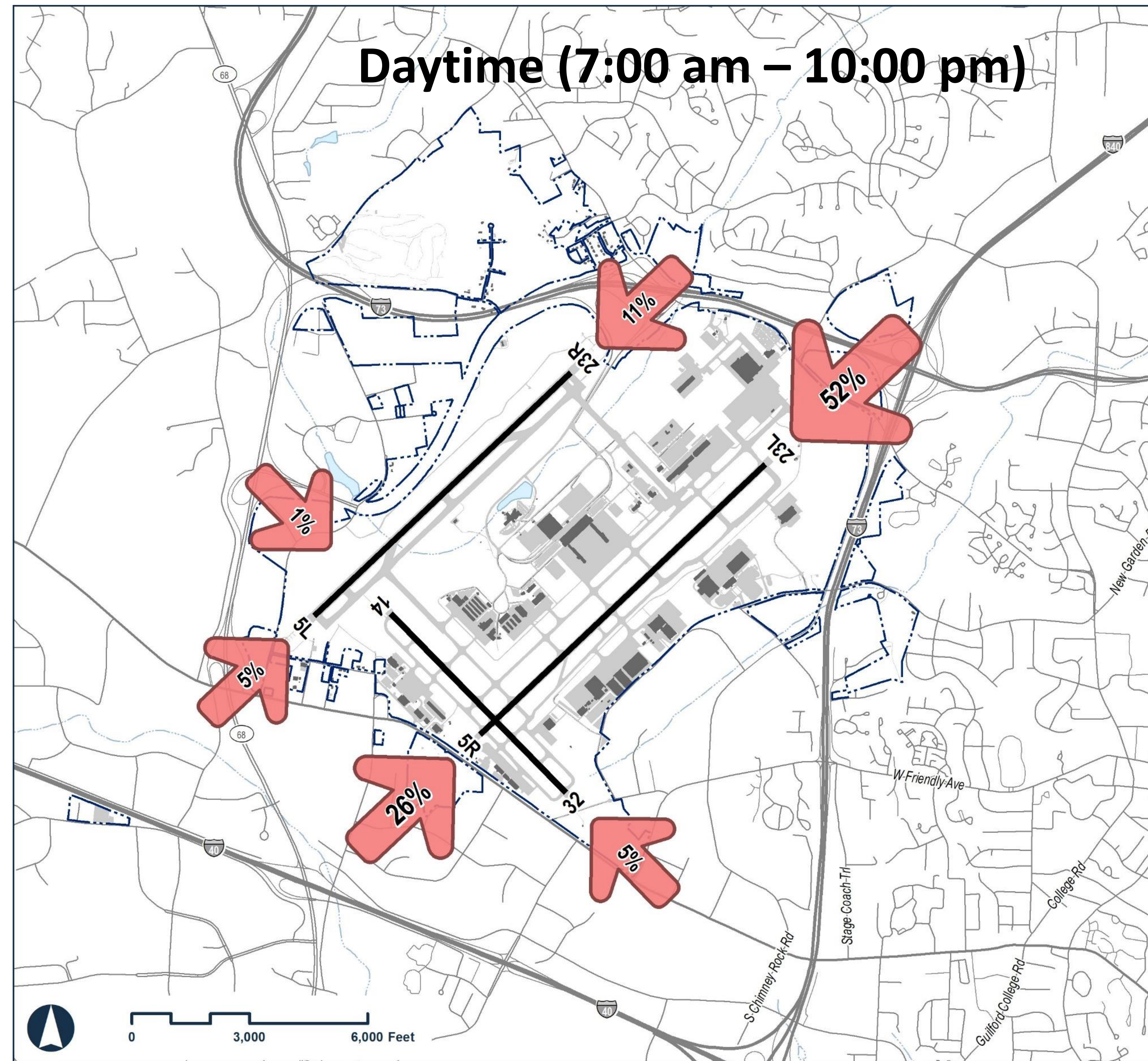


Runway Use to be modeled for 2020 & 2025

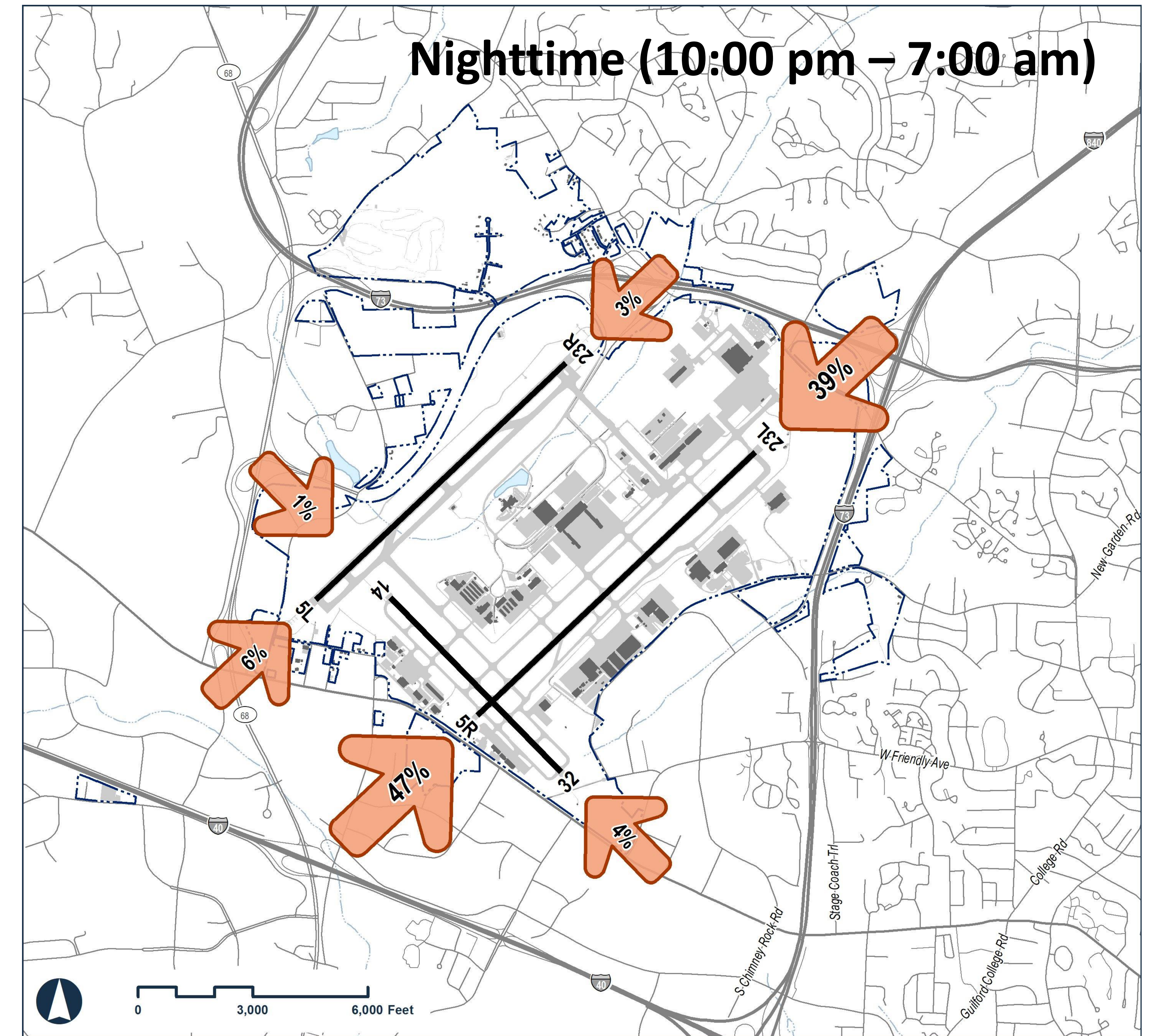
- Daytime Runway Use for each category calculated from 12-month sample of data without runway closures (April 1, 2017 – December 14, 2017 and December 15, 2018 – March 31, 2019)
- Nighttime directional use calculated from full year of operations after hub operations commenced (September 15, 2018 – September 14, 2019), with Left/Right split calculated from 3.5-month period without runway closures (December 15, 2018 – March 31, 2019)

Runway	Daytime					
	Jets		NonJets		FedEx	
	Arrival	Departure	Arrival	Departure	Arrival	Departure
5L	2.7%	3.4%	9.5%	4.5%	0.6%	2.5%
5R	30.9%	30.0%	18.0%	21.6%	33.7%	26.0%
14	0.2%	0.7%	1.7%	3.9%	0.0%	0.0%
23L	57.6%	55.3%	40.4%	51.1%	61.9%	67.2%
23R	5.6%	7.9%	20.4%	13.6%	2.9%	4.2%
32	2.9%	2.7%	10.0%	5.4%	0.9%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Runway	Nighttime					
	Jets		NonJets		FedEx	
	Arrival	Departure	Arrival	Departure	Arrival	Departure
5L	6.1%	3.2%	6.1%	1.9%	6.1%	1.3%
5R	48.4%	19.7%	42.5%	23.3%	55.1%	10.8%
14	0.0%	0.5%	5.3%	3.6%	0.0%	0.0%
23L	41.9%	71.0%	24.8%	57.5%	36.6%	86.1%
23R	2.5%	4.6%	3.5%	6.6%	2.1%	1.8%
32	1.2%	1.0%	17.8%	7.1%	0.2%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Runway Use: All Arrivals, Day and Night

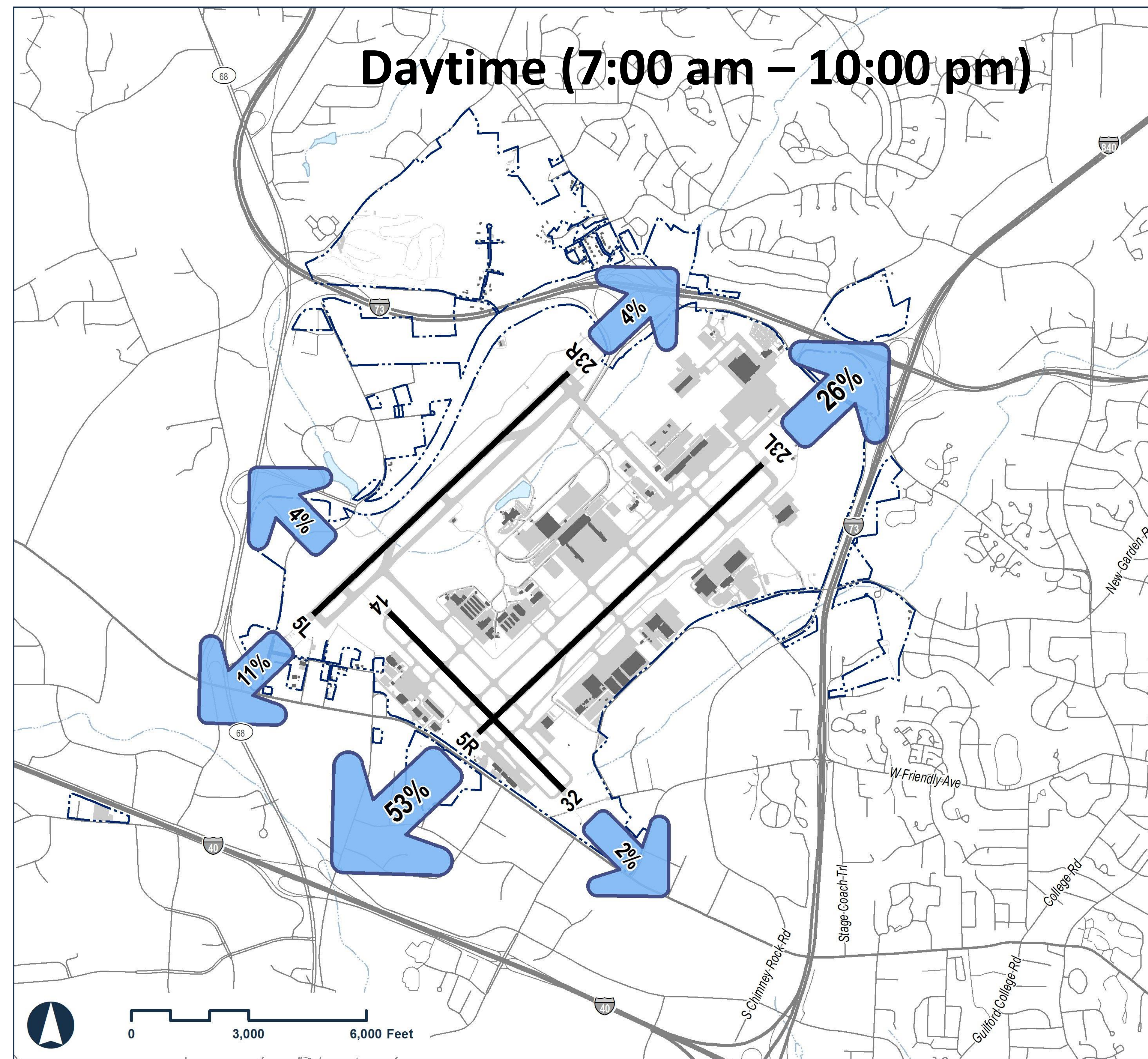


Calculated from radar data taken from 12 months without runway closures

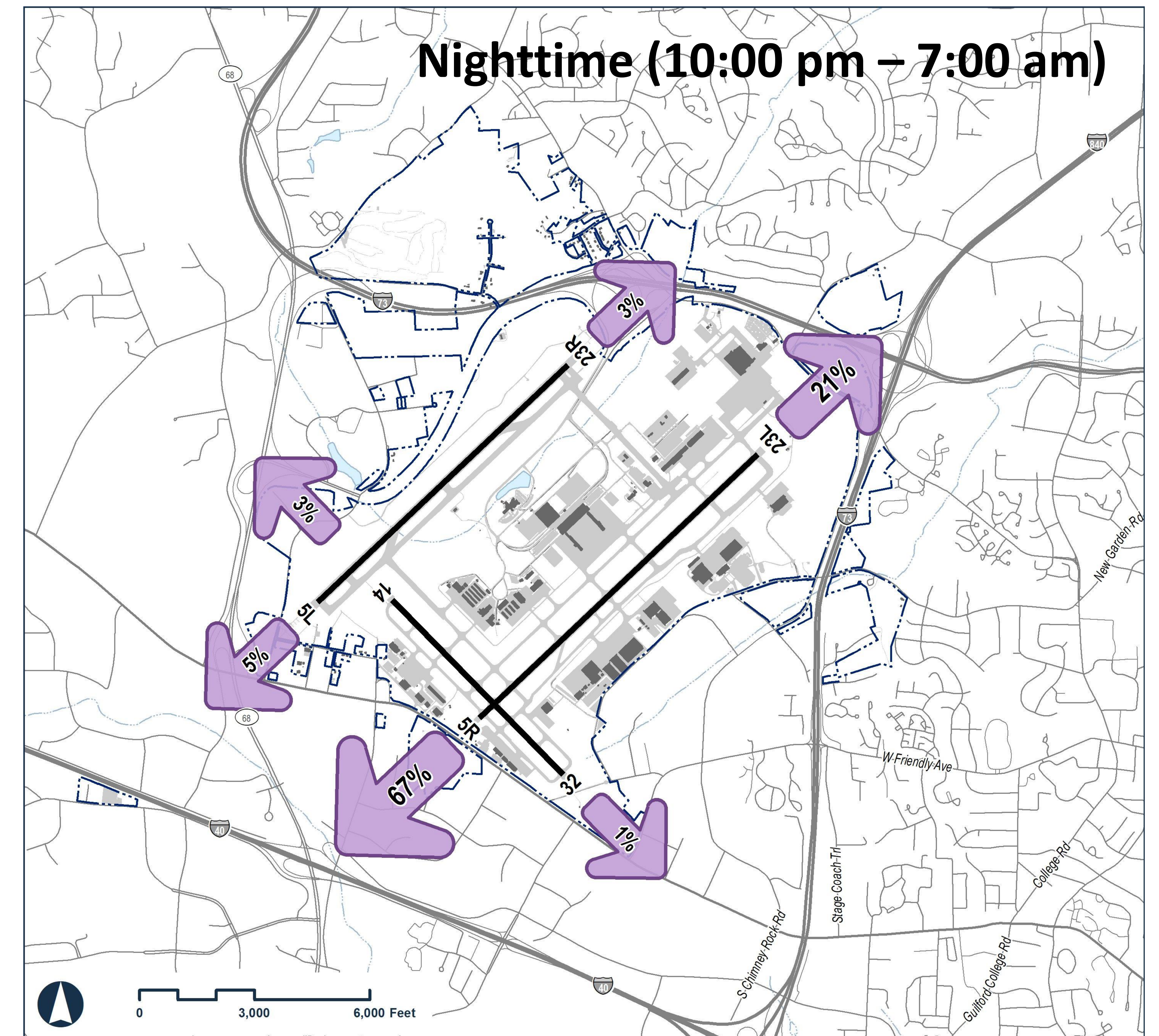


Directional use calculated from 12 months of radar data after FedEx hub operations commenced with left/right splits as observed during the 3.5 months with all runways open

Runway Use: All Departures, Day and Night



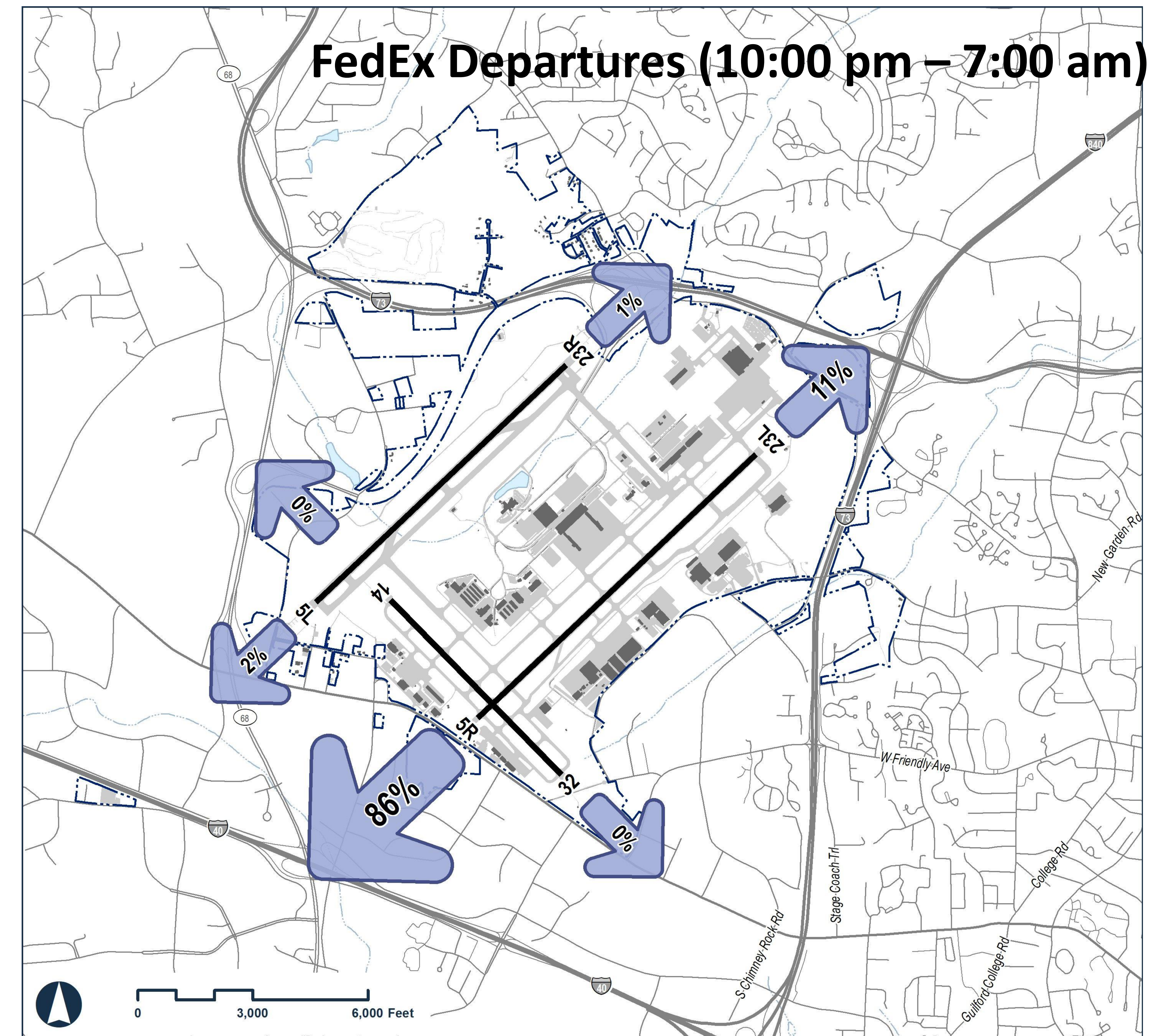
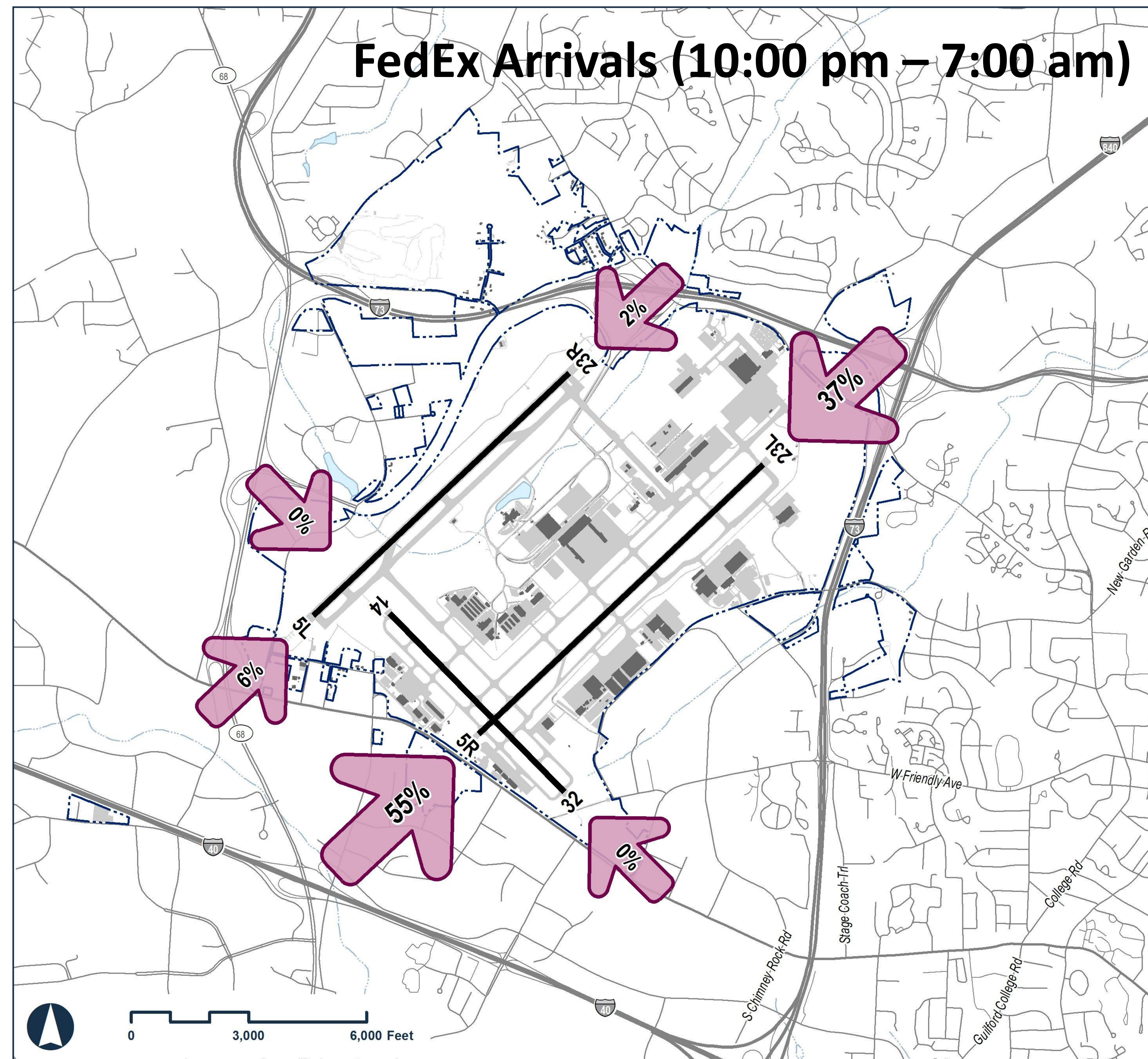
Calculated from radar data taken from 12 months without runway closures



Directional use calculated from 12 months of radar data after FedEx hub operations commenced with left/right splits as observed during the 3.5 months with all runways open



Nighttime FedEx Runway Use



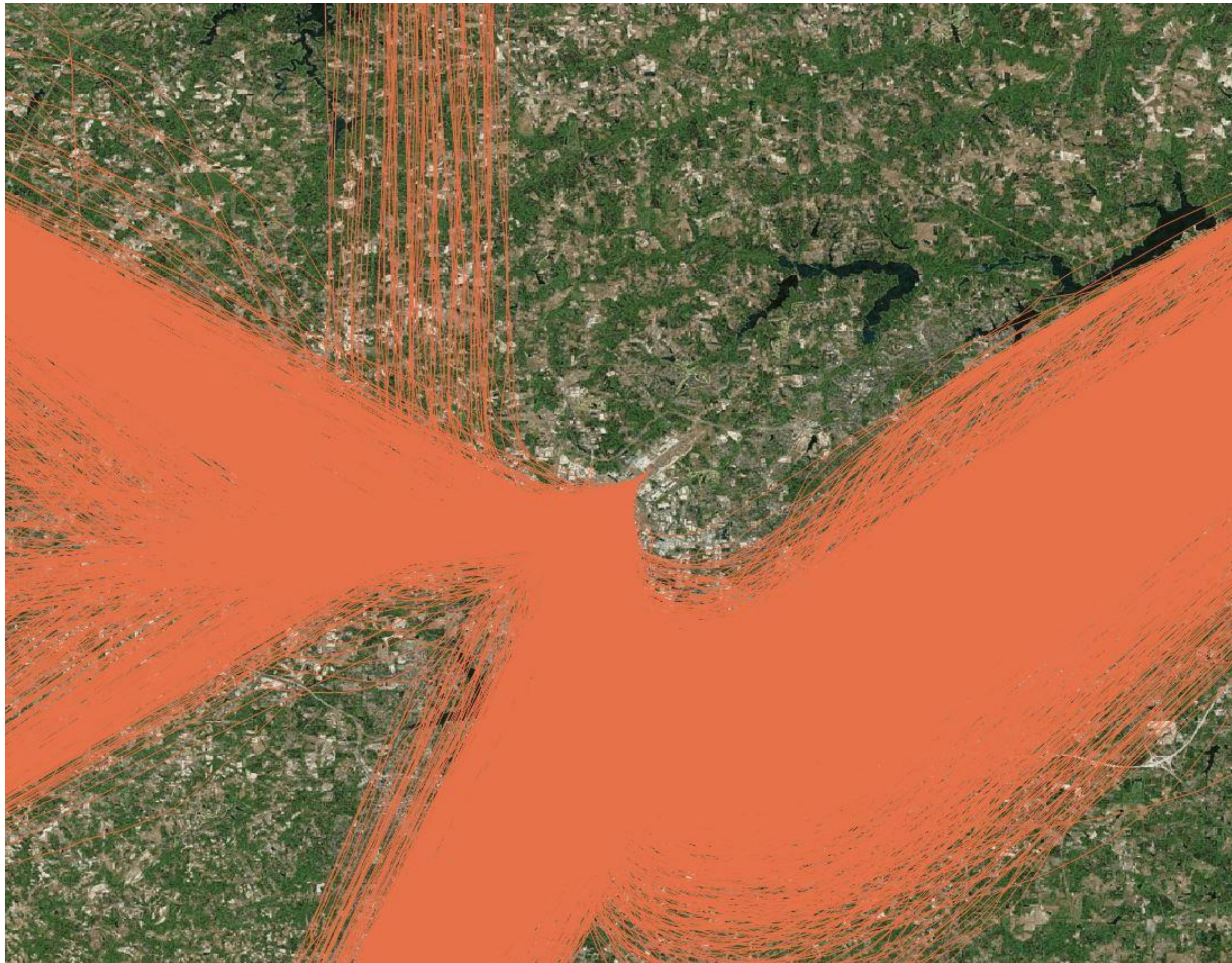
Calculated from radar data taken from 12 months since hub operations commenced, with left/right split using data from the 3.5 months without runway closures



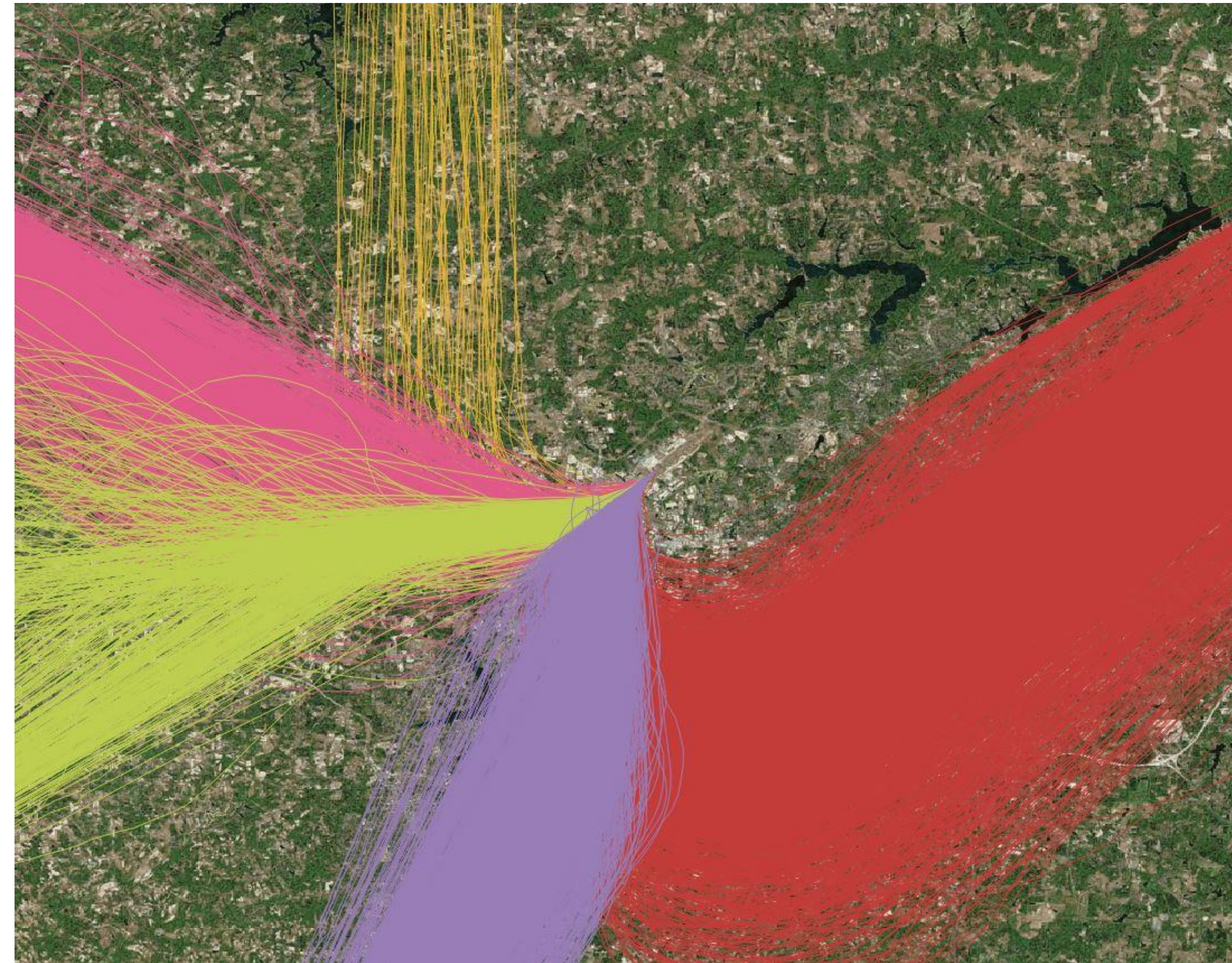
Model Flight Tracks Development

Radar Data for 12 months or more are sorted by aircraft type, operation type, runway, and then by corridor.

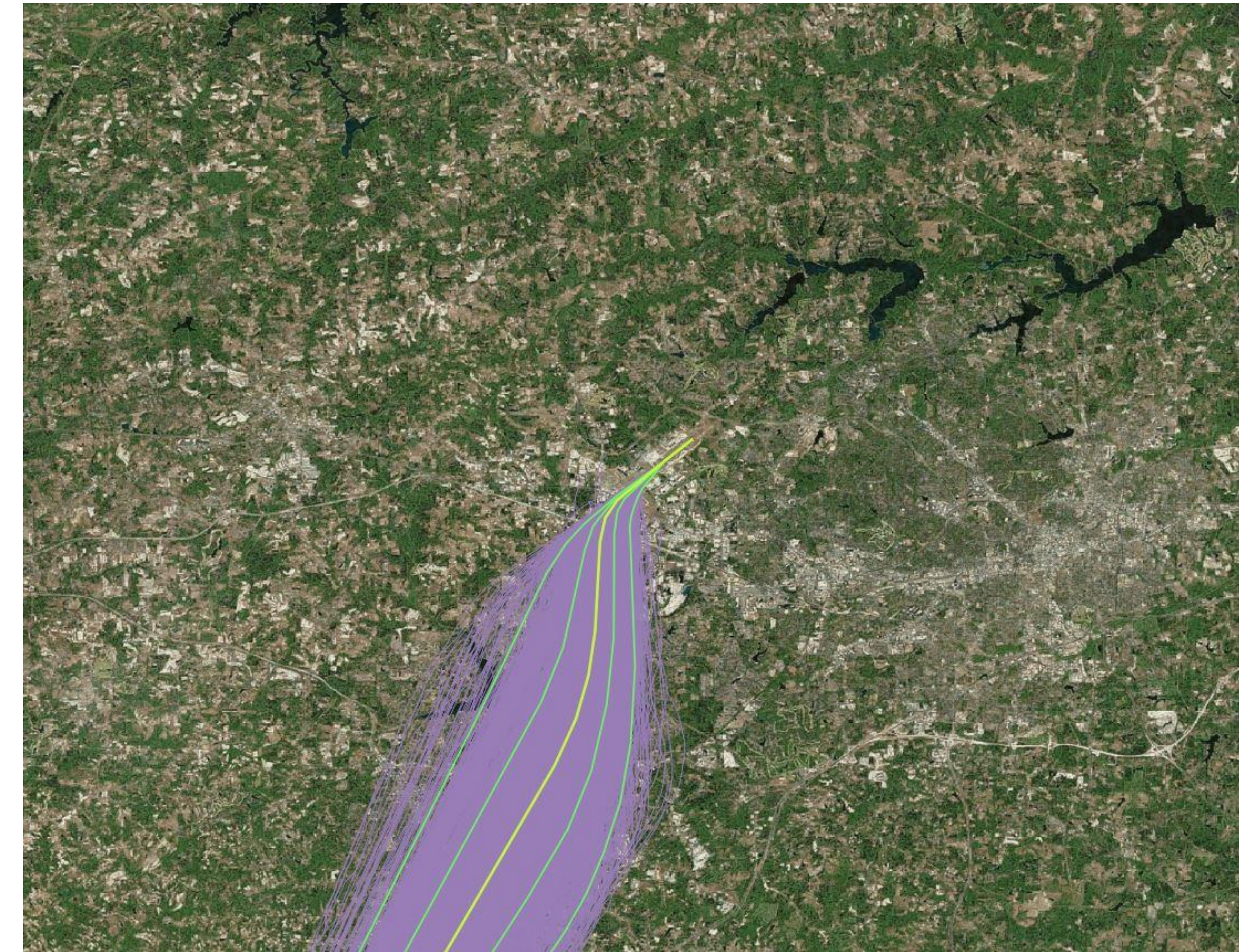
Statistical analysis determines position and percent usage of model flight tracks.



Runway 23L Jet Departures in radar sample

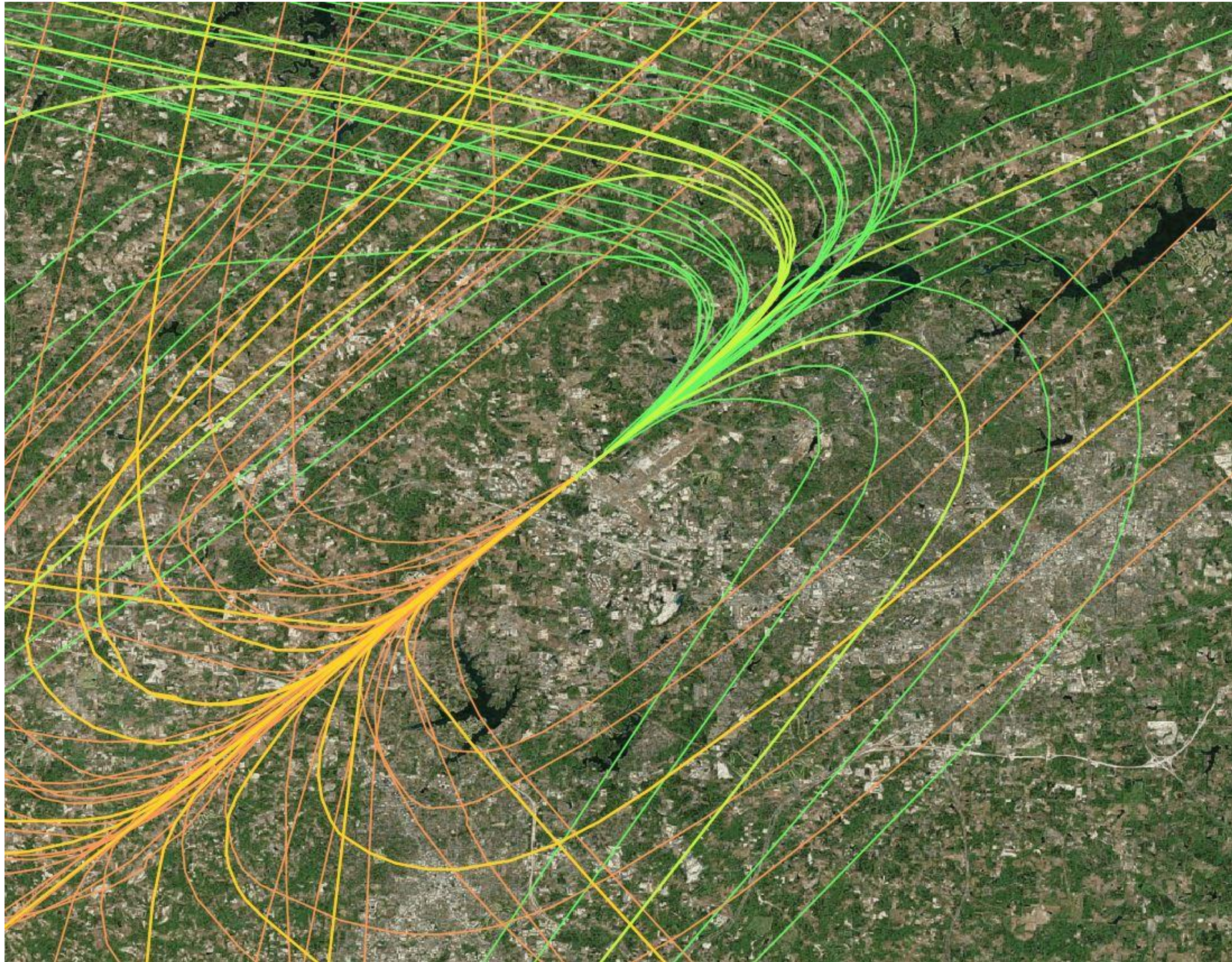


Runway 23L Jet Departure "bundles"

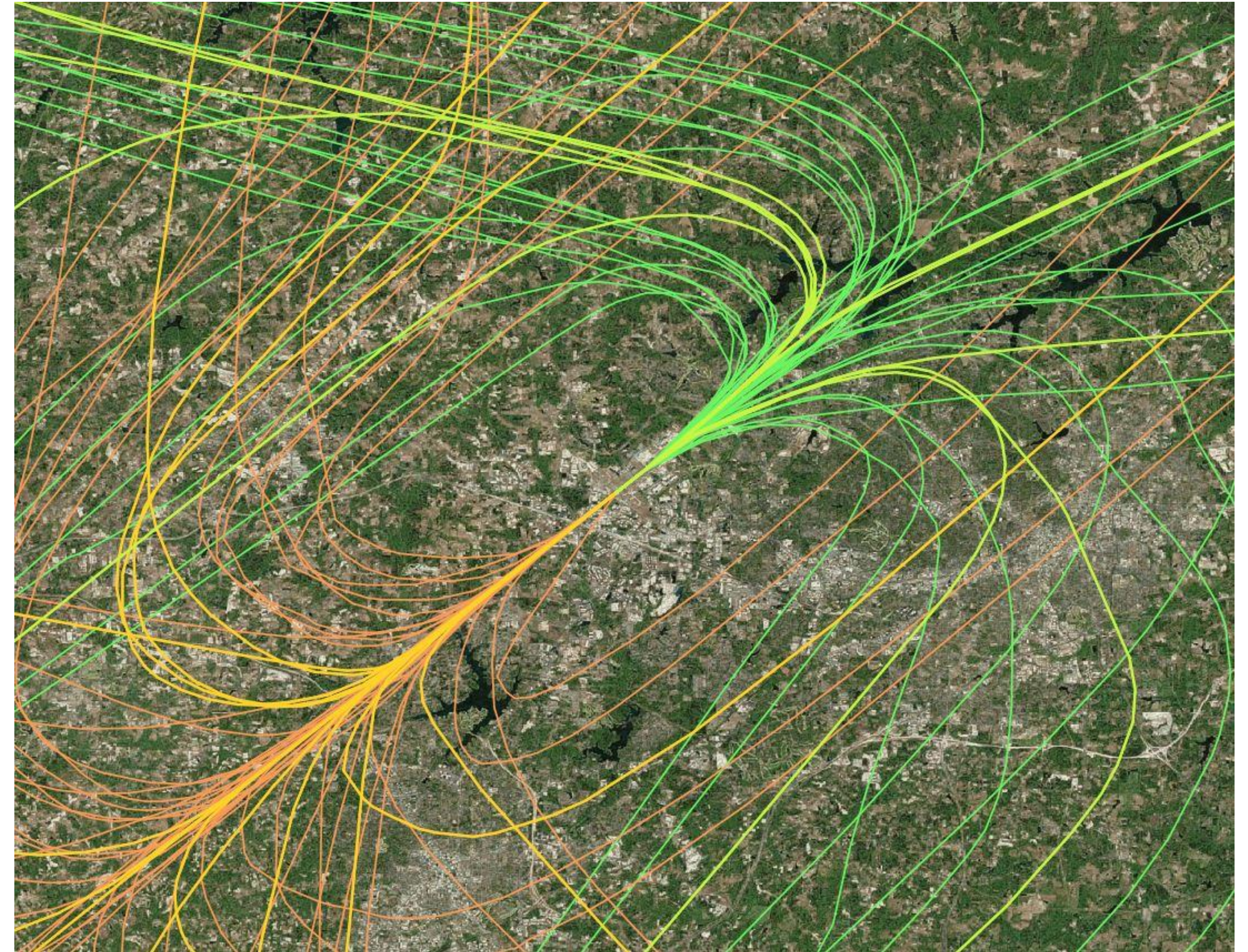


One bundle with associated model flight tracks

Model Flight Tracks: Jets, Runways 5L and 5R

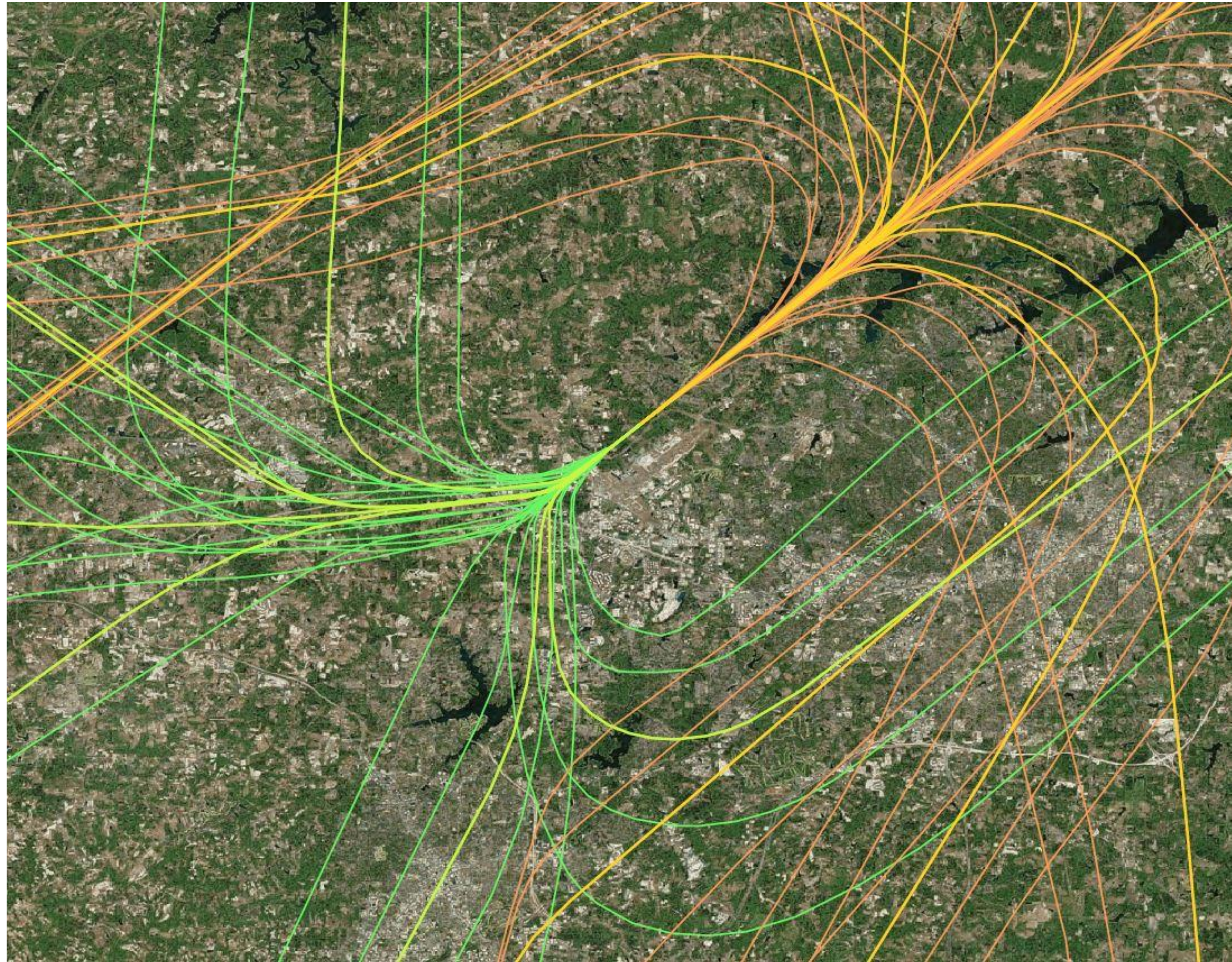


Jet Model Tracks, Runway 5L

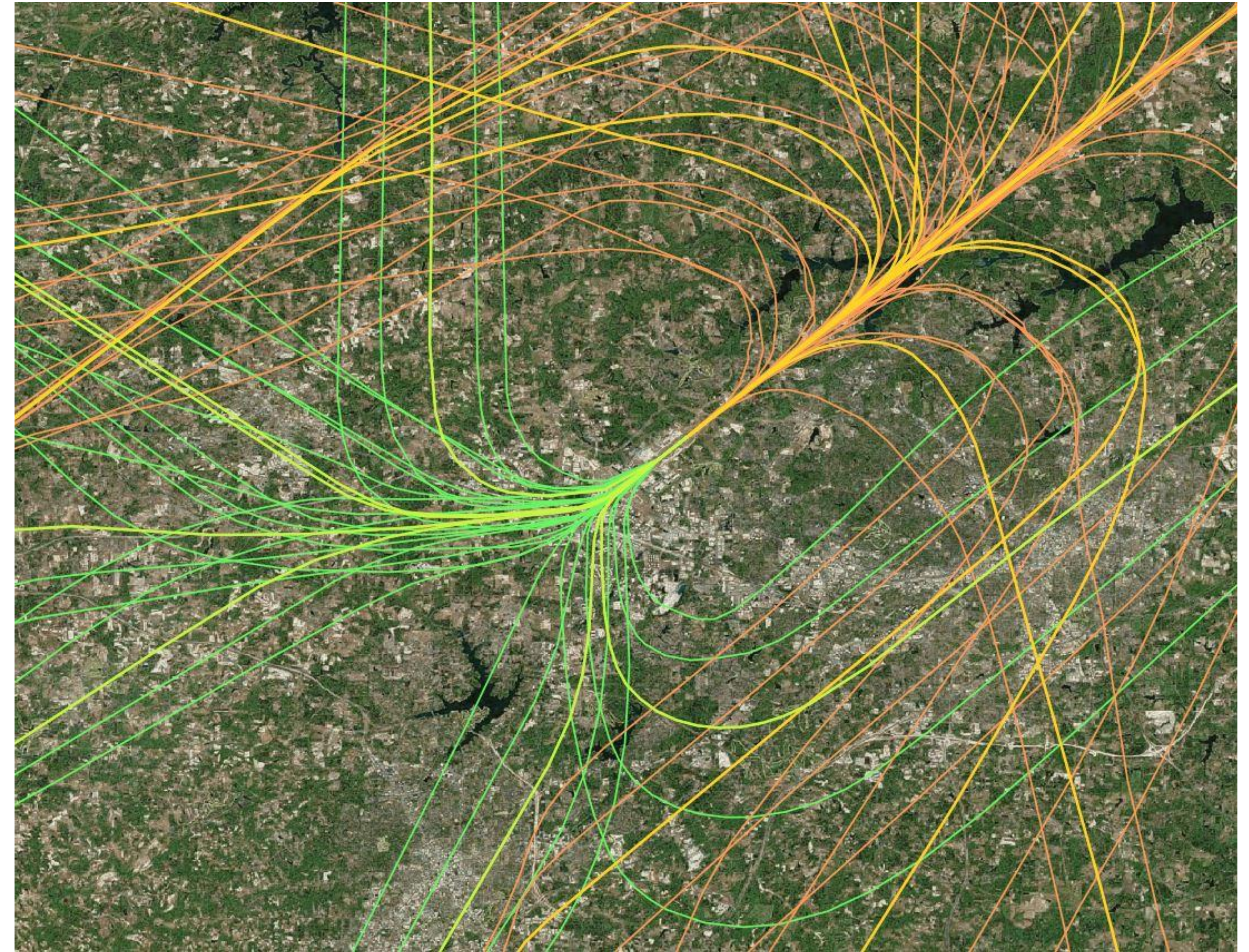


Jet Model Tracks, Runway 5R

Model Flight Tracks: Jets, Runways 23L and 23R

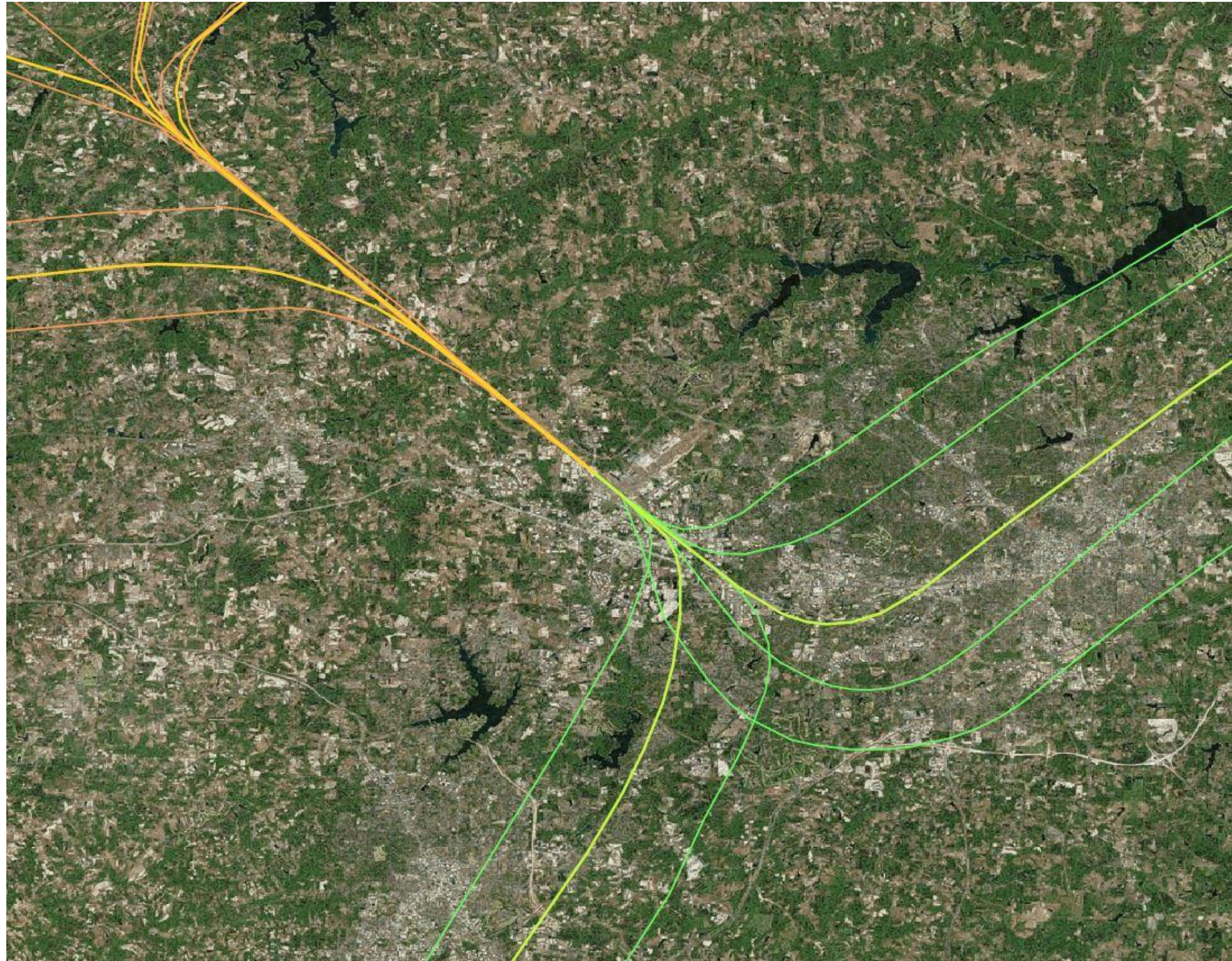


Jet Model Tracks, Runway 23R

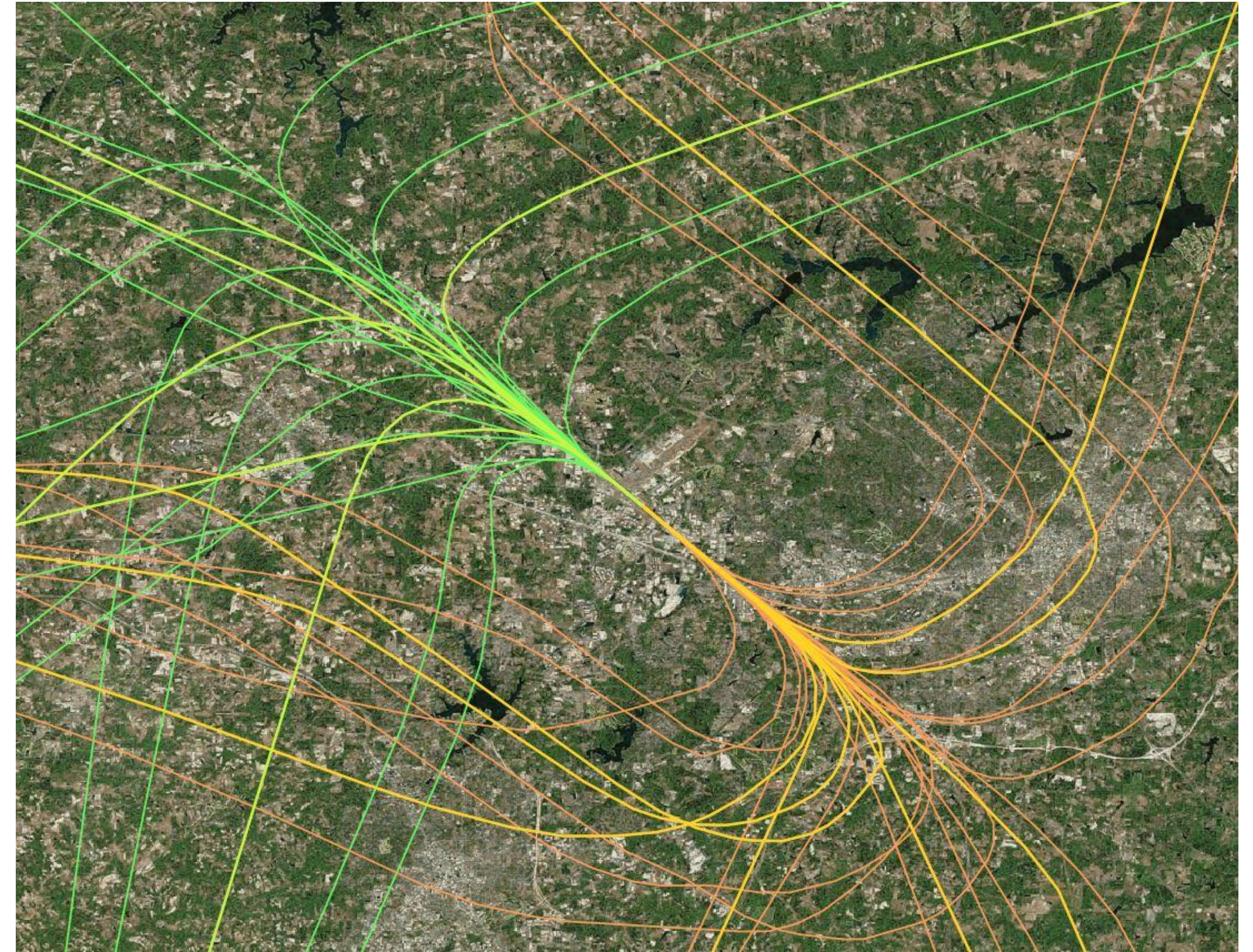


Jet Model Tracks, Runway 23L

Model Flight Tracks: Jets, Runways 14 and 32



Jet Model Tracks, Runway 14

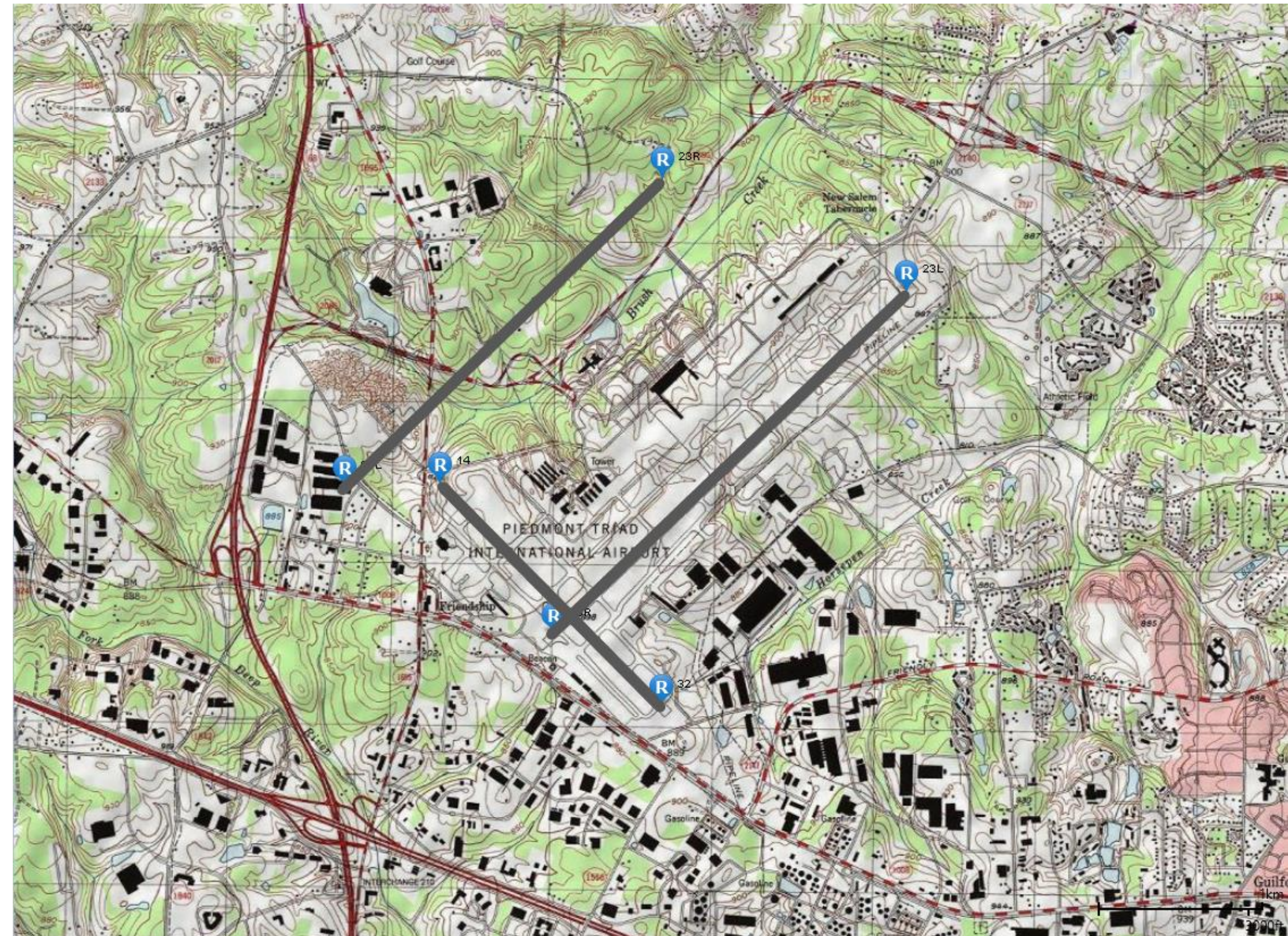


Jet Model Tracks, Runway 32

Weather and Terrain data

- Temperature: 58° F
- Station Pressure: 985.75 mbar
- Sea Level Pressure: 1018.04 mbar
- Dew point: 46.99° F
- Relative humidity: 67.35%
- Wind speed 6.15 knots

Source: AEDT 30-year weather database



Noise Measurements

- November 10 through November 16, 2019
- Using 6 portable monitors; one at each of 6 sites
- Measurements of individual aircraft noise events; will be correlated with radar data
- Hourly noise levels (Leq) and daily (DNL) values will be measured at each of the locations
- Two HMMH staff will spend time at each location, observing and logging aircraft noise events



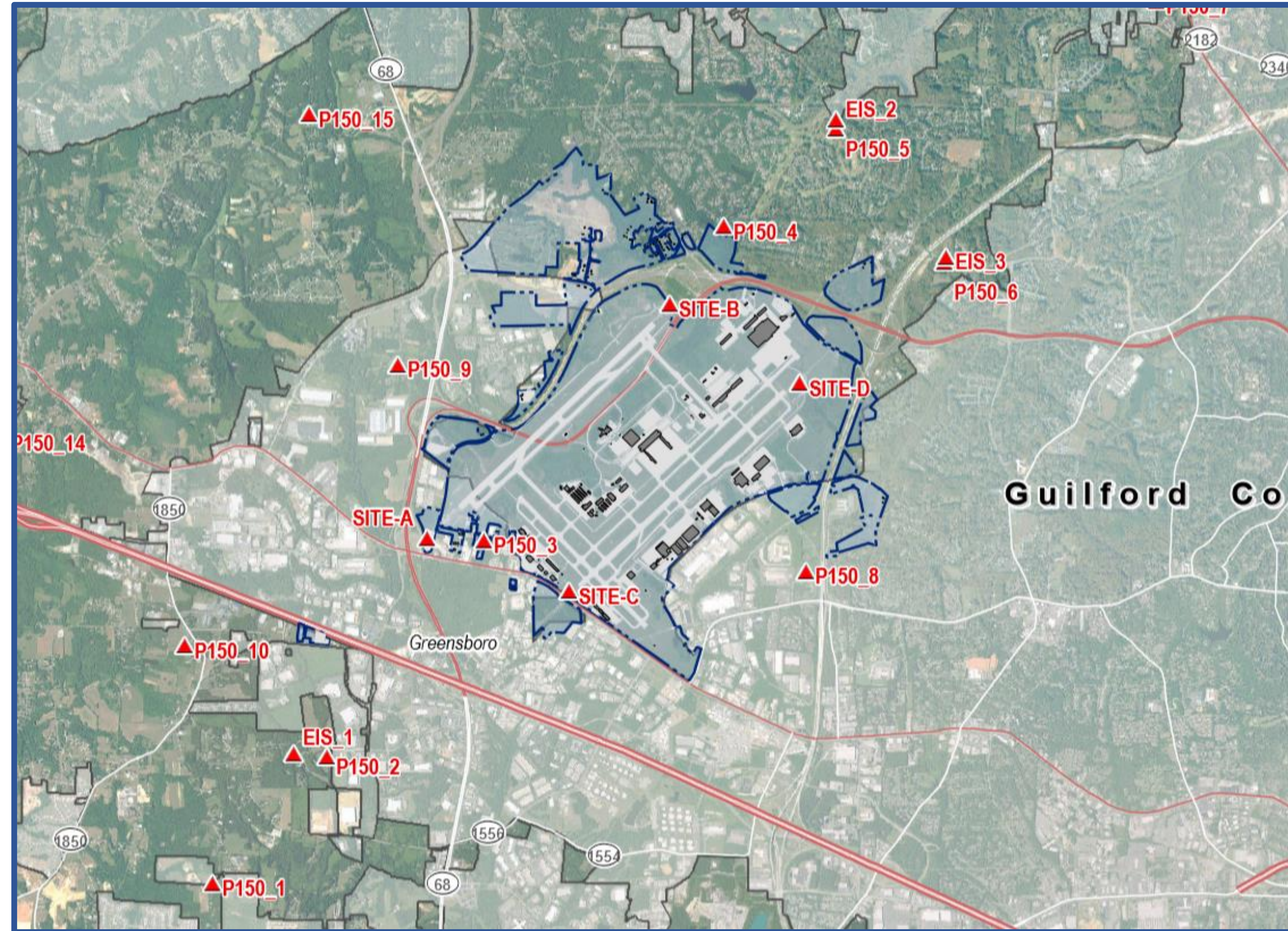
Note: Measured noise levels are NOT used to generate or calibrate contours

Noise Measurement Locations

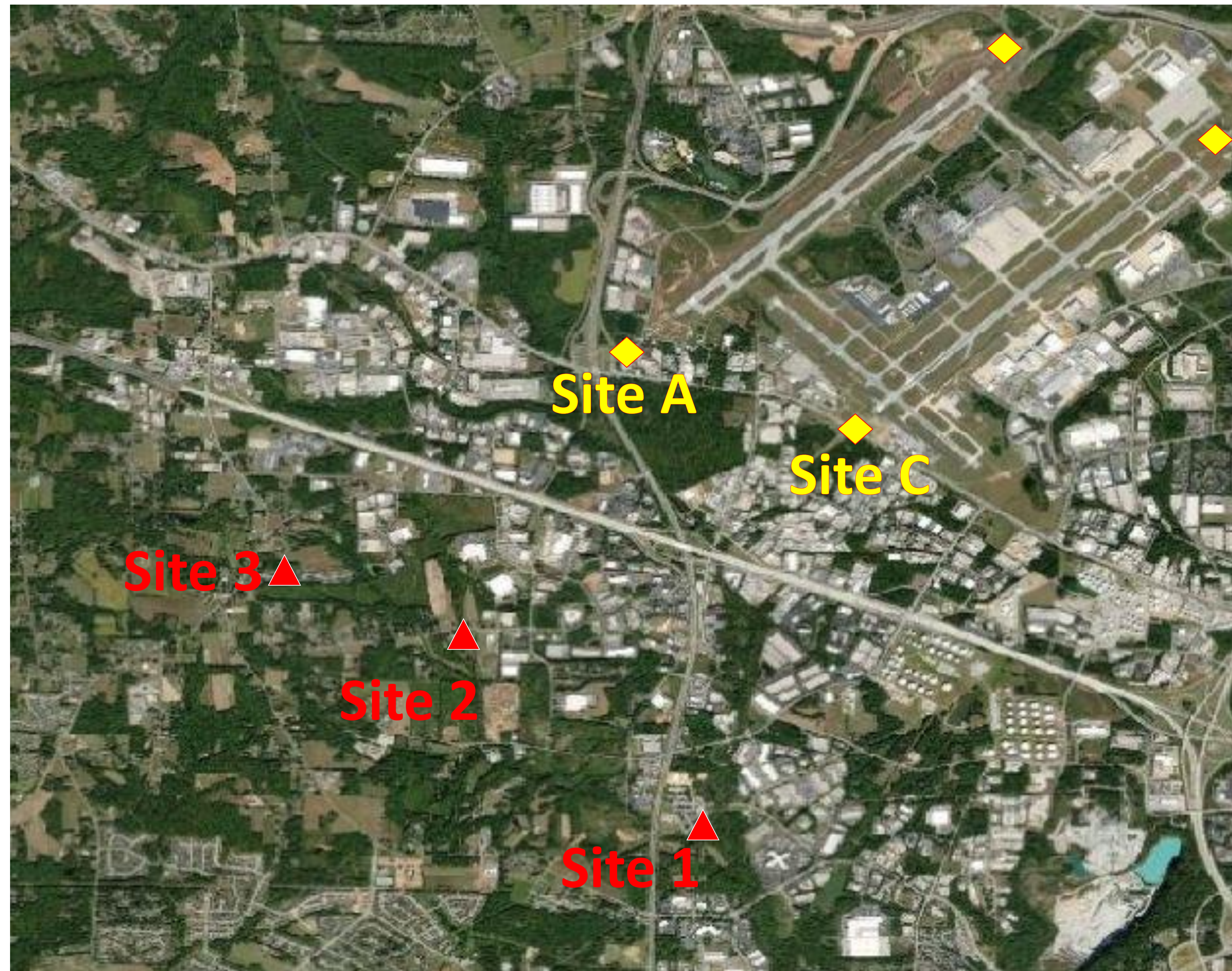
Sites 2, 4, 5 & 6 replicate locations from previous Part 150 study (measurements conducted in August 2004)

Site 1 - recommend be placed under Route 68 departure corridor

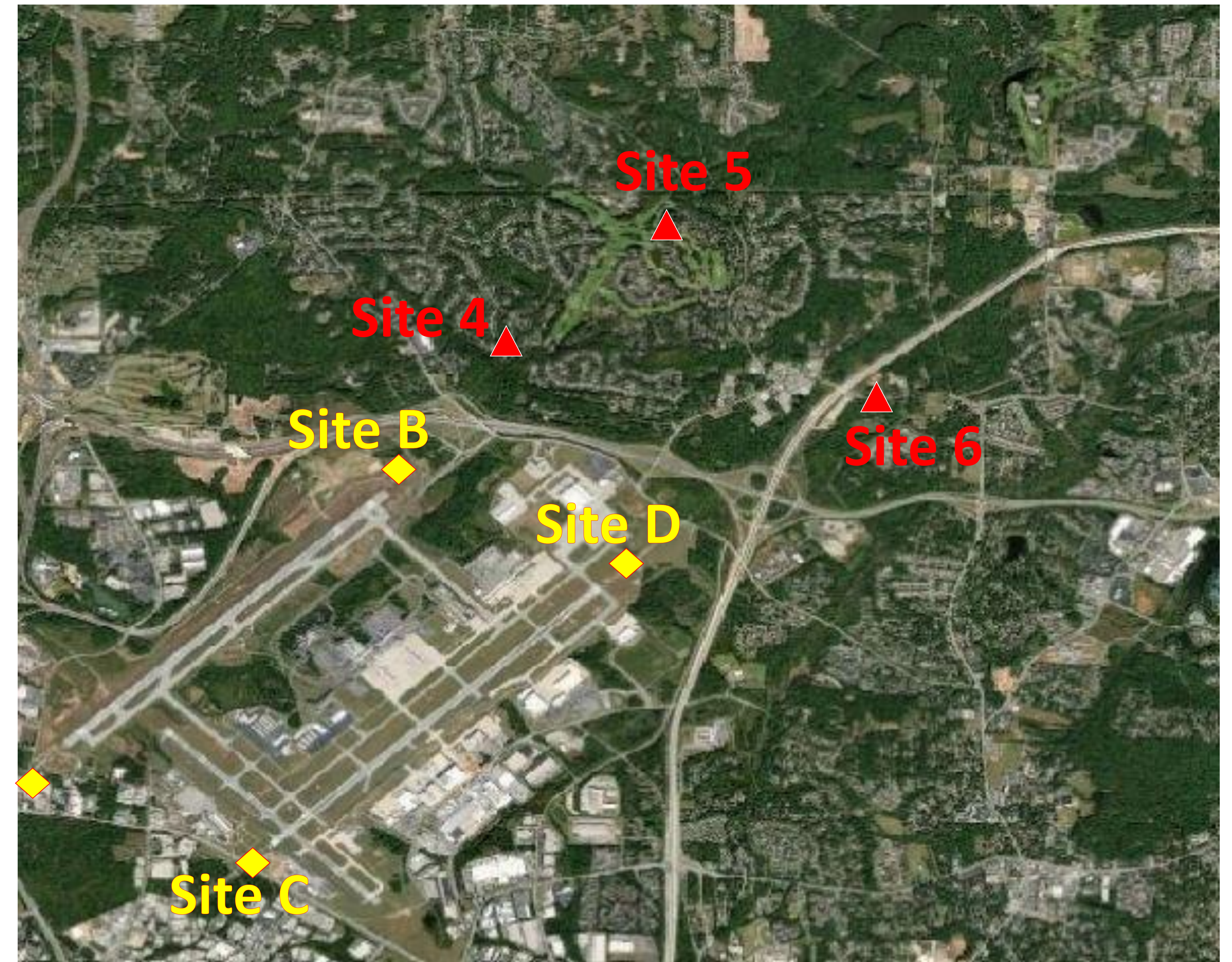
Site 3 - recommend be placed in a residential area under the Runway 05L approach corridor



Proposed Noise Measurement Locations



Sites 1, 2 and 3: south of airport



Sites 4, 5 and 6: north of airport

Projected TAC Meetings & Public Workshops

Meeting	Date	Topic
TAC Meeting #1	June 27, 2019	Introduction to the Part 150 process
Public Information Workshop #1	June 27, 2019	Introduction to the Part 150 study
<i>TAC Meeting #2</i>	<i>October 2, 2019 (today)</i>	<i>Noise modeling inputs</i>
TAC Meeting #3	Early 2020	Noise modeling results and review of NCP measures
TAC Meeting #4	Spring 2020	Presentation of the Part 150 Report
Public Information Workshop #2	Spring 2020	Presentation of the study results



Next Steps

- Confirm land use adjacent to the airport
- Finalize noise model inputs after FAA forecast approval
- Generate noise contours with AEDT
- Assess land use and population within contours
- Conduct noise measurements and analyze data
- Review NCP measures



TAC Member Discussion



Adjournment

- Next TAC meeting **early 2020** (exact date and time to be determined)
- Project contacts and websites
 - Suzanne Akkoush, Project Manager – Part 150 Study
 - Address emails to Part150@gsoair.org
 - Part 150 Website (PTIPart150Update.com) provides most relevant information
 - Will be updated regularly for public outreach purposes
 - TAC will receive direct notices
 - PTAA noise information website provides broader information
 - <https://flyfrompti.com/noise-information/>

Thanks for participating and attending!

