WRITTEN RE-EVALUATION AND RECORD OF DECISION FOR THE NEW YORK/NEW JERSEY/PHILADELPHIA METROPOLITAN AREA AIRSPACE REDESIGN FINAL ENVIRONMENTAL IMPACT STATEMENT

December 22, 2020
US Department of Transportation
Federal Aviation Administration

1. Introduction

On September 5, 2007, the Federal Aviation Administration (FAA) issued its Record of Decision (ROD) on the New York/New Jersey/Philadelphia (NY/NJ/PHL) Metropolitan Area Airspace Redesign project.[1] After more than nine years of study and evaluation to address congestion and delays at some of the busiest airports in the U.S., the ROD established the agency's final decision to approve the project to redesign the airspace in the NY/NJ/PHL Metropolitan Area. The ROD relied on detailed analysis contained in an Environmental Impact Statement (EIS) and its appendices. It approved the Integrated Airspace Alternative with Integrated Control Complex (the "Selected Project") for implementation.

The purpose of the Airspace Redesign project was to increase the efficiency and reliability of the airspace structure and the Air Traffic Control (ATC) system, thereby accommodating growth while enhancing safety and reducing delays in air travel[2], for the NY/NJ/PHL Metropolitan Area. The Airspace Redesign project was intended to modernize the structure of the NY/NJ/PHL air traffic environment while laying a foundation for achieving the Next Generation Air Transportation System (NextGen) in an environmentally responsible manner.

The EIS and the ROD for the Airspace Redesign project projected a five-year implementation period for the project. The FAA began implementation of the project on December 19, 2007.

The Airspace Redesign project is the largest project of its type that the FAA has ever attempted in both magnitude and complexity. In addition to having a high volume of aircraft, the airspace that was being redesigned is some of the most complex airspace in the world. The complexity results from the location of three large hub airports, John F. Kennedy International Airport (JFK), LaGuardia Airport (LGA), and Newark Liberty International Airport (EWR), within 10 miles of each other as well as several smaller airports with commercial service (Westchester County Airport, Islip MacArthur Airport) in the same area, and a fourth large hub airport, Philadelphia International Airport (PHL), within 90 miles. The same airspace also accommodates aircraft transitioning to arrive at the Washington, D.C. area airports, and is in the middle of the heavily congested Northeast Corridor between Washington, D.C., and Boston, Massachusetts. Additionally, the Airspace Redesign project addressed flight paths from the ground through cruise altitudes. Other airspace redesign efforts have addressed airport proximity, airspace complexity, high traffic volumes, and extensive flight path changes. However, none of these efforts addressed all of these elements in combination; especially not with the unprecedented scope and magnitude of the Airspace Redesign project.

While several beneficial elements were implemented by 2012, the Airspace Redesign project was suspended at that point and is no longer expected to be fully implemented. The National Airspace System evolved significantly after the 2007 ROD, with new NextGen capabilities such

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[1] After signing the ROD, the FAA identified several items in the document that were omitted or incorrect due to editing. FAA prepared an errata sheet, and for clarity and ease in reference, subsequently incorporated the errata sheet into a corrected ROD dated September 28, 2007.

[2] Corrected ROD, at 9-10.

as Time Based Metering and advanced satellite based navigation procedures, increasing consolidation of the airline industry, changes in system use, and evolving traffic projections resulting in new airspace and procedures requirements. As a result, the FAA suspended the Redesign in May 2013. The FAA has determined it is appropriate to end implementation. The FAA intends to consider new ways to best meet the unique operational and safety needs in the NY/NJ/PHL Metropolitan Area and the Northeast Corridor.

This decision is based on a comparison of 2012 Conditions with the EIS. 2011 was the originally-intended deployment date, so 2012 Conditions are the best basis for comparison of alternatives in the context of the EIS. In the years since then, the air transportation system has evolved in response to changes in technology, user business practices, and macroeconomic conditions. All of these factors are independent of the Airspace Redesign and are not substantially affected by its suspension or completion. As the system has evolved since the suspension and the EIS remained static, identifying environmental impacts relative to actual conditions has become progressively more difficult to describe. Expressing them in terms consistent with the EIS would require progressively greater resources for each year since 2012. Therefore, the approach which most effectively discloses the environmental impacts is a comparison with 2012 Conditions.

2. Background

A. Implementation of Airspace Redesign

To manage the complexity of implementation, the Airspace Redesign project was divided into four Stages. The early stages could be implemented through bilateral coordination between just two facilities. Later stages involved JFK, LGA, EWR, PHL, New York Terminal Radar Approach Control (TRACON), Philadelphia TRACON and Boston, Cleveland, Washington, and New York Air Route Traffic Control Centers, so implementation was expected to be much more complicated.

Procedure development for Stage 1 began immediately upon approval of the ROD. It included dispersal headings at EWR and PHL and development of a new high-altitude airway (called Q42) to add a routing option for westbound traffic. Dispersal headings at EWR are rarely used because they depend on complementary arrival changes that were planned for Stage 4. Dispersal headings at PHL, however, were a success, saving affected flights almost six miles of flying distance and increased efficiency at PHL by reducing time between departures. Q42 relieved congestion on jet airway J80, which enabled flights to Ohio and Indiana to use different airspace from transcontinental flights. When Q42 is used, short-haul flights avoid delays from traffic management restrictions that moderate long-haul demand.

Stage 2 brought the expansion of departure fixes into New York Center from New York TRACON. Before Stage 2, the ELIOT departure fix out of New York was used to funnel traffic from four large airports onto four airways. This was a bottleneck during times of heavy demand. When ELIOT was split into two fixes, departure restrictions were reduced. Prior to the Airspace

Redesign, JFK's departure fix over Robbinsville (RBV) Very High Frequency Omni-Directional Range Tactical Air Navigation Aid (VORTAC) served six airways. After Stage 2, JFK was able to use a new departure procedure (called DEEZZ) to gain additional access to westbound routes and relieve congestion over RBV.

B. Suspension of Airspace Redesign

Stage 3 was intended to begin in 2012. Stages 3 and 4 are the high-cost stages of the Airspace Redesign project, with the highest operational benefit. Before authorizing the expenditures, the FAA re-evaluated their utility in light of the changes in the air transportation system over the intervening years. Traffic had not grown to the anticipated levels. More notably, changes in airline business practices and possibilities for improved airspace usage provided by NextGen obviated further implementation of the Airspace Redesign which was designed using conventional (non-RNAV) procedures. Given the circumstances, the project was suspended in 2013.

3. Purpose of this Written Re-Evaluation

The Council on Environmental Quality (CEQ) regulations address when it is appropriate for a federal agency to prepare a supplement to a draft or a final EIS. A supplement is required if there is remaining federal action and "the agency makes substantial changes in the proposed action that are relevant to environmental concerns or there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts," 40 C.F.R.§ 1502.9(c)(1). FAA Order 1050.1F references this standard and states that a Written Re-evaluation is required if "[a]ll or part of the action is postponed beyond the time period analyzed in the EA or EIS."[3]

While suspension and termination of Stages 3 and 4 may require a supplement, Order 1050.1F permits FAA to take an interim step and prepare a re-evaluation to determine whether the "[d]ata and analyses contained in the previous EA and FONSI or EIS are still substantially valid and there are no significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts," Order 1050.1F at 9-2.c(2). If the evaluation determines that the data and analyses remain valid, no supplement is required. This reevaluation examines the information previously disclosed in the new context and shows that it is sufficient to explain the consequences of terminating the Selected Project in its current, partial state.

4. Analysis

The following sections describe the noise impacts already disclosed in the EIS and the conditions at the time the Airspace Redesign project was suspended. They also describe the analysis conducted to determine the noise impacts of the project suspension (relative to No Action

[3] FAA Order 1050.1F 9-2 a (1) (b).

conditions) as well as the impacts of full implementation. The air quality implications are also discussed.

A. Noise Disclosures in the EIS

The EIS disclosed noise exposures expected from five alternatives: Future No Action, Modifications within Current Boundaries, Integrated Airspace, Integrated Airspace with Integrated Control Complex, and Ocean Routing. Because the Airspace Redesign project was suspended before any major changes in the boundaries of the local air traffic control facilities were made, it closely resembles the assumptions behind the "Modifications" alternative. This alternative was re-examined for its applicability to conditions at the time of suspension.

There are seven differences between the airspace conditions at the time of suspension and the Modifications alternative. Three differences occur at high altitudes, 10,000 feet above ground level (AGL) and above, altitudes that do not contribute to levels of noise exposure on the ground. One, the TNNIS climb out of LGA, was implemented to improve separation of LGA departures from JFK arrivals. It was conceived independent of the Airspace Redesign project, was implemented after the suspension, and would have been implemented even if the Airspace Redesign project was completed. Its purpose is to deconflict LGA and JFK traffic. Its environmental impacts were treated in its own decision documents. The dispersal headings out of Newark and Philadelphia, which were part of the Selected Project but not the Modifications Alternative, have an impact, and were investigated. Two departure flows involve changes to flight paths at low altitudes and were modeled to estimate their impacts.

EIS Modifications Alternative	**2012 Conditions**	**Noise Impact**
Single ELIOT	Split ELIOT	Above 10,000 feet. Did not contribute to the noise impact
WHITE/ DITCH climbs	South departures as No Action	DITCH above 12,000 feet; WHITE above 10,000 feet. Did not contribute to the noise impact.
STOEN later join to J48	STOEN as No Action	Above 18,000 feet. Did not contribute to the noise impact
LGA as No Action	LGA - TNNIS	Independent of redesign. Identical for both situations.
EWR & PHL dispersal headings	Dispersal headings mitigated	Mitigation of headings applied equally in all airspace alternatives.[4] To be modeled.
No change to JFK departures	DEEZZ departures to J60 and J64	Changes balance of aircraft among departure runways. To be modeled.
EWR offshore access from 04L	Does not exist	Right turn over LGA at 8,000 feet. To be modeled.

[4] Only the Integrated Airspace with ICC was published with noise-mitigated headings. This analysis applies those headings to Modifications to get a match to 2012 Conditions.

As detailed in Appendix A "Post-Stage-2 Suspension of the New York/New Jersey/Philadelphia Airspace Redesign", none of these flows creates noise impacts that are substantially different from those disclosed in the EIS. Dispersal headings at EWR are rarely used, and patterns of departures in 2012 matched those in the Future No Action alternative. Dispersal headings at PHL match those in the Selected Project.

The DEEZZ departure procedure out of JFK was not part of the Modifications alternative, but was part of the Selected Project. Its purpose is to avoid congestion in the airspace that connects JFK to southwest-bound airways by giving departing flights a series of left turns as they climb above LGA and EWR flight paths. On the average annual day in 2012, it would be used by 12 flights. The DEEZZ path matches the previously-existing flow towards the northwest below 11,000 feet. It leads to no audible differences; all changes in noise exposure in the Study Area are between -0.1 and +0.1 dB DNL.

The departure flow from Newark Runway 04Left (L) to the West Atlantic route system was part of the Modifications alternative, but not the Selected Project. It was never implemented. It was forecast to be used by eight flights on the annual-average day in 2012. This path would have matched the departure track towards New England and the North Atlantic until 7,000 feet, after which it would have turned to cross LGA and JFK airports on its way to the ocean. The portion of the path above 7,000 feet, which is different from the Selected Project, would have generated no audible difference in noise because the flights are inaudible compared to the two airports beneath them. All resulting changes in noise exposure in the Study Area are between -0.1 and +0.1 dB.

B. Conditions at Time of Suspension

There are two principal changes to circumstances in which the Airspace Redesign project was forecast to take place. First is the number of flights around New York. Air carriers have consolidated in recent years and the number of Instrument Flight Rule (IFR) general aviation operations declined, leading to lower traffic at most airports. Traffic at JFK and LGA in 2012 was within expected uncertainties of the forecast, but at other airports traffic in 2012 was 25%-33% below forecast.

The second change in conditions is the increase in early-morning activity. At all the major hubs, departures before 7:00 a.m. are a larger fraction of the traffic than was forecast in the EIS. The day-night average sound level (DNL) penalizes flights between 11:00 p.m. and 7:00 a.m. by counting them ten times as much towards noise exposure.

These two effects counteract each other, but the increase in early-morning operations is slightly larger. Whether this meets the standard of "bearing on the proposed action or its impacts" depends on the noise exposures caused by continuing or terminating implementation, which is discussed below.

C. Environmental Impacts of Suspension

This reevaluation considers whether the contents of the EIS remain valid in light of impacts of the partial implementation of the Airspace Redesign. The question at hand is whether suspending the Airspace Redesign at this stage would cause any environmental impacts that have not been disclosed to the public. In making this determination, FAA has compared the 2012 Conditions, that is the project as implemented (Stages 1 and 2 only), with the Future No Action Alternative as described in the EIS. The FAA also compared the 2012 Conditions with the Selected Project approved in the 2007 Record of Decision. Appendix A contains estimates of the effects on noise exposure of the 2012 Conditions as compared to the Future No Action Alternative and the Selected Project. These noise results were obtained by re-analyzing the results of previously-performed studies, "commensurate with the potential for environmental impacts".[5] All of the possible impacts are to be found in previously disclosed documents.

In most of the study area no differences were found between the actual noise conditions in 2012 and those that would have occurred had the Airspace Redesign project never begun. Around Philadelphia, four census blocks just off the end of Runway 27L would have experienced a decrease in noise of DNL 1.5 dB or greater if the Airspace Redesign elements had not been implemented. These are points that had reportable noise changes that were disclosed in the EIS. Among other census blocks, 111 would have heard slight noise decreases and one would have heard a slight noise increase if the Airspace Redesign elements had not been implemented. In 2012, these points were all exposed to noise from aircraft below 55 dB DNL. All of these impacts were due to differences in PHL dispersal headings implemented as part of the Airspace Redesign project.

D. Environmental Impacts of Full Implementation

Were the Airspace Redesign project to be completely implemented, reportable noise differences from 2012 would be widespread across the study area. The table, derived from Appendix A, Table 5, summarizes the number of people exposed to noise changes that would be significant (an increase of 1.5 dB or greater above 65 dB DNL)[6], moderate (a change greater than 3 dB between 60-65 dB DNL), or slight (a change greater than 5 dB between 45-60 dB DNL), if the Selected Project were to be completed.

Population Exposed	Increase	Decrease
Significant	41	55
Moderate	856	1,045
Slight	293,000	153,000

The results are similar to those reported in the EIS, but significant impacts are reported because 2012 Conditions are used instead of the forecast for 2011. The slight increases and decreases are

[5] FAA Order 1050.1F, Section 9-2.
[6] FAA also reported decreases of 1.5 dB above 65 dB DNL. While they are referred to as significant to distinguish the level of decrease, FAA has no standard for a "significant noise decrease".

due to changes in the flows of aircraft more than ten miles from an airport. These are similar to the slight changes in the EIS. The numerical differences in affected population are attributable to three factors: first, some of the route changes have already been implemented so this is only a portion of the change from Future No Action to the Selected Project; second, the population at each point has been updated with the 2010 census; and third, aircraft are more likely to use satellite-based navigation, which causes them to stay closer to their charted paths than was forecast in the EIS.

With two exceptions, the significant and moderate noise changes are around Philadelphia, once again due to departure headings. These were as disclosed in the EIS, with differences due to the updated Census, the change in aircraft navigation, and the increase in early-morning traffic.

The two exceptions are a significant increase in Westchester County, NY, near White Plains, and a moderate increase in Pike County, PA, (4 miles from the Delaware Water Gap National Recreation Area) which will no longer occur since the project will not be fully implemented. These changes were investigated in detail. In both cases, a low-altitude stream of traffic is lined up on approach to the runway, beneath a flow of traffic bound to a major hub that was planned for relocation in Stage 4 of the Airspace Redesign. With more precise navigation, the noise directly beneath charted routes tends to be higher than with conventional navigation. (Noise to either side of the charted route tends to be lower.) Where two of these routes cross, the effect is magnified. The baseline noise exposure, therefore, is higher, so a noise change that was not significant in the EIS was raised above a threshold for reportability. The noise change was the same, 2.8 dB, but the baseline noise in the EIS at that point was in the range where a change of more than 3 dB is reportable. Under 2012 Conditions, which includes the expansion of traffic into the early hours of the morning, the baseline is higher and anything above 1.5 dB is significant.

E. Air Quality

Air quality may be affected by an airspace design through the increased or decreased burning of fuel by aircraft. The FAA conducted a fuel burn analysis of the Future No Action Alternative, the Preferred Alternative, and the Selected Project. The Selected Project, if fully implemented, was found to have a minor beneficial effect on air quality because the excess air mileage flown by aircraft would be more than offset by the reduction in time spent in airborne delays, or idling on the airport surfaces.[7] A detailed analysis was necessary because some parts of the Project would tend to increase fuel consumption and others would tend to reduce it, so the net result was not obvious. The result was a *de minimis* improvement in air quality.

The Modifications within Current Boundaries Alternative, by contrast, does not involve such trade-offs, so it did not need such detailed analysis. As was shown in the EIS[8], Modifications yielded the shortest flying time and distance at low altitudes of all the alternatives. It reduced

[7] EIS, Appendix R
[8] EIS, Appendix C, Table 9-14

block time and did not increase overall route length. Under this Alternative, no tradeoff had to be made, and fuel consumption under Modifications was lower than under Future No Action.

Routing under 2012 Conditions differs from Modifications only in the two route bundles described above. These affect only 20 flights on the average day. Therefore, suspension of the Airspace Redesign at this point would have a de minimis impact on air quality, relative to the Selected Project or the original Future No Action.

Additionally, the 2012 Conditions would fall under the FAA's Presumed to Conformed Actions[9] which lists Air Traffic Control activities and Adopting Approach, Departure and Enroute Procedures for Air Operations.[10]

5. Findings

Implementation of the Airspace Redesign did not involve any physical changes on the ground. The only environmental impact categories under FAA Order 1050.1F that it affected were Noise and Compatible Land Use. The Redesign was intended to reduce the total fuel consumed by aircraft, so no air quality issues arose. Based on the above review and in conformity with FAA Order 1050.1F Section 9-2, the FAA has concluded that:

a. Changes in airline business practices and possibilities for improved airspace usage provided by NextGen[11] obviate further implementation of the Airspace Redesign.
b. The implications for noise exposure of terminating the Airspace Redesign project at the point where it was suspended are substantially similar to those communicated in the Environmental Impact Statement under the "Modifications within Existing Boundaries" alternative.
c. Re-baselining noise exposure estimates to the point when the project was suspended shows that completing implementation would cause a significant noise increase with respect to 2012 Conditions, which would need to be mitigated.
d. Under 2012 Conditions, four co-located census blocks near Philadelphia experience a significant increase in noise relative to the Future No Action Alternative. This increase would have occurred even had the project had been fully implemented and are the same points where noise changes were disclosed in the EIS. Terminating the Airspace Redesign project does not have any additional relevance to environmental concerns.

6. Order

This document is prepared pursuant to Federal Aviation Administration Order 1050.1F, "Environmental Impacts: Policies and Procedures," Section 9-2 e.

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[9] See 72. F. Reg. 41565.
[10] ROD, at 42
[11] PBN NAS Navigation Strategy, Table 6

After careful and thorough consideration of the facts contained in this Written Re-Evaluation and Record of Decision, the undersigned finds that suspending the New York/New Jersey/Philadelphia Airspace Redesign at the end of Stage 2 has not introduced any environmental impacts that were not previously disclosed in one of the EIS alternatives. Therefore, the Record of Decision from September 2007 can be superseded without further environmental review, and the project terminated. I direct that the Agency discontinue its implementation of the NY/NJ/PHL Airspace Redesign project.

RYAN W ALMASY

Digitally signed by RYAN W ALMASY
Date: 2020.12.22 11:53:15 -05'00'

Ryan W. Almasy
Director (Acting), Eastern Service Center
Mission Support Services
Air Traffic Organization
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Right of Appeal: This decision is taken pursuant to 49 U.S.C. § 40101 *et seq*., and constitutes an order of the Administrator which is subject to review by the Courts of Appeal of the United States in accordance with the provisions of 49 U.S.C. § 46110.

For further information, contact the Airspace Program Office, Federal Aviation Administration via email at 9-AEA-NY-NJ-PHL-Airspace@faa.gov.

Reference List

1. New York/New Jersey/Philadelphia Metropolitan Area Airspace Redesign Final Environmental Impact Statement (FEIS), July 2007.
2. Federal Aviation Administration Order 1050.1F, “Environmental Impacts: Policies and Procedures”. July 2015.
3. Record of Decision for the New York/New Jersey/Philadelphia Metropolitan Area Airspace Redesign, September 2007.
4. Categorical Exclusion/Record of Decision, LaGuardia Airport Runway 13 TNNIS FOUR RNAV Standard Instrument Departure (SID) Procedure, October 2012.
5. Federal Aviation Administration, “PBN NAS Navigation Strategy”. U.S. Department of Transportation, 2016.

Appendix

MTR190369

Post-Stage-2 Suspension of the New York/New Jersey/Philadelphia Airspace Redesign

Noise Exposure Implications

Jonathan Hoffman

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Sponsor: The Federal Aviation Administration
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McLean, VA

Center for Advanced Aviation System Development

Executive Summary

The Federal Aviation Administration (FAA) suspended implementation of the New York/New Jersey/Philadelphia Airspace Redesign (NY ARD) at the end of the second of four stages. The National Environmental Policy Act (NEPA) and its implementing regulations require the FAA to disclose the environmental impacts of this decision. However, this eventuality was not included in the original 2007 Environmental Impact Statement (EIS).

This report documents an analysis to assess the environmental impacts of a decision to cease implementation of the NY ARD, based upon a 2015 analysis of conditions at the time NY ARD activities were suspended in 2012, and supporting information from the 2007 EIS. It computes the impacts if Stages 1 and 2 had not been implemented, as well as the impacts of completing all four NY ARD stages.

The "Modifications to Existing Airspace" Alternative in the EIS closely resembles the airspace at the time NY ARD implementation was suspended. The differences between that alternative, the EIS "Future No Action" Alternative, and the EIS Selected Project (the mitigated Preferred Alternative, "Integrated Airspace with Integrated Control Complex"), are evaluated to understand the impacts of an FAA decision to cease NY ARD implementation activities.

The differences in low-altitude flows result in Day-Night Average Sound Level (DNL) changes of only ±0.1 dB or less across the study area.

Considering the changed operational conditions since the Record of Decision, this analysis shows:

- Dispersal headings at Newark Liberty International Airport (EWR) resemble the EIS Future No Action Alternative. Those at Philadelphia International Airport (PHL) resemble the Selected Project.
- The implementation to date had no reportable noise impacts apart from those associated with dispersal headings. Had Stages 1 and 2 not been implemented, the only difference from the previously existing conditions would be in Delaware County, PA, near the west end of the runways at PHL.
- Finishing implementation of the Selected Project, apart from dispersal headings, would likely cause a significant noise increase at one point near Westchester County Airport (HPN) and a cluster of moderate noise increases at 24 blocks in Pike County near Stewart International Airport (SWF).

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1 Introduction

1.1 Background

The Federal Aviation Administration (FAA) implemented Stages 1 and 2 of the New York/New Jersey/Philadelphia Airspace Redesign (NY ARD) between 2007 and 2012. The changes implemented include dispersal headings at Philadelphia International Airport (PHL) and on the south side of Newark Liberty International Airport (EWR), departure paths in high-altitude airspace where aircraft are not audible from the ground, and shifts in the flight paths of some air traffic to and from John F. Kennedy International Airport (JFK) and LaGuardia Airport (LGA).

In May 2013, the FAA decided to suspend further NY ARD implementation due to constraints that limited its ability to integrate airspace and air traffic control facilities to the extent necessary to complete implementation. Changes in system use and traffic projections, primarily caused by the increasing consolidation of the airline industry, altered the need for some of the Stage 3 and 4 design elements. In response to this evolving environment, the FAA is considering ceasing implementation and expending no additional resources on the implementation of the NY ARD. FAA is also considering a path forward that best meets the unique operational and safety needs in the New York area, and will engage in a collaborative process with the National Air Traffic Controllers Association (NATCA) for that purpose.

In order to determine whether to close out the project, the FAA needs to understand whether the impacts of the partial implementation (Stages 1 and 2) are substantially different from those disclosed in the Environmental Impact Statement (EIS). This paper lays out an approach for determining the impacts of the project as implemented by answering two key questions:

- What were the environment impacts of implementing Stages 1 and 2 of the project?
- How do the environmental impacts of the elements implemented to date differ from the impacts of the full implementation as disclosed in the Environmental Impact Statement (EIS)?

Since FAA is considering closing out a project that has been extensively modeled, it was unnecessary to conduct new noise analyses to support this environmental impact review. These questions were answered via re-analysis of noise models that have been previously computed.

1.2 Alternatives in the Environmental Impact Statement

The 2007 Record of Decision (ROD) selected the “Integrated Airspace with Integrated Control Complex Alternative with noise mitigation” as the mitigated Preferred Alternative from the NY ARD EIS. The environmental impacts of this alternative as disclosed in the EIS reflected the full implementation of Stages 1 through 4 of the project. The impacts of partial implementation were not examined.

The NY ARD EIS also included detailed analysis of a “Future No Action” Alternative and a “Modifications to Existing Airspace Alternative” (Modifications Alternative). The Modifications Alternative closely resembles the airspace at the time NY ARD implementation activities were suspended.

2 Analysis Approach

The ATAC Corporation recently completed a study to estimate the noise exposure associated with aircraft operations in the EIS study area, which included an updated noise analysis of the period immediately after NY ARD Stage 2 implementation was completed. This “2012 Conditions” analysis, based on radar track data from July through December of 2012, describes existing conditions after NY ARD Stages 1 and 2 were implemented, but prior to additional procedure changes that have occurred since that time and had utility independent of any changes that have or would have occurred with the NY ARD.

It is important to look at 2012 Conditions to isolate the impacts of NY ARD implementation from subsequent changes. However, the 2012 Conditions should not be directly compared to more recent noise exposure maps, such as those produced during the ongoing NY area Part 150 studies, because the demand, fleet, and procedures have continued to evolve since 2012.

Similarly, the 2012 Conditions model from the ATAC report is not directly comparable to the EIS for four reasons.

1. The FAA changed its required noise modeling system from the Noise Integrated Routing System (NIRS) used in the EIS to the Aviation Environmental Design Tool (AEDT) used for the ATAC analysis.
2. Traffic levels were down by 22% relative to the EIS forecast.
3. Airlines consolidated, so the distribution of aircraft among airports and routes changed.
4. Area navigation (RNAV) is ubiquitous. Hand-flying aircraft is much less common than at the time of the NY ARD EIS analysis. While RNAV was considered for some procedures in the EIS, procedures that were not designed to require the capability were assumed to follow historic dispersal patterns. In the current operating environment, most aircraft are RNAV-equipped, so flight tracks adhere more closely to charted procedures.

This analysis, therefore, bridges the gap between the EIS noise models and the 2012 Conditions model, as shown in Figure 1. The method to be used is identical to the final-stage accounting in AEDT and NIRS. In their first stages, AEDT and NIRS perform extensive acoustic calculations for each individual flight operation. Those will be taken as given here. Then the sound energy from those calculations is added up to produce DNL measurements. This final stage of computation is expanded here, outside the integrated tools. The EIS estimates were computed in a rigorously consistent way, so noise energy may be added and subtracted as needed to model variations among alternatives. The key is to find an Alternative in the EIS that approximates 2012 Conditions with a manageable number of differences.

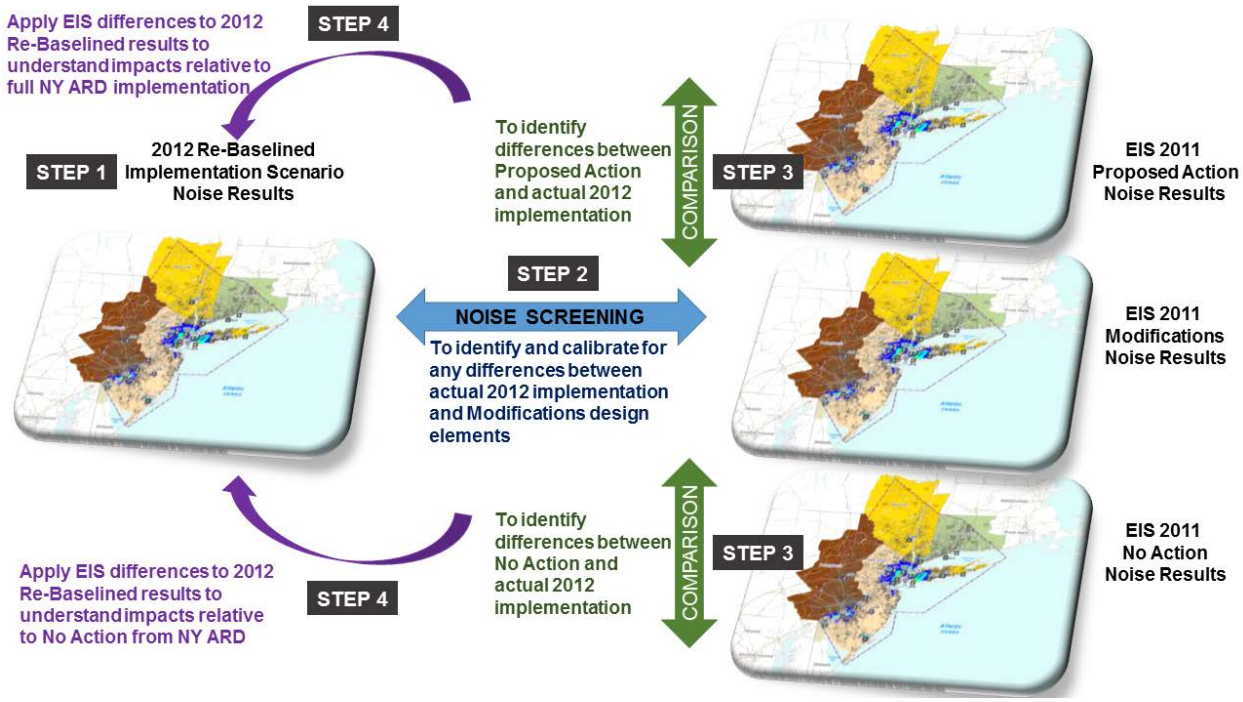

Figure 1. Re-Baselining the EIS Noise Analysis

2.1 Numerical Example of Approach

To illustrate the process, consider one hypothetical census block near LaGuardia Airport (LGA). The noise exposure near LGA is obtained from the ATAC 2012 analysis. Suppose that at some point, the exposure is about 56 dB DNL.

The difference between the Modifications alternative and today's airspace near this point is a departure flow from Newark International Airport (EWR) Runway 04L to the WAVEY departure fix. From the EIS average annual day, there were 33 flights in the flow, mostly B737.[12] The flow passes over LGA at 8,000 feet. An AEDT analysis of this difference might give a stand-alone noise exposure of DNL of approximately 35 dB from these aircraft.

Table 1 shows the example calculation. Figures taken from published studies are on a white background; figures calculated here are shaded. Noise at this point is dominated by low-altitude traffic in and out of LGA, so the flow that was over the point in the Modifications alternative, but in 2012 is farther away from the point has very little effect. This adjusted EIS Modifications noise exposure was about 1.1 dB higher than the EIS No Action (56.97 compared to 55.9). This difference in noise energy is subtracted from the 2012 analysis results (the aircraft that would have caused it did not fly there in 2012) giving a value of 54.6 dB, had Stages 1 and 2 never been implemented. The difference between the EIS Preferred Alternative (IAICC) and the adjusted EIS Modifications alternative was about 0.1 dB at the same point (56.97 compared to 56.9). The impact of finishing the airspace redesign as planned would be to lower the estimated noise exposure at our hypothetical point from 56.0 to 55.91 dB DNL. This method would be repeated for every point in the study area.

[12] Among these were two MD83 on the forecast day, whereas in November 2015 there were only 2 southbound MD83 departures from EWR in the entire month. This illustrates the primary source of difference between the 2012 ATAC scenario and the EIS analysis.

Table 1. Using EIS Noise Exposures in the Context of 2012 Conditions

	DNL (dBA)	Energy	Source
2012 Noise Exposure	56.0	398,107	ATAC
EIS No Action	55.9	389,045	EIS
EIS Modifications	57.0	501,187	EIS
EIS Preferred Alternative (IAICC)	56.9	489,779	EIS
Change to EIS Modifications DNL for 2012 Conditions	35.0	3,162	AEDT Analysis
Best EIS approximation to 2012	56.97	498,025	
Had Stages 1 and 2 Never Been Implemented (No Action)	54.61	289,127	
Were Selected Project Finished (IAICC)	55.91	389,861	

2.2 The Need for a New Baseline

Overall demand for air traffic is substantially below the forecast used in the EIS. The levels in the EIS did not anticipate the global financial crisis in 2007, the ensuing recessions in most air travel markets, or the industry's response to the new environment. Air traffic congestion in the study area remains high, so the purpose and need of the EIS remains valid, but the magnitudes of the operational and noise impacts have changed. Figure 2 shows the effect on levels of airport traffic.[13] The forecast was correct at John F. Kennedy International Airport (JFK), and only about 12% too high at LGA. At Philadelphia International Airport (PHL), EWR, and smaller airports, the traffic in 2012 was 25-33% below the EIS forecast.

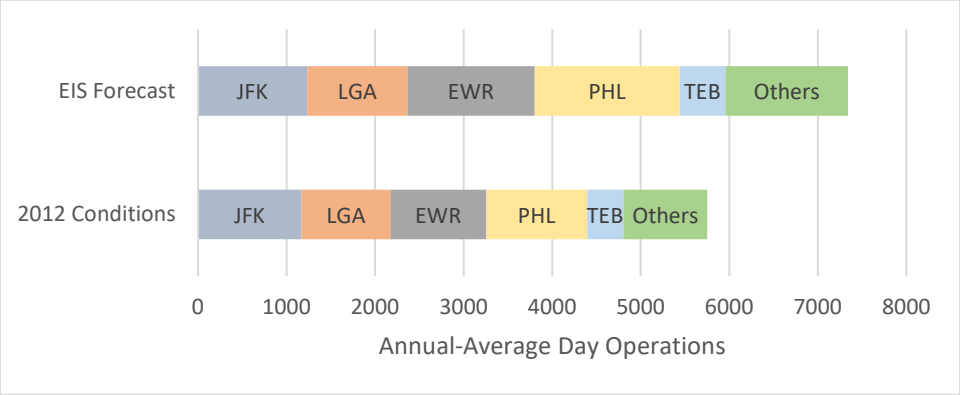

Figure 2. Traffic Levels

[13] All figures in this section are computed from "Preparation of National Environmental Policy Act Analysis and Documentation in Support of Airspace Redesign of New York-New Jersey-Philadelphia: Task 2 Technical Report," ATAC Corporation, October 2015.

If all other features of the demand were equal, this 22% reduction in total traffic should lead to a reduction of about 1 dB in noise energy.[14] However, the Day/Night Average Sound Level (DNL) depends on the distribution of traffic around the clock as well.

Airlines schedule passenger carrying flights to leave earlier in the morning and arrive later into the night than they did in the past. Figure 3 shows the fraction of traffic departing or arriving between 7:00 AM and 10:00 PM local time in the EIS forecast and in 2012. The size of each bubble is proportional to the traffic at each airport. Airports above the diagonal line are those at which the fraction of operations during the day was higher in 2012 than forecast. Only three airports, of which only Teterboro Airport (TEB) is among the 50 busiest in the country, are in this category.

All of the major hubs in Figure 3 are below the line. Compared to the EIS forecast, a higher percentage of their traffic occurs during the nighttime hours that contribute the most to DNL. This can cause the noise exposure to be higher, across the study area, even though the total number of flights is lower.

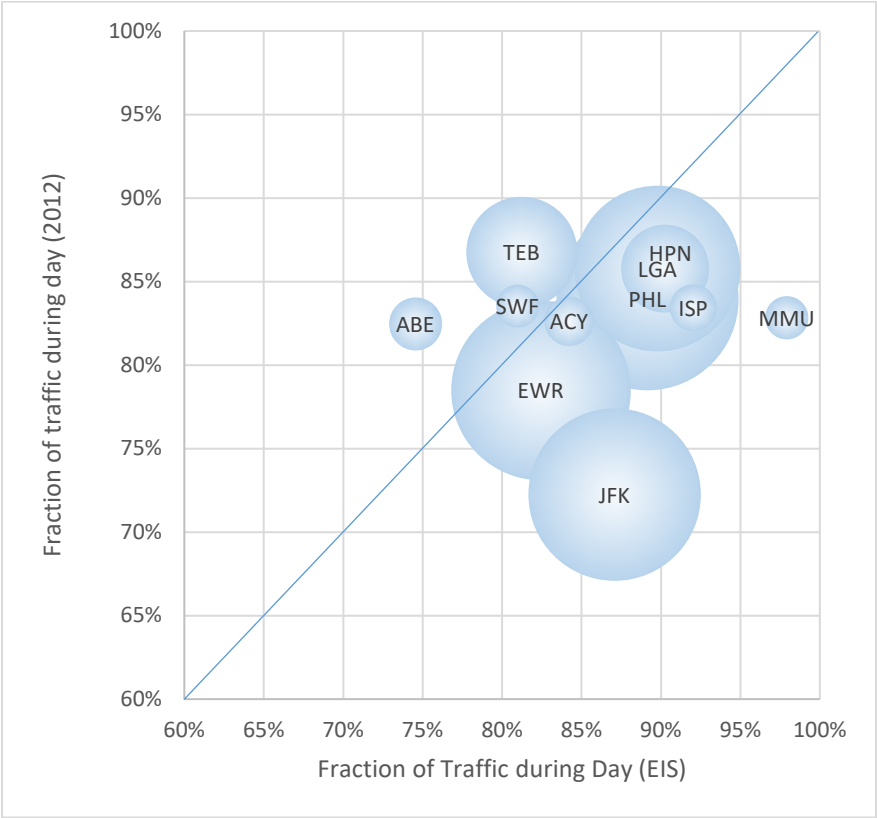

Figure 3. Increase in Night-Time Traffic since the EIS

The mix of aircraft types in the EIS forecast is fairly close to the observed fleet of 2012. Figure 4 shows the relative frequency of general classes of aircraft. The largest difference is the relative rarity of wide-body jets. The changes in DNL resulting from these changes in fleet mix are on

[14] With other conditions remaining the same, a 22% reduction in traffic causes noise energy to be 78% of its previous value. Using the definition of a decibel, 10*log(78%) = -1.08, which to the ear is -1 dB.

the order of hundredths of a decibel, which is imperceptible by the human ear and has no consequences in a NEPA context.

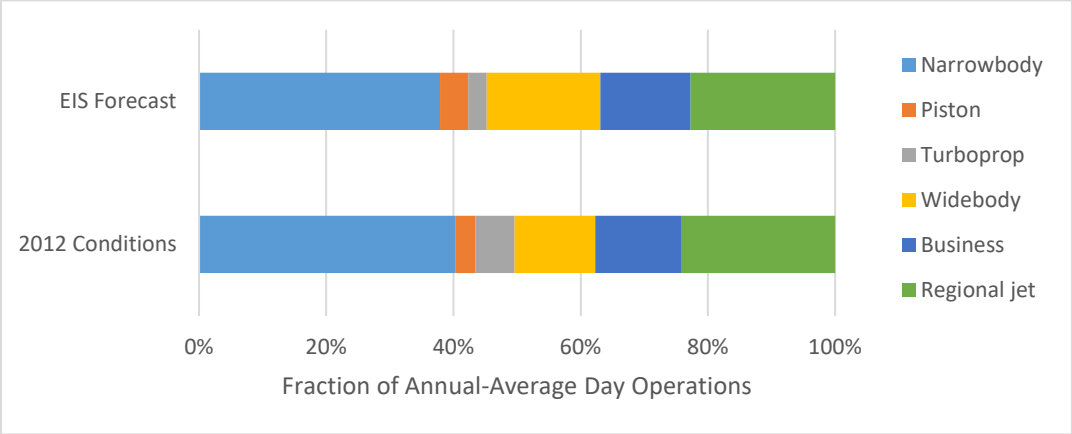

Figure 4. Aircraft Types in the Modeled Fleet

2.3 2012 Conditions versus the Modifications Alternative

The "Modifications to Existing Airspace" Alternative was created for a situation in which air traffic control facilities could not exchange airspace, which has come to pass. As a result, 2012 Conditions closely resemble the Modifications Alternative. With respect to the airspace and procedure designs, the Modifications Alternative differs from the 2012 Conditions model in only seven ways, which are enumerated in Table 2. Three of the airspace changes affect how aircraft move only above 10,000 feet, so they have no noise implications.

The LGA TNNIS departure procedure is separate from the NY ARD. It has independent utility and was conceived and implemented in 2013 after the suspension of NY ARD activities. TNNIS is not in the Modifications Alternative nor the 2012 Conditions model, but it will exist in any conceivable future, so it causes no noise-exposure differences in the context of this analysis. LGA departures will fly the same paths in all cases. Since the TNNIS is not considered in the Modifications Alternative, the Future No Action Alternative, and the Selected Project, the differences reported in the EIS will apply to the 2012 Conditions, and no adjustments to the noise modeling are required to disclose the impacts of the NY ARD.

The remaining three changes (white backgrounds) will be applied to the Modifications Alternative to create an estimate of 2012 Conditions that permits direct comparison with noise calculations from the EIS.

Table 2. Differences between EIS Modifications Alternative and 2012 Conditions

	EIS Modifications Alternative	2012 Conditions	Commentary
High Altitude	Single ELIOT	Split ELIOT	Changed above 10,000 ft.
	WHITE/ DITCH climbs	South deps unchanged	DITCH above 12,000 ft. WHITE moved 10 miles west above 10,000 ft.
	STOEN later join to J48	STOEN unchanged	Above 18,000 ft.
Low Altitude	LGA - no change	LGA - TNNIS	Not part of the redesign nor the 2012 Conditions; no change necessary.
	EWR and PHL dispersal headings	Dispersal headings mitigated	Mitigation of headings applied equally[15] in all airspace alternatives.
	No change to JFK departures	DEEZZ departures to J60 and J64	Changes balance of aircraft among departure runways
	EWR - Offshore access from 04L	Does not exist	Offshore departures pass over LGA at 8,000 ft.

2.4 Dispersal Headings

Both the Modifications Alternative and the Selected Project in the EIS provided for dispersal headings at PHL and EWR. EWR departures from Runway 22R had three headings. PHL departures from Runways 09L and 27L had three and four headings, respectively. Comparing 2012 Conditions to the EIS alternatives shows that operations in 2012 can be represented by combining noise exposures from different Alternatives in the appropriate parts of the study area.

Figure 5 shows the fraction of traffic departing on different headings from EWR Runway 22R in three noise models. The EIS Future No Action alternative has a single flow of traffic at 190 degrees, somewhat spread out by the variation in performance among types of aircraft. The peak in 2012 is slightly higher and narrower because of the reduction in the number of slow-moving propeller-driven aircraft, which turn quickly aside from the main jet flow. The Selected Project had three headings, which appear on this chart around 200, 230, and 250 degrees. At the end of Stage 2, the new procedures were published. They may be used, but rarely are, since the Stage 4 relocation of arrival paths to EWR has not been implemented. Use of these departure procedures without corresponding arrival changes can cause unmanageable complexity. Therefore, 2012 Conditions closely resemble Future No Action.

[15] Only the Integrated Airspace with ICC was published with noise-mitigated headings. This analysis applies those headings to Modifications to get a match to 2012 Conditions.

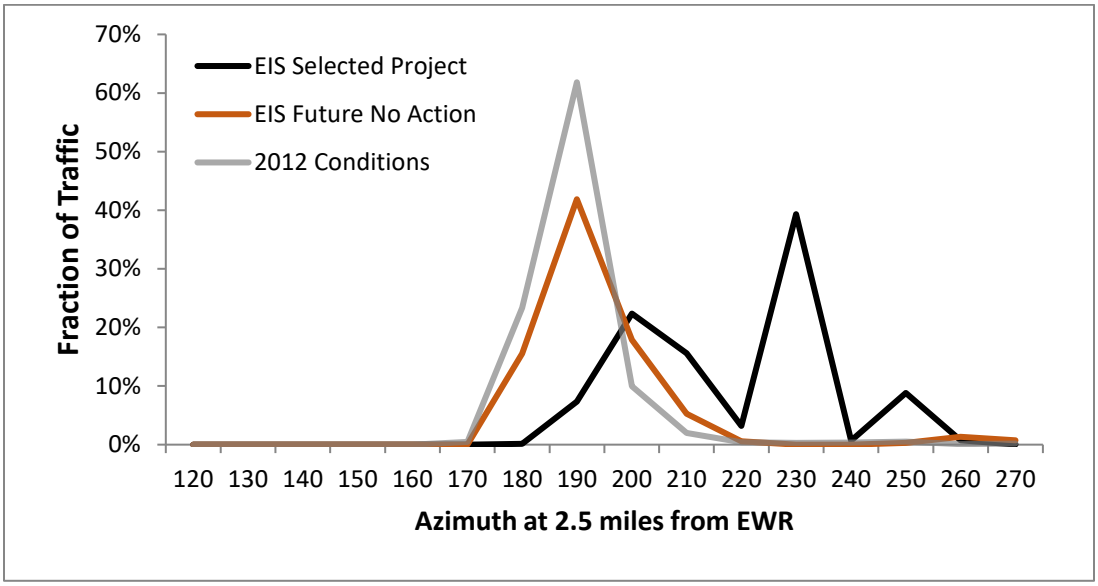

Figure 5. Departure Headings from EWR Runway 22R

There would be no change in noise exposure south of EWR from finishing the Selected Project, either. Mitigation of the impact of the three headings was done by limiting their use to times when demand was high enough that the extra runway throughput was necessary for the safe and efficient operation of the airport. Because of consolidation in the airline industry, demand is no longer forecast to rise to the levels expected in the EIS, so use of the dispersal headings would be rare.

Figure 6 shows the situation for PHL Runways 09L and 27L. The single headings of Future No Action have been replaced by broader spreads of multiple headings. There was no need for any other airspace changes to facilitate departure headings as there was at EWR, so 2012 Conditions resemble the Selected Project in lateral extent.

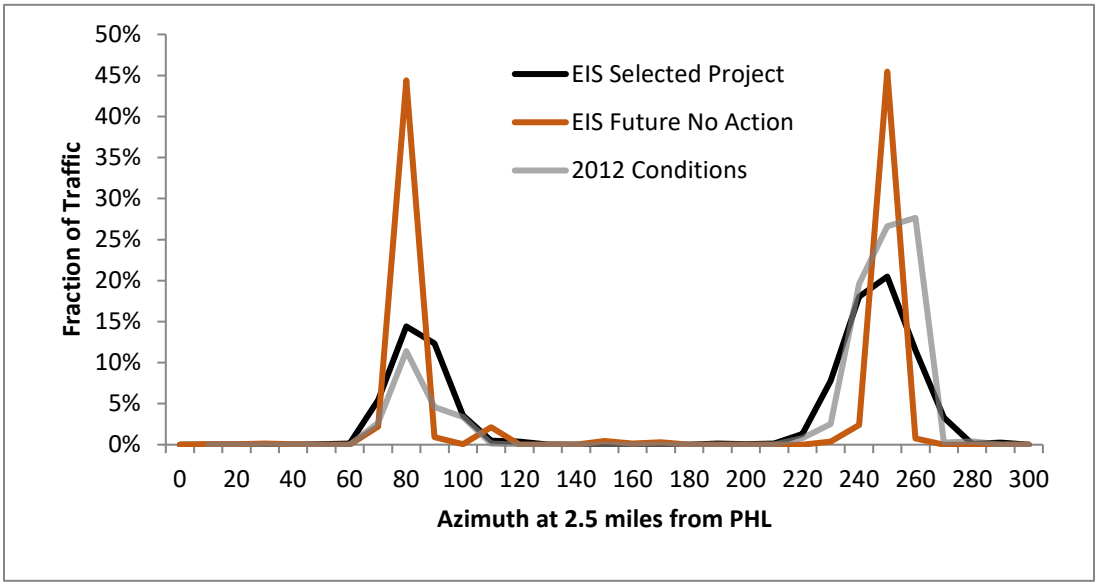

Figure 6. Departure Headings from PHL

2.5 JFK Departures to the West

Before the NY ARD, JFK departures to the southwest and west were routed over the Lower Bay and Sandy Hook, then past Robbinsville (RBV) (shown in black in Figure 7). To establish flights on their routes, it was necessary to cross as many as four major airways. The resulting complexity caused frequent delays at JFK, especially during thunderstorm season. To reduce complexity in the en route airspace, the NY ARD proposed wrapping that flow counterclockwise around New York City, so JFK departures could go directly to their route. Stage 2 began that process by moving the westernmost flow, using jet airways J60 and J64, onto a new procedure called DEEZZ (shown in grey). Other RBV departures were to be moved in Stage 4.

To align the Modifications Alternative with what was implemented, the appropriate RBV traffic was reassigned to the DEEZZ procedure (grey tracks), and the resulting change to the noise distribution was estimated with AEDT. The difference was then applied to the 2012 Conditions noise distribution.

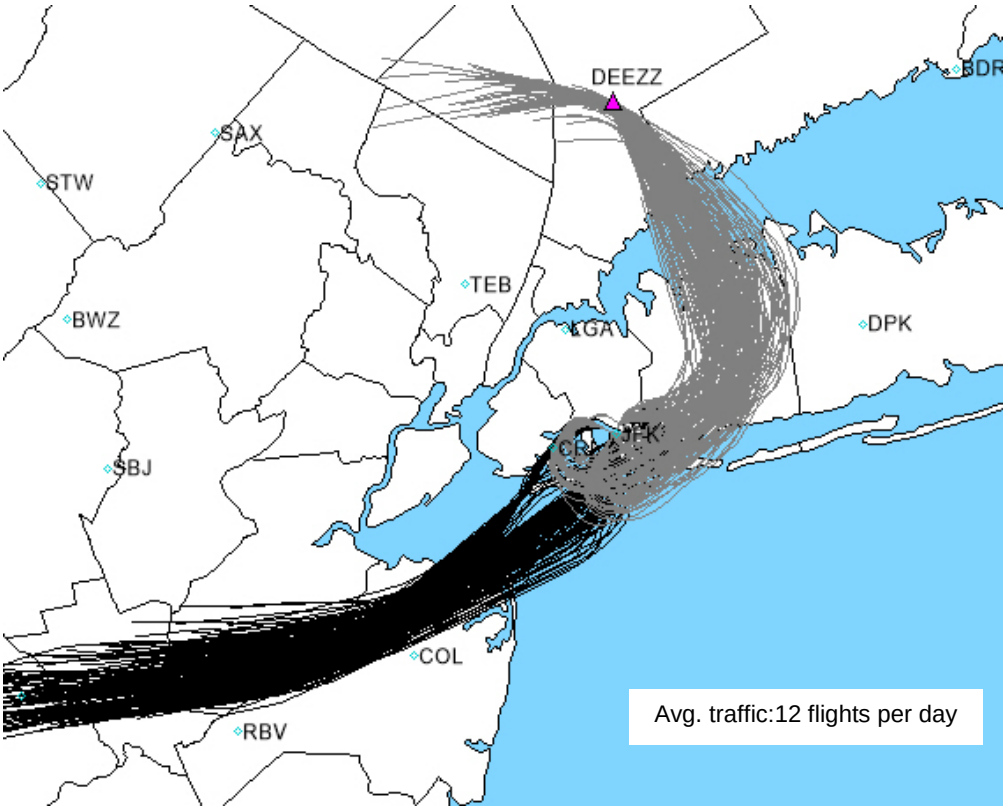

Figure 7. Noise-Model Backbones for DEEZZ (grey) and RBV Departures (black)

The largest noise change was only a small fraction of a decibel, because the RBV procedure is heavily used by other traffic. The DEEZZ procedure begins along the same ground track as departures to the northwest, another flow of hundreds of aircraft per day. Since the number of reassigned flights is only about a dozen flights per day, the noise change is inaudible against the background. Changes to the DNL are all calculated to be within ±0.1 dB.

2.6 EWR Departures to the West Atlantic

The Modifications Alternative proposed another path (shown in black in Figure 8) from EWR Runway 04R to the West Atlantic routes. The existing route (shown in grey) is substantially longer and contends for airspace with the busiest departure fix out of New York.

The proposed path in the Modification Alternative was never implemented, so the traffic on the black routes was reassigned to the grey routes and the resulting change to the noise distribution was estimated with AEDT. The difference was applied to the 2012 Conditions noise distribution.

The Modifications tracks in black depart EWR along the same path as departures to New England and the North Atlantic. At 8,000 feet, they turn to a path that is not part of the 2012 Conditions model. That path overflies LGA and JFK, so the additional traffic above 8,000 feet would be inaudible among the local takeoffs and landings. Changes to the DNL are all calculated to be within ±0.1 dB. The grey tracks are a small addition to traffic over the main departure fix, with no measurable noise impact.

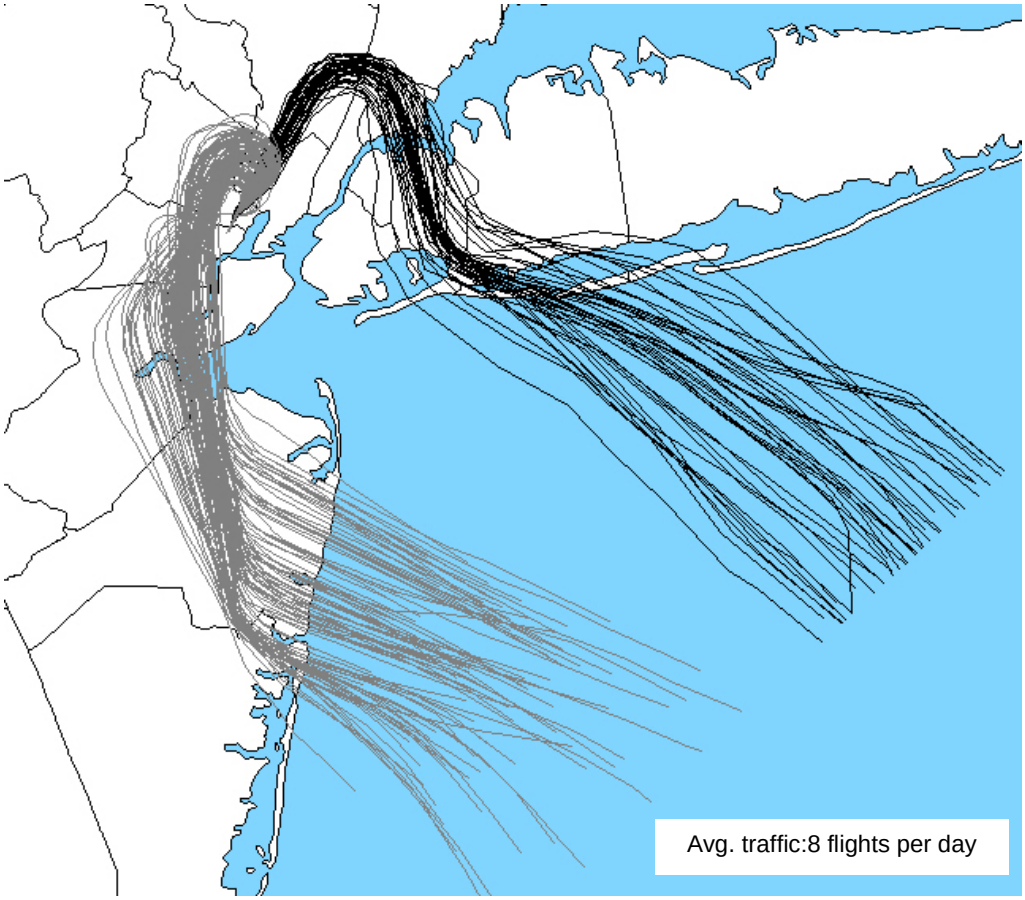

Figure 8. Noise-Model Backbones from EWR Runway 4L to the West Atlantic

3 Noise Exposure Impacts

The EIS study area has three distinct regions. The first is near EWR on the south side, where dispersal headings off Runway 22R could potentially affect noise exposure. The second is near PHL, with respect to dispersal headings off Runways 09L and 27L. The third is all other points, where no single flow change could affect noise exposure, but interactions among flow changes must be investigated for cumulative effect.

3.1 Without Implementation through Stage 2

3.1.1 Noise Due to EWR Departure Headings

Figure 5 shows that the headings used in modeling noise under 2012 Conditions closely match those in the Future No Action Alternative of the EIS.

3.1.2 Noise Due to PHL Departure Headings

Figure 6 shows that PHL has implemented the departure headings in the Selected Project. Since the 2012 Conditions model includes these headings, the EIS computation of the impact of departure headings can be reversed to estimate the effect on noise exposure, had Stages 1 and 2 never been implemented. Table 3 presents the color coding used to describe the DNL changes in the figures and tables in this report, while Figure 9 shows the locations of reportable noise changes within 10 nautical miles (NM) of the airport. There are four clustered census blocks near the end of Runway 27L that would experience a reduction in DNL of 1.6 to 1.7 dB, which would change their exposure from just over 65 dB to just under if PHL dispersal headings had not been implemented. There are 111 census blocks further out in Delaware County, all currently below 55 dB DNL, that would experience a slight noise reduction. There is one census block in Gloucester County, NJ, that would see a slight noise increase. This noise impact was described in the EIS as a noise reduction due to the Modifications Alternative. Here, it appears as a slight increase if the 2012 Conditions reverted to Future No Action. (Similar impacts at nearby points have dropped below reportable thresholds.)

Table 4 adds up the affected population in each category of noise change. The columns represent the affected populations under 2012 Conditions while the rows represent the affected populations if Stages 1 and 2 of the NY ARD had not been implemented. Where there are two numbers in a cell, the uncolored number represents the number of people that did not experience a reportable change in noise level. For example, 25 people experienced an increase from 45-50 dB DNL under 2012 Conditions to 50-55 dB DNL if conditions reverted to the Future No Action scenario. These 25 people experienced a reportable increase of 5 dB or more. The 71,748 people represented by the uncolored number experienced a non-reportable increase of less than 5 dB.

Table 3. Color Coding for Reportable Changes in DNL

Baseline DNL	Change in Noise Level from Baseline to Alternative		Characterization
	Increase	Decrease	
< 45 dB	No Color	No Color	Negligible
45 ≤ 50 dB	+ 5 dB (yellow)	- 5 dB (magenta)	Slight
50 ≤ 55 dB			
55 ≤ 60 dB			
60 ≤ 65 dB	+ 3 dB (orange)	- 3 dB (blue)	Moderate
> 65 dB	+ 1.5 dB (red)	- 1.5 dB (green)	Significant

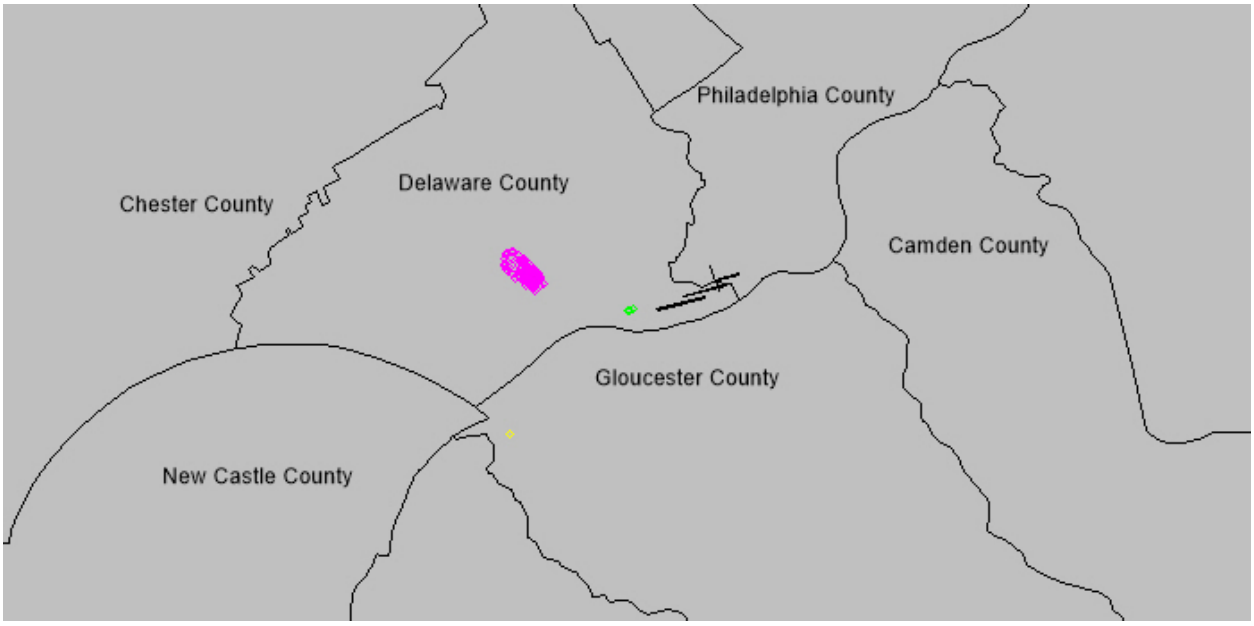

Figure 9. Reportable Noise Changes without Implementation through Stage 2

Table 4. Populations Affected without Implementation through Stage 2

EIS Future No Action DNL	2012 Conditions DNL						
	<45 dB	**45-50 dB**	**50-55 dB**	**55-60 dB**	**60-65 dB**	**65-70 dB**	**>70 dB**
<45 dB	13,901,165	56,095 365	364	0	0	0	0
45-50 dB	0 80,592	9,164,423	102,453 6,153	0	0	0	0
50-55 dB	0	25 71,748	4,587,739	17,775 0	0	0	0
55-60 dB	0	0	0 14,893	1,775,301	5,239 0	0	0
60-65 dB	0	0	0	0 751	382,217	0 144	0
65-70 dB	0	0	0	0	0 0	83,263	0 0
>70 dB	0	0	0	0	0	0 0	15,682

3.1.3 Noise Due to Other Causes

The EIS Modifications Alternative made no low-altitude changes, relative to Future No Action, other than those described in Section 2. Neither of those flows (JFK Departures to the West or EWR departures to the West Atlantic) had an audible impact, so there are no further reportable noise changes.

3.2 Completion of the Selected Project

The Selected Project moved dozens of flows at low and high altitudes. The noise exposure relative to 2012 Conditions is calculated as described in Figure 9. The difference between the Selected Project and the Modifications Alternative was published in the EIS. The difference between Modifications and 2012 Conditions is essentially zero. Therefore, the noise exposure changes that would result from completing Stages 3 and 4 can be calculated.

3.2.1 Noise Due to EWR Departure Headings

Figure 5 shows that, despite implementation of the departure headings in the Selected Project, the headings used in the 2012 Conditions noise modeling closely match those in the Future No Action Alternative of the EIS. The noise mitigation included in the Selected Project limits their use to times of highest demand, when expediting departures is necessary to keep taxiways clear for arriving aircraft.

Because of consolidation in the airline industry, demand is no longer forecast to rise to the levels expected in the EIS, so use of the dispersal headings would be rare. Noise exposure would be the same as it is today.

3.2.2 Noise Due to PHL Departure Headings

Figure 6 shows that PHL has implemented the headings designed in the Selected Project. There are no interactions with other flows that limit their use in 2012 Conditions, so there would be no further noise impacts from finishing the remaining two Stages of the Selected Project.

3.2.3 Noise Due to Other Causes

Whether a noise change meets the criteria for classification as slight, moderate, or significant depends on both the extra sound energy and the baseline against which it is measured. The changes to the operating environment described in Section 2.2 caused differences in the quantity and distribution of reportable impacts.

The route changes in the Selected Project caused eight areas of slight to moderate noise impacts. When those changes are compared to 2012 Conditions as a baseline, the slight impacts become more pronounced. Table 5 shows the affected population.

- 293,000 people would be exposed to slight noise *increases*.
- 153,000 people would be exposed to slight noise *decreases*.
- 856 people would be exposed to moderate noise *increases*.
- 1,045 people would be exposed to moderate noise *decreases*.
- 41 people would be exposed to a significant noise *increase*.
- 55 people would be exposed to a significant noise *decrease*.

Most of the moderate and significant noise changes would be due to dispersal of departures from Runway 27L at PHL (Figure 10). Their impact was mitigated by optimizing the departure headings to avoid populated areas. The optimization process resolved all the significant changes in the EIS given conditions as envisioned 10 years ago; however, completing the Selected Project would have some significant impacts relative to the 2012 Conditions.

The slight increases and decreases are due to changes in the flows of aircraft more than 10 miles from an airport. These are similar to the slight changes in the EIS. The numerical differences in affected population are attributable to three factors: first, some of the route changes have already been implemented so this is only a portion of the change from Future No Action to the Selected Project; second, the population at each point has been updated with the 2010 census; and third, aircraft are more likely to use satellite-based navigation, which causes them to stay closer to their charted paths than was forecast in the EIS.

Table 5. Population Affected by Completion of the Selected Project

EIS Selected Project DNL	2012 Conditions DNL						
	<45 dB	45-50 dB	50-55 dB	55-60 dB	60-65 dB	65-70 dB	>70 dB
<45 dB	13,437,770	1,269,183 138,405	7,959	0	0	0	0
45-50 dB	188,275 752,594	7,312,161	546,220 5,239	263	0	0	0
50-55 dB	43,926	46,025 708,496	3,890,031	124,198 639	0	0	0
55-60 dB	11,525	3,417	172 350,032	1,624,779	24,311 1,045	0	0
60-65 dB	613	0	134	109 66,759	362,241	1,025 55	0
65-70 dB	0	0	0	0	41 5,129	83,077	331 0
>70 dB	0	0	0	0	0	0 695	15,536

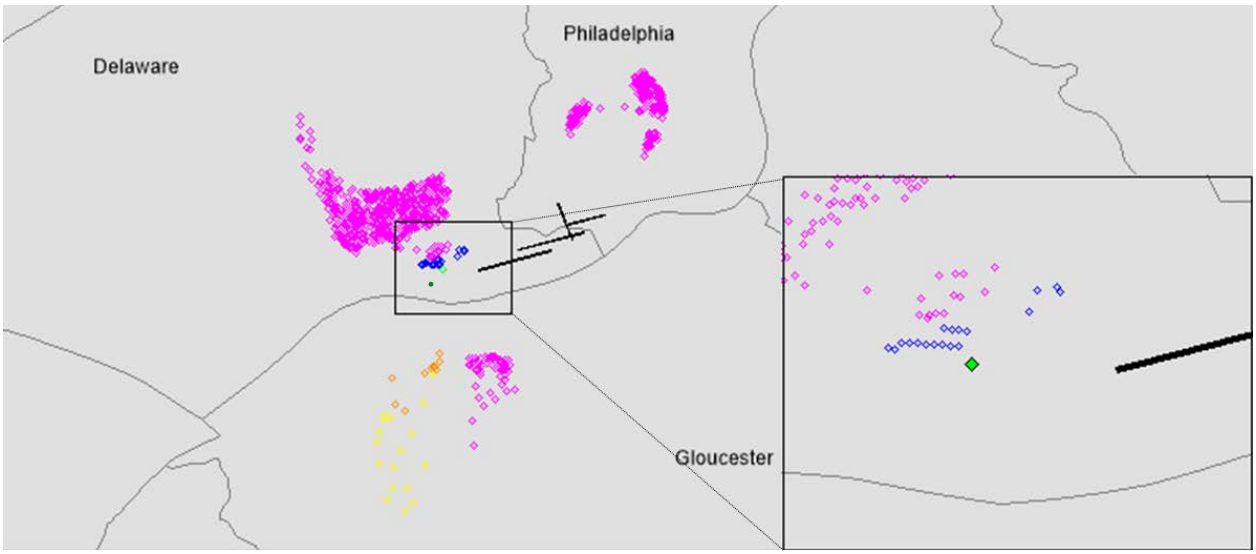

Figure 10. Reportable Noise Changes from Re-Baselined Selected Project near Philadelphia

The slight noise increases that appear as streaks of yellow in Figure 11 are due to the concentration of noise by RNAV aircraft. The difference between the alternatives is no larger than it was in the EIS, but the baseline noise is higher. Completing the Selected Project would cause moderate and significant noise increases at the orange and red points, respectively. They would be the cumulative effect of route changes in the Selected Project, increases in nighttime

operations, and traffic to satellite airports that has become more concentrated due to PBN. Stewart International Airport (SWF) is on the west in Pike County and Westchester County Airport (HPN) is on the east.

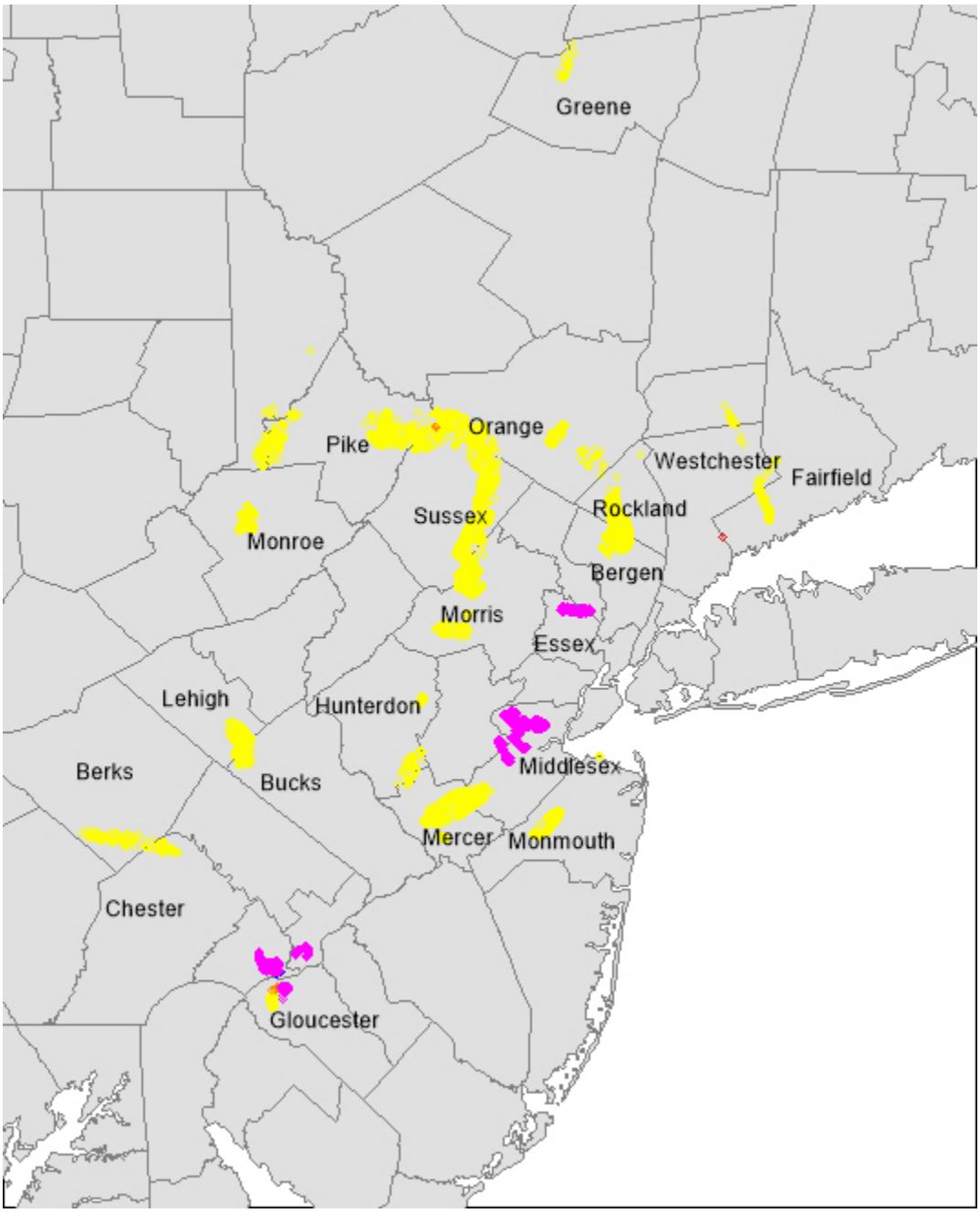

Figure 11. Reportable Noise Changes from Re-Baselined Selected Project, Full Study Area

4 Conclusion

The Modifications Alternative from the NY ARD EIS resembles 2012 Conditions in the study area. With a few small-scale re-computations, it is possible to calculate the noise impacts of terminating the NY ARD at the end of Stage 2 of implementation.

Noise exposure from route changes in the Selected Project from the NY ARD was assessed on the basis of aircraft fleets, capabilities, and demand patterns that existed at the time. Since the ROD, the airline industry has consolidated, which caused reductions in overall traffic and the retirement of older aircraft. Modern aircraft navigate more precisely, adhering closer to the published routes even when using conventional-navigation procedures. The traffic flow management system has begun to deploy time-based metering, which enables air traffic controllers to take delay maneuvers earlier in the flight. (This reduces fuel consumption.) When aircraft adhere more closely to their planned routes, and last-minute maneuvers are less common, aircraft noise remains under the planned flight paths.

These changes have brought about 2012 Conditions that deviate in many ways from the decade-old forecast in the EIS. The ATAC Corporation analyzed noise exposure under 2012 Conditions. Their results served as a new baseline, against which the impacts of finishing the Selected Project can be assessed. The results also permit estimation of the impact of Stages 1 and 2, relative to the Future No Action alternative from the EIS.

Had Stages 1 and 2 not been implemented, the only difference in noise exposure from the previously existing conditions would be in Delaware County, PA, near the west end of the runways at Philadelphia International Airport. This was the impact of implementing PHL dispersal headings during Stages 1 and 2 of the NY ARD.

Were the Selected Project to be completed, noise would be redistributed in Philadelphia, Delaware County, and Gloucester County, NJ. One block would see a significant noise reduction; others would experience slight to moderate increases and decreases. Elsewhere, areas lying under the new routes would see slight increases in noise. Where those new routes cross an RNAV or RNP approach path to a satellite airport, moderate or even significant noise increases could occur. Moderate noise increases would be audible at 24 census blocks near SWF, and one significant increase would be likely near HPN. These increases and decreases are due to the evolution of aircraft types, navigation equipment, and airline schedules since publication of the EIS, and would have happened either with or without the Airspace Redesign.

Glossary

Acronym	Definition
AEDT	Aviation Environmental Design Tool
ARD	Airspace Redesign
DNL	Day/Night Average Sound Level
EIS	Environmental Impact Statement
EWR	Newark Liberty International Airport
FAA	Federal Aviation Administration
HPN	Westchester County Airport
LGA	LaGuardia Airport
NEPA	National Environmental Policy Act
NIRS	Noise Integrated Routing System
NM	Nautical Mile/s
NY/ARD	New York/New Jersey/Philadelphia Airspace Redesign
PHL	Philadelphia International Airport
RBV	Robbinsville
RNAV	Area Navigation
ROD	Record of Decision
SWF	Stewart International Airport
TEB	Teterboro Airport

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