TARGETS

AEDT Environmental Plug-in Report

For

Ronald Reagan Washington National Airport

KDCA

Arlington, VA

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Executive Summary

A new group of nine Standard Instrument Departures (SIDs) have been proposed for Ronald Reagan Washington National Airport (DCA) in Arlington, Virginia. Using an FAA-approved noise screening tool, the Terminal Area Route Generation, Evaluation, and Traffic Simulation (TARGETS) Aviation Environmental Design Tool (AEDT) Environmental Plug-In, a noise modeling analysis was completed to screen for potential increases in noise resulting from implementation of the proposed procedures.

Historic track data was obtained and modeled to establish a baseline scenario. After the baseline scenario was established, aircraft operations assigned to the proposed procedure were modeled as flying the proposed procedure instead of their historical tracks where the procedure was modified in order to establish an alternative scenario. Aircraft operation counts were adjusted to represent an average annual day (AAD), and the model was used to calculate the noise exposure for the baseline and alternative scenarios on that AAD. The baseline and alternative scenarios were then compared to determine whether the procedure would result in an increase in noise by the standards of the National Environmental Policy Act (NEPA) in the environment surrounding the airport.

The results of the noise analysis indicated that no noise impact is expected as a result of implementation of this group of SIDs at Ronald Reagan Washington National Airport.

Ronald Reagan Washington National Airport **(**DCA**)**

TARGETS Environmental Analysis Process

1. Purpose

The purpose of this report is to document the process used to analyze the noise impact of a proposed air traffic action at Ronald Reagan Washington National Airport (DCA). Figure 1-1 shows the airport diagram for DCA. This report shows the analysis of nine Standard Instrument Departures (SIDs) at DCA using the Terminal Area Route Generation, Evaluation, and Traffic Simulation (TARGETS) Aviation Environmental Design Tool (AEDT) Environmental Plug-In tool. Table 1-1 shows the procedure name, type and publication date. Figure 1-2 shows the location of the arrival procedure.

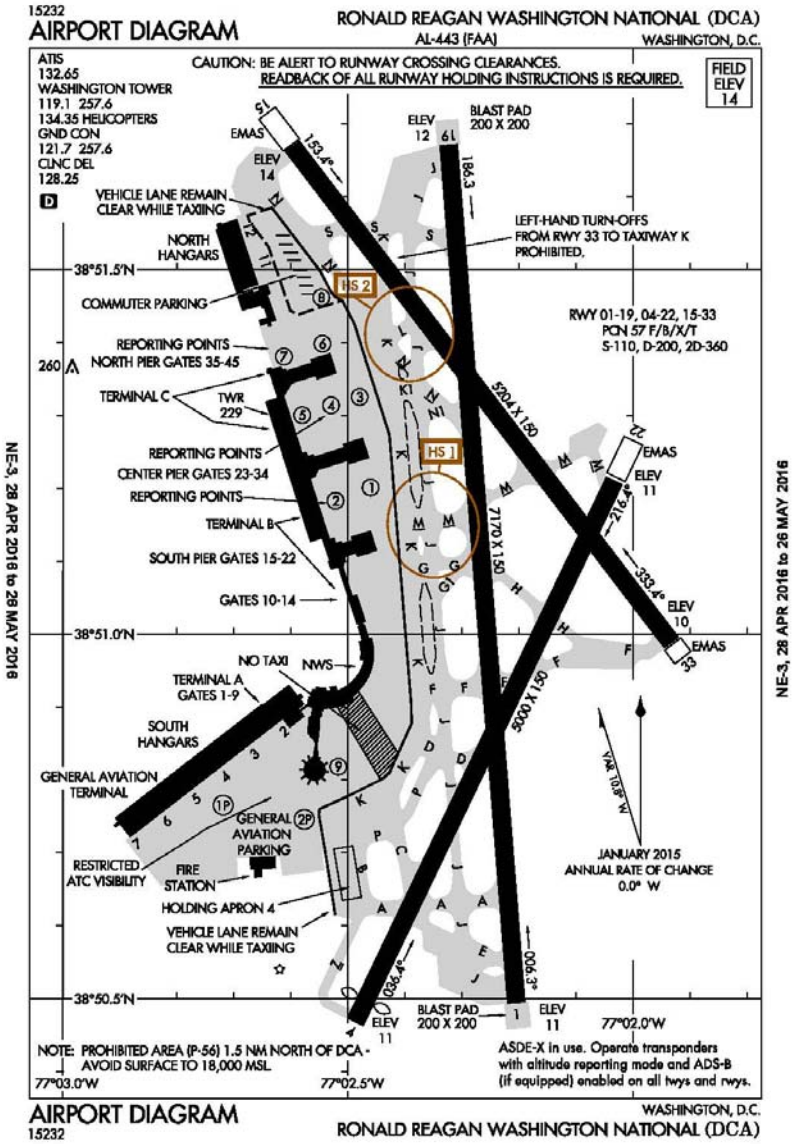

Figure 1-1: Airport Diagram of DCA

Procedure Name	Procedure Type	Current Publication Date
BOOCK THREE	SID	November 10, 2016
CLTCH TWO	SID	November 10, 2016
DOCTR FOUR	SID	November 10, 2016
HORTO THREE	SID	November 10, 2016
JDUBB TWO	SID	November 10, 2016
REBLL FOUR	SID	November 10, 2016
SCRAM FOUR	SID	November 10, 2016
SOOKI FOUR	SID	November 10, 2016
WYNGS FOUR	SID	November 10, 2016

Table 1-1: DCA Procedures to Be Modeled

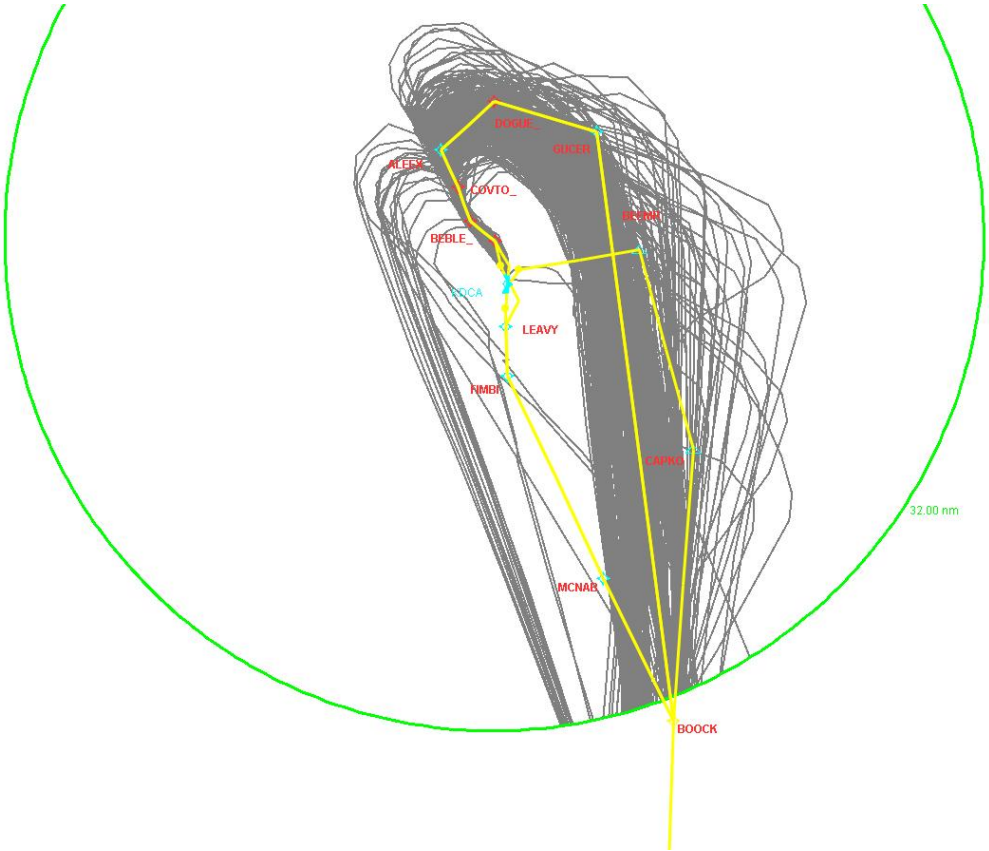

Figure 1-2: DCA BOOCK THREE Procedure and Assigned Tracks

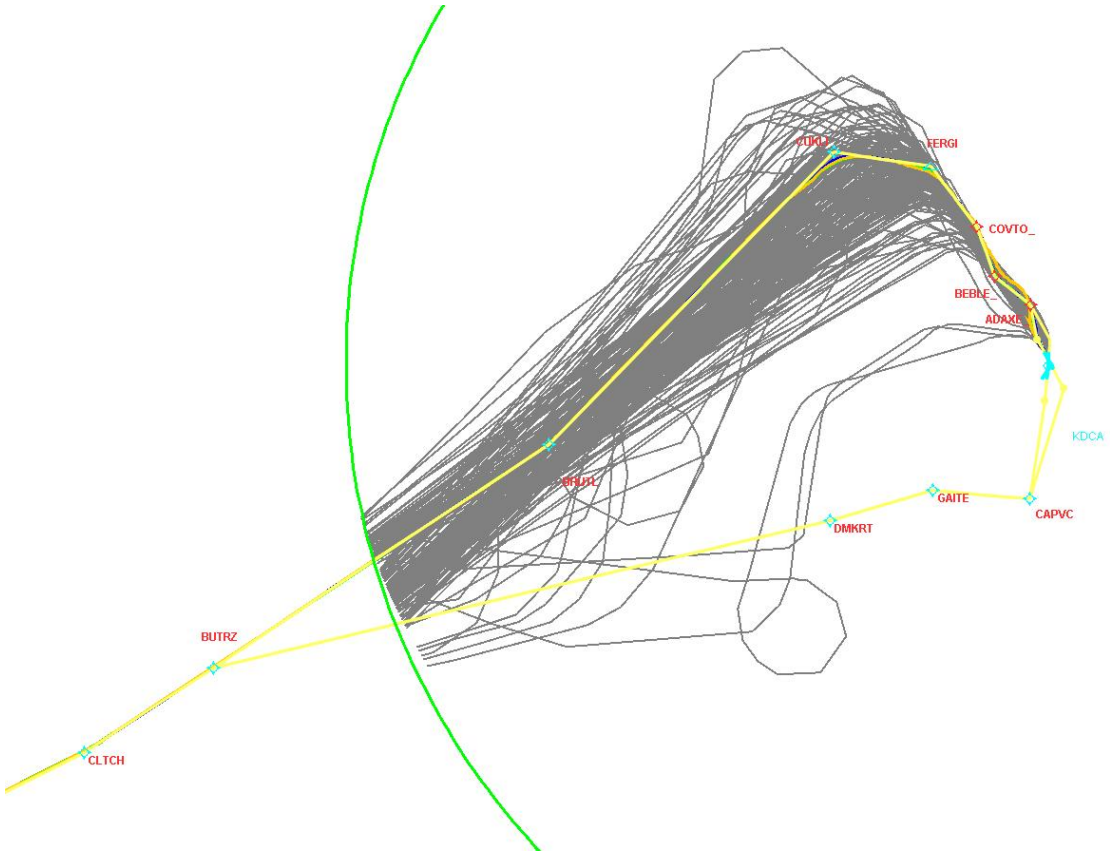

Figure 1-3: DCA CLTCH TWO Procedure and Assigned Tracks

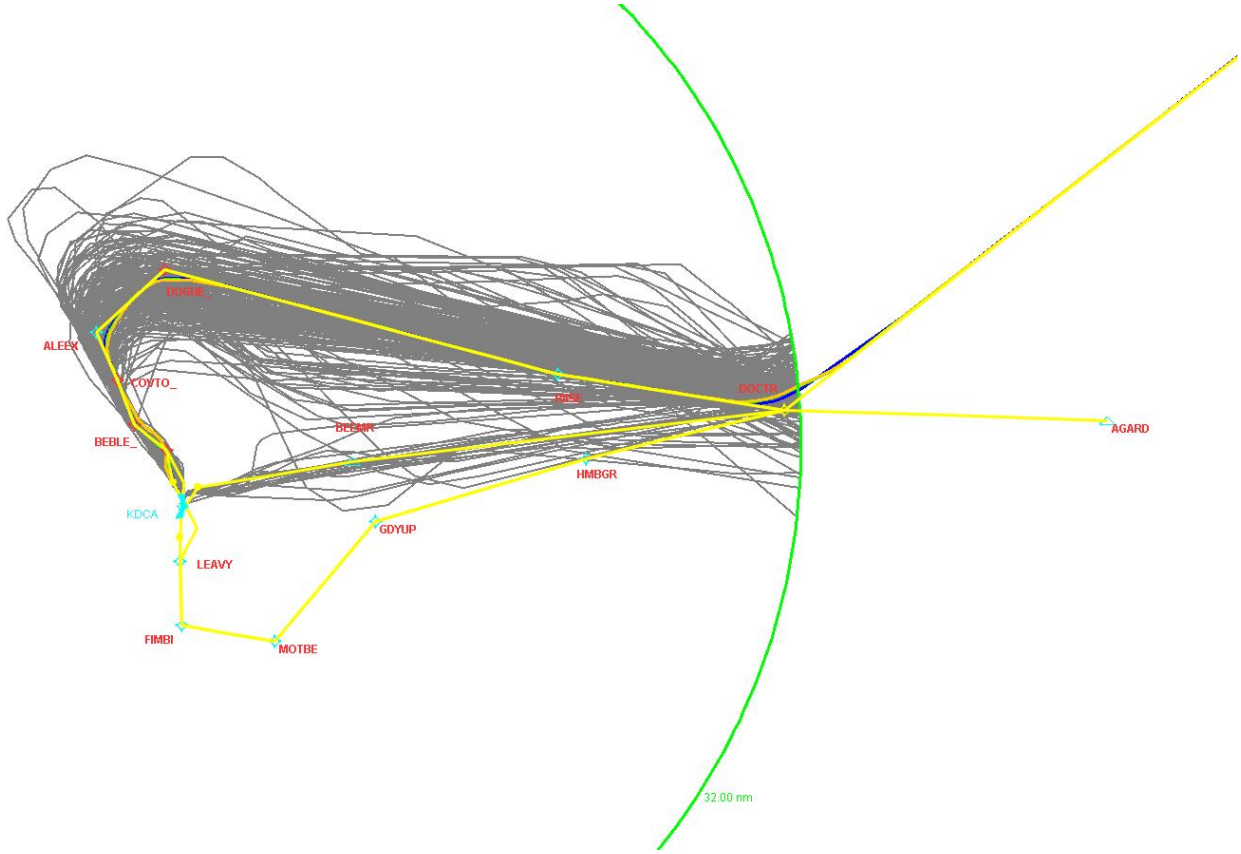

Figure 1-4: DCA DOCTR FOUR Procedure and Assigned Tracks

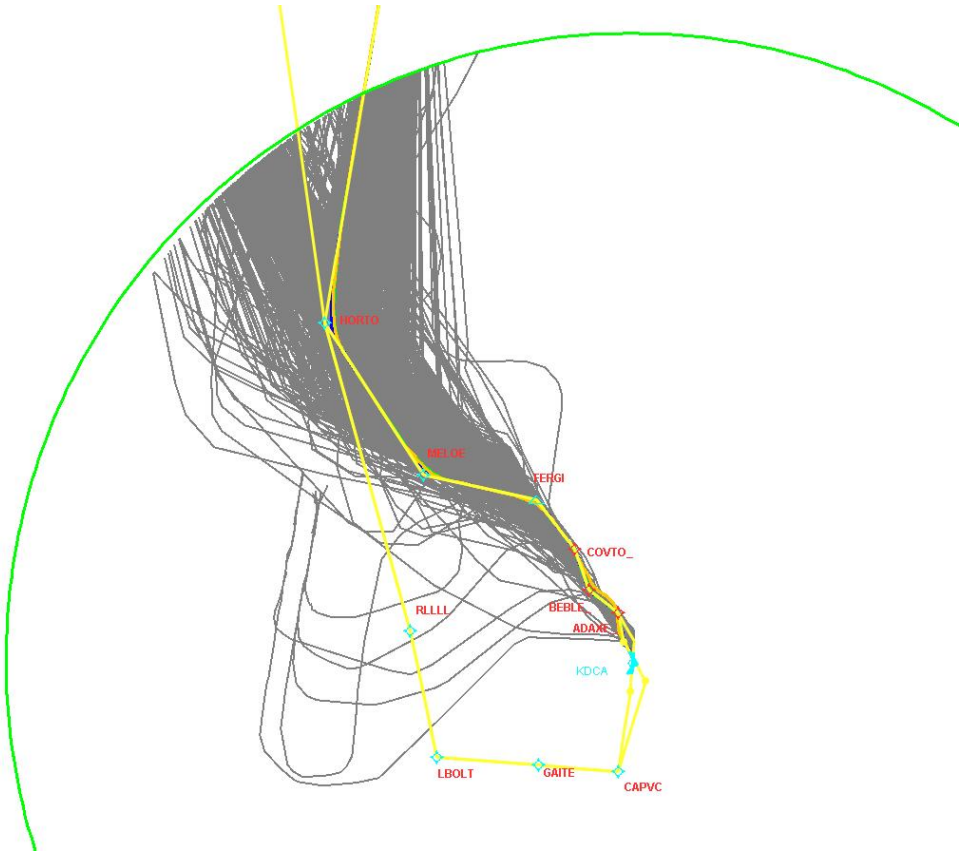

Figure 1-5: DCA HORTO THREE Procedure and Assigned Tracks

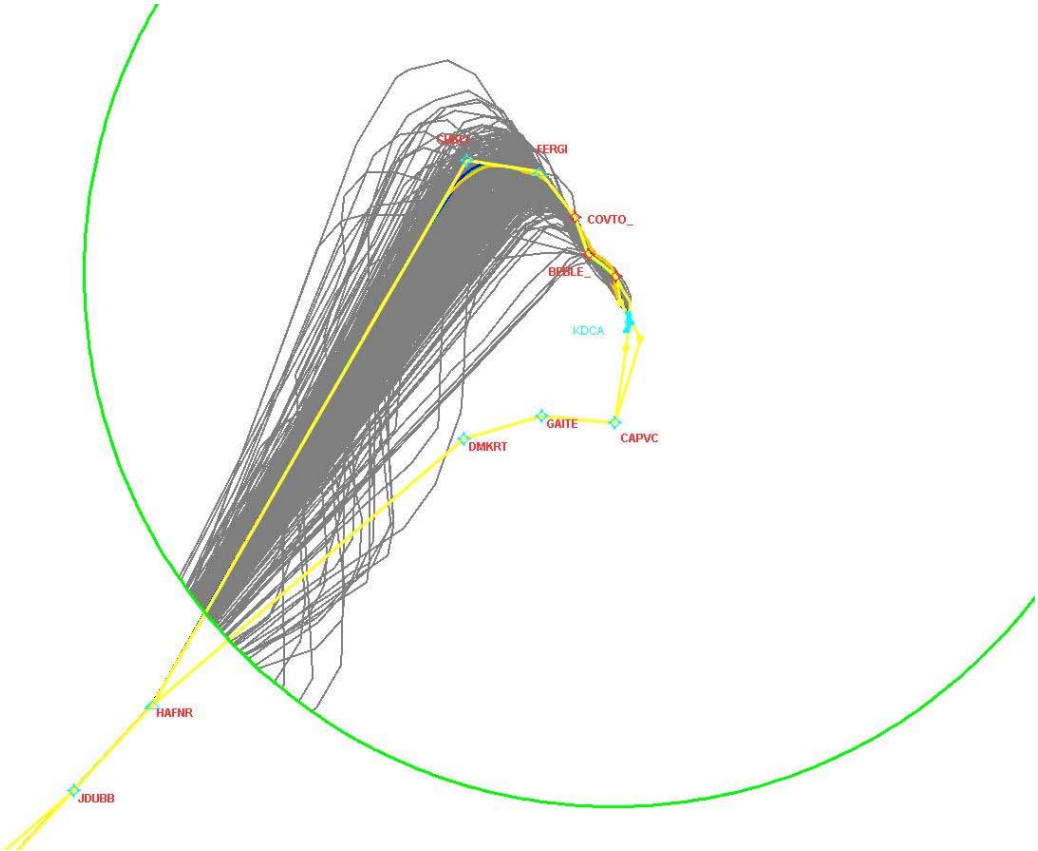

Figure 1-6: DCA JDUBB TWO Procedure and Assigned Tracks

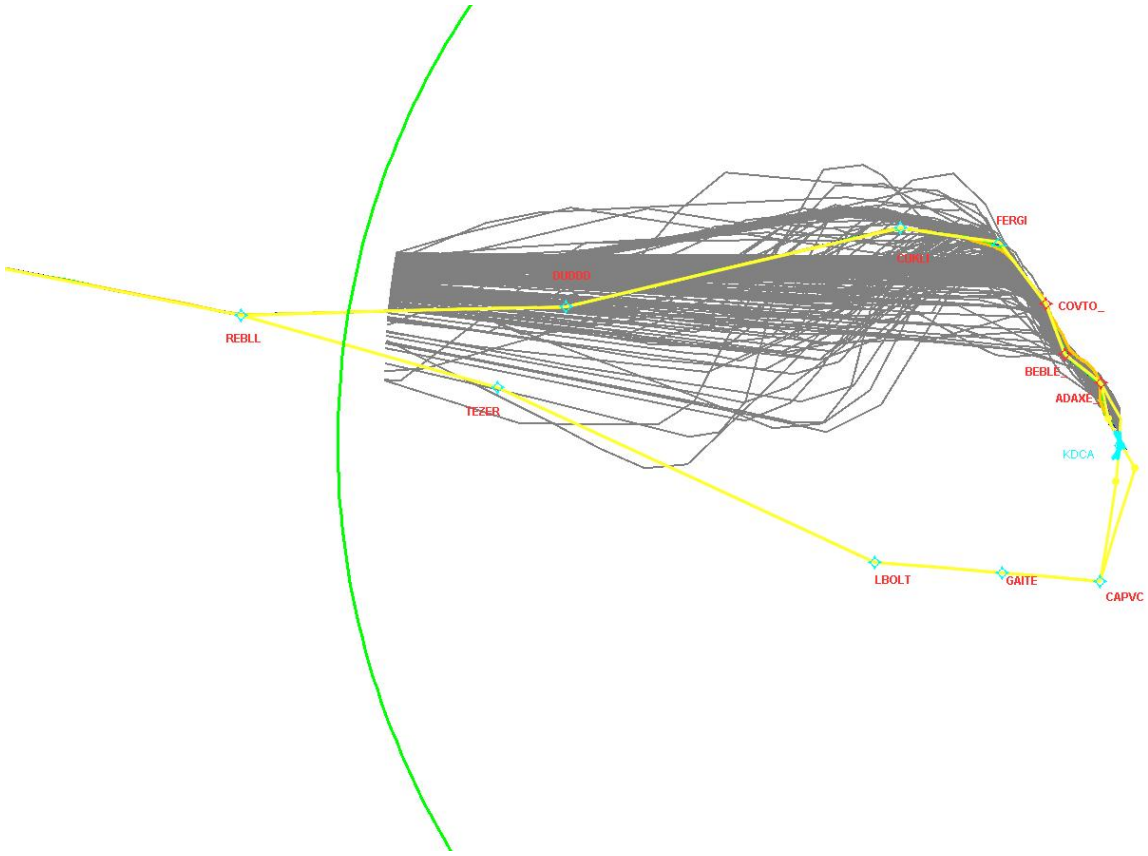

Figure 1-7: DCA REBLL FOUR Procedure and Assigned Tracks

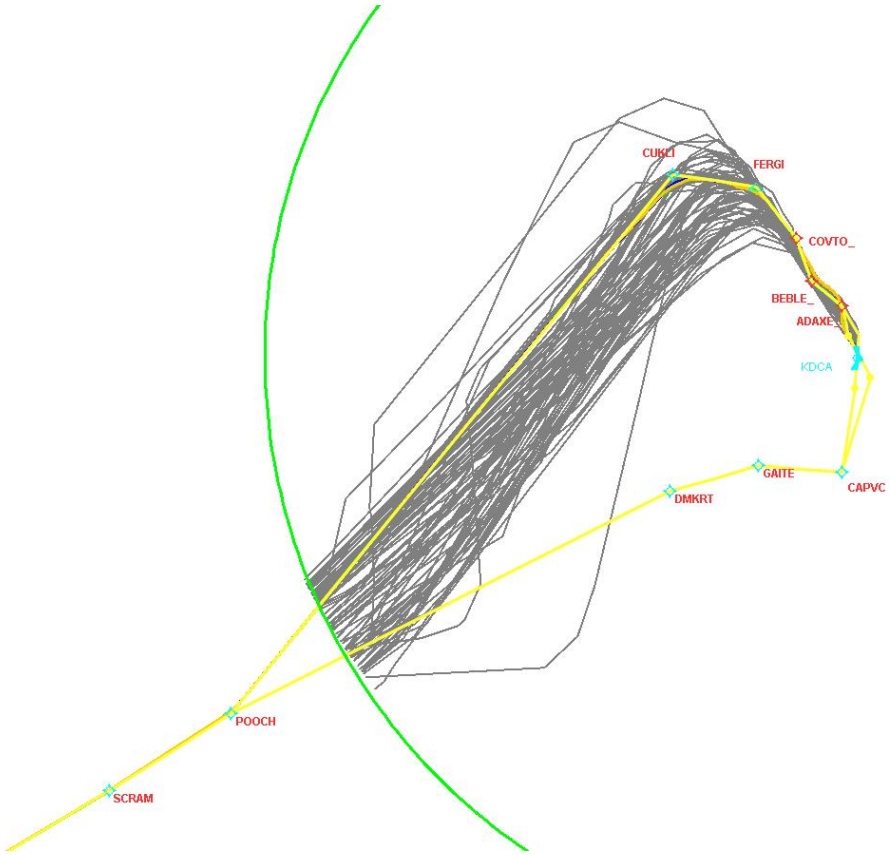

Figure 1-8: DCA SCRAM FOUR Procedure and Assigned Tracks

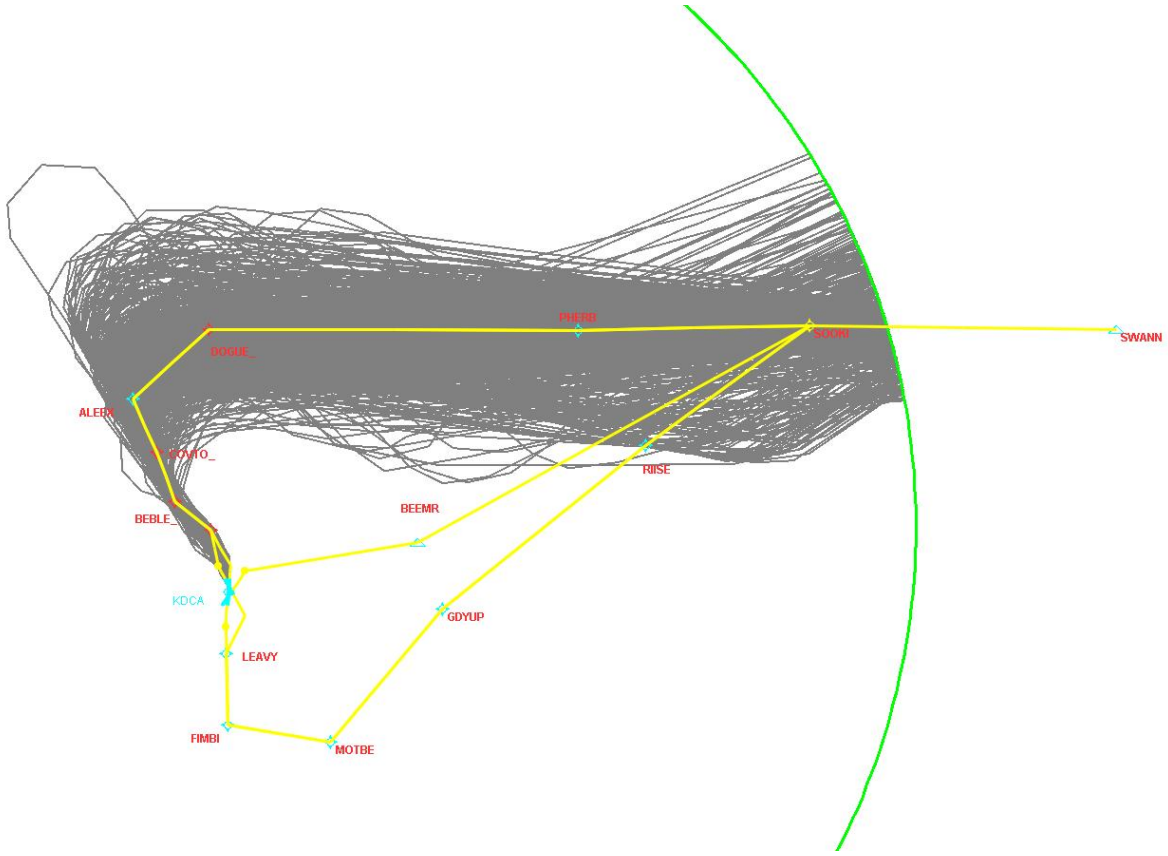

Figure 1-9: DCA SOOKI FOUR Procedure and Assigned Tracks

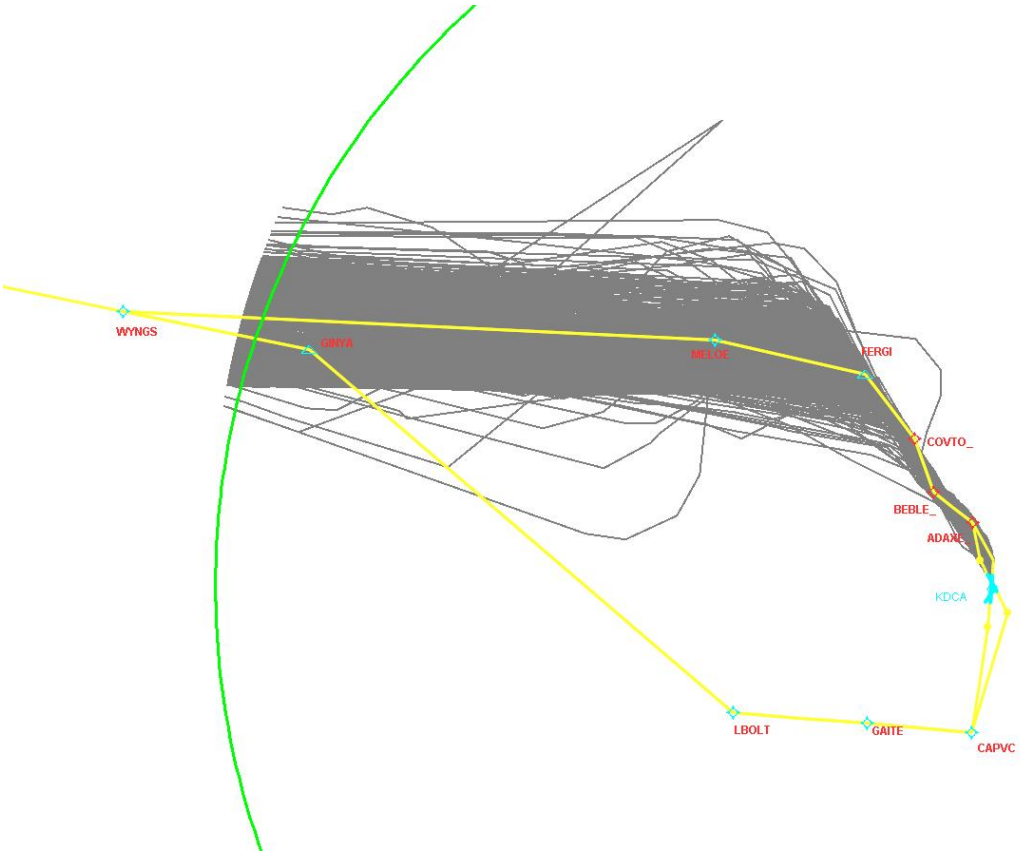

Figure 1-10: DCA WYNGS FOUR Procedure and Assigned Tracks

2. Methodology

Historic radar track data for DCA was obtained from the FAA's National Offload Program (NOP) after concurrence of the dates to be used by the environmental specialist and air traffic facility. Twenty eight days of radar track data were selected for the DCA analysis representing a range of temperature and wind conditions according to historic weather data for DCA provided by weather underground (http://www.weatherunderground.com) as well as being representative of the average runway usage.

All traffic data for DCA was obtained using the Potomac TRACON (PCT) as the radar source facility. After the removal of overflights, incomplete track segments, and other irrelevant tracks, 22,890 tracks were used for the analysis.

The dates selected for this project were the following:

April 22-28, 2015
July 17-23, 2015
October 7-13, 2015
January 14-20, 2016

These dates represent average traffic counts and traffic flows through various seasons and peak travel times for DCA. There were no significant runway outages or significant conditions that would otherwise result in abnormal traffic counts or traffic flows. In order to calculate the accurate AAD parameter, traffic counts for average daily departures and arrivals used for annualization in this analysis were obtained through the FAA's Traffic Flow Management System Counts (TFMSC) database.

Historical radar track data (figures 2-1 and 2-2) was used to create a baseline noise exposure, which provides lateral path definition, aircraft fleet mix, departure/arrival stream proportions for each runway, and day/night traffic ratios. A legend (Table 2-1) shows, by color, the altitudes of the track data.

After the baseline scenario was built, aircraft operations assigned to the proposed procedure were modeled as flying the proposed procedure instead of their historical tracks, which gives us the alternative scenario.

The analysis does not take into account terrain. All calculations were based on "above field elevation" (AFE) using the airport's reference elevation. The altitude controls of the RNAV procedures were used to adjust the vertical profile for each modeled aircraft flying the proposed procedure. When a range of altitudes was given for a particular waypoint, the lowest point of the range was used in order to model the most conservative environmental case. The TARGETS Environmental Plug-in uses 0.3 nautical mile dispersion on either side of the centerline of a procedure as its default dispersion value.

Once the baseline and alternative scenarios were built, the TARGETS Environmental Plug-in Tool was used to generate noise outputs for both scenarios. The Environmental Plug-in Tool uses the Aviation Environmental Design Tool version 2b (AEDT 2b) to calculate noise. The noise output files from AEDT 2b for both the baseline and alternative noise exposures consist of a series of equally spaced grid points, each assigned a day-night average noise level (DNL) value. This data is then loaded back into TARGETS by the Environmental Plug-in Tool, which generates three outputs: baseline noise exposure, alternative noise exposure, and noise impact.

The noise impact is a comparison between the baseline and the alternative noise exposure that depicts reportable and significant noise changes at all affected locations per the criteria indicated in FAA Order 1050.1F (“Environmental Impacts: Policies and Procedures”) and Chapter 32 of FAA Order 7400.2K (“Procedures for Handling Airspace Matters”). The reportable and significant noise increases and decreases (if any) are then depicted on an aerial photograph using Google Earth as well as on a sectional chart.

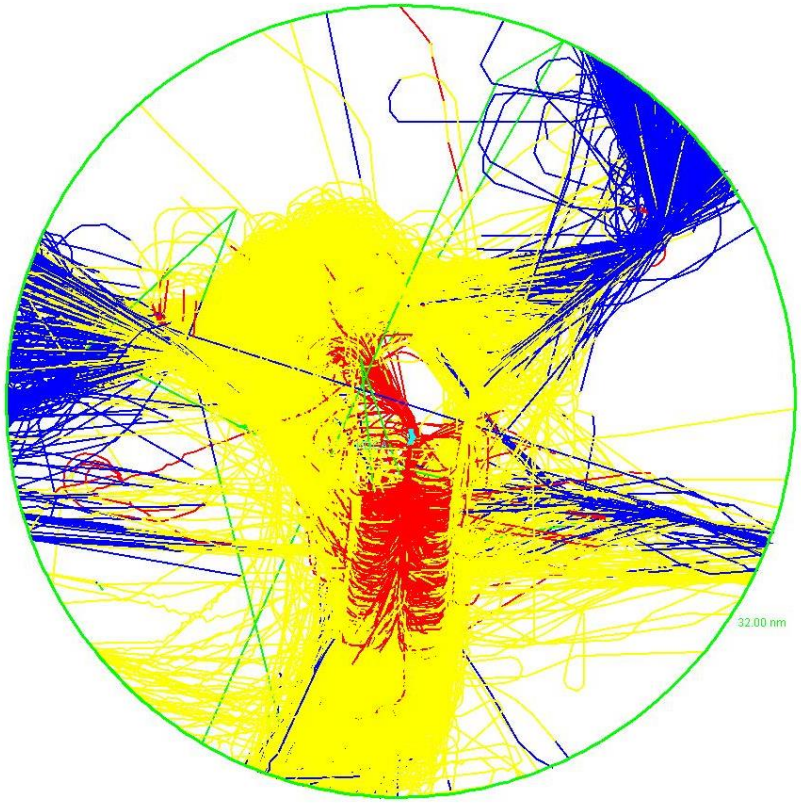

Figure 2-1: DCA Arrival Traffic Used in Analysis

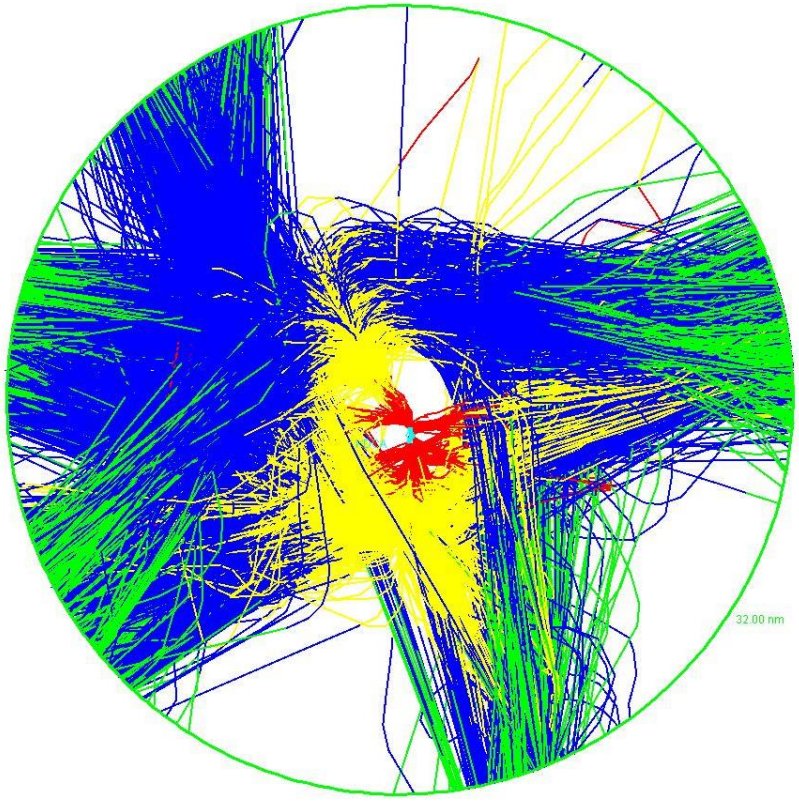

Figure 2-2: DCA Departure Traffic Used in Analysis

Track Data Legend with Above Ground Level (AGL) and Mean Sea Level (MSL) Altitudes			
Airport: DCA		***Field Elevation***	***14***
AGL Altitudes		**MSL Altitudes**	**Legend Colors**
1000		1014	
2000		2014	
3000		3014	
4000		4014	
5000		5014	
6000		6014	
7000		7014	
8000		8014	
9000		9014	
10000		10014	
11000		11014	
12000		12014	
13000		13014	
14000		14014	
15000		15014	
16000		16014	
17000		17014	
18000		18014	
Above		Above	

Table 2-1: Legend for Baseline Arrival and Departure Traffic

3. Baseline Noise Exposure

The baseline noise exposure is shown in Figure 3-1, which depicts the levels and locations of the noise produced by the historical radar track data for arrivals and departures. Figure 3-2 depicts the results on an aerial photograph using Google Earth. Table 3-1 is the legend for the baseline noise exposure figures The TARGETS Runway Usage Report provides information on fleet mix by runway for both day and night operations.

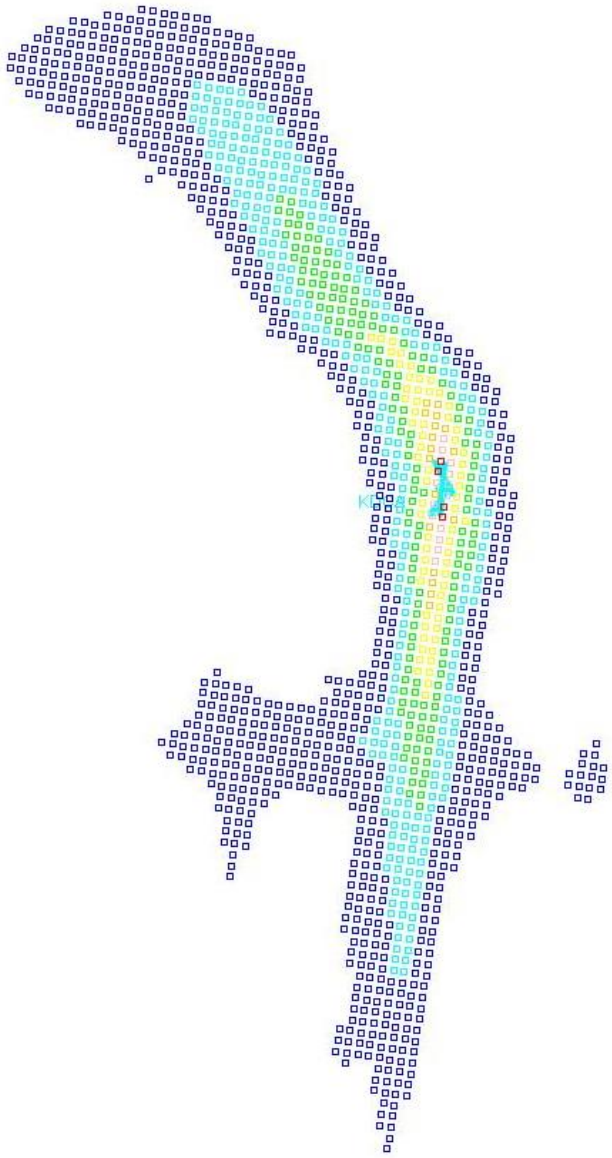

Figure 3-1: Baseline Noise Exposure in TARGETS

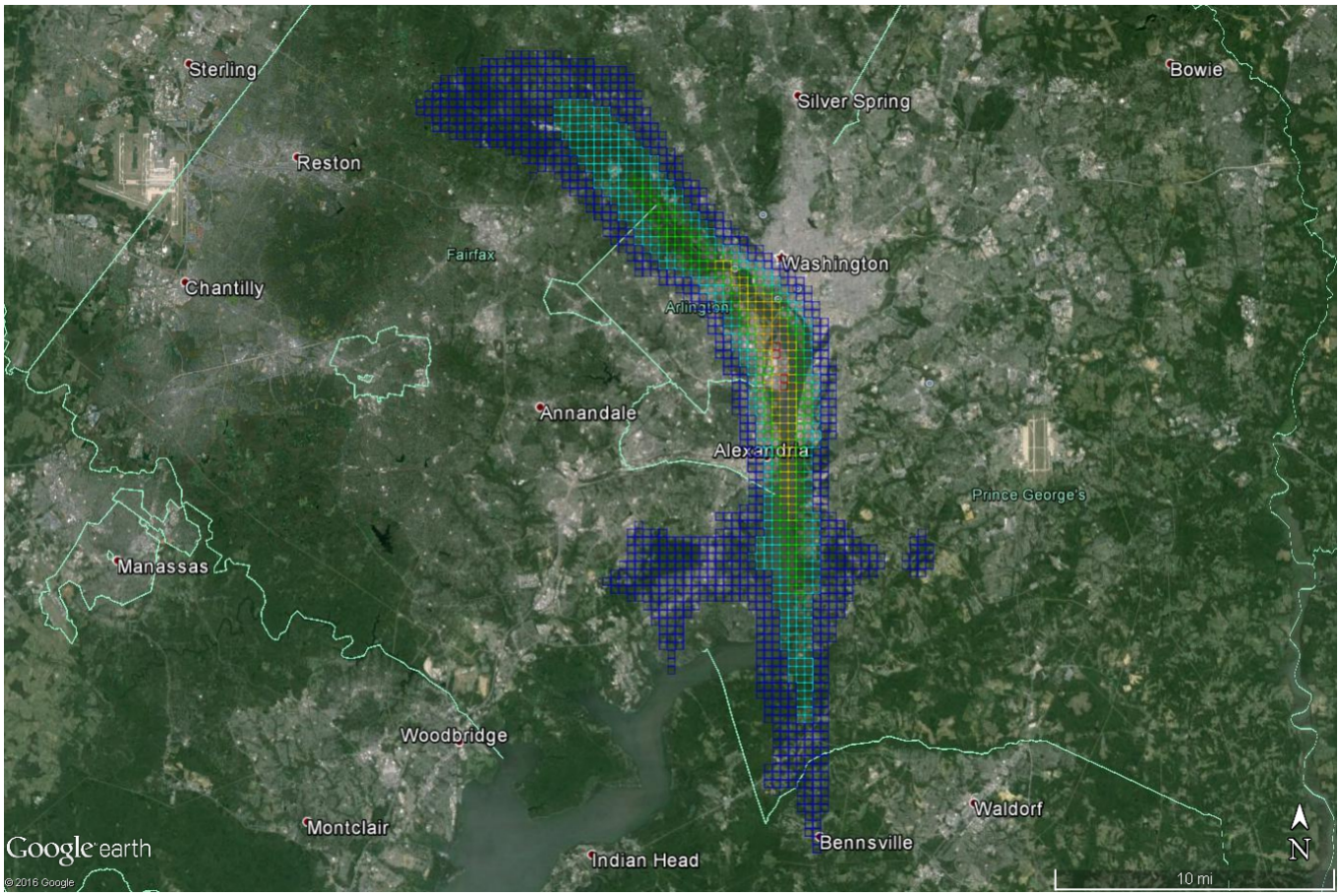

Figure 3-2: Baseline Noise Exposure in Google Earth

Geometric Shape	Color	DNL Value
SQUARE	BLUE	45–50 dB
SQUARE	LIGHT BLUE	50–55 dB
SQUARE	GREEN	55–60 dB
SQUARE	YELLOW	60–65 dB
SQUARE	ORANGE	65–70 dB
SQUARE	PINK	70–75 dB
SQUARE	RED	75 dB OR MORE

Table 2-1: Legend for Noise Exposure

4. Alternative Noise Exposure

The alternative noise exposure is shown in Figure 4-1, which depicts the levels and locations of the noise using the proposed procedures. Table 4-1 is the legend for the alternative noise exposure figures. Figure 4-2 depicts the results on an aerial photograph using Google Earth. The TARGETS Runway Usage Report provides information on fleet mix by runway for both day and night operations.

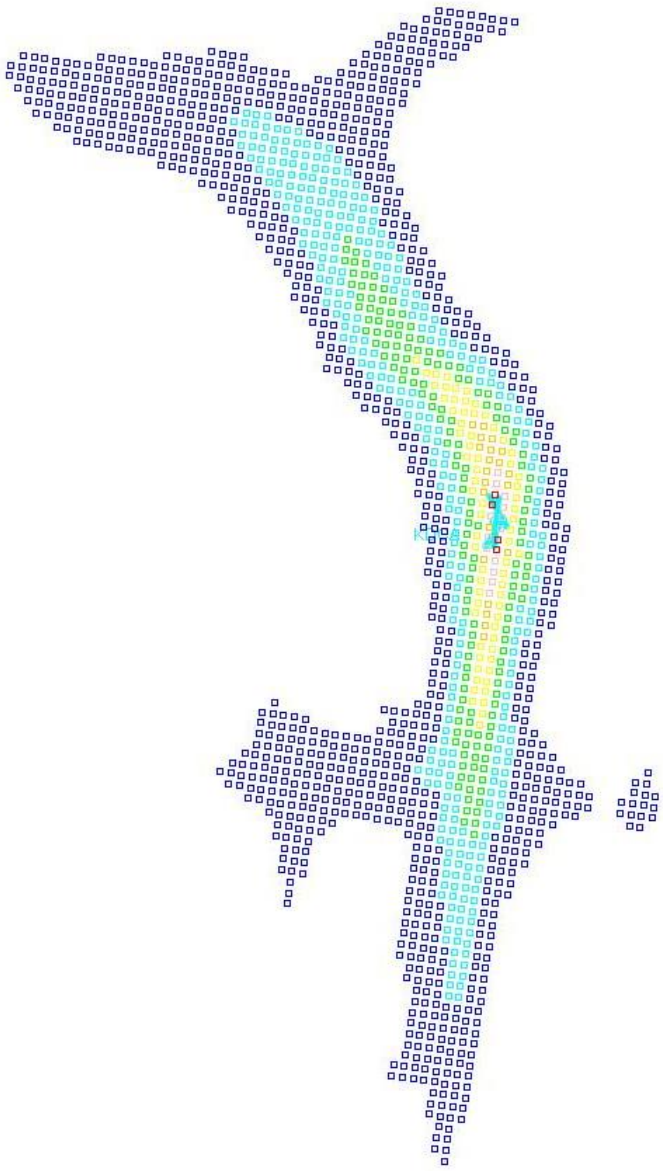

Figure 4-1: Alternative Noise Exposure for the Proposed Procedures in TARGETS

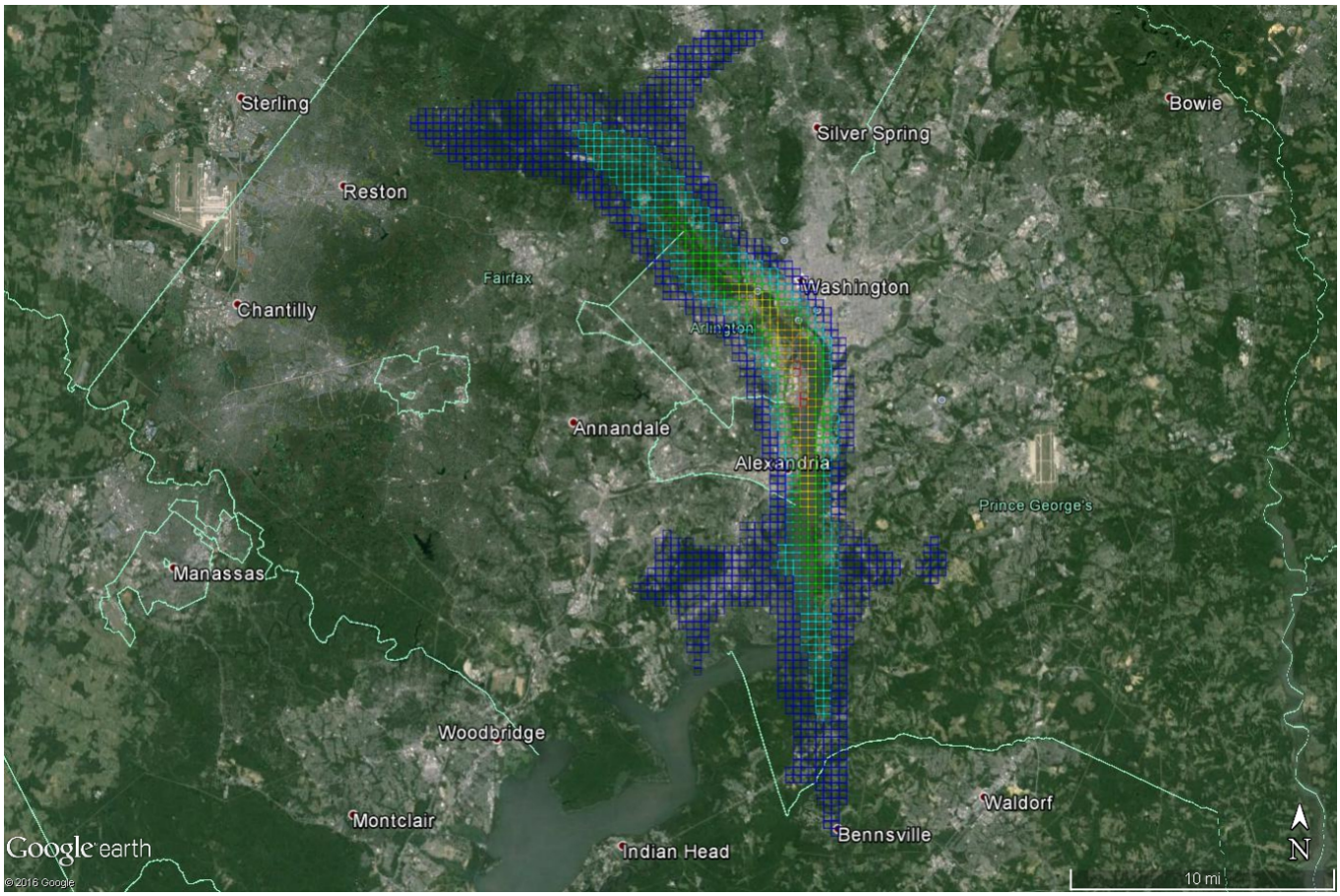

Figure 4-2: Baseline Noise Exposure in Google Earth

Geometric Shape	Color	DNL Value
SQUARE	BLUE	45–50 dB
SQUARE	LIGHT BLUE	50–55 dB
SQUARE	GREEN	55–60 dB
SQUARE	YELLOW	60–65 dB
SQUARE	ORANGE	65–70 dB
SQUARE	PINK	70–75 dB
SQUARE	RED	75 dB OR MORE

Table 3-1: Legend for Noise Exposure

5. Comparison of Baseline and Alternative Noise Exposure

The baseline and alternative noise exposures were compared using the TARGETS AEDT Environmental plug-in to determine the impact of the proposed procedure and it was determined that there were no increases or decreases in noise that were significant enough to meet the appropriate criteria in FAA Order 1050.1F (shown in Table 5-1).

GEOMETRIC SHAPE	COLOR	DNL DIFFERENCE
SQUARE	PURPLE	45-60 DB BASELINE WITH A DECREASE OF 5.0 DB OR GREATER IN THE ALTERNATIVE
SQUARE	BLUE	60-65 DB BASELINE WITH A DECREASE OF 3.0 DB OR GREATER IN THE ALTERNATIVE
SQUARE	GREEN	65 DB BASELINE OR GREATER WITH A DECREASE OF 1.5 DB OR GREATER IN THE ALTERNATIVE
OVAL	RED	65 DB OR GREATER ALTERNATIVE WITH AN INCREASE OF 1.5 DB OR GREATER OVER THE BASELINE
OVAL	ORANGE	60-65 DB ALTERNATIVE WITH AN INCREASE OF 3.0 DB OR GRTEATER OVER THE BASELINE
OVAL	YELLOW	45-60 ALTERNATIVE DB WITH AN INCREASE OF 5.0 DB OR GREATER OVER THE BASELINE

Table 4-1: Legend for Noise Impact