Newark Liberty International Airport

Title 14 Code of Federal Regulations (CFR) Part 150

Noise Compatibility Program Report

August 2022

Prepared for:

The Port Authority of New York and New Jersey
4 World Trade Center | 150 Greenwich Street, 18th Floor | New York, NY 10007

By:

hmmh

and

Fitzgerald & Halliday, Inc. | Planning Technology, Inc. | RS&H, Inc.

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Executive Summary

(Stand-alone document prepared after FAA approvals of NCP measures)

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THE PORT AUTHORITY OF NY & NJ

Sponsor's Certification

The Port Authority as the airport sponsor submits this Noise Compatibility Program (NCP) for Newark Liberty International Airport in accordance with Title 14 Code of Federal Regulations Part 150 (14 CFR Part 150). The Program was prepared with the best available information and is certified as true and complete to the best of my knowledge and belief.

The Noise Exposure Map (NEM) was submitted under separate cover in January 2019 and accepted by the FAA on January 15, 2019. The NCP is submitted in two volumes – the NCP document and the appendices with background and supporting material.

The NCP report was prepared in consultation with local public and planning agencies whose area or any portion of whose area of jurisdiction is within the 65 Day-Night Average Sound Level (DNL)[1] contour depicted on the NEM and might be affected by any Port Authority recommended measures. The consultation also included federal and local officials having oversight responsibility and regular aeronautic users of the airport. The proposed NCP measures are recommended by the Port Authority and not by a consultant or other third party.

It is further certified that adequate opportunity has been afforded to interested persons to submit their views, data, and comments concerning the formulation and adequacy of the NCP Report and the supporting documentation. The required public hearing was held virtually due to the COVID-19 pandemic restrictions on group gatherings on October 7, 2021 to obtain public comments related to the Port Authority recommended NCP measures.

By:	DocuSigned by: Charles R. Everett Jr. A4FE189A8B2449D...
Title:	Director, Aviation Department, Port Authority of New York & New Jersey
Date:	August 5, 2022

Airport Name:	Newark Liberty International Airport
Airport Owner/Operator:	Port Authority of New York and New Jersey
Address:	4 World Trade Center, 150 Greenwich Street, 18th Floor, New York, NY 10007

[1] For the regulatory definition of DNL, see 14 CFR Part 150 §150.7 Definitions: https://www.ecfr.gov/current/title-14/chapter-I/subchapter-I/part-150/subpart-A/section-150.7

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FAA Part 150 NCP Checklist

The FAA has developed checklists for their internal use in reviewing NEM and NCP submissions. For ease of review, the Port Authority has included the FAA's NCP checklist with appropriate page numbers or other references and other notes and comments to assist in the document's review, as presented in Table 1.

Table 1: Part 150 Noise Compatibility Program Checklist

Source: FAA/APP, Washington, DC, March 1989; updated December 2007 and published February 2008 (Confirmed December 2019)

14 CFR Part 150		
Noise Compatibility Program Checklist - Part 1		
Airport name: Newark Liberty International Airport	**Reviewer:**	
	Yes/No/NA	**Supporting Pages/Review Comments**
I. SUBMITTING AND IDENTIFYING THE NCP:		
A. Submission is properly identified:		
1. 14 C.F.R. Part 150 NCP?	Yes	Chapter 1, page 1-1
2. NEMs and NCP together?	No	NEM submitted in January 2019
3. Program revision? (To what extent has it been revised?)	No	N/A
B. Airport and Airport Sponsor's name are identified?	Yes	Sponsor's Certification page xiii
C. NCP is transmitted by airport sponsor's cover letter?	Yes	Cover Letter page ix
II. CONSULTATION (INCLUDING PUBLIC PARTICIPATION): [150.23]		
A. Documentation includes narrative of public participation and consultation process?	Yes	Section 1.4 Roles and Responsibilities, Chapter 5 and Appendix E – Public Outreach
B. Identification of consulted parties:	Yes	
1. All parties in 150.23(c) consulted?	Yes	Section 1.4 Roles and Responsibilities, Chapter 5, Sections 5.1 and 5.3, and Appendix D – Technical Advisory Committee
2. Public and planning agencies identified?	Yes	Chapter 5, Sections 5.1 and 5.3, and Appendix D – Technical Advisory Committee
3. Agencies in 2, above, correspond to those affected by the NEM noise contours?	Yes	Chapter 5, Sections 5.1 and 5.3, and Appendix D – Technical Advisory Committee
C. Satisfies 150.23(d) requirements by:		
1. Documentation shows active and direct participation of parties in B., above?	Yes	Chapter 5 and Appendix E – Public Outreach

14 CFR Part 150		
Noise Compatibility Program Checklist - Part 1		
Airport name: Newark Liberty International Airport	**Reviewer:**	
	Yes/No/NA	**Supporting Pages/Review Comments**
2. Active and direct participation of general public and opportunity to submit their views, data, and comments on the formulation and adequacy of the NCP?	Yes	Chapter 5 and Appendix E – Public Outreach
3. Participation was prior to and during development of NCP and prior to submittal to FAA?	Yes	Chapter 5, Appendix E – Public Outreach, and Appendix F – Public Comments
4. Indicates adequate opportunity afforded to all consulted parties to submit views, data, etc.?	Yes	Chapter 5, Appendix E – Public Outreach, and Appendix F – Public Comments
D. Evidence is included there was notice and opportunity for a public hearing on the final NCP?	Yes	Chapter 5, Appendix E – Public Outreach, and Appendix F – Public Comments
E. Documentation of comments:		
1. Includes summary of public hearing comments, if hearing was held?	Yes	Appendix F – Public Comments
2. Includes copy of all written material submitted to operator?	Yes	Appendix F – Public Comments
3. Includes operator's response/disposition of written and verbal comments?	Yes	Appendix F – Public Comments
F. Is there written evidence from the appropriate office within the FAA that the sponsor received informal agreement to carry out proposed flight procedures?	Yes	Port Authority met with FAA ATCT, ATO and Region to review potential proposed flight procedures. Section 5.4 and Appendix E – Public Outreach
III. NOISE EXPOSURE MAPS: [150.23, B150.3; 150.35(f)] (This section of the checklist is not a substitute for the Noise Exposure Map checklist. It deals with maps in the context of the Noise Compatibility Program submission.)		
A. Inclusion of NEMs and supporting documentation:		
1. Map documentation either included or incorporated by reference?	Yes	Section 1.7 FAA-Accepted 2019 and 2024 Noise Exposure Maps, Figure 1-6 & Figure 1-7
2. Maps previously found in compliance by FAA?	Yes	Appendix A.1 – Federal Aviation Administration Letter of Acceptance for Noise Exposure Map January 15, 2019
3. FAA's compliance determination still valid?		
(a) Existing condition NEM represents conditions at the airport at the time of submittal of the NCP for FAA approval?	Yes	Cover letter, Section 1.7 FAA-Accepted 2019 and 2024 Noise Exposure Maps and Figure 1-6

14 CFR Part 150		
Noise Compatibility Program Checklist - Part 1		
Airport name: Newark Liberty International Airport	**Reviewer:**	
	Yes/No/NA	**Supporting Pages/Review Comments**
(b) Forecast condition NEM represents conditions at the airport at least 5 years into the future from the date of submittal of the NCP to the FAA for approval?	Yes	Cover letter, Section 1.7 FAA-Accepted 2019 and 2024 Noise Exposure Maps and Figure 1-7
(c) Sponsor letter confirming elements (a) and (b), above, if date of submission is either different than the year of submittal of the previously approved NEMs or over 12 months from the date shown on the face of the NEM?	Yes	Cover letter provided with official submittal to the FAA.
(d) (d) If (a) through (c) cannot be validated, the NEMs must be redone and resubmitted as per 150.21.	N/A	N/A
4. Does 180-day period have to wait for map compliance finding?	No	Acceptance of the NEM by FAA occurred on January 15, 2019.
B. Revised NEMs submitted with program: (Review using NEM checklist if map revisions included in NCP submittal. Report the applicable findings in the spaces below after a full review using the NEM checklist and narrative.)		
1. Revised NEMs included with program?	No	N/A
2. Has airport sponsor requested in writing that FAA make a determination on the NEM(s), showing NCP measures in place, when NCP approval is made?	No	N/A
C. C. If program analysis uses noise modeling:		
1. INM, HNM, or FAA-approved equivalent?	Yes	INM7.0d
2. Monitoring in accordance with A150.5?	N/A	N/A
D. One existing condition and one forecast-year map clearly identified as the official NEMs?	Yes	Chapter 1, Section 1.7 FAA-Accepted 2019 and 2024 Noise Exposure Maps, Figure 1-6, Existing Conditions & Figure 1-7, Forecast Conditions
IV. CONSIDERATION OF ALTERNATIVES: [B150.7, 150.23(E)(2)]		
A. At a minimum, were the alternatives below considered, or if they were rejected was the reason for rejection reasonable and based on accurate technical information and local circumstances?		
1. Land acquisition and interests therein, including air rights, easements, and developmental rights?	Yes	Chapter 3, Section 3.2 and Appendix G – Noise Compatibility Program Strategies Suggested by Stakeholders

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Airport name: Newark Liberty International Airport	**Reviewer:**	
	Yes/No/NA	**Supporting Pages/Review Comments**
2. Barriers, acoustical shielding, public building soundproofing	Yes	Chapters 2, Section 2.2 and 3, Section 3.2 and Appendix G – Noise Compatibility Program Strategies Suggested by Stakeholders
3. Preferential runway system	Yes	Chapter 2, Section 2.2 and Appendix G – Noise Compatibility Program Strategies Suggested by Stakeholders
4. Voluntary flight procedures	Yes	Chapter 2, Section 2.2 and Appendix G – Noise Compatibility Program Strategies Suggested by Stakeholders
5. Restrictions described in B150.7 (taking into account Part 161 requirements)	Yes	Chapter 2, Section 2.2 and Appendix G – Noise Compatibility Program Strategies Suggested by Stakeholders
6. Other actions with beneficial impact not listed in the regulation	Yes	Chapters 2, 3, and 4 and Appendix G – Noise Compatibility Program Strategies Suggested by Stakeholders
7. Other FAA recommendations (see D, below)	N/A	N/A
B. Responsible implementing authority identified for each considered alternative?	Yes	Chapters 2, 3 and 4; Sections 2.2, 3.2, 3.3 and 4.2 (See implementation tables)
C. Analysis of alternative measures:		
1. Measures clearly described?	Yes	Chapters 2, 3, 4; Sections 2.2, 3.2, 3.3 and 4.2 and Appendix C – Supplemental Information Related to the Recommended Noise Abatement Measures
2. Measures adequately analyzed?	Yes	Chapters 2, 3 and 4; Sections 2.3, 3.4, and 4.3
3. Adequate reasoning for rejecting alternatives?	Yes	Chapters 2, 3 and 4; Sections 2.3, 3.4, and 4.3
D. Other actions recommended by the FAA: As the FAA staff person familiar with the local airport circumstances, determine whether other actions should be added? (List separately, or on back, actions and describe discussions with airport sponsor to have them included prior to the start of the 180-day cycle. New measures recommended by the airport sponsor must meet applicable public participation and consultation with officials before they can be submitted to the FAA for action. See V.E.2., below.)	N/A	N/A

14 CFR Part 150		
Noise Compatibility Program Checklist - Part 1		
Airport name: Newark Liberty International Airport	Reviewer:	
	Yes/No/NA	Supporting Pages/Review Comments
V. ALTERNATIVES RECOMMENDED FOR IMPLEMENTATION: [150.23(E), B150.7(C); 150.35(B), B150.5]		
A. Document clearly indicates:		
1. Alternatives that are recommended for implementation?	Yes	Chapters 2, 3 and 4; Sections 2.2, 3.2, 3.3 and 4.2 and Appendix G – Noise Compatibility Program Strategies Suggested by Stakeholders
2. Final recommendations are airport sponsor's, not those of consultant or third party?	Yes	Sponsor's Certification, page xiii.
B. Do all program recommendations:		
1. Relate directly or indirectly to reduction of noise and noncompatible land uses? (Note: All program recommendations, regardless of whether previously approved by the FAA in an earlier Part 150 study, must demonstrate a noise benefit if the airport sponsor wants FAA to consider the measure for approval in a program update. See E., below.)	Yes	Chapters 2, 3, 4; Sections 2.2, 3.2, 3.3 and 4.2, Appendix C – Supplemental Information Related to the Recommended Noise Abatement Measures, and Appendix H – Noise Compatibility Program Implementation Schedule
2. Contain description of each measure's relative contribution to overall effectiveness of the program?	Yes	Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, Appendix C – Supplemental Information Related to the Recommended Noise Abatement Measures, and Appendix H – Noise Compatibility Program Implementation Schedule
3. Noise/land use benefits quantified to extent possible to be quantified? (Note: some program management measures cannot be readily quantified and should be described in other terms to show their implementation contributes to overall effectiveness of the program.)	Yes	Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, Appendix C – Supplemental Information Related to the Recommended Noise Abatement Measures, and Appendix H – Noise Compatibility Program Implementation Schedule
4. Does each alternative include actual/anticipated effect on reducing noise exposure within noncompatible area shown on NEM?	Yes	Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, Appendix C – Supplemental Information Related to the Recommended Noise Abatement Measures, and Appendix H – Noise Compatibility Program Implementation Schedule
5. Effects based on relevant and reasonable expressed assumptions?	Yes	Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, Appendix C – Supplemental Information Related to the Recommended Noise Abatement Measures, and Appendix H – Noise Compatibility Program Implementation Schedule

14 CFR Part 150		
Noise Compatibility Program Checklist - Part 1		
Airport name: Newark Liberty International Airport	**Reviewer:**	
	Yes/No/NA	**Supporting Pages/Review Comments**
6. Does the document have adequate supporting data that the measure contributes to noise/land use compatibility?	Yes	Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, Appendix C – Supplemental Information Related to the Recommended Noise Abatement Measures, and Appendix H – Noise Compatibility Program Implementation Schedule
C. Analysis appears to support program standards set forth in 150.35(b) and B150.5?	Yes	Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, Appendix C – Supplemental Information Related to the Recommended Noise Abatement Measures, and Appendix H – Noise Compatibility Program Implementation Schedule
D. When use restrictions are recommended for approval by the FAA:		
1. Does (or could) the restriction affect Stage 2 or Stage 3 aircraft operations (regardless of whether they presently operate at the airport)? (If the restriction affects Stage 2 helicopters, Part 161 also applies.)	N/A	N/A
2. If the answer to D.1 is yes, has the airport sponsor cleted the Part 161 process and received FAA Part 161 approval for a restriction affecting Stage 3 aircraft? Is the FAA's approval documented? For restrictions affecting only Stage 2 aircraft, has the airport sponsor successfully completed th Stage 2 analysis and consultation process required by Part 161 and met the regulatory requirements, and is there evidenced by letter from FAA stating this fact?	N/A	N/A
3. Are non-restrictive alternatives with potentially significant noise/compatible land use benefits thoroughly analyzed so that appropriate comparisons and conclusions among all alternatives can be made?	N/A	N/A
4. Did the FAA regional or ADO reviewer coordinate the use restriction with APP-400 prior to making determination on start of 180-days?	N/A	N/A
E. Do the following also meet Part 150 analytical standards?		

14 CFR Part 150		
Noise Compatibility Program Checklist - Part 1		
Airport name: Newark Liberty International Airport	**Reviewer:**	
	Yes/No/NA	**Supporting Pages/Review Comments**
1. Recommendations that continue existing practices and that are submitted for FAA re-approval? (Note: An airport sponsor does not have to request FAA re-approval if noise compatibility measures are in place from previously approved Part 150 studies. If the airport has implemented the measures as approved in the previous NCP, the measures may be reported and modeled as baseline conditions at the airport.)	Yes	See Chapter 2, Section 2.2
2. New recommendations or changes proposed at the end of the Part 150 process?	Yes	Chapter 2, Section 2.2 and Appendix C – Supplemental Information Related to the Recommended Noise Abatement Measures
F. Documentation indicates how recommendations may change previously adopted noise compatibility plans, programs, or measures?	Yes	Chapters 2, 3 and 4, Sections 2.2, 3.2, 3.3 and 4.2.
G. Documentation also:		
1. Identifies agencies that are responsible for implementing each recommendation?	Yes	Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, and Appendix H – Noise Compatibility Program Implementation Schedule
2. Indicates whether those agencies have agreed to implement?	Yes	Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, and Appendix H – Noise Compatibility Program Implementation Schedule
3. Indicates essential government actions necessary to implement recommendations?	Yes	Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, and Appendix H – Noise Compatibility Program Implementation Schedule
H. Timeframe:		
1. Includes agreed-upon schedule to implement alternatives?	Yes	Proposed schedule included in Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, and Appendix H – Noise Compatibility Program Implementation Schedule
2. Indicates period covered by the program?	Yes	Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, and Appendix H – Noise Compatibility Program Implementation Schedule
I. Funding/Costs:		
1. Includes costs to implement alternatives?	Yes	Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, and Appendix H – Noise Compatibility Program Implementation Schedule

14 CFR Part 150		
Noise Compatibility Program Checklist - Part 1		
Airport name: Newark Liberty International Airport		**Reviewer:**
	Yes/No/NA	**Supporting Pages/Review Comments**
2. Includes anticipated funding sources?	Yes	Chapters 2, 3, 4, Sections 2.2, 3.2, 3.3 and 4.2, and Appendix H – Noise Compatibility Program Implementation Schedule
VI. PROGRAM REVISION: [150.23(E)(9)] Supporting documentation includes provision for revision? (Note: Revision should occur when it is likely a change has taken place at the airport that will cause a significant increase or decrease in the DNL noise contour of 1.5 dB or greater over noncompatible land uses. See §150.21(d))	Yes	As described in Section 4.2, EWR Program Management Measure 11: Update the Noise Compatibility Program, on page 4-12

1. Noise Compatibility Program - Introduction

This Noise Compatibility Program (NCP) Report documents the second and final phase of the Port Authority's Title 14 Code of Federal Regulations Part 150 (14 CFR Part 150), "Airport Noise Compatibility Planning Study" (the Study) for Newark Liberty International Airport (EWR). This NCP Report was prepared in accordance with the requirements of 14 CFR Part 150. The Federal Aviation Administration (FAA) checklist that outlines the requirements for NCP documentation is included in this report just prior to Chapter 1. The associated supporting references in this document are identified within the footnotes and/or appendices.

This NCP Report presents the results of the Port Authority's study of airport-related noise exposure in the airport environs and potential measures to minimize land uses surrounding the EWR airport that are not compatible with airport activities due to airport-related noise exposure as identified in the Noise Exposure Maps (NEMs). The NEMs were prepared during the first phase of the Study. While development of NEMs and NCPs is voluntary, airport sponsors must have NEMs accepted by the FAA and NCP measures approved by the FAA in order for those NCP measures to be eligible for potential federal funding from the Airport Improvement Program (AIP).

The FAA accepted the Port Authority's 2024 forecast condition NEM contours. Since then, the COVID-19 pandemic has resulted in a reduction of aircraft operations at EWR due to significant decreases in business and vacation travel, as well as early retirements of aging aircraft. The severity and duration of these substantial contractions in aviation operations are unknown, but it is expected that demand and airline capacity will grow. Future NEM updates, as discussed in proposed EWR Program Management Measure 10 would reflect updated aviation forecasts and changes to aircraft fleet mix.

From a national historical perspective, the emphasis on aircraft noise compatibility planning began with the passage of the Airport Safety and Noise Abatement Act of 1979. This Act gave the FAA the authority to issue regulations on noise compatibility planning and provide a means for federal funding of projects dedicated to improving "noncompatible" land uses around an airport. These regulations became the impetus for promulgating 14 CFR Part 150 "Airport Noise Compatibility Planning" (Part 150). In 1990, the passage of the Airport Noise and Capacity Act (ANCA) established a national policy on aircraft noise with an emphasis on a phase out of the noisier aircraft types. ANCA also put restrictions in place regarding the types of measures airports may implement to manage or mitigate aircraft noise.

1.1. How to Use This Document

This NCP Report and the Part 150 Study represent steps undertaken in accordance with requirements found in 14 CFR Part 150. The NCP is the second phase of the Part 150 Study for EWR. A checklist is provided beginning on page xv, which enumerates specific FAA requirements and the location of text addressing those requirements in the document and its appendices. This NCP Report is organized as follows:

- Chapter 1 introduces Newark Liberty International Airport, the Part 150 Study process, the NCP phase and the stakeholders in this process, and summarizes the FAA-accepted Noise Exposure Maps developed in the NEM phase of the project
- Chapter 2 contains the EWR NCP noise abatement measures analyzed and considered for Port Authority recommendation
- Chapter 3 contains EWR NCP land use measures analyzed and considered for Port Authority recommendation
- Chapter 4 contains the EWR NCP program management measures analyzed and considered for Port Authority recommendation
- Chapter 5 describes stakeholder engagement efforts undertaken during the NCP phase of the Part 150 process
- The Appendices, a separate volume to this document, provide technical information, supporting documentation, and public outreach meeting materials referenced in the NCP Report.

Each individual measure and Appendix H contain the necessary information for compliance with 14 CFR 150.23(e)(8), namely: The period covered by the program, the schedule for implementation of the program, the persons responsible for implementation of each measure in the program, and, for each measure, documentation supporting the feasibility of implementation, including any essential governmental actions, costs, and anticipated sources of funding, that will demonstrate that the program is reasonably consistent with achieving the goals of airport noise compatibility planning under this part.

Part 150 sets forth standards for airport operators to use in documenting noise exposure in the airport environs and establishing programs, subject to FAA approval, to reduce noise-related noncompatible land use. While participation in the Part 150 program by an airport is voluntary, more than 250 airports have participated. Participation may provide eligibility for federal funds for implementation of FAA-approved NCP measures.

This chapter provides:

- A brief summary of the location and setting of EWR (Section 1.2 on page 1-3);
- An introduction to Part 150 (Section 1.3 on page 1-5);
- A summary of roles and responsibilities (Section 1.4 on page 1-7); and
- The FAA-accepted NEM (Section 1.7 on page 1-14, as Figure 1-6 on page 1-17 and Figure 1-7 on page 1-19).[2]

This volume presents the NCP Report for Newark Liberty International Airport, as required by the specific provisions of Part 150 Subpart B, Section 150.23, and Appendix B. A separate volume, "Newark Liberty International Airport Part 150 Noise Compatibility Program Appendices", includes the technical information, supporting documentation and public outreach meeting materials referenced in the NCP Report.

[2] Note that the NEMs presented in this report are reductions of the NEMs submitted to and accepted by the FAA. The NEMs herein are not at 1"=2,000' scale and with extent to 30,000' from the airport reference point, as required by FAA for the official submittal of the Noise Exposure Maps. The accepted NEMs can be found as Attachment C to the Newark Liberty International Airport Final Noise Exposure Map Report, located here: http://panynjpart150.com/EWR_FNEM.asp, labeled as "Final NEM Report Attachment C – Noise Exposure Maps"

1.2. Project Location and Airport Setting

This section provides introductory information on EWR, including its historical context, its location and purpose, and a basic level of information on noise terminology to inform the reader for the remainder of the document.

Airport History

The area's first major airport, Newark Airport, was built by the City of Newark on 68 acres of marshland. After the airport's opening on October 1, 1928, it quickly became the world's busiest commercial airport at that time.[3]

During World War II, the Army Air Corps operated the airport. After the Port Authority assumed responsibility for Newark Airport's operation on March 22, 1948, the agency added an instrument runway,[4] a passenger terminal, an Airport Traffic Control Tower, and an air cargo center. In 2002, the airport was renamed Newark Liberty International Airport to memorialize those who lost their lives on September 11, 2001. The Port Authority owns the portion of the airport within the City of Elizabeth and leases the portion of the airport within Newark. In 2002, the Port Authority and the city of Newark agreed to extend the lease through 2075. Figure 1-1 displays a timeline of major historical events for EWR over the past century.

Since 1959, the Port Authority has been active in addressing airport noise concerns. Examples include implementing a soundproofing program for schools in the vicinity of EWR; installing the world's first aircraft noise monitoring system,[5] which currently includes three permanent noise monitoring sites surrounding EWR; and establishing a fully-staffed noise office to investigate and respond to aircraft noise concerns and interface with local communities to assist with understanding aircraft noise as it pertains to the operation of the Port Authority's airports.

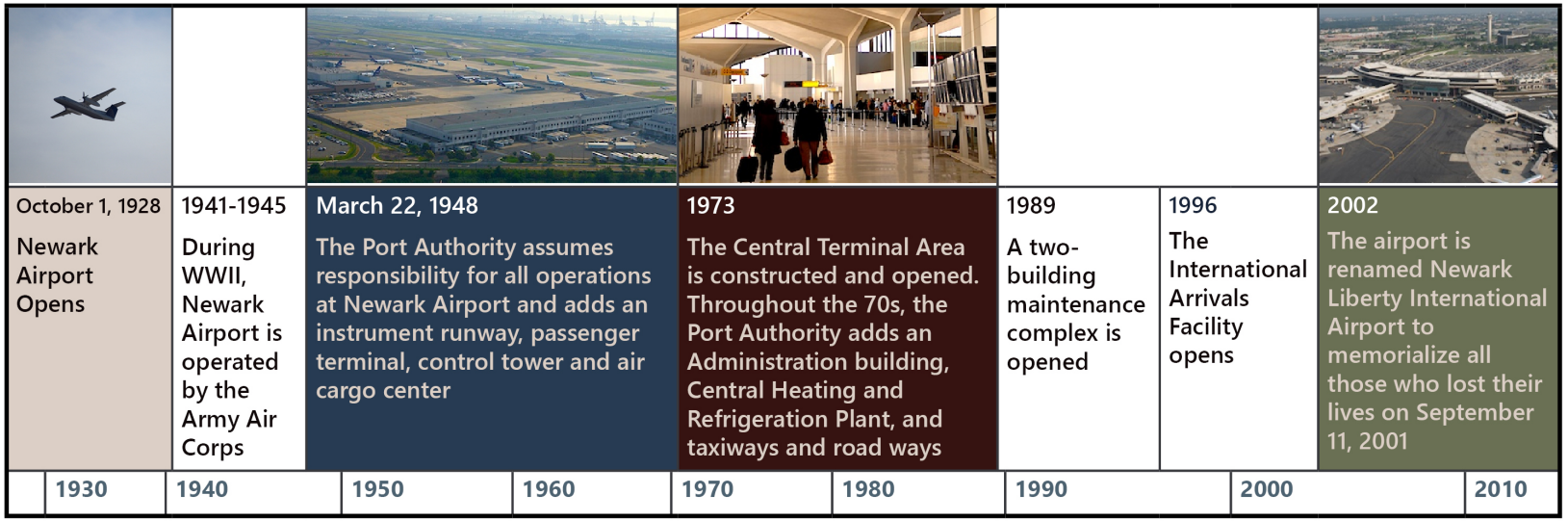


Figure 1-1: Timeline of Newark Liberty International Airport Major Events
Source: Port Authority, 2019

[3] FAA, January 1996. Final Environmental Impact Statement for the Newark International Airport Ground Access Monorail Northeast Corridor Connection project.

[4] A runway equipped with electronic and visual navigation aids for which a precision or a non-precision approach procedure having straight-in landing minimums has been approved, FAA Pilot/Controller Glossary, effective February 28, 2019

[5] https://aircraftnoise.panynj.gov/aircraft-noise-engagement-history/

Airport Location and Purpose

EWR covers 2,027 acres, including a 425-acre Central Terminal Area. The New Jersey Turnpike, Interstate 78, and U.S. Routes 1-9 in the cities of Newark and Elizabeth border the airport. Located 15 miles southwest of New York City, Newark Liberty International Airport is classified by the FAA as a primary use airport.[6]

As one of the busiest international airports in the U.S., EWR transported about 46 million passengers domestically and internationally during 2018. More than 35 airlines operate out of EWR and serve over 160 nonstop destinations.[7] Additionally, in 2017, over 2.9 billion tons of cargo landed at EWR, making it the twelfth busiest cargo airport in the U.S. in that year.[8]

The Port Authority airport system is comprised of four commercial airports (Newark Liberty International [EWR], John F. Kennedy International [JFK], LaGuardia [LGA], and New York Stewart International [SWF]) and one general aviation reliever airport (Teterboro, or TEB) serving the region. Each airport fulfills a particular mission to accommodate the air service requirements of the New York and New Jersey Metropolitan area. The regional context location of the four airports conducting Part 150 Studies is depicted in Figure 1-2.

[6] Primary Airports are Commercial Service Airports that have more than 10,000 passenger boardings each year. https://www.faa.gov/airports/planning_capacity/categories/

[7] Newark Aviation Role: http://www.panynj.gov/airports/general-information.html

[8] CY 2017 Final All-Cargo Landed Weights, Rank Order. FAA. 2018. https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/media/cy17-cargo-airports.pdf

Contribution to Economy and Airport Development

EWR employs approximately 22,000 people. The airport contributes approximately $33 billion in annual economic activity to the New York-New Jersey metropolitan region, generating over 175,000 total jobs and $11 billion in annual wages.[9]

The U.S. Government spent more than $15.1 million on EWR prior to 1948. Since assuming the airport's lease in 1948, the Port Authority has invested $6 billion at the airport.

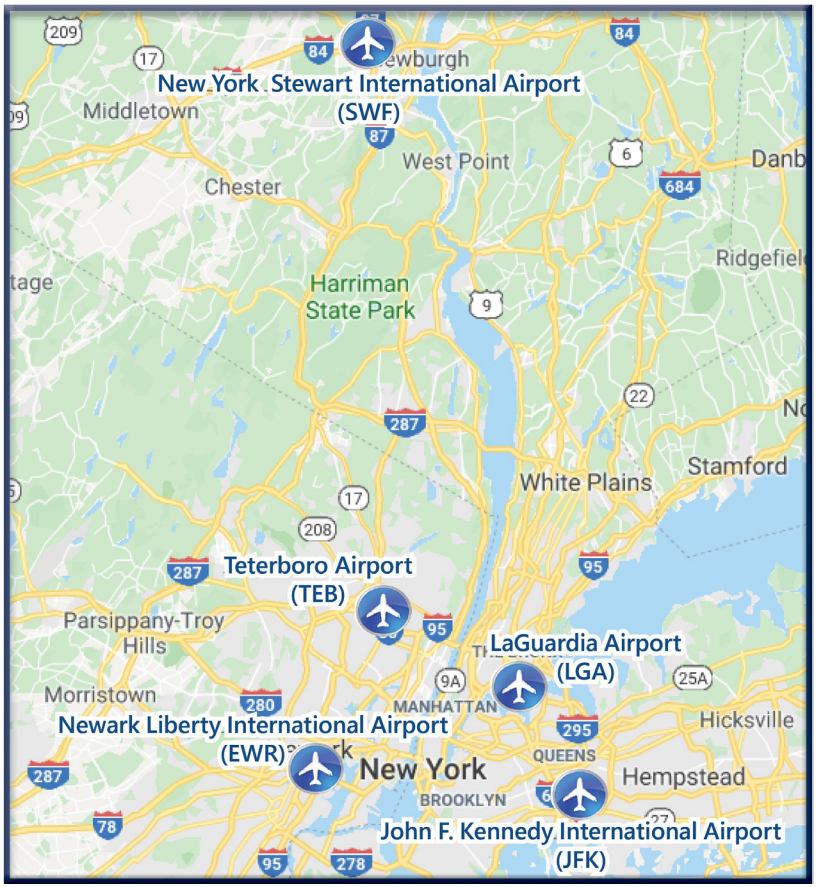


Figure 1-2: Airport Regional Context Location Map

[9] Port Authority, 2018. Airport Traffic Report (published 2019). https://www.panynj.gov/airports/en/statistics-general-info.html Much of the information in this section can be found in the Port Authority's Airport Traffic Report

1.3. Part 150 Overview

"Airport Noise Compatibility Planning" is codified in 14 CFR Part 150 or Part 150.[10] Part 150 sets forth standards for airport operators to use when documenting noise exposure around airports and for establishing programs, subject to FAA approval, to reduce noise-related noncompatible land use. Specifically, Part 150 prescribes standards and systems for the following:

- Measuring noise
- Estimating cumulative noise exposure
- Describing noise exposure (including instantaneous, single event and cumulative levels)
- Coordinating NCP development with local land use officials and other interested parties
- Documenting the analytical process and development of the compatibility program
- Submitting documentation to the FAA
- FAA and public review processes
- FAA approval or disapproval of the submission

Components of a Part 150 Study

A Part 150 Study includes two principal elements:

(1) A Noise Exposure Map (NEM)

(2) A Noise Compatibility Program (NCP)

Acceptance of an NEM by the FAA is a prerequisite to their subsequent review of recommended NCP measures.

Noise Exposure Map

The Noise Exposure Map (NEM) describes the airport layout and operation, aircraft-related noise exposure, land uses in the airport environs, and the resulting noise and land use compatibility. Aircraft noise exposure is expressed in terms of the annual-average Day-Night Average Sound Level (DNL).[11] DNL represents noise as it occurs over a 24-hour period, with the addition of a 10 dB penalty for noise events occurring at night (10 p.m. to 7 a.m.). A brief summary of noise terminology is provided in Section 1.5 on page 1-10. Appendix A in the EWR NEM Report for a more detailed summary of the noise terminology used throughout this document.

The NEM must address two periods; existing conditions for the year of submittal of the NEM to the FAA and forecast conditions at least five years following the year of submission. Contours of equal DNL values, similar to terrain contours of equal elevation, form the basis for evaluating the aircraft noise exposure, as well as land use compatibility, based on FAA designations (presented in Table 1-1 on page 1-12) for both the existing and forecast conditions.

The Port Authority conducted an extensive stakeholder engagement program to develop the NEM, which included a period of public comment for the draft NEM. Prior to providing the draft NEM Report to the public for comment, the Port Authority provided the draft report to the FAA for their suggested edits and comments. The Port Authority made the 2019 Draft NEM available for public review and comment from September 13 through October 15, 2018. The 2019 Draft NEM was the primary topic of the third public workshop, held in two locations: one location on Tuesday, September 25 and the second location on Wednesday, September 26, 2018. Public and FAA comments were addressed within the NEM document prior to submitting the final NEM to the FAA for acceptance. The Port Authority addressed public and FAA comments prior to submitting the final NEM to the FAA for acceptance. The FAA evaluated and accepted the EWR NEM as noted in the FAA "Newark Liberty International Airport 14 CFR Part 150 Study – FAA Acceptance of Noise Exposure Maps" letter on January 15, 2019 as provided in Appendix A on page A-5.[12]

[10] 14 CFR (FAR) Part 150, "Airport Noise Compatibility Planning".http://www.ecfr.gov/cgi-bin/text-idx?SID=f8e6df268e3dad2edb848f61b9a0fb51&mc=true&node=pt14.3.150&rgn=div5#se14.3.150_11

[11] For the regulatory definition of DNL see 14 CFR Part 150 §150.7 Definitions. https://www.ecfr.gov/cgi-bin/text-idx?SID=f8e6df268e3dad2edb848f61b9a0fb51&mc=true&node=pt14.3.150&rgn=div5#se14.3.150_17

[12] Port Authority of New York and New Jersey, "Newark Liberty International Airport, Title 14 Code of Federal Regulations (CFR) Part 150, Noise Exposure Map Report," January 2019. Federal Register Notice published on June 11, 2019.

Noise Compatibility Program

This NCP Report provides a framework for evaluating aircraft noise exposure and the costs and benefits of Port Authority-recommended measures aimed at improving land use compatibility. The NCP also addresses the results of the Port Authority's engagement with local planning authorities in the impacted communities around EWR regarding potential policies and measures to manage existing and future noncompatible land uses. While the Port Authority maintains ultimate responsibility for the NCP, it is a culmination of efforts by local jurisdictions, agencies, other stakeholders, and the FAA.

The NCP development process focused on the following three strategies to improve land use compatibility:[13]

- Noise Abatement – noise reduction at the noise source
- Land Use – noise mitigation for the receivers
- Program Management – means to implement, monitor and/or report on NCP measures

This NCP Report describes all noise compatibility measures considered by the Port Authority, the effectiveness of the measures, the reasons that individual measures were or were not recommended for inclusion in this NCP by the Port Authority, implementation of the measures and funding required to implement. Stakeholder engagement is vital to the development of the NCP. The Port Authority continued the precedent set in the NEM phase of the Part 150 Study to provide ample opportunity for public and stakeholder input during the development of the NCP, including, but not limited to:

- Regular briefings to the Technical Advisory Committee (TAC) established at the outset of the project
- Informational newsletters
- Engagement with EWR Roundtable on the Part 150 Process
- Consultation with agencies with land use jurisdiction and responsibility within the Study Area[14]
- Opportunities for public review and comment during NCP development
- Project-specific materials available on the Port Authority's Part 150 website
- Public workshop to present the Part 150 Study process and resulting NCP
- Public hearing, in conjunction with the public workshop, to gather public comments related to the draft NCP

Chapter 5 details the stakeholder engagement process, including specific information regarding the Port Authority's strategies, opportunities for comment, and the documentation of these efforts.

Upon completion of the analyses and coordination, the Port Authority will submit the NCP Report to the FAA for review and approval of the individual Port Authority-recommended NCP measures. Upon receipt of the FAA's Record of Approval (ROA) for this NCP, the Port Authority may begin implementation of FAA-approved program measures and apply for federal financial assistance to support implementation of eligible FAA-approved NCP measures at EWR.

A Glossary of Terms and Acronyms used throughout this NCP Report is included in Appendix B.

[13] 14 CFR Part 150, Sec. B150.5(a).

[14] See Section 2.2 of the Newark Liberty International Airport Final Noise Exposure Map Report, located here:

http://panynjpart150.com/EWR_FNEM.asp for a description on how the Study Area was defined

1.4. Roles and Responsibilities

Several groups are involved in the preparation of EWR's Part 150 Study. As depicted in Figure 1-3, the three primary groups involved are the Port Authority, including its staff and consultant team; an EWR Part 150 Study Technical Advisory Committee (TAC) chartered to advise the Port Authority throughout the process; and the FAA.

The Port Authority

As the "airport operator", the Port Authority developed recommendations for this NCP and is responsible for initiating the implementation of FAA-approved measures and may apply for grant funding for AIP eligible measures. A Port Authority-recommended and FAA-approved measure does not require the implementation of the measure, but merely demonstrates that the measure is in compliance with 14 CFR Part 150 and allows the Port Authority to apply for federal AIP grants for measures that are eligible. Additionally, if a measure requires subsequent FAA action, implementation may require environmental study under the National Environmental Policy Act (NEPA).

The Port Authority has retained a team of consultants led by Harris Miller Miller & Hanson Inc. (HMMH) to assist with the technical tasks required to fulfill Part 150 analysis and documentation requirements. The HMMH Study Team consisting of Fitzgerald & Halliday, Inc. (FHI), Planning Technology, Inc. (PTI), and Reynolds, Smith & Hills (RS&H) in close consultation with the Port Authority have conducted the NCP analysis and developed the NCP Report.

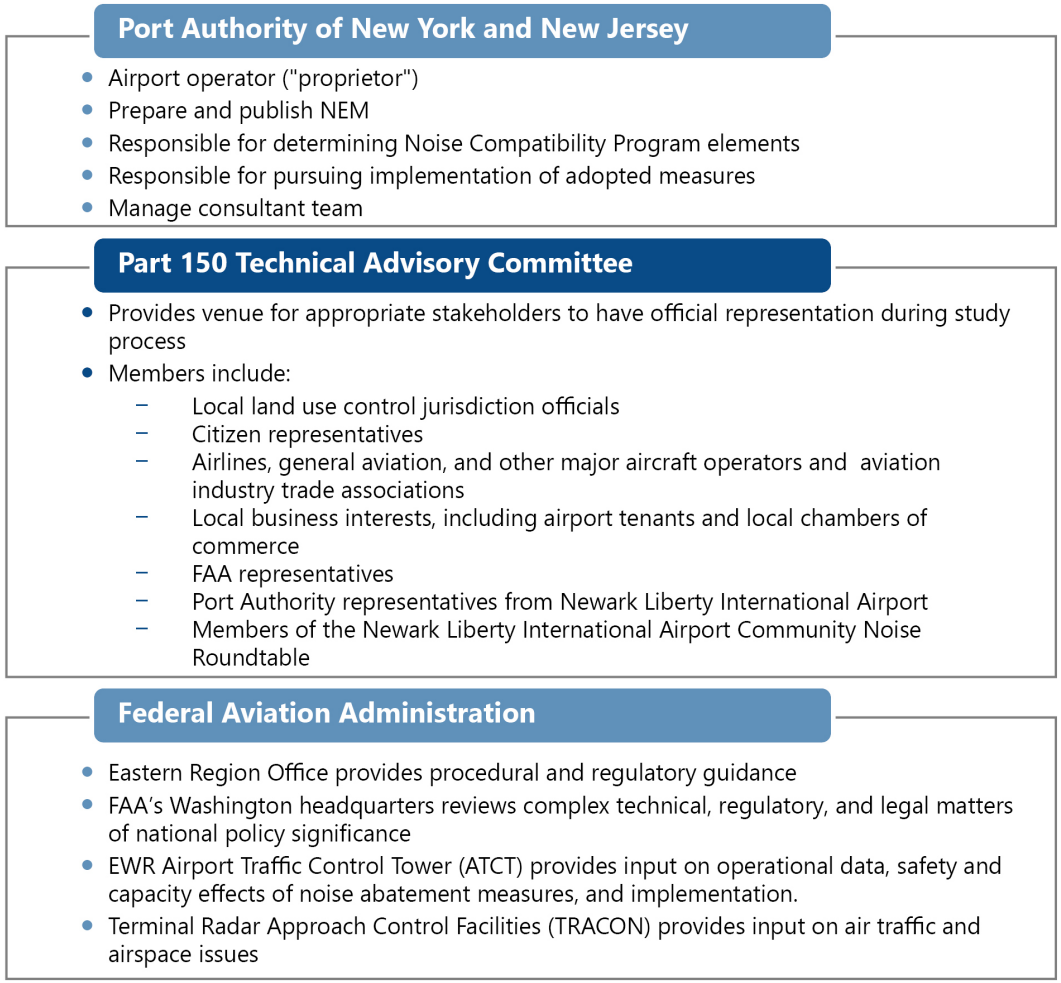


Figure 1-3: Roles and Responsibilities in the EWR Part 150 Study
Source: HMMH, 2019

Part 150 Noise Technical Advisory Committee

The Port Authority's establishment of the EWR Part 150 TAC ensures that a wide range of stakeholders is given official representation in the study process.

The TAC was formed to provide varying perspectives and inputs to the NEM and NCP development process. The goal of the TAC is to create an atmosphere of understanding, awareness, and collaboration to derive solutions to improve noise compatibility. Through an invitation from the Port Authority and a voluntary participation process, the TAC brings together representatives from a broad spectrum of entities with interest in the Part 150 process and its outcome. These entities include representatives of the local communities and jurisdictions in the airport's noise-affected environs; government agencies with aviation and land use responsibilities; and private sector interests, particularly in the aviation industry.

TAC members are responsible for representing their constituents throughout the study process, including commenting on the adequacy and accuracy of collected data, simplifying assumptions, and technical analyses, and reporting to their constituents. The TAC also serves as a forum for stakeholders to discuss complex issues and share their differing perspectives on aircraft noise issues. Section 5.1 on page 5-2 discusses the TAC involvement during the development of the EWR NCP Report.

Federal Aviation Administration

For the NEM, FAA responsibility included approval of non-standard modeling requests and review and acceptance of the NEM submission to determine whether the technical work, consultation, and documentation comply with Part 150 requirements.

For the NCP, FAA responsibility includes the same review and acceptance of the NCP Report to determine whether the technical work, consultation, and documentation comply with Part 150 requirements. In addition, the FAA is responsible for review of the details of technical documentation as well as broader issues of safety and consistency of recommended noise abatement measures with applicable federal law. The final role of the FAA is to approve or disapprove each Port Authority-recommended NCP measure. The FAA will evaluate recommended measures individually with respect to a criteria framework and determine whether each measure merits approval, disapproval, or further review for the purposes of Part 150. Following this determination, the FAA will issue the Record of Approval (ROA).

According to Part 150, Appendix B §B150.5 Program standards, the following are requirements of the Noise Compatibility Program:

- *(a) Reduces existing noncompatible uses and prevents or reduces the probability of the establishment of additional noncompatible uses*
- *(b) Does not impose undue burden on interstate and foreign commerce*
- *(c) Provides for revision in accordance with [Part 150]*
- *(d) Is not unjustly discriminatory*
- *(e) Does not derogate safety or adversely affect the safe and efficient use of airspace*
- *(f) To the extent practicable, meets both local needs and needs of the national air transportation system, considering trade-offs between economic benefits derived from the airport and the noise impact*
- *(g) Can be implemented in a manner consistent with all of the powers and duties of the Administrator of FAA*

FAA involvement includes participation by staff from at least three parts of the agency:

(1) The Office of Environment and Energy (AEE)
(2) The Air Traffic Organization (ATO)
(3) The Office of Airports (APP)

- The FAA's **Office of Environment and Energy** (at FAA headquarters) reviews complex technical, regulatory, and legal matters of national environmental policy significance.
- The **Air Traffic Organization** is responsible for providing safe and efficient air navigation services to the entire U.S. airspace. **EWR's Airport Traffic Control Tower** (ATCT) provides significant input to the NCP in several areas, including operational data, judgment regarding safety and capacity effects of alternative noise abatement measures, and implementation requirements. The **New York TRACON** (Terminal Radar Approach Control) also provides input on air traffic issues to the extent that they might affect operational procedures and airspace issues at EWR and other nearby airports, including TEB, LGA, and JFK.
- Two groups in the FAA's **Airports Division** are involved in the review: (1) the **Office of Airport Planning and Programming** ensures that the national airport system is safe, efficient, environmentally responsible, and meets the needs of the traveling public; and (2) the FAA's **Eastern Region Office** is responsible for determining if the NCP satisfies all Part 150 requirements and has final review of the NCP Report for adequacy in satisfying technical and legal requirements.

1.5. Noise Terminology

Information presented in this NCP Report relies upon a reader's understanding of the characteristics of noise (unwanted sound), the effects noise has on persons and communities, and the metrics or descriptors most commonly used to quantify aircraft noise.

Introduction to Noise Terminology

Sound is a physical phenomenon consisting of minute vibrations (waveforms) that travel through a medium such as air.

Noise is sound that is unwelcome because of its undesirable effects on persons (e.g., speech interference, sleep disturbance) or on entire communities (annoyance).

Noise Metrics

Noise metrics are essentially measures of noise levels or noise exposure. There are two main categories of metrics to describe noise: (1) noise events (single-event noise metrics) and (2) noise experienced over durations (cumulative noise metrics). Single-event noise metrics are indicators of the intrusiveness, loudness, or noisiness of individual aircraft events. Cumulative noise metrics are indicators of community annoyance. Unless otherwise noted, all noise metrics presented in Part 150 documentation are reported in terms of the A-weighted decibel (dB). Figure 1-4 displays common environmental sound levels in dB.

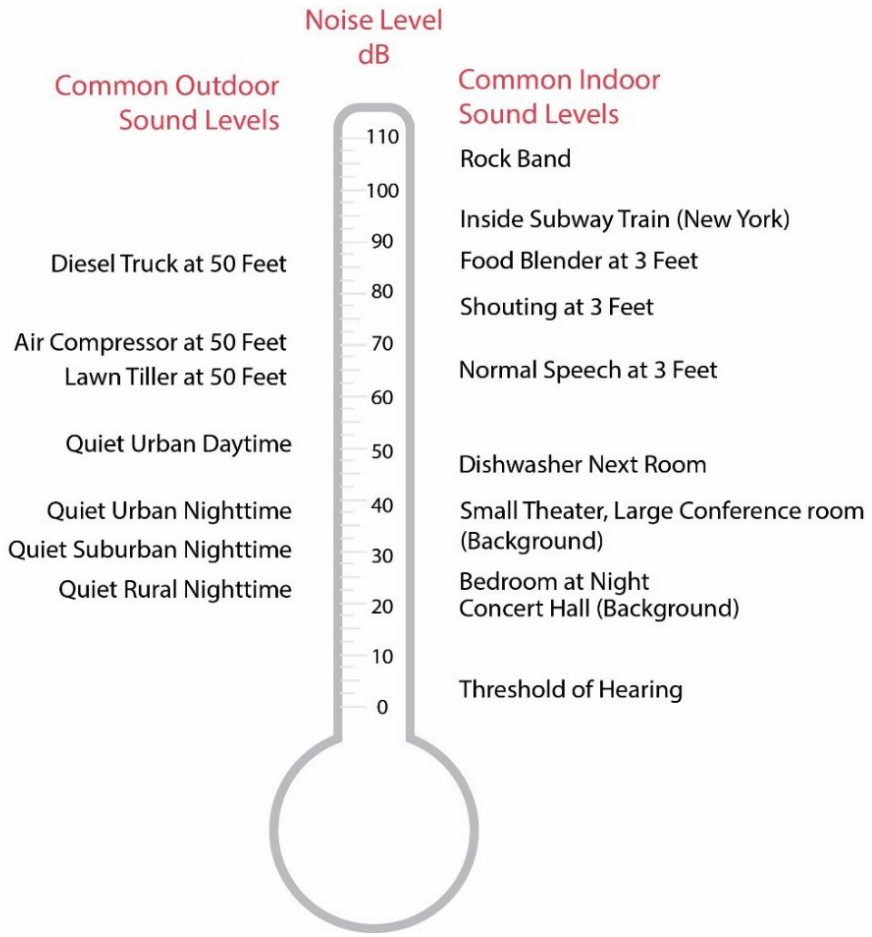


Figure 1-4: Common Environmental Sound Levels, in dB
Source: HMMH, 2019

Day-Night Average Sound Level (DNL)

The ***Day-Night Average Sound Level*** represents the noise energy present during a 24-hour period.

DNL represents a weighted average of the noise level over a 24-hour period. Weighting is applied to noise events occurring at night (10:00 p.m. to 7:00 a.m.), with 10 dB added to the actual nighttime sound level. This 10 dB weighting accounts for greater sensitivity to nighttime noise, and the fact that events at night are often perceived to be more intrusive than daytime events (see Figure 1-5).[15]

For purposes of Part 150, DNL reported herein represents the annual-average day of aircraft operations at EWR. For more information regarding noise terminology and noise metrics, please see Appendix A in the EWR NEM Report.

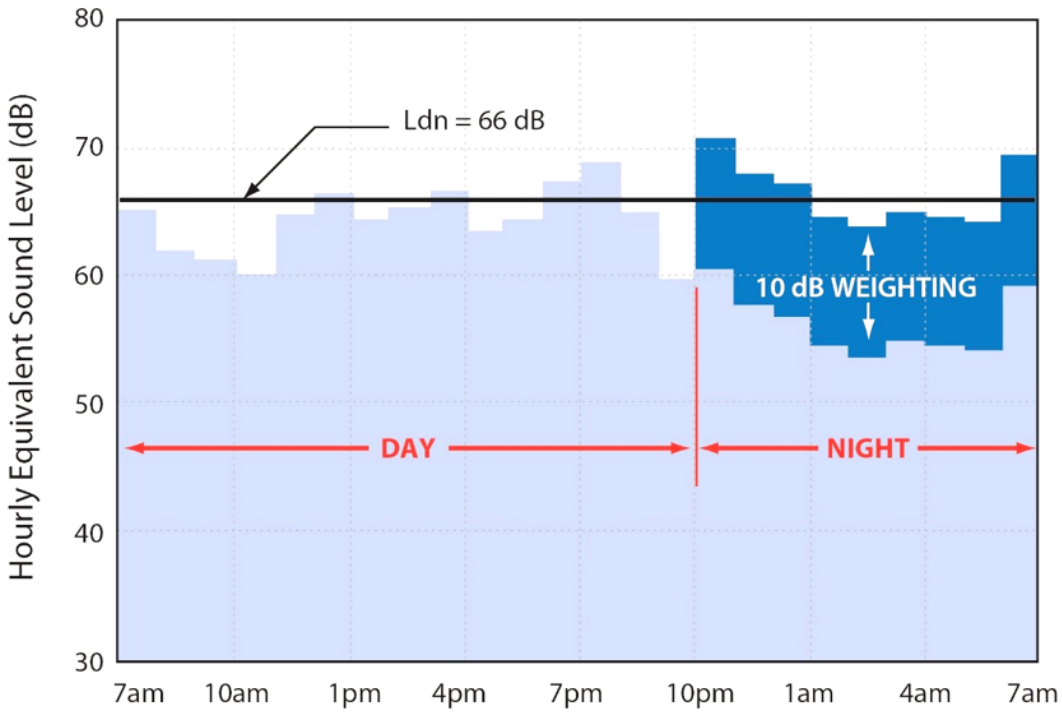


Figure 1-5: Example of a Day-Night Average Sound Level Calculation
Source: HMMH, 2019

[15] For the regulatory definition of DNL see 14CFR Part 150 §150.7 Definitions. http://www.ecfr.gov/cgi-bin/text-idx?SID=f8e6df268e3dad2edb848f61b9a0fb51&mc=true&node=pt14.3.150&rgn=div5

1.6. Noise/Land Use Compatibility

The objective of airport noise compatibility planning is to promote compatible land use in communities surrounding airports. Part 150 requires the review of existing land uses surrounding an airport to determine land use compatibility associated with aircraft activity at the airport.

The FAA has published land use compatibility designations, as set forth in Part 150, Appendix A, Table 1 (reproduced here as Table 1-1 on page 1-12). As the table indicates, the FAA generally considers all land uses to be compatible with aircraft-related DNL below 65 dB, including hotels, retirement homes, intermediate care facilities, hospitals, nursing homes, schools, preschools, and libraries. These categories will be referenced throughout the Part 150 process.

The Port Authority and Study Team established a study area and collected detailed land use information from municipalities throughout the study area. The collected land use and zoning information was summarized to match the Part 150 land use categories. The Noise Exposure Maps reproduced in the next section from the EWR NEM include the results of the aircraft noise and land use analysis pursuant to FAA-provided land use compatibility designations.

Table 1-1: Part 150 Airport Noise / Land Use Compatibility Guidelines
Source: Part 150, Appendix A, Table 1

Land Use	Yearly Day-Night Average Sound Level, DNL, in Decibels (Key and notes on following page)					
	<65	65-70	70-75	75-80	80-85	>85
Residential Use						
Residential other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home park	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade--general	Y	Y	25	35	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Key to Table 1-1

SLUCM: Standard Land Use Coding Manual.

Y(Yes): Land use and related structures compatible without restrictions.

N(No): Land use and related structures are not compatible and should be prohibited.

NLR: Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35: Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dBA must be incorporated into design and construction of structure.

Notes for Table 1-1

The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dBA and 30 dBA should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dBA, thus, the reduction requirements are often started as 5, 10, or 15 dBA over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

2) Measures to achieve NLR of 25 dBA must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

3) Measures to achieve NLR of 30 dBA must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

4) Measures to achieve NLR of 35 dBA must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

5) Land use compatible provided special sound reinforcement systems are installed.

6) Residential buildings require an NLR of 25.

7) Residential buildings require an NLR of 30

8) Residential buildings not permitted.

1.7. FAA-Accepted 2019 and 2024 Noise Exposure Maps

On January 15, 2019, the FAA accepted the 2019 NEM for EWR as summarized in this section of the NCP Report. Figure 1-6 on page 1-17 presents the Noise Exposure Map for existing conditions (2019), and Figure 1-7 on page 1-19 presents the Noise Exposure Map for the five-year forecast conditions (2024). Table 1-2, Table 1-3, and Table 1-4 show dwelling units, population, and noise-sensitive sites, respectively, within the 2019 and 2024 reported DNL contour intervals.[16]

The noise contours for this study were prepared using the Integrated Noise Model (INM) Version 7.0d as approved by the FAA.[17] The INM determines the cumulative effect of aircraft noise exposure around airports. The airport-specific information required by the INM includes both physical and operational data.

The physical data includes airfield geometry (i.e., runway locations and utilization), the elevation of the airfield, weather, and terrain data. Operational data includes the number and types of aircraft operating at the airport and the three-dimensional flight trajectories of aircraft arriving to and departing from the airport.

This chapter provides a summary of the current FAA-accepted 2019 NEM for reference purposes. The fundamental noise elements of NEMs are DNL contours for existing and five-year forecast conditions (i.e., 2019 and 2024) for the current FAA-accepted NEM.

Table 1-2: Dwelling Units within 2019 and 2024 65 DNL Contour
Source: RS&H and HMMH, 2019

Year	Estimated Dwelling Units			
	65-70 dB DNL	70-75 dB DNL	>75 dB DNL	Total
2019	9,040	291	0	9,331
2024	9,399	667	0	10,066

Table 1-3: Population within 2019 and 2024 65 DNL Contours[18]
Source: 2010 US Census Block Data and HMMH, 2019

Year	Estimated Population			
	65-70 dB DNL	70-75 dB DNL	>75 dB DNL	Total
2019	25,017	804	0	25,821
2024	25,912	1,883	0	27,795

[16] Day-Night Average Sound Level (DNL) noise contours represents lines of equal noise exposure as it occurs over a 24-hour period, with the assumption that noise events occurring at night (10 p.m. to 7 a.m.) are 10 dB louder than actual.

[17] The EWR 14 CFR Part 150 Study was initiated in January 2015, prior to the FAA's release of the Aviation Environmental Design Tool (AEDT) on May 29, 2015 and the latest version AEDT 3d on March 30, 2021. When the study began, INM 7.0d was the most current FAA-approved model for determining aircraft noise exposure around airports and was identified as the model required for use in this study. The FAA approval of INM 7.0d use for this Study can be found in Appendix D.1 of the EWR NEM Report.

[18] 2010 US Census Block Data. In order to estimate the number of people residing within the noise contours, existing parcel boundary land use maps were overlaid on 2010 US Census TIGER file maps that depict Census blocks – the smallest Census enumeration unit. "Populated Area" data polygons were then created by combining Census blocks with the residential land use concentrating population and housing unit values into the residential portion of the census block where people actually live. For example, in some areas the population is concentrated along the road rather than over several square miles of open or undeveloped land. Using Geographic Information Systems (GIS) tools, the noise contours were intersected with the "Residential/ Census" data for each DNL noise contour interval. The resultant wholly or partially encompassed Residential/Census areas were then identified and the proportion of total area within the contour level was calculated to determine the estimated residential population and housing unit counts.

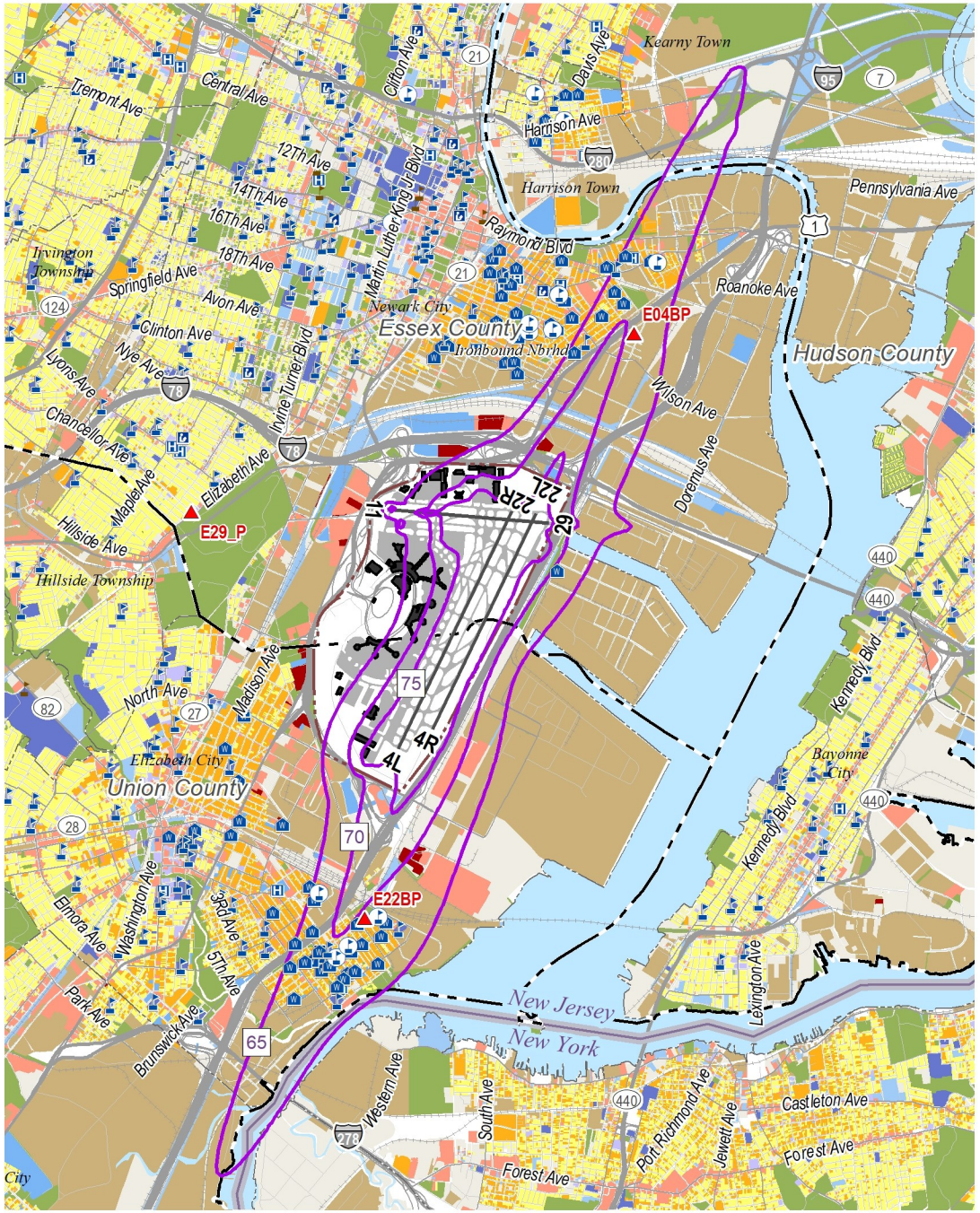
Table 1-4: Noise Sensitive Sites within 2019 and 2024 65 DNL Contour
Source: HMMH and RS&H, 2019

Year	Noise-Sensitive Site	Type	Contour Interval	Address	City
Within 2019 and 2024	SpringHill Suites Newark Liberty International Airport	Transient Lodging	65-70 dB	652 US Highway 1 and 9 South	Newark
	Embassy Suites	Transient Lodging	2019: 65-70 dB 2024: 70-75 dB	95 International Blvd	Elizabeth
	Country Inn & Suites by Carlson Newark Airport, NJ	Transient Lodging	2019: 65-70 dB 2024: 70-75 dB	100 International Blvd	Elizabeth
	Courtyard Newark Elizabeth	Transient Lodging	70-75 dB	34905 Newark Blvd	Newark
	Residence Inn Newark Elizabeth	Transient Lodging	70-75 dB	83 International Blvd	Elizabeth
	Extended Stay America – Elizabeth	Transient Lodging	70-75 dB	45 International Blvd	Elizabeth
	Howard Johnson	Transient Lodging	70-75 dB	20 Frontage Rd	Newark
	George Washington Academy School No. 1[1]	Elementary School	65-70 dB	250 Broadway	Elizabeth
	Benjamin Franklin School No. 13[1]	Elementary School	65-70 dB	248 Ripley Place	Elizabeth
	John Marshal School No. 20[1]	Elementary School	65-70 dB	521 Magnolia Avenue	Elizabeth
	Dr. Martin Luther King Jr. Ecc #52	Nursery/Preschool	65-70 dB	130 Trumbull Street	Elizabeth
	Hawkins Street School[1]	Elementary School	65-70 dB	8 Hawkins Street	Newark
	iPrep Academy School No 8[1, 2]	Elementary School	65-70 dB	221-227 Court Street	Elizabeth
	Jerome Dunn Academy No 9	Grades K-8	65-70 dB	201 Livingston Street	Elizabeth
	Juan Pablo Duarte - Jose Julian Marti #28	Elementary School	65-70 dB	25 First Street	Elizabeth
	Innovative Education Programs	Pre-School	65-70 dB	697 Market Street	Newark
	Rainbow Land Learning Center II	Pre-School	65-70 dB	115 Gotthardt St.	Newark
	City of Elizabeth Library	Library	65-70 dB	102 Third Street	Elizabeth
	Trinity Reformed Church	Place of Worship	65-70 dB	483 Ferry St.	Newark
	St Aloysius Church	Place of Worship	65-70 dB	66 Flemming Ave	Newark
	Maranatha Fellowship Church	Place of Worship	65-70 dB	97 St Francis St.	Newark
	Universal Church	Place of Worship	65-70 dB	51 St Francis St.	Newark
	St Benedict Church	Place of Worship	65-70 dB	65 Barbara St.	Newark
	St Peter & Paul Roman Catholic	Place of Worship	65-70 dB	211 Ripley Pl.	Elizabeth
	Iglesia De Dios Pentecostal	Place of Worship	65-70 dB	269 Second St.	Elizabeth
	St Adalbert's Church	Place of Worship	65-70 dB	250 E Jersey St.	Elizabeth

Table 1-4 (Continued): Noise Sensitive Sites within 2019 and 2024 65 DNL Contour
Source: HMMH and RS&H, 2019

Year	Noise-Sensitive Site	Type	Contour Interval	Address	City
Within 2019 and 2024 (Continued)	Church of the Nazarene Iglesia	Place of Worship	65-70 dB	214 Fulton St.	Elizabeth
	Greater Faith Temple	Place of Worship	65-70 dB	128 Broadway.	Elizabeth
	St Peter & Paul Byzantine	Place of Worship	65-70 dB	316 1st Ave.	Elizabeth
	Immaculate Heart of Mary and Saint Patrick's	Place of Worship	65-70 dB	215 Court St.	Elizabeth
	Church	Place of Worship	65-70 dB	213 Bond Street	Elizabeth
	SDA Del Puerto Church	Place of Worship	65-70 dB	114 South Park Street	Elizabeth
	Iglesia de Dios Pentecostal Cristo Te llama, Inc	Place of Worship	65-70 dB	221 East Jersey St.	Elizabeth
	Liberty Baptist Church	Place of Worship	65-70 dB	515 Court Street	Elizabeth
	Iglesia Nueva Vida	Place of Worship	65-70 dB	51 3rd Street	Elizabeth
	Mount Cavalry United Church of God	Place of Worship	65-70 dB	1st Street & Community Lane	Elizabeth
	Bethel Holy Church	Place of Worship	65-70 dB	242 3rd Street	Elizabeth
	Glorious Hope Baptist Church	Place of Worship	65-70 dB	88 1st Street	Elizabeth
	Jesus Atelie Baptist Church,	Place of Worship	65-70 dB	118 Livingston Street #1	Elizabeth
	Iglesia de Restauracion ELIM	Place of Worship	65-70 dB	80 1st Street	Elizabeth
	Shelter Temple Apostolic Church,	Place of Worship	65-70 dB	70 South Second Street	Elizabeth
	St Adalbert's Church (Hall)	Place of Worship	65-70 dB	30 3rd Street	Elizabeth
	Haitian Smyrna Church of God	Place of Worship	65-70 dB	100 3rd St.	Elizabeth
	Stella Maris Chapel	Place of Worship	65-70 dB	170 Corbin St.	Newark
	Elizabeth Church of God	Place of Worship	65-70 dB	401 Livingston St.	Elizabeth
	Hermanos Unidos En Cristo	Place of Worship	65-70 dB	109 Fulton St.	Elizabeth
	Mundial Igreja Mundial do Poder de Deus	Place of Worship	65-70 dB	418 New York Ave	Newark
	Casa de Oracion - Monte Sinai	Place of Worship	65-70 dB	50 4th St.	Elizabeth
	Mount Carmel Guild	Medical	65-70 dB	56 Freeman St.	Newark
Within 2024 Only	Fairfield Inn & Suites by Marriott Newark	Transient Lodging	65-70 dB	618 US Highway 1 & 9 South	Newark
	Jehovah's Witnesses Kingdom Hall,	Place of Worship	65-70 dB	67 Mott St.	Newark
	Greater St John's MER Church	Place of Worship	65-70 dB	183 6th St.	Elizabeth

Notes:
[1] Schools have been soundproofed as part of the School Soundproofing Program discussed in Section 2.4 on page 2-7, Subsection "School Soundproofing Projects" on page 2-8 of the 2019 EWR NEM. All soundproofed schools are listed in Table 3-1 and Figure 3-1 beginning on page 3-2.
[2] Formerly St. Patrick High School; now closed



THE PORT AUTHORITY OF NY & NJ

Newark Liberty International Airport

Airport Noise Compatibility
Part 150 Study
2021 Noise Compatibility Program

Figure: 1-6

Existing Conditions (2019) Noise Exposure Map

- 2019 DNL Contours (65-75)
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad

- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined

- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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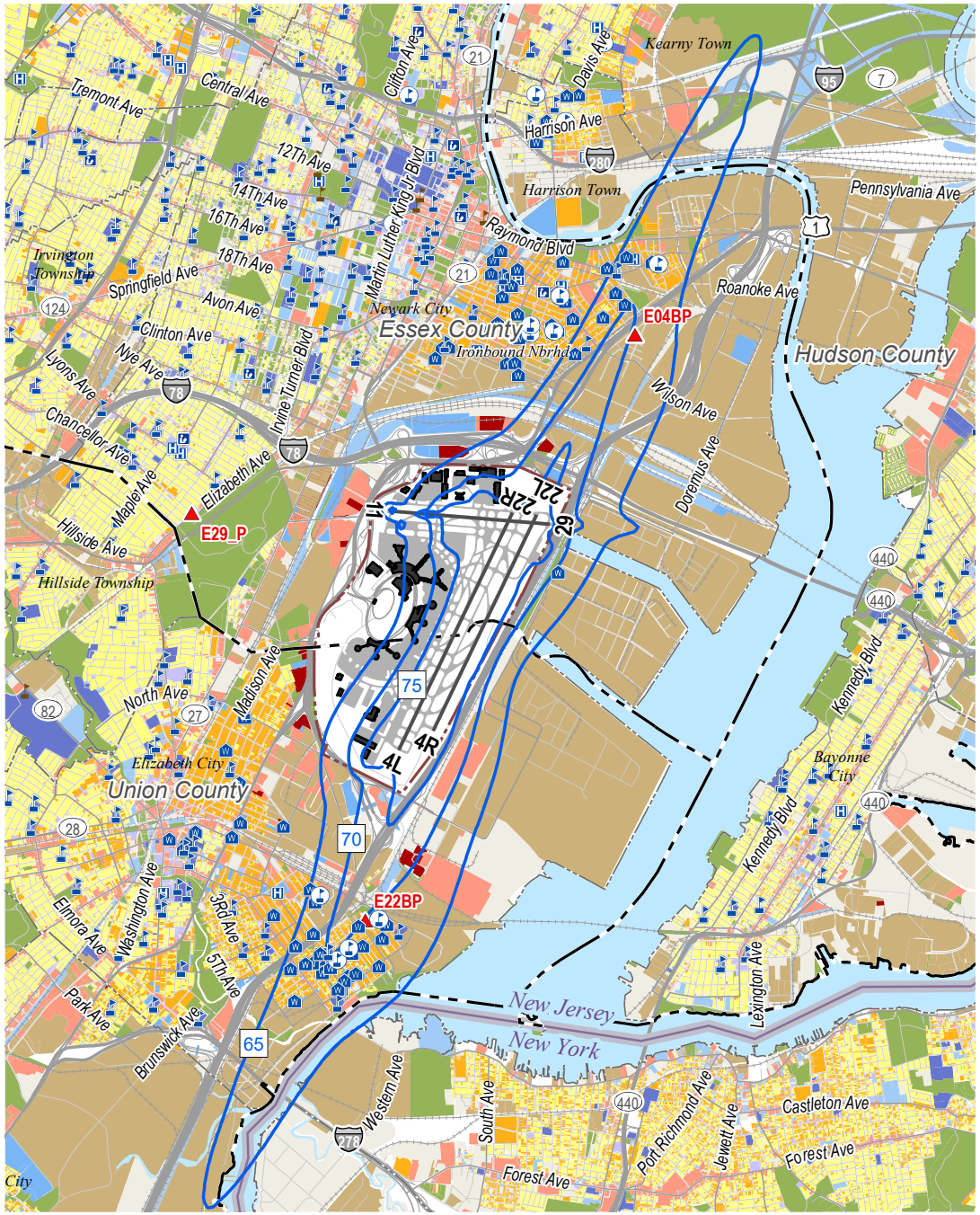

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Newark Liberty International Airport

Airport Noise Compatibility
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Figure: 1-7

Forecast Conditions (2024) Noise Exposure Map

- 2024 DNL Contours (65-75)
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- County Boundary
- Municipal Boundary
- Park / Open Space
- Water
- Highway
- Major Roads
- Minor Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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2. Noise Abatement Measures

Noise abatement measures are those that control noise at the source. Such measures include aircraft flight procedures, airport layout, preferential runway use and arrival and departure procedures. The intention of noise abatement measures in the NCP is to reduce the number of people and noise-sensitive sites exposed to aircraft noise of 65 DNL and higher.[19]

EWR is located in one of the most highly congested airspaces in the country.[20] *EWR is within 25 miles of two other large hub airports (JFK and LGA) and the busiest general aviation airport in the country (TEB in New Jersey)*[21] *and is within 50 miles of three other general aviation airports that serve the New York – New Jersey metropolitan area.*[22] *The number and types of noise abatement measures that can be implemented are consequently limited due to the congested airspace and the need to prevent conflicts in the use of the airspace.*

This chapter details the following 13 Noise Abatement Measures recommended for inclusion in this NCP:

- EWR Noise Abatement Measure 1: Design and Implement an Offset Approach Procedure to Runway 22L
- EWR Noise Abatement Measure 2: Continue Use of Easterly Departure Headings on Runways 4L and 4R
- EWR Noise Abatement Measure 3: Continue Use of Easterly Departure Headings on Runways 22L and 22R
- EWR Noise Abatement Measure 4: Determine and Implement Optimal Easterly Departure Headings on Runways 4L and 4R
- EWR Noise Abatement Measure 5: Determine and Implement Optimal Easterly Departure Headings on Runways 22L and 22R
- EWR Noise Abatement Measure 6: Encourage Use of FAA-prescribed Distant Noise Abatement Departure Profile Procedures on a Voluntary Basis
- EWR Noise Abatement Measure 7: Minimize Nighttime Intersection Departures
- EWR Noise Abatement Measure 8: Implement a Nighttime Preferential Runway Use Program
- EWR Noise Abatement Measure 9: Implement Nighttime Optimized Profile Descent Procedures
- EWR Noise Abatement Measure 10: Implement Nighttime Unlimited Climb Procedures
- EWR Noise Abatement Measure 11: Implement Nighttime "New Jersey Turnpike" Departure Procedures for Runways 4L and 4R
- EWR Noise Abatement Measure 12: Implement Nighttime "New Jersey Turnpike" Departure Procedures for Runways 22L and 22R
- EWR Noise Abatement Measure 13: Continue Existing Mandatory Departure Noise Limit

[19] 14 CFR Part 150, Appendix A, Table 1
[20] FAA Webinar – NY/NJ Airspace 101: http://panynjpart150.com/Airspace101reduced.mp4
[21] FAA Business Jet Report: October 2019 Issue. https://aspm.faa.gov/apmd/sys/bjpdf/b-jet-201910.pdf
[22] Large hubs are those airports where each account for at least one percent of total U.S. passenger enplanements. General aviation airports primarily serve civil aircraft that are not engaged in commercial air transport operations.

2.1. Existing Aircraft Noise Abatement Measures

The Port Authority has pursued aircraft noise abatement measures for several decades. In 1959, the Port Authority established an aircraft departure noise limit of 112 Perceived Noise Decibels (PNdB). PNdB expresses the perceived loudness of an individual aircraft noise event.[23] To enforce the departure noise limit, the Port Authority installed an airport noise monitoring system. This original monitoring system consisted of 11 permanent noise monitors distributed across the vicinities of LGA, JFK, EWR, and TEB and required manual correlation of measured noise levels with individual aircraft operations. A system upgrade in 1992 added flight tracking and automated the correlation process. There are now 37 noise monitors across the vicinities of LGA, JFK, EWR, and TEB, three of which measure noise in the vicinity of EWR. The noise departure limit at EWR is a noise abatement measure that was established before such measures were restricted by the Airport Noise and Capacity Act of 1990 (ANCA).[24]

In 1985, the Port Authority prohibited the use of Stage 1 aircraft[25] at JFK, LGA, and EWR in accordance with the Noise Control Act of 1972. In 1989, the Port Authority also prohibited the scheduling of additional nighttime flights of Stage 2 aircraft at JFK, LGA, and EWR. Stage 3 aircraft operating at JFK, LGA, and EWR are not subject to the Stage 1 and Stage 2 use restrictions, and they meet the noise standards set forth in 14 CFR Part 36, Section B36.5(c). Table 2-1 presents a timeline of actions taken by the Port Authority, U.S. Congress, and FAA regarding noise abatement at EWR.

For the existing EWR departure procedures developed by FAA, departing aircraft turn to the east as soon as they reach a safe altitude to avoid the populated areas in Elizabeth and Newark that are under the extended runway centerlines of the parallel runways (Runway 4L/22R and Runway 4R/22L). These turns to the east were established in an era when departure noise dominated the noise exposure from aircraft operations in the vicinity of most commercial service airports, including EWR. With modern quiet aircraft technology and regulations requiring quieter aircraft, aircraft engine manufacturers have successfully reduced engine noise during departure operations to a point where arrival noise can be a more dominant contributor to aircraft noise exposure in some locations.

Based on current analysis for EWR, aircraft arrivals, specifically nighttime arrivals, were determined to be the dominant aircraft noise exposure source in the communities nearest the airport.[26] However, turning aircraft to the east on departure remains effective in reducing the number of noise-sensitive parcels and population exposed to 65 DNL and higher, as described in more detail later in this chapter.

The current FAA ATCT standard practice for noise abatement at EWR is to use Runway 4R/22L (eastern runway) as much as possible during the nighttime hours because the areas to the east of the runway centerline are less densely populated than to the west.[27]

The Part 150 process requires a complete review of existing and potential measures that may reduce the number of people exposed to 65 DNL and higher aircraft noise exposure. The review includes analysis of departure procedures and preferential runway use measures like those already in place at EWR. In addition, Part 150 requires the following types of noise abatement measures be assessed:

- Flight tracks
- Preferential runway use
- Arrival/departure procedures
- Airport layout modifications
- Use restrictions

[23] K.D. Kryter, "The Meaning and Measurement of Perceived Noise Level," Noise Control 6:5, Sept.-Oct., 1960, pp. 12-17; K.D. Kryter, "Scaling Human Reaction to Sound from Aircraft," Journal of the Acoustical Society of America, vol. 31, 1959, p.1415.

[24] Passage of the ANCA subsequently prohibited operation of Stage 2 aircraft with a maximum weight above 75,000 pounds within the United States after December 31, 1999. This prohibition provided noise benefits around airports nationwide. As a result of ANCA, airport operators could not establish additional operational restrictions on Stage 2 (or quieter) aircraft in flight except through consistence with 14 CFR Part 161, Notice and Approval of Airport Noise and Access Restrictions. The FAA Modernization and Reform Act of 2012 (FMRA) prohibits operation of any aircraft not complying with Stage 3 within the 48 contiguous United States after December 31, 2015 eliminating any further airport sponsored efforts to do so.

[25] "Stage 1" aircraft are transport-category aircraft of at least 12,500 pounds in maximum takeoff weight, or subsonic jet-powered aircraft of any category, that have never been shown to meet the noise standards in 14 CFR Part 36 (Noise Standards: Aircraft Type and Airworthiness Certification). "Stage 2" aircraft met the noise standards in 14 CFR Part 36, Section B36.5(b), originally established in 1969. "Stage 3" aircraft meet the noise standards in 14 CFR Part 36, Section B36.5(c), established in 1977.

[26] See Technical Advisory Committee Meeting #8 presentation in Appendix D, starting on page D-23, and meeting minutes, starting on page D-144, for discussion on analysis of aircraft contributions to the contours.

[27] See Technical Advisory Committee Meeting #7 minutes in Appendix D for discussion, starting on page D-104.

Table 2-1: Timeline of EWR Noise Abatement Actions

Source: HMMH and Port Authority, 2019

Port Authority establishes a noise limit at JFK of 112 Perceived Noise Decibels (PNdB) for aircraft departures and installs an airport noise monitoring system	1959 Port Authority
Congress enacted the Noise Control Act, which gave the FAA authority to set limits for aircraft noise emissions. Amendments established three stages of aircraft noise and established a phaseout of aircraft less than Stage 2 with a maximum weight greater than 75,000 pounds by January 1, 1985.	1972 Congress
Congress passes the Aviation Safety and Noise Abatement Act (ASNA), requiring the FAA to establish processes for aircraft noise measurement and noise compatibility planning	1979 Congress
FAA codifies Title 14 CFR - Part 150 Airport Noise Compatibility and Planning in the Code of Federal Regulations (CFR) in response to the requirements of ASNA	1984 FAA
Port Authority prohibits the use of Stage 1 aircraft at JFK, LGA, and EWR	1985 Port Authority
Port Authority prohibits the scheduling of nighttime flights of Stage 2 aircraft at JFK, LGA, and EWR	1989 Port Authority
Congress passes Airport Noise and Capacity Act of 1990 (ANCA), preventing airports nationwide from establishing additional operational restrictions on Stage 2 (or quieter) aircraft in flight without FAA approval	1990 Congress
FAA codifies Title 14 CFR - Part 161, Notice and Approval of Airport Noise and Access Restrictions in response to the requirements of ANCA	1991 FAA
ANCA prohibits U.S. operations of Stage 2 aircraft with maximum weight above 75,000 pounds, providing noise benefits nationwide.	2000 Congress
Congress passes the FAA Modernization and Reform Act of 2012 (FMRA)	2012 Congress
Port Authority initiates 14 CFR Part 150 Studies for JFK, LGA, EWR , and TEB	2014 Port Authority
FMRA prohibits U.S. operations of aircraft not complying with Stage 3 with maximum weight at or below 75,000 pounds within the 48 contiguous United States	2016 Congress
FAA promulgates the Stage 5 noise standard, this standard is effective December 31, 2017, for certification of new aircraft designs with a maximum takeoff weight of at least 121,254 pounds, and December 31, 2020, for certification of new aircraft designs with a maximum takeoff weight of less than 121,254 pounds.	2017 FAA
	1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Section 2.2 of this chapter describes the noise benefit analyses and Port Authority recommended noise abatement measures. Appendix H provides an estimated implementation schedule for the recommended Noise Abatement measures. Section 2.3 provides the measures evaluated that the Port Authority is not recommending in this NCP.

The computer model INM version 7.0d (INM 7.0d) was used for the modeling of potential NCP noise abatement measures and its analysis of benefits. The INM uses airport-specific information (e.g., runway data); flight track information; aircraft operation levels distributed by time of day, aircraft fleet mix, and aircraft altitude profiles to develop noise exposure contours. During an annual average 24-hour period, referred to as "annual average day" (AAD), the INM accounts for each aircraft flight along flight tracks departing from, or arriving to, an airport. The flight tracks are coupled with information in the model's database relating to noise levels at varying distances and flight performance data for each type of aircraft. In general, the model computes and sums noise levels at grid locations at ground level around the airport. The cumulative values of noise exposure at each grid location are used to develop contours of equal noise exposure. The INM can also compute noise levels at user-defined points.

2.2. Recommended Noise Abatement Measures

This section describes noise abatement measures recommended by the Port Authority; the potential benefits and implementation requirements (e.g., the party responsible for implementing a measure) for each measure, the estimated cost to implement, funding sources for the cost of implementation, and requirements to implement such measures (such as potential environmental review requirements). While many parties were involved in arriving at these recommendations, the recommendations are solely the Port Authority's and not those of the TAC, consultants, or other stakeholders.

Each recommended noise abatement measure in this NCP is a notional design that was developed in order to determine potential noise benefits. Any approved noise abatement measures would need to be developed in detail by the FAA. Precise implementation details, such as flight track locations and altitudes, developed by the FAA may differ from the notional noise abatement measure designs presented in this NCP, in order to adequately address safety, efficiency, and aircraft performance considerations. Detailed noise abatement measure designs may require environmental review under NEPA, which may yield different noise results than the results presented in this NCP. Contradictory results arising from subsequent environmental review efforts may be due to differences in approaches to noise abatement measure design or noise modeling methodology. Any NEM updates performed by the Port Authority in the future, in accordance with EWR Program Management Measure 10 (presented in Section 4.2), would reflect actual implementation of the NCP measures as of the date of those NEM updates.

The FAA-accepted forecast 2024 Noise Exposure Map contours[28] (as described in Section 1.7 and shown in Figure 1-7) provide the baseline for the noise evaluations of all noise abatement measures within this NCP Report. Each measure compares the DNL contours, dwelling units and population counts to the baseline results. Detailed descriptions and analysis results for each Port Authority-recommended measure are provided below.

Aircraft arrivals into EWR are the predominant noise source, particularly nighttime arrivals, and they influence the noise exposure contours shown in Figure 1-7.[29] Therefore, the Port Authority first evaluated noise abatement alternatives for aircraft arrivals and many were carried over to recommended measures. As required under Part 150 and shown in the following paragraphs, the Port Authority also evaluated noise abatement alternatives not related to aircraft arrival procedures.

[28] NEM accepted January 15, 2019

[29] See Technical Advisory Committee Meeting #8 presentation in Appendix D, starting on page D-20, and meeting minutes, starting on page D-136, for discussion on analysis of aircraft contributions to the contours.

EWR Noise Abatement Measure 1: Design and Implement an Offset Approach Procedure to Runway 22L

Noise Abatement Measure 1 is recommending the design and implementation of an offset approach from the north to Runway 22L to be flown when air traffic conditions allow, and aircraft operators can fly safely. An offset approach is a procedure that approaches the runway at a specified angle to the extended centerline of the runway. This proposed measure is consistent with the Port Authority's existing noise abatement departure procedures, which direct departing aircraft to the east immediately upon reaching a safe altitude to avoid the Ironbound Neighborhood of Newark, NJ. An offset approach could potentially avoid direct overflights of the majority of the properties within the Ironbound Neighborhood, reducing noise by moving the arrival flight path over existing compatible land use.

The Airlines on the TAC voiced concerns over pilots able to align aircraft so close to the runway end. As shown in Figure 2-1, a hypothetical 12 degree (°) offset approach was developed, similar to the existing Alpha Approach[30] procedure flown at LaGuardia Airport (LGA), with an alignment distance to the end of the runway of approximately 0.8 nautical miles.[31]

This proposed flight path was modeled for two example scenarios to determine the potential noise benefit of implementing an offset approach procedure to Runway 22L. The first example scenario evaluates the procedure at night. During nighttime hours, the volume of arrival and departure traffic at EWR is lower than during the day which reduces controller workload such that they can accommodate an offset procedure. Based on input from the TAC and the FAA, the model assumed that 75 percent of nighttime arrivals from the north could use the offset approach. Figure 2-2 displays the modeling results.

Table 2-2 displays the change in affected dwelling units and population compared to the baseline (FAA-accepted 2024 NEM). Potentially, over 2,500 people in nearly 1,000 dwelling units could be removed from the 65 DNL and higher contours. Table 2-3 displays the change in noise-sensitive sites and contour land area compared to the baseline. As shown in Figure 2-2, the offset approach could result in no Ironbound Neighborhood residents being exposed to 70 DNL and higher nor directly overflown by arriving aircraft using the offset approach.

Implementing a new offset procedure for arrivals to Runway 22L is shown to be beneficial, and it is likely that the initial implementation would occur at night, during conditions of fewer aircraft operations. If FAA is successfully able to implement this procedure at night, by extension, the implementation of this measure during daytime would avoid overflight of the Ironbound Neighborhood all times of the day, further improving land use compatibility.

[30] LaGuardia Airport Localizer Directional Aid (LDA) Alpha Approach, Federal Aviation Administration, Effective August 16, 2018

[31] The TAC requested that the Study Team model more distant alignment locations to evaluate noise benefits to the community. Appendix C.1 provides the results of this analysis

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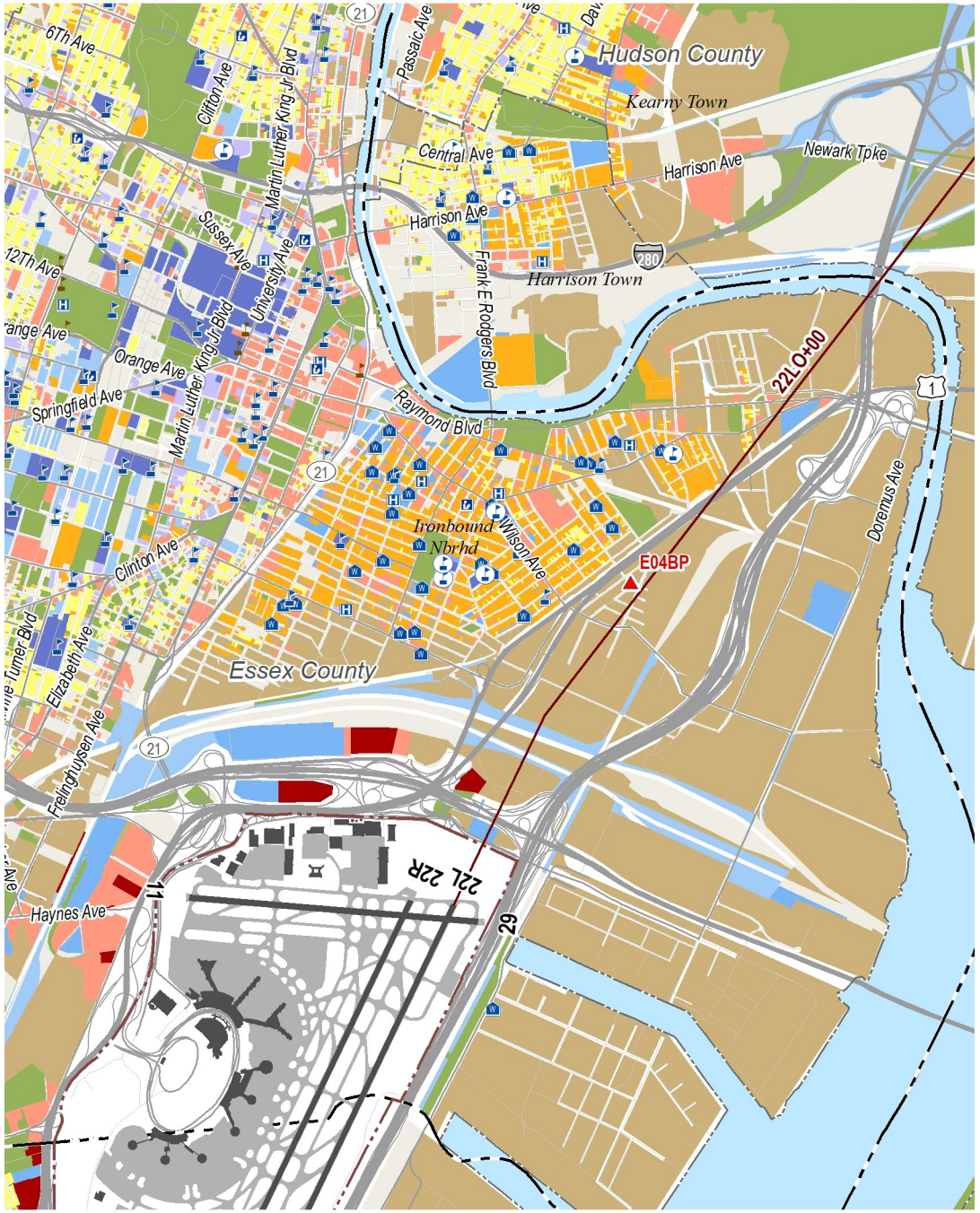

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Figure: 2-1

Hypothetical 12-degree Offset Approach Track with Alignment at 0.8 nmi

- Hypothetical Arrival Flight Track
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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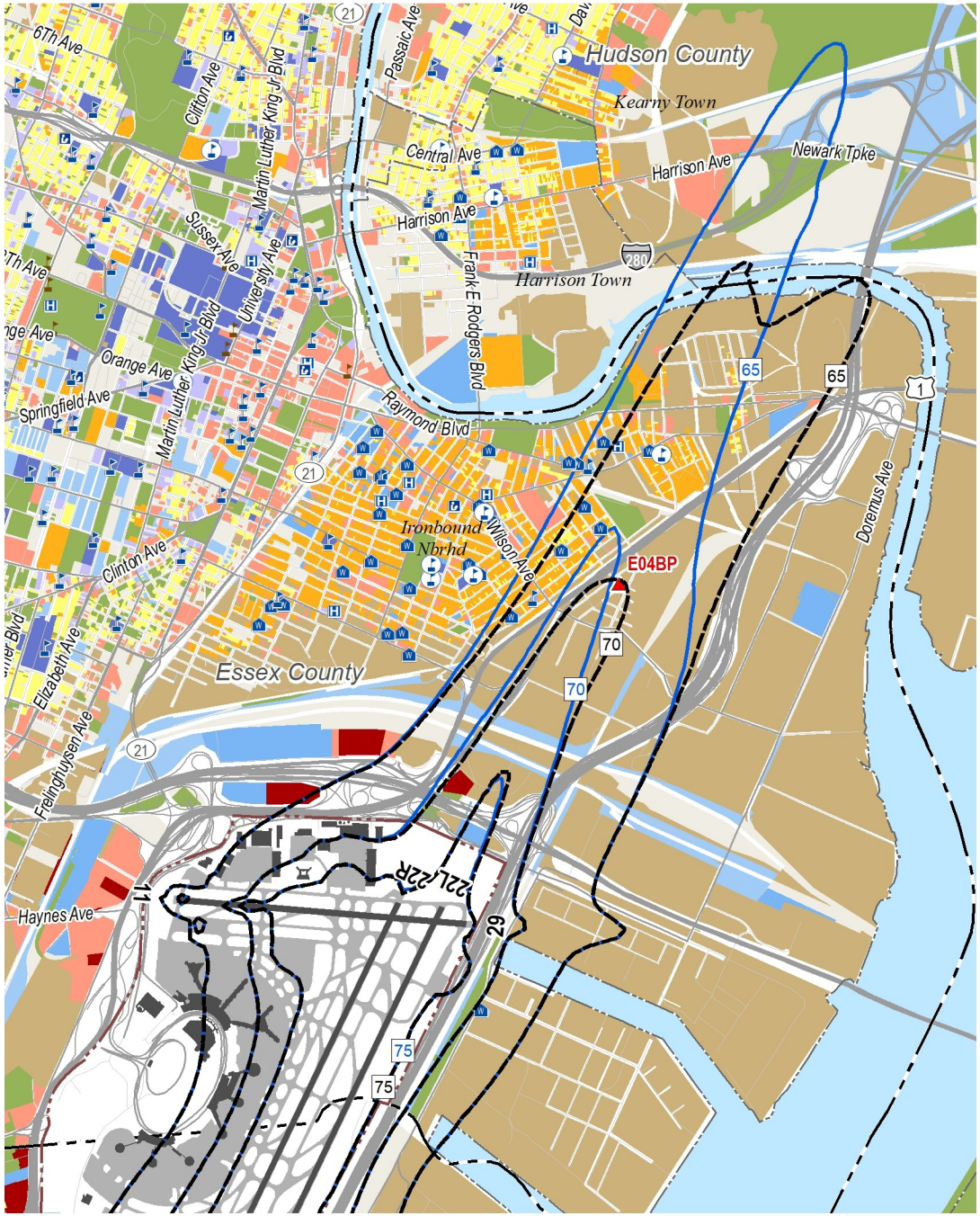

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Figure: 2-2

Hypothetical 2024 DNL with Offset Approach for Nighttime Arrivals to Runway 22L

- Hypothetical 2024 DNL
- DNL for 2024 Future Conditions Contour
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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Table 2-2: Estimated Dwelling Units and Population Counts for 2024 Baseline and Design and Implement a Nighttime Offset Approach Procedure to Runway 22L (EWR Noise Abatement Measure 1) within Different Noise Contour Intervals
Source: Port Authority and HMMH, 2019

Scenario (All changes are by unit or population within the DNL contour interval notated)	Number of Dwelling Units			Population		
	65-70	70+	Total	65-70	70+	Total
2024 Baseline	9,399	667	10,066	25,912	1,883	27,795
EWR Noise Abatement Measure 1: Nighttime	8,556	513	9,069	23,687	1,451	25,138
Total change from baseline	-843	-154	-997	-2,225	-432	-2,657

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change in dwelling units or population within the 65 DNL contour, Green indicates a reduction in dwelling units or population within the 65 DNL contour and red indicates an increase in dwelling units or population within the 65 DNL contour.

Table 2-3: Estimated Noise-Sensitive Sites and Land Area for 2024 Baseline and Design and Implement a Nighttime Offset Approach Procedure to Runway 22L (EWR Noise Abatement Measure 1) Exposed to 65 DNL and Higher
Source: Port Authority and HMMH, 2019

Scenario (All changes are within the 65 DNL contour)	Number of Noise-Sensitive Sites						Land Area Outside the Airport Boundary (Sq. Miles)		
	Transient Lodging	School	Place of Worship	Daycare	Medical	Total	Compatible	Noncompatible	Total
2024 Baseline	8	10	1	32	1	52	5.78	0.55	6.33
EWR Noise Abatement Measure 1: Nighttime	8	9	1	30	1	49	5.70	0.51	6.21
Total change from baseline	0	-1	0	-2	0	-3	-0.08	-0.04	-0.12

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change within the 65 DNL contour, Green indicates a reduction within the 65 DNL contour and red indicates an increase within the 65 DNL contour.

A second scenario using the same hypothetical 12° offset as shown in Figure 2-1 was modeled to determine the potential noise benefit of implementing an offset approach procedure to Runway 22L at all times of the day. The modeling assumed that 75 percent of nighttime arrivals from the north and all daytime arrivals to 22L would use the offset approach, and that daytime arrivals to 22R remain unchanged ensuring efficiencies of the airport are left intact during the busier daytime hours. Figure 2-3 displays the resulting shift in the 65 DNL on the north side of the airport.

Preliminary analysis showed, as provided in Table 2-4, that over 5,000 people in nearly 2,000 dwelling units could be removed from the 65 DNL and higher contours due to the arrival flight path moving over compatible land use. Table 2-5 displays the change in noise-sensitive sites and contour land area compared to the baseline. As shown in Figure 2-3, the offset approach could result in no Ironbound Neighborhood residents being exposed to 70 DNL and higher.

The TAC is supportive of implementing an offset approach to EWR Runway 22L, as long as the FAA can design a procedure that aircraft operators can safely fly. Appendix C.1 provides supplemental analysis for EWR Noise Abatement Measure 1. The public has requested, through public comments to the draft EWR NEMs, that flight tracks be positioned over compatible land use. This measure is consistent with such public requests.

Table 2-6 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 1.

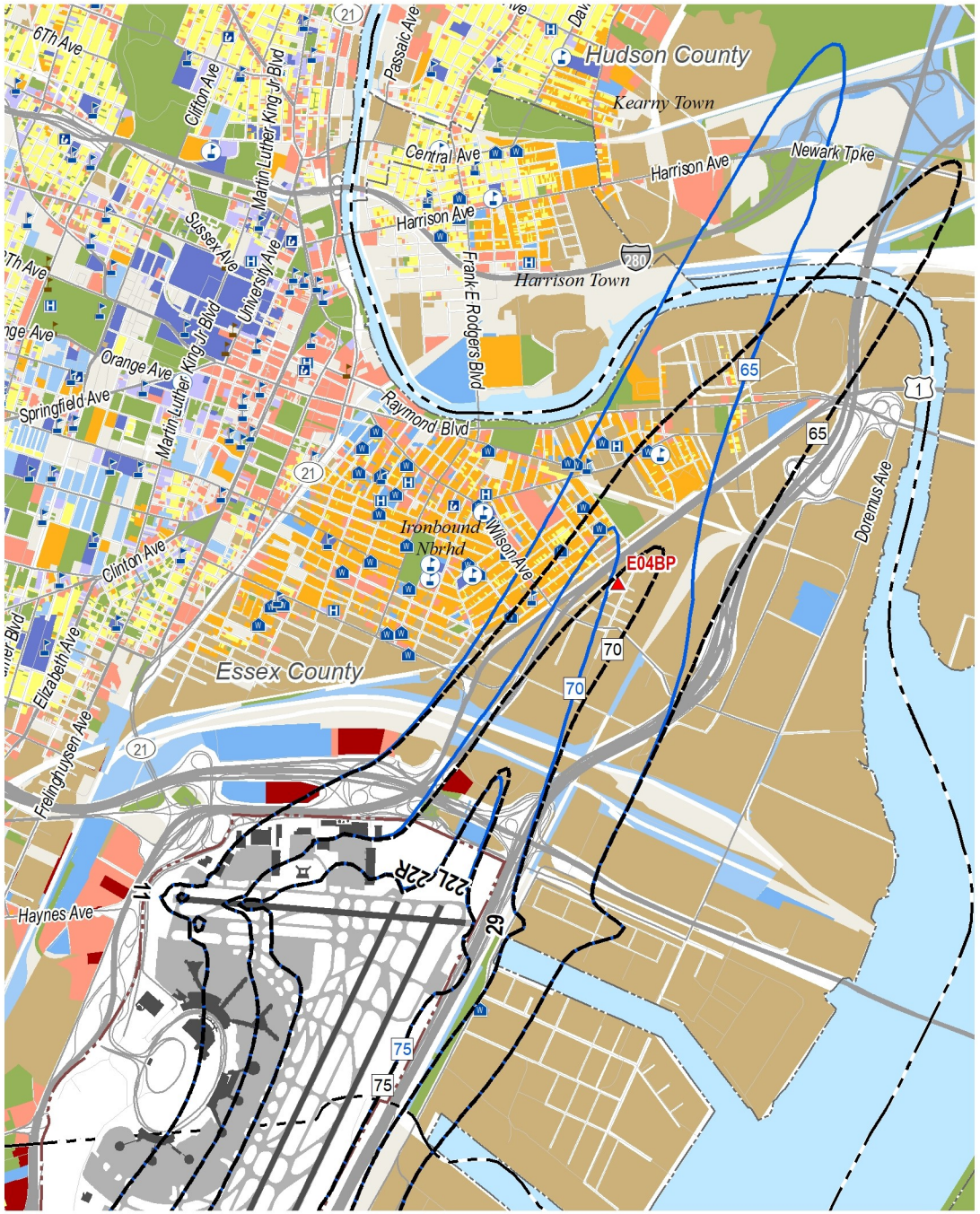

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Figure: 2-3

Hypothetical 2024 DNL with 24-hour Offset Approach to Runway 22L

- Hypothetical 2024 DNL
- DNL for 2024 Future Conditions Contour
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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Table 2-4: Estimated Dwelling Units and Population Counts for 2024 Baseline and Use the Offset Approach Procedure to Runway 22L at All Hours (EWR Noise Abatement Measure 1) within Different Noise Contour Intervals

Source: Port Authority and HMMH, 2019

Scenario (All changes are by unit or population within the DNL contour interval notated)	Number of Dwelling Units			Population		
	65-70	70+	Total	65-70	70+	Total
2024 Baseline	9,399	667	10,066	25,912	1,883	27,795
EWR Noise Abatement Measure 1: All Hours	7,641	513	8,154	21,242	1,450	22,692
Total change from baseline	-1,758	-154	-1,912	-4,670	-433	-5,103

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change in dwelling units or population within the 65 DNL contour, Green indicates a reduction in dwelling units or population within the 65 DNL contour and red indicates an increase in dwelling units or population within the 65 DNL contour.

Table 2-5: Estimated Noise-sensitive Sites and Land Area for 2024 Baseline and Use the Offset Approach Procedure to Runway 22L at All Hours (EWR Noise Abatement Measure 1) Exposed to 65 DNL and Higher

Source: Port Authority and HMMH, 2019

Scenario (All changes are within the 65 DNL contour)	Number of Noise-Sensitive Sites						Land Area Outside the Airport Boundary (Sq. Miles)		
	Transient Lodging	School	Place of Worship	Daycare	Medical	Total	Compatible	Noncompatible	Total
2024 Baseline	8	10	1	32	1	52	5.78	0.55	6.33
EWR Noise Abatement Measure 1: All Hours	8	9	1	28	0	46	5.79	0.47	6.26
Total change from baseline	0	-1	0	-4	-1	-6	0.01	-0.08	-0.07

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change within the 65 DNL contour, Green indicates a reduction within the 65 DNL contour and red indicates an increase within the 65 DNL contour.

Conclusions: *EWR Noise Abatement Measure 1: Design and Implement an Offset Approach Procedure to Runway 22L* could reduce a large number of people (approximately 5,000) exposed to 65 DNL and higher by relocating the arrival flight path over compatible land use to the east of the Ironbound Neighborhood of Newark.

Table 2-6: Implementation Summary for EWR Noise Abatement Measure 1: Design and Implement an Offset Approach Procedure to Runway 22L
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Potential reduction of approximately 5,000 people in nearly 2,000 dwelling units exposed to 65 DNL and higher with implementation of the proposed procedure.
Rationale	The Port Authority is recommending EWR Noise Abatement Measure 1 because it may reduce overflight of noncompatible land uses in the Ironbound Neighborhood north of the airport, which results in reducing noise exposure in this area.
Responsible Parties	The development, safety review, environmental review, and the decision whether to implement flight procedures consistent with procedure development criteria is the sole responsibility of the FAA. The Port Authority will request that the development process be initiated, then will work with NY TRACON and other FAA personnel to further study and develop this procedure. Implementation of this measure may require an environmental study as required under the National Environmental Policy Act (NEPA); the FAA would be the responsible party to complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are unknown and internal to the FAA (e.g., Air Traffic Organization) and other coordinating agencies. An FAA Airport Improvement Program grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require an environmental study under NEPA. *Note: an offset approach to Runway 22L at night is required for a proposed noise abatement procedure at TEB.*
Estimated Schedule	The Port Authority to submit a request for its development within six to twelve months of the FAA's Record of Approval for the NCP. FAA design, testing and implementation of the procedure typically could take 18 to 24 months, potentially up to three years once the Port Authority requests initiation of the development process.

EWR Noise Abatement Measure 2: Continue Use of Easterly Departure Headings on Runways 4L and 4R

An existing noise abatement measure in place at EWR since the 1980s directs aircraft departing on Runways 4L and 4R to turn east, to a heading of 60°, upon reaching a safe altitude, in order to avoid noncompatible areas of the Ironbound in Newark. The 60° heading for aircraft departing Runways 4L and 4R directs aircraft to fly over an industrial area (compatible land use).

The TAC requested that the Study Team assess the noise benefit of the existing departure turns from Runways 4L and 4R. Assessments conducted compared the existing turns with a hypothetical straight-out flight track.

Figure 2-4 and Table 2-7 display the results to the 65 DNL contour, population and dwelling units if the existing noise abatement departure procedure was abandoned.

These results, which show an increase in population of over 5,000 people exposed to 65 DNL and higher noise exposure indicate that the current EWR noise abatement departure procedure is effective at reducing the people exposed to 65 and higher DNL. Table 2-8 displays the change in noise-sensitive sites and contour land area compared to the baseline, which in this case includes the noise abatement departure procedure. Therefore, an increase in exposure represents a benefit of the existing procedure.

The TAC is supportive of maintaining the easterly departure headings as a noise abatement measure for aircraft departing Runways 4L and 4R to avoid overflying the Ironbound area of Newark. The public has requested, through public comments to the draft EWR NEM, that flight tracks be positioned over compatible land use. This measure is consistent with such public requests.

Table 2-9 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 2.

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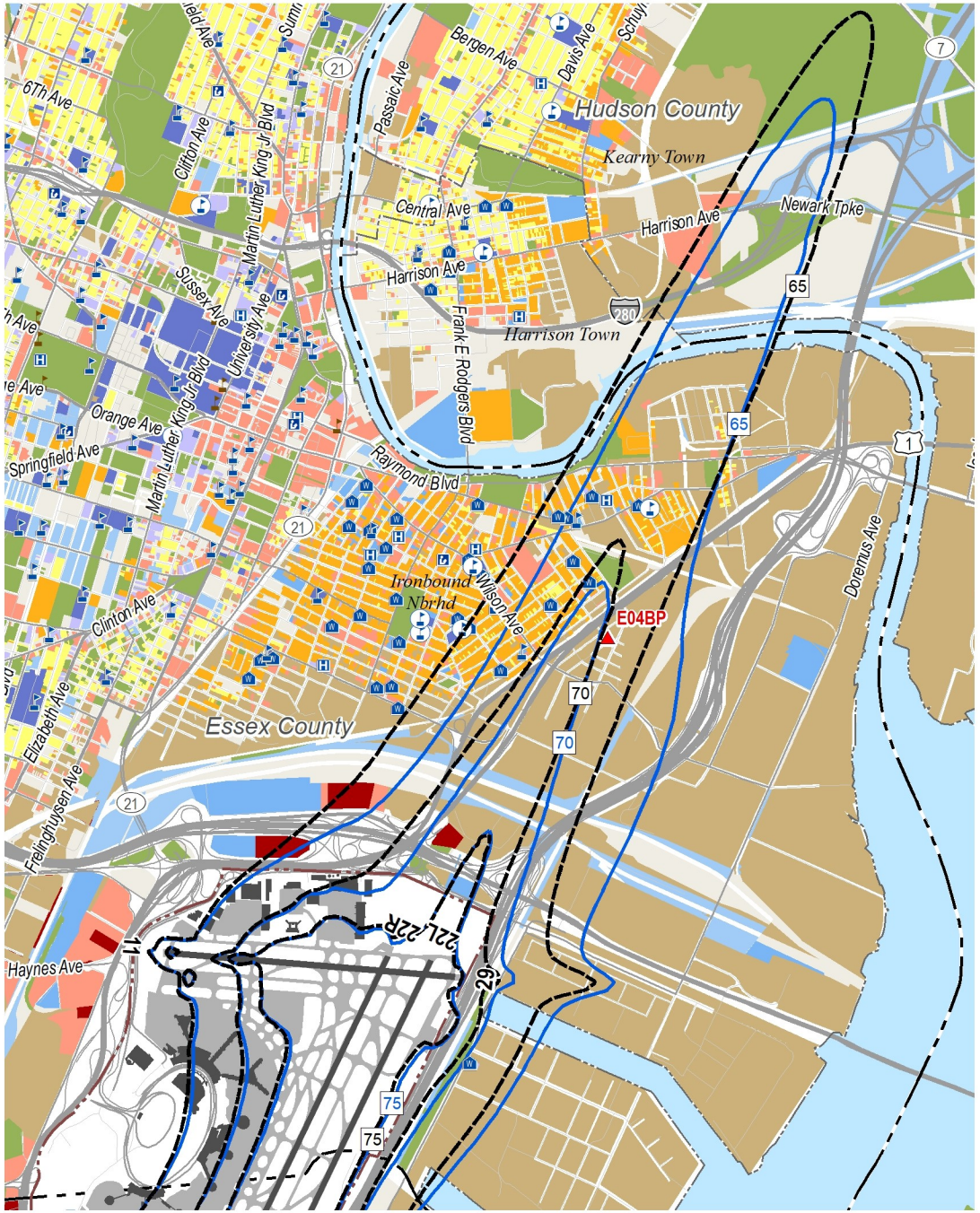

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Figure: 2-4

EWR Noise Abatement Measure 2 2024 DNL without Easterly Departure Headings from Runways 4L and 4R

- Hypothetical 2024 DNL
- DNL for 2024 Future Conditions Contour
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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Table 2-7: Estimated Dwelling Units and Population Counts for 2024 Baseline and Straight Out Runway 4L and 4R Departures (EWR Noise Abatement Measure 2) within Different Noise Contour Intervals

Source: Port Authority and HMMH, 2019

Scenario (All changes are by unit or population within the DNL contour interval notated)	Number of Dwelling Units			Population		
	65-70	70+	Total	65-70	70+	Total
2024 Baseline	9,399	667	10,066	25,912	1,883	27,795
Removal of EWR Noise Abatement Measure 2	11,162	972	12,134	30,622	2,655	33,277
Total change from baseline	1,763	305	2,068	4,710	772	5,482

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change in dwelling units or population within the 65 DNL contour, Green indicates a reduction in dwelling units or population within the 65 DNL contour and red indicates an increase in dwelling units or population within the 65 DNL contour.

Table 2-8: Estimated Noise-sensitive Sites and Land Area for 2024 Baseline and Straight Out Runway 4L and 4R Departures (EWR Noise Abatement Measure 2) Exposed to 65 DNL and Higher

Source: Port Authority and HMMH, 2019

Scenario (All changes are within the 65 DNL contour)	Number of Noise-Sensitive Sites						Land Area Outside the Airport Boundary (Sq. Miles)		
	Transient Lodging	School	Place of Worship	Daycare	Medical	Total	Compatible	Noncompatible	Total
2024 Baseline	8	10	1	32	1	52	5.78	0.55	6.33
Removal of EWR Noise Abatement Measure 2	13	10	1	35	1	60	5.83	0.66	6.49
Total change from baseline	5	0	0	3	0	8	0.05	0.11	0.16

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change within the 65 DNL contour, Green indicates a reduction within the 65 DNL contour and red indicates an increase within the 65 DNL contour.

Conclusions: *EWR Noise Abatement Measure 2: Continue Use of Easterly Departure Headings on Runways 4L and 4R* has resulted in fewer people exposed to aircraft noise of 65 DNL and higher and reduces the overflight of non-compatible land use. Without the easterly heading procedure, more than 5,000 people in Newark would be exposed to 65 DNL and higher that are currently not exposed.

Table 2-9: Implementation Summary for EWR Noise Abatement Measure 2: Continue Use of Easterly Departure Headings on Runways 4L and 4R

Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	This existing measure has been a successful part of the EWR noise abatement program by removing more than 5,000 people in over 2,000 dwelling units from 65 DNL and higher.
Rationale	The Port Authority is recommending the continuation of EWR Noise Abatement Measure 2 because it continues to be an effective noise abatement procedure by placing departing aircraft over compatible land uses adjacent to the Ironbound Neighborhood in Newark north of the airport.
Responsible Parties	The FAA.
Estimated Costs	Not Applicable.
Funding Sources	Not Applicable.
Requirements	Existing measure – No requirements to implement.
Estimated Schedule	Not applicable as this measure is currently implemented.

EWR Noise Abatement Measure 3: Continue Use of Easterly Departure Headings on Runways 22L and 22R

An existing noise abatement measure in place at EWR since the 1980s directs aircraft departing on Runways 22L and 22R to turn east, to a heading of 190°, upon reaching a safe altitude, in order to avoid noncompatible areas in Elizabeth. The 190° heading for aircraft departing Runways 22L and 22R directs aircraft to fly over areas of mixed land use (industrial and noncompatible) in Elizabeth.

The TAC requested that the Study Team assess the noise benefit of the existing departure turns from Runways 22L and 22R. Assessments conducted compared the existing turns with a hypothetical straight-out flight track. Figure 2-5 and Table 2-10 display the results to the 65 DNL contour, population and dwelling units if the existing noise abatement departure procedure was abandoned.

These results, displayed in Table 2-10, which show an increase in population of over 4,000 people exposed to 65 DNL and higher noise exposure, indicate that the current EWR noise abatement departure procedures are an effective noise abatement measure. Table 2-11 displays the change in noise-sensitive sites and contour land area compared to the baseline, which in this case includes the noise abatement departure procedure. Therefore, an increase in exposure represents a benefit of the existing procedure.

The TAC is supportive of maintaining the easterly departure headings as a noise abatement measure for aircraft departing Runways 22L and 22R to avoid overflying the more densely populated area in Elizabeth. The public has requested, through public comments to the draft EWR NEM, that flight tracks be positioned over compatible land use. This measure is consistent with such public requests.

Table 2-12 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 3.

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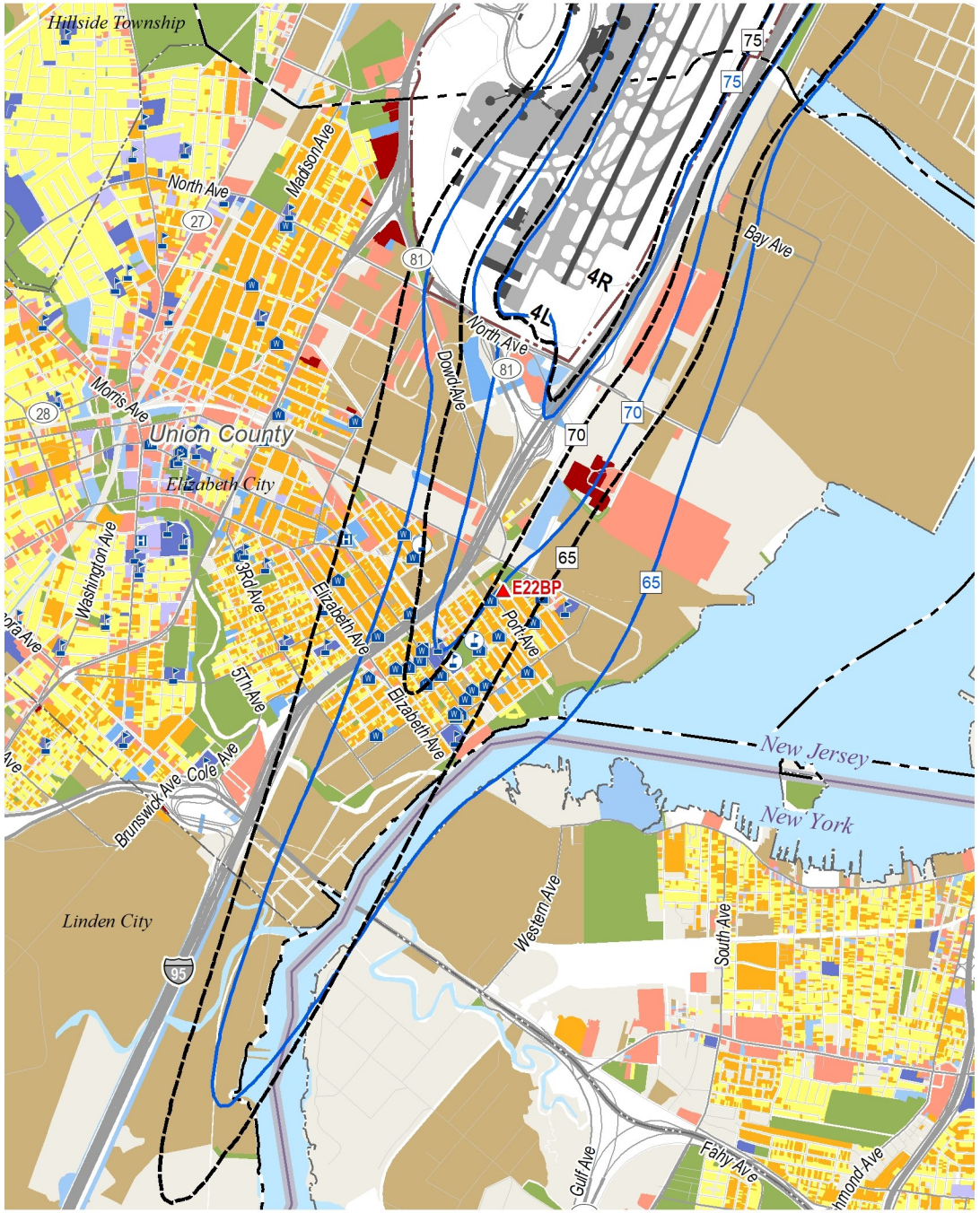

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Figure: 2-5

Hypothetical 2024 DNL with Straight Out Runway 22L and 22R Departures

- Hypothetical 2024 DNL
- DNL for 2024 Future Conditions Contour
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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Table 2-10: Estimated Dwelling Units and Population Counts for 2024 Baseline and Straight Out Runway 22L and 22R Departures (EWR Noise Abatement Measure 3) within Different Noise Contour Intervals

Source: Port Authority and HMMH, 2019

Scenario (All changes are by unit or population within the DNL contour interval notated)	Number of Dwelling Units			Population		
	65-70	70+	Total	65-70	70+	Total
2024 Baseline	9,399	667	10,066	25,912	1,883	27,795
Removal of EWR Noise Abatement Measure 3	10,153	1,059	11,212	28,805	3,000	31,805
Total change from baseline	754	392	1,146	2,893	1,117	4,010

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change in dwelling units or population within the 65 DNL contour, Green indicates a reduction in dwelling units or population within the 65 DNL contour and red indicates an increase in dwelling units or population within the 65 DNL contour.

Table 2-11: Estimated Noise-sensitive Sites and Land Area for 2024 Baseline and Straight Out Runway 22L and 22R Departures (EWR Noise Abatement Measure 3) Exposed to 65 DNL and Higher

Source: Port Authority and HMMH, 2019

Scenario (All changes are within the 65 DNL contour)	Number of Noise-Sensitive Sites						Land Area Outside the Airport Boundary (Sq. Miles)		
	Transient Lodging	School	Place of Worship	Daycare	Medical	Total	Compatible	Noncompatible	Total
2024 Baseline	8	10	1	32	1	52	5.78	0.55	6.33
Removal of EWR Noise Abatement Measure 3	8	11	2	31	1	53	5.73	0.61	6.34
Total change from baseline	0	1	1	-1	0	1	-0.05	0.06	0.01

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change within the 65 DNL contour, Green indicates a reduction within the 65 DNL contour and red indicates an increase within the 65 DNL contour.

Conclusions: *EWR Noise Abatement Measure 3: Continue Use of Easterly Departure Headings on Runways 22L and 22R* has resulted in fewer people exposed to aircraft noise of 65 DNL and higher and reduces the overflight of non-compatible land use. Without the easterly heading procedure, approximately 4,000 more people in Elizabeth would likely be exposed to 65 DNL and higher that are not currently exposed.

Table 2-12: Implementation Summary for EWR Noise Abatement Measure 3: Continue Use of Easterly Departure Headings on Runways 22L and 22R

Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	This existing measure has been a successful part of the EWR noise abatement program by removing approximately 4,000 people in over 1,000 dwelling units from 65 DNL and higher.
Rationale	The Port Authority is recommending the continuation of EWR Noise Abatement Measure 3 because it continues to be an effective noise abatement procedure by placing departing aircraft over mixed land uses in the City of Elizabeth south of the airport.
Responsible Parties	The FAA.
Estimated Costs	Not Applicable.
Funding Sources	Not Applicable.
Requirements	Existing measure – No requirements to implement.
Estimated Schedule	Not applicable as this measure is currently implemented.

EWR Noise Abatement Measure 4: Determine and Implement Optimal Easterly Departure Headings on Runways 4L and 4R

Turning Runways 4L and 4R departing aircraft to an easterly heading of 60° is shown to be effective in reducing noncompatible land use.[32] At the TAC's request, the Study Team analyzed the noise benefit of increasing the turn after departure on Runways 4L and 4R to more easterly headings. The analysis indicated that the greater the turn to an easterly heading (e.g. 65- or 70°), the fewer people exposed to noise in the 65 DNL and higher contours. For example, increasing the turn east by 5° would result in removing approximately 1,400 people in over 500 dwelling units from 65 DNL and higher. The analysis and results, provided in Appendix C.2, show the increased benefit achieved by directing aircraft to a more easterly heading after departing Runways 4L and 4R.

The FAA has noted during conversations with the TAC and in discussion with TRACON that, there is a limit to how far east aircraft can be directed before they conflict with LGA traffic because the LGA airspace is to the east of EWR. The TAC requested that the FAA determine the easternmost heading they can safely direct aircraft without conflicting with LGA traffic. The results of the FAA's analysis will lead to the identification of the optimal easterly heading for aircraft departing Runway 4L and 4R.

The TAC supports the Port Authority working with the FAA to determine the easternmost heading that is possible without conflicting with the LGA airspace.

Table 2-13 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 4.

[32] See EWR Noise Abatement Measure 2

Conclusions: *EWR Noise Abatement Measure 4: Determine and Implement Optimal Easterly Departure Headings on Runways 4L and 4R* could identify the optimal easterly heading to further reduce the number of people in the Ironbound Neighborhood of Newark exposed to 65 DNL and higher.

Table 2-13: Implementation Summary for EWR Noise Abatement Measure 4: Determine and Implement Optimal Easterly Departure Headings on Runways 4L and 4R
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Potential further reduction of people and dwelling units exposed to 65 DNL and higher with implementation of the proposed procedure.
Rationale	The Port Authority is recommending EWR Noise Abatement Measure 4 because it could result in aircraft flying further from the noncompatible land uses in the Ironbound Neighborhood north of the airport, further reducing noise exposure.
Responsible Parties	Development, safety review, environmental review, and the decision whether to implement flight procedures consistent with procedure development criteria is the sole responsibility of the FAA. The Port Authority will request that the development process be initiated, then will work with NY TRACON and other FAA personnel to further study and develop this procedure. Implementation of this measure may require an environmental study as required under the National Environmental Policy Act (NEPA); the FAA would be the responsible party to complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are unknown and internal to the FAA (e.g., Air Traffic Organization) and other coordinating agencies. An FAA Airport Improvement Program grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require an environmental study under NEPA.
Estimated Schedule	The Port Authority to submit a request for its development within six to twelve months of the FAA's Record of Approval for the NCP. FAA design, testing and implementation of the procedure typically could take 18 to 24 months, potentially up to three years once the Port Authority requests initiation of the development process.

EWR Noise Abatement Measure 5: Determine and Implement Optimal Easterly Departure Headings on Runways 22L and 22R

Turning Runway 22L and 22R departing aircraft to an easterly heading of 190° is shown to be effective in reducing noncompatible land use.[33] At the TAC's request, the Study Team analyzed the noise benefit of increasing the turn after departure on Runways 22L and 22R to a more easterly heading. The analysis indicated that the greater the turn to an easterly heading (e.g. 185- or 180°), the fewer people exposed to 65 DNL and higher. For example, increasing the turn east by 5° would result in removing approximately 1,400 people in over 500 dwelling units from 65 DNL and higher. The analysis and results, provided in Appendix C.3, show the increased benefit achieved by directing aircraft to a more easterly heading after departing Runways 22L and 22R.

The FAA has noted during conversations with the TAC and in discussion with TRACON that there is a limit to how far east aircraft can be directed before they conflict with LGA traffic because the LGA airspace is to the east of EWR. The TAC requested that the FAA determine the easternmost heading they can safely direct aircraft without conflicting with LGA traffic. The results of the FAA's analysis will lead to the identification of the optimal easterly heading for aircraft departing Runway 22L and 22R.

The TAC supports the Port Authority working with the FAA to determine the easternmost heading that is possible without conflicting with the LGA airspace.

Table 2-14 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 5.

[33] See EWR Noise Abatement Measure 3

Conclusions: *EWR Noise Abatement Measure 5: Determine and Implement Optimal Easterly Departure Headings on Runways 22L and 22R* could identify the optimal easterly heading to further reduce the number of people in Elizabeth exposed to 65 DNL and higher.

Table 2-14: Implementation Summary for EWR Noise Abatement Measure 5: Determine and Implement Optimal Easterly Departure Headings on Runways 22L and 22R
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Potential further reduction of people and dwelling units exposed to 65 DNL and higher with implementation of the proposed procedure.
Rationale	The Port Authority is recommending EWR Noise Abatement Measure 5 because it could reduce overflight of noncompatible land uses in the City of Elizabeth south of the airport, further reducing noise exposure.
Responsible Parties	Development, safety review, environmental review, and the decision whether to implement flight procedures consistent with procedure development criteria is the sole responsibility of the FAA. The Port Authority will request that the development process be initiated, then will work with NY TRACON and other FAA personnel to further study and develop this procedure. Implementation of this measure may require an environmental study as required under the National Environmental Policy Act (NEPA); the FAA would be the responsible party to complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are unknown and internal to the FAA (e.g., Air Traffic Organization) and other coordinating agencies. An FAA Airport Improvement Program grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require an environmental study under NEPA.
Estimated Schedule	The Port Authority to submit a request for its development within six to twelve months of the FAA's Record of Approval for the NCP. FAA design, testing and implementation of the procedure typically could take 18 to 24 months, potentially up to three years once the Port Authority requests initiation of the development process.

EWR Noise Abatement Measure 6: Encourage Use of FAA-prescribed Distant Noise Abatement Departure Profile Procedures on a Voluntary Basis

FAA Advisory Circular 91-53A provides acceptable criteria for two safe Noise Abatement Departure Profile (NADP) procedures for commercial jet aircraft: Close-in NADP (NADP 1) and Distant NADP (NADP 2). As the names of the procedures suggest, the Close-in NADP provides noise benefit to areas adjacent to the airport whereas the Distant NADP provides noise benefit slightly further out from the airport. Airport operators cannot mandate the use of NADP at an airport because airport operators do not have the authority to require specific operating procedures for aircraft in flight; implementation of NADP is voluntary and at the choice of aircraft operators. However, FAA Advisory Circular 91-53A encourages aircraft operators "…to use the appropriate NADP when an airport operator requests its use to abate noise for either a close-in or distant community." In order to determine the potential effects of promoting one of the NADP profiles for use at EWR, all of the aircraft types for which the non-standard NADP 1 or NADP 2 profiles existed in the INM database were modeled using those profiles. The remaining aircraft without an available NADP 1 or NADP 2 profile remained modeled with their standard (unmodified) departure profiles, as used in the 2024 baseline NEM.[34]

Figure 2-6 gives a general overview of both types of NADPs. The NADPs outline criteria for speed, thrust settings, and airplane configurations used in connection with the NADPs. The designs of NADPs and their frequencies of use are specific to individual aircraft operators and aircraft types.

The noise modeling results for the NADP 1 (close-in) procedure are depicted in Figure 2-7, showing a net increase in residential areas exposed to 65 DNL and higher. The areas closest to the airport where the NADP 1 (close-in) DNL 70 contours differ (see Figure 2-6) would experience reduced noise from the noise abatement procedure. However, neighborhoods more distant from the airport, such as the area within the southernmost reaches of the 65 DNL contour, would experience somewhat higher noise exposure, as compared to standard profile departures. Figure 2-8 shows the effects of utilizing the established NADP 2 (distant) procedure. The 65 DNL contour line in Figure 2-8 indicates a slight noise benefit in the residential areas within 65 DNL.

Table 2-15 displays the population changes within the DNL contours for both scenarios. The NADP 1 (close-in) procedure analysis shows a net increase in the number of people exposed to 65 DNL and higher, but the NADP 2 (distant) procedure analysis shows overall fewer people and dwelling units. Table 2-16 displays the change in noise-sensitive sites and contour land area compared to the baseline.

The TAC requested NADPs be evaluated. The NADP 2 (Distant) profile is generally preferred by aircraft operators because it helps with fuel savings as well as noise reduction due to reduced thrust shortly after takeoff. Since the modeled scenario using the NADP 2 (Distant) departure profiles shows a reduction in noncompatible land use, encouraging voluntary use of that procedure is recommended.

Table 2-17 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 6.

[34] For more information on the technical discussion of this measure see Appendix D.2 for TAC #10 presentation starting on page D-45 and accompanying meeting minutes starting on page D-151 and TAC #12 presentation starting on page D-70 and accompanying meeting minutes starting on page D-172.

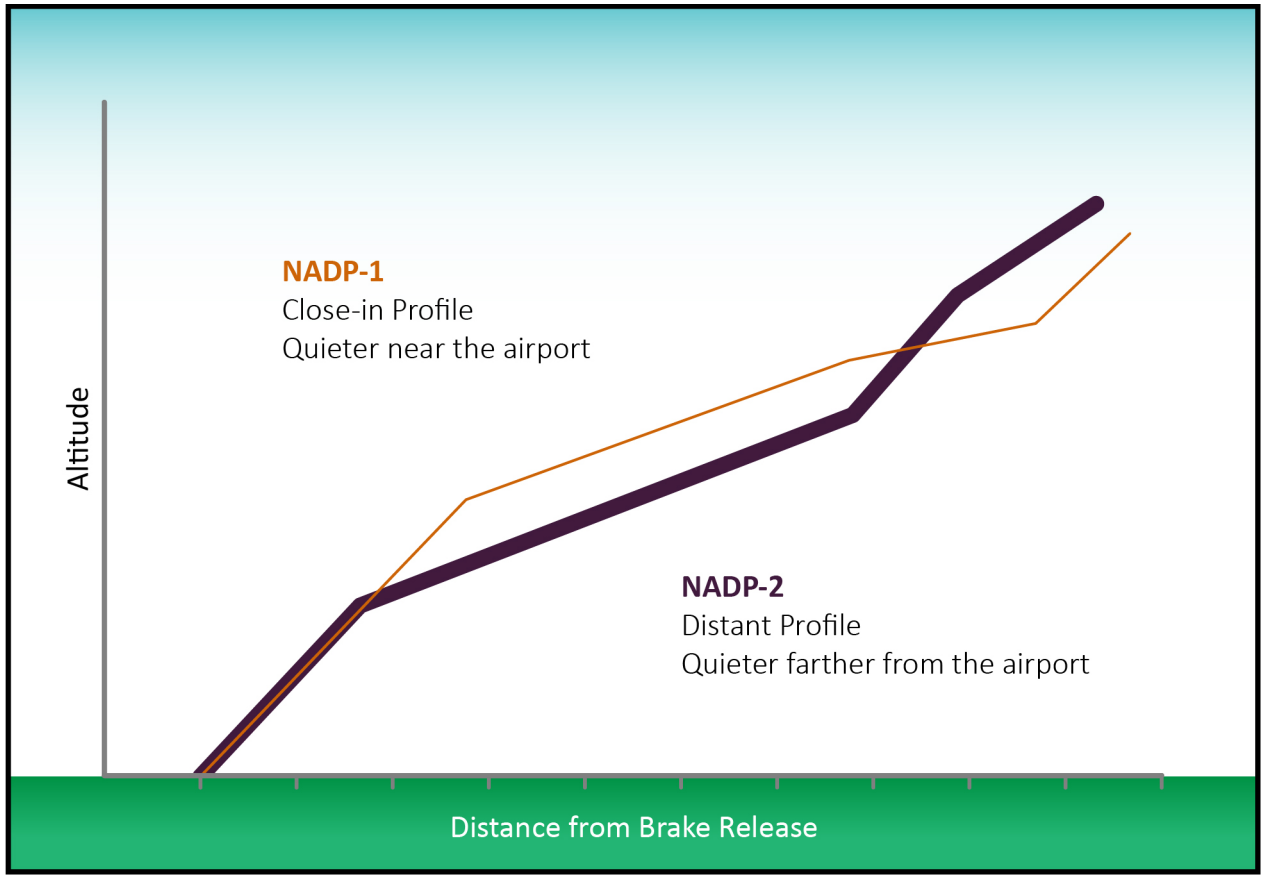

Figure 2-6: General Overview of NADP 1 (Close-In) and NADP 2 (Distant)

Source: HMMH, 2020.

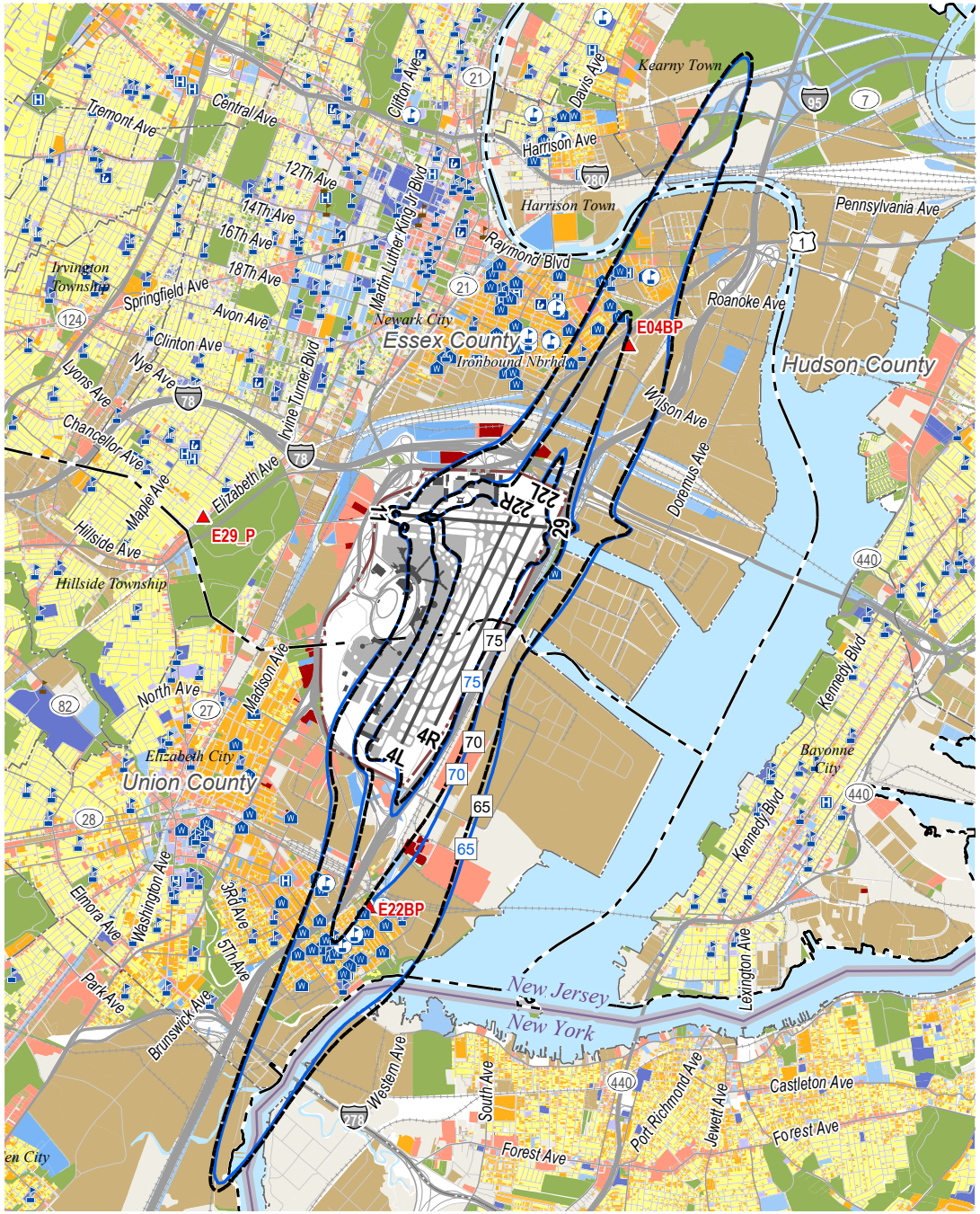

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Figure: 2-7

Hypothetical 2024 DNL with Noise Abatement Departure Profile NADP 1 (Close-in)

- Hypothetical 2024 DNL
- DNL for 2024 Future Conditions Contour
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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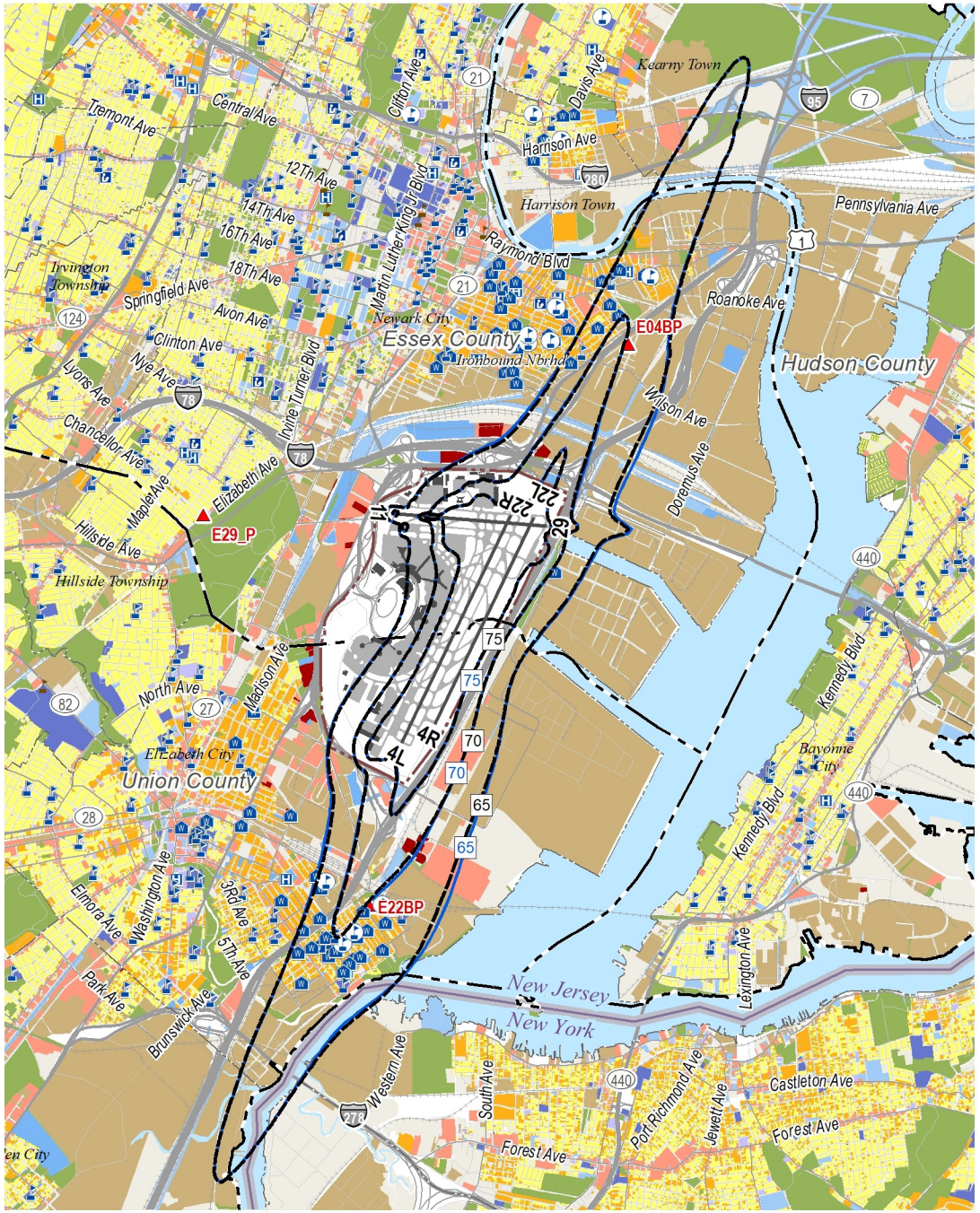

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Figure: 2-8

Hypothetical 2024 DNL with Noise Abatement Departure Profile NADP 2 (Distant)

- Hypothetical 2024 DNL
- DNL for 2024 Future Conditions Contour
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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Table 2-15: Estimated Dwelling Units and Population Counts for 2024 Baseline and NADP 1 (Close-in) and NADP 2 (Distant) (EWR Noise Abatement Measure 6) within Different Noise Contour Intervals

Source: Port Authority and HMMH, 2019

Scenario (All changes are by unit or population within the DNL contour interval notated)	Number of Dwelling Units			Population		
	65-70	70+	Total	65-70	70+	Total
2024 Baseline	9,399	667	10,066	25,912	1,883	27,795
Use of NADP 1 (Close-in)	9,795	707	10,502	27,015	1,964	28,979
Total change from baseline (Close-in)	396	40	436	1,103	81	1,184
Use of NADP 2 (Distant)	9,257	630	9,887	25,545	1,768	27,313
Total change from baseline (Distant)	-142	-37	-179	-367	-115	-482

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change in dwelling units or population within the 65 DNL contour, Green indicates a reduction in dwelling units or population within the 65 DNL contour and red indicates an increase in dwelling units or population within the 65 DNL contour.

Table 2-16: Estimated Noise-sensitive Sites and Land Area for 2024 Baseline and NADP 1 (Close-in) and NADP 2 (Distant) (EWR Noise Abatement Measure 6) Exposed to 65 DNL and Higher

Source: Port Authority and HMMH, 2019

Scenario (All changes are within the 65 DNL contour)	Number of Noise-Sensitive Sites						Land Area Outside the Airport Boundary (Sq. Miles)		
	Transient Lodging	School	Place of Worship	Daycare	Medical	Total	Compatible	Noncompatible	Total
2024 Baseline	8	10	1	32	1	52	5.78	0.55	6.33
Use of NADP 1 (Close-in)	7	10	1	31	1	50	5.29	0.52	5.81
Total change from baseline (Close-in)	-1	0	0	-1	0	-2	-0.49	-0.03	-0.52
Use of NADP 2 (Distant)	8	10	1	31	1	51	5.64	0.55	6.19
Total change from baseline (Distant)	0	0	0	-1	0	-1	-0.14	0	-0.14

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change within the 65 DNL contour, Green indicates a reduction within the 65 DNL contour and red indicates an increase within the 65 DNL contour.

Conclusions: *EWR Noise Abatement Measure 6: Encourage Use of FAA-prescribed Distant Noise Abatement Departure Profile Procedures on a Voluntary Basis* could reduce the number of people (approximately 500) exposed to 65 DNL and higher when the NADP 2 (distant) departure procedure is used.

Table 2-17: Implementation Summary for EWR Noise Abatement Measure 6: Encourage Use of FAA-prescribed Distant Noise Abatement Departure Profile Procedures on a Voluntary Basis
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Potential reduction of approximately 500 people in less than 200 dwelling units exposed to 65 DNL and higher by utilizing the "distant" noise abatement departure procedure (NADP 2).
Rationale	The Port Authority is recommending EWR Noise Abatement Measure 6 specifically the voluntary use of NADP 2 because it could reduce noise exposure in both the cities of Elizabeth and Newark.
Responsible Parties	Pilots are responsible for the operation of their aircraft. The Port Authority will request that aircraft operators begin using NADP 2 as available by aircraft type. Implementation of this measure may require an environmental study as required under the National Environmental Policy Act (NEPA); the FAA would be the responsible party to complete such a study.
Estimated Costs	The expected costs associated with the implementation of this procedure are unknown and internal to the FAA (e.g., Air Traffic Organization) and other coordinating agencies. An FAA Airport Improvement Program grant would not be required.
Funding Sources	The FAA (if NEPA is required).
Requirements	FAA approval of an environmental study under NEPA.
Estimated Schedule	Dependent upon aircraft operators to implement NADP 2. Within six to twelve months of the FAA's Record of Approval for the NCP, the Port Authority to submit a request for the FAA to determine whether NEPA is required to implement. Upon FAA response or completion of the NEPA study, the Port Authority will request all aircraft operators to use NADP 2, as available per aircraft type, when departing EWR.

EWR Noise Abatement Measure 7: Minimize Nighttime Intersection Departures

The location along a runway from which an aircraft begins its takeoff affects its altitude above ground level in its initial climb. The further back the aircraft begins its takeoff procedures, the higher over the community at the other end of the runway the aircraft will be, which typically results in a reduction of aircraft noise on the ground. At EWR, it is a standard operating procedure for aircraft to depart Runways 22L, 22R, and 29 at taxiway intersections.[35] These taxiways provide access to the longest runway departure point without having to cross an active runway. Intersection departures allow for greater operational safety and efficiency of the airfield since aircraft do not have to cross an active runway, which reduces taxi times for some operations. This NCP measure could reduce the number of nighttime intersection departures on Runway 22L and Runway 22R and increase the number of nighttime departures that use the full length of the runway.

Aircraft ground movement data collected by the Port Authority showed that aircraft departing these runways begin at the locations identified on Figure 2-9 and listed here by Runway.[36]

- Runway 22R: Taxiway Y & Taxiway W
- Runway 22L: Taxiway W
- Runway 29: Taxiway P

[35] Appendix C contains a copy of the most recent Letter to Airmen regarding Intersection Departures at EWR

[36] See Appendix D.2 "Noise Modeling Inputs" Section 7 on page D-19 of the Newark Liberty International Airport Final Noise Exposure Map Report, located here: http://panynjpart150.com/EWR_FNEM.asp for a description on how aircraft landing and departure points were analyzed

If aircraft currently using Runway 22L and 22R intersection departures were instead directed by ATCT to use the full length of the runway for departures, they may be at higher altitudes in the neighborhoods south of the airport. This would also mean that aircraft can turn toward the easterly heading sooner, which would better avoid the residential areas. A reduction of intersection departures at night may reduce noise exposure, particularly in the City of Elizabeth neighborhoods to the south of EWR.

As modeled in the 2024 baseline case DNL contours, the majority of aircraft departing Runways 22L and 22R use Taxiway W to enter the runway for departure rather than crossing Runway 11/29 to depart from the end of the runway. Similarly, the majority of aircraft departing Runway 29 use Taxiway P rather than cross Runway 4R/22L or use Taxiway R rather than cross both Runways 4L/22R and 4R/22L to depart.

Due to the infrequent use of Runway 29 for departures, the noise exposure contours of 65 DNL and higher do not extend into noncompatible land use west of the airport. Therefore, full-length departures were analyzed only for aircraft departing Runway 22L and 22R. To determine the potential noise benefits from aircraft using the full runway length for departures on Runways 22L and 22R, all nighttime modeled intersection departures were moved to the end of the runway. For daytime operations, intersection departures remain unchanged.

Figure 2-10 shows the resulting DNL contours. To reduce aircraft noise in the communities near EWR, the TAC suggested that departing aircraft utilize a runway's full length by eliminating intersection runway departures. Using the full runway length would thus allow departing aircraft to reach a higher altitude sooner, which typically results in a reduction of aircraft noise on the ground. However, the TAC understood that during the daytime when the airfield is busy, eliminating intersection departures would cause delays and may compromise operational efficiency and safety. As such, a more feasible alternative was suggested to eliminate intersection departures only during nighttime hours due to the following reasons: 1) this measure is easier to implement during the night rather than during daytime hours since the traffic volume is lower, and 2) communities are most affected by noise from aircraft operations during nighttime hours. Therefore, elimination of intersection departures is being recommended for implementation during nighttime hours only.

Table 2-18 displays the change in affected dwelling units and population, and Table 2-19 displays the change in noise-sensitive sites and contour land area compared to the baseline 2024 contours. The results indicate a decrease in the number of people exposed to 65 DNL and higher noise exposure if aircraft use the full runway length for departures at night as aircraft would turn to the easterly heading sooner avoiding the overflight of more noncompatible land uses in the City of Elizabeth.

Table 2-20 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 7.

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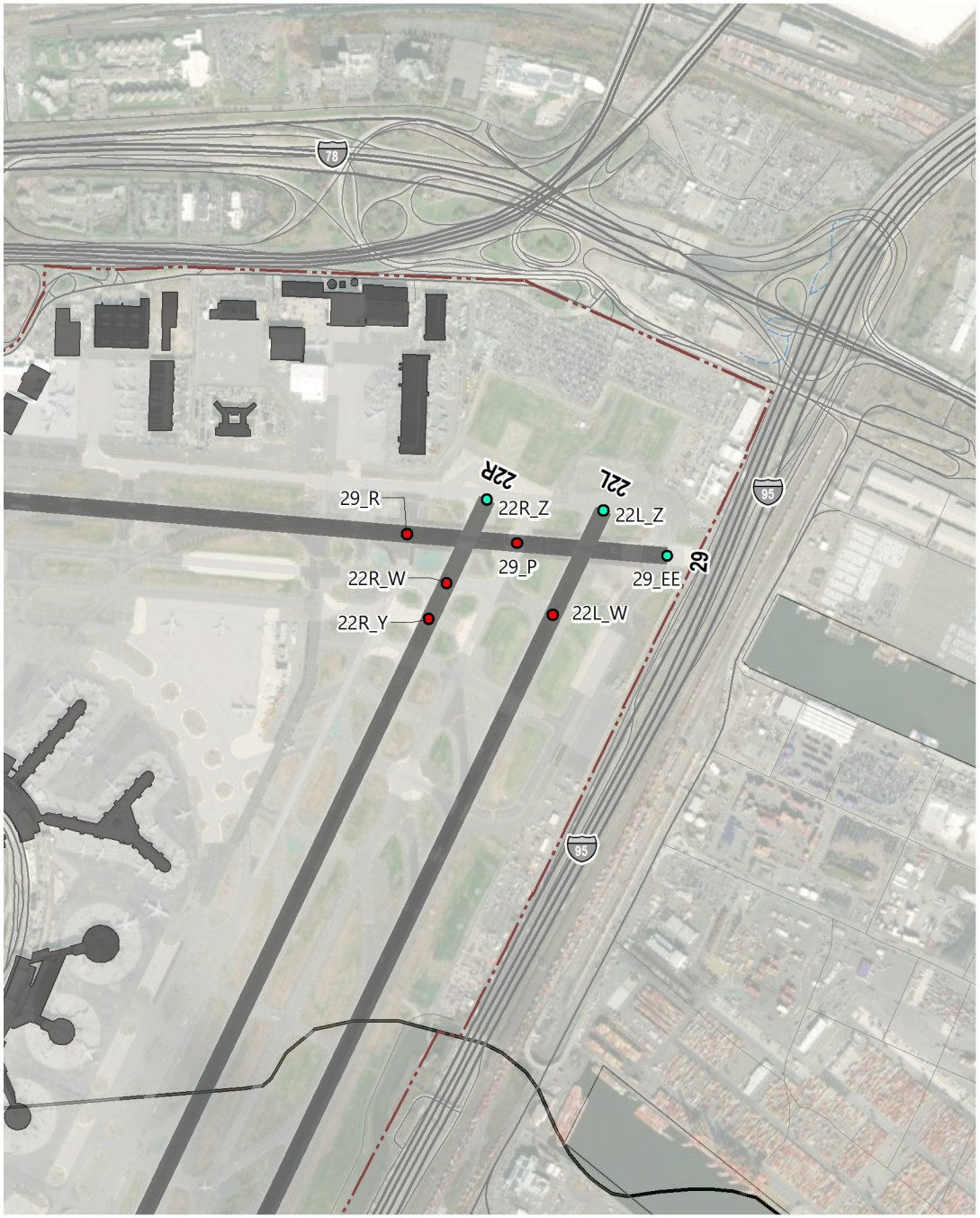

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Figure: 2-9

Aircraft Departure Locations for Runways 22L, 22R, and 29

EWR Airport Boundary (Approximate)

Taxiway Intersection Departure Locations

Full Length Departure Locations (Runway End)

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Source: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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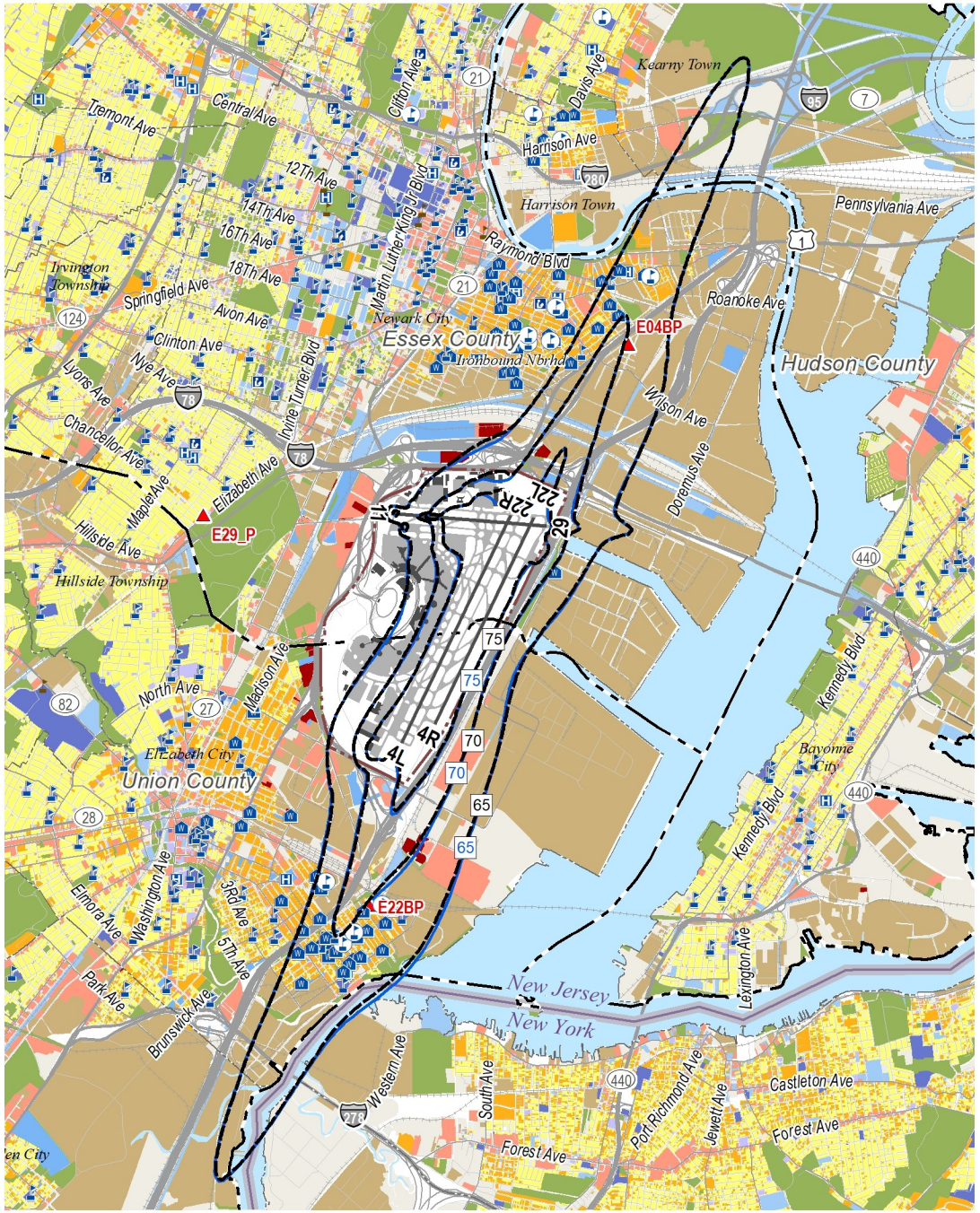

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Figure: 2-10

Hypothetical 2024 DNL with Full Length Departures at Night on Runways 22L and 22R

- Hypothetical 2024 DNL
- DNL for 2024 Future Conditions Contour
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

N

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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Table 2-18: Estimated Dwelling Units and Population Counts for 2024 Baseline and Full Length Departures at Night on Runways 22L and 22R (EWR Noise Abatement Measure 7) within Different Noise Contour Intervals
Source: Port Authority and HMMH, 2019

Scenario (All changes are by unit or population within the DNL contour interval notated)	Number of Dwelling Units			Population		
	65-70	70+	Total	65-70	70+	Total
2024 Baseline	9,399	667	10,066	25,912	1,883	27,795
EWR Noise Abatement Measure 7	9,374	621	9,995	25,855	1,742	27,597
Total change from baseline	-25	-46	-71	-57	-141	-198

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change in dwelling units or population within the 65 DNL contour, Green indicates a reduction in dwelling units or population within the 65 DNL contour and red indicates an increase in dwelling units or population within the 65 DNL contour.

Table 2-19: Estimated Noise-sensitive Sites and Land Area for 2024 Baseline and Full Length Departures at Night on Runways 22L and 22R (EWR Noise Abatement Measure 7) Exposed to 65 DNL and Higher
Source: Port Authority and HMMH, 2019

Scenario (All changes are within the 65 DNL contour)	Number of Noise-Sensitive Sites						Land Area Outside the Airport Boundary (Sq. Miles)		
	Transient Lodging	School	Place of Worship	Daycare	Medical	Total	Compatible	Noncompatible	Total
2024 Baseline	8	10	1	32	1	52	5.78	0.55	6.33
EWR Noise Abatement Measure 7	9	10	1	31	1	52	5.70	0.56	6.26
Total change from baseline	1	0	0	-1	0	0	-0.08	0.01	-0.07

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change within the 65 DNL contour, Green indicates a reduction within the 65 DNL contour and red indicates an increase within the 65 DNL contour.

Conclusions: *EWR Noise Abatement Measure 7: Minimize Nighttime Intersection Departures* could reduce the number of people (approximately 200) in Elizabeth exposed to 65 DNL and higher by aircraft gaining more altitude before reaching the community and turning sooner to the easterly heading.

The analysis of this measure assumed use of the procedure would be limited to nighttime when intersection departures on Runway 22L and 22R are less likely to be required by ATCT due to limited aircraft operations.

Table 2-20: Implementation Summary for EWR Noise Abatement Measure 7: Minimize Nighttime Intersection Departures
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Potential reduction of up to 198 people in 71 dwelling units exposed to 65 DNL and higher with implementation of the proposed measure.
Rationale	The Port Authority is recommending EWR Noise Abatement Measure 7 because it could reduce noise exposure experienced at noncompatible land uses south of the airport.
Responsible Parties	Selection among available runways for use by aircraft is the responsibility of the FAA and requesting pilots. The Port Authority will request that the development process for this measure be initiated and will then work with FAA personnel to implement the measure. Implementation of this measure may require an environmental study as required under the National Environmental Policy Act (NEPA); the FAA would be the responsible party to complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are unknown and internal to the FAA (e.g., Air Traffic Organization) and other coordinating agencies. An FAA Airport Improvement Program grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require an environmental study under NEPA.
Estimated Schedule	The Port Authority to submit a request for its implementation within six to twelve months of the FAA's Record of Approval for the NCP. FAA implementation of the procedure typically could take at least one year after the Port Authority requests initiation of the development process.

EWR Noise Abatement Measure 8: Implement a Nighttime Preferential Runway Use Program

A preferential runway use program is a measure evaluated during the development of an NCP. If it can be shown that the number of people exposed to aircraft noise of 65 DNL and higher through a modification of the runway use, the airport would then establish a preferential runway use program to obtain those benefits. Preferential runway use programs distribute aircraft operations among the available runways at a particular airport. ATCT will take into account various factors to determine runway usage. These factors include, but are not limited to, runway availability, prevailing wind and weather patterns, runway length requirements, operational efficiency, and community noise concerns. Navigational aids and published arrival and departure procedures are also factors in runway selection. Because there are multiple airports in close proximity to EWR, modifying EWR runway selection is likely to adversely impact operations at other airports, so the ability to implement preferential runway use at all times could be limited.

There are areas of compatible land use around EWR, particularly to the east of the airport, which aircraft could be routed over by FAA through the use of a preferential runway use program. As determined at the outset of the NCP analysis, arrival noise (and predominantly nighttime arrival noise) dominates the noise exposure at EWR.[37] If the FAA can move nighttime arrivals from the parallel runways (Runway 4L/22R and Runway 4R/22L) to Runway 29, it is possible to improve land use compatibility over current conditions.

To show the potential benefits of a nighttime preferential runway use program, multiple noise modeling scenarios were completed. The first set of scenarios modeled varying increases of arrivals to Runway 29 at night. Depending on the ability to change nighttime runway use, this measure would result in removing up to 7,689 people in over 2,700 dwelling units from 65 DNL and higher. The results from these hypothetical scenarios are provided in Appendix C.5.

A preferential runway use program could also include increased usage of Runway 4R/22L for departures because that runway is slightly further from residential areas than Runway 4L/22R. Because Runway 4R/22L is slightly to the east of 4L/22R, aircraft departing 4R/22L aircraft can avoid more of the residential areas of Elizabeth and Newark than can aircraft departing 4L/22R.

Lastly, and similar to the use of the outboard runway, Runway 22L nighttime arrivals should use the offset approach, if implemented,[38] as part of a preferential nighttime runway use program.

TAC membership is generally supportive of a runway use program that moves flight tracks from populated areas to compatible land use areas to provide noise benefit. However, some voiced concern with moving nighttime aircraft operations closer to Staten Island and Jersey City as they may notice the increased aircraft operations and associated noise exposure even though the noise exposure is expected to be less than 65 DNL in those communities.

Table 2-21 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 8.

[37] See Technical Advisory Committee Meeting #8 presentation in Appendix D, starting on page D-20, and meeting minutes, starting on page D-136, for discussion on analysis of aircraft contributions to the contours.

[38] As recommended EWR Noise Abatement Measure 1 in this document.

Conclusions: *EWR Noise Abatement Measure 8: Implement a Nighttime Preferential Runway Use Program* could reduce the number of people exposed to 65 DNL and higher by several thousand, depending on the extent to which Runway 29 and the offset approach to Runway 22L can be used for arrivals at night. Appendix C provides additional analysis on the potential benefit of this measure. A Nighttime Preferential Runway Use Program for EWR could include the following elements:

1. Runway 29 designated as the preferred arrival runway
2. Outboard Runway 4R/22L designated as the preferred departure runway
3. When Runway 29 is not available for arrivals, Runway 22L designated as the preferred arrival runway with aircraft using the offset approach
4. When Runway 29 is not available and the offset approach cannot be used, outboard Runway 4R/22L designated as the preferred arrival runway

The analysis of this measure assumed application of the preferential runway use program would be limited to nighttime when there are less aircraft operations allowing more flexibility in runway use.

Table 2-21: Implementation Summary for EWR Noise Abatement Measure 8: Implement a Nighttime Preferential Runway Use Program
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Potential reduction of people exposed to 65 DNL and higher possible with implementation of the proposed measure.
Rationale	The Port Authority is recommending EWR Noise Abatement Measure 8 because it could improve land use compatibility and reduce overflight of noncompatible land uses in both the cities of Elizabeth and Newark.
Responsible Parties	The Port Authority will request that the development process be initiated, then will work with ATCT and other FAA personnel to further study and develop this procedure. Implementation of this measure may require an environmental study as required under the National Environmental Policy Act (NEPA); the FAA would be the responsible party to complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are unknown and internal to the FAA (e.g., Air Traffic Organization) and other coordinating agencies. An FAA Airport Improvement Program grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require an environmental study under NEPA.
Estimated Schedule	The Port Authority to submit a request for its development within 6 to 12 months of the FAA's Record of Approval for the NCP.

EWR Noise Abatement Measure 9: Implement Nighttime Optimized Profile Descent Procedures

An Optimized Profile Descent (OPD) is an approach procedure that allows the aircraft to descend from altitude to the runway threshold with minimal engine thrust (also known as power settings) and minimal changes to such settings. Figure 2-11 depicts the difference between a traditional stepdown approach and an OPD.

OPDs direct aircraft to descend to the runway with the minimal amount of engine power needed to safely land the aircraft. Hold-downs that require high power settings for the level flight segments with traditional arrival procedures are generally eliminated. This results in less noise being heard on the ground. An OPD has several benefits including: less communication between the FAA and the pilot; less maneuvering of the aircraft by the pilot; less fuel consumption resulting in fewer emissions of air pollutants; and less noise.

Because of the busy and complex nature of the New York/New Jersey/Philadelphia airspace, aircraft are, by FAA procedures to safely manage the air traffic, held at continuous altitudes (known as "hold-downs") for extended periods (or distances) in order to maintain aircraft separation as they arrive EWR. OPDs are being recommended only during nighttime hours, given that the airspace is much less busy during the nighttime. The FAA's ATO could examine whether the "hold-downs" can be eliminated or reduced during these hours.

Given that the airspace is much less busy at night, it may be feasible to eliminate or reduce hold-downs during the night hours, thereby providing a reduction in noise exposure for those communities under the arrival flight paths into EWR. Aircraft on an OPD are generally configured with flaps and landing gear, airspeed, and approach angle prior to five miles from the runway, mostly benefiting areas outside of the 65 DNL contour. The hold-downs mentioned above are also outside the 65 DNL contour. Therefore, eliminating the hold-downs would not result in a reduction of noncompatible land use. Accordingly, an OPD was not modeled.

The TAC has suggested the use of OPDs as a possible noise abatement measure to consider at EWR. While it is well understood that the noise benefits would be experienced in communities beyond the 65 DNL, the TAC recommends attempting to eliminate the hold-downs on arrival to EWR.

Table 2-22 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 9.

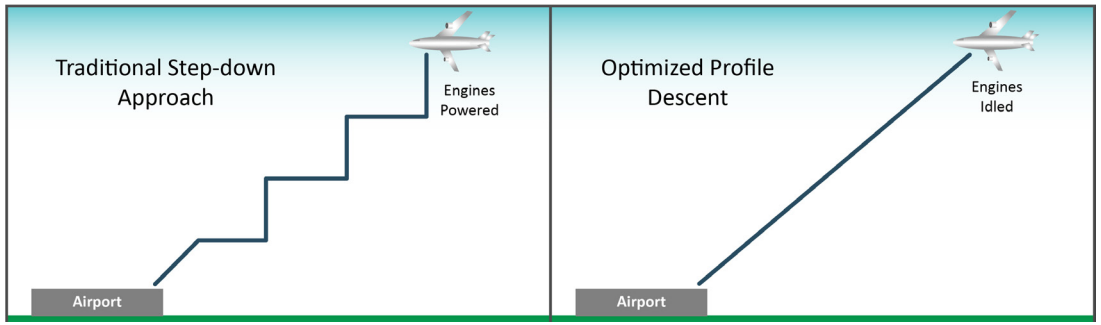

Figure 2-11: Optimized Profile Descent Comparison to a Traditional Approach Procedure
Source: HMMH, 2020.

Conclusions: *EWR Noise Abatement Measure 9: Implement Nighttime Optimized Profile Descent Procedures* could provide noticeable noise exposure reduction to residents under EWR arrival flight corridors during nighttime hours. OPD procedures allow aircraft to arrive with as little power applied to the engines as possible as compared to high power settings required to remain at level flight during the FAA-required hold-downs.

The discussion of this measure with the TAC assumed use of the procedure would be limited to nighttime.

Table 2-22: Implementation Summary for EWR Noise Abatement Measure 9: Implement Nighttime Optimized Profile Descent Procedures
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Potential noticeable noise exposure reduction for people and dwelling units under the EWR arrival flight corridors outside 65 DNL and higher with implementation of the proposed measure.
Rationale	The Port Authority is recommending EWR Noise Abatement Measure 9 because it may be an effective way to reduce noise exposure in residential areas under the arrival flight path upon approach.
Responsible Parties	Development, safety review, environmental review, and the decision whether to implement flight procedures consistent with procedure development criteria is the sole responsibility of the FAA. The Port Authority will request that the development process be initiated, and then will work with NY TRACON and other FAA personnel to further study and develop this procedure. Implementation of this measure may require an environmental study as required under the National Environmental Policy Act (NEPA); the FAA would be the responsible party to complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are internal to the FAA (e.g., Air Traffic Organization) and other coordinating agencies. These costs are unknown, and an FAA Airport Improvement Program grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require an environmental study under NEPA.
Estimated Schedule	The Port Authority to submit a request for its development within 6 to 12 months of the FAA's Record of Approval for the NCP. FAA design, testing and implementation of the procedure typically could take 18 to 24 months, potentially up to three years once the Port Authority requests initiation of the development process.

EWR Noise Abatement Measure 10: Implement Nighttime Unlimited Climb Procedures

Unlimited climb refers to the aircraft continuing to ascend after takeoff without restrictions (such as FAA-required hold-downs to maintain separation of aircraft for the multitude of aircraft operations in the New York/New Jersey/Philadelphia airspace). Figure 2-12 depicts the difference between a hold-down departure and an unlimited climb procedure.

Similar to OPDs, unlimited climb procedures have multiple benefits including: less communication between the FAA and the pilot; less maneuvering of the aircraft by the pilot; less fuel consumption resulting in fewer air emissions; and less noise due to the elimination of level-off segments resulting in aircraft being at higher altitudes during their climb. Because of the busy and complex nature of the New York/New Jersey/Philadelphia airspace, aircraft are, by FAA procedures to safely manage the air traffic, held at a continuous altitudes (known as "hold-downs") for extended periods in order to maintain aircraft separation as they depart EWR.

Implementation of unlimited climb procedures at night could reduce noise exposure to residents living under EWR departure corridors outside the 65 DNL because of aircraft being higher in altitude over noise-sensitive land areas. Unlimited climb procedures are being recommended only during nighttime hours, given that the airspace is much less busy during the nighttime.

TAC has suggested the use of continuous climb as a possible noise abatement measure to consider at EWR. While such a procedure would likely only provide noise benefits in communities outside the 65 DNL, the TAC recommended attempting to eliminate the hold-downs on departures.

Table 2-23 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 10.

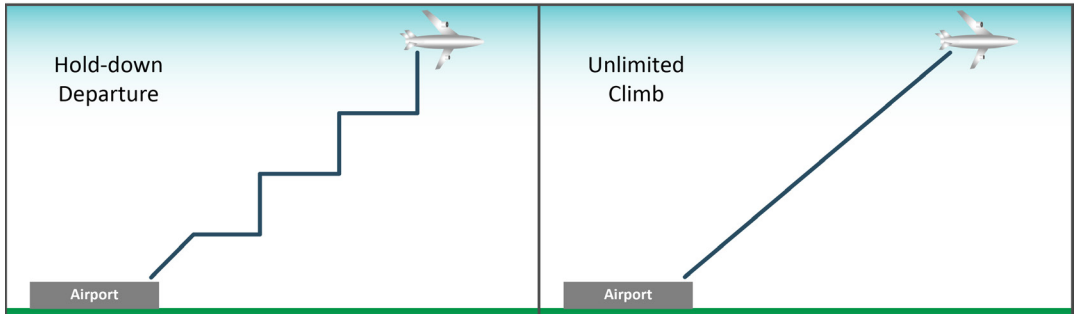

Figure 2-12: Unlimited Climb Comparison to a Hold-down Departure Procedure

Source: HMMH, 2020.

Conclusions: *EWR Noise Abatement Measure 10: Implement Nighttime Unlimited Climb Procedures* could provide noticeable noise exposure reduction to residents under EWR departure corridors during nighttime hours by allowing aircraft to continue gaining altitude resulting in increased distance from the community thus reducing noise levels.

The discussion of this measure with the TAC assumed use of the procedure would be limited to nighttime when traffic volumes accommodate such procedures for the reasons stated above.

Table 2-23: Implementation Summary for EWR Noise Abatement Measure 10: Implement Nighttime Unlimited Climb Procedures
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Potential noticeable noise exposure reduction for people and dwelling units under the EWR departure flight corridors outside 65 DNL and higher with implementation of the proposed measure.
Rationale	The Port Authority is recommending EWR Noise Abatement Measure 10 because it could be an effective way to reduce noise exposure in residential areas under the departure flight corridors.
Responsible Parties	Development, safety review, environmental review, and the decision whether to implement flight procedures consistent with procedure development criteria is the sole responsibility of the FAA. The Port Authority will request that the development process be initiated, then will work with NY TRACON and other FAA personnel to further study and develop this procedure. Implementation of this measure may require an environmental study as required under the National Environmental Policy Act (NEPA); the FAA would be the responsible party to complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are unknown and internal to the FAA (e.g., Air Traffic Organization) and other coordinating agencies. An FAA Airport Improvement Program grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require an environmental study under NEPA.
Estimated Schedule	The Port Authority to submit a request for its development within 6 to 12 months of the FAA's Record of Approval for the NCP. FAA design, testing and implementation of the procedure typically could take 18 to 24 months, potentially up to three years once the Port Authority requests initiation of the development process.

EWR Noise Abatement Measure 11: Implement Nighttime "New Jersey Turnpike" Departure Procedures for Runways 4L and 4R

Public comments submitted on the Draft NEM suggested that aircraft follow the New Jersey Turnpike as a noise abatement measure. Based on these comments, a hypothetical modeling scenario was developed to eliminate westerly turns for all Runway 4L and 4R nighttime departing aircraft until reaching an altitude of approximately 10,000 feet above airport field elevation.[39]

Figure 2-13 shows the baseline flight tracks (on the left) compared to the hypothetical modeled flight tracks that eliminate an early westerly turn (on the right) for departures for Runway 4L and 4R.

Implementation of such a procedure at night could reduce noise exposure to residents by directing the aircraft to continue ascending over compatible land uses along the Turnpike for an additional short distance (reaching 10,000 feet altitude) before turning west to continue to their destinations. Aircraft will be at a higher altitude over residential areas because of a slightly later turn. While this could reduce throughput[40] (number of aircraft that can takeoff per hour) on the parallel runways (Runway 4L/22R and Runway 4R/22L), that is likely less of an issue during the nighttime when there are fewer aircraft operations.

Figure 2-14 displays the results to the 65 DNL contour westerly turns are delayed during nighttime departures from Runways 4L and 4R.

Table 2-24 displays the change in affected dwelling units and population compared to the baseline (FAA-accepted 2024 NEM). Potentially, 77 people in 28 dwelling units could be added to the 65 DNL contour with the implementation of Noise Abatement Measure 11 as modeled.[41] Table 2-25 displays the change in noise-sensitive sites and contour land area compared to the baseline. This increase in people and dwelling units within the 65 DNL could be eliminated if more aircraft turned east upon reaching a safe altitude – see EWR Noise Abatement Measure 2. Port Authority recommends this measure as long as the procedure can be combined with other noise abatement procedures presented in this NCP Report or developed in a way that does not lead to an increase of people or dwelling units inside the 65 DNL contour.

The TAC and public requested that aircraft be required to follow the New Jersey Turnpike until aircraft reach higher altitudes before making their turns to the west.

Table 2-26 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 11.

[39] All airports have a known field elevation, which is the elevation above mean sea level. Pilots use this information for departure and arrival procedures. The airport field elevation at EWR is 17.4 ft.

[40] Throughput would be reduced by aircraft taking longer to diverge on departure to meet FAA parallel runway separation standards for safety, requiring longer wait times on the ground.

[41] Changes in the modeled flight tracks were made outside the 65 DNL contour boundary however, due to the nature of the noise modeling process, minute changes are represented here as an increase in population and dwelling unit counts.

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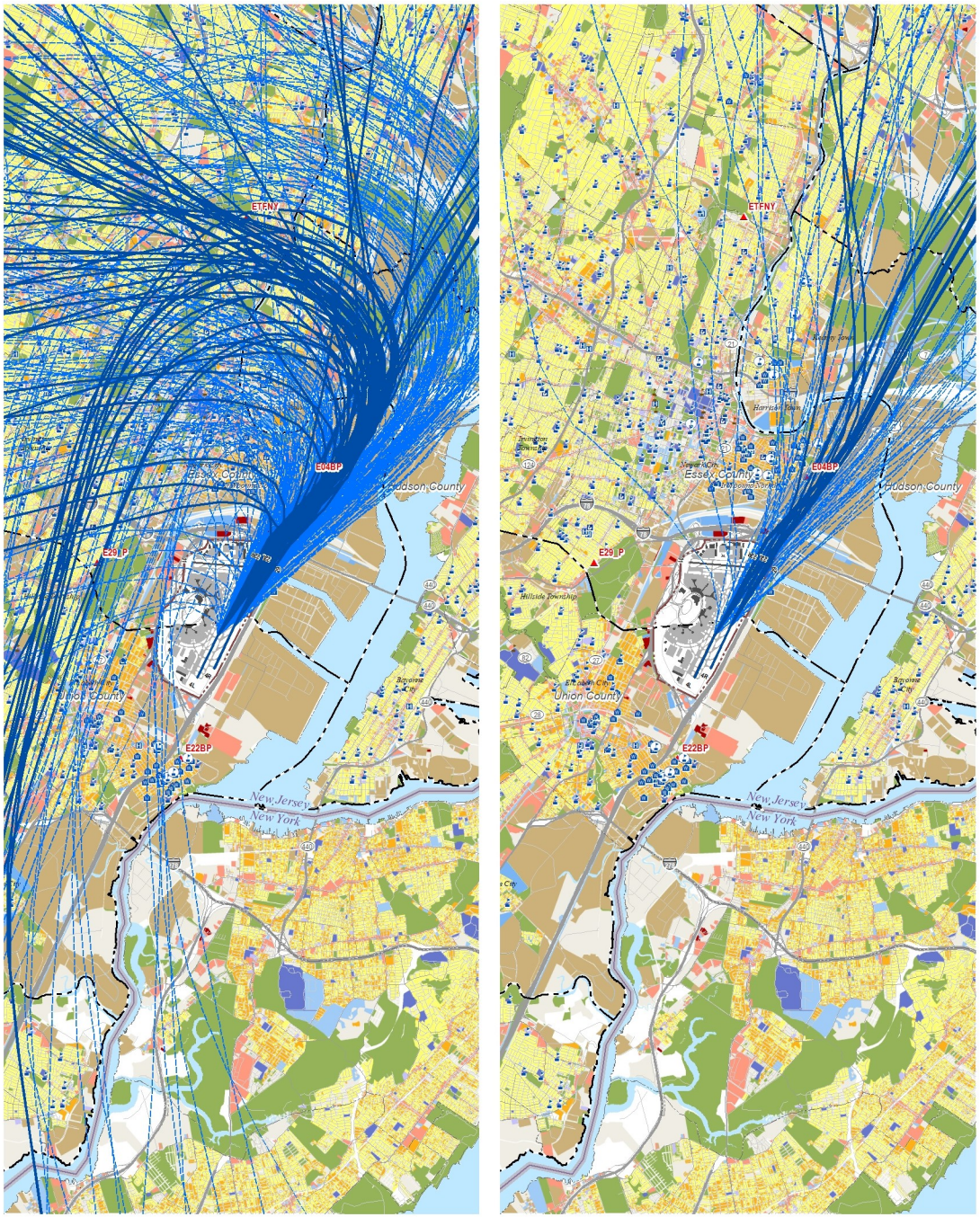

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Figure: 2-13

Baseline Departure Model Tracks (left) and Hypothetical "New Jersey Turnpike" Departure Model Tracks (right) from Runways 4L and 4R

- Model Backbone Track (Departure)
- Model Track (Departure)
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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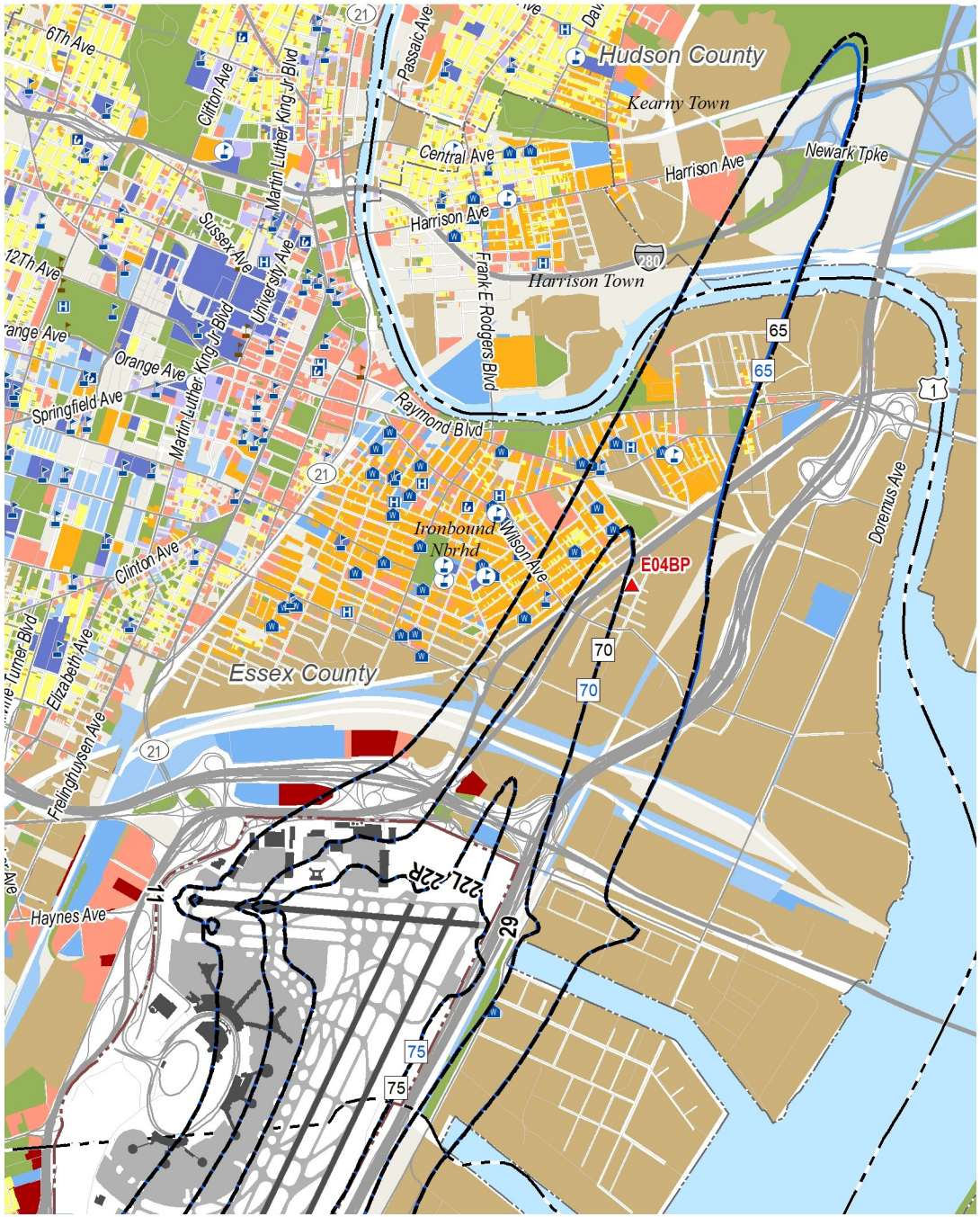

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Figure: 2-14

EWR Noise Abatement Measure 11 2024 DNL with Nighttime "New Jersey Turnpike" Departure Procedures from Runways 4L and 4R

- Hypothetical 2024 DNL
- DNL for 2024 Future Conditions Contour
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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Table 2-24: Estimated Dwelling Units and Population Counts for 2024 Baseline and Implement Nighttime "New Jersey Turnpike" Departure Procedures for Runways 4L and 4R (EWR Noise Abatement Measure 11) within Different Noise Contour Intervals
Source: Port Authority and HMMH, 2019

Scenario (All changes are by unit or population within the DNL contour interval notated)	Number of Dwelling Units			Population		
	65-70	70+	Total	65-70	70+	Total
2024 Baseline	9,399	667	10,066	25,912	1,883	27,795
EWR Noise Abatement Measure 11	9,410	684	10,094	25,950	1,922	27,872
Total change from baseline	11	17	28	38	39	77

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change in dwelling units or population within the 65 DNL contour, Green indicates a reduction in dwelling units or population within the 65 DNL contour and red indicates an increase in dwelling units or population within the 65 DNL contour.

Table 2-25: Estimated Noise-sensitive Sites and Land Area for 2024 Baseline and Implement Nighttime "New Jersey Turnpike" Departure Procedures for Runways 4L and 4R (EWR Noise Abatement Measure 11) Exposed to 65 DNL and Higher
Source: Port Authority and HMMH, 2019

Scenario (All changes are within the 65 DNL contour)	Number of Noise-Sensitive Sites						Land Area Outside the Airport Boundary (Sq. Miles)		
	Transient Lodging	School	Place of Worship	Daycare	Medical	Total	Compatible	Noncompatible	Total
2024 Baseline	8	10	1	32	1	52	5.78	0.55	6.33
EWR Noise Abatement Measure 11	8	10	1	32	1	52	5.80	0.56	6.36
Total change from baseline	0	0	0	0	0	0	0.02	0.01	0.03

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change within the 65 DNL contour, Green indicates a reduction within the 65 DNL contour and red indicates an increase within the 65 DNL contour.

Conclusions: *EWR Noise Abatement Measure 11: Implement Nighttime "New Jersey Turnpike" Departure Procedures for Runways 4L and 4R* could provide noticeable noise exposure reduction to residents west of the EWR extended centerline of Runway 4R/22L during nighttime hours by not turning west until aircraft reach 10,000 feet in altitude. The Port Authority recommends this measure as long as the procedure can be developed in a way that does not lead to increase of people or dwelling units inside the 65 DNL contour.

The analysis of this measure assumed use of the procedure would be limited to nighttime when traffic volume is low to accommodate such procedures.

Table 2-26: Implementation Summary for EWR Noise Abatement Measure 11: Implement Nighttime "New Jersey Turnpike" Departure Procedures for Runways 4L/4R

Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Potential noticeable noise exposure reduction for people and dwelling units west of the extended centerline for Runway 4R/22L outside 65 DNL and higher with implementation of the proposed measure.
Rationale	The Port Authority is recommending EWR Noise Abatement Measure 11 because it could be an effective way to reduce noise exposure in residential areas west of Runway 4R/22L centerline.
Responsible Parties	Development, safety review, environmental review, and the decision whether to implement flight procedures consistent with procedure development criteria is the sole responsibility of the FAA. The Port Authority will request that the development process be initiated, then will work with NY TRACON and other FAA personnel to further study and develop this procedure. Implementation of this measure may require an environmental study as required under the National Environmental Policy Act (NEPA); the FAA would be the responsible party complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are unknown and internal to the FAA (e.g., Air Traffic Organization) and other coordinating agencies. An FAA Airport Improvement Program grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require an environmental study under NEPA.
Estimated Schedule	The Port Authority to submit a request for its development within six to twelve months of the FAA's Record of Approval for the NCP. FAA design, testing and implementation of the procedure typically could take 18 to 24 months, potentially up to three years once the Port Authority requests initiation of the development process.

EWR Noise Abatement Measure 12: Implement Nighttime "New Jersey Turnpike" Departure Procedures for Runways 22L and 22R

Public comments submitted on the Draft NEM suggested that aircraft follow the New Jersey Turnpike as a noise abatement measure. Based on these comments, a hypothetical modeling scenario was developed to eliminate westerly turns for all runway 22L and 22R nighttime departing aircraft until reaching an altitude of approximately 10,000 feet above airport field elevation. Figure 2-15 shows the baseline flight tracks (on the left) compared to the hypothetical modeled flight tracks that eliminate an early westerly turn (on the right) for departures for Runway 22L and 22R.

Implementation of such a procedure at night could reduce noise exposure to residents by directing the aircraft to continue ascending over compatible land uses along the Turnpike for an additional short distance (reaching 10,000 feet altitude) before turning west to continue to their destinations. Aircraft will be at a higher altitude over residential areas because of a slightly later turn. While this could reduce throughput (number of aircraft that can takeoff per hour) on the parallel runways (Runway 4L/22R and Runway 4R/22L), that is likely less of an issue during the nighttime when there are fewer aircraft operations. Figure 2-16 displays the results to the 65 DNL contour westerly turns are delayed during nighttime departures from Runways 22L and 22R.

Table 2-27 displays the change in affected dwelling units and population compared to the baseline (FAA-accepted 2024 NEM). Potentially, over 400 people in about 160 dwelling units could be removed from the 65 DNL contour due to a shift in noise that reduces non-compatible noise exposure. Table 2-28 displays the change in noise-sensitive sites and contour land area compared to the baseline.

The TAC and public requested that aircraft be required to follow the New Jersey Turnpike until aircraft reach higher altitudes before making their turns to the west for their destinations.

Table 2-29 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 12.

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Figure: 2-15

Baseline Departure Model Tracks (left) and Hypothetical "New Jersey Turnpike" Departure Model Tracks (right) from Runways 22L and 22R

- Model Backbone Track (Departure)
- Model Track (Departure)
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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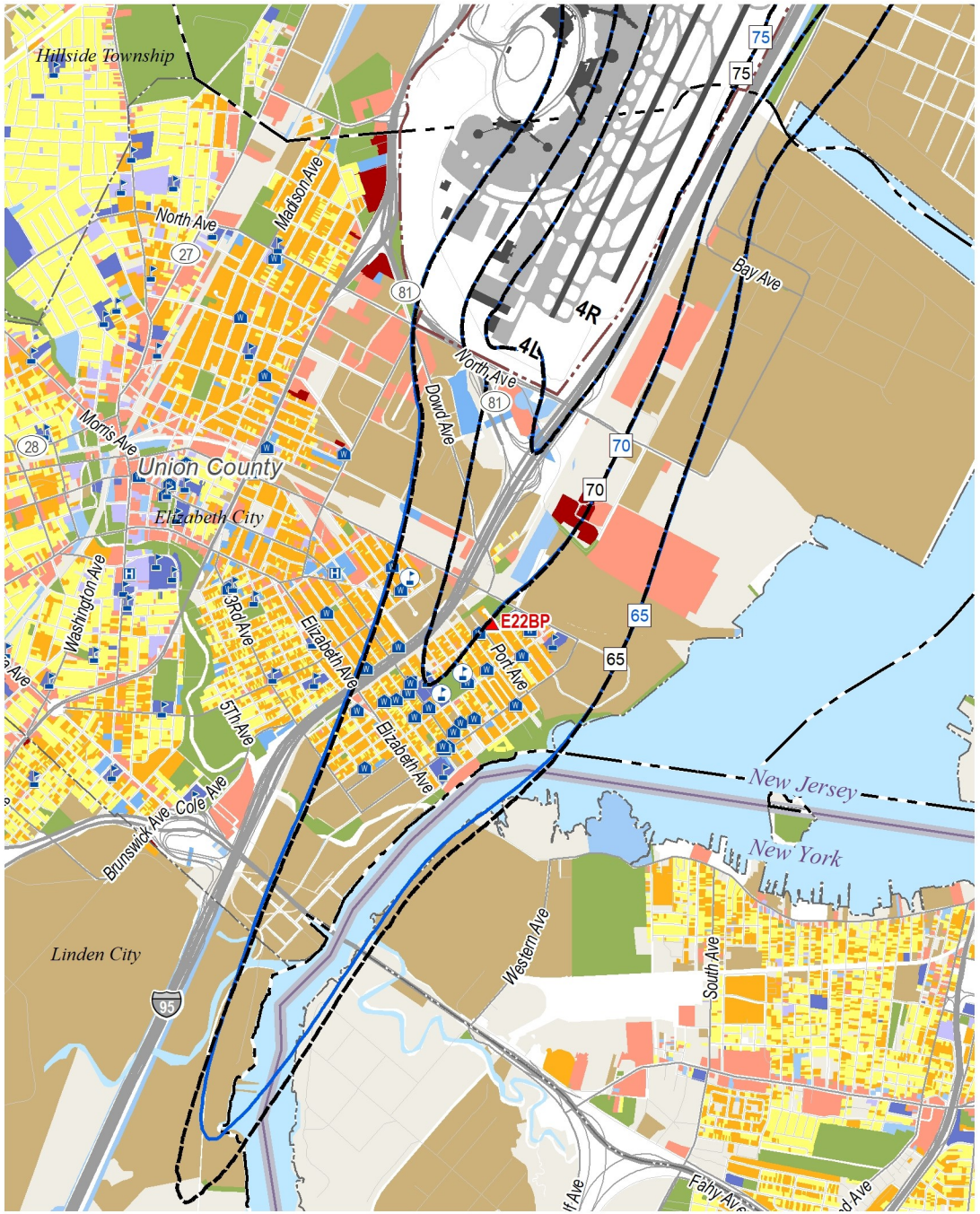

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Figure: 2-16

Hypothetical 2024 DNL with Nighttime "New Jersey Turnpike" Departure Procedures from Runways 22L and 22R

- Hypothetical 2024 DNL
- DNL for 2024 Future Conditions Contour
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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Table 2-27: Estimated Dwelling Units and Population Counts for 2024 Baseline and Implement Nighttime "New Jersey Turnpike" Departure Procedures for Runways 22L and 22R (EWR Noise Abatement Measure 12) within Different Noise Contour Intervals
Source: Port Authority and HMMH, 2019

Scenario (All changes are by unit or population within the DNL contour interval notated)	Number of Dwelling Units			Population		
	65-70	70+	Total	65-70	70+	Total
2024 Baseline	9,399	667	10,066	25,912	1,883	27,795
EWR Noise Abatement Measure 12	9,235	671	9,906	25,458	1,893	27,351
Total change from baseline	-164	4	-160	-454	10	-444

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change in dwelling units or population within the 65 DNL contour, Green indicates a reduction in dwelling units or population within the 65 DNL contour and red indicates an increase in dwelling units or population within the 65 DNL contour.

Table 2-28: Estimated Noise-sensitive Sites and Land Area for 2024 Baseline and Implement Nighttime "New Jersey Turnpike" Departure Procedures for Runways 22L and 22R (EWR Noise Abatement Measure 12) Exposed to 65 DNL and Higher
Source: Port Authority and HMMH, 2019

Scenario (All changes are within the 65 DNL contour)	Number of Noise-Sensitive Sites						Land Area Outside the Airport Boundary (Sq. Miles)		
	Transient Lodging	School	Place of Worship	Daycare	Medical	Total	Compatible	Noncompatible	Total
2024 Baseline	8	10	1	32	1	52	5.78	0.55	6.33
EWR Noise Abatement Measure 12	8	10	1	30	1	50	5.88	0.55	6.43
Total change from baseline	0	0	0	-2	0	-2	0.10	0	0.10

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change within the 65 DNL contour, Green indicates a reduction within the 65 DNL contour and red indicates an increase within the 65 DNL contour.

Conclusions: *EWR Noise Abatement Measure 12: Implement Nighttime "New Jersey Turnpike" Departure Procedures for Runways 22L and 22* could reduce the number of people (less than 500) in Elizabeth exposed to 65 DNL and higher, and could provide noticeable noise exposure reduction to residents west of the extended centerline of Runway 4R/22L during nighttime hours by not turning west until aircraft reach 10,000 feet in altitude.

The analysis of this measure assumed use of the procedure would be limited to nighttime when traffic volume is low to accommodate such procedures.

Table 2-29: Implementation Summary for EWR Noise Abatement Measure 12: Implement Nighttime "New Jersey Turnpike" Departure Procedures for Runways 22L and 22R
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Potential reduction of less than 500 people in less than 200 dwelling units exposed to 65 DNL and higher with implementation of the proposed measure.
Rationale	The Port Authority is recommending EWR Noise Abatement Measure 12 because it could reduce noise exposure experienced at noncompatible land uses south of the airport.
Responsible Parties	Development, safety review, environmental review, and the decision whether to implement flight procedures consistent with procedure development criteria is the sole responsibility of the FAA. The Port Authority will request that the development process be initiated, then will work with NY TRACON and other FAA personnel to further study and develop this procedure. Implementation of this measure may require an environmental study as required under the National Environmental Policy Act (NEPA); the FAA would be the responsible party complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are unknown and internal to the FAA (e.g., Air Traffic Organization) and other coordinating agencies. An FAA Airport Improvement Program grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require an environmental study under NEPA.
Estimated Schedule	The Port Authority to submit a request for its development within six to twelve months of the FAA's Record of Approval for the NCP. FAA design, testing and implementation of the procedure typically could take 18 to 24 months, potentially up to three years once the Port Authority requests initiation of the development process.

EWR Noise Abatement Measure 13: Continue Existing Mandatory Departure Noise Limit

The Port Authority has pursued aircraft noise abatement measures for several decades. In 1959, the Port Authority established a mandatory aircraft departure noise limit of 112 PNdB for aircraft departures at EWR. Operators of aircraft that violate the departure noise limit at EWR are contacted by the Port Authority and notified of the violation. The existing monitoring system at EWR, which currently consists of three monitors, supports the Port Authority's enforcement of this departure noise limit. The departure noise limit is a measure that was established before such measures were restricted by ANCA in 1990 and is therefore "grandfathered," permitting the Port Authority to continue the measure.[42] The Port Authority is recommending continuation of the existing departure noise limit, with no changes, to continue restricting operational activity that violates the limit. This provides benefits to communities in the vicinity of EWR.

Table 2-30 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Noise Abatement Measure 13.

[42] United States Environmental Protection Agency. "Legal and Institutional Analysis of Aircraft and Airport Noise and Apportionment of Authority Between Federal, State, and Local Governments." July 27, 1973. Page 2-57.

Conclusions: *EWR Noise Abatement Measure 13: Continue Existing Mandatory Departure Noise Limit* provides noise benefits to communities in the vicinity of EWR by restricting the types of aircraft activity that can occur at EWR.

Table 2-30: Implementation Summary for EWR Noise Abatement Measure 13: Continue Existing Mandatory Departure Noise Limit
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	The existing mandatory departure noise limit provides noise benefits to communities in the vicinity of EWR by continuing enforcement of the mandatory 112 PNdB departure noise limit at EWR.
Rationale	The Port Authority is recommending EWR Noise Abatement Measure 13 because it is the continuation of an existing mandatory noise abatement measure with no changes, and the existing measure provides benefits to communities in the vicinity of EWR.
Responsible Parties	The Port Authority.
Estimated Costs	Not Applicable.
Funding Sources	Not Applicable.
Requirements	Existing measure – No requirements to implement.
Estimated Schedule	Not applicable as this measure is currently implemented.

2.3. Noise Abatement Measures Considered but Not Recommended for Inclusion in this NCP

As required under 14 CFR Part 150, this section provides the noise abatement measures the Port Authority considered but is not recommending for inclusion in the EWR Noise Compatibility Program. Each measure provided below includes discussion of: (1) the entity(ies) that recommended the measure, (2) a description of the measure, (3) potential noise benefits, if any and (4) reason(s) for not recommending in this NCP the measure.

Increase the Arrival Glide Slope

The TAC and public requested that the Study Team evaluate the noise benefit of increasing the arrival glide slope into EWR. If the glide slope were increased, the aircraft would be higher above the ground on approach to the airport. The nominal arrival glide slope at most airports for all aircraft is 3°. As discussed in the TAC meetings, some aircraft are unable to fly an arrival glide slope much above 3°. Few exceptions to the 3° arrival glide slope exist, such as the 3.22° glide slope at San Diego International Airport due to rising terrain on approach.

The change in noise level to the receiver on the ground during final approach is mainly a function of distance between the receiver and the arriving aircraft (i.e. altitude). As such, with a simple calculation the reduction in noise can be estimated based on the aircraft approach angle to the runway and distance to the receiver on the ground. The calculation results in approximately 0.5 dB for every 0.2° increase in arrival glide slope angle, as shown in Table 2-31. If the glide slope at EWR were changed to the same as San Diego International Airport, the change in DNL, according to our spreadsheet analysis, near the 65 DNL would be approximately 0.6 dB.

Figure 2-17 shows the 65, 70 and 75 DNL contour and the 65.5, 70.5 and 75.5 DNL contour as a way of demonstrating the potential decrease in noise exposure due to an increased glideslope. The increased glideslope would reduce the extent of the 65 DNL contour in areas where the majority of land use is compatible.

Table 2-32 displays the change in affected dwelling units and population compared to the baseline (FAA-accepted 2024 NEM). Potentially, almost 2,000 people in about 700 dwelling units could be removed from the 65 DNL contour. Table 2-33 displays the change in noise-sensitive sites and contour land area compared to the baseline.

Reason for not recommending in this NCP:
Just as implementing OPDs, increasing the glideslope by 0.2° at EWR would interfere with existing airspace since the aircraft would be at higher altitudes further from the airport and possibly encroach other airport airspace boundaries. In addition, runways cannot have separate glideslopes assigned to them during the day and night since there is one approach chart[43] and associated glide slope that is published for each procedure. Therefore, while OPDs are recommended at night due to limited aircraft operations in the airspace, a distinct nighttime glideslope is not possible. In addition, an increased glideslope may result in some aircraft not being able to arrive at EWR due to the steeper descent rate and its impact on aircraft performance. The FAA, specifically the TRACON and Airport Traffic Control Tower, and Airport personnel were resistant to modifying arrival glideslopes on each of the EWR runways that comply with the current airport layout and the New York/New Jersey Airspace constraints.

[43] Having multiple approach charts to choose from would increase pilot selection and possible controller error and cause confusion with two charts for a single procedure.

Table 2-31: Glide Slope Effect on Aircraft Altitude and DNL
Sources: HMMH and Port Authority, 2019.

Runway	Existing Glide Slope	Dist. to 65 DNL contour (nmi)	Altitude at 65 DNL contour (ft)	Increase in glide slope (°)					
				0.1°		0.2°		0.3°	
				Increase in Altitude (ft) and estimated decrease in DNL (dB) at 65 DNL contour					
				Altitude	Decrease in DNL	Altitude	Decrease in DNL	Altitude	Decrease in DNL
4L	3.0°	2.9	923	30.8	0.3	61.7	0.6	92.5	0.8
4R	3.0°	3.6	1146	38.3	0.3	76.6	0.6	114.9	0.8
11	3.1°	0.2	66	2.1	0.3	4.3	0.5	6.4	0.8
22L	3.0°	3.9	1242	41.5	0.3	83	0.6	124.5	0.8
22R	3.0°	3.7	1178	39.3	0.3	78.7	0.6	118.1	0.8
29	3.0°	0.8	255	8.5	0.3	17	0.6	25.5	0.8

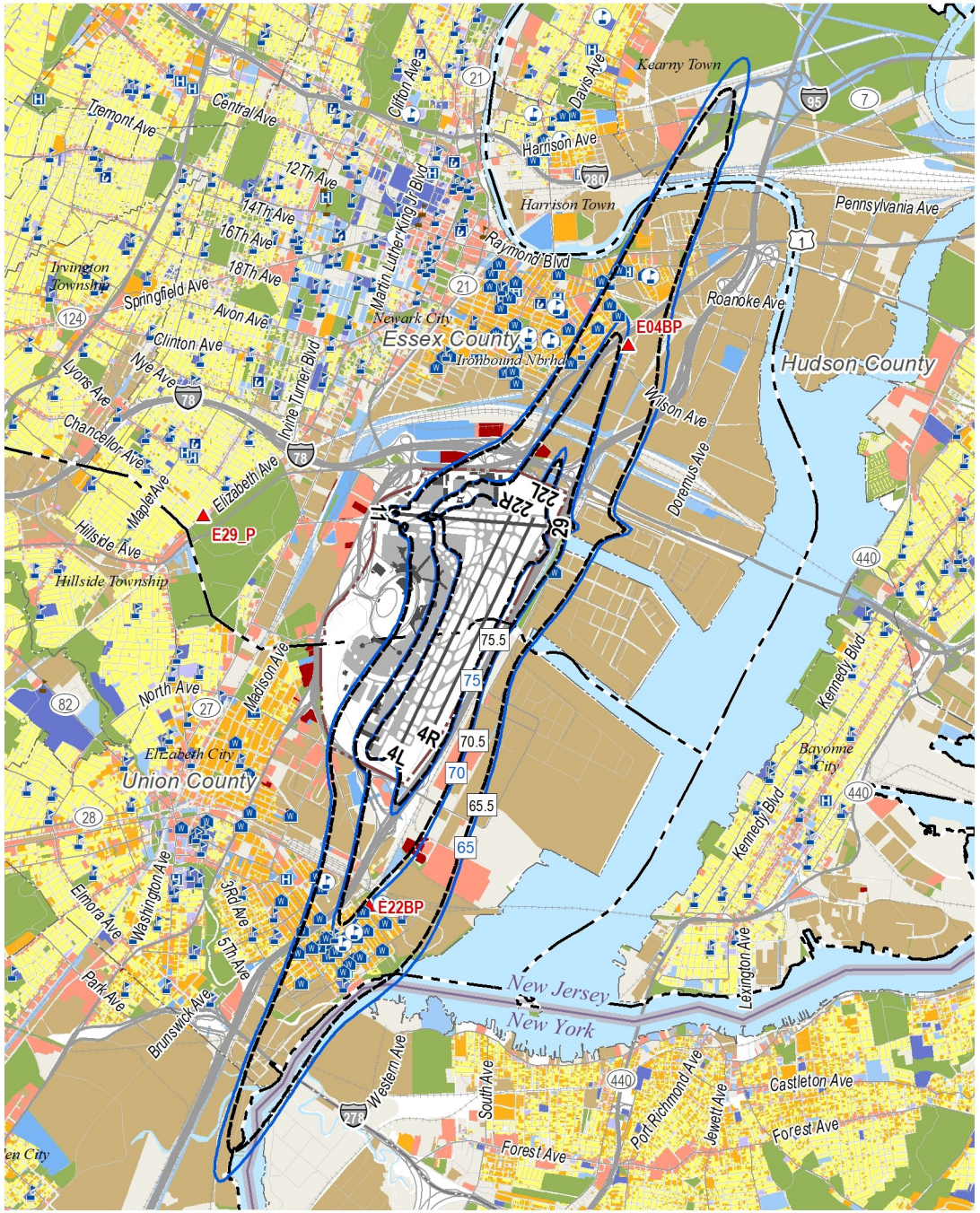

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Figure: 2-17

Hypothetical 2024 DNL with Increase in Glide Slope of 0.2 Degrees

- Hypothetical 2024 DNL
- DNL for 2024 Future Conditions Contour
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Library
- College/University
- Hospital
- Place of Worship

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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Table 2-32: Estimated Dwelling Units and Population Counts for 2024 Baseline and Analysis of Scenario with Increase in Glide Slope within Different Contour Intervals

Source: Port Authority and HMMH, 2019

Scenario (All changes are by unit or population within the DNL contour interval notated)	Number of Dwelling Units			Population		
	65-70	70+	Total	65-70	70+	Total
2024 Baseline	9,399	667	10,066	25,912	1,883	27,795
Increase in Glide Slope	9,030	314	9,344	24,982	873	25,855
Total change from baseline	-369	-353	-722	-930	-1,010	-1,940

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change in dwelling units or population within the 65 DNL contour, Green indicates a reduction in dwelling units or population within the 65 DNL contour and red indicates an increase in dwelling units or population within the 65 DNL contour.

Table 2-33: Estimated Noise-sensitive Sites and Land Area for 2024 Baseline and Analysis of Scenario with Increase in Glide Slope Exposed to 65 DNL and Higher

Source: Port Authority and HMMH, 2019

Scenario (All changes are within the 65 DNL contour)	Number of Noise-Sensitive Sites						Land Area Outside the Airport Boundary (Sq. Miles)		
	Transient Lodging	School	Place of Worship	Daycare	Medical	Total	Compatible	Noncompatible	Total
2024 Baseline	8	10	1	32	1	52	5.78	0.55	6.33
Increase in Glide Slope	6	10	1	30	1	48	5.05	0.52	5.57
Total change from baseline	-2	0	0	-2	0	-4	-0.73	-0.03	-0.76

Note: Cell color indicates whether there is benefit in introducing this EWR Noise Abatement Measure. No coloring indicates no change within the 65 DNL contour, Green indicates a reduction within the 65 DNL contour and red indicates an increase within the 65 DNL contour.

Turn Northbound Departures over West Hudson Park after Departing Runways 4L or 4R

A comment was received requesting evaluation of the noise benefit of moving northbound departures from EWR over West Hudson Park. West Hudson Park is outside the 65 DNL contours and changes to flight paths of departing aircraft in the vicinity of the park would increase noise exposure to those properties underlying that particular path. Figure 2-18 shows the location of Hudson County Park in relation to the 2024 65 DNL contour. As evident in the figure, there is residential development on all sides of West Hudson Park. Therefore, shifting flight paths to fly over the Park would increase noise exposure for those under that particular flight path and could be perceived as a shifting of noise from one neighborhood to another or concentrating flight paths over particular neighborhoods.

Reason for not recommending in this NCP:
Placing all aircraft that fly this particular procedure "over the Park" would shift a broad flight corridor into a narrow flight corridor resulting in increasing noise exposure to those properties underlying that particular path. In addition, the noise levels from individual aircraft operations would not noticeably change if those flying over the condo complex moved to fly over the Park as the condo complex is adjacent to the Park.

Develop and Implement a Rotational Runway Use Program & Alternate Departure Procedure/South Arrivals

The TAC and public requested evaluation of the noise benefit of implementing a rotational runway use program at EWR which would systematically alternate the runways used based on changing weather and traffic conditions. EWR operates within the FAA's existing runway use policy. The ATCT takes into account various factors to determine runway usage under the policy. These factors include, but are not limited to, runway availability, prevailing wind and weather patterns, runway length requirements, operational efficiency, and community noise concerns. Runway use and selection is directed by the FAA (and operator preference on occasion) and is primarily based on the prevailing winds and, because of airspace constraints, the operating configurations of the other area airports.[44] Rotating usage of runways at EWR in a manner that keeps the annual average runway use the same as it is today would not change the noise contours because the DNL metric is calculated using an annual-average day of operations. The same is true for rotating or alternating departures/arrivals on an hourly basis.

Reason for not recommending in this NCP:
The Port Authority does not recommend developing a rotational runway use program at EWR for noise purposes as such a measure would not result in a change to annual-average DNL at EWR since annual-average runway use would remain the same. The ATCT currently determines runway usage based on factors of changing weather and traffic, as well as other, more complex factors. Therefore, a rotational runway use program would likely reflect current runway usage at EWR on an annual-average basis. EWR Noise Abatement Measure 8 contains the Port Authority's recommended Preferential Runway Use Program, that would make Runway 29 the preferential runway for nighttime arrivals, moving them off of the parallel runways (Runway 4L/22R and Runway 4R/22L) to avoid noncompatible land uses.

[44] FAA Webinar – NY/NJ Airspace 101: http://panynjpart150.com/Airspace101reduced.mp4

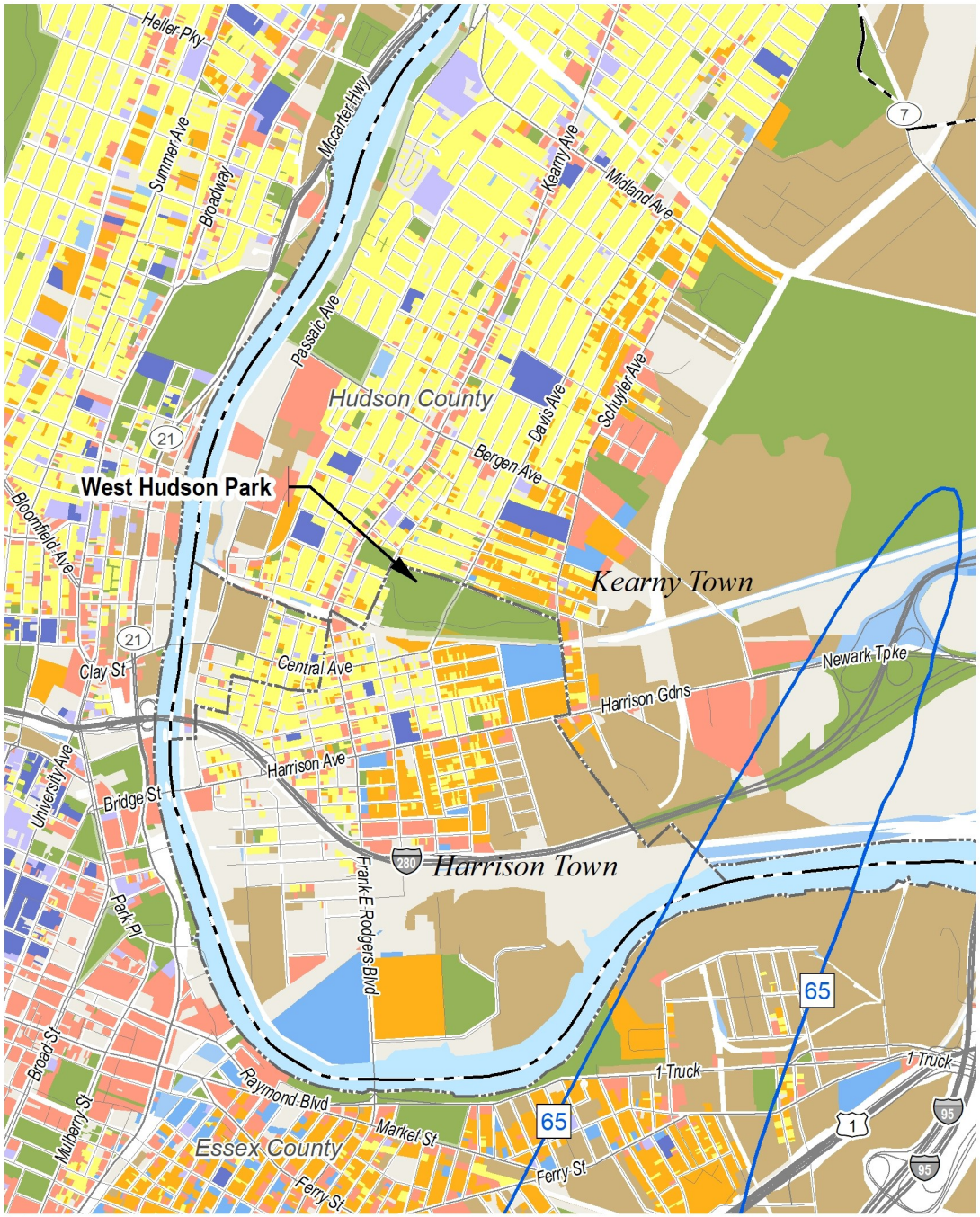

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Figure: 2-18

West Hudson Park in Relation to the 2024 65 DNL Contour

- DNL for 2024 Future Conditions Contour
- EWR Airport Boundary (Approximate)
- County Boundary
- Municipal Boundary

- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined

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Source:

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Increase Displaced Distance for Landing Thresholds on Runways 4L/22R and 4R/22L

The TAC and public requested evaluation of the noise benefit of increasing the displaced distance for landing thresholds at EWR. The landing threshold is a marking on a runway that indicates the area for aircraft to land. A displaced threshold is a location other than the end of the runway that indicates the start of the portion of the runway that is usable for landings. This displaced threshold does not affect departing aircraft or aircraft landing in the opposite direction, which may use the full length of the runway. Figure 2-19 shows a displaced landing threshold relative to the end of the runway.

EWR runways have existing displaced landing thresholds on all but one runway as shown in Table 2-34.

By placing the landing threshold farther down a runway, arriving aircraft can remain at a higher altitude as they approach the runway. The increased altitude on approach can reduce noise exposure due to the increased distance from the aircraft to the receiver on the ground below. The TAC requested evaluation of the feasibility of increasing the existing displaced thresholds on the parallel runways (Runways 4L/22R and 4R/22L).

Increasing displaced thresholds at the airport would affect safety and efficiency at the airport. In the current and forecast aircraft fleets at EWR, the MD11 aircraft has the longest runway requirement for landing distance. In poor weather conditions, the MD11 needs 8,250 feet of runway length to land. Runway 4L/22R is the longest runway at EWR with an overall length of 11,000 feet. When accounting for the displaced threshold on Runway 4L at 2,540, the resulting available runway for aircraft to land is 8,460 feet, just 210 feet longer than required. Runway lengths and displaced threshold locations are determined by the aircraft they are intended to serve, which includes the MD11 at EWR.

Table 2-34: Existing Displaced Landing Threshold by Runway
Sources: HMMH and Port Authority, 2019.

Runway	Displaced Landing Threshold (feet from end of Runway)
4L	2,540
4R	1,190
11	Not Applicable
22L	1,793
22R	1,440
29	224

Reason for not recommending in this NCP:
The runway lengths currently in place are required for efficiency and safety and adjusting the distances is not recommended at this time. The Port Authority will continue to work with the FAA to optimize the operations of the facilities at EWR, including the locations of the displaced thresholds on each of the runways as the needs change.

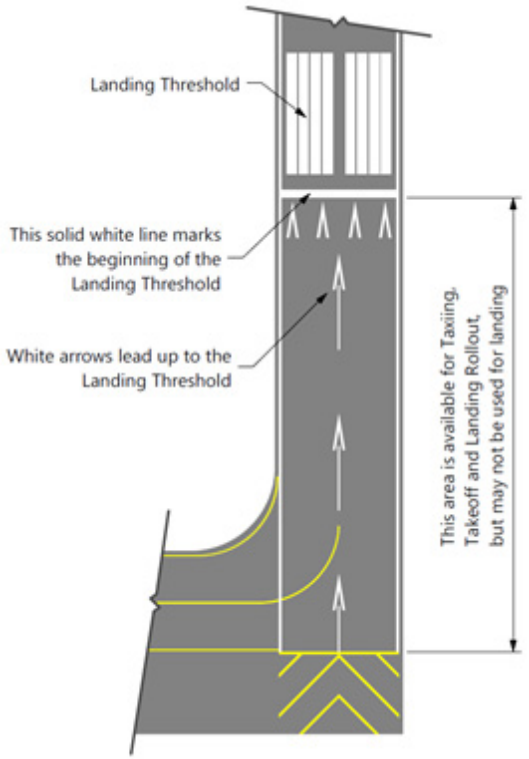


Figure 2-19: Landing Threshold Diagram
Source: HMMH, 2019

Implement an Aircraft Arrival Sequencing Program

The TAC requested evaluation of the noise benefits of implementing arrival sequencing at EWR by putting arrival aircraft in a specific order to optimize efficiency and utilization of the airspace sequencing in air traffic control procedures is to minimize delays, particularly during peak demand times. DNL contours might change[45] due to arrival sequencing if some arrivals during the 10 pm hour could be accomplished during the 9 pm or earlier hours as a result of fewer delays. Peak arrival times occur between the 11 am and 7 pm,[46] inclusively, with more than 25 arrivals per hour. The 9 pm and 10 pm hours have, on average 24 and 23 arrivals, which implies that arrivals are unlikely to be pushed to after 10 pm due to delays in the air traffic system other than those related to weather for which arrival sequencing would not affect. The Port Authority and FAA are continuing to find ways to reduce delays at EWR outside of the Part 150 Study.

Reason for not recommending in this NCP:
An aircraft arrival sequencing program would not likely affect the DNL contours at EWR because the annual average day, which is derived from aircraft operations data for an entire calendar year, would remain unchanged.

Implement Simultaneous Arrival/ Departure Procedures to the Parallel Runways

The TAC requested evaluation of the noise benefits of implementing simultaneous arrival and departure procedures using Runway 4L/22R and Runway 4R/22L. This measure would change the sequencing of aircraft arriving and departing EWR. The use of simultaneous approaches and departures is an important method for air traffic controllers to manage a high volume of traffic without extensive delays.[47]

The only possible change to DNL resulting from such procedures is if some arriving or departing aircraft during the 10 pm hour could be accomplished during the 9 pm or earlier hours because of fewer delays. As stated above, aircraft are unlikely to be pushed to after 10 pm due to delays in the air traffic system other than those resulting from weather. The implementation of this measure is not expected to change runway use. The Port Authority and FAA are continuing to find ways to reduce delays at EWR outside of the Part 150 Study.

Reason for not recommending in this NCP:
A simultaneous arrival/departure program would not likely affect the DNL contours because the annual average day, which is derived from aircraft operations data for an entire calendar year, would remain unchanged.

Add a Third Parallel Runway East of Runway 4R/22L

The TAC requested evaluation of the noise benefits of adding a third runway parallel to and east of Runway 4R/22L. Adding a third parallel runway east of Runway 4R/22L, or moving 4R/22L to the east, would potentially provide noise benefits since most noncompatible land use is to the west of the extended centerline of the existing Runway 4R/22L, whereas there is an abundance of compatible land use to the east. This suggested noise abatement strategy is not feasible because there is not enough room at EWR for another runway that could be added parallel to and east of Runway 4R/22L. EWR is essentially land locked due to the highways on all sides: Interstate 78 to the north, U.S Highways 1-9 to the west, Highway 81 to the south and Interstate 95 (New Jersey Turnpike) to the east. Due to the lack of land available to build a new runway or move Runway 4R/22L further east, a noise analysis of this potential noise abatement measure was not conducted.

Reason for not recommending in this NCP:
A third parallel runway at EWR is not recommended at this time because of the land constraints around the airport. Major highways and/or waterways on most sides drastically constrain the ability to incorporate another runway at EWR.

[45] The inclusion of arrival sequencing and the potential to move aircraft from the nighttime hours to the daytime hours does not change the number of aircraft overhead, but rather would change how DNL is calculated since nighttime aircraft operations (between 10pm and 7am) are weighted higher in the DNL calculation.
[46] Figure C.4-1 in the Appendix shows the average hourly arrivals operations.

[47] Any airport with parallel runways spaced less than 2,500 feet apart would have to comply with FAA Order JO Order 7110.308A "Simultaneous Dependent Approaches to Closely Spaced Parallel Runways"

Design, Install and Use End-Around Taxiways

The TAC requested evaluation of the noise benefits of using end-around taxiways at EWR. Taxiways that go around the runway ends are called End-Around Taxiways or EAT. An example of such a taxiway is illustrated in Figure 2-20. Use of End-Around Taxiways at airports like EWR that have parallel runways (Runway 4L/22R and Runway 4R/22L) can increase operational capacity of the runways and reduce the risk of potential runway incursions by eliminating the need to cross an active runway which reduces taxi times for some operations. Thus, End-Around Taxiways can reduce wait times to depart a runway. However, aircraft taxiing noise does not significantly contribute to the 65 DNL and higher contours in areas of noncompatible land use.

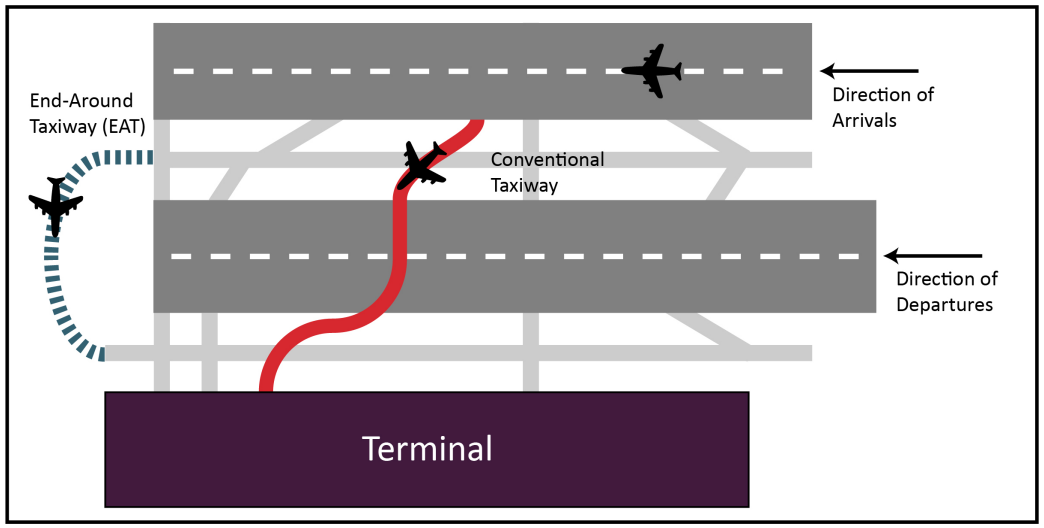


Figure 2-20: End-Around Taxiway Diagram
Source: HMMH, 2020

Reason for not recommending in this NCP:

An end around taxiway at EWR would not affect the DNL contours because the annual average day operations, which is derived from aircraft operations data for an entire calendar year, would remain unchanged. The Port Authority will consider such measures in their planning efforts, which include delay reduction.

Install Noise Barriers

The TAC requested evaluation of the noise benefits of noise barriers at EWR. Noise barriers, including earth berms and walls, can be effective at reducing noise from a source that is at or near ground level. For a noise barrier to reduce noise, the line of sight between the source and receiver needs to be blocked. Figure 2-21 illustrates the noise barrier concept. The barrier at the top of the figure is effectively placed. The barrier at the bottom of the figure is too far from either the source or receiver to be effective. The middle figure demonstrates that an earthen berm can effectively block noise.

The construction of barriers at airports also requires compliance with 14 CFR part 77 (Part 77) "Safe, Efficient use, and Preservation of the Navigable Airspace," the regulations that restricts the placement and height of structures near runways.

Engine run-ups are a source of ground noise at airports. Figure 2-22 shows the run-up locations as presented in the FAA-approved 2024 NEM at EWR.[48]

The Port Authority has not received any noise complaints associated with EWR aircraft ground operations and the 65 DNL and higher contours resulting from aircraft ground operations do not extend into areas of noncompatible land uses.

Reason for not recommending in this NCP:

At EWR, the 65 DNL and higher contours resulting from aircraft ground operations do not extend into areas of noncompatible land uses. Therefore, installation of a barrier would not reduce areas of noncompatible land uses.

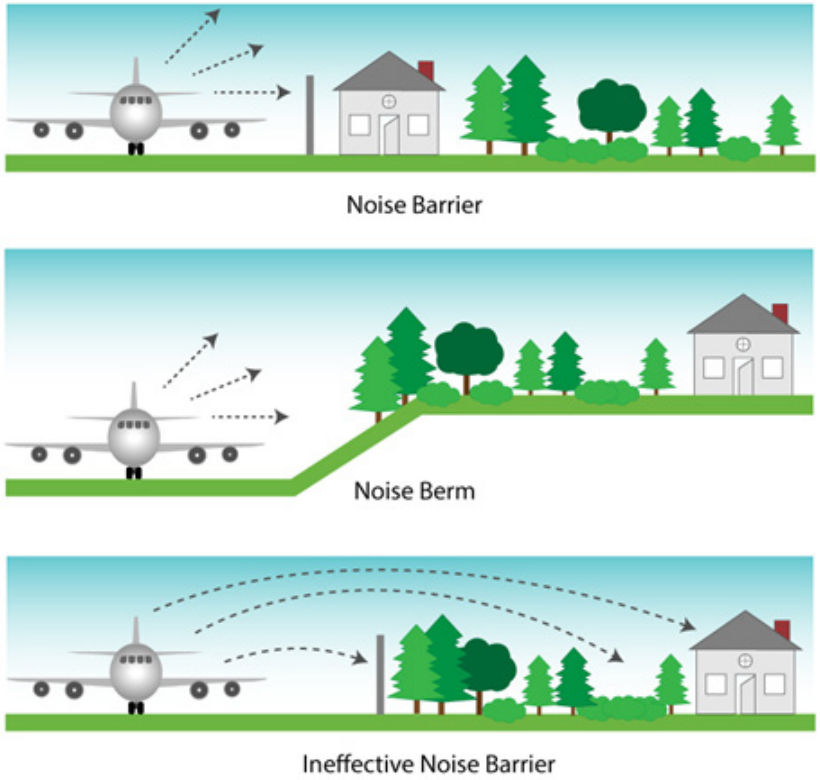
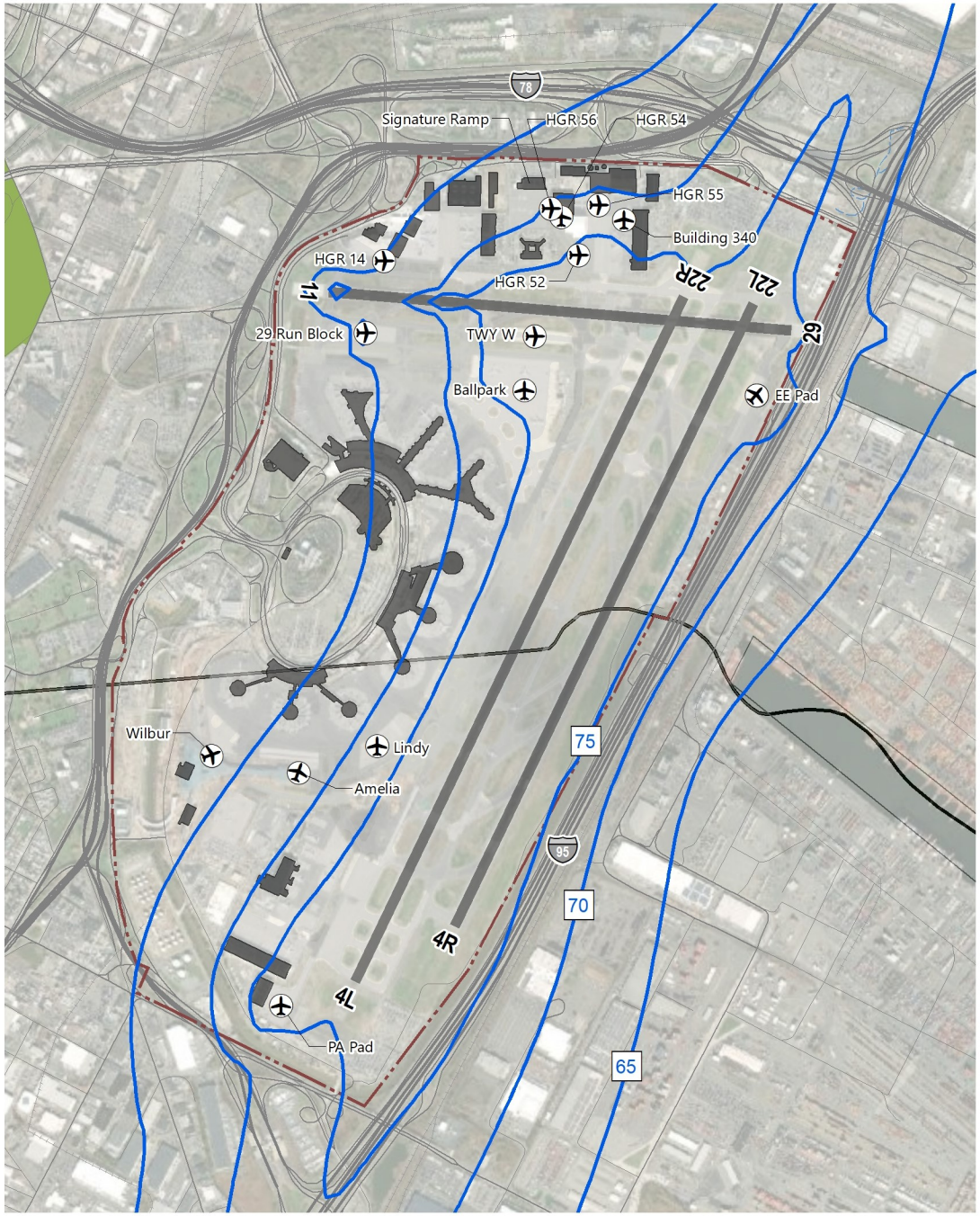


Figure 2-21: Illustration of the Effectiveness of a Noise Barrier for Aircraft Ground Noise

Source: HMMH, 2019

[48] Ground run-up locations as shown on the figure (such as Wilbur) may be relocated or removed due to the construction of the new Terminal A



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Newark Liberty International Airport

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Figure: 2-22

Ground Run-up Location Areas

DNL for 2024 Future Conditions Contour

EWR Airport Boundary (Approximate)

Runup Location

Aircraft Orientation
- Amelia – 20°
- Lindy - 0°
- Building 340 - 0°
- HGR 52 - 90°
- HGR 54 – 0°
- HGR 55 – 90°
- HGR 56 - 90°
- Wilbur - Varies
- 29 Run Block - Varies
- HGR 14 - Varies
- PA Pad - Varies
- EE Pad - Varies
- Ballpark - Varies
- TWY W - Varies

N

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Source: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Control the Number/Types of Aircraft and Discourage Traffic Increases

The TAC and public requested evaluation of the noise benefits of controlling the number and types of aircraft and discouraging traffic increases at EWR. In 2016, the FAA designated EWR as a Level 2 scheduled facility airport under the International Air Transport Association (IATA) Worldwide Slot Guidelines (WSG).[49] This designation, which became effective October 30, 2016, removed EWR from the more restrictive, slot-controlled Level 3 category, providing additional slots[50] for the FAA to issue to aircraft operators. Consistent with existing FAA practice for schedule facilitation at Level 2 airports, under the Level 2 designation at EWR, the FAA requests and reviews airline schedules for the 6 a.m. to 10:59 p.m. period and either approves the request or works with carriers to achieve schedule adjustments as needed to avoid exceeding the airport's capacity.

The Port Authority must abide by its FAA grant assurances, which require that the Port Authority provide access to its airports with no undue operational restrictions or burdens on interstate or foreign commerce. The Airport Noise and Capacity Act of 1990 limits the ability of airport authorities to implement new operational restrictions on jet operations. An airport operator may impose a use restriction through agreement of all airport users affected by the proposed restriction, or by obtaining FAA approval for the proposed use restriction pursuant to the requirements of 14 CFR Part 161. A restriction must meet all of the following statutory and regulatory conditions:

1. The restriction is reasonable, nonarbitrary and nondiscriminatory
2. The restriction does not create an unreasonable burden on interstate or foreign commerce
3. The restriction is not inconsistent with maintaining the safe and efficient use of the navigable airspace
4. The restriction does not conflict with a law or regulation of the United States
5. An adequate opportunity has been provided for public comment on the restriction
6. The restriction does not create an unreasonable burden on the national aviation system

In its analysis, the airport must show the benefits of a restriction outweigh the costs and that all non-restrictive measures have been shown to be ineffective at eliminating the noise and noncompatible land use addressed by the restriction. The EWR Part 150 study is intended to reduce or eliminate noncompatible land use.

Reason for not recommending in this NCP:
The Port Authority, through the recommended noise abatement, land use, and programmatic measures, plans to have a Noise Compatibility Program in place to adequately address all noncompatible land uses without the need for aircraft operation restrictions. In addition, the Port Authority must abide by grant assurances in place with the FAA – one of which is to not restrict operations.

[49] https://www.iata.org/policy/slots/Pages/index.aspx
[50] A slot is defined as the scheduled time of arrival or departure available for allocation by, or as allocated by, a coordinator for an aircraft movement on a specific date at a coordinated airport.

Remove Restricted Airspace over the Atlantic Ocean near New York/New Jersey

The public requested evaluation of the noise benefits at EWR if the restricted airspace over the Atlantic Ocean were removed. The FAA may designate special use airspace in which certain aircraft activities are confined or aircraft operations are limited. An FAA-designated special use airspace is located over 3 nautical miles east of New York and New Jersey, over the Atlantic Ocean. This area is limited to mission-approved military aircraft. The elimination of this restricted airspace would have no noise benefits around EWR because the area is over 3 nautical miles from EWR.

Reason for not recommending in this NCP:
Removing the restricted airspace over the Atlantic Ocean near New York and New Jersey is not recommended for inclusion in this NCP because the flight paths beyond the eastern U.S. coastline do not contribute to the aircraft noise exposure of 65 DNL and higher in the vicinity of EWR.

Use of De-rated Thrust Departure Procedures

The TAC and public requested evaluation of the noise benefits of using de-rated thrust departure procedures at EWR. Distinct from NADPs, aircraft operators commonly use reduced engine thrust ("de-rated") for departures as a means of saving fuel and increasing the life span of the jet engine. De-rated departures use a thrust level less than the maximum takeoff thrust allowed for and prescribed in an aircraft's airplane flight manual (AFM). The higher the thrust, the greater the engine noise.

Noise experienced on the ground from aircraft in flight is influenced by the noise being generated by the aircraft (with engine noise being the predominant noise source on departure), and the distance between the aircraft and the person (receiver) on the ground. A greater distance between the source and receiver results in a lower noise exposure at the receiver. While de-rated thrust departures generate less engine noise, they also result in the aircraft being closer to the receiver on the ground as de-rated thrust is less than takeoff thrust so the aircraft cannot climb as quickly. Therefore, the resulting noise exposure at the receiver location is not necessarily lower due to de-rated thrust on departure.

The noise model (INM) includes no de-rated thrust departure profiles and does not provide a means to determine de-rated thrust. Therefore, there is no current analysis or method to determine the noise benefits from de-rated thrust departures for EWR.

Reason for not recommending in this NCP:
The Port Authority cannot evaluate the potential noise benefits of de-rated thrust departures because there is no FAA- or industry-accepted method for computing noise benefits from this measure. The Port Authority will consider this measure if the FAA develops a tool capable of quantifying the noise benefits to the community.

2.4. Summary of Recommended Noise Abatement Measures

Appendix H summarizes the full list of recommended noise abatement measures.

Measures Already in Place at EWR

- EWR Noise Abatement Measure 2: Continue Use of Easterly Departure Headings on Runways 4L and 4R
- EWR Noise Abatement Measure 3: Continue Use of Easterly Departure Headings on Runways 22L and 22R
- EWR Noise Abatement Measure 13: Continue Existing Mandatory Departure Noise Limit

Measures to be Initiated at EWR within One Year of FAA Record of Approval

- EWR Noise Abatement Measure 1: Design and Implement an Offset Approach Procedure to Runway 22L
- EWR Noise Abatement Measure 4: Determine and Implement Optimal Easterly Departure Headings on Runways 4L and 4R
- EWR Noise Abatement Measure 5: Determine and Implement Optimal Easterly Departure Headings on Runways 22L and 22R
- EWR Noise Abatement Measure 6: Encourage Use of FAA-prescribed Distant Noise Abatement Departure Profile Procedures on a Voluntary Basis
- EWR Noise Abatement Measure 7: Minimize Nighttime Intersection Departures
- EWR Noise Abatement Measure 8: Implement a Nighttime Preferential Runway Use Program
- EWR Noise Abatement Measure 9: Implement Nighttime Optimized Profile Descent Procedures
- EWR Noise Abatement Measure 10: Implement Nighttime Unlimited Climb Procedures
- EWR Noise Abatement Measure 11: Implement Nighttime “New Jersey Turnpike” Departure Procedures for Runways 4L and 4R
- EWR Noise Abatement Measure 12: Implement Nighttime “New Jersey Turnpike” Departure Procedures for Runways 22L and 22R

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3. Land Use Management Measures

Land use management measures address aircraft noise in areas of high noise exposure that cannot be eliminated through the implementation of noise abatement measures as described in Chapter 2. Pursuant to the requirements of 14 CFR Part 150, this chapter evaluates corrective and preventive land use measures. Corrective land use measures, which are typically implemented by an airport operator, include land acquisition and sound insulation treatments of structures. In contrast, preventive measures prohibit the introduction of new noncompatible land uses and/or notifying potential buyers of properties affected by aircraft noise; such measures are typically implemented by the local planning and zoning jurisdictions.

The FAA and Port Authority of New York and New Jersey has no regulatory authority to control land uses around airports and recognizes that state and local governments are responsible for land use planning, zoning, and regulation. However, as a condition of receipt of FAA funding for airport development projects, an airport operator must provide the FAA with written assurances that "appropriate action, including the adoption of zoning laws have been or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations including the landing and takeoff of aircraft . . ."[51] In response to this FAA requirement, this NCP Report discusses preventive land use management measures in Section 3.3 on page 3-14 and 3.4 on page 3-16.

Table 1 of 14 CFR Part 150 (presented in this NCP as Table 1-1 on page 1-12) identifies land uses surrounding an airport that are acceptable within the 65, 70, and 75 DNL contours (compatible land uses). The table implies that virtually all land uses outside of the 65 DNL contour are compatible with aircraft noise.

In the context of noise mitigation, strategies that reduce existing noncompatible uses are known as corrective strategies, and those that limit the establishment of additional noncompatible uses are known as preventive strategies. Corrective noise mitigation strategies, such as the removal of noncompatible land uses (e.g., land acquisition) or the application of sound insulation, which focuses on reducing interior noise exposure. Preventive mitigation strategies are intended to discourage the development of new noncompatible land uses using techniques such as the application of zoning regulations and the modification of building codes.

Noncompatible land uses within the forecast 2024 NEM provided the basis for the cost and schedule estimates for implementation of each recommended land use measure. However, consistent with FAA guidance, the NEM will be updated regularly to ensure the land use measures address current or forecast aircraft noise exposure. Eligibility to implement the land use measures will depend on the FAA-accepted NEM at the time of implementation.

This chapter details the following three Land Use Measures recommended for inclusion in this NCP:

- EWR Land Use Measure 1: Sound Insulate Eligible Dwelling Units
- EWR Land Use Measure 2: Sound Insulate Eligible Non-Residential Noise-Sensitive Structures
- EWR Land Use Measure 3: Port Authority Assistance with Establishing an Airport Noise Overlay Zone

[51] Airport and Airway Development Act of 1970. Pub. L. 91-258. 84 Stat. 219-253. May 21, 1970.

3.1. Existing Land Use Management Measures

Prior to initiating this 14 CFR Part 150 Study, the Port Authority voluntarily implemented a school sound insulation program. Since the program began in 1983, 26 schools in the vicinity of EWR have been sound insulated to reduce noise impacts. Total program expenditures for the 26 schools exceed an estimated $95 million, which was paid for, in part, with FAA AIP grants. The soundproofing program included acoustic windows, insulation, ventilation and air conditioning.

Schools eligible for Sound Insulation were determined from noise contours developed internally by the Port Authority for EWR. The 26 schools treated are shown in . Table 3-1 provides a list of the 26 schools that were sound insulated. It is important to note that once a school has been insulated, it is considered a compatible use for the purposes of 14 CFR Part 150.

Table 3-1: Sound Insulated Schools

Source: Port Authority and HMMH, 2019

School	City	Type
Ann Street - Ph.I (New Building)	Newark	Elementary School
Ann Street - Ph.II (Middle Bldg)	Newark	Elementary School
Ann Street - Ph.III (Auditorium)	Newark	Elementary School
Benjamin Franklin School No. 131	Elizabeth	Elementary School
East Newark PS	East Newark	Elementary School
Franklin	Kearny	Elementary School
George Washington Academy School No. 1[1]	Elizabeth	Elementary School
Grover Cleveland & Elizabeth Holmes Middle School	Elizabeth	Middle School
Harrison HS	Harrison	Four-Year High School
Hawkins Street School[1]	Newark	Elementary School
Holy Cross	Harrison	Elementary School
John Marshal School No. 20[1]	Elizabeth	Elementary School
Moore Catholic HS	Staten Island	High School
St. Adalbert	Elizabeth	Closed
St. Benedict	Newark	K – 12 School
St. Patrick Elementary	Elizabeth	Closed
iPrep Academy School No 8[1, 2]	Elizabeth	Elementary School
St. Peter & St. Paul	Elizabeth	Closed
Wilson Avenue	Newark	Elementary
East Side HS (Design only)	Newark	Four-Year High School
Kearny HS	Kearny	Four-Year High School
Lincoln Elementary, Kearny	Kearny	Elementary School
McKinley	Newark	Elementary School
St. Casimir	Kearny	Closed
St. Cecilia	Newark	Elementary School
St. Stephen	Kearny	Elementary School

Notes:
[1] Schools are within the 2021 65 DNL Contour as described in Table 1-4 in Section 1.7
[2] Formerly St. Patrick High School; now closed

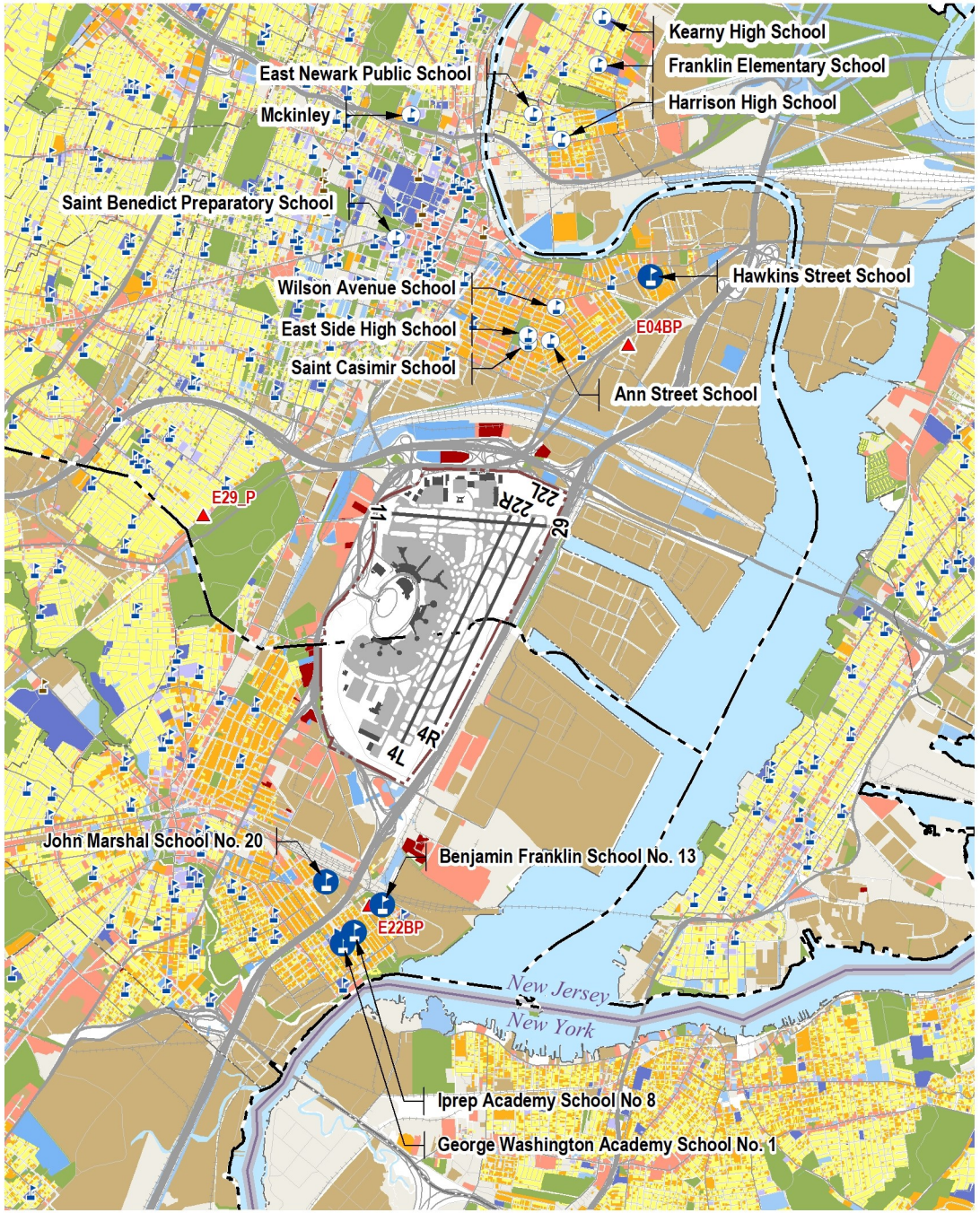

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Figure 3-1

Port Authority Sound Insulated Schools

- School
- Sound Insulated School
- Sound Insulated School (within Forecast 2024 65 DNL)
- EWR Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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3.2. Recommended Corrective Land Use Management Measures

This section describes ***corrective*** land use management measures that are recommended as part of the EWR Noise Compatibility Program. Corrective measures are applicable to off-airport land within the 65 DNL contour.

EWR Land Use Measure 1: Sound Insulate Eligible Dwelling Units

Types of dwelling units include, but are not limited to, single-family units, multi-family units (up to and including high-rise buildings}, and multi-use structures (such as those with retail on the ground floor and dwelling units above). Compatible areas of multiuse structures are not eligible for sound insulation.

Sound insulation treatments may include window and door replacement, caulking, weather stripping, and positive air ventilation. The purpose of positive air ventilation is to allow for replacement windows and doors to remain closed to provide the full benefit of the sound insulation treatment to residents. Positive ventilation systems use a fan to draw outside air into an indoor space, pressurizing the space. Indoor air is exhausted out of the building through sound-insulated exterior openings.[52]

Sound insulation does not change the outdoor noise environment (e.g., backyards, patios, and courtyards). The goal of sound insulation under 14 CFR Part 150 is to provide an average interior noise level of 45 DNL or below and to provide at least a 5-dB improvement to the structure. Based on the experience of other airports' residential sound insulation programs, sound insulation is effective in reducing interior noise exposure and has a high level of satisfaction among dwelling unit occupants.

Noise attenuating windows and doors are most effective at reducing interior noise levels when they are closed. Keeping them closed can reduce interior air circulation, which in turn can increase moisture levels. To address such ventilation issues and allow for air circulation inside structures, installation of positive air ventilation systems is commonly included as part of sound insulation programs at other airports. The FAA has determined that positive ventilation systems are an eligible mitigation option for both private dwelling units and non-residential noise-sensitive structures, provided that all other eligibility requirements in the *AIP Handbook* are met.

In residential sound insulation programs funded in part by FAA AIP grants, a dwelling unit is only eligible for sound insulation if it meets all of the criteria set forth in the *AIP Handbook*,[53] Appendix R.[54] A dwelling unit is not eligible for federally funded sound insulation just by virtue of its location inside the 65 DNL contour. Rather, to be eligible, the dwelling unit must meet, at a minimum, the following criteria:

1. Located within the 65 DNL contour of an FAA-accepted NEM.
2. Constructed before the first publication of FAA-accepted DNL contours.[55] In the case of EWR FAA-accepted DNL contours were first made available to the public on January 15, 2019. Therefore, dwelling units constructed after January 15, 2019, are not eligible for sound insulation.[56]
3. Adherence with the local building code.[57]
4. An average noise level in habitable rooms at or above 45 DNL (with windows closed).

[52] National Academies of Sciences, Engineering, and Medicine. 2013. Guidelines for Airport Sound Insulation Programs. Washington, DC: The National Academies Press. https://doi.org/10.17226/22519. Section 7.5.3.

[53] FAA Order 5100.38D, Airport Improvement Program Handbook, dated 9/30/2014.

[54] Determination of eligibility would be made when the EWR Noise Compatibility Program has been approved, program protocols have been established, and the NCP implementation phase has been initiated.

[55] On March 27, 1998, FAA issued a policy on 14 CFR Part 150 airport noise compatibility programs that limits approval of remedial mitigation measures, e.g., sound insulation, property acquisitions, and relocation, to land uses that were in place as of October 1, 1998 unless an airport operator can demonstrate that DNL contours were not published prior to that date. New noncompatible uses resulting from airport expansion may be eligible for funding consideration. For EWR, 65, 70, and 75 DNL contours were first made available to the public on January 15, 2019.

[56] Port Authority of New York and New Jersey, "Newark Liberty International Airport, Title 14 Code of Federal Regulations (CFR) Part 150, Noise Exposure Map Report, January 2019.

[57] Areas within a structure that do not meet the local building code are not "habitable" under FAA requirements and, therefore, are not eligible for sound insulation that is funded with AIP grants. The *AIP Handbook*, Appendix R, provides the following example of an area that is not eligible for sound insulation: "A resident has converted part of a basement to a bedroom and the bedroom conversion does not meet the building code requirements to be categorized as a bedroom. The converted bedroom is not considered habitable space."

The following residential noise-sensitive structures may be eligible for federally-funded positive ventilation systems: (1) structures that qualify for sound insulation and do not have existing positive ventilation systems, and (2) structures that do not qualify for sound insulation and require positive ventilation so that exterior doors and windows can be kept closed to obtain the noise-level reduction required for compatibility.

Residential and non-residential noise-sensitive structures that do not have positive ventilation systems and are determined to be eligible for federally funded positive ventilation systems would be divided into two groups:

1. Existing interior noise exposure of *at least* 45 DNL
2. Existing interior noise exposure *below* 45 DNL, but only with having all exterior doors and windows closed

According to Table C-5 of the *AIP Handbook*, the FAA may not authorize the installation of sound insulation for structures with non-residential noise-sensitive land uses that are temporarily located in commercial facilities (e.g., a house of worship or day care facility under lease in a retail/commercial facility). In addition, mobile dwelling units are not eligible because FAA has determined that there are no effective sound insulation methods or materials for mobile homes (*AIP Handbook*, Table C-5).

According to 14 CFR Part 150, Appendix A, Sec. 101, a noise-sensitive land use is considered compatible and, therefore, not eligible for sound insulation funded by FAA AIP grants "if the self-generated noise from a given use and/or the ambient noise from other non-aircraft and non-airport uses is equal to or greater than the noise from aircraft and airport sources." Ambient noise exposure generally increases as intensity of development increases, ranging from rural to suburban to urban to dense urban environment. The City of Newark and the City of Elizabeth include land uses that can be classified at the higher end of this range. Areas in proximity to EWR generally fall within the urban to dense urban classification. The areas closest to the Airport would be classified as urban or dense urban. Information from the Port Authority's Airport Noise and Operations Management System (ANOMS) indicates that community noise exposure at the noise monitors placed around EWR vary from around the 70 DNL range of non-aircraft noise measurements at those sites. Section 5.4 of the EWR NEM Report discusses the comparison of measured aircraft noise to ambient noise in the community in further detail.

According to Appendix R-9 of the *AIP Handbook*, a dwelling unit located outside of the 65 DNL contour may be eligible for sound insulation in some circumstances. Pursuant to Appendix R-9 of the *AIP Handbook*, dwelling units located on or immediately outside the 65 DNL contour may be eligible for FAA-funded sound insulation treatments under the concept of "block rounding." Block rounding involves expanding noise mitigation just beyond the 65 DNL contour to "include parcels contiguous to the project area." The FAA has the option of approving a request for block rounding if all requirements in Table R-2 of the *AIP Handbook* are met. The FAA is not obligated to approve a request for block rounding. Furthermore, a parcel included in a request for block rounding must meet all other eligibility requirements described in Appendix R of the *AIP Handbook*, such as being a noise-sensitive land use, having an average sound level above 45 DNL in habitable rooms, and being constructed before publication of FAA-accepted noise contours.

In addition, pursuant to Appendix R-10 of the *AIP Handbook*, an airport sponsor may "consider the use of neighborhood equity when a few dwelling units in the eligible noise contour (pursuant to Paragraph R-6) that do not meet the interior noise level requirements are scattered among dwelling units that meet the interior noise level criteria." The FAA has the option, but is not obligated, to approve such requests for consideration of neighborhood equity. The dwelling units in consideration would have to meet all other eligibility requirements, such as having an average sound level above 45 DNL in habitable rooms and being constructed before publication of FAA-accepted noise contours.

The FAA also has discretion to fund sound insulation for dwelling units located in structures that contain a mix of residential and commercial uses (e.g., buildings with retail on the first floor and apartments in upper floors).[58] In addition, a modular structure that has a noise-sensitive use may be eligible for sound insulation if the structure is permanent and meets the same building requirements for non-modular structures, as given in Appendix R of the *AIP Handbook*.

For a dwelling unit to be eligible for positive ventilation as part of a treatment package, it cannot have an existing positive ventilation system. A full list of eligibility requirements for positive ventilation is provided in Table R-6 and other relevant parts of Appendix R of the *AIP Handbook*.

In exchange for accepting sound insulation under EWR Land Use Measure 1, the property owner must provide to the Port Authority an avigation easement. An avigation easement is a conveyance of airspace over another property for use by the airport. The property owner has restricted use of their property subject to the airport sponsor's easement for overflight and other applicable restrictions on the use and development of the parcel. Avigation easements run with the land (i.e., are attached to the property for so long as the easement is in effect). Therefore, an avigation easement binds future property owners and informs them of the property's exposure to aircraft noise while also restricting use of the parcel as described in the avigation easement.

The specific language of the avigation easement will be developed by the Port Authority during the initiation of its noise mitigation program, which will implement the corrective land use measures. The avigation easement will be attached to the property deed and filed with the local jurisdiction prior to the Port Authority accepting the dwelling unit into the EWR sound insulation program.

Positive ventilation is paid for by the FAA only on a discretionary basis. Positive ventilation will not automatically be provided to noise-sensitive structures. In addition, an avigation easement would be required in order to receive positive ventilation.

Costs to complete sound insulation for dwelling units were estimated based on recent residential sound insulation projects in the northeastern United States, adjusted to reflect construction costs in the New York–New Jersey metropolitan area. This includes data from the first four phases of the sound mitigation program for T.F. Green Airport (PVD) in Rhode Island (2013 through 2015), which is a recent noise mitigation program with similar dwelling unit construction types, along with a review of New York and New Jersey construction cost indices in RSMeans data from Gordian.[59] The construction cost per dwelling unit was estimated to be approximately $35,000 to $85,000 (in 2018 dollars), with a weighted average estimated cost of $58,000 per dwelling unit. Based on soft costs (project administration, legal, etc.) associated with recent residential sound insulation projects in the northeastern United States and based on Port Authority experience with the school sound insulation program, costs other than actual construction costs were estimated to be approximately 30 percent of construction costs. A 15 percent contingency was then added for unforeseen conditions that may be encountered during construction. Assuming no other measures in this NCP are taken to change the noise contours, 100 percent participation in the program, and 85 percent of the 10,066 dwelling units within the 65 DNL contour are eligible for sound insulation, the Port Authority estimates a cost of approximately $720 million (in 2018 dollars) to complete the EWR residential sound insulation program (construction costs plus soft costs) for 10,066 dwelling units accounting for a population of 23,626 people.[60]

[58] 14 CFR Part 150, Appendix A, Table 1 (included in this NCP Report as Table 1-1 on page 1-12) indicates that residential land uses are not compatible with aircraft noise exposure of 65 DNL or higher.

[59] Gordian Construction Publishers & Consultants, Construction Cost Indexes with RSMeans data, Volume 44, Number 1, January 2018.

[60] Assuming a consistent population across all dwelling units for estimates. Note that due to rounding, numbers may not add up precisely to the totals indicated.

The Port Authority would offer positive ventilation systems to the following categories of structures within the 65 DNL contour (subject to meeting all eligibility requirements): (1) residential and non-residential structures that qualify for sound insulation and do not have existing positive ventilation systems, and (2) residential and non-residential structures that do not qualify for sound insulation and require positive ventilation so that exterior doors and windows can be kept closed to obtain the noise-level reduction required for compatibility.

For the second eligibility group, which includes structures that do not qualify for sound insulation and require positive ventilation so that exterior doors and windows can be kept closed to obtain the noise-level reduction required for compatibility, the Port Authority has estimated that approximately 15 percent of the identified noncompatible dwelling units (approximately 1,510 dwelling units or population of 4,169 people).[61] These structures may be offered positive ventilation as a means of obtaining noise level reduction with doors and windows closed.

Additional factors evaluated for each site include:

- Existence of air conditioning/positive ventilation
- The existence of a significant number of windows (including stained glass windows)
- Overall condition of the structure (good, fair, or poor)

The Port Authority estimates a cost of $44 million to provide positive ventilation to an estimated 1,510 dwelling units (construction costs are assumed to be $20,000 per dwelling unit).[62] This estimate is based on recent conversations with sound insulation experts and available construction cost index data. Based on soft costs (project administration, legal, etc.) associated with recent residential sound insulation projects in the northeastern United States and based on Port Authority experience with the school sound insulation program, costs other than actual construction costs were estimated to be approximately 30 percent of construction costs. A 15 percent contingency for unforeseen conditions that may be encountered during construction was added.

The total cost of this measure is estimated to be $764 million (in 2018 dollars).

In implementing EWR Land Use Measure 1 (if approved by FAA), the Port Authority will follow FAA's guidelines as outlined in the AIP handbook for a residential sound insulation program (i.e. starting at the highest level of noise exposure within the noise contour areas moving outwards to the 65 DNL).

Once sound insulation programs are well established and proceeding at a relatively regular pace, airport operators typically can install sound insulation in 50 to 250 dwelling units per year. Depending on the availability of program funding[63] from year to year, the pace of construction and other factors, this program may take many years to complete. As a result of inflation, the costs per dwelling unit will increase over time. Therefore, total program costs will be higher than what is projected in 2018 dollars.

The Port Authority intends to fund 80 percent of eligible costs for residential sound insulation with FAA AIP grants and the remaining 20 percent with fees paid by users of EWR pursuant to an agreement between them and the Port Authority.

Table 3-2 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Land Use Measure 1.

[61] Based on field observations of the presence or absence of storm windows on a sample of properties around EWR, and data from the T.F. Green sound mitigation program (2013–2015).

[62] Note that due to rounding, numbers may not add up precisely to the totals indicated.

[63] The Port Authority intends to fund the cost of residential sound insulation and positive ventilation with FAA AIP grants and, for portions not covered by AIP grants, fees paid by users of EWR pursuant to an agreement between the EWR airport users and the Port Authority. AIP grants can cover up to 80% of eligible costs of residential sound insulation and positive ventilation. Not all contingencies and soft costs may be eligible for AIP funding.

Conclusions: *EWR Land Use Measure 1: Sound Insulate Eligible Dwelling Units* could provide appropriate noise level reduction inside the dwelling units and improve the noise level reduction of the structures by at least 5 dB. The sound insulation of dwelling units could be an effective way to improve compatibility with aircraft noise.

Table 3-2: Implementation Summary for EWR Land Use Measure 1: Sound Insulate Eligible Dwelling Units
Sources: HMMH and Port Authority, 2021.

Implementation Item	Discussion
Benefits	Installation of sound insulation and positive ventilation treatments provides adequate noise reduction inside people's homes for compatibility with indoor activities. Once treated, a property is considered compatible with aircraft noise.
Rationale	The Port Authority is recommending EWR Land Use Measure 1 because it could be an effective way to provide appropriate noise level reduction inside eligible dwelling units.
Responsible Parties	The Port Authority.
Estimated Costs	$764 million to provide sound insulation treatments to 10,066 dwelling units and a population of 27,795, subject to the assumptions and limitations set forth in EWR Land Use Measure 1.
Funding Sources	80 percent of eligible costs FAA Airport Improvement Program grants and 20 percent Port Authority. Costs borne by the Port Authority would be recovered through the EWR flight fee agreement.
Requirements	FAA approval, identification of eligible properties, and funding secured to sound insulate properties.
Estimated Schedule	The Port Authority will seek to request federal financial assistance to set up a sound insulation program for EWR when economic conditions recover following the COVID-19 pandemic and any updates of the NEMs, if necessary. Consistent with Part 150 requirements, the Port Authority will evaluate any changes in the noise environment at EWR and notify the FAA whether the NEM continues to be a reasonable representation of current and/or forecast conditions at EWR or submit an updated NEM to the FAA for acceptance. The noise mitigation program set up task will determine the implementation schedule for EWR Land Use Measure 1.

EWR Land Use Measure 2: Sound Insulate Eligible Non-Residential Noise-Sensitive Structures

Non-residential noise-sensitive structures, according to current FAA land use compatibility designations,[64] include public use facilities such as schools, places of worship, libraries, daycares, and transient lodging. Sound insulation programs provide compatible noise environments inside structures to mitigate aircraft noise exposure. Sound insulation treatments may include window and door replacement, caulking, weather stripping, and positive air ventilation.

The purpose of sound insulation is to provide an average interior of 45 DNL[65] or below and at least a 5-dB improvement to the noise level reduction of the structure with the installation of the treatments. All eligibility requirements in Appendix R of the *AIP Handbook* must be met. Several key eligibility requirements are summarized in EWR Land Use Measure 1.

In non-residential sound insulation programs funded in part by FAA AIP grants, a structure is only eligible for sound insulation if it meets all of the criteria set forth in the *AIP Handbook*,[66] Appendix R.[67] A structure is not eligible for federally funded sound insulation just by virtue of its location inside the 65 DNL contour. Rather, to be eligible, the structure must meet, at a minimum, the following criteria:

1. Located within the 65 DNL contour of an FAA-accepted NEM.
2. Constructed before the first publication of FAA-accepted DNL contours.[68] In the case of EWR FAA-accepted DNL contours were first made available to the public on January 15, 2019. Therefore, dwelling units constructed after January 15, 2019, are not eligible for sound insulation.[69]
3. Adherence with the local building code.[70]
4. An average noise level in *noise-sensitive* rooms at or above 45 DNL (with windows closed).

The following non-residential noise-sensitive structures may be eligible for federally-funded positive ventilation systems: (1) structures that qualify for sound insulation and do not have existing positive ventilation systems, and (2) structures that do not qualify for sound insulation and require positive ventilation so that exterior doors and windows can be kept closed to obtain the noise-level reduction required for compatibility.

Non-residential noise-sensitive structures that do not have positive ventilation systems and are determined to be eligible for federally funded positive ventilation systems would be divided into two groups:

1. Existing interior noise exposure of *at least* 45 DNL
2. Existing interior noise exposure *below* 45 DNL, but only with having all exterior doors and windows closed

According to Table C-5 of the *AIP Handbook*, the FAA may not authorize the installation of sound insulation for structures with non-residential noise-sensitive land uses that are located in temporary commercial facilities (e.g., a house of worship or day care facility under lease in a retail/commercial facility). In addition, mobile structures are not eligible because FAA has determined that there are no effective sound insulation methods or materials for mobile homes (A*IP Handbook*, Table C-5).

[64] 14 CFR Part 150, Appendix A, Table 1.

[65] Average interior DNL from aircraft operations for non-residential noise-sensitive structures is based on the time of day that the facility is in use. For example, places of worship have particular times that noise-sensitive rooms are in use, and the average interior noise level is to be based on the times these rooms are in use rather than a full 24-hour day. For example, schools often use a school-time Leq (equivalent noise level) rather than the DNL for eligibility and design requirements.

[66] FAA Order 5100.38D, Airport Improvement Program Handbook, dated 9/30/2014.

[67] Determination of eligibility would be made when the EWR Noise Compatibility Program has been approved, program protocols have been established, and the NCP implementation phase has been initiated.

[68] On March 27, 1998, FAA issued a policy on 14 CFR Part 150 airport noise compatibility programs that limits approval of remedial mitigation measures, e.g., sound insulation, property acquisitions, and relocation, to land uses that were in place as of October 1, 1998 unless an airport operator can demonstrate that DNL contours were not published prior to that date. New noncompatible uses resulting from airport expansion may be eligible for funding consideration. For EWR, 65, 70, and 75 DNL contours were first made available to the public on January 15, 2019.

[69] Port Authority of New York and New Jersey, "Newark Liberty International Airport, Title 14 Code of Federal Regulations (CFR) Part 150, Noise Exposure Map Report, January 2019.

[70] Areas within a structure that do not meet the local building code are not "habitable" under FAA requirements and, therefore, are not eligible for sound insulation that is funded with AIP grants. The *AIP Handbook*, Appendix R, provides the following example of an area that is not eligible for sound insulation: "A resident has converted part of a basement to a bedroom and the bedroom conversion does not meet the building code requirements to be categorized as a bedroom. The converted bedroom is not considered habitable space."

According to 14 CFR Part 150, Appendix A, Sec. 101, a noise-sensitive land use is considered compatible and, therefore, not eligible for sound insulation funded by FAA AIP grants "if the self-generated noise from a given use and/or the ambient noise from other non-aircraft and non-airport uses is equal to or greater than the noise from aircraft and airport sources." Ambient noise exposure generally increases as intensity of development increases, ranging from rural to suburban to urban to dense urban environment. The City of Newark and the City of Elizabeth include land uses that can be classified at the higher end of this range. Areas in proximity to EWR generally fall within the urban to dense urban classification. The areas closest to the Airport would be classified as urban or dense urban. Information from the Port Authority's Airport Noise and Operations Management System (ANOMS) indicates that community noise exposure at the noise monitors placed around EWR vary from around the 70 DNL range of non-aircraft noise measurements at those sites. Section 5.4 of the EWR NEM Report discusses the comparison of measured aircraft noise to ambient noise in the community in further detail.

The 2024 DNL contours include five schools that received sound insulation treatments during previous Port Authority sound insulation programs as well five schools that did not receive sound insulation treatments from the previous Port Authority program. It also includes 32 Places of Worship and one library, for a total of 38 non-residential noise-sensitive structures within the 65 DNL contour as shown in Table 3-3.

The RSMeans Square Foot Cost Estimating Guide[71] and information from similar projects at other airports were used to estimate the cost of sound insulation and positive ventilation for these structures. To provide a basis for cost estimation, square footage of each structure was determined using high-resolution aerial photography and Google Street View. Additional factors evaluated for each site included:

- Existence of air conditioning/positive ventilation
- A significant number of windows (including stained glass windows)
- Overall condition of the structure (good, fair, or poor)

A 10 percent contingency was then added for design, along with an additional 15 percent contingency for unforeseen conditions that may be encountered during construction. An estimate of soft costs (project administration, legal, etc.) associated with non-residential sound insulation was assumed to be similar to the soft costs associated with residential sound insulation, which was estimated to be approximately 30 percent of the construction costs.

The Port Authority estimates a cost of $450,000 to provide positive ventilation to an estimated three non-residential noise-sensitive structures (construction costs are assumed to be $150,000 for non-residential noise structures). Additionally, the Port Authority estimates a cost of $310.5 million (in 2018 dollars) to provide sound insulation treatments to the 38 non-residential noise-sensitive structures identified. The total cost of this measure is estimated to be $311 million (in 2018 dollars).

The Port Authority will work with the FAA to develop a plan for identifying eligible properties within the 65 DNL. This will be developed independently of the NCP process and specifics of the plan will be subject to FAA NCP approval.

Table 3-4 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Land Use Measure 2.

[71] The cost by square foot was determined through a review of similar projects at other airports, adjusted to 2018 dollars using the Building Cost Index published by Engineering News-Record and converted to the New York location factor published by RSMeans.

Table 3-3: Noise-sensitive Sites within 2024 65 DNL Contour Potentially Eligible for Sound Insulation
Sources: RS&H, HMMH, 2019

Noise-Sensitive Site	Type	Contour Interval	Address	City
Dr. Martin Luther King Jr. Ecc #52	Nursery/Preschool	65-70 dB	130 Trumbull Street	Elizabeth
Jerome Dunn Academy No 9	Grades K-8	65-70 dB	201 Livingston Street	Elizabeth
Juan Pablo Duarte - Jose Julian Marti #28	Elementary School	65-70 dB	25 First Street	Elizabeth
Innovative Education Programs	Pre-School	65-70 dB	697 Market Street	Newark
Rainbow Land Learning Center II	Pre-School	65-70 dB	115 Gotthardt St.	Newark
City of Elizabeth Library	Library	65-70 dB	102 Third Street	Elizabeth
Trinity Reformed Church	Place of Worship	65-70 dB	483 Ferry St.	Newark
St Aloysius Church	Place of Worship	65-70 dB	66 Flemming Ave	Newark
Maranatha Fellowship Church	Place of Worship	65-70 dB	97 St Francis St.	Newark
Universal Church	Place of Worship	65-70 dB	51 St Francis St.	Newark
St Benedict Church	Place of Worship	65-70 dB	65 Barbara St.	Newark
St Peter & Paul Roman Catholic	Place of Worship	65-70 dB	211 Ripley Pl.	Elizabeth
Iglesia De Dios Pentecostal	Place of Worship	65-70 dB	269 Second St.	Elizabeth
St Adalbert's Church	Place of Worship	65-70 dB	250 E Jersey St.	Elizabeth
Church of the Nazarene Iglesia	Place of Worship	65-70 dB	214 Fulton St.	Elizabeth
Greater Faith Temple	Place of Worship	65-70 dB	128 Broadway.	Elizabeth
St Peter & Paul Byzantine	Place of Worship	65-70 dB	316 1st Ave.	Elizabeth
Immaculate Heart of Mary and Saint Patrick's	Place of Worship	65-70 dB	215 Court St.	Elizabeth
Church	Place of Worship	65-70 dB	213 Bond Street	Elizabeth
SDA Del Puerto Church	Place of Worship	65-70 dB	114 South Park Street	Elizabeth
Iglesia de Dios Pentecostal Cristo Te llama, Inc	Place of Worship	65-70 dB	221 East Jersey St.	Elizabeth
Liberty Baptist Church	Place of Worship	65-70 dB	515 Court Street	Elizabeth
Iglesia Nueva Vida	Place of Worship	65-70 dB	51 3rd Street	Elizabeth
Mount Cavalry United Church of God	Place of Worship	65-70 dB	1st Street & Community Lane	Elizabeth
Bethel Holy Church	Place of Worship	65-70 dB	242 3rd Street	Elizabeth
Glorious Hope Baptist Church	Place of Worship	65-70 dB	88 1st Street	Elizabeth
Jesus Atelie Baptist Church,	Place of Worship	65-70 dB	118 Livingston Street #1	Elizabeth
Iglesia de Restauracion ELIM	Place of Worship	65-70 dB	80 1st Street	Elizabeth
Shelter Temple Apostolic Church,	Place of Worship	65-70 dB	70 South Second Street	Elizabeth
St Adalbert's Church (Hall)	Place of Worship	65-70 dB	30 3rd Street	Elizabeth
Haitian Smyrna Church of God	Place of Worship	65-70 dB	100 3rd St.	Elizabeth
Stella Maris Chapel	Place of Worship	65-70 dB	170 Corbin St.	Newark
Elizabeth Church of God	Place of Worship	65-70 dB	401 Livingston St.	Elizabeth
Hermanos Unidos En Cristo	Place of Worship	65-70 dB	109 Fulton St.	Elizabeth
Mundial Igreja Mundial do Poder de Deus	Place of Worship	65-70 dB	418 New York Ave	Newark
Casa de Oracion - Monte Sinai	Place of Worship	65-70 dB	50 4th St.	Elizabeth
Jehovah's Witnesses Kingdom Hall,	Place of Worship	65-70 dB	67 Mott St.	Newark
Greater St John's MER Church	Place of Worship	65-70 dB	183 6th St.	Elizabeth

Conclusions: *EWR Land Use Measure 2: Sound Insulate Eligible Non-Residential Noise-Sensitive Structures* could provide appropriate noise level reduction inside eligible non-residential noise-sensitive structures and improve the noise level reduction of the structure by at least 5 dB. The sound insulation of eligible non-residential structures could be an effective way to improve compatibility with aircraft noise.

Table 3-4: Implementation Summary for EWR Land Use Measure 2: Sound Insulate Eligible Non-Residential Noise-Sensitive Structures

Sources: HMMH and Port Authority, 2021.

Implementation Item	Discussion
Benefits	Installation of sound insulation and positive ventilation treatments provides noise reduction inside noise-sensitive structures for compatibility with indoor activities. Once treated, the property is considered compatible.
Rationale	The Port Authority is recommending EWR Land Use Measure 2 because it could be an effective way to provide appropriate noise level reduction inside eligible non-residential noise-sensitive structures.
Responsible Parties	The Port Authority.
Estimated Costs	$311 million to provide sound insulation treatments to approximately 38 facilities, based on the assumptions set forth in EWR Land Use Measure 2.
Funding Sources	80 percent of eligible costs FAA Airport Improvement Program grants and 20 percent Port Authority. Costs borne by the Port Authority would be recovered through the EWR flight fee agreement.
Requirements	FAA approval, identification of eligible properties, and funding secured to sound insulate properties.
Estimated Schedule	The Port Authority will seek to request federal financial assistance to set up a sound insulation program for EWR when economic conditions recover following the COVID-19 pandemic and any updates of the NEMs, if necessary. Consistent with Part 150 requirements, the Port Authority will evaluate any changes in the noise environment at EWR and notify the FAA whether the NEM continues to be a reasonable representation of current and/or forecast conditions at EWR or submit an updated NEM to the FAA for acceptance. The noise mitigation program set up task will determine the implementation schedule for EWR Land Use Measure 2.

3.3. Recommended Preventive Land Use Management Measures

Based on the experience of other airports and according to the FAA, the preventive land use measures discussed in Sections 3.3 and 3.4 of this NCP Report can be effective in preventing the development of new noncompatible land uses. It is up to state and local governments to decide whether to pursue preventive land use management measures to reduce noncompatible land use. Consistent with the requirements of 14 CFR Part 150, Appendix A, Sec. 150.123, the Port Authority met with land use planning entities in the communities surrounding EWR to educate them about preventive land use measures and to learn their level of interest in potentially pursuing any of these approaches. A summary of those meetings is presented in Section 5.3 of this NCP Report, and meeting notes are provided in Appendix E.2.

Based on this outreach, the land use planning agencies expressed willingness to explore preventive land use measures in the future but were not at this time prepared to take action. At least one of the planning agencies expressed a preference for the Port Authority to focus on developing voluntary measures that would incentivize property owners to install noise mitigation rather than the jurisdictions themselves implementing preventive land use measures through changes in zoning or building codes.

The Port Authority acknowledges that local jurisdictions currently do not intend to pursue changes to their zoning and building codes to prevent future noncompatible land uses. To the extent that a state or local government would like to evaluate preventive land use measures sometime in the future, the Port Authority would make itself available to assist in any such evaluation. Therefore, solely to assist jurisdictions that may elect to pursue such land use measures in the future, the Port Authority recommends the ***preventive*** land use measures set forth below.

EWR Land Use Measure 3: Port Authority Assistance with Establishing an Airport Noise Overlay Zone

Airport noise overlay zones are intended to prevent noncompatible land uses from being developed near an airport. The noise overlay zone works in tandem with the jurisdictions existing zoning and provides detailed information regarding the land uses allowable within the overlay zone, such as noise level reduction required for noise-sensitive structures. If the overlay zone allows for noncompatible land uses, such as residential, schools and churches, then the overlay will also include specific building codes to ensure compatibility and the addition of avigation easements. These specific codes are generally more stringent than standard building codes, but similar to the existing codes required for energy conservation purposes.

Land use control agencies within the jurisdictions showed interest in establishing airport noise overlay zones to assist in better land use compatibility with aircraft operations.[72] The following land use jurisdictions expressed interest in an overlay zone during meetings, which occurred in January and March of 2017.

- New Jersey Sports and Exposition Authority
- Union County
- City of Elizabeth
- Hudson County
- Town of Harrison
- City of Newark
- Essex County
- City of Linden

The Port Authority could support the local jurisdictions' desire to establish an airport noise overlay zone. Using the forecast NEM as the basis, the Port Authority could provide information to each local jurisdiction responsible for land use zoning designations in developing an airport noise overlay zone that would achieve the land use zoning goals of that community.

Table 3-5 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Land Use Measure 3.

[72] More information on the individual meetings with each local jurisdiction is discussed in Section 5.3 on page 5-7

Conclusions: *EWR Land Use Measure 3: Port Authority Assistance with Establishing an Airport Noise Overlay Zone* could help prevent the introduction of new noncompatible land uses.

Table 3-5: Implementation Summary for EWR Land Use Measure 3: Port Authority Assistance with Establishing an Airport Noise Overlay Zone
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Airport noise overlay zones could help prevent the introduction of new noncompatible land uses.
Rationale	The Port Authority is recommending EWR Land Use Measure 3 to deter the introduction of new noncompatible land uses as required by the FAA Grant Assurances.
Responsible Parties	The local jurisdiction responsible for land use zoning is responsible for development and implementation.
Estimated Costs	$25,000 per jurisdiction to allow each jurisdiction to prepare an airport noise overlay zone and for the Port Authority to provide assistance to each jurisdiction to implement.
Funding Sources	80 percent FAA Airport Improvement Program grants and 20 percent Port Authority. Costs borne by the Port Authority would be recovered through the EWR flight fee agreement.
Requirements	FAA approval.
Estimated Schedule	Within 6 to 12 months of FAA approval of this measure, the Port Authority will contact the responsible local land use jurisdictions to explore their interest in pursuing this measure. If a local jurisdiction elects to proceed, the Port Authority will request a federal grant at the next FAA grant cycle to allow the jurisdiction to develop an airport overlay zone.

3.4. Land Use Management Measures Considered but not Recommended for Inclusion in this NCP

The Port Authority considered but does not recommend the following land use management measures as part of the EWR Noise Compatibility Program.

Acquire Avigation Easements

An avigation easement is a conveyance of airspace over another parcel for use by the airport. The property owner has restricted use of the property subject to the airport sponsor's easement for overflight and other applicable restrictions on the use and development of the parcel. Easement rights acquired typically include the following: the "right-of-flight" of aircraft; the right to cause noise, dust, and other environmental disturbances; the right to remove all objects protruding into the airspace together with the right to prohibit future obstructions or interference in the airspace; and the right of ingress and egress on the land to exercise the other rights acquired. Avigation easements run with the land (i.e. are attached to the property for so long as the easement is in effect) therefore, an avigation easement binds future property owners and informs them of the parcel's exposure to aircraft noise while also restricting use of the parcel as described in the avigation easement.

As set forth in Section 3.2, the Port Authority recommends obtaining avigation easements in exchange for installation of sound insulation. Avigation easements can also be obtained in exchange for compensation, but the Port Authority is not recommending that as a mitigation measure. Easement acquisition as a stand-alone measure would require payment to the parcel owner in accordance with FAA AC- 150-5100-17, "Land Acquisition and Relocation Assistance for Airport Improvement Program (AIP) Assisted Projects," Section 2.2.8, "Appraisal of Avigation Easements Acquired for Airport Operations and Standards." The Port Authority is not recommending acquisition of easements other than avigation easements in conjunction with sound insulation and positive ventilation.

Reason for not recommending in this NCP:
The Port Authority prefers to focus noise mitigation on those items that provide a noise benefit to the residents and users of the noncompatible structures. This measure would not provide a reduction in noncompatible land use. The Port Authority may reconsider this measure to obtain land use compatibility in a future NCP update. Avigation easements will be required for parcel owners to receive noise mitigation from the land use measures recommended in Section 3.2.

Implement Cooperative Land Use Agreements

A cooperative land use agreement is an agreement voluntarily entered into between an airport sponsor (i.e., Port Authority) and jurisdictions with local land use authority, which focuses on land use, redevelopment, and infrastructure in the airport vicinity. This agreement is intended to prevent the introduction of new noncompatible land uses with aircraft noise and to share information on proposed land developments between parties. This would promote discussion between the airport sponsor and the jurisdiction about future plans at the airport and inform the airport sponsor about proposed land development that could introduce noncompatible land uses.[73] Such agreements can be effective at preventing the introduction of new noncompatible land uses. This measure is not recommended for inclusion in this NCP.

Reason for not recommending in this NCP:

During the NEM phase of the 14 CFR Part 150 Study, the Port Authority held several discussions with land use agencies. In general, the agencies did not support cooperative land use agreements to promote compatible land use. Therefore, the Port Authority prefers to continue to work collaboratively with land use jurisdictions without implementing cooperative land use agreements at this time. The Port Authority is open to furthering the relationships with the jurisdictions and may recommend cooperative land use agreements as a measure on future updates to the NCP.

Raise Minimum Building Standards

Jurisdictions create, codify and enact into law, and periodically update building codes to protect public health, safety, and general welfare as they relate to the construction and occupancy of structures. In areas of noncompatible land use, particularly within the 65 DNL or higher aircraft noise exposure contours, jurisdictions may implement amended building codes to ensure newly installed structures provide for adequate noise level reduction that results in compatible land use by providing acceptable interior/habitable spaces. Such amended building codes would specify a required interior noise level in terms of DNL and/or a specific noise level reduction in terms of Sound Transmission Class, Outdoor to Indoor Transmission Loss or both. The result would require home builders and contractors to provide plans that provide for the required minimum noise level reduction based on the location of the parcel relative to the 65 DNL or higher aircraft noise exposure contours and the intended use of the interior space(s). This measure is not recommended for inclusion in this NCP.

Reason for not recommending in this NCP:

There is an extremely limited number of vacant parcels within the existing 65 DNL contour. It is relatively rare that jurisdictions are asked to approve plans for newly constructed or large-scale additions to noise-sensitive structures in these locations. In addition, as discussed in EWR Land Use Measure 1, dwelling units and nonresidential structures with Noise-Sensitive land uses are considered compatible if constructed after January 15, 2019 – the date in which there is a publicly available aircraft noise exposure contour alerting the communities to the existence of aircraft noise. Therefore, raising the minimum building standards does not seem to have much benefit in reducing noncompatible land uses surrounding EWR. The Port Authority is open to further discussions with the local jurisdictions about preventive land use measures and would offer assistance to jurisdictions expressing an interest in pursuing building code changes.

[73] Cooperative Land Use Agreements were discussed with the TAC in meetings #9, #11 and #14. See Appendix D.

Implement Rezoning of Land Uses

The creation or revision of zoning rules is focused on reducing or preventing construction of future noncompatible uses in areas experiencing 65 DNL or higher noise exposure from EWR aircraft operations. This measure is not recommended for inclusion in this NCP.

Reason for not recommending in this NCP:

During the NEM phase of the 14 CFR Part 150 Study, the Port Authority held several discussions with land use agencies. In general, the agencies did not support rezoning to promote compatible land use.[74] In addition, as discussed in EWR Land Use Measure 1, dwelling units and nonresidential structures with Noise-Sensitive land uses are considered compatible if constructed after January 15, 2019 (the date of the first publicly available aircraft noise exposure contour for EWR). Therefore, rezoning noncompatible land uses does not seem to have much benefit in reducing noncompatible land uses surrounding EWR. The Port Authority does not have jurisdiction over zoning codes, but would work with land use and regulatory agencies if they are interested in pursuing noise-related zoning code changes specifically focused toward new development, and may reconsider this as a measure in future updates to the NCP.

Include Aircraft Noise in Real Estate Disclosures

Real estate disclosure is a preventive land use strategy because it is focused on raising awareness of aircraft noise exposure among potential buyers of property. Real estate disclosures provide the opportunity for the real estate purchaser to learn about the property and the seller's experience in it. Such disclosures inform buyers while also protecting the sellers from future legal action by revealing issues that negatively affect the value, usefulness, or enjoyment of the property.[75] Some communities near airports include aircraft noise in real estate disclosure forms to ensure that the buyer is aware that the property is in the vicinity of an airport.

The decision whether to pursue a policy to include aircraft noise in real estate disclosures is an issue for government entities to decide. During discussion with land use agencies, none showed interest in pursuing real estate disclosures. Therefore, the Port Authority is not recommending this measure.

Reason for not recommending in this NCP:

During the NEM phase of the 14 CFR Part 150 Study, the Port Authority held several discussions with land use agencies. In general, the agencies did not support the inclusion of aircraft noise in real estate disclosures. The Port Authority does not have jurisdiction over real estate disclosures but would work with land use and regulatory agencies if they are interested in pursuing inclusion of aircraft noise in real estate disclosures and may reconsider this as a measure in future updates to the NCP.

[74] See Appendix E.2 beginning on page E-17

[75] https://webtrak.emsbk.com/panynj4

Acquire Noncompatible Residential Parcels

Acquisition of noncompatible residential parcel and/or other interests associated with such parcels is a corrective land use measure. Property acquisition is a corrective land use measure because it reduces noncompatible land use by converting the noncompatible land use to a compatible land use. Land acquisition is the most effective means available to airports under 14 CFR Part 150 to change the land use from noncompatible to compatible with aircraft noise exposure. Airports acquire noncompatible land use by purchasing the property from the landowner and then modify the land use, mostly through removal of the noncompatible structure, working with the jurisdiction to rezone the property to compatible land use, and reselling the property. Examples of this effective program can be found at McCarran International Airport in Las Vegas[76] and Burlington International Airport in Vermont.[77]

Some airports have opted to purchase the property, sound insulate the noncompatible structure and resell the property without rezoning. However, the latter option of sound insulating the structure is less preferred, as having the entire property compatible is generally more desirable than having only the structure compatible with aircraft noise exposure.

Pursuant to FAA requirements, if an airport operator acquires land for noise mitigation purposes, the airport operator is required to either seek to change the designated land use so that it is compatible with the existing aircraft noise environment (e.g., rezoning) or modify the structures to become compatible without a change to the designated land use (e.g., sound insulation or conversion from residential to commercial). The first option is intended to create "buffer zones" of compatible land use near the airport, while the second option attempts to maintain the neighborhood and allow residents an option to relocate.

Reason for not recommending in this NCP:

The Port Authority is not recommending property acquisition as a land use measure for inclusion in this NCP at this time. The Port Authority has not identified any areas or residential parcels for land acquisition at this time. The Port Authority may reconsider this as a measure in future updates to the NCP should any noncompatible parcels be identified for acquisition. If the Port Authority acquires any noncompatible parcels in the future, it would take action to make the land compatible and otherwise comply with applicable FAA requirements for residential property acquisition.[78]

[76] https://www.mccarran.com/Business/RealEstate

[77] http://www.btvsound.com/reuse-plan/

[78] 49 USC §47107(c)(2)(A).

3.5. Summary of Recommended Land Use Management Measures

Appendix H summarizes the full list of recommended land use measures.

Measures to be Initiated at EWR within One Year of FAA Record of Approval

- EWR Land Use Measure 3: Port Authority Assistance with Establishing an Airport Noise Overlay Zone

Measures with Schedule Dependent Upon External Factors/Pandemic Recovery

- EWR Land Use Measure 1: Sound Insulate Eligible Dwelling Units
- EWR Land Use Measure 2: Sound Insulate Eligible Non-Residential Noise-Sensitive Structures

4. Program Management Measures

Program management measures would enable the Port Authority to monitor the implementation and compliance of the recommended noise abatement and land use management measures in Chapters 2 and 3 of this NCP Report, as well as enhance stakeholders' understanding of aircraft noise. Program management measures are critical to the success of the NCP.

This chapter details the following 12 Program Management Measures recommended for inclusion in this NCP:

- EWR Program Management Measure 1: Maintain Noise Office
- EWR Program Management Measure 2: Maintain Noise and Operations Management System (NOMS)
- EWR Program Management Measure 3: Maintain Public Flight Tracking Portal
- EWR Program Management Measure 4: Maintain Noise Complaint Management System
- EWR Program Management Measure 5: Maintain Noise Office Website
- EWR Program Management Measure 6: Continue Community Outreach Activities
- EWR Program Management Measure 7: Establish a Community Planners Forum
- EWR Program Management Measure 8: Establish and Manage a Fly Quiet Program
- EWR Program Management Measure 9: Make Aircraft Noise Contours Available in a Geographic Information System (GIS)
- EWR Program Management Measure 10: Update the Noise Exposure Map
- EWR Program Management Measure 11: Update the Noise Compatibility Program
- EWR Program Management Measure 12: The Port Authority to Coordinate with FAA on Development and Implementation of NextGen Procedures

4.1. Existing Program Management Measures

The Port Authority has been proactive in establishing program management measures to address aircraft noise concerns since 1959 as presented in Table 2-1 on page 2-3. The Port Authority currently has several programs in place to monitor aircraft noise exposure and engage local communities in understanding aircraft noise. These include a flight tracking system, a fully staffed noise office, and other related measures, as described in this section.

Noise Office

The Port Authority's Noise Office manages the noise programs for JFK, LGA, EWR, and TEB, including the 14 CFR Part 150 Studies for each airport. Currently, six full-time employees staff the Port Authority's Noise Office, providing public liaising as well as management of the noise monitoring, flight tracking, and complaint management systems in place. The Noise Office operates as the principal office for receiving and responding to aircraft noise complaints from the public and interfacing with stakeholder representatives, noise-impacted communities, and airport users. Noise Office staff regularly communicate with FAA personnel, aircraft operators, community members, and aviation industry associations about aircraft noise. In addition, the Noise Office investigates and responds to aircraft noise complaints, compiles data for reports to the public and FAA, operates and maintains the Port Authority's Noise and Operations Management System (NOMS) and public flight tracking portal system, participates in roundtable and community meetings to discuss aircraft noise issues, and meets with elected officials to discuss aircraft noise issues.

Noise and Operations Management System (NOMS)

The existing NOMS, a system called Airport Noise and Operations Management System (ANOMS™) provided by EMS Bruel & Kjaer, collects noise monitoring data in the vicinity of EWR using permanent and portable noise monitors. It receives flight tracking data from the FAA and can link noise events and complaints to specific aircraft operations. In addition to providing reliable airport operations and noise monitoring data, ANOMS allows investigation and validation of noise complaints, and provides historical data on runway use, flight tracks, and weather. ANOMS data is used by the Port Authority to enforce the departure noise limit of 112 PNdB.

Public Flight Tracking Portal (WebTrak)

The public can view aircraft movements within the New York / New Jersey metropolitan area using WebTrak, a public access component of ANOMS located on the Port Authority's website.[79] For each aircraft, WebTrak provides specific information regarding aircraft type, altitude, origin and destination airports, and flight identification. Noise level readings at the noise monitors near each airport are also shown in A-weighted instantaneous sound pressure level readings. The public can use WebTrak to submit a noise complaint to the Port Authority through the link to an online web form. The Port Authority also posts runway closure information in a pop-up window on the main WebTrak webpage, which is updated on a weekly basis.

Noise Complaint Management System (PlaneNoise®)

The Port Authority collects and manages noise complaint information from each of the airports in its system. There are three primary means of filing an aircraft noise complaint: (1) a form on the Port Authority's website, (2) a dedicated noise complaint hotline, or (3) WebTrak website. Noise complaints are collected with the help of the Port Authority's PlaneNoise® complaint management system. Each complaint received is compiled in a database, verified for accuracy, analyzed, and mapped for reporting. The Port Authority provides noise complaint reports to the FAA on a monthly basis for informational purposes.

Noise Office Website

The Port Authority maintains a Noise Office website,[80] which provides links to web pages describing the Port Authority's various noise management programs. These include links to submit a noise complaint, WebTrak, noise monitoring, data reports, and airport community roundtables. The noise information website also contains a link to frequently asked questions (FAQs) and a central web page for each of the Port Authority's JFK, LGA, EWR, and TEB 14 CFR Part 150 Studies.

Community Outreach

The Port Authority, in collaboration with the FAA and representatives of communities surrounding its airports, facilitated the development of airport community roundtables for JFK, LGA, EWR, and TEB. Each community roundtable meets on a regular basis to provide opportunities for its members to maintain open communication with the Port Authority and the FAA, seeking mutual and feasible ways to manage aircraft noise impacts.

[79] https://webtrak.emsbk.com/panynj4

[80] http://www.panynj.gov/airports/aircraft-noise-information.html

4.2. Recommended Program Management Measures

The Port Authority has considered and is recommending the following program management measures for implementation.

EWR Program Management Measure 1: Maintain Noise Office

The Port Authority's Noise Office is a vital link between the airport and communities on aircraft noise concerns. After FAA's approval of the recommended NCP measures, the Port Authority's Noise Office's responsibilities will expand to include implementation of the recommended NCP measures and monitoring adherence with the existing and implemented noise abatement measures. It is possible that the Port Authority may need additional staff resources in the Noise Office to adequately address the increased responsibilities that come with the implementation and monitoring of Noise Compatibility Programs at JFK, LGA, EWR, and TEB.

Table 4-1 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Program Management Measure 1.

Conclusions: *EWR Program Management Measure 1: Maintain Noise Office* will enable the Port Authority to continue to understand, respond to, and address community concerns associated with aircraft noise from EWR operations. In the future, the Noise Office will facilitate the implementation of the new measures recommended for inclusion in the EWR 14 CFR Part 150 NCP Report, as approved by the FAA.

Table 4-1: Implementation Summary for EWR Program Management Measure 1: Maintain Noise Office
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	The existing Noise Office enables the Port Authority to understand, respond to, and address community concerns associated with aircraft noise from EWR operations. In the future, the Noise Office will continue to maintain the existing program management measures, facilitate the implementation of the new approved NCP measures and monitor compliance with them.
Rationale	The Port Authority is recommending EWR Program Management Measure 1 because the existing Noise Office is the principal office for receiving and responding to aircraft noise complaints from the public and interfacing with stakeholder representatives, noise-impacted communities, and airport users. With the completion of the NCP, the Noise Office staff will be critical in successful implementation of the approved NCP measures.
Responsible Parties	The Port Authority.
Estimated Costs	The FAA does not fund program operating expenses. The Port Authority will continue to fund the operation of the Noise Office. Costs borne by the Port Authority would be recovered through the EWR flight fee agreement.
Funding Sources	The Port Authority.
Requirements	Port Authority approval for additional staff if and when required.
Estimated Schedule	This measure is already implemented; the Port Authority will continue to operate the Noise Office.

EWR Program Management Measure 2: Maintain Noise and Operations Management System (NOMS)

The existing NOMS, a system called Airport Noise and Operations Management System (ANOMS) provided by EMS Bruel & Kjaer, is a key tool used by the Noise Office to correlate noise monitoring data with individual aircraft operations. This supports the investigation of noise complaints as well as communication with the public about the noise environment associated with EWR. ANOMS also retains historical data so that noise and operational trends can be determined.

Table 4-2 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Program Management Measure 2.

Conclusions: *EWR Program Management Measure 2: Maintain Noise and Operations Management System* will enable the Port Authority Noise Office to maintain its ability to investigate noise complaints and provide a means to monitor compliance with NCP noise abatement measures for EWR. The Port Authority will continue to upgrade NOMS software and noise monitors to incorporate future monitoring and flight tracking technologies that would be beneficial to the functions of the Noise Office.

Table 4-2: Implementation Summary for EWR Program Management Measure 2: Maintain Noise and Operations Management System
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	The NOMS enables the Port Authority Noise Office to correlate noise monitoring data with individual aircraft operations at EWR. This supports the investigation of noise complaints as well as communication with the public about the noise environment associated with EWR.
Rationale	The Port Authority is recommending EWR Program Management Measure 2 because the NOMS is a key tool used by the Noise Office.
Responsible Parties	The Port Authority.
Estimated Costs	The FAA does not fund program operating expenses. The Port Authority will continue to fund the maintenance of the existing system. However, if a system upgrade and/or replacement is needed in the future, then the cost is expected to be to be approximately $90,000. If any of the existing noise monitors need to be replaced and/or upgraded in the future, then the cost for hardware and installation of one noise monitor is expected to be approximately $35,000. Only noise monitors within the FAA-accepted NEM are eligible for AIP funding. These cost estimates are determined based on the development of the existing system as a baseline with added future anticipated cost for system upgrades and/or replacement. The cost for the implementation of this measure is eligible to be partially funded by the FAA.
Funding Sources	For system replacement and/or upgrades of eligible components: 80 percent FAA Airport Improvement Program grants and 20 percent Port Authority. Funding for maintenance of the existing system and for system replacement and/or upgrades of non-eligible components will be provided by the Port Authority. Costs borne by the Port Authority would be recovered through the EWR flight fee agreement.
Requirements	FAA approval of this measure; and Port Authority to secure funding for system replacement and/or upgrades.
Estimated Schedule	This measure is already implemented; the Port Authority will continue to maintain the existing NOMS. When current Port Authority contracts with vendors expire, the Port Authority will attempt to request a federal grant for system replacement and/or upgrades.

EWR Program Management Measure 3: Maintain Public Flight Tracking Portal

The existing public flight tracking portal is an internet-based system that allows the public to view aircraft movements in the New York / New Jersey area through use of a website. The existing portal, known as WebTrak and provided by EMS Bruel & Kjaer, provides aircraft locations and noise monitor values for current and historical operations at EWR, and also is used to post information about runway closures. A flight tracking portal provides a public interface for ANOMS and thus is a key communication and educational tool used by the Noise Office.

Table 4-3 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Program Management Measure 3.

Conclusions: *EWR Program Management Measure 3: Maintain Public Flight Tracking Portal* will enable the Port Authority Noise Office to continue providing information to the public about aircraft operations and associated noise levels at EWR. The Port Authority will continue to explore new technologies to incorporate into its flight tracking portal system that would be beneficial to the functions of the Noise Office and the needs of the communities.

Table 4-3: Implementation Summary for EWR Program Management Measure 3: Maintain Public Flight Tracking Portal
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	The existing public flight tracking portal enables the Port Authority Noise Office to provide information to the public about aircraft operations and associated noise exposure at EWR. This supports the Noise Office function of communicating with the public about the impacts of operations at EWR.
Rationale	The Port Authority is recommending EWR Program Management Measure 3 because the existing public flight tracking portal is a key tool used by the Noise Office. Costs of system upgrades are to be determined, based on appropriate future technologies, and will be partially funded by the FAA.
Responsible Parties	The Port Authority.
Estimated Costs	The FAA does not fund program operating expenses. The Port Authority will continue to fund the maintenance of the existing system. However, if a system upgrade and/or replacement is needed in the future, then the cost is expected to be approximately $4,000. The cost estimate is determined based on the development of the existing system as a baseline with added future anticipated cost for system upgrades and/or replacement. The cost for the implementation of this measure is eligible to be partially funded by the FAA.
Funding Sources	For system upgrades: 80 percent FAA Airport Improvement Program grants and 20 percent Port Authority. Costs borne by the Port Authority would be recovered through the EWR flight fee agreement.
Requirements	FAA approval of this measure; and Port Authority to secure funding for the system upgrades.
Estimated Schedule	This measure is already implemented; the Port Authority will continue to maintain the existing public flight tracking portal. When existing Port Authority contracts with vendors expire, the Port Authority will attempt to request a federal grant for system replacement and/or upgrades.

EWR Program Management Measure 4: Maintain Noise Complaint Management System

The existing noise complaint management system, provided by PlaneNoise, is used by the Port Authority to collect and manage noise complaint information from each of the airports in its system. Noise complaints submitted to the Noise Office through the internet and through voicemails are collected with the help of the noise complaint management system. Each complaint received is compiled in a database, verified for accuracy, analyzed, and mapped for reporting. The Port Authority provides noise complaint reports to the FAA on a monthly basis for informational purposes. The use of a noise complaint management system enables the Noise Office to efficiently respond to noise complaints and gain insights from noise complaint data.

Table 4-4 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Program Management Measure 4.

Conclusions: *EWR Program Management Measure 4: Maintain Noise Complaint Management System* will enable the Port Authority Noise Office to continue efficient collection and reporting of noise complaints associated with operations at EWR. The Port Authority will continue to upgrade its noise complaint management system to incorporate future functionality that would be beneficial to the functions of the Noise Office and the needs of the communities.

Table 4-4: Implementation Summary for EWR Program Management Measure 4: Maintain Noise Complaint Management System
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	The existing noise complaint management system, enables the Port Authority Noise Office to efficiently collect and report noise complaints associated with aircraft operations at EWR. This supports the Noise Office function of communicating with the public about impacts of operations at EWR.
Rationale	The Port Authority is recommending EWR Program Management Measure 4 because the existing noise complaint management system supports the function of the Noise Office.
Responsible Parties	The Port Authority.
Estimated Costs	The FAA does not fund program operating expenses. The Port Authority will continue to fund the maintenance of the existing system. However, if a system upgrade and/or replacement is needed in the future, then the cost is expected to be to be approximately $4,000. The cost estimate is determined based on the development of the existing system as a baseline with added future anticipated cost for system upgrades and/or replacement. The cost for the implementation of this measure is eligible to be partially funded by the FAA.
Funding Sources	For system upgrades: 80 percent FAA Airport Improvement Program grants and 20 percent Port Authority. Costs borne by the Port Authority would be recovered through the EWR flight fee agreement.
Requirements	FAA approval of this measure; and Port Authority to secure funding for the system upgrades.
Estimated Schedule	This measure is already implemented; the Port Authority will continue to maintain the existing noise complaint management system. When existing Port Authority contracts with vendors expire, the Port Authority will attempt to request a federal grant for system replacement and/or upgrades.

EWR Program Management Measure 5: Maintain Noise Office Website

The Port Authority's Noise Office website provides links to web pages describing the Port Authority's various noise management programs. These include links to submit a noise complaint, public flight tracking portal, noise monitoring, data reports, and airport community roundtables. The noise information website also contains a link to a central web page for each of the Port Authority's JFK, LGA, EWR, and TEB 14 CFR Part 150 Studies. Thus, the Noise Office website serves as a single point of entry to all of the publicly available information and services provided by the Noise Office.

Table 4-5 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Program Management Measure 5.

Conclusions: *EWR Program Management Measure 5: Maintain Noise Office Website* will enable the Port Authority Noise Office to continue providing a single point of entry to all of the publicly available information and services associated with EWR provided by the Noise Office. The Port Authority will continue to upgrade its Noise Office website to incorporate future functionality that would be beneficial to the Noise Office and the needs of the communities.

Table 4-5: Implementation Summary for EWR Program Management Measure 5: Maintain Existing Noise Office Website
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	The existing Noise Office website provides links to the Port Authority's publicly available information and services associated with the noise environment at EWR. This supports the Noise Office function of communicating with the public about the impacts of operations at EWR.
Rationale	The Port Authority is recommending EWR Program Management Measure 5 because the existing Noise Office website supports the function of the Noise Office.
Responsible Parties	The Port Authority.
Estimated Costs	The FAA does not fund program operating expenses. The Port Authority will continue to fund maintenance and upgrades of the Noise Office website. Costs borne by the Port Authority would be recovered through the EWR flight fee agreement.
Funding Sources	Not applicable.
Requirements	Existing measure – No requirements to implement.
Estimated Schedule	This measure has already been implemented; the Port Authority will continue to maintain and upgrade the Noise Office website.

EWR Program Management Measure 6: Continue Community Outreach Activities

The Port Authority facilitated the development of the Airport Community Roundtable for EWR, in collaboration with the FAA and representatives of nearby communities. The EWR Roundtable meets on an as-needed basis to provide ongoing communication with the Port Authority and the FAA, seeking mutual and feasible ways to manage aircraft noise concerns. The Noise Office leverages these types of in-person outreach activities to support and maintain meaningful dialogue with communities, the FAA, and other aviation stakeholders regarding aircraft noise.

Table 4-6 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Program Management Measure 6.

Conclusions: *EWR Program Management Measure 6: Continue Existing Community Outreach Activities* will enable the Port Authority Noise Office to support and maintain meaningful dialogue with the communities, the FAA, and other aviation stakeholders regarding aviation noise at EWR. The Port Authority will continue to participate in the EWR Roundtable.

Table 4-6: Implementation Summary for EWR Program Management Measure 6: Continue Community Outreach Activities
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Community outreach activities enable the Port Authority to support and maintain meaningful dialogue regarding aircraft noise at EWR. This supports the Noise Office function of communicating with the public about the impacts of operations at EWR.
Rationale	The Port Authority is recommending EWR Program Management Measure 6 because existing community outreach activities support the function of the Noise Office.
Responsible Parties	The Port Authority.
Estimated Costs	No FAA funding is required to implement, and the Port Authority will continue its community outreach activities.
Funding Sources	Not applicable at this time; the Port Authority would seek reimbursement if funding becomes available in the future. Costs borne by the Port Authority would be recovered through the EWR flight fee agreement.
Requirements	Existing measure – No requirements to implement.
Estimated Schedule	This measure has already been implemented; the Port Authority will continue its community outreach activities.

EWR Program Management Measure 7: Establish a Community Planners Forum

The Port Authority recommends initiating a Community Planners Forum that will bring together land use planners and local zoning jurisdictions responsible for land use planning in the vicinity of the airport. The Port Authority would provide the venue for this voluntary forum to allow for the sharing and dissemination of aircraft noise related information pertaining to comprehensive planning, land use issues, zoning issues, and noise mitigation efforts by the local jurisdictions. The goal of this measure is to provide a forum for land use planning agencies and zoning jurisdictions to be made aware of aircraft noise related information relating to comprehensive planning, land use issues, zoning issues, and noise mitigation efforts at EWR. Increasing awareness of aircraft noise related information and land use compatibility improves the likelihood that new noncompatible land uses will not be introduced in the future.

Table 4-7 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Program Management Measure 7.

Conclusions: *EWR Program Management Measure 7: Establish a Community Planners Forum* will enable the collaboration of various jurisdictions in the airport vicinity to share information pertaining to comprehensive planning, land use issues, zoning issues, and noise mitigation efforts. The voluntary forum would include New Jersey land use planning agencies, and other stakeholders at EWR.

Table 4-7: Implementation Summary for EWR Program Management Measure 7: Establish a Community Planners Forum
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	A Voluntary Community Planners Forum that will enable the collaboration of various jurisdictions in the airport vicinity to share aircraft noise related information pertaining to comprehensive planning, land use issues, zoning issues, and noise mitigation efforts at EWR.
Rationale	The Port Authority is recommending EWR Program Management Measure 7 so that there can be a collaboration and sharing of information, with various jurisdictions in the airport vicinity, pertaining to comprehensive planning, land use issues, zoning issues, and noise mitigation efforts for EWR.
Responsible Parties	The Port Authority.
Estimated Costs	At this time there is no cost to implement as Port Authority would provide the venue for the meeting.
Funding Sources	Not applicable.
Requirements	FAA's approval of this measure; and Port Authority to initiate a Community Planners Forum.
Estimated Schedule	Within one year of the FAA's Record of Approval for the NCP, the Port Authority will initiate convening a Community Planners Forum.

EWR Program Management Measure 8: Establish and Manage a Fly Quiet Program

A Fly Quiet Program is a voluntary collaboration among the airport proprietor, airlines, and air traffic controllers that encourages pilots and air traffic controllers to use noise abatement flight procedures, NADPs and preferential runways. It also typically includes an airline/pilot awareness campaign with promotional materials (e.g., handouts/flyers, signage, and other educational materials) to ensure pilots know about the recommended noise abatement procedures at the Airport.

The Port Authority recommends initiating a voluntary Fly Quiet Program for EWR to develop solutions for abating noise from aircraft operations. The Fly Quiet Program would be used to facilitate implementation of recommended noise abatement measures approved by the FAA. The Fly Quiet Program would also be used as a forum for developing and discussing noise abatement measures that may provide benefits outside of the 14 CFR Part 150 process. The Fly Quiet noise reports would be published on the Noise Office website and shared with various stakeholders including, but not limited to, the FAA, EWR Roundtable members, land use planners, and airlines.

Table 4-8 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Program Management Measure 8.

Conclusions: *EWR Program Management Measure 8: Establish and Manage a Fly Quiet Program* could enable the collaborative development and management of solutions to abate noise from aircraft operations at EWR. The program could include engagement with pilots, FAA air traffic controllers, and other stakeholders at EWR

Table 4-8: Implementation Summary for EWR Program Management Measure 8: Establish and Manage a Fly Quiet Program
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Establishment and management of a Fly Quiet Program will enable the development and management of solutions for abating noise from aircraft operations at EWR.
Rationale	The Port Authority is recommending EWR Program Management Measure 8 so that aircraft noise can be collaboratively abated and managed at EWR.
Responsible Parties	The Port Authority.
Estimated Costs	Establishment of a Fly Quiet Program may cost approximately $150,000, based on previous efforts at other airports.
Funding Sources	80 percent FAA Airport Improvement Program grants and 20 percent Port Authority (If determined to be eligible for AIP funding). Costs borne by the Port Authority would be recovered through the EWR flight fee agreement.
Requirements	FAA's approval of this measure; and Port Authority to develop the Fly Quiet program.
Estimated Schedule	Within one year of the FAA's Record of Approval for the NCP, the Port Authority will initiate development of the Fly Quiet Program.

EWR Program Management Measure 9: Make Aircraft Noise Contours Available in a Geographic Information System (GIS)

An interactive NEM (presenting 65 DNL and higher contours) can provide the public, land use agencies and other stakeholders with easy access to an airport's noise contours to enhance awareness and decision-making regarding aircraft noise. This measure would involve the Port Authority providing a Google Earth file (or other readily useable file) of the EWR Future Condition 65, 70, and 75 DNL contours to the public for download. The Port Authority could also host a map on its Noise Office website that would include these GIS layers as a downloadable file containing noise contour shapes for easy viewing by interested parties.

Interactive noise contour maps for EWR were developed as part of this Study. Those maps allow users to determine whether their residence or other noise-sensitive building is within or outside of the 65 DNL contours. They were favorably received when showcased at the EWR draft NEM workshops and subsequently posted for public access on the EWR 14 CFR Part 150 Study website. It is the Port Authority's intention to maintain public access to these maps.

The Port Authority will also provide the Future Condition 65 DNL contours to the local planning agencies with land uses within the contour boundary. Table 4-9 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Program Management Measure 9.

Conclusions: *EWR Program Management Measure 9: Make Aircraft Noise Contours Available in a Geographic Information System (GIS)* could provide the public, land use planning agencies, and other stakeholders with easy access to EWR Future Condition noise contours to enhance awareness and decision-making regarding aircraft noise.

Table 4-9: Implementation Summary for EWR Program Management Measure 9: Make Aircraft Noise Contours Available in a Geographic Information System (GIS)
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Making EWR noise contours available in a GIS will provide the public, land use planning agencies, and other stakeholders with easy access to Future Condition noise contours.
Rationale	The Port Authority is recommending EWR Program Management Measure 9 to provide easy access to EWR Future Condition noise contours that could enhance awareness and decision-making for interested parties regarding aircraft noise.
Responsible Parties	The Port Authority.
Estimated Costs	No FAA funding is required to implement, and the Port Authority has used available information and methods to make the contours available.
Funding Sources	Not applicable.
Requirements	Existing measure – No requirements to implement.
Estimated Schedule	This measure has already been implemented. The Port Authority will maintain public access to the existing interactive noise contour map.

EWR Program Management Measure 10: Update the Noise Exposure Map

The FAA requires that an airport operator maintain Noise Exposure Maps (NEMs) that reflect current or reasonably projected conditions in order to obtain FAA funding for noise programs. Specifically, 14 CFR Part 150, Section 150.21(d), states that an airport operator shall "promptly prepare and submit a revised noise exposure map" if any change in the operation of the airport creates a "substantial, new noncompatible use" or a "significant reduction in noise over existing noncompatible uses" that is not reflected on the FAA-accepted noise exposure map on record. The former condition reflects an increase of 1.5 dB DNL over noncompatible uses or over uses that are made noncompatible by the noise increase, while the latter condition reflects a reduction of 1.5 dB over uses that were formerly noncompatible but are made compatible by the noise reduction.

Consistent with Part 150 requirements, the Port Authority will evaluate any changes in the noise environment at EWR and notify the FAA whether the NEM continues to be a reasonable representation of current and/or forecast conditions at EWR or submit an updated NEM to the FAA for acceptance. The Port Authority anticipates updating the NEMs when operations at EWR stabilize as the aviation sector continues to recover from the COVID-19 pandemic.

Table 4-10 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Program Management Measure 10.

Conclusions: *EWR Program Management Measure 10: Update the Noise Exposure Map* will enable the Port Authority to meet the requirements of 14 CFR Part 150, Section 150.21(d), if applicable changes in the noise environment occur at EWR.

Table 4-10: Implementation Summary for EWR Program Management Measure 10: Update the Noise Exposure Map
Sources: HMMH and Port Authority, 2021.

Implementation Item	Discussion
Benefits	Updating the Noise Exposure Map will enable the Port Authority to meet the requirements of 14 CFR Part 150 if applicable changes in the noise environment occur at EWR.
Rationale	The Port Authority is recommending EWR Program Management Measure 10 to meet the requirements of 14 CFR Part 150, Section 150.21(d).1.125 in
Responsible Parties	The Port Authority.
Estimated Costs	Based on the cost of the EWR NEM development process, an NEM update may cost approximately $2 million.
Funding Sources	80 percent FAA Airport Improvement Program grants and 20 percent Port Authority. Costs borne by the Port Authority would be recovered through the EWR flight fee agreement.
Requirements	FAA's approval of this measure; and Port Authority to secure funding for the update of the Noise Exposure Map when warranted.
Estimated Schedule	The Port Authority anticipates updating the NEMs when operations at EWR stabilize from the COVID-19 pandemic. Thereafter, the Port Authority expects to update the NEM in accordance with Section 174 of the FAA Reauthorization Act of 2018.

EWR Program Management Measure 11: Update the Noise Compatibility Program

14 CFR Part 150, Section 150.23(e)(9) states that Noise Compatibility Programs (NCP) must include a "[p]rovision for revising the program if made necessary by revision of the noise exposure map." This may occur if a significant change is identified that results in a revision to the NEMs. Examples of changes are a large addition of noncompatible land uses, or new elements required to achieve land use compatibility. The NCP does not require an update with each NEM update. The Port Authority anticipates updating the NCP only when additional measures and/or modified measures are required to reduce noncompatible land use. The Port Authority is recommending this measure in order to meet 14 CFR Part 150 requirements if an update to the NCP is made necessary by a revision of the NEM.

Table 4-11 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Program Management Measure 11.

Conclusions: *EWR Program Management Measure 11: Update the Noise Compatibility Program* will enable the Port Authority to meet the requirements of 14 CFR Part 150, Section 150.23(e)(9), if made necessary by a revision of the Noise Exposure Maps for EWR.

Table 4-11: Implementation Summary for EWR Program Management Measure 11: Update the Noise Compatibility Program
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Updating the Noise Compatibility Program would enable the Port Authority to meet the requirements of 14 CFR Part 150 if a revision of the NCP is made necessary by a revision of the Noise Exposure Map for EWR.
Rationale	The Port Authority is recommending EWR Program Management Measure 11 to meet the requirements of 14 CFR Part 150, Section 150.23(e)(9).
Responsible Parties	The Port Authority.
Estimated Costs	Based on the Port Authority's experience with this Study, an NCP update may range from $300,000 to $2,000,000.
Funding Sources	80 percent FAA Airport Improvement Program grants and 20 percent Port Authority. Costs borne by the Port Authority would be recovered through the EWR flight fee agreement.
Requirements	FAA's approval of this measure; and Port Authority to secure funding for the update of Noise Compatibility Program when appropriate.
Estimated Schedule	Within two years of FAA acceptance of a revised NEM, the Port Authority will attempt to initiate a review of the NCP to determine if revision is necessary.

EWR Program Management Measure 12: The Port Authority to Coordinate with FAA on Development and Implementation of NextGen Procedures

The Port Authority supports the FAA's efforts to modernize the air transportation system to make flying safer, more efficient and more predictable. FAA's Next Generation Air Transportation System (NextGen) is a comprehensive overhaul of the National Airspace System (NAS) to make air travel more convenient and dependable, while ensuring that flying is as safe, secure, and convenient as possible. Through NextGen, the FAA seeks to build the capability to guide and track aircraft more precisely and efficiently to save fuel and reduce noise and pollution.[81] A key NextGen technology is Performance Based Navigation (PBN), which uses satellites to guide aircraft along precise flight paths.[82] These precise flight paths often result in concentration of aircraft within narrow corridors. Because the use of NextGen procedures to guide aircraft along precise flight paths can increase the frequency of overflights of areas below the concentrated flight paths, the Port Authority recommends that the FAA coordinate closely with the Port Authority if and when it evaluates the implementation of NextGen flight procedures in the greater New York/ New Jersey region.

FAA's NextGen implementation involves the management of flight procedures for numerous airports in the region and is not specific to EWR. The Port Authority is a member of the NextGen Advisory Committee (NAC),[83] which is a federal advisory committee that makes recommendations to the FAA regarding the possible implementation of NextGen in the New York/New Jersey/Philadelphia airspace; this includes air traffic and airspace management recommendations. Through participation in the NAC, the Port Authority can provide their insight for FAA consideration regarding future airspace and procedure designs for the region as a whole. The Port Authority expects to continue that collaborative approach. As a collaborating member of the NAC, the Port Authority can advance measures for further FAA evaluation by either directly engaging with the regional FAA TRACON or submitting them to the NAC for its consideration.

Additionally, the FAA is working on ways to reduce the concentration of aircraft that result from the implementation of NextGen departure procedures. To address community concerns about the concentration of aircraft on particular flight procedures, Congress enacted legislation requiring FAA to consider dispersal headings,[84] when FAA is proposing a new NextGen departure procedure or amending an existing procedure below 6,000 feet over noise-sensitive areas. "Dispersal headings" is a term used to describe the use of more than one departure heading from a runway which may result in a reduced concentration of aircraft on departure close into the airport. Reducing the concentration of aircraft through the use of dispersal headings can assist in balancing noise exposure.

Following final record of approval of this NCP, the Port Authority will, in consultation with the affected communities, request that FAA consider dispersal headings or other lateral track variations pursuant to Section 175 of the FAA Reauthorization Act of 2018 when the FAA is evaluating new or amended area navigation departure procedures.

Table 4-12 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of EWR Program Management Measure 12.

[81] www.faa.gov/nextgen/, Last accessed: March 20, 2019.

[82] https://www.faa.gov/nextgen/how_nextgen_works/new_technology/pbn/in_depth/. Last accessed: March 20, 2019.

[83] https://www.faa.gov/about/office_org/headquarters_offices/ang/nac/ Last accessed: March 20, 2019.

[84] Upon request of an airport operator and in consultation with the affected community. FAA Reauthorization Act of 2018, Public Law No. 115-254 (effective October 5, 2018).

Conclusions: *EWR Program Management Measure 12: The Port Authority to Coordinate with FAA on Development and Implementation of NextGen Procedures* would allow the Port Authority to be aware of potential flight path changes that could affect aircraft noise exposure and land use compatibility around EWR. The implementation of NextGen departures in other areas of the United States has resulted in increased noise to some communities. The Port Authority seeks to avoid noise increases resulting from implementation of NextGen flight procedures and requests that the FAA coordinate closely with the Port Authority if and when it is interested in evaluating the implementation of NextGen in the New York/New Jersey region.

Table 4-12: Implementation Summary for EWR Program Management Measure 12: The Port Authority to Coordinate with FAA on Development and Implementation of NextGen Procedures
Sources: HMMH and Port Authority, 2019.

Implementation Item	Discussion
Benefits	Implementation of NextGen technologies for the improvement of flight procedures in the New York/New Jersey/Philadelphia area and potential noise benefits to noise-sensitive land uses.
Rationale	To find opportunities to reduce community noise exposure through the implementation of NextGen technologies in the airspace. The Port Authority would only support NextGen procedures that would not result in an increase in noise over residential areas.
Responsible Parties	The FAA is responsible to design, test and implement the NextGen flight procedure as well as complete the environmental review under NEPA if required.
Estimated Costs	The expected costs associated with the development and implementation of NextGen procedures are internal to the FAA (e.g., Air Traffic Organization) and other coordinating agencies. The costs to implement such procedures within the FAA are unknown, and an FAA Airport Improvement Program grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require an environmental study under NEPA.
Estimated Schedule	Ongoing, as part of the Port Authority's participation in the NextGen Advisory Committee (NAC).

4.3. Program Management Measures Considered but Not Recommended for Inclusion in this NCP

The Port Authority recommends implementing all programmatic measures considered as part of the EWR Noise Compatibility Program.

4.4. Summary of Recommended Program Management Measures

Appendix H provides a summary of recommended program management measures.

Measures Already in Place at EWR

- EWR Program Management Measure 1: Maintain Noise Office
- EWR Program Management Measure 2: Maintain Noise and Operations Management System (NOMS)
- EWR Program Management Measure 3: Maintain Public Flight Tracking Portal
- EWR Program Management Measure 4: Maintain Noise Complaint Management System
- EWR Program Management Measure 5: Maintain Noise Office Website
- EWR Program Management Measure 6: Continue Community Outreach Activities
- EWR Program Management Measure 9: Make Aircraft Noise Contours Available in a Geographic Information System (GIS)
- EWR Program Management Measure 12: The Port Authority to Coordinate with FAA on Development and Implementation of NextGen Procedures

Measures to be Initiated at EWR within One Year of FAA Record of Approval

- EWR Program Management Measure 7: Establish a Community Planners Forum
- EWR Program Management Measure 8: Establish and Manage a Fly Quiet Program

Measures for EWR without Identified Timeline

- EWR Program Management Measure 10: Update the Noise Exposure Map
- EWR Program Management Measure 11: Update the Noise Compatibility Program

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5. Stakeholder Engagement

A critical element of the 14 CFR Part 150 Study (Part 150) is stakeholder engagement. This chapter describes outreach efforts conducted as part of the development of this Noise Compatibility Program (NCP) Report.

The Part 150 Study is an ongoing process that includes several efforts to engage a wide range of stakeholders. The most prominent of these is the Technical Advisory Committee (TAC), scheduled to meet up to 18 times over the course of the Part 150 Study. As of the final submittal of this document, the TAC has met 14 times. In addition, the Port Authority has hosted three public workshops: one held as an introduction to the Part 150 Study in fall 2015, another held at two separate locations in fall 2016, to receive public input on the 2016 Draft Noise Exposure Map (NEM) document; and the third held at two separate locations in fall 2018, to receive public input on the 2019 Draft Noise Exposure Map (NEM) document.

The Port Authority released a 2016 Revised Draft NEM for public review in early 2017. After receiving public comments on the 2016 draft, the Port Authority determined the need to update the aviation forecast, given the discrepancy between projected 2016 aircraft operations and the actual operations in 2016 at EWR. The 2019 Draft NEM was released and made available for public review with the public comment period for the NEM closing on October 15, 2018.

Due to the COVID-19 pandemic, the Port Authority conducted the fourth public workshop and public hearing virtually to receive public comments on the draft 2021 NCP Report on October 7, 2021.

14 CFR Part 150 Guidance on Public Participation for the NCP

FAA's approval of the NCP will be contingent on an FAA finding that § 150.23 (c) consultation requirements have been met; i.e.:

§ 150.23 (c) [For Noise Compatibility Programs]:

Each noise compatibility program must be developed and prepared … in consultation with FAA regional officials, the officials of the state and of any public agencies and planning agencies whose area, or any portion or whose area, of jurisdiction within the Ldn 65 dB noise contours is depicted on the noise exposure map, and other Federal officials having local responsibility of land uses depicted on the map. Consultation with FAA regional officials shall include, to the extent practicable, informal agreement from FAA on proposed new or modified flight procedures. For air carrier airports, consultation must include any air carriers and, to the extent practicable, other aircraft operators using the airport.

5.1. Technical Advisory Committee

The Part 150 Study benefited from the creation and participation of a Technical Advisory Committee (TAC). The TAC served several important functions, such as:

- Representing a broad range of stakeholder groups
- Receiving information about the Study and sharing it with their constituencies
- Reviewing information and providing timely input to the Study.
- In some cases, providing technical advice to the Study Team

For the TAC to be representative of all of the key perspectives within the vicinity of EWR, the Port Authority invited a diverse group of key stakeholders including, but not limited to, aircraft operators/airlines; aviation industry experts; affected jurisdictions; land use planners; chambers of commerce and other regional business organizations; and other local aircraft noise interest/advocacy groups. While broad representation was critical, the TAC remained a reasonable size so that deliberations were efficient. While the Port Authority did not officially invite the public to be members of the TAC, all TAC meetings were open to the public.

Formation of the TAC

An initial letter of invitation was distributed to a key set of stakeholders, designated with an asterisk (*) in Table 5-1, describing the Part 150 Study and the responsibilities of TAC members. The identification of agencies requiring consultation was based on the regulations governing the Part 150 Process at 14 CFR 150.21 (b) and 14 CFR 150.105(a).53.[85] Of member organizations invited by the Port Authority to provide a representative, not all chose to do so.

Table 5-1: Member Organizations of the Technical Advisory Committee (TAC)
Source: HMMH, 2019

Stakeholders Identified in 14 CFR 150.21 (b) and A150.105(a)			
States, public agencies or planning agencies	**FAA regional officials**	**Regular Aeronautical Users of the Airport**	**Interested Persons**
- Port Authority Noise Office* - Port Authority EWR Airport Staff* - City of Elizabeth* - Essex County* - Staten Island - Greater Elizabeth Chamber of Commerce - Hudson County - City of Newark - City of Linden - Town of Harrison - Union County - Union County Air Traffic Noise Advisory Board	- FAA Airport Traffic Control Tower (ATCT)* - FAA Airports Division* - FAA Air Traffic Organization* - FAA Flight Standards District Office (FSDO)* - FAA TRACON*	- United * - FedEx* - Southwest Airlines* - Fixed Base Operators (Signature Flight Support)*	- EWR Roundtable* - Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC)* - AvPORTS/TEB Staff - NJ Citizens Against Aircraft Noise (NJCAAN) - National Business Aviation Association (NBAA) - NJ State Noise Control Council (NJNCC) - Newark Regional Business Partnership (NRBP) - Aviation Development Council (ADC)

Note[1]: States, public agencies or planning agencies whose area of jurisdiction is within the 65 dB DNL contour
Note: All organizations designated with an asterisk (*) were identified as agencies requiring consultation based on the regulations governing the Part 150 process (14 CFR 150.21 (b)) and received an initial invite to the TAC.

[85] 14 CFR 150.105 (a) states: "The airport proprietor shall identify each public agency and planning agency whose jurisdiction or responsibility is either wholly or partially within the Ldn 65 dB boundary."

Membership

TAC meetings were open to the public, and a standing agenda item existed to offer the opportunity for public comments and discussion at every TAC meeting. Table 5-1 identifies member organizations represented in the TAC.

The TAC was advisory only to the Study, this means that the TAC was able to offer opinions, advice and guidance to the Study, but the Port Authority had the sole discretion to accept or reject the TAC recommendations in accordance with 14 CFR Part 150.

The Port Authority, as the sponsor of the Part 150 Study, and the owner and operator of EWR, was a member of the TAC. The FAA, as the primary funding agency for the Study and as the approval authority, was a key advisor of the TAC. Appendix D.1 provides a complete list of the EWR TAC members.

Summary of TAC Meetings

The Study Team handled all aspects of TAC meeting logistics including preparing meeting invitations, reminders, agendas, and presentations as well as contacting TAC members in advance of meetings to confirm attendance. The Study Team also identified specific meeting goals and objectives prior to each meeting, recommended the appropriate meeting format, and served as the facilitator for each TAC meeting. The first eight TAC meetings focused on the development of the draft 2016 NEM. Discussion of NCP measures began at the fifth TAC meeting and continued throughout the remainder of the Study. Table 5-2 displays the topics discussed at the TAC meetings involved in the development of the NCP for this Part 150 Study. Appendix D.2 provides TAC presentations and meeting minutes.

Table 5-2: Noise Compatibility Program TAC Meeting Topics
Source: HMMH, 2019.

TAC Meeting #	Date	Topics Covered
5	5/25/2016	Noise modeling status, land use, land use compatibility, and introduce NCP development process.
6	7/27/2016	NEMs, supplemental contours, NCP process.
7	9/21/2016	Review of NEM document, NCP process and preliminary discussion of NCP analyses
8	11/16/2016	Review of public workshop #2 and discussion of NCP measures and potential analyses
9	1/26/2017	Present first-round of abatement alternative analysis
10	3/30/2017	Notify need to revise NEM contours and present second-round abatement alternative analysis
11	5/22/2017	Present revised NEM contours, first-round compatible land use alternatives
12	11/8/2017	Discussion of NCP documentation, including document outline, and presentation of the third round of abatement alternative analyses.
13	7/19/2018	Present 2019 Draft NEM and proposed NCP measures.
14	10/24/2019	Present Noise Abatement, Land Use, and Programmatic measures being considered for the NCP.

5.2. Public Workshops, Public Hearing and other Stakeholder Opportunities to Comment

Members of the general public were encouraged to stay informed of the Study's progress by visiting the Study's website, signing up to receive the project newsletters, attending TAC meetings, participating in public workshops and hearings, and submitting comments on the draft documents prepared for submittal to the FAA over the course of the Study. Details for each of these meetings, resources, and opportunity for public participation in the NCP study are the focus of the remainder of this section.

The Study Team worked with the Port Authority to keep interested parties informed of the public workshops and hearing by:

- Creating and distributing press releases about the location, time, and format of the public workshops and hearing in multiple languages;
- Informing media and elected officials about the public workshops and public hearing; and,
- Developing supporting media materials for each meeting including presentation boards and project newsletters.

To prepare for public meetings, the Study Team worked with the Port Authority to identify appropriate meeting locations within the EWR Study Area, ensured the locations were Americans with Disabilities Act (ADA) accessible and, when possible, public transit accessible. Language interpretation services and refreshments were also provided at public meetings.

The public workshops were conducted in an open house format, with display/ presentation boards and other project information set up around the perimeter of the meeting room by topic area (e.g., noise model development, land use, NEM noise contours and NCP measures). Members of the Study Team as well as Port Authority staff served as facilitators at the various workshop stations to present the project information as well as answer questions from the public. A public comment table was also provided so that members of the public could prepare written comments on official project comment sheets. The Study Team prepared a brief summary for each public workshop.

Four public workshops were conducted for the EWR Part 150 Study. The first workshop introduced the public to the Study and the development of the NEM. The second workshop presented the Draft 2016 NEM. The third public workshop presented the Draft 2019 NEM and land use compatibility analysis results. The fourth and final public workshop and public hearing presented the draft NCP Report, which included Port Authority-recommended measures to improve aircraft noise compatibility at EWR. Due to the COVID-19 pandemic and consistent with Port Authority's intent to protect the health and safety of the community, the final information public workshop and public hearing on the EWR NCP were conducted on a virtual platform.

Table 5-3 lists the dates, times, and locations of each of the workshops/ hearing, and indicates where in this Part 150 documentation the workshop materials can be found.

The final 2019 NEM document contains all materials presented at the first three public workshops in Appendix G.3.2, beginning on page G-67. Copies of workshop materials, presentations, and the 2019 NEM document are available on the Study website. This final NCP Report contains all materials from the fourth public workshop and public hearing in Appendix E.1.

Table 5-3: EWR Part 150 Public Meetings
Source: HMMH, 2021.

Public Meeting	Purpose	Date	Time	Location	Material Location
Public Workshop 1	Introduce Part 150 Study	10/14/2015	6:00 p.m. to 8:00 p.m.	Marriott Newark Airport	2019 NEM Document; Appendix G.3.2, page G-67
Public Workshop 2	Present the 2016 Draft Noise Exposure Map	10/25/2016 10/27/2016	6:00 p.m. to 9:00 p.m.	Hilton Newark Penn Station and Kean University/Donald R. Conklin Conference Center, 6th Floor	2019 NEM Document; Appendix G.3.2, page G-81
Public Workshop 3	Present the 2019 Draft Noise Exposure Map	9/25/2018 9/26/2018	6:00 p.m. to 9:00 p.m.	Union County College Kellogg Building and Weequahic Park Sports Authority Community Room	2019 NEM Document; Appendix G.3.2, page G-96
Public Workshop 4	Present the Draft Noise Compatibility Program	10/7/2021	5:00 p.m. to 6:30 p.m.	Virtual Online Meeting	NCP Document; Appendix E.1, page E-14
Public Hearing	Receive public comment on the Draft Noise Compatibility Program		7:00 p.m. to 9:00 p.m.	Advance Registration was Required draftewrncp.eventbrite.com	NCP Document; Appendix E.1, page E-7

The EWR NCP Report was the primary topic of the final workshop. In conjunction with the virtual public workshop, the Port Authority held a virtual public hearing. At this hearing, the public was provided the opportunity to make comments on the record. The Port Authority made the Draft EWR NCP available for public review and comment from September 1, 2021, through October 15, 2021. All public comments that the Port Authority received during the public comment period for the NCP are added to the NCP documentation. The comments are provided in Appendix F.4.

The draft EWR NCP Report was made available for public review in the following manners:

- The Study website (http://panynjpart150.com/EWR_DNCP.asp)
- Hard copy, USB, or CD of the draft EWR NCP Report provided to individuals upon request (specifically indicating lack of access to a computer or the internet) on a first-come, first-served basis.

The public workshop and hearing and draft EWR NCP Report availability and comment period were advertised through:

- The Study website (http://panynjpart150.com/EWR_homepage.asp)
- Legal advertisements in numerous print publications, including:[86]
  - The Star Ledger, The Record, The Jersey Journal, El Especialito (in Spanish), Luso Americano (in Portuguese), Korea Daily (in Korean), Bayonne Community News, and Union News Daily
- Notices to elected officials[87]

[86] Issue editions and distribution dates are available in Appendix E.
[87] Notices to elected officials are available in Appendix E.

Summary of Public Comments

Throughout the NCP phase and the public comment period of the EWR 14 CFR Part 150 Study, members of the public could submit comments on the study to the Port Authority by using a dedicated Port Authority email address at NJPart150@panynj.gov. The Port Authority received two public comments through email/letter during the draft EWR NCP comment period of September 1, 2021 through October 15, 2021. Ten comments were provided during the Public Hearing held on October 7, 2021.

Appendix F.4 provides copies of all written comments received, including comments received through email, postal mail and at the public hearing.

Table 5-4 lists and provides comment topics for the most frequent comment categories received during the public comment period and the number of comments received regarding each topic.

Table 5-4: Most Frequent Public Comments Received

Source: Port Authority and HMMH, 2021.

Comment Category	Description
Scope of the EWR Part 150 Study	The Port Authority received seven comments on the scope of the EWR Part 150 Study.
Flight Frequency	The Port Authority received two comments on flight frequency.
Part 150 Public Meetings and Outreach	The Port Authority received seven comments on Part 150 public meetings and outreach.

5.3. Public and Planning Agency Coordination

Part 150 Section A150.123 requires that the NCP provide active and direct participation of the public and planning agencies with jurisdiction within the 65 DNL noise contours. As depicted in the EWR NEM documentation, agencies having land use jurisdiction within the 65 DNL contours include Union, Essex, and Hudson counties in New Jersey; and Richmond County, New York. Table 5-1 on page 5-2 lists those jurisdictions included on the TAC to provide the consultation required under 14 CFR Part 150, Subpart B, §150.23 (d).

In addition to TAC meetings, the Study Team held individual meetings with each local jurisdiction within the EWR Part 150 Study Area to inform them about the Part 150 Study and to discuss possible corrective and preventive land use measures that could be applied in their community to improve aircraft noise compatibility. Typically, corrective land use measures are the responsibility of the airport owner, whereas preventive land use measures are the responsibility of the planning jurisdictions.

EWR Roundtable

The Newark Liberty International Airport Community Roundtable (NLIACR) was formed in 2014 to enhance the dialogue between The Port Authority and the communities around EWR. The EWR Roundtable is comprised of federal, state, and locally elected officials, airport users, and representatives of local municipalities surrounding EWR. Meetings are held on an as needed basis. The Port Authority and the FAA attend as advisory, non-voting representatives. The general public is invited to attend roundtable meetings and are given the opportunity during each meeting to ask questions to any of the attendees.

The Study Team presented the purpose and overview of the Part 150 Process to the EWR Roundtable in June 2015. Since then, The Port Authority has attended all subsequent Roundtable meetings and kept the Roundtable informed on Part 150 Study updates and progress, key milestones, and public meetings throughout the development of the draft NEM and draft NCP documents. Additionally, roundtable members attended and provided input on the EWR Part 150 Study at the EWR Part 150 TAC meetings, and the EWR Part 150 public workshops.

Land Use Jurisdictional Meetings

Individual meetings with the land use jurisdictions were conducted in November 2015 and in March and May 2016. Follow-up meetings were conducted in January and February 2017. Members of the Study Team, Port Authority staff, and representatives from various local communities and land use organizations were present at these meetings.

Meetings with twelve planning jurisdictions within the Land Use Data Collection Area were conducted to provide each jurisdiction with an introduction of the Part 150 Study and how it could potentially affect each jurisdiction. This included the New Jersey Sports and Exposition Authority (NJSEA), which has jurisdiction over land uses and development within the Meadowlands. Figure 5-1 shows these municipalities and jurisdictions in relation to EWR. Additionally, the initial project meeting was used to obtain existing, planned, and future land use data including, but not limited to, jurisdictional boundaries; open space and environmental feature plans; historic properties; current master plans; zoning maps; and redevelopment plans. Appendix E contains the initial outreach letter sent to each jurisdiction within the Land Use Data Collection Area, which was also used to facilitate the discussion during each initial Study meeting.

The meetings facilitated an open discussion of the Part 150 process. Each jurisdiction was interested in how the results of the Study could affect them and they requested to stay informed throughout the Study.

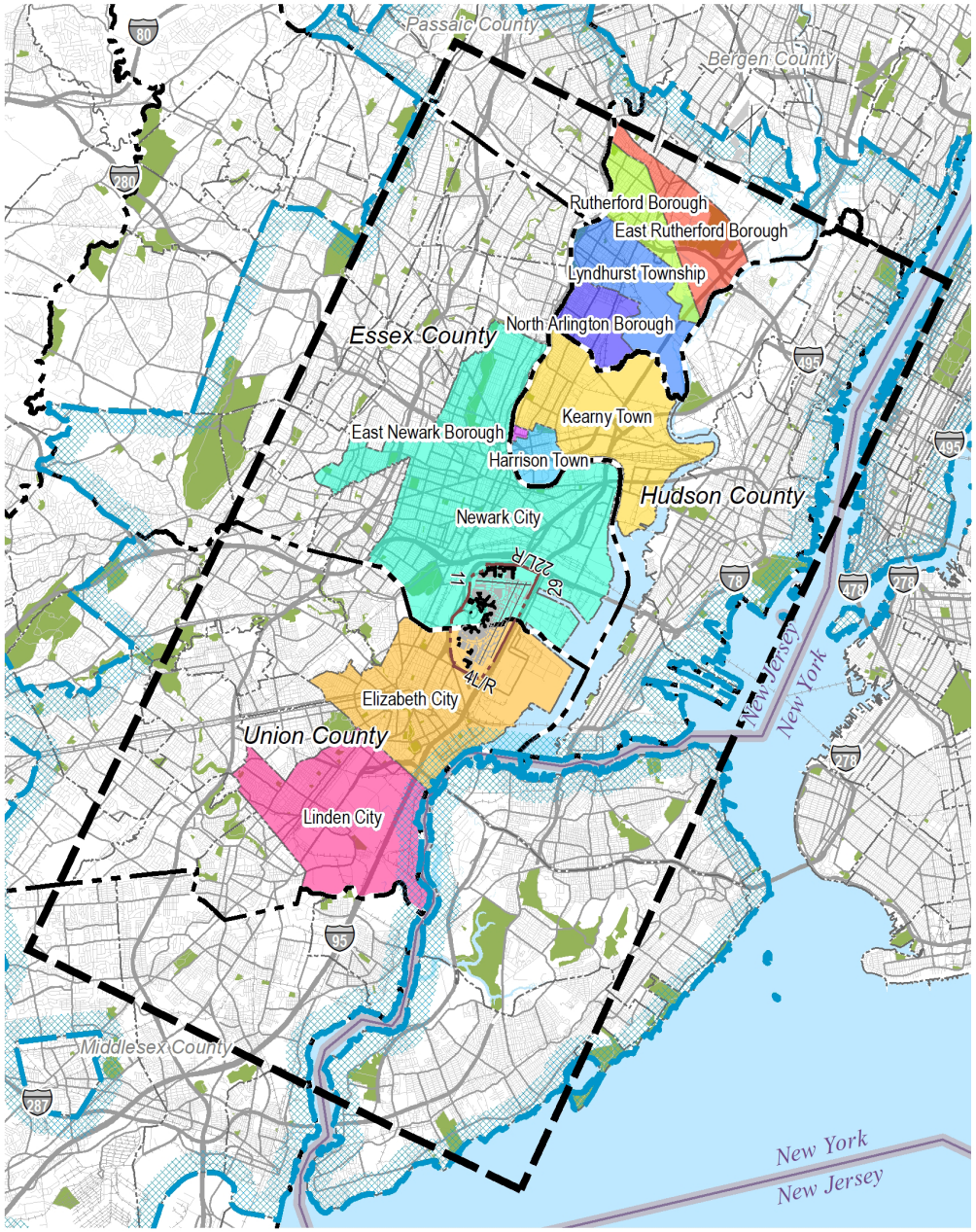
A follow-up meeting was conducted with each jurisdiction to provide information on the NEMs, discuss potential NCP measures, and to provide an overview of continued opportunities for their involvement in the process. Appendix E.2 contains the handout each jurisdiction received that was used to facilitate the discussion during each meeting. The discussion of possible NCP measures provided information as to which measures could be implemented by the jurisdiction, and which measures could be implemented by the Port Authority in coordination with a jurisdiction. Each meeting emphasized that neither the FAA nor the Port Authority have land use controls, and that this authority rests with the jurisdictions. Appendix E.2 contains a summary of each follow-up meeting that occurred. Jurisdictions were generally interested in the following:

- Overlay zoning
- Cooperative land use agreements
- Community planner forums
- Updates on noise mitigation

Table 5-5 lists each jurisdiction and the meeting dates.

Table 5-5: Local Jurisdiction Meetings
Source: HMMH, 2019.

Jurisdiction	Initial Meeting Date	Second Meeting Date
City of Linden	November 13, 2015	February 17, 2017
Essex County	March 2, 2016	February 16, 2017
City of Elizabeth	March 2, 2016	January 25, 2017
Township of Lyndhurst	March 3, 2016	Not within 65 DNL Contour
Hudson County	March 3, 2016	January 25, 2017
Town of Kearny	March 3, 2016	May 22, 2017
Borough of North Arlington	March 3, 2016	Not within 65 DNL Contour
Town of Harrison	March 3, 2016	January 25, 2017
New Jersey Sports & Exposition Authority	March 3, 2016	January 23, 2017
Borough of East Newark	May 23, 2016	Not within 65 DNL Contour
City of Newark	May 23, 2016	January 25, 2017
Union County	No Meeting	January 23, 2017



THE PORT AUTHORITY OF NY & NJ

Newark Liberty International Airport

Airport Noise Compatibility
Part 150 Study
2021 Noise Compatibility Program

Figure: 5-1

Local Jurisdictions

- Extent of Municipal Boundaries within EWR Study Area
- EWR Airport Boundary (Approximate)
- EWR Study Area
- Runway
- State Boundary
- County Boundary
- Municipal Boundary
- Park / Open Space
- Water
- Highway
- Major Roads
- Minor Roads
- Railroad

Note: The purpose of this figure is limited to depicting the area within which land use and flight operations data will be collected, and does not relate in any way to definition of noise exposure, land use compatibility, or eligibility for noise mitigation. Consistent with FAA guidelines in 14 CFR Part 150, land use compatibility will be assessed only within the existing and five-year forecast conditions 65 decibel (dB) Day-Night Average Sound Level (DNL) contours, when prepared and accepted by the FAA.

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Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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5.4. Other Opportunities for Stakeholder Engagement and Public Input

The Study Team and the Port Authority held numerous meetings with stakeholders to discuss the Part 150 Study, its process, methodology, and content development throughout the NCP phase. These meetings included EWR airport staff, EWR airport users and coordination with FAA lines of business, and the other Port Authority's Part 150 Study Team for NY airports.

Study-Specific Meetings

The Port Authority is simultaneously conducting Part 150 Studies at four separate airports; two in New Jersey and two in New York. The Port Authority, as the airport sponsor for all four airports, is responsible for the four studies and manages the consulting team led by HMMH for the New Jersey studies, and the consulting team led by Environmental Science Associates (ESA) for the New York studies. As the NCP portions of the four studies began to review and evaluate mitigation measures, the Port Authority initiated cross-team meetings, which occurred on an as-needed basis to discuss potential NCP measures, ways of maintaining consistency and efficiency between the studies, and similar issues that affect the outcome of the studies. The Port Authority and Study Teams also convened a series of joint meetings with the FAA and airlines during the course of the studies to review potential noise abatement measures. The intent of these meetings was to obtain necessary information and guidance for the various noise abatement procedures.

The New York and New Jersey Part 150 Study Teams developed potential noise abatement measures, which were shared with the FAA to determine whether there were any issues or constraints identified. The FAA reviewed the initial list of potential measures and provided feedback (January 2017 meeting). The FAA Air Traffic Division evaluated some of the proposed measures using their procedure development tools and provided comments back to the Study Teams.

The FAA developed and presented a webinar to the Study Teams, TAC members and the interested public about the interdependencies between the four airports in various airspace flows.

Additional meetings were held throughout 2017, as the potential procedures were evaluated and refined. The major airlines were involved, and the FAA participated in meetings to review the refined concepts in fall 2017. Their input helped to finalize the potential measures evaluated in each NCP Report.

Table 5-6 summarizes these meetings. Copies of the agendas, presentations and meeting minutes are provided in Appendix E.3, beginning on page E-41.

Table 5-6: Part 150 Study Specific Meetings
Source: HMMH. 2019

Meeting Date	Attendee Groups	Subject Matter
11/10/2016	Port Authority, EWR TAC, TEB TAC, JFK TAC, LGA TAC, HMMH, ESA, FAA TRACON, FAA Airports Division	FAA provided a NY-NJ Airspace 101 webinar for both Study Teams, all four TAC's and the interested public. http://panynjpart150.com/Airspace101reduced.mp4
1/27/2017	Port Authority, HMMH, FAA TRACON, FAA Airports Division	Discussion regarding possible Noise Abatement procedures at EWR and TEB.
5/24/2017	Port Authority, HMMH, ESA, FAA TRACON, FAA Airports Division	Discussions regarding possible Noise Abatement procedures at all four NY/NJ airports.
9/8/2017	Port Authority, HMMH, ESA, FAA AEE, FAA Airports Division, FAA TRACON, FAA ATCT, American Airlines, Delta Airlines, FedEx, JetBlue, Southwest Airlines, United Airlines, and United Parcel Service	Proposed Noise Abatement Procedure Concepts: Further discussions regarding the 22L offset approach at night.
10/6/2017	Port Authority, HMMH, ESA, FAA TRACON, FAA Airports Division	Follow-up discussions from the 9/8/2017 meeting with the airlines.
11/3/2017	Port Authority, HMMH, ESA, FAA AEE, FAA Airports Division, FAA TRACON, FAA ATCT, American Airlines, Delta Airlines, FedEx, JetBlue, Southwest Airlines, United Airlines, and United Parcel Service	Proposed Noise Abatement Procedure Concepts: Further discussions regarding the 22L offset approach at night.
11/16/2017	Port Authority, HMMH, ESA, FAA TRACON, FAA Airports Division	Follow-up discussions from the 11/3/2017 meeting with the airlines.

Stakeholder Database and Project Newsletters

The Study Team developed a detailed database of stakeholders including members of the public, elected officials, and special interest/advocacy groups with an interest in the Part 150 Study. The database was developed from interested parties who signed up through the Study website to receive study updates, TAC meeting sign-in sheets, and public workshop sign-in sheets.

The Study Team prepared newsletters, which were distributed in electronic format to TAC members, community representatives, elected officials, and other interested stakeholders included in the stakeholder database. In addition to project newsletters, stakeholders in the database also received TAC meeting and public workshop notices. Newsletters are also posted on the Study website. Table 5-7 provides information on the NCP newsletter and copies of the newsletter are provided in Appendix E.4, beginning on page E-62.

Newspaper Articles

The Study Team has collected and archived newspaper articles regarding the Part 150 Study at EWR and other articles related to noise and flight procedures at the airport during the Part 150 proceedings. These articles are provided in Appendix E.5, beginning on page E-68.

Table 5-7: Newsletters

Source: HMMH, 2019.

Date	Subject Matter
Fall 2015	Overview of the Part 150 Noise Compatibility process, Study Team, and study schedule.
March 2016	Study update including technical advisory committee overview, land use data collection process and polices, and public workshop information.
Summer 2016	Draft Noise Exposure Map for the DNL 2016 contours, including impact counts of noise-sensitive sites within the contour, and next steps of the noise compatibility program.
Winter 2017	Study update and public workshop recap.
Summer 2017	Revised draft Noise Exposure Map for 2021, noise abatement strategies, introduction to programmatic strategies, and land use strategies.
Winter 2017/2018	Port Authority's decision to update their aviation forecast and develop a 2019 NEM rather than submitting the 2016 NEM to the FAA given the difference in actual aircraft operations in 2016 as compared to those modeled for the 2016 NEM.

Study Website

The Port Authority established a Part 150 Study website that contains information related to all four of the Part 150 Studies (http://panynjpart150.com/). The Part 150 website includes various features and content to inform the public of the studies, including the following:

- Project schedule information and schedule updates
- Upcoming project meetings
- Project documents, including the Part 150 Study Protocol, TAC Meeting materials, Public Information Workshop materials, Draft NEM report and maps, Draft NCP report, and project newsletters
- Links to the FAA's Airport Noise Program and the Port Authority's WebTrak websites
- Frequently Asked Questions
- Port Authority contact information
- Links to the Port Authority's other Part 150 Study websites
- A link for interested parties to join the EWR Part 150 mailing list to receive project updates and announcements.