LaGuardia Airport

Title 14 Code of Federal Regulations (CFR) Part 150
Final Noise Exposure Map Report

Prepared for

March 2017

The Port Authority of New York & New Jersey
4 World Trade Center
150 Greenwich Street
New York, NY 10007

by

Environmental Science Associates
2600 Capitol Street, Suite 200
Sacramento, CA 95816

and

Fitzgerald & Halliday, Inc.

KB Environmental Sciences, Inc.

Kimley-Horn and Associates, Inc.

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Planning Technology, Inc.

VHB Engineering, Surveying, and Landscape Architecture, P.C.

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OUR COMMITMENT TO SUSTAINABILITY | ESA helps a variety of public and private sector clients plan and prepare for climate change and emerging regulations that limit GHG emissions. ESA is also a corporate member of the U.S. Green Building Council and the Business Council on Climate Change (BC3). Internally, ESA has adopted a Sustainability Vision and Policy Statement and a plan to reduce waste and energy within our operations.

March 31, 2017

Mr. Andrew Brooks
Environmental Program Manager
Federal Aviation Administration
Eastern Regional Office
1 Aviation Plaza
Jamaica, NY 11434

Subject: Noise Exposure Map (NEM) Submission pursuant to Title 14 of the Code of Federal Regulations, Part 150 for LaGuardia Airport (LGA)

Dear Mr. Brooks:

The Port Authority of New York and New Jersey (PANYNJ) is pleased to submit Noise Exposure Maps (NEMs) and supporting documentation for LaGuardia Airport (LGA) prepared in accordance with 14 CFR Part 150 ("Airport Noise Compatibility Planning"). As of December 31, 2016, the aircraft operations at LaGuardia Airport within this document are hereby certified by the PANYNJ to be consistent with the fleet mix, forecast operational levels, and flight procedures depicted for calendar years 2016 and 2021.

In accordance with 14 CFR Part 150, Section 150.21(c), PANYNJ requests that Federal Aviation Administration (FAA) confirm receipt of these Existing (2016) and Forecast (2021) Noise Exposure Maps (NEMs) and indicate whether they are in compliance with the applicable requirements. Both the Existing (2016) and Forecast (2021) NEMs were prepared using the forecast operations reviewed and approved by the FAA.

As discussed in Chapter 6 of the document, the PANYNJ provided all interested parties adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft noise exposure map and descriptions of forecast aircraft operations, consistent with Part 150, §150.21(b). The Sponsor's Certification, the formal certification required by Part 150, is provided after the report cover. As requested, each document contains a CD attached to the front cover containing electronic copies of the document.

On March 1, 2017, Delta Air Lines announced that the airline would cease MD-88 (INM substitute is MD83) aircraft operations at LGA on March 2, 2017, utilizing the A320, B737, and MD90 aircraft in its place. This change does not affect the 2016 Existing Condition Noise Exposure Maps. However, a small number of MD-88 aircraft operations (approximately 10 daily takeoffs and 10 daily landings) were modeled in the 2021 Future Condition. The PANYNJ has analyzed this change in fleet mix using the Area Equivalent Method (AEM), an FAA noise exposure screening tool. Through this analysis, the PANYNJ determined that the change will not result in a substantial, new noncompatible use nor would it significantly reduce noise over existing noncompatible uses contained within the 2021 DNL 65 contour area. It is anticipated; however, that the limits of the 2021 DNL 65 contour area may slightly change as a result of

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150 Greenwich Street, 18th Floor
New York, NY 10007

Delta Air Lines fleet mix actions. Determining the specific extent of the changes would take substantial time to determine at this point in the process. Therefore, the best path forward in this process is to proceed with submittal of the Final NEM with a commitment to reflect any changes to the 2021 NEM at the time of the upcoming Noise Compatibility Plan (NCP) submittal. In addition, PANYNJ will post a notice to the public on the LGA Part 150 project website regarding this change and will address any comments on the change during the NCP process.

The PANYNJ is grateful for the meaningful participation provided throughout this project by your office, the New York Airports District Office, FAA Washington D.C. headquarters, New York TRACON and the LGA Air Traffic Control Tower has provided throughout this project. We look forward to continuing to work together in preparation of the NCP and implementation of the NCP measures.

Please do not hesitate to contact me with any questions.

Sincerely yours,

Tom Bock
General Manager
Aviation Regulatory & Operational Support

enc.

THE PORT AUTHORITY
OF NY & NJ

SPONSOR'S CERTIFICATION

The Port Authority of New York and New Jersey has completed a comprehensive Title 14 Code of Federal Regulations (CFR) Part 150 Noise Exposure Map Report for LaGuardia Airport.

This is to certify the following:

(1) The 2016 and 2021 Noise Exposure Maps for LaGuardia Airport, and the associated documentation the Port Authority of New York and New Jersey submitted in this volume to the Federal Aviation Administration under Title 14 CFR Part 150, Subpart B, Section 150.21, are true and complete as of December 31, 2016, under penalty of 18 U.S.C. 1001.

(2) Pursuant to Title 14 CFR Part 150, Subpart B, Section 150.21(b), all interested parties have been afforded adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft noise exposure maps, and of the descriptions of forecast aircraft operations.

(3) The "2016 Existing Condition Noise Exposure Map" (Appendix M, 2016 Map 1 of 6) accurately represents conditions for calendar year 2016.

(4) The "2021 Five-Year Forecast Condition Noise Exposure Map" (Appendix M, 2021 Map 1 of 6) accurately represents forecast conditions for calendar year 2021 as of December 31, 2016.

Though submittal of the document is occurring in March 2017, the operations at LaGuardia Airport are hereby certified to currently be consistent with the fleet mix, forecast operational levels, and flight procedures depicted for 2016 within this document, as of December 31, 2016. Further information regarding development of the fleet mix, forecast, and procedures can be found in Chapter 4 - NEM Development, Appendix E - Radar Flight Tracks and Flight Profiles, and Appendix F - Forecast and Operational Data. On March 1, 2017, Delta Airlines announced that the airline would cease MD-88 (INM substitute is MD83) aircraft operations on March 2, 2017, utilizing the A320, B737, and MD90 aircraft in its place. This change does not affect the 2016 Existing Condition Noise Exposure Maps. However, MD-88 aircraft operations were modeled in the 2021 Future Condition. This change, and other fleet mix, forecast, or known operational changes that may arise, will be reflected in a revised 2021 Noise Exposure Map as part of the Noise Compatibility Program.

By: Huntley L Jamieson

Title: Aviation Director, Port Authority of New York and New Jersey

Date: 3/28/17

Airport Name: LaGuardia 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

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14 CFR PART 150 NEM CHECKLIST – PART I

AIRPORT NAME: LaGuardia Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
I. Submitting And Identifying The NEM:			
A. Submission is properly identified:			
1. 14 C.F.R. Part 150 NEM?	X		Front Cover and Inside Cover state, "Title 14 Code of Federal Regulations Noise Exposure Map Report"
2. NEM and NCP together?		X	Submittal is for NEM only. Front Cover and Inside Cover state "Noise Exposure Map Report"
3. Revision to NEMs FAA previously determined to be in compliance with Part 150?		X	No revision to NEMs. FAA previously determined to be in compliance with Part 150 because there is no prior 14 CFR Part 150 Study for LaGuardia Airport.
B. Airport and Airport Operator's name are identified?	X		Airport and Airport Operator's name are identified in the Front Cover and Page 1-1.
C. NCP is transmitted by airport operator's dated cover letter, describing it as a Part 150 submittal and requesting appropriate FAA determination?	X		Submission is an NEM only. The dated sponsor's cover letter follows the report cover and describes the submission as a Noise Exposure Map for LaGuardia Airport dated March 2017. The cover letter requests the FAA to "…confirm receipt of these Existing (2016) and Forecast (2021) Noise Exposure Maps (NEMs) and indicate whether they are in compliance with the applicable requirements."
II. Consultation: [150.21(b), A150.105(a)]			
A. Is there a narrative description of the consultation accomplished, including opportunities for public review and comment during map development?	X		See Section 1.4, Chapter 6, and Appendices H, K, and L for a narrative description of the consultation accomplished, including opportunities for public review and comment during map development.
B. Identification of consulted parties:			
1. Are the consulted parties identified?	X		See Chapter 6 and Appendices H and K for identification of consulted parties.
2. Do they include all those required by 150.21(b) and A150.105(a)?	X		See Chapter 6 and Appendices H and K for identification of all consulted parties required by 150.21(b) and A150.105(a).
3. Agencies in 2, above, correspond to those indicated on the NEM?	X		See the NEM, Chapter 5, Chapter 6, and Appendices H and K for the indication that the New York City Department of City Planning is the sole land use agency for all areas within the 2016 and 2021 DNL 65 contours. This agency corresponds to the agency indicated on the NEM.
C. Does the documentation include the airport operator's certification, and evidence to support it, that interested persons have been afforded adequate opportunity to submit their views, data, and comments during map development and in accordance with 150.21(b)?	X		See Sponsor's Certification before Table of Contents. Sponsor's Certification indicates that interested persons have been afforded adequate opportunity to submit their views, data, and comments during map development and in accordance with 150.21(b). Evidence is contained in Chapter 6 and Appendices H and K.
D. Does the document indicate whether written comments were			See Section 6.3 and Appendix L. Written comments received

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AIRPORT NAME: LaGuardia Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
received during consultation and, if there were comments that they are on file with the FAA regional airports division manager?	X		during consultation are included in Appendix L and are on file with the FAA regional airports division manager.
III. General Requirements: [150.21]			
A. Are there two maps, each clearly labeled on the face with year (existing condition year and one that is at least 5 years into the future)?	X		There are two maps, each clearly labeled on the face with year (existing condition year of 2016, and the five-year future year of 2021). Full size plots of the 2016 and 2021 NEMs are provided in Appendix M.
B. Map currency:			
1. Does the year on the face of the existing condition map graphic match the year on the airport operator's NEM submittal letter?		X	Though submittal of the document is occurring in March 2017, the operations at LaGuardia Airport are hereby certified to currently be consistent with the fleet mix, forecast operational levels, and flight procedures depicted for 2016 within this document. Further information regarding development of the fleet mix, forecast, and procedures can be found in Chapter 4 - NEM Development, Appendix E - Radar Flight Tracks and Flight Profiles, and Appendix F - Forecast and Operational Data. The Existing Conditions map reflects 2016 conditions which is also the year of the Draft NEM Report submittal.
2. Is the forecast year map based on reasonable forecasts and other planning assumptions and is it for at least the fifth calendar year after the year of submission?	X		The forecast year map of 2021 is based on reasonable forecasts and other planning assumptions, and is for at least the fifth calendar year after the year of submission (2016). See Section 4.3.2 and Appendix F-1 for information regarding the forecast and the FAA's approval for use in developing the NEMs.
3. If the answer to 1 and 2 above is no, the airport operator must verify in writing that data in the documentation are representative of existing condition and at least 5 years' forecast conditions as of the date of submission?		X	Not applicable
C. If the NEM and NCP are submitted together:			
1. Has the airport operator indicated whether the forecast year map is based on either forecast conditions without the program or forecast conditions if the program is implemented?		X	Not applicable. This is an NEM submission only.
2. If the forecast year map is based on program implementation:			
a. Are the specific program measures that are reflected on the map identified?		X	Not applicable. This is an NEM submission only.
b. Does the documentation specifically describe how these measures affect land use compatibilities depicted on the map?		X	Not applicable. This is an NEM submission only.

14 CFR PART 150 NEM CHECKLIST – PART I

AIRPORT NAME: LaGuardia Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
3. If the forecast year NEM does not model program implementation, the airport operator must either submit a revised forecast NEM showing program implementation conditions [B150.3(b), 150.35(f)] or the sponsor must demonstrate the adopted forecast year NEM with approved NCP measures would not change by plus/minus 1.5 DNL? (150.21(d))		X	Not applicable. This is an NEM submission only.
IV. Map Scale, Graphics, And Data Requirements: [A150.101, A150.103, A150.105, 150.21(a)]			
A. Are the maps of sufficient scale to be clear and readable (they must not be less than 1" to 2,000'), and is the scale indicated on the maps? (*Note (1) if the submittal uses separate graphics to depict flight tracks and/or noise monitoring sites, these must be of the same scale, because they are part of the documentation required for NEMs*.) (*Note (2) supplemental graphics that are not required by the regulation do not need to be at the 1" to 2,000' scale*)	X		Full size plots of the 2016 and 2021 NEMs, flight track figures, and noise monitoring sites are at a scale of 1 inch = 2,000 feet and are of sufficient scale to be clear and readable. The scale is indicated on the maps. The full size plots are provided in Appendix M. Supplemental Figures 5-1 and 5-2 are at a scale of 1 inch = 2,500 feet; supplemental flight track figures (Figures 4-2 through 4-5) are 1 inch = 20,000 feet; and the supplemental noise monitoring sites figure is 1 inch = 8,500 feet (Figure 4-12).
B. Is the quality of the graphics such that required information is clear and readable? (*Refer to C. through G., below, for specific graphic depictions that must be clear and readable*)	X		The quality of the graphics is such that required information is clear and readable. Refer to NEM Checklist IV.C. through IV.G., below. Also see full sized NEMs for 2016 and 2021 included in this submittal in Appendix M.
C. Depiction of the airport and its environs:			
1. Is the following graphically depicted to scale on both the existing condition and forecast year maps?			
a. Airport boundaries	X		Airport boundaries are graphically depicted to scale on both the existing condition and forecast year maps. See the 2016 and 2021 NEMs in Appendix M.
b. Runway configurations with runway end numbers	X		Runway configurations with runway end numbers are depicted to scale on both the existing condition and forecast year maps. See the 2016 and 2021 NEMs in Appendix M.
2. Does the depiction of the off-airport data include?			
a. A land use base map depicting streets and other identifiable geographic features	X		The depiction of the off-airport data includes a land use base map depicting streets and other identifiable geographic features. See the 2016 and 2021 NEMs in Appendix M.
b. The area within the DNL[1] 65 dB (or beyond, at local discretion)	X		The depiction of the off-airport data includes the area within the DNL 65. See the 2016 and 2021 NEMs in Appendix M.

[1] CNEL for California airports

14 CFR PART 150 NEM CHECKLIST – PART I

AIRPORT NAME: LaGuardia Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
c. Clear delineation of geographic boundaries and the names of all jurisdictions with planning and land use control authority within the DNL 65 dB (or beyond, at local discretion)	X		The depiction of the off-airport data includes a clear delineation of geographic boundaries and the name of the New York City Department of City Planning, which is the sole land use agency for all areas within the 2016 and 2021 DNL 65 contours. See the 2016 and 2021 NEMs in Appendix M.
D. 1.Continuous contours for at least the DNL 65, 70, and 75 dB?	X		Continuous contours for the DNL 65, 70, and 75 are shown on the 2016 and 2021 NEMs provided in Appendix M.
2. Has the local land use jurisdiction(s) adopted a lower local standard and if so, has the sponsor depicted this on the NEMs?		X	The DNL 65, 70, and 75 contours are shown on the NEMs. In response to public requests, supplemental graphics provided in Appendix J depict the DNL 55 and 60 contours, for informational purposes only. However, the local land use jurisdiction has not adopted a lower standard than DNL 65. The New York City Department of City Planning is the sole land use agency for all areas within the DNL 65 contour.
3. Based on current airport and operational data for the existing condition year NEM, and forecast data representative of the selected year for the forecast NEM?	X		The 2016 NEM is based on current airport and operational data for the existing condition year (2016). The 2021 NEM is based on forecast data representative of the selected year for the forecast NEM (2021). See Section 4.3, Section 5.2, Section 5.3, and Appendix F.
E. Flight tracks for the existing condition and forecast year timeframes (these may be on supplemental graphics which must use the same land use base map and scale as the existing condition and forecast year NEM), which are numbered to correspond to accompanying narrative?	X		Flight tracks for the existing condition and forecast year timeframes are shown in full size flight track plots in Appendix M. Also see Figures 4-2 through 4-5, which are numbered to correspond to the accompanying narrative, and follow page 4-8. Flight tracks for the existing condition and forecast year timeframes are the same, as described in Section 4.5.
F. Locations of any noise monitoring sites (these may be on supplemental graphics which must use the same land use base map and scale as the official NEMs)	X		Locations of noise monitoring sites are shown in Appendix M using the same land use base map and scale as the official NEMs. Also see Figure 4-12, which follows page 4-28.
G. Noncompatible land use identification:			
1. Are noncompatible land uses within at least the DNL 65 dB noise contour depicted on the map graphics?	X		Noncompatible land uses within the DNL 65 contour are depicted on the map graphics. See full sized plots in Appendix M. Also see supplemental Figure 5-1 (page 5-3) and supplemental Figure 5-2 (page 5-9).
2. Are noise sensitive public buildings and historic properties identified? (*Note: If none are within the depicted NEM noise contours, this should be stated in the accompanying narrative text.*)	X		Noise sensitive public buildings and historic properties are identified. See supplemental Figures 3-2 through 3-8. Also see Section 3.3 and Appendix D.

14 CFR PART 150 NEM CHECKLIST – PART I

AIRPORT NAME: LaGuardia Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
3. Are the noncompatible uses and noise sensitive public buildings readily identifiable and explained on the map legend?	X		Noncompatible uses and noise sensitive public buildings are readily identifiable on the NEMs and explained on the map legend. See full sized plots in Appendix M. Also see supplemental Figure 5-1 (page 5-3) and supplemental Figure 5-2 (page 5-9).
4. Are compatible land uses, which would normally be considered noncompatible, explained in the accompanying narrative?	X		Compatible land uses, which would normally be considered noncompatible, are explained in Section 5. See footnote on Tables 5-2, 5-5 and 5-6. Several schools within the DNL 65 contour have been sound insulated (see Section 2.6.1).
V. Narrative Support Of Map Data: [150.21(a), A150.1, A150.101, A150.103]			
A. 1. Are the technical data and data sources on which the NEMs are based adequately described in the narrative?	X		Technical data and data sources on which the NEMs are based are adequately described in the narrative. See Sections 4.3 through 4.5 and Appendices E and F.
2. Are the underlying technical data and planning assumptions reasonable?	X		The underlying technical data and planning assumptions are reasonable. See Sections 3 and 4.3 through 4.5; and Appendices E and F.
B. Calculation of Noise Contours:			
1. Is the methodology indicated?	X		The methodology is indicated. See Section 4.2.
a. Is it FAA approved?	X		The methodology is FAA approved. INM 7.0d was used, and approval is included in Appendix G.
b. Was the same model used for both maps? (*Note: The same model also must be used for NCP submittals associated with NEM determinations already issued by FAA where the NCP is submitted later, unless the airport sponsor submits a combined NEM/NCP submittal as a replacement, in which case the model used must be the most recent version at the time the update was started.*)	X		The same model was used for both maps. INM 7.0d was used for both the Existing Condition NEM (2016) and the Future Condition NEM (2021).
c. Has AEE approval been obtained for use of a model other than those that have previous blanket FAA approval?		X	Not applicable.
2. Correct use of noise models:			
a. Does the documentation indicate, or is there evidence, the airport operator (or its consultant) has adjusted or calibrated FAA-approved noise models or substituted one aircraft type for another that was not included on the FAA's pre-approved list of aircraft substitutions?	X		The documentation indicates that the airport operator (or its consultant) has substituted one aircraft type for another that was not included on the FAA's pre-approved list of aircraft substitutions. INM 7.0d was used for this NEM report. There are 13 aircraft that operate at LGA that aren't included in the INM 7.0d database or on the FAA's pre-approved list of aircraft substitutions. Substitutions for these 13 aircraft were approved by the FAA. See Appendix G for FAA AEE's approval of the proposed INM aircraft substitutions.

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AIRPORT NAME: LaGuardia Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
			User-defined departure and arrival profiles were developed for several aircraft that routinely operated following profiles that differ from the INM standard profiles. Section 4.5.3 and Appendix E-2 detail the user-defined aircraft profiles. FAA approval is provided in Appendix G-1 and Airline Concurrence is in Appendix G-2.
b. If so, does this have written approval from AEE, and is that written approval included in the submitted document?	X		The use of substitutions not included on the FAA's pre-approved list of substitutions and the use of user-defined departure and arrival profiles has written approval from AEE. See Appendix G.
3. If noise monitoring was used, does the narrative indicate that Part 150 guidelines were followed?		X	No noise monitoring was conducted as part of this NEM report. Calendar Year 2014 and 2015 noise measurement data from the Port Authority's permanent noise monitoring system are presented in Table 4-10 and Table 5-3. While the information was reviewed relative to the modeled results, the information had limited value due to limitations of the collection periods (partial years) and the difference in operational conditions between the measured and modeled information. The noise monitoring data was used for information purposes only and was not used to calibrate the model.
4. For contours below DNL 65 dB, does supporting documentation include an explanation of local reasons? (*Note: A narrative explanation, including evidence the local jurisdiction(s) have adopted a noise level less than DNL 65 dB as sensitive for the local community(ies), and including a table or other depiction of the differences from the Federal table, is highly desirable but not specifically required by the rule. However, if the airport sponsor submits NCP measures within the locally significant noise contour, an explanation must be included if it wants the FAA to consider the measure(s) for approval for purposes of eligibility for Federal aid.*)		X	DNL 65, 70, and 75 contours are shown on the NEMs. Supporting documentation in Section 3.2 and Appendix I indicate that in response to public requests, supplemental graphics provided in Appendix J depict the DNL 55 and 60 contours, for informational purposes only. However, the local jurisdiction has not adopted a lower standard than DNL 65.
C. Noncompatible Land Use Information:			
1. Does the narrative (or map graphics) give estimates of the number of people residing in each of the contours (DNL 65, 70 and 75, at a minimum) for both the existing condition and forecast year maps?	X		The narrative gives estimates of the number of people residing in each of the DNL 65, 70, and 75 contours for both the existing condition and forecast year maps. See Tables 5-2 and 5-5.
2. Does the documentation indicate whether the airport operator used Table 1 of Part 150?	X		The documentation indicates the airport operator used Table 1 of Part 150. See Sections 3.3.1, 5.2, and 5.3; Table 3-2; and Appendix D-1. However, the "Residential" land use category from Table 1 of Part 150 was divided into subcategories including, Single and Two Family Residential, Multi-Family Residential, and Mixed-Residential Commercial, which is common in New York City and other urban areas. Additionally, Table 1 includes Transient Lodging as a subcategory of Residential; however, this is included as "Commercial and Office" for consistency with New York City

14 CFR PART 150 NEM CHECKLIST – PART I

AIRPORT NAME: LaGuardia Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
			Department of City Planning land use categories.
a. If a local variation to table 1 was used:			
(1) Does the narrative clearly indicate which adjustments were made and the local reasons for doing so?	X		The narrative clearly indicates which adjustments were made to Table 1 of Part 150 and the local reasons for doing so. Section 3.3 discusses Table 1 and indicates how the compatibility guidelines apply to the conformed land uses developed for New York City and Nassau County. Further detail can be found in Appendix D-1.
(2) Does the narrative include the airport operator's complete substitution for table 1?	X		Section 3.3 discusses Table 1 and indicates how the compatibility guidelines apply to the conformed land uses developed for New York City and Nassau County. Further detail can be found in Appendix D-1.
3. Does the narrative include information on self- generated or ambient noise where compatible or noncompatible land use identifications consider non-airport and non-aircraft noise sources?	X		Chapter 3 includes information on self-generated and ambient noise and implications for how non-airport and non-aircraft noise sources affect compatible or noncompatible land use identifications.
4. Where normally noncompatible land uses are not depicted as such on the NEMs, does the narrative satisfactorily explain why, with reference to the specific geographic areas?	X		Several schools within the DNL 65 contour are depicted on the NEMs, but the symbolic representation indicates that they have been sound-insulated. Also see footnote on Tables 5-2, 5-4 and 5-5; and Section 2.6.1.
5. Does the narrative describe how forecast aircraft operations, forecast airport layout changes, and forecast land use changes will affect land use compatibility in the future?	X		The narrative describes how forecast aircraft operations, forecast airport layout changes, and forecast land use changes will affect land use compatibility in the future. See Section 5.3 and Table 5-4.
VI. Map Certifications: [150.21(b), 150.21(e)]			
A. Has the operator certified in writing that interested persons have been afforded adequate opportunity to submit views, data, and comments concerning the correctness and adequacy of the draft maps and forecasts?	X		The operator has certified in writing that interested persons have been afforded adequate opportunity to submit views, data, and comments concerning the correctness and adequacy of the draft maps and forecasts. See Sponsor's Certification before Table of Contents.
B. Has the operator certified in writing that each map and description of consultation and opportunity for public comment are true and complete under penalty of 18 U.S.C. § 1001?	X		The operator has certified in writing that each map and description of consultation and opportunity for public comment is true and complete under penalty of 18 U.S.C. § 1001. See Sponsor's Certification before Table of Contents.

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Contents

LaGuardia Airport 14 CFR Part 150 Study

CHAPTER 6 Consultation and Public Involvement

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CHAPTER 1
Introduction

1.1 Introduction

This document represents the Port Authority of New York and New Jersey's (Port Authority) study to prepare the Noise Exposure Maps (NEMs) for the LaGuardia Airport (LGA) in accordance with the requirements of the Title 14 *Code of Federal Regulations* Part 150, "Airport Noise Compatibility Planning" (14 CFR Part 150). The Federal Aviation Administration (FAA) checklist that outlines the requirements for NEMs and this document is included in this report. The associated supporting references in this document can also be identified either within the appendices or footnotes.

The Port Authority, operator of LGA, is evaluating aircraft noise and land use compatibility in the vicinity of LGA, pursuant to 14 CFR Part 150. The preparation of a 14 CFR Part 150 Study is a voluntary action on the part of the Port Authority.[1] This study provides the opportunity for aviation interests, state and local government officials, and the community members to address noise and land use compatibility issues related to the aircraft operations occurring at the Airport. The three primary objectives of this study are listed below. This component of the study, preparation of NEMs, addresses the first objective. The Noise Compatibility Program (NCP) phase will address the second and third objectives listed below and will be initiated after the NEMs are prepared.

	Objectives	Study Component
1	Identify LGA's existing operational procedures and determine the existing and future noise conditions around the Airport. Determine existing and future land uses that are and are not compatible with aircraft noise based on the noise conditions and land use compatibility guidelines in 14 CFR Part 150, Appendix A, Table 1.	Noise Exposure Maps
2	Identify and evaluate potential future operational, land use, and program management measures that could be implemented to reduce noise impacts to noise sensitive land uses.	Noise Compatibility Program
3	Develop a comprehensive NCP that consists of Airport Sponsor recommendations to the FAA to reduce future noise impacts to the surrounding communities.	Noise Compatibility Program

[1] The regulations contained in 14 CFR Part 150 are voluntary and airport operators are not required to participate. However, accepted NEMs and an approved NCP are necessary for federal financial participation in 14 CFR Part 150-related noise abatement measures at an airport.

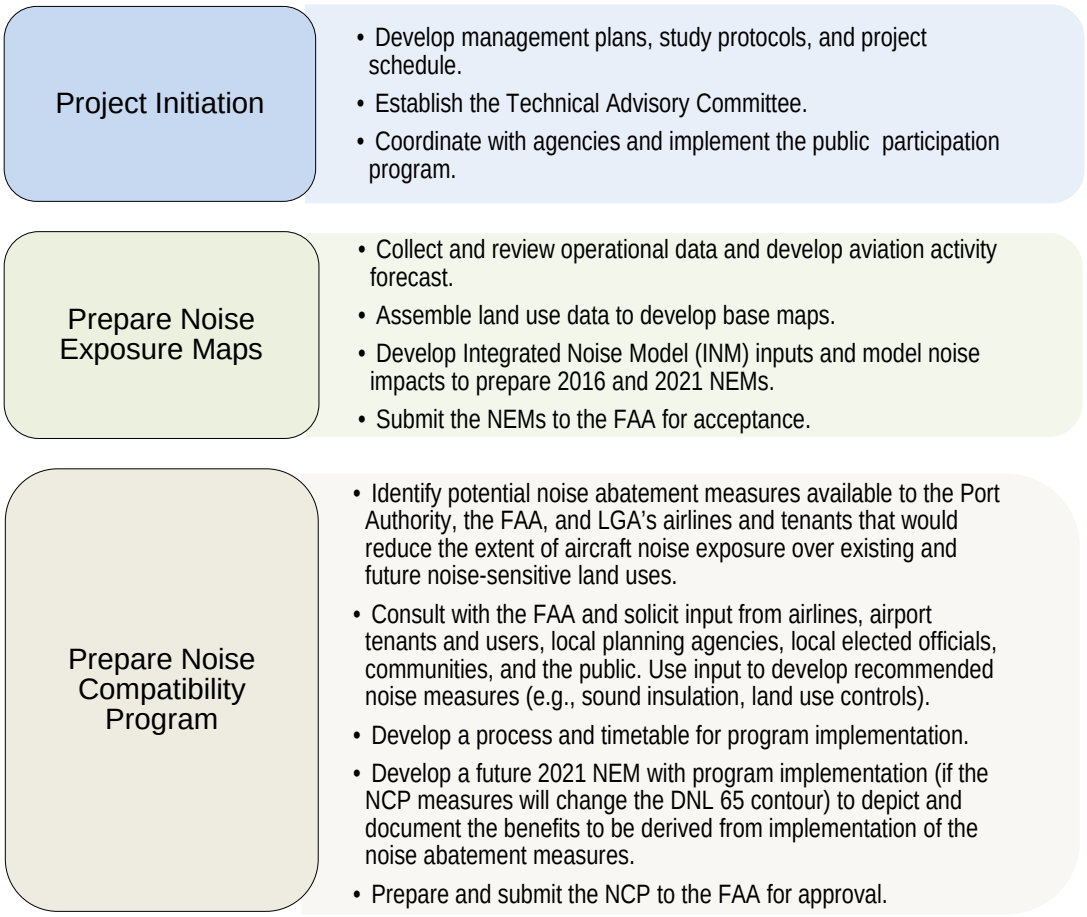
1.2 14 CFR Part 150 Study Process

In 2014, the Port Authority began its first ever 14 CFR Part 150 Studies, beginning with LGA and John F. Kennedy International Airport (JFK). These studies are voluntary and are designed to identify existing incompatible land uses surrounding an airport and to recommend measures to both mitigate existing incompatibilities as well as minimize future incompatibilities. Coordination with representatives of the affected jurisdictions, aviation officials, local communities, and interested members of the public has occurred throughout the study process, aided by regular meetings of a Technical Advisory Committee (TAC) established as a coordination mechanism at the beginning of the LGA 14 CFR Part 150 Study.

In late 2014, the Port Authority retained a team of consultants led by Environmental Science Associates (ESA) to assist in conducting 14 CFR Part 150 Studies at LGA and JFK. An overview of the 14 CFR Part 150 process undertaken by the Port Authority and its consultant team is provided on the next page.

Early in the Study, the ESA Study Team produced a unified study protocol document covering both the LGA and JFK 14 CFR Part 150 Studies. The Study Protocol is presented in **Appendix I** and was reviewed by the TAC before being released to the public. The purpose of the Study Protocol was to provide consistency in the following key aspects of both Studies:

- Roles and responsibilities of all Study stakeholders, including the interested public;
- Strategies for communication with communities, government, and the media;
- Methods for managing data;
- Forecasts of aviation activity;
- Aircraft noise modeling methodology;
- Land use designation and analysis methodology; and
- Study schedules, milestones, and deliverables.



1.3 Preparation of Noise Exposure Maps

NEMs graphically depict aircraft noise exposure levels on and in the vicinity of an airport by presenting lines of equal aircraft noise Day-Night Average Sound Level (DNL) values. Aircraft noise DNL values represent the sound produced by a 24-hour period of aircraft activity. For 14 CFR Part 150 studies, this 24-hour period of aircraft activity is based on average aircraft activity over a 12-month period and the sound energy is represented as A-weighted decibels (dBA). NEMs provide local communities an opportunity to see aircraft noise exposure levels in order to make better informed decisions regarding proposed noise sensitive development in the vicinity of an airport.

1.3.1 NEM Study Years

The official NEMs include two maps. The first NEM depicts existing noise exposure levels and the land uses in the vicinity of an airport. The LGA Existing Conditions (2016) NEM was developed using an aircraft operations forecast developed by the Port Authority and a consultant (Landrum & Brown) and calendar year 2014 day/night utilization, runway usage, flight tracks, and trip length data from the Port Authority's Airport Noise and Operations Management System

(ANOMS).[2,3] The aircraft operations forecast used for the LGA 14 CFR Part 150 Study was approved by the FAA on March 28, 2016, as shown on **Page F-3** of **Appendix F-1**.

The second NEM depicts noise exposure levels anticipated five years in the future, which represents forecast conditions without the Noise Compatibility Program. The future NEM was developed using projected levels of aircraft activity at LGA in 2021 as derived from the Port Authority aircraft operations forecast. In accordance with 14 CFR Part 150, the Future Conditions NEM represents conditions five years after the NEM date of submittal to the FAA. The Port Authority will proceed with preparing the NCP for LGA after submitting the NEMs to the FAA for acceptance. An updated NEM, the future scenario with program implementation, will take into account anticipated changes in land use and recommended noise abatement measures and will be created and included in the NCP Report if the NCP is proposing measures that modify the DNL 65 contour.

1.3.2 Technical Approach to Preparing Noise Exposure Maps

Subsequent chapters of this report describe in detail the information, methods, and tools used to develop the NEMs and estimate existing and future aircraft noise impacts in the vicinity of LGA. A brief overview of the technical approach is provided below.

1.3.2.1 Data Collection and Verification

A wide range of data and information related to the operation of the Airport were collected to provide a complete understanding of aircraft noise at LGA and its effects on local communities including:

Aircraft Activity

The Study Team collected information related to all the types of aircraft that operate at the Airport, the number of annual operations generated by these aircraft, the times of day that these aircraft operate, and the flight paths and flight profiles used by these aircraft for departures and arrivals. The Study Team performed a detailed analysis of FAA data, airline schedules and aircraft fleets, and LGA radar data from the ANOMS. To provide a basis for the NEMs, the Port Authority developed forecasts of aviation activity for 2016 and 2021, which was reviewed and approved by the FAA.

Approach and Departure Procedures

The Study Team reviewed the airspace structure in the New York City area and air traffic control procedures used to direct flights by the FAA in and out of LGA.

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2 An aircraft operation is defined as one arrival flight or one departure flight.

3 The FAA's 2014 Terminal Area Forecast for LGA (issued in January 2015) was used as the baseline for developing the operational forecast for 2016 and 2021 activity. Calendar year 2014 information and data related to fleet mix and runway utilization provided a baseline for developing Integrated Noise Model (INM) inputs for the 2016 Existing Conditions NEM. The 2016 INM inputs served as the basis for developing the INM inputs for the 2021 Future Conditions NEM.

Land Use

The Study Team collected existing land use information for the study area established for the LGA 14 CFR Part 150 study and developed land use base maps (see **Appendix D**).[4] The Study Team also identified proposed land use changes that are planned to occur over the next five-year period.

1.3.2.2 Aircraft Noise Modeling

Using the FAA's Integrated Noise Model (INM) Version 7.0d, noise exposure contours were developed for the year 2016 (Existing Conditions NEM) and the year 2021 (Future Conditions NEM). This process involved compiling information and generating detailed input data for the INM that represent aircraft activity and operating conditions at LGA. At the time the study started, the 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 (see **Appendix G-1**).

1.3.2.3 Preparation of NEMs

Using Geographic Information System (GIS) software, the Study Team developed 2016 and 2021 NEMs in accordance with criteria contained in 14 CFR Part 150.

1.3.2.4 Aircraft Noise Impact Analysis

Using GIS software, the type and amount (acreage) of incompatible land uses were identified for the 2016 NEM and the 2021 NEM. The analysis also determined the number of people, households, and noise-sensitive sites that are incompatible with the noise exposure levels they receive.

1.4 Consultation and Public Involvement

14 CFR Part 150 Sections 150.21(b) and A150.105(a) (Appendix A to Part 150) require that the NEMs and documentation submitted "…be developed and prepared…in consultation with states, public agencies and planning agencies whose area, or any portion of whose area, of jurisdiction is within the DNL 65 contour depicted on the map, FAA regional officials, and other Federal officials having local responsibility for land uses depicted on the map. This consultation must include regular aeronautical users of the airport." The consultation and public involvement process included the following elements to provide adequate opportunities for engagement and participation in development of the NEMs:

- Airlines, other airport tenants and users, the FAA, planning agencies, local communities, elected officials, and the general public were involved in the development of the NEMs for LGA.

[4] A study area was established for the collection of detailed land use information and related data. The study area was designed to encompass the anticipated existing conditions and future conditions DNL 65 and higher noise exposure contours.

- Technical Advisory Committee meetings were the primary means of disseminating information to stakeholders and receiving feedback throughout the development of the NEMs. The Technical Advisory Committee membership is provided in **Chapter 6**.
- Public Workshops soliciting input throughout the development of the draft NEM Report.
- For stakeholders, agencies, and the general public, a Study website[5] was developed to provide the draft NEM report as well as updates on the project progress and schedule, Frequently Asked Questions (FAQs), Study documents, additional links, and contact information to submit questions to the Study Team.

Additional information related to public outreach activities is included in **Chapter 6**.

1.5 NEM Report Organization

This report provides the NEMs for LGA and the technical documentation required by 14 CFR Part 150. This report is organized as follows:

Chapter 1 Introduction

Chapter 2 LaGuardia Airport Overview
This chapter provides background information regarding the airport and the history of noise abatement at LGA.

Chapter 3 Land Use
This chapter describes the LGA Part 150 Study land use study area and methods for collecting data, land uses in the study area, and noise sensitive sites.

Chapter 4 NEM Development
This chapter describes the development of the noise exposure maps, including the methodology behind the noise model and noise modeling inputs.

Chapter 5 2016 and 2021 Noise Exposure
This chapter presents the 2016 and 2021 Noise Exposure Maps and information on land use compatibility and aircraft noise-related impacts.

Chapter 6 Consultation and Public Involvement
This chapter documents stakeholder and public outreach engagement efforts undertaken during the 14 CFR Part 150 process.

Technical information, documentation, and maps are contained in the appendix to this report. The appendix is organized as follows:

Appendix A Glossary of Terms and Acronyms List

Appendix B Airport Facilities and Airspace

Appendix C Aircraft Noise

[5] http://panynjpart150.com/LGA_homepage.asp

Appendix D Land Use, Zoning and Noise Sensitive Sites
Appendix E Radar Flight Tracks and Flight Profiles
Appendix F Forecast and Operational Data
Appendix G Correspondence and Consultation
Appendix H Technical Advisory Committee
Appendix I 14 CFR Part 150 Study Protocol
Appendix J Supplemental Noise Contours
Appendix K Public Outreach
Appendix L Public Comments and Responses
Appendix M Official Noise Exposure Maps

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CHAPTER 2
LaGuardia Airport Overview

2.1 Airport Location and Setting

LGA is located in the northern section of the Borough of Queens, within the city limits of New York City. The Airport is located on 680 acres of land, approximately eight miles (by highway) east of midtown Manhattan. Much of the Airport is bounded by Flushing Bay to the north and east and Bowery Bay to the west. Communities that border the Airport include Jackson Heights and East Elmhurst to the south, Flushing and College Point to the east, and Astoria to the west and southwest. Major regional access to the Airport is provided by the Brooklyn-Queens Expressway and the Grand Central Parkway. The location of the Airport is depicted on **Figure 2-1**. The Airport and its environs are depicted on **Figure 2-2**.

2.1.1 LaGuardia Airport History

LaGuardia Airport is located on land originally developed in the late 1880s for the North Beach Bowery Bay Gala Amusement Park. The amusement park and its resorts closed in 1929 and its buildings, amusement parks, and resorts were torn down. During this time, 105 acres of land were re-developed as a private aviation field, named Glenn H. Curtiss Airport (later Curtiss-Wright Field). Plans for a new airport serving New York City were initiated by Mayor Fiorello H. LaGuardia soon after he became Mayor in 1934. The City of New York purchased Curtiss-Wright Field in 1935 and renamed it North Beach Airport. Construction of a new airport began in 1937 and the New York City Municipal Airport was dedicated in 1939 (shortly thereafter re-named as the New York City Municipal Airport – LaGuardia Field. The airport soon was known simply as LaGuardia Airport. The Port Authority began operating LaGuardia Airport in 1947.[6,7]

Source: Port Authority of New York and New Jersey.

[6] *Airport Traffic Report 2015*, Port Authority of New York and New Jersey, April 1, 2016. http://www.panynj.gov/airports/pdf-traffic/ATR_2015.pdf. Accessed July 1, 2016.

[7] http://www.panynj.gov/airports/lga-about.html. Accessed March 7, 2016.

2.2 LaGuardia Airport Overview

2.2.1 Aviation Role

In 2015, LGA was the 20th busiest commercial service airport, based on passenger traffic, in the United States. The Port Authority's *Airport Traffic Report 2015*, notes that LGA is "one of the nation's leading domestic gateways for business travel, and is the primary business/short-haul airport for New York City." LGA provides scheduled service primarily to destinations within the U.S. LGA set a new all-time record in 2015 with more than 28.4 million passengers and the airport, relative to its size, holds the distinction of being the "most efficient airport in the world, handling more passengers per acre per year than any other airport."[8]

The FAA's National Plan of Integrated Airport Systems (NPIAS) identifies LGA as a Large Hub Primary Commercial Service Airport.[9] Large hubs are those airports that each account for at least one percent of total U.S. passenger enplanements.

2.2.2 Airport Facilities Overview

This section provides an overview of LGA's facilities, airspace, and approach and departure procedures. The configuration of the major airfield and landside facilities at LGA is described in the following sections and shown on **Figure 2-3**. More detailed information on LGA's facilities and airspace can be found in **Appendix B** of this report.

2.2.2.1 Passenger Terminal Facilities

LGA has four passenger terminals: the Marine Air Terminal (Terminal A), the Central Terminal Building (Terminal B), Terminal C, and Terminal D. The passenger terminals are configured to provide a total of 72 gates. Airport Central Terminal Road and LaGuardia Access Road provide access to Terminals B, C, and D and their associated parking lots and garages. Marine Terminal Drive provides access to Terminal A and its parking lot. All passenger terminals at LGA are inter-connected by bus.

LGA is served by 14 airlines that provide service to mostly U.S. markets. Delta operates a major hub at LGA, with approximately 275 daily departures from Terminals A, C and D. The other 13 airlines primarily operate from Terminal B with a few also operating from Terminals C or D.

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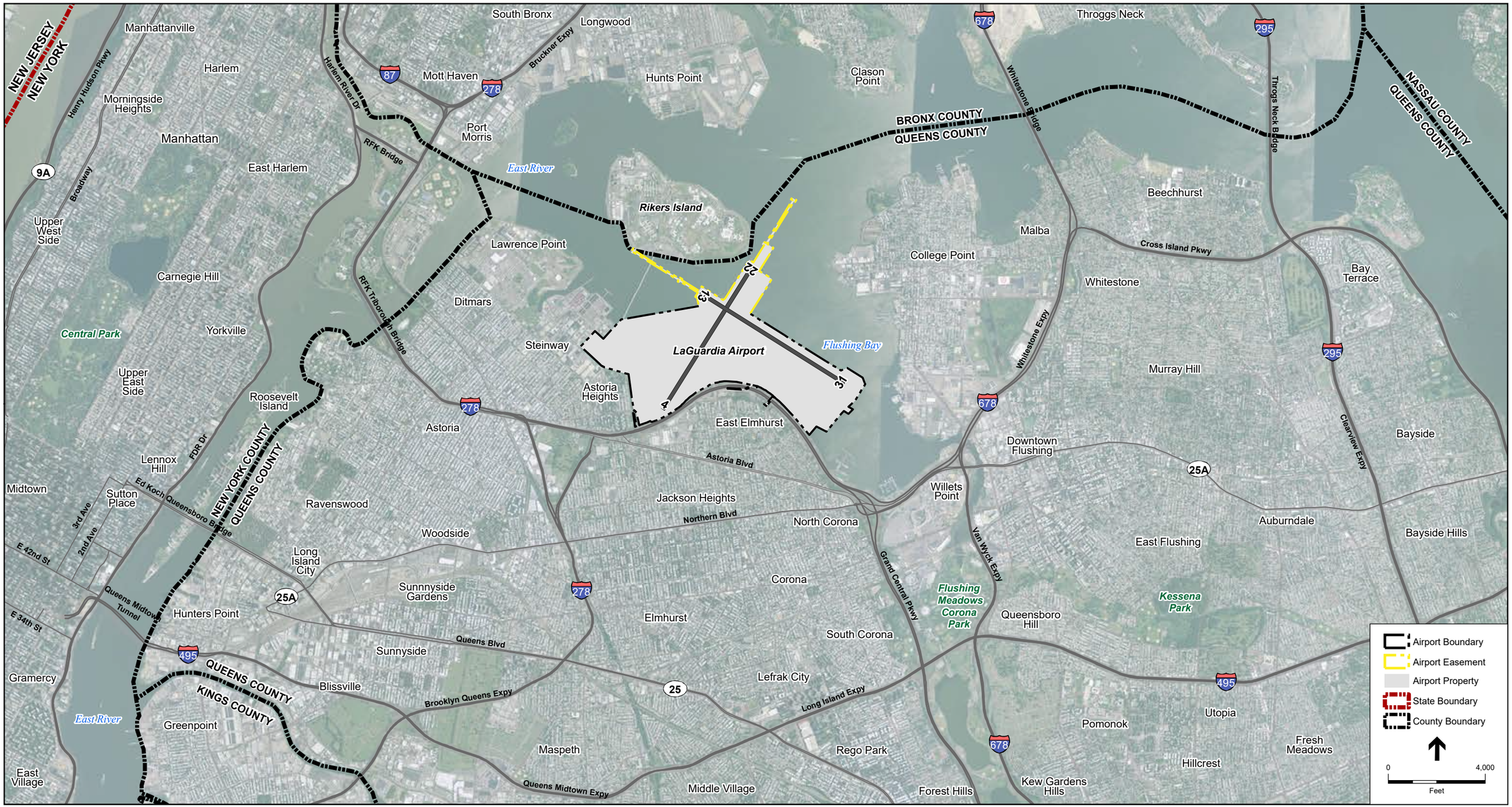
8 *Airport Traffic Report 2015*, Port Authority of New York and New Jersey, April 1, 2016. http://www.panynj.gov/airports/pdf-traffic/ATR_2015.pdf. Accessed July 1, 2016.

9 *Report to Congress – National Plan of Integrated Airport Systems (NPIAS) 2015 - 2019*. Federal Aviation Administration, September 30, 2014.



SOURCE: USDA, 2013 (Aerial); ESA, 2016

LaGuardia Airport 14 CFR Part 150 Study .140037

Figure 2-1

Airport Location Map

LaGuardia Airport

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SOURCE: USDA, 2013 (Aerial); ESA, 2016

LaGuardia Airport 14 CFR part 150 Study. 140037

Figure 2-2

Airport Vicinity Map

LaGuardia Airport

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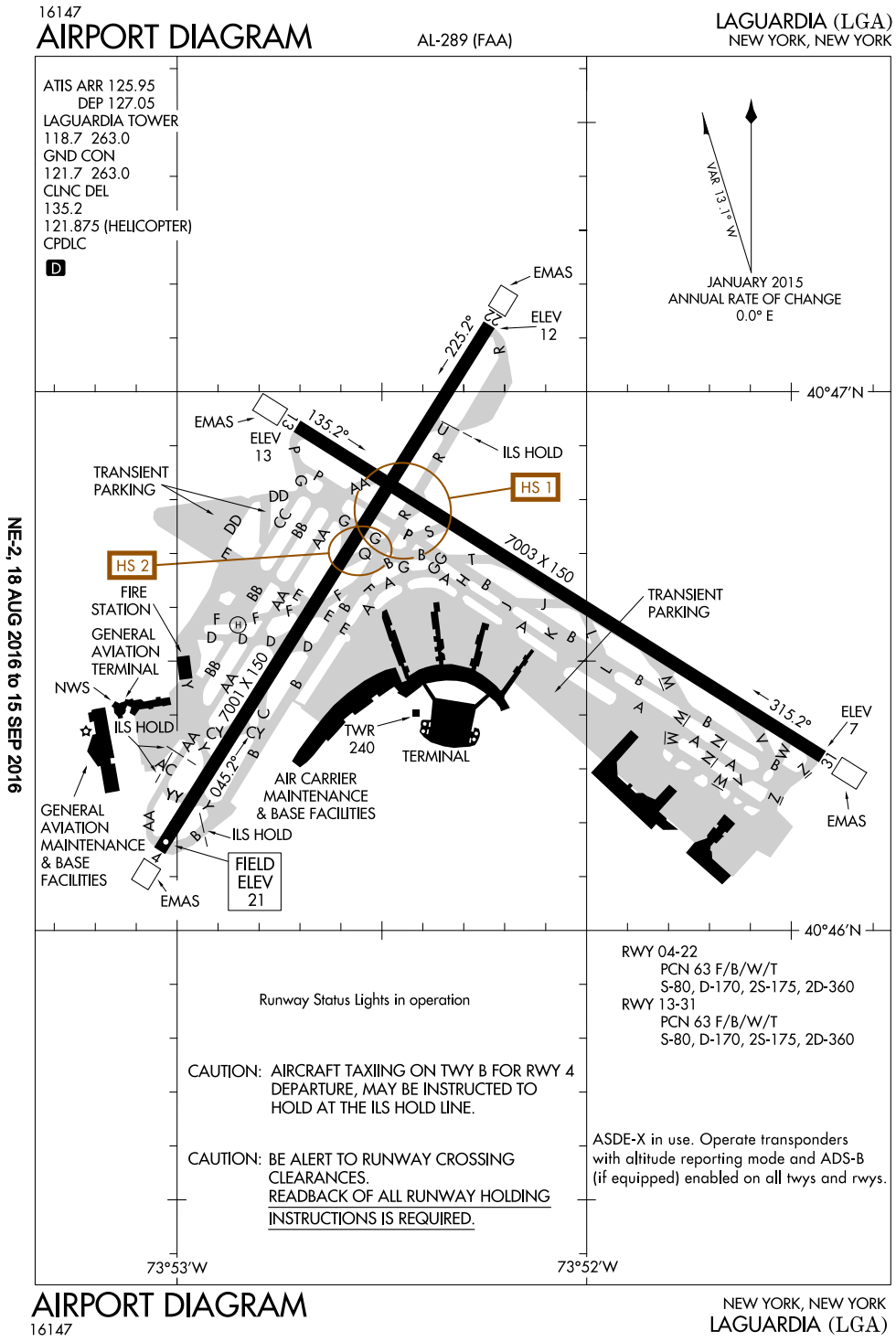

SOURCE: Federal Aviation Administration, 2016

Figure 2-3
Airport Diagram
LaGuardia Airport

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2.2.2.2 Runways

LaGuardia Airport has intersecting runways, each supported by a network of taxiways. Runway 4-22 and Runway 13-31, which were extended to their present lengths in 1967, are described below. **Table 2-1** presents additional information regarding the runways and helipad at LGA. This information is important for consideration of procedure development under the NCP.

Runway 13-31

Runway 13-31 is a Precision Instrument runway[10] that is oriented in a northwest-southeast direction. The runway is 7,003 feet long and 150 feet wide. Runway 13 is primarily used for departures when the airport is in a south runway use configuration. Runway 31 is primarily used for arrivals when the airport is in a north runway use configuration.

Runway 13 is equipped with an Instrument Landing System (ILS) and an approach lighting system. Departures are permitted from both runways with visibility as low as ¼ mile. Landings are permitted on Runway 13 with visibility greater than ½ mile. Both ends of Runway 13-31 are equipped with an Engineered Materials Arresting System (EMAS).[11]

Runway 4-22

Runway 4-22 is a Precision Instrument runway that is oriented in a southwest-northeast direction. This runway is 7,001 feet long and 150 feet wide. Runway 4 is primarily used for departures when there is a north runway use configuration, and Runway 22 is used for arrivals when there is a south runway use configuration.

The approaches to both ends of Runway 4-22 are supported by an ILS and approach lighting systems. Departures are permitted from both runways with visibility as low as ¼ mile. Landings are permitted on Runway 22 with visibility as low as ½ mile. Both ends of Runway 4-22 are equipped with an EMAS.

2.2.2.3 Helipad H1

Helipad H1 is 60 feet by 60 feet in size and is used for helicopter arrivals and departures. The helipad is constructed of asphalt and is marked with painted edge markings. The helipad is located on Taxiway BB, between Taxiway F and Taxiway D (west of Runway 4-22).

2.2.2.4 Taxiways

The taxiway system at LGA is comprised of a network of parallel taxiways and connecting taxiways that provide access between the Airport's two runways and the passenger terminal buildings, Fixed Base Operator (FBO) and general aviation terminal, aircraft parking aprons, and aircraft maintenance facilities.

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[10] Title 14 CFR Part 77, *Safe, Efficient Use, and Preservation of the Navigable* Airspace, defines a Precision Instrument runway as a runway having an existing instrument approach procedure utilizing an Instrument Landing System (ILS) or a Precision Approach Radar (PAR). It also means a runway for which a precision approach system is planned and is so indicated by an FAA approved Airport Layout Plan.

[11] EMAS uses crushable material placed at the end of a runway to stop an aircraft that overruns the runway. The tires of the aircraft sink into the lightweight material and the aircraft is decelerated as it rolls through the material.

TABLE 2-1
EXISTING RUNWAY AND HELIPAD CHARACTERISTICS

Landing Area Characteristics	Runway 4-22		Runway 13-31		Helipad H1
	4	22	13	31	H1
Length (Feet)	7,001		7,003		60
Width (Feet)	150		150		60
Displaced Arrival Threshold (Feet)	n/a	n/a	n/a	n/a	n/a
Approach Surface Slope	50:1[1]	50:1	50:1	34:1	n/a
Runway End Elevation (MSL)	20.6	11.5	11.6	6.7	21.0
Markings	Precision	Precision	Precision	Precision	Basic
Lighting	HIRL		HIRL		PERI
Part 77 Category – Instrument Type	Precision-ILS CAT I	Precision-ILS CAT I[2]	Precision-ILS CAT I	Non-Precision-LOC/DME	Precision
Approach Lighting	MALSR	ALSF-1	MALSR	None	N/A

NOTES:
MSL = Mean Sea Level
HIRL = High Intensity Runway Lighting
PERI = Helipad runway edge lights
ALSF-1 = Approach Lighting System with Sequenced Flashing Lights 1
MALSR = Medium Intensity Approach Light System with Runway Alignment Indicator Lights
ILS CAT = Instrument Landing System Category
LOC/DME = Localizer Antenna/Distance Measuring Equipment

1 FAA Flight Standards waiver, requiring specific lighting and runway configuration, issued for existing obstructions to approach slope in order to maintain nighttime operations. Changes to either condition would require a reevaluation of waiver and reissuance is not guaranteed.

2 Runway 22 has published Special Authorization CAT II available, which has lower minimums than CAT I.

SOURCE: The Port Authority of New York and New Jersey. *Airport Layout Plan.* September 2011.

2.2.2.5 Airport Traffic Control Tower

The Airport is serviced by an FAA-staffed airport traffic control tower (ATCT) located adjacent to Terminal B, which features the latest aviation technology, including a system that tracks the surface movement of aircraft and vehicles, enhancing safety and efficiency. The ATCT operates 24 hours a day, 365 days a year. Radar approach and departure control services are provided by the New York Terminal Radar Approach Control (NY TRACON) facility located in Westbury, New York.

2.2.2.6 General Aviation Facilities

General aviation includes all facets of civil aviation operations other than military, scheduled commercial passenger air service, and non-scheduled air transportation for hire. The predominant general aviation activity at LGA is business and corporate aviation.

Sheltair provides FBO services at LGA. The FBO and general aviation terminal facilities are located in the Marine Air Terminal (Terminal A). At LGA, Sheltair offers ground support,

deicing, concierge, catering, refreshments, aircraft ground handling, flight planning, a pilot's lounge, and shuttle service.

2.2.2.7 Air Cargo Facilities

LGA has limited cargo facilities, operated by passenger carriers (short-haul and medium-haul markets only). Hangars 28 and 5B are used by airlines for handling the cargo that is carried on passenger aircraft.

2.2.2.8 Other Aviation-Related Facilities

In addition to the passenger terminal, cargo facilities, and general aviation facilities, a number of aviation-related support facilities are located on airport property. These facilities include:

- Aircraft Rescue and Firefighting Facility (ARFF)
- Airport Surveillance Radar
- Airport Police Department

2.2.3 Future/Planned Airport Facilities

A review was conducted to determine if there are ongoing or planned capital improvement projects that would be constructed and operational at LGA by 2021, which would have potential to substantially affect the level of activity or the runway use and flight patterns at the Airport either during or after construction.

LGA is undergoing an extensive capital redevelopment program that will provide world-class airport facilities for both passengers and airlines. The Central Terminal Building (CTB) Redevelopment Program at LGA is the major capital project to be undertaken at LGA during the 14 CFR Part 150 Study planning period. The project includes replacing the existing CTB with a new 1.3 million square foot passenger terminal building. Related projects include aircraft parking improvements and landside access and parking improvements. Landside improvements include a new airport roadway system and parking garages.[12] Construction of the CTB, which began in the second quarter of 2016 and is scheduled to be completed in the first quarter of 2022, is anticipated to have no impact airside operations during the forecast period of this Study.

Other future projects planned at LGA over the upcoming five-year period include rehabilitation and routine maintenance and upgrade of airfield pavements and infrastructure, terminal facilities, and landside facilities. These projects would not have a substantial effect on aircraft activity or airport capacity. The Port Authority intends to acquire and install a Ground Based Augmentation System (GBAS) for LGA by 2018. The installation and use of GBAS is not expected to change aircraft operations and procedures at LGA within the timeframe of this study.

[12] The FAA issued a Finding of No Significant Impact and Record of Decision for the CTB Redevelopment Program on December 11, 2014. The FAA evaluated subsequent design changes and issued a Written Re-Evaluation and Record of Decision on December 30, 2015. http://www.panynj.gov/about/studies-reports.html.

In July 2015, the Governor's Office announced a comprehensive vision to redesign LGA. Under this plan, the "airport will be transformed into a single, structurally unified main terminal with expanded transportation access, significantly increased taxiway space and best-in-class passenger amenities."[13] The CTB represent the first half of the program. The second half of the unified terminal program represents Terminals C and D redeveloped by Delta Air Lines. For this Study, redevelopment of Terminal C and Terminal D is anticipated to be completed after 2021 and is not anticipated to affect the assumptions associated with the forecast period of this study.

2.2.4 Demand Management at LGA

LGA has historically been one of the more congested airports in the United States, in one of the most highly congested airspaces in the country. LGA is less than 10 miles away from the Downtown Manhattan/Wall Street Heliport, the East 34th Street Heliport, and the West 30th Street Heliport. LGA is less than 20 miles away from JFK, Newark Liberty International Airport (EWR), and Teterboro Airport (TEB). Furthermore, within a 50-mile radius are Morristown Municipal Airport (MMU), Westchester County Airport (HPN), Long Island MacArthur Airport (ISP), and Republic Airport (FRG). Because air traffic controllers must separate aircraft traveling to and from these multiple airports to keep their flight paths from interfering with each other, arrival and departure operations to and from LaGuardia (respectively) are constrained in both location and frequency. To reduce congestion and operational delays at LGA, the FAA designated LGA as a "high density airport" and limits the hourly number of allocated aircraft operations (slots) at the airport under 14 CFR Part 92.123. Existing slot limits for LGA are 71 scheduled operations per hour and three unscheduled operations per hour (Monday-Friday 6:00 AM to 9:59 PM and Sundays 12:00 PM to 9:59 PM).[14] As an additional measure to mitigate ground congestion, the Port Authority instituted a "Perimeter Rule" in 1984 that prohibits nonstop flights from LGA to cities more than 1,500 statute miles away, with the exception of flights to Denver Colorado. Additional information on the demand management measures implemented at LGA to reduce congestion is provided in **Page B-6 of Appendix B**.

2.2.5 Regional Economic Impact

Along with JFK and EWR, LGA is a significant driver of the New York–New Jersey metropolitan region's economy. The operating activities associated with these airports produce both direct economic contributions and an equally significant multiplier effect to the local economy. The Port Authority's *Airport Traffic Report 2015* summarizes the direct contribution and regional benefit that is generated by LGA. The report notes that LGA employed 11,977 people and had a $17.7 billion impact on the local economy. [15]

LGA Economic Impact (2015)

[13] https://www.governor.ny.gov/news/governor-cuomo-unveils-vision-transformative-redesign-laguardia-airport. Accessed April 27, 2016.

[14] https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=18054. Accessed March 11, 2016.

[15] *Airport Traffic Report 2015*, Port Authority of New York and New Jersey, April 1, 2016. http://www.panynj.gov/airports/pdf-traffic/ATR_2015.pdf. Accessed July 1, 2016.

2.3 Navigational Aids

Navigational aids, airport lighting, and airport markings help users of LGA to safely navigate around the Airport and through local airspace. The NAVAIDs available to pilots using LGA are summarized in **Table 2-2**.

2.4 Instrument Approach Procedures

Instrument approach procedures (IAPs) are flight procedures developed and published by the FAA that pilots use to navigate their aircraft to the runway. The IAPs currently published for LGA are listed in **Table 2-3**.

TABLE 2-2
LAGUARDIA AIRPORT NAVIGATIONAL AIDS

Navigational Aids	Description
Instrument Landing Systems (ILS)	An ILS is a type of precision ground-based electronic landing navigation aid that has been in use in the U.S. for more than 50 years. An ILS guides pilots to runways during periods of limited visibility or inclement weather. An ILS has several components, including: · Localizer antenna (LOC) that provides lateral course guidance to the runway · Glide slope antenna (GS) that provides vertical course guidance · Marker beacons along the extended runway centerline · Approach lighting system Non-precision LOC instrument approach procedures are often available when a GS is not installed or for approaches from the opposite end of the runway ("back-course" approach).
Area Navigation (RNAV)	RNAV is a method of Instrument Flight Rules (IFR) navigation that permits aircraft operation on any desired flight path using the combination of both GPS and ground-based navigational aids. RNAV routes and terminal procedures, including departure procedures and standard terminal arrivals, are designed with RNAV systems in mind to save time and fuel, reduce aircraft dependence on air traffic control (ATC) vectoring, and provide for more efficient use of the airspace.
Global Positioning System (GPS)	The GPS, operated by the Department of Defense, uses a network of satellites that create reference points to enable aircraft equipped with GPS receivers to determine their latitude, longitude, and altitude. GPS systems can be used during all phases of flight.
Very High Frequency Omni-Directional Range (VOR) **Distance Measuring Equipment (DME)**	A VOR is a ground-based electronic system that provides azimuth information for high and low altitude routes and airport approaches. DME determines a slant range distance from an aircraft to the DME. VORs can be stand-alone or equipped with DME. These navigational aids provide navigational fixes on an aeronautical chart.
Airport Beacon	Airport beacons help pilots identify an airport at night. Beacons that alternately flash white and green designate civilian land airports.

SOURCE: FAA, 2016. Adapted by Environmental Science Associates.

TABLE 2-3
LAGUARDIA INSTRUMENT APPROACH PROCEDURES

Runway 4-22		Runway 13-31	
4	**22**	**13**	**31**
ILS or LOC	ILS	ILS or LOC	LOC
RNAV (RNP) Z	ILS or LOC	Copter ILS or LOC	RNAV (GPS)
RNAV (GPS) Y	RNAV (RNP) Z	RNAV (GPS)	
VOR	RNAV (GPS) Y		
	Copter ILS or LOC/DME		
	Special Authorization CAT II ILS		

SOURCE: Federal Aviation Administration, 2016.

Circling IAPs published for LGA include RNAV (GPS)-B, LDA-A, and VOR/DME-H. Published IAPs into LGA also include the Copter RNAV (GPS) 250. Runway 13 has a visual approach procedure called the "River Visual" available when weather conditions permit (3,200 foot-ceilings and more than 5 statute miles visibility). Using this procedure, aircraft follow reference landmarks and altitudes to navigate to the runway. Runway 31 also has a charted visual flight procedure (CVFP) called the "Expressway Visual" for when weather conditions permit (3,000 foot-ceilings and more than 5 statute miles visibility); aircraft follow reference landmarks and altitudes to navigate to the runway end. CVFPs are approaches that depict visual landmarks, rather than the airport, and are established for environmental, safety, or air traffic efficiency reasons.[16] They can be used only by aircraft following IFR flight plans that have been cleared by Air Traffic Control to use the procedures for landing at an airport with an operating control tower.[17] Pilots following a CVFP use reference landmarks and altitudes on the procedure chart to navigate to the runway. Once cleared to follow a CVFP, pilots continue operating under IFR but require visual meteorological conditions (cloud ceilings of at least 1,000 feet, and visibility of at least 3 miles). A CVFP may also have higher minimum weather requirements than a Visual Approach.[18,19]

Pilots operating under IFR can also be directed by Air Traffic Control to fly visual approaches to runways without the use of CVFPs. Once given a clearance to fly a visual approach without a CVFP, pilots continue operating under IFR but must maintain visual separation from other aircraft.[20]

[16] *Aeronautical Information Manual*. Paragraph 5-4-24. Federal Aviation Administration, December 10, 2015.
[17] Order JO 7110.65W, *Air Traffic Control*. Federal Aviation Administration, December 10, 2015.
[18] FAA Aeronautical Information Manual (AIM), Section 5-4-24. December 10, 2015.
[19] FAA Information for Operators (InFO) 11003. January 25, 2011.
[20] FAA Aeronautical Information Manual (AIM), Section 5-4-23. December 10, 2015.

Runway 31 also has a Special Area Navigation Visual Flight Procedure (RVFP). Special RVFPs have three requirements. First, RVFP is only used by pilots of aircraft equipped with Instrument Flight Rules (IFR)-approved RNAV systems. Second, these procedures require approval by FAA Flight Standards Services (AFS). Third, a lead operator, in this case JetBlue, must request and submit a design with oversight by AFS. The RNAV Visual Runway 31 is only available when weather conditions permit (3,000 foot-ceilings and 5-statute miles or more visibility) and must be requested by operators which have received AFS approval. The procedure requires pilots to utilize RNAV to navigate over specific waypoints with recommended altitudes to the runway end.

2.5 Standard Terminal Arrivals and Departure Procedures

New York airspace is structured so that arriving aircraft can be safely and efficiently transitioned from the en route environment to the approach control environment and eventually to the airfield. Likewise, the airspace is structured so that departing aircraft can transition from the airfield to the terminal environment and ultimately to the en route environment. Standard Terminal Arrival Routes (STARs) and Departure Procedures (DPs) simplify and expedite Instrument Flight Rules (IFR) air traffic controller arrival and departure procedures in the New York airspace. As discussed previously, aircraft flying in and out of LGA follow these precise routes, depending on the operational flow of the Airport. Furthermore, the locations of these routes and their frequencies of use are heavily influenced by the complexity of air traffic management associated with the numerous other airports near LGA, as discussed in **Section 2.2.4**.

2.5.1 Standard Terminal Arrivals

The New York TRACON and LGA ATC use five STARs to route aircraft into LGA. The STARs, which are listed in **Table 2-4**, are presently all conventional arrival procedures.[21] **Page B-15** and **Attachment 1** of **Appendix B** include descriptions of the STARs and a copy of the charts.

TABLE 2-4
LGA STANDARD TERMINAL ARRIVAL ROUTES

Procedure Name	Procedure Type	Arrival Direction
GATBY ONE	Conventional	Southwest
KORRY THREE	Conventional	South
HAARP THREE	Conventional	North
MILTON FOUR	Conventional	West
NOBBI FIVE	Conventional	North

SOURCE: FAA, 2016.

[21] FAA's *Instrument Procedures Handbook* (FAA-H-8083-16A) notes that STARs based on conventional NAVAIDs essentially have the same procedure design and obstacle clearance criteria as that for en route procedures. STAR procedures typically include standardized descent gradients and allow for deceleration segments. RNAV STARs serve the same purpose as conventional STARs, but are only used by aircraft equipped with Flight Management Systems or GPS. An RNAV STAR typically includes flyby (or flyover) waypoints. These waypoints may be assigned crossing altitudes and speeds to optimize the descent and deceleration profiles.

2.5.2 Departure Procedures

Aircraft departing LGA are often assigned a specific DP. A DP is a published procedure that provides a standard route from the runway to the appropriate en route airspace structure. In some cases, a DP may have an associated en route transition, which is a published procedure segment that connects the end of the DP to one of several en route structures. DPs are designed to separate departing aircraft from arriving aircraft, provide for efficient interception of an outbound course, simplify the issuance of departure clearances, and reduce radio communication.

DPs at LGA include a mix of RNAV and conventional procedures. **Table 2-5** summarizes the departure procedures for LGA. **Page B-16** and **Attachment 1** of **Appendix B** include the descriptions and charts of each procedure listed below.

TABLE 2-5
LGA DEPARTURE PROCEDURES

Procedure Name	Procedure Type
GLDMN FIVE	RNAV
HOPEA THREE	RNAV
JUTES THREE	RNAV
LA GUARDIA FIVE	Conventional
NTHNS FOUR	RNAV
TNNIS SIX	RNAV

NOTE: RNAV = Area Navigation.
SOURCE: FAA, 2016.

2.6 Port Authority Noise Monitoring, Noise Abatement, and Community Outreach Programs

Since 1959, the Port Authority has been active in addressing aircraft noise concerns and currently has several programs in place to monitor aircraft noise levels and assist local communities in understanding the effects of aircraft noise. These include a fully-staffed noise office, installation of a noise monitoring system in the communities around LGA, and implementation of a sound insulation program.

2.6.1 School Sound Insulation Program

The Port Authority voluntarily initiated a soundproofing program for schools in the vicinity of Port Authority airports. This program included sound insulation of 21 schools over the past three decades in the vicinity of LGA to reduce noise impacts. Total program expenditures for the 21 schools exceed an estimated $128 million which was paid for in part with FAA grants. **Table 2-6** provides additional information related to each school including the year in which the school was sound insulated and the estimated number of students in attendance in the 2015/2016 school year.

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 2-6
PORT AUTHORITY SCHOOL SOUNDPROOFING PROGRAM AT LGA

	School	City	Number of Students	Completion Year
1	I.S. 52X	Bronx	2,593	2001
2	Our Lady of Fatima	Jackson Heights	550	1989
3	P.S. 120Q	Flushing	1,068	1989
4	P.S. 143Q	Corona	1,725	1990
5	P.S. 161X	Bronx	562	1992
6	P.S. 165Q	Flushing	761	1992
7	P.S. 219Q	Flushing	687	1991
8	P.S. 62X	Bronx	781	1995
9	St. Ann	Flushing	Permanently Closed	2001
10	St. Sebastian	Woodside	440	1998
11	College of Aeronautics (Vaughn)	Flushing	1,635	2012
12	John Bowne High School	Flushing	3,694	2010
13	Lexington School for Deaf	Jackson Heights	496	2007
14	Monsignor McClancy Memorial High School	East Elmhurst	520	2010
15	P.S. 146B	Bronx	453	2009
16	P.S. 5X	Bronx	689	2009
17	Samuel Gompers Vocational School	Bronx	Permanently Closed	2010
18	St. Anselm	Bronx	548	2010
19	St. Athanasius	Bronx	360	2010
20	St. Michael – Most Holy Redeemer	Flushing	224	2010
21	St. Pius V (Elementary)	Bronx	227	2007

SOURCE: Port Authority, 2015. New York City Department of Education, 2016. National Center for Education Statistics, 2016.

2.6.2 Airport Noise Monitoring

The Port Authority operates an Airport Noise and Operations Management System (ANOMS) that collects noise monitoring data in the vicinity of LGA using permanent and portable noise monitors. The ANOMS, which gathered data from 13 noise monitors in 2015, can also link noise events and complaints to specific aircraft operations.

The Port Authority's WebTrak Flight Tracking and Noise Information System allow the public to watch aircraft movements and view noise levels within the New York metropolitan area via a

website.[22] For each aircraft, WebTrak provides specific information regarding aircraft type, altitude, and origin/destination airports and flight identification. Noise level readings at the noise monitors near each airport are also shown on WebTrak in A-weighted instantaneous sound pressure level readings. In this report, 2014 and 2015 monthly noise level data for the monitors near LGA are provided in **Section 4.6**. These data are provided for informational purposes only as per the Study Protocol (in **Appendix I, Section 6.6**) and the request of the TAC. The data were not used in the development of noise contours, as the FAA does not allow noise monitoring data to be used to "calibrate" the noise model used to develop contours.

2.6.3 Aircraft Noise Complaints

As part of its noise program, the Port Authority collects and manages noise complaints related to each of the airports in its system. There are two primary means of filing an aircraft noise complaint: (1) by completing and submitting the form on the Port Authority's website or 2) by leaving a voicemail on the airport noise complaint hotline.[23] Noise complaints are recorded and processed with the help of the Port Authority's PlaneNoise® complaint management system. Each noise 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. **Table 2-7** provides the number of noise complaints and individual households submitting complaints for 2014 and 2015, and part of 2016. **Figures 2-4 and 2-5** provide a visual depiction of the locations of the households submitting complaints for 2014 and 2015, respectively. The majority of complaints are from households more than a mile from the airport, outside of the DNL 65 contour.

TABLE 2-7
LGA AIRCRAFT NOISE COMPLAINTS

Year	Number of Noise Complaints	Number of Distinct Households
2016[1]	6,092	577
2015	18,735	1,441
2014	22,324	988

SOURCE: Port Authority, 2016.
[1] Data provided for January-May 2016.

2.6.4 Community Outreach

The Port Authority continues to participate in local community and town meetings to discuss and answer citizen questions related to aircraft noise. For the LGA 14 CFR Part 150 Study, the TAC serves as one method of outreach to communities and other stakeholders (see Section 6.2). In conjunction with the approval to initiate the 14 CFR Part 150 studies for LGA and JFK, the Port Authority also initiated the formation of a community aviation roundtable (Roundtable) that

[22] http://webtrak.bksv.com/panynj
[23] The noise complaint form is located at: http://www.planenoise.com/panynj/daPRAbr9/. The airport noise complaint hotline can be reached by calling 1-800-225-1071.

would include elected officials and representatives of local community boards in the vicinity of LGA and JFK. In the spring of 2015, the responsibility for the Roundtable was turned over to the elected Coordinating Committee, which is presently coordinating the writing and adoption of by-laws. Once formalized, the Roundtable will provide a forum for the Port Authority, the FAA, and the affected community at large for discussions on aircraft noise issues.

2.6.5 Noise Abatement Measures

The Port Authority has pursued aircraft noise abatement measures for several decades. In 1959, the Port Authority established a noise limit of 112 Perceived Noise Decibels (PNdB) for aircraft departures. PNdB expresses the perceived loudness of an individual aircraft noise event. To enforce the departure noise limit, the Port Authority installed the world's first airport noise monitoring system. This monitoring system consisted of 11 permanent noise monitors in total, located near LGA, JFK, and EWR. At LGA, the operator receives a notification of noise level exceedance for each aircraft that exceeds the noise departure limit, based on noise levels measured by the monitoring system. The original system required manual correlation of noise levels with individual aircraft operations; a system upgrade in 1992 added flight tracking and automated this process.

In the year 1985, the Port Authority prohibited the use of Stage 1 aircraft at LGA, JFK, and EWR. "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*). In 1989, the Port Authority also prohibited the scheduling of additional nighttime flights of Stage 2 aircraft at LGA, JFK, and EWR. "Stage 2" aircraft met the noise standards in 14 CFR Part 36, Section B36.5(b), originally established in 1969. Passage of the Airport Noise and Capacity Act of 1990 (ANCA) subsequently prohibited operation of Stage 1 and Stage 2 aircraft with a maximum weight above 75,000 pounds within the United States after December 31, 1999. This prohibition provided noise benefits nationwide. ANCA also prevented the Port Authority from establishing additional operational restrictions on Stage 2 (or quieter) aircraft in flight except through compliance with 14 CFR Part 161, *Notice and Approval of Airport Noise and Access Restrictions*. In addition, the FAA Modernization and Reform Act of 2012 (FMRA) prohibits operation of Stage 1 and Stage 2 aircraft with a maximum weight of 75,000 pounds or lower within the 48 contiguous United States after December 31, 2015.

In an effort to minimize nighttime noise exposure, the Port Authority established a voluntary curfew at LGA from midnight to 6 AM. If an operator does not abide by the voluntary restraints, the operator receives a letter informing them that the voluntary curfew is in place and that only essential flights should be conducted during the curfew hours.

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SOURCE: PANYNJ and PlaneNoise, 2016; Google Maps.
NOTE: The blue noise complaint indicators without a number reflect locations where a single noise complaint was filed.

Figure 2-4
2014 Noise Complaints
LaGuardia Airport

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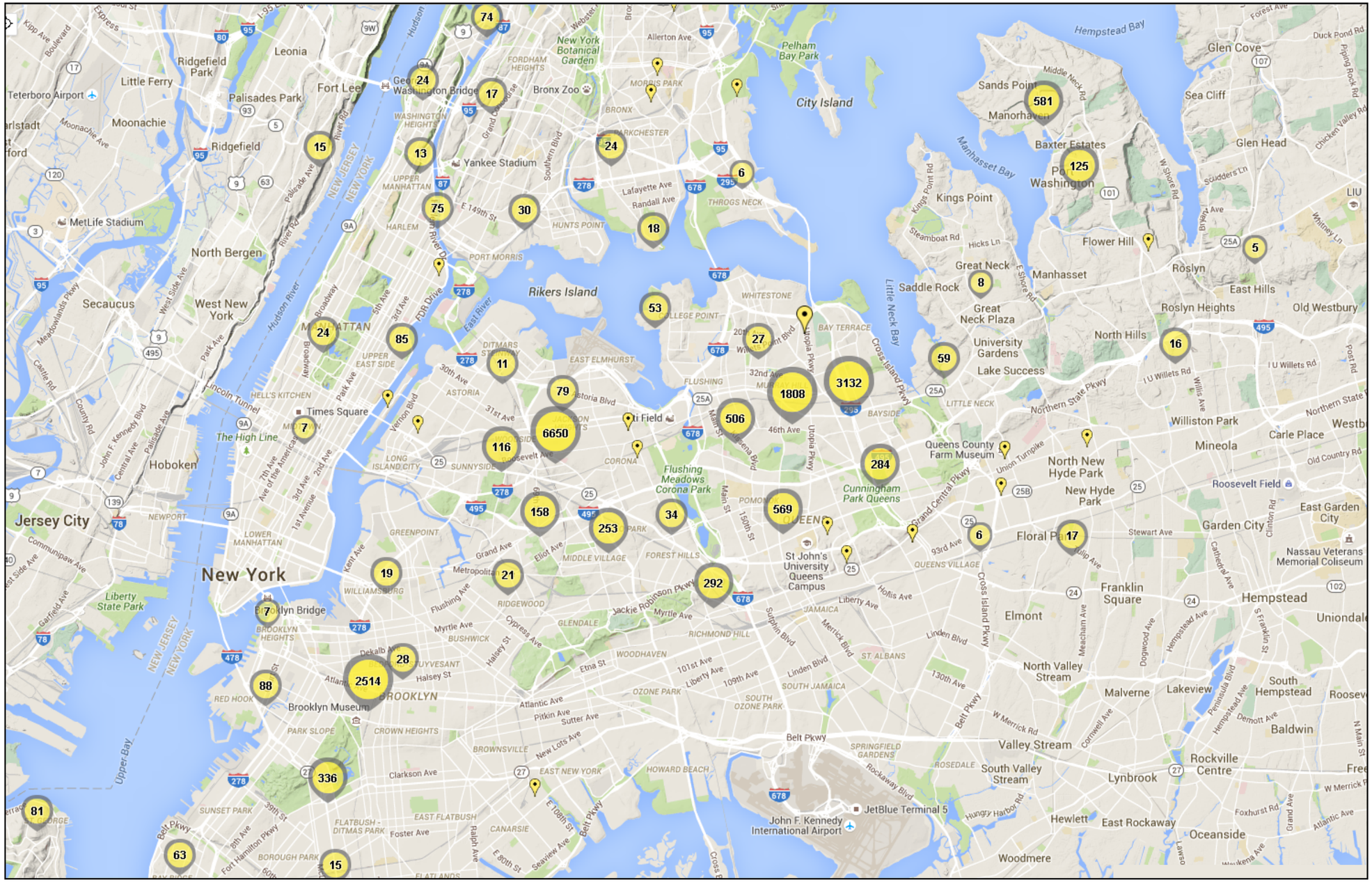

SOURCE: PANYNJ and PlaneNoise, 2016; Google Maps.
NOTE: The yellow noise complaint indicators without a number reflect locations where a single noise complaint was filed.

LaGuardia Airport 14 CFR Part 150 Study .140037

Figure 2-5
2015 Noise Complaints
LaGuardia Airport

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CHAPTER 3
Land Use

3.1 Introduction

Title 14 CFR Part 150 requires the review of land uses located in the airport environs to understand the relationship between those land uses and the noise exposure associated with arriving and departing aircraft. This includes delineation of land uses within the DNL 65 and higher contours on the NEMs and identification of noise sensitive uses that may be incompatible with that level of noise exposure. Identification of a noise sensitive use within the DNL 65 contour does not necessarily mean that the use is either considered incompatible or that it is eligible for mitigation. Rather, identification merely indicates that the use is *generally* considered incompatible, but requires further investigation. Factors that influence compatibility and/or eligibility may include but not be limited to previous sound reduction treatments, current interior noise levels, structure condition, ambient and self-generated noise levels, whether a given use is considered temporary or permanent, and the timeframe within which a given structure was constructed.[24] These factors will be more thoroughly evaluated during the NCP and subsequent implementation phase.[25]

This chapter outlines the land use data collection process, land use compatibility and noise sensitive uses, and the land use regulatory environment.

3.2 Land Use Data Collection

Various types of land use information were collected to provide the basis for the evaluation of land use compatibility and noise exposure in this study.

The Port Authority, in response to requests from several communities, agreed to identify the locations of both the DNL 60 and DNL 55 contours on a map separate from the NEMs for ***informational purposes only*** (see **Appendix J** and the Study Protocol in **Appendix I, Section 6.7**). It is important to note that the FAA considers all uses compatible with sound levels below DNL 65.

[24] 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., soundproofing, property acquisitions, and relocation, etc., to land uses that were in place as of October 1, 1998 unless an airport can demonstrate that DNL contours were not published prior to that date. New non-compatible uses resulting from airport expansion may be eligible for consideration.

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

3.2.1 Land Use Data Collection Area

The LGA 14 CFR Part 150 Study required the development of a database of existing land uses located in the airport environs affected by noise and flight activity. As described in the Study Protocol in **Appendix I, Section 7.2**, the Land Use Data Collection Area for this study considered the following:

- The most current set of noise contours for LGA prior to this study,[26]
- Land use within a radial distance of 30,000 feet from each runway end at LGA for capture of flight tracks per 14 CFR Part 150 requirements,
- Flight track data associated with arrivals and departure operations at LGA in 2014, and
- Major roadways, transportation corridors, and geographic features.

This process defined a broad data collection area that conforms to 14 CFR Part 150 criteria and meets the expectations of communities around the airport. A more detailed discussion and depiction of the Land Use Data Collection Area are provided on **Page D-5** of **Appendix D**.

3.2.2 Study Area

A Study Area was identified for more detailed collection and review of land use data and information. The LGA 14 CFR Part 150 Study Area included areas with the potential to be located within or in proximity to LGA's 2016 Existing and/or 2021 Future DNL 65 and higher contours. The LGA 14 CFR Part 150 Study Area is depicted on **Page D-4** of **Appendix D**.

3.2.3 Local Agency and Government Coordination

The following New York City agencies were consulted in order to document existing land uses, discuss applicable land use studies and data, and identify future projects that may affect land use in the LGA 14 CFR Part 150 Study Area:

- New York City Department of City Planning (DCP) – Environmental Review, Manhattan, Queens, Brooklyn and Bronx offices
- New York City Economic Development Corporation (NYCEDC)
- New York City Department of Housing and Preservation (HPD)

These agencies are the primary City agencies responsible for the planning and approval of land use changes.[27] The School Construction Authority (SCA) and NYC Health + Hospitals were also contacted to determine if these organizations had relevant planning studies or future projects that would occur within the project timeframe.

[26] 2030 noise contours were used from the CTB Environmental Assessment (November 2014).

[27] Other City agencies, such as the NYC Board of Standards and Appeals, also approve development projects within NYC; however, these agencies generally do not approve substantial land use and zoning changes, which are instead undertaken by the NYC DCP.

In addition, the following government entities were consulted to determine existing land uses in Nassau County, as well as applicable land use studies and future projects in the study area:

- Nassau County Department of Public Works Planning Division (NC)
- Town of Hempstead (TOH)
- Town of North Hempstead (TONH)

3.3 Land Use Compatibility

3.3.1 Aircraft Noise and Land Use Compatibility

Guidelines regarding the compatibility of land uses within various DNL contour intervals are specified in *Appendix A of 14 CFR Part 150*. These guidelines are consistent with land use guidelines developed by other federal agencies, such as the U.S. Environmental Protection Agency and the U.S. Department of Housing and Urban Development. The noise metric used for land use compatibility is the Day-Night Average Sound Level (DNL), which represents average noise levels over a 24-hour period. DNL values are expressed in A-weighted decibels (dBA), which is a sound pressure level metric that emphasizes sound at the frequency range where the human ear is most sensitive. In the calculation of DNL, sound events occurring during the nighttime (10:00 P.M. to 7:00 A.M.) are increased by a 10 decibel-weighting penalty to represent the increased sensitivity of people to noise that occurs at night. Aircraft DNL values represent the cumulative effects of all aircraft operations occurring during an average 24-hour period referred to as an "annual average day," which is derived from aircraft operations data for an entire calendar year. Further details on aircraft noise are presented in **Appendix C** of this report.

The FAA has determined that the major land uses listed in 14 CFR Part 150, Appendix A, Table 1 (presented here as **Table 3-1**) are normally compatible with aircraft noise below the DNL 65 contour. When evaluating land use compatibility, attention is therefore focused on uses within the DNL 65 contour.

As shown in **Table 3-1**, noise sensitive land uses such as residential, mobile home parks, transient lodging, schools, and outdoor music venues are considered incompatible with noise levels of DNL 65 or higher. Other noise sensitive land uses such as hospitals, nursing homes, churches, auditoriums, and concert halls are considered compatible with noise levels of DNL 65 to 75, provided that appropriate noise attenuation is designed into the building's structure. Commercial, manufacturing, and recreational land (parks, amusement parks, zoos, etc.) are generally less sensitive to noise and are considered compatible with noise levels up to DNL 70 without noise attenuation and up to DNL 80 with appropriate levels of noise attenuation. For the LGA 14 CFR Part 150 study, the identification of compatible and incompatible land uses within the DNL 65 and higher contours was documented using the guidance provided in **Table 3-1** (on the following page) to the extent that it was able to be readily applied to the New York City Land Use categories.

TABLE 3-1
14 CFR PART 150 LAND USE COMPATIBILITY GUIDELINES IN AIRCRAFT NOISE EXPOSURE AREAS

Land Use	Yearly Day-Night Noise Level (DNL) in decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	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
Government 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	30	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

Numbers in parenthesis refer to notes.

* 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.

TABLE 3-1
14 CFR PART 150 LAND USE COMPATIBILITY GUIDELINES IN AIRCRAFT NOISE EXPOSURE AREAS (CONTINUED)

Key to Table

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 dB must be incorporated into design and construction of structure.

Notes:

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor NLR of at least 25 dB to 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB 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 dB 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 normal noise level is low.

(3) Measures to achieve NLR of 30 dB 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 normal noise level is low.

(4) Measures to achieve NLR of 35 dB 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 normal noise level is low.

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

(6) Residential buildings require an NLR of 25 dB.

(7) Residential buildings require an NLR of 30 dB.

(8) Residential buildings not permitted.

SOURCE: Title 14 *Code of Federal Regulations* Part 150, "Airport Noise Compatibility Planning."

3.3.2 Local Ambient Noise Environment

One important consideration in evaluating land use compatibility relative to aircraft noise is the overall noise environment in proximity to the airport. 14 CFR Part 150, Appendix A, Section 101 indicates that "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," the land use is considered compatible.

Ambient noise levels generally increase as intensity of development increases ranging from rural to suburban to urban to dense urban environment. New York City and the five (5) boroughs include land uses that can be classified at the higher end of this range. Reviewing these classifications relative to LGA, it can be determined that areas in near proximity to LGA generally fall within the urban to dense urban classification. The areas immediately southwest and northeast of the airport would be classified as urban while areas southeast of the airport would be considered dense urban. Immediately northwest of the airport is Rikers Island. Information from the Port Authority's ANOMS indicates that community noise levels at the noise monitors placed around LGA vary from around the DNL 55 range to just over the DNL 70 range and in many cases exceed the DNL values for aircraft noise measurements at those sites.

Table 3-2 and **Table 3-3** compare aircraft-associated measured DNL values, community-associated measured DNL values, and total measured DNL values for the years 2014 and 2015, respectively. Each value is a yearly average of all available monitor data. A number of monitors did not have a full year of data. Both tables show that in the years 2014 and 2015, the monitors for sites L13_P and L22_P measured aircraft-associated DNL values greater than DNL 65. Monitor L13_P measured an average community-associated DNL value that was greater than the

aircraft-associated DNL value for both years. This suggests that a detailed analysis of ambient noise near Site L13_P may be necessary during the NCP phase and subsequent implementation of the LGA 14 CFR Part 150 Study NCP recommendations.

TABLE 3-2
2014 MEASURED AIRCRAFT, NON-AIRCRAFT, AND TOTAL DNL

Site Number	Site ID	Location	Aircraft DNL	Community DNL	Total DNL
58	L13_P	39th Ave. Flushing, NY 11354	67.2	70.4	71.8
11	L22_P	78th St. Jackson Heights, NY 11370	69.0	64.9	71.0
16*	FLUSH	163rd St. Queens, NY 11358	60.4	64.8	66.3
52	KEWHI	72nd Ave. Flushing, NY 11367	57.6	59.9	61.9
59	SCNLN	Hutchinson River Parkway Bronx, NY 10465	64.0	67.8	70.3
61	L205BYSD	205th St. Bayside, NY 11360	54.8	56.8	59.0
62	LFRNKLN	Franklin Ave. Flushing, NY 11355	63.9	67.2	68.7
63	LDKLB	Dekalb Ave. Brooklyn, NY 11216	57.8	58.7	60.8

*Measured values contaminated by noise from wind moving through a nearby tree.
SOURCE: Port Authority, 2016.

TABLE 3-3
2015 MEASURED AIRCRAFT, NON-AIRCRAFT, AND TOTAL DNL

Site Number	Site ID	Location	Aircraft DNL	Community DNL	Total DNL
58	L13_P	39th Ave. Flushing, NY 11354	68.4	71.3	73.1
11	L22_P	78th St. Jackson Heights, NY 11370	70.6	64.8	71.2
52	KEWHI	72nd Ave. Flushing, NY 11367	58.0	59.6	61.9
59	SCNLN	Hutchinson River Parkway Bronx, NY 10465	64.5	66.7	68.6
61	L205BYSD	205th St. Bayside, NY 11360	54.1	55.3	57.8
62	LFRNKLN	Franklin Ave. Flushing, NY 11355	62.5	66.9	68.2
63	LDKLB	Dekalb Ave. Brooklyn, NY 11216	56.1	60.1	61.6
71	LCLGPT	23rd Ave. College Point, NY 11356	61.9	66.0	67.5
70	LMDLVLG	78th St. Middle Village, NY 11379	55.4	61.2	62.1
73	LPRKSLP	5th Street Brooklyn, NY 11215	53.8	58.4	59.9
75	LPMR	Pidgeon Meadow Road Flushing, NY 11358	58.0	61.3	63.0

SOURCE: Port Authority, 2016.

3.3.3 Land Uses within the Study Area

LaGuardia Airport is bounded by Flushing Bay to the north and east, Bowery Bay to the west, and the Grand Central Parkway (an eight-lane divided highway) to the south. Neighborhoods that

border LGA include East Elmhurst, Jackson Heights, and North Corona to the south; Astoria, Steinway and Astoria Heights to the west; and College Point, Flushing, and Flushing Meadows to the east. Rikers Island Correctional Facilities are located northwest of LGA.[28] A variety of data sources were used to determine details of the land uses in the Study Area. The Study Protocol notes these data sources in **Appendix I, Section 7.3**; further information can be found on **Page D-10** of **Appendix D-1**.

Land in the Study Area is densely developed. Land use west, south, and northeast of the airport is predominantly single-family and multi-family residential. Commercial and Office land use and Mixed Residential and Commercial land use are found along most major road corridors in the Study Area. The neighborhoods in the Study Area are interspersed with recreation areas and public facilities (e.g., schools, parks, post offices). Industrial land use is found immediately west and east of the airport. Land uses in the Land Use Data Collection Area and Study Area are summarized in **Table 3-4** and depicted in **Figure 3-1**. Transient lodgings (i.e., airport hotels) are included in the "Commercial and Office" land use category, as shown in **Appendix D-1**, for consistency with New York City Department of City Planning land use categories. Based on the criteria established in 14 CFR Part 150 and the land use compatibility guidelines shown in **Table 3-1**, which includes transient lodging as a sub-category of residential, eligibility for mitigation will be evaluated in the NCP. Unclassified land uses shown on the figure are land uses which have no designation in the New York City land use database. All unclassified parcels located within the DNL 65 contour were further investigated and resolved. A more detailed discussion of land uses and the methods used to identify land uses is provided on **Page D-10** of **Appendix D-1**.

It should be noted that the Mixed Residential and Commercial land use category is a land use designation that is common in New York City's densely urbanized environment. This classification may involve a residential use located directly over a commercial use (e.g., an apartment over a coffee shop) or a commercial development with localized concentrations of residential development (e.g., a multilevel residential tower constructed over a portion of a shopping mall). Per **Table 3-1**, the commercial elements of this type of use may be considered compatible within the DNL 65 contour while the residential uses would typically be considered incompatible. However, if the noise generated by the commercial use equals or exceeds that of the aircraft, the residential use would not be considered incompatible (as described in the discussion of ambient noise above). For the NEM, population totals reported in **Chapter 5** includes all potentially incompatible residential land uses, including Mixed Residential and Commercial. As described here and in **Section 3.3.2**, a detailed analysis of ambient noise may be necessary during the NCP phase and implementation of the LGA 14 CFR Part 150 Study NCP recommendations, to determine eligibility and precise incompatible population estimates.

[28] The City of New York Department of Corrections operates ten jails on Rikers Island that can collectively house approximately 15,000 inmates. Other facilities include infirmaries, a bakery, a laundry shop, a print shop, maintenance shops, and a power plant.

TABLE 3-4
CONSOLIDATED LAND USE CATEGORIES WITHIN THE STUDY AREA

Consolidated Land Use Categories	Typical Uses	Compatibility with the DNL 65 Contour
Single and Two Family Residential	Single family homes, two-family homes, and duplex buildings.	Generally considered incompatible.
Multi-Family Residential	Apartment buildings, cooperative apartment buildings, condominiums, public housing complexes, single room occupancy (SROs), and assisted living facilities.	Generally considered incompatible.
Mixed Residential and Commercial	Multiple use buildings with dwellings attached or apartments above shopping centers or other commercial uses, one-story multi-use buildings with single or multiple occupants.	Per Table 3-1, residential portions of this land use may be considered incompatible while the commercial portions may be considered compatible. Considerations include the configuration of uses and self-generated noise associated with the Commercial uses.
Commercial and Office	Retail, including shopping malls, shopping centers, stores, shops, entertainment, restaurants, bars, galleries, and service establishments. Business, professional, and healthcare services.	Generally considered compatible.
Industrial and Manufacturing	Piers, wharves, docks and marinas, bulk fuel storage, heavy manufacturing and assembly plants, light manufacturing and processing facilities, warehouse and storage, truck terminals, junkyards, sand and gravel pits, and wholesale nurseries and greenhouses.	Generally considered compatible.
Transportation, Parking and Utilities	Roadways and highways (including rights-of-way), parking lots and garages, electric power generation and transmission, and water supply and treatment facilities.	Generally considered compatible.
Public Facilities and Institutions	Schools and universities, libraries, museums, cultural facilities, places of worship, government buildings, auditoriums, hospitals and hospice facilities, nursing homes, police and fire protection, post offices, correctional institutions, and animal shelters.	Generally considered compatible with the exception of specific noise sensitive uses (hospitals, churches, nursing homes).
Open Space, Cemeteries, and Outdoor Recreation	Parks, recreation areas (parks, amusement parks, zoos, etc.), playgrounds, athletic fields, conservation land, preserves, cemeteries, and public land.	Generally considered compatible with the exception of outdoor music venues

Source: Kimley-Horn and Associates, 2016; Environmental Science Associates, 2016.

3.3.4 Noise Sensitive Sites

In addition to identifying and mapping land uses, 14 CFR Part 150 also requires the identification of noise sensitive public buildings and properties included or eligible for inclusion in the National Register of Historic Places. The LGA 14 CFR Part 150 Study identified the following noise sensitive uses within the Land Use Data Collection Area:

- Places of worship
- Schools, colleges and universities
- Libraries/cultural institutions
- Hospitals and residential healthcare facilities
- Daycare and assisted living facilities, and
- Historic properties.

There were no outdoor music shells or amphitheaters located in the immediate vicinity of LGA (none within the DNL 65 and higher contours). There are 30 parks (31 in 2021) and one yacht club with the 2016 NEM; all are compatible land uses (see **Table 3-1**). These resources are not depicted in this section since no noise sensitive uses were identified within the NEM.

Data used to identify these uses were collected from a number of sources including various NYC government departments, the Nassau County Planning Department, Assessor records, previous environmental studies conducted within the area, and various readily available online data and mapping sources. Information sources for the identification of historic resources included the National Register of Historic Places, the New York State Register of Historic Places, and the New York City Landmarks Preservation Commission. For the LGA 14 CFR Part 150 Study, only those resources that have been previously determined to be eligible for listing in, or are already listed in, the National Register of Historic Places were identified and their locations mapped.

The locations of noise sensitive uses in the Land Use Data Collection Area are depicted in **Figures 3-2** through **Figure 3-8**. A more detailed discussion of methods used to identify noise sensitive sites and historic resources is provided on **Page D-24** of **Appendix D**. As indicated previously, inclusion of these properties within the DNL 65 contour does not necessarily mean that a use is either considered incompatible or that it is eligible for mitigation. Inclusion merely indicates that the use is generally considered incompatible, but requires further investigation during the NCP and subsequent implementation phase. In particular, some places of worship identified during the data collection process occupy temporary spaces (e.g., leased storefronts). For those places of worship that may be determined incompatible with aircraft noise, investigation will occur for each facility during the NCP and subsequent implementation phase to determine eligibility for mitigation.

3.4 Land Use Control Regulations

The identification of land use controls was undertaken to provide an understanding of existing land use control regulations (e.g., zoning ordinances) within each political jurisdiction inside the Study Area. Review of the permitted uses by zoning district for each jurisdiction's zoning provisions found that there have been occasions where one or more uses permitted in a zoning district have been identified as potentially being incompatible, depending upon the results of the noise analysis. These occurrences will be explored in the NCP by identifying and evaluating land use management measures that may be considered to avoid the establishment of additional incompatible land uses in areas subject to noise levels of DNL 65 or higher.

A discussion of zoning classifications by jurisdiction, the permitted uses within the zoning districts on a jurisdiction by jurisdiction basis and, where residential uses and/or noise sensitive uses are found to be permitted in commercial or industrial zoning classification is provided on **Page D-45** of **Appendix D-1**.

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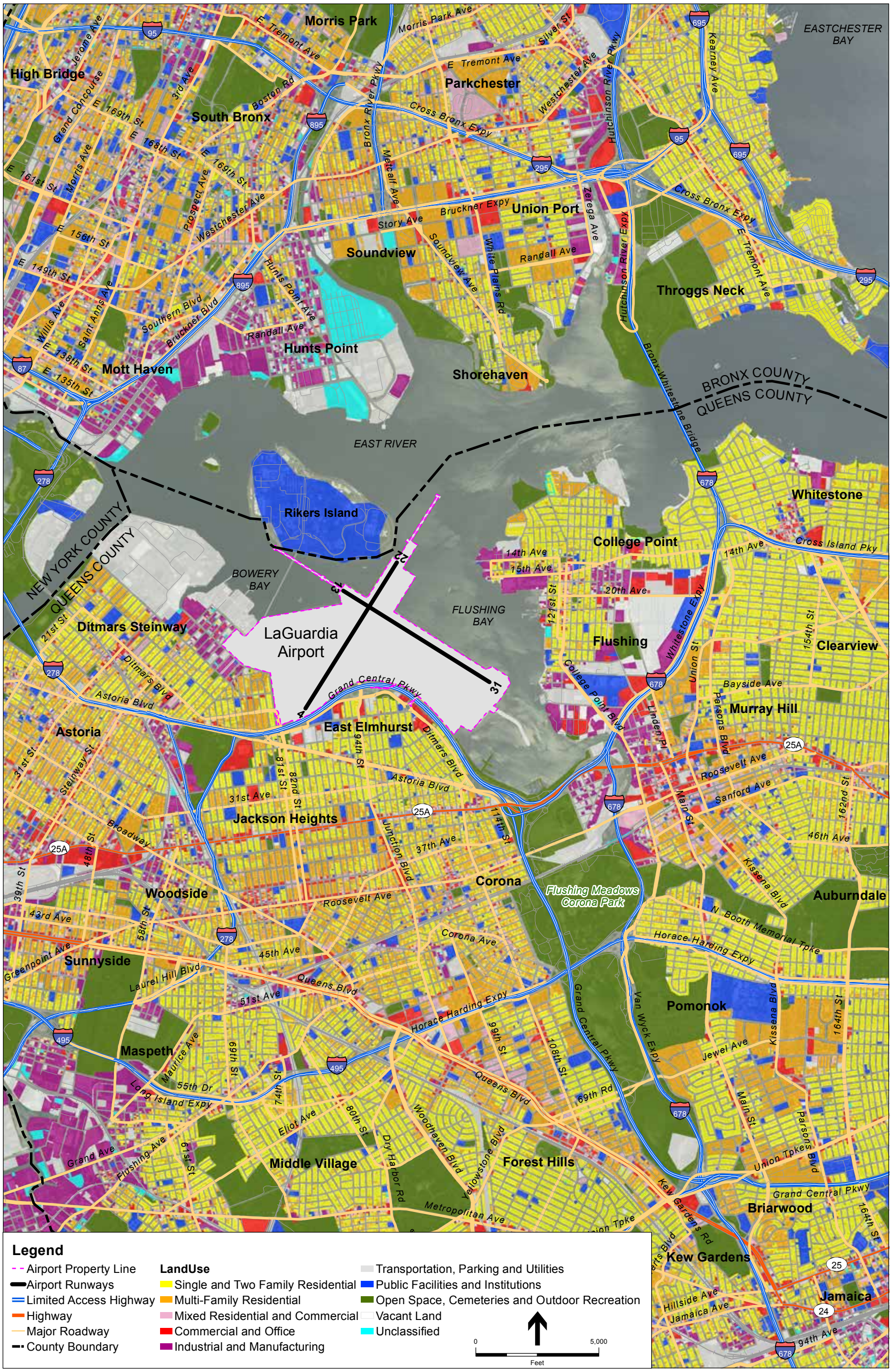

SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; ESA Airports 2016; ESRI Mapping Services.

LaGuardia Airport 14 CFR Part 150 Study . 140037

Figure 3-1

Generalized Existing Land Uses
LaGuardia Airport

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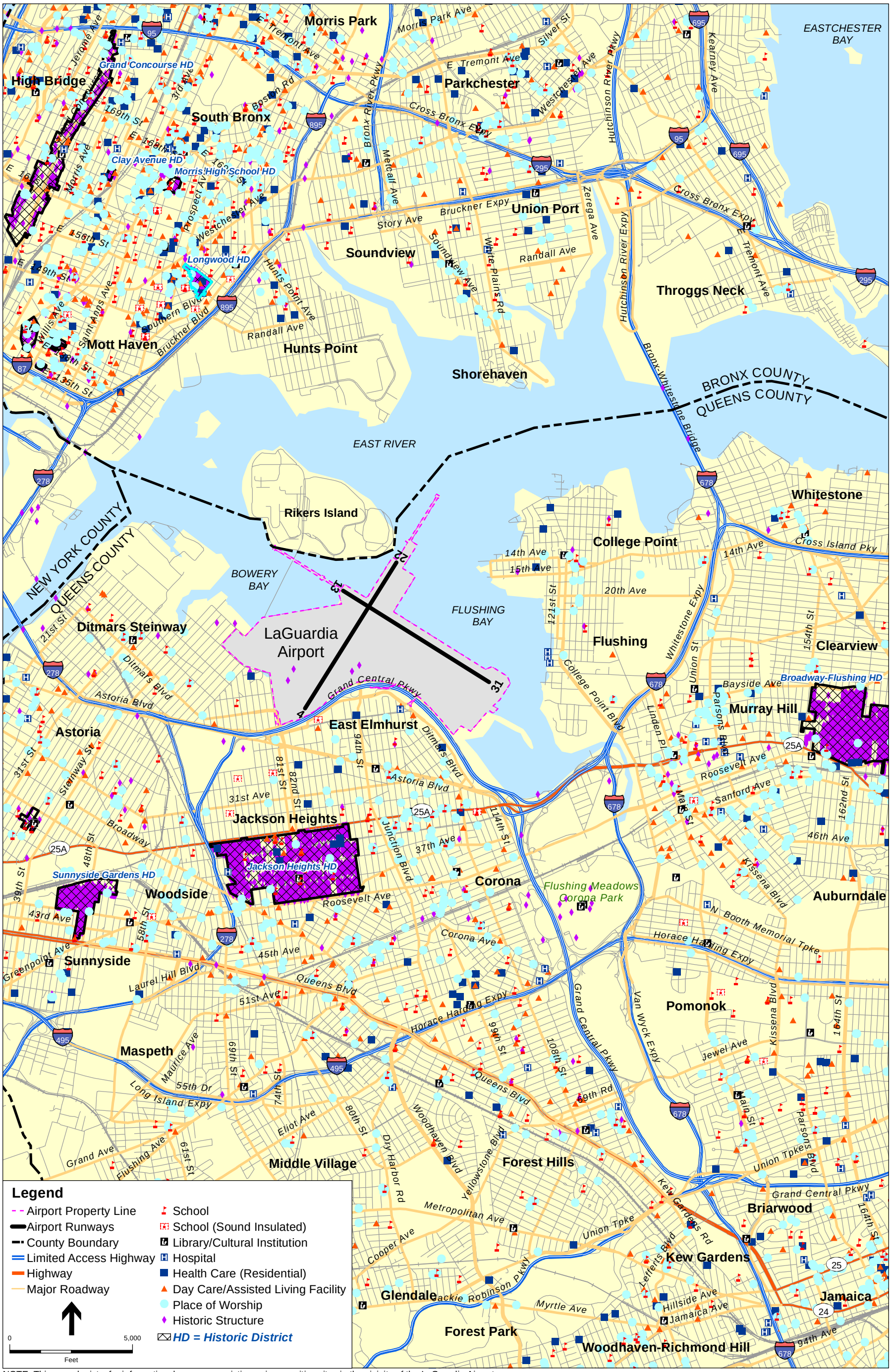

NOTE: This map depicts, for informational purposes, existing noise sensitive sites in the vicinity of the LaGuardia Airport.
This map is not intended to identify, or otherwise indicate, sites that may be incompatible with aircraft noise or sites that may require mitigation.

SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; ESA Airports 2016; ESRI Mapping Services.

LaGuardia Airport 14 CFR Part 150 Study . 140037

Figure 3-2
Noise Sensitive Sites
LaGuardia Airport

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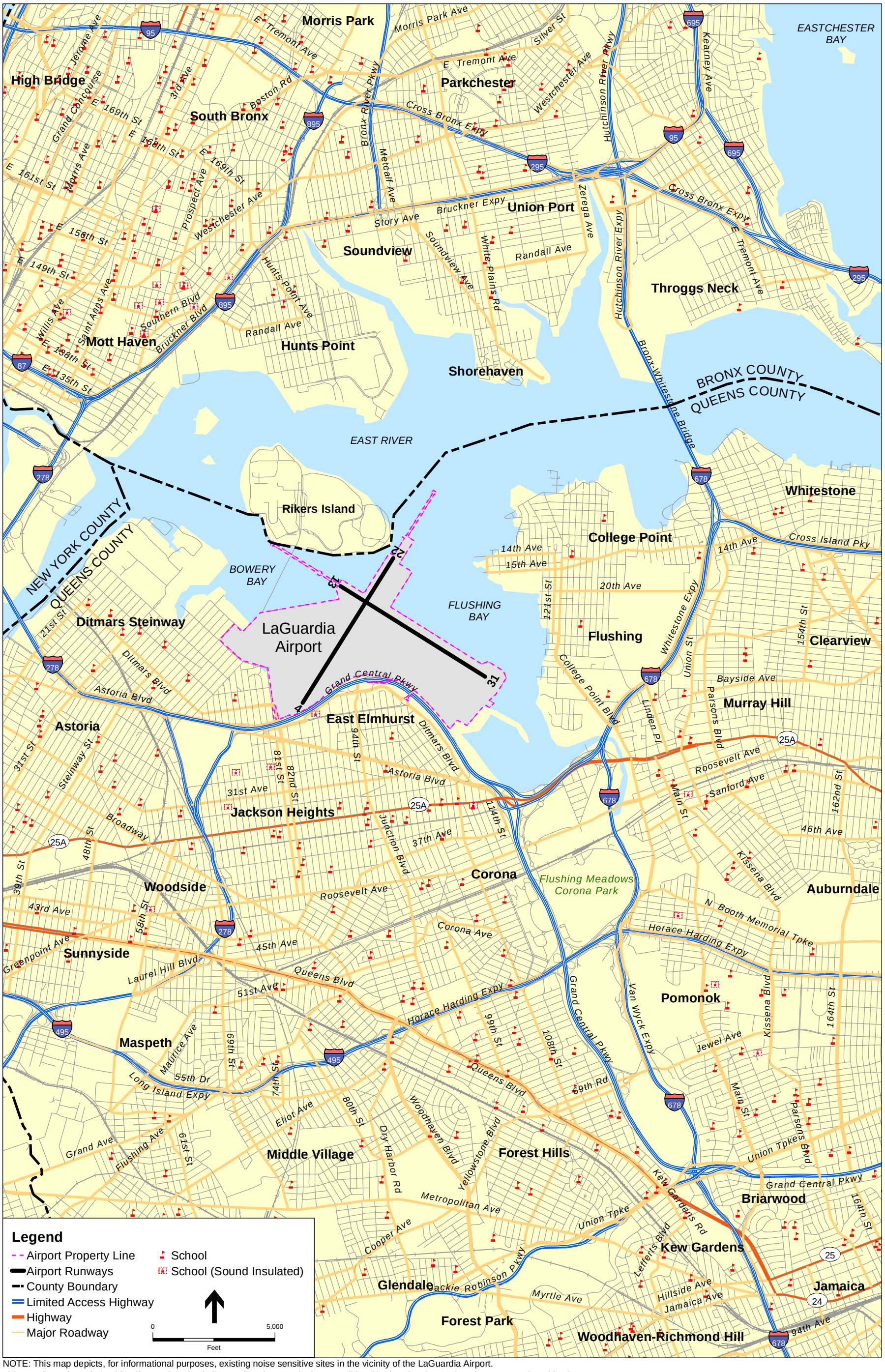

NOTE: This map depicts, for informational purposes, existing noise sensitive sites in the vicinity of the LaGuardia Airport.
This map is not intended to identify, or otherwise indicate, sites that may be incompatible with aircraft noise or sites that may require mitigation.

SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; ESA Airports 2016; ESRI Mapping Services.

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Figure 3-3

Noise Sensitive Sites - Schools
LaGuardia Airport

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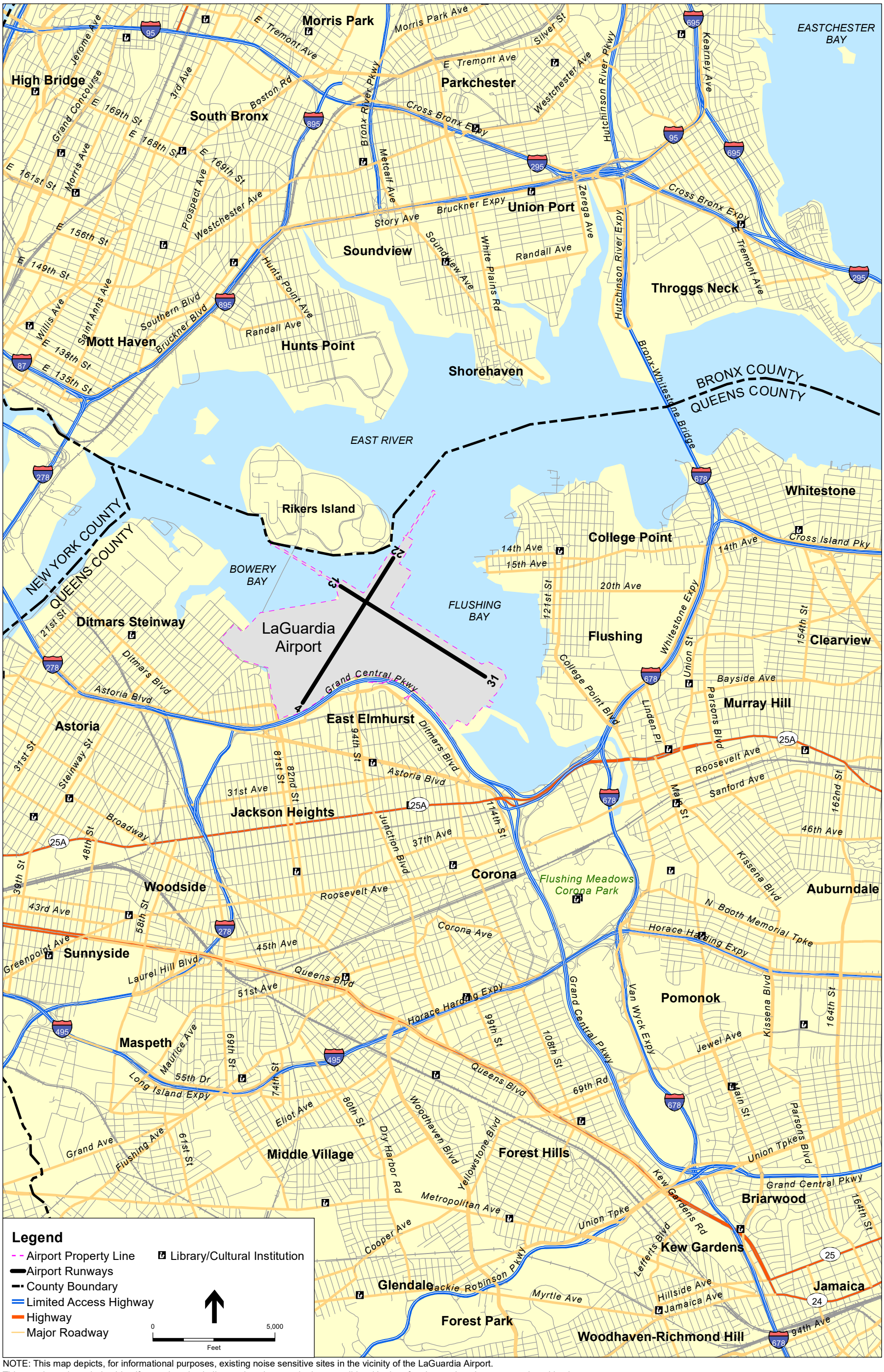

NOTE: This map depicts, for informational purposes, existing noise sensitive sites in the vicinity of the LaGuardia Airport.
This map is not intended to identify, or otherwise indicate, sites that may require mitigation.

SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; ESA Airports 2016; ESRI Mapping Services.

LaGuardia Airport 14 CFR Part 150 Study . 140037

Figure 3-4
Noise Sensitive Sites -
Libraries and Cultural Institutions
LaGuardia Airport

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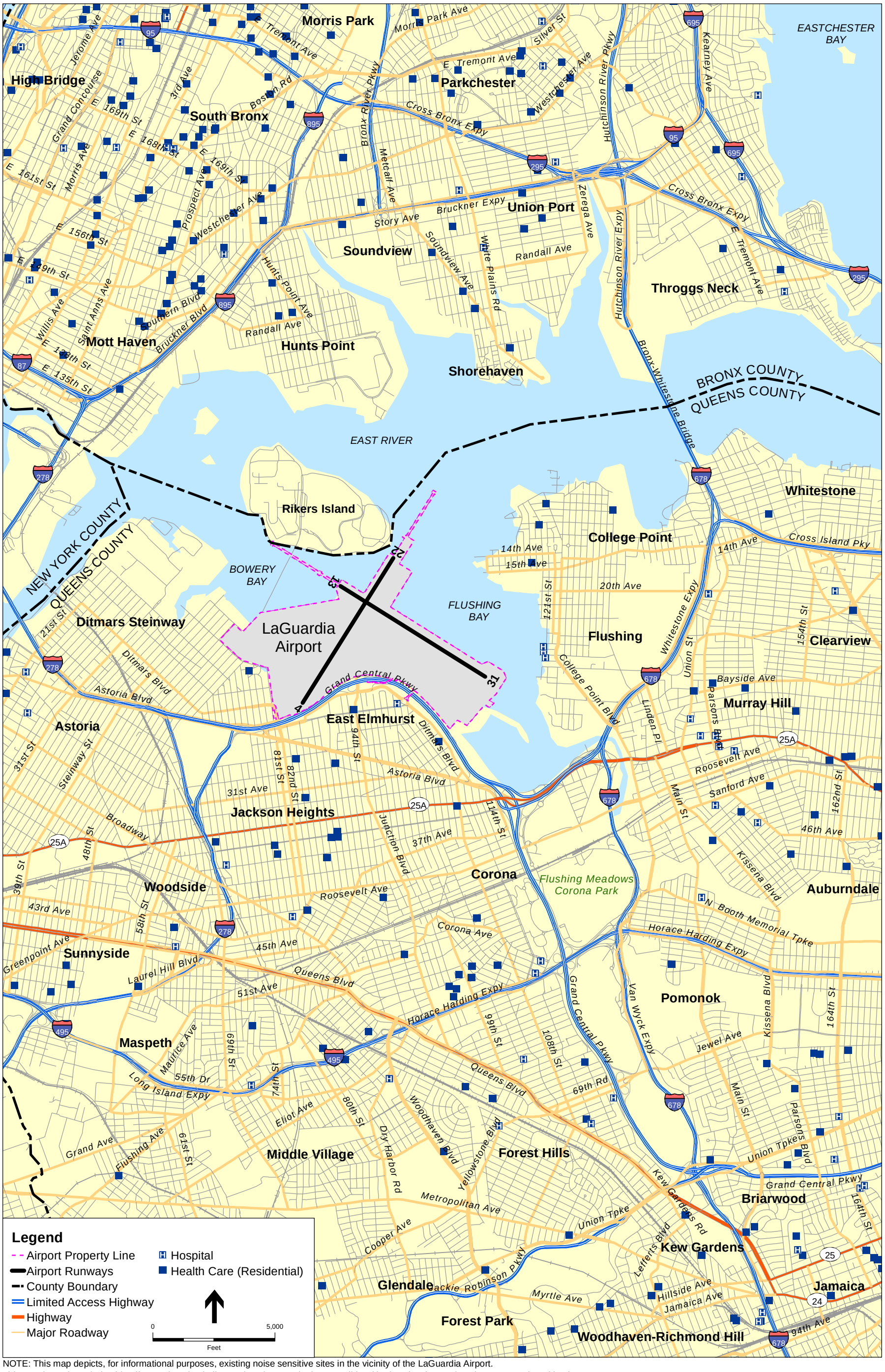

NOTE: This map depicts, for informational purposes, existing noise sensitive sites in the vicinity of the LaGuardia Airport.
This map is not intended to identify, or otherwise indicate, sites that may be incompatible with aircraft noise or sites that may require mitigation.

SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; ESA Airports 2016; ESRI Mapping Services.

LaGuardia Airport 14 CFR Part 150 Study . 140037

Figure 3-5

Noise Sensitive Sites -
Hospitals and Health Care (Residential)
LaGuardia Airport

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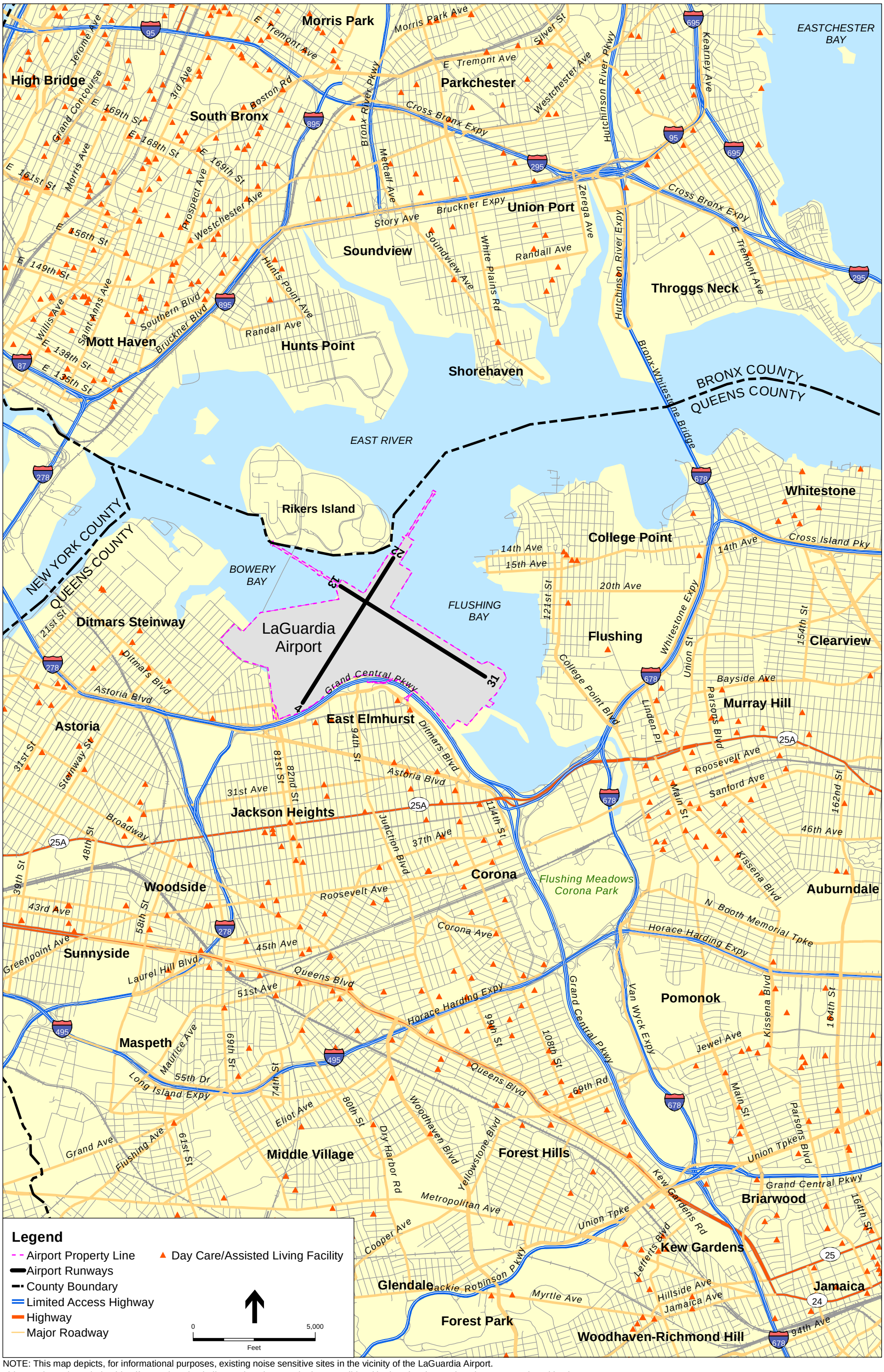

NOTE: This map depicts, for informational purposes, existing noise sensitive sites in the vicinity of the LaGuardia Airport.
This map is not intended to identify, or otherwise indicate, sites that may be incompatible with aircraft noise or sites that may require mitigation.

SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; ESA Airports 2016; ESRI Mapping Services.

LaGuardia Airport 14 CFR Part 150 Study . 140037

Figure 3-6

Noise Sensitive Sites -
Day Care and Assisted Living Facilities
LaGuardia Airport

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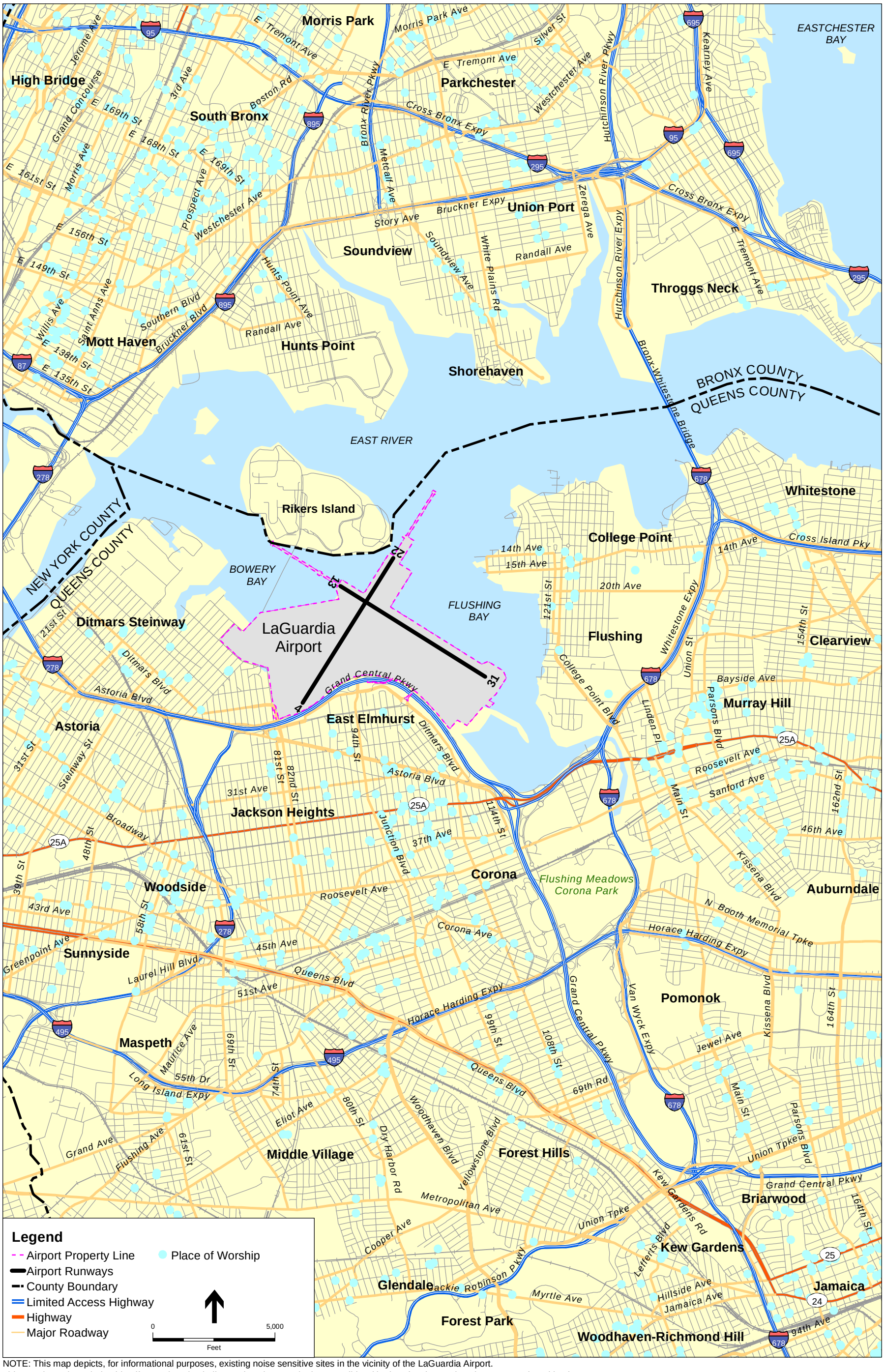

NOTE: This map depicts, for informational purposes, existing noise sensitive sites in the vicinity of the LaGuardia Airport.
This map is not intended to identify, or otherwise indicate, sites that may be incompatible with aircraft noise or sites that may require mitigation.

SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; ESA Airports 2016; ESRI Mapping Services.

LaGuardia Airport 14 CFR Part 150 Study . 140037

Figure 3-7

Noise Sensitive Sites - Places of Worship
LaGuardia Airport

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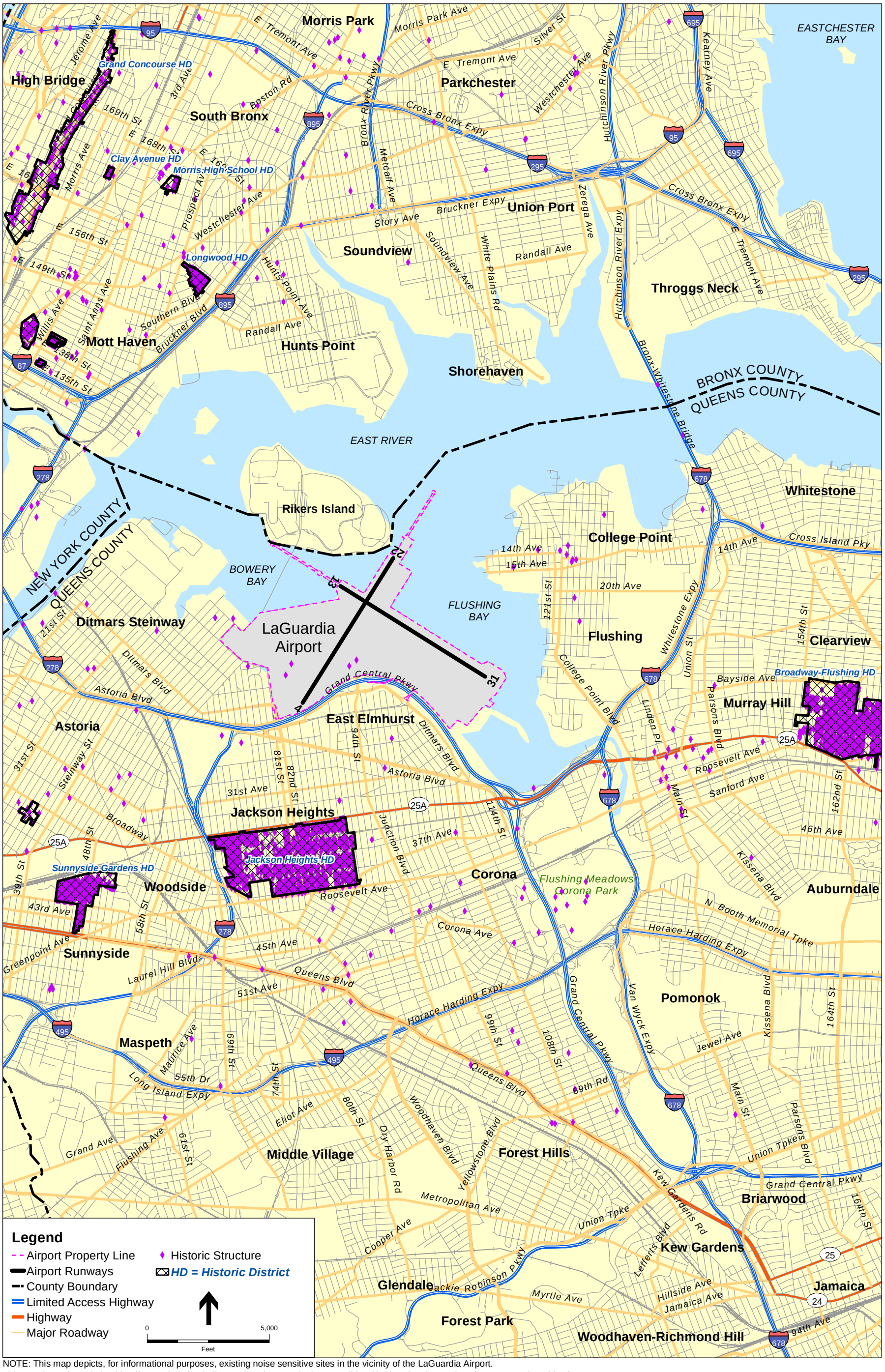

NOTE: This map depicts, for informational purposes, existing noise sensitive sites in the vicinity of the LaGuardia Airport.
This map is not intended to identify, or otherwise indicate, sites that may be incompatible with aircraft noise or sites that may require mitigation.

SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; ESA Airports 2016; ESRI Mapping Services.

LaGuardia Airport 14 CFR Part 150 Study . 140037

Figure 3-8

Noise Sensitive Sites - Historic Resources
LaGuardia Airport

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CHAPTER 4
NEM Development

4.1 Introduction

This chapter summarizes the methods and data used to conduct the aircraft noise analysis and produce the noise exposure contours that are depicted on the NEMs. This chapter will provide information on the noise model used to calculate noise exposure, the noise metric used in this study, information used as inputs into the noise model, and information on noise monitors near LGA. Noise monitor data were not used as input into the noise model, as the FAA does not allow noise monitor data to be used to "calibrate" the noise model.

4.2 FAA Noise Model and Metrics

4.2.1 Integrated Noise Model

This 14 CFR Part 150 Study was initiated in October 2014, prior to the FAA's release of the Aviation Environmental Design Tool (AEDT) on May 29, 2015.[29] At the time the study started, the 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. As noted by the Study Protocol in **Appendix I, Section 6.1**, the INM 7.0d was used to calculate noise exposure for the existing conditions (2016) and the five-year future year (2021) scenarios in this study.

The INM uses airport-specific information (e.g., runway data), flight track information, aircraft operation levels distributed by time of day, aircraft fleet mix information, and aircraft flight 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 individual user-defined points.

[29] The FAA's Aviation Environmental Design Tool (AEDT) replaced the Integrated Noise Model (INM) and Emissions and Dispersion Modeling System (EDMS) as the required model to calculate noise exposure, fuel burn, and emissions for federal actions that are required to comply with the National Environmental Policy Act (NEPA) and for 14 CFR Part 150 studies as of May 29, 2015. The use of AEDT for this 14 CFR Part 150 Study was not required because the study and substantial work on the noise analysis at LGA was initiated prior to May 29, 2015 (see **Page G-5** of **Appendix G-1**).

4.2.2 Day-Night Average Sound Level (DNL)

Day-Night Average Sound Level (DNL), expressed in A-weighted decibels[30] (dBA), accounts for the noise levels of all individual aircraft events, the number of times those events occur, and the period of day/night in which they occur. The calculation of DNL logarithmically averages aircraft sound levels at grid locations over a 24-hour period, with a 10-decibel adjustment added to those noise events occurring between 10:00 P.M. and 7:00 A.M. Because of the increased sensitivity to noise during normal sleeping hours and because ambient (without aircraft) sound levels during nighttime are typically lower than during daytime hours, the 10-decibel adjustment, or "penalty," represents the added intrusiveness of sounds occurring during nighttime hours.

The DNL metric is the noise descriptor required by the FAA for aircraft noise exposure analyses under NEPA, FAA Order 1050.1F, and land use compatibility planning under 14 CFR Part 150.[31] A more detailed discussion of the INM and noise metrics is provided in **Appendix C**.

4.3 Data for Developing Noise Exposure Maps

The following sections summarize the information used to develop the noise exposure maps.

4.3.1 Aircraft Activity Levels

In accordance with 14 CFR Part 150 and the Study Protocol in **Appendix I, Section 5.1**, the LGA NEMs were prepared for two scenarios: existing conditions (2016) and a five-year future year (2021). To obtain aircraft activity levels for the development of the NEMs, either an existing forecast needed to be identified or a new forecast developed. The Port Authority developed the *LaGuardia Airport (LGA) Aircraft Fleet Mix and Annual Aircraft Operations Forecast 2014-2033* (LGA NEM Forecast) through an independent consultant for use in the LGA 14 CFR Part 150 study. For the development of the aircraft fleet for 2016 and the fleet changes forecasted to occur in 2021, the LGA NEM Forecast used available information, including airline fleet data; commercial aircraft order and delivery data from Boeing, Airbus, Embraer, and Bombardier; interviews with airlines operating at LGA; Official Airline Guide (OAG) commercial carrier schedule data; aircraft manufacturer publications; and FAA industry forecasts. Using the LGA NEM Forecast, another forecast was developed to provide the additional inputs required for the INM. This forecast, known as a “derivative forecast,” contains details on aircraft and engine types, daytime and nighttime operations, and departure flight distances (known as “stage lengths” and described below). The forecast and derivative forecast were approved by the FAA on March 28, 2016. **Appendix F-1** contains further details on the development of the forecasts along with a copy of the LGA NEM Forecast, the derivative forecast, and FAA’s approval of the LGA NEM Forecast and the derivative forecast. The following sections summarize elements of the forecasts.

[30] When assessing the effect of sound on humans, sound is measured using an electronic filter that de-emphasizes frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear’s decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting, and A-weighted sound levels are expressed in units of A-weighted decibels (dBA).

[31] U.S. Department of Transportation. Federal Aviation Administration. Order 1050.1F, *Environmental Impacts: Policies and Procedures.* July 16, 2015.

4.3.2 Forecasted Annual Aircraft Operations

The number of annual aircraft operations modeled for the 2016 study year and 2021 study year was obtained from the LGA NEM Forecast. As per the approved Study Protocol, these forecasts utilized the projected 378,764 annual aircraft operations at LGA in 2016 and 387,234 annual aircraft operations in 2021 from the FAA's 2014 Terminal Area Forecast (TAF). However, prior to the approval of the LGA NEM Forecast, the FAA's 2015 TAF was issued. In the 2015 TAF there were 370,964 operations projected for 2016 and 387,324 operations in 2021. The FAA considers an airport's forecasts consistent with the agency's TAF if the airport's forecasts for total enplanements, based aircraft, and operations vary from the TAF by less than ten percent in the five-year forecast period and 15 percent in the ten-year forecast period. When compared to the newer 2015 TAF, the LGA NEM Forecast is within 2.1 percent for operations in 2016 and nearly identical for 2021 (see **Page F-6** of **Appendix F-1** for additional information).

4.3.3 Aircraft Fleet Mix

The LGA NEM Forecast and information from the Port Authority's Airport Noise and Operations Management System (ANOMS) was used to determine the types of aircraft (fleet mix) projected to operate at LGA in 2016 and 2021 and the number of operations generated by each aircraft type in those years. In addition, the FAA's Civilian Aircraft Registry and ANOMS data were utilized to identify different aircraft type and engine combinations. This information was then used to identify the corresponding INM aircraft (or the selection of an FAA-approved INM substitute aircraft). Details pertaining to INM aircraft type assignments and substitutions are included in **Appendix F-1** starting on **Page F-7**.

The number of forecasted annual aircraft operations at LGA in 2016 and 2021, by aircraft type, are summarized in **Table 4-1**. The table also identifies the INM aircraft assignments. As required for use in the INM, annual aircraft operations were converted to AAD operations.

TABLE 4-1
ANNUAL AIRCRAFT OPERATIONS BY INM AIRCRAFT TYPE

Aircraft Category	Aircraft Type	INM Aircraft Type	2016 Annual Operations	2021 Annual Operations
Widebody	Boeing 767-300	767400	30	30
		Widebody Total	***30***	***30***
Narrowbody	Boeing 757-200	757PW	553	576
		757RR	23	24
	Boeing 737-800 / 900	737800	35,756	37,923
	Boeing 737-600 / 700	737700	28,177	28,828
	Boeing 717-200	717200	17,094	20,530
	Airbus A321 / A321neo	A321-232	6,476	8,554
	Airbus A320 / A320neo	A320-211	21,259	24,279
		A320-232	25,690	27,338
	Airbus A319	A319-131	2,909	3,622
	MD-88	MD83	16,972	7,132

TABLE 4-1
ANNUAL AIRCRAFT OPERATIONS BY INM AIRCRAFT TYPE (CONTINUED)

Aircraft Category	Aircraft Type	INM Aircraft Type	2016 Annual Operations	2021 Annual Operations
	MD-90	MD9025	982	1,134
		MD9028	4,714	5,445
	Embraer 190	EMB190	25,196	24,713
		Narrowbody Total	***185,801***	***190,098***
Regional Jet	Canadair RJ 700 / 900	CRJ9-ER	92,492	103,812
	Canadair RJ 200	CL601	12,899	-
	Embraer 175	EMB175	31,604	48,192
	Embraer 170	EMB170	23,918	38,000
	Embraer RJ145	EMB14L	18,100	-
	Embraer RJ140	EMB145	6,818	-
		Regional Jet Total	***185,831***	***190,004***
General Aviation	Business Jet	CL600	872	875
		CNA525C	93	93
		CNA55B	100	100
		CNA560E	272	274
		CNA560XL	772	775
		CNA680	412	413
		CNA750	759	762
		F10062	162	162
		GIV	736	738
		GV	1,052	1,056
		LEAR35	614	616
		MU3001	554	556
	Turboprop	CNA208	196	185
		CNA441	52	49
	Helicopter	B407	106	106
		S76	106	106
		SA355F	184	186
	Piston	GASEPV	60	50
		General Aviation Total	***7,102***	***7,102***
All Aircraft			**378,764**	**387,234**

NOTE: An aircraft operation is equivalent to one arrival/landing or one departure/takeoff.
SOURCE: *LaGuardia Airport Aircraft Fleet Mix and Annual Aircraft Operations Forecast 2014-2033*. Port Authority of New York and New Jersey. March 23, 2016. Adapted by Environmental Science Associates, 2016.

4.3.4 Aircraft Operations by Time of Day

As discussed previously, aircraft operations modeled in INM are assigned as occurring during daytime or nighttime. **Table 4-2** summarizes time of day splits in which aircraft arrivals and departures are expected to occur in 2016 and 2021 (by percent of total operations). The 2014 ANOMS data served as the primary source for the operational splits and time of day information since ANOMS captures actual arrival and departure times, versus scheduled times. This accounts for delayed operations that sometimes occur at LGA. While one would expect that the time of day splits for 2021 would be similar to the 2016 conditions, there are some small differences as

shown in **Table 4-2**. These differences result from the assumption that the utilization of some slots, those that are not used every day of the week, will increase throughout the planning period of the 14 CFR Part 150 Study (see Page **F-34** of **Appendix F**). A detailed breakout of operation times of day by aircraft type is provided on **Page F-14** of **Appendix F**.

TABLE 4-2
ANNUAL AIRCRAFT OPERATIONS (ALL AIRCRAFT) BY TIME OF DAY

	Arrivals		Departures	
Study Year	**Day**	**Night**	**Day**	**Night**
2016	90.93%	9.07%	91.82%	8.18%
2021	91.49%	8.51%	91.76%	8.24%

SOURCE: *LaGuardia Airport Aircraft Fleet Mix and Annual Aircraft Operations Forecast 2014-2033*. Port Authority of New York and New Jersey. March 23, 2016. Adapted by KB Environmental Sciences, Inc. and Environmental Science Associates, 2016.

4.3.5 Departure Stage Length

Noise exposure from aircraft departures varies depending on takeoff weight. For example, a fully-loaded aircraft departing on a long-haul flight typically weighs more on departure than the same fully-loaded aircraft departing on a short-haul flight, due to the weight of the additional fuel needed to travel a longer distance (see **Figure 4-1**). A heavier aircraft typically requires higher power (thrust settings) to reach its takeoff speed and uses more runway length. Heavier aircraft also climb at a slower rate than lighter aircraft. Therefore, more land area can be exposed to higher levels of aircraft noise by departures of heavier aircraft. To account for this variance in aircraft weight, the INM contains up to nine departure climb profiles (corresponding to different departure weights), depending on the type of aircraft. These profiles represent aircraft origin-to-destination trip lengths from 500 nautical miles to over 6,500 nautical miles. The trip distances for each stage length are shown in **Table 4-3**.

As per the Study Protocol in **Appendix I, Section 6.5.8**, an analysis of calendar year 2014 ANOMS operations data was conducted to determine existing departure stage lengths at LGA by aircraft type and assist with projecting stage lengths in 2016 and 2021. For this analysis, additional effort was also undertaken to determine actual take-off weights for the top ten aircraft (by number of operations) that operate at LGA. Additional details for these aircraft are included in **Section 4.5.3** of this chapter. **Table 4-4** summarizes the projected departure stage lengths for all aircraft at LGA in 2016 and 2021, respectively. Due to demand management measures in place at LGA, the ANOMS data showed that essentially all aircraft operations at LGA are Stage Length 3 or less. A detailed discussion of stage length and a breakout of stage length by aircraft type are provided on **Page F-17** of **Appendix F-2**.

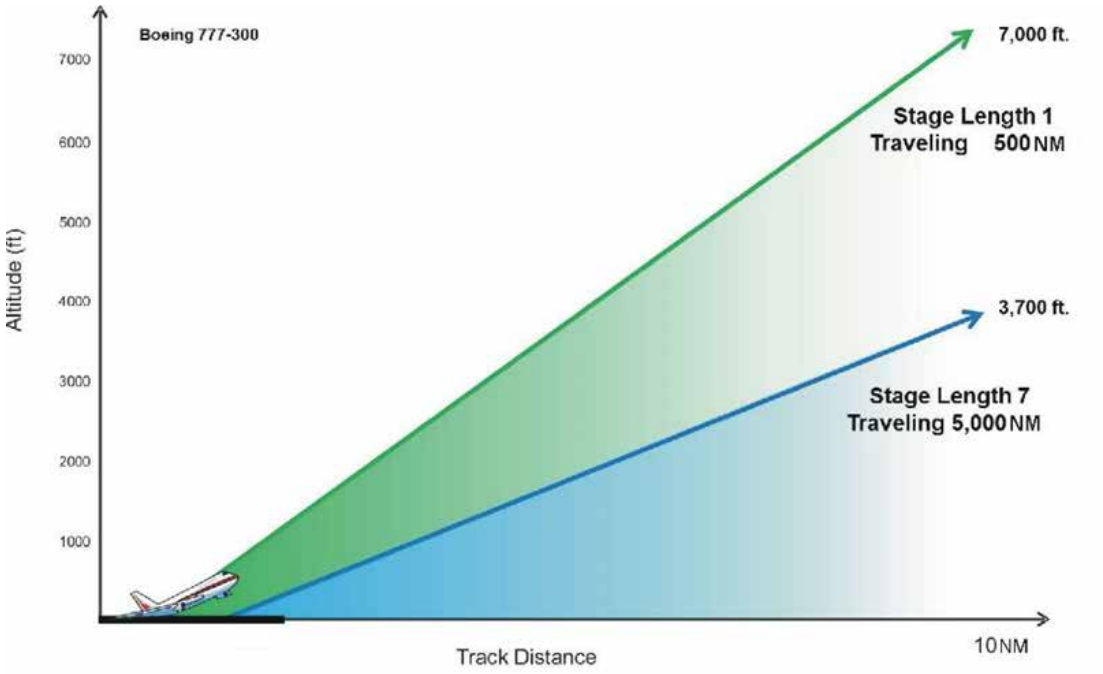


Figure 4-1
Stage Length Comparison for Boeing 777-300

TABLE 4-3
INM DEPARTURE STAGE LENGTH CATEGORIES

Stage Length Category	Departure Route/Trip Length (nautical miles)
1	0 - 500
2	501 – 1,000
3	1,001 - 1,500
4	1,501 - 2,500
5	2,501 - 3,500
6	3,501 - 4,500
7	4,501 - 5,500
8	5,501 - 6,500
9	Over 6,500

SOURCE: Federal Aviation Administration, 2007.

TABLE 4-4
DEPARTURE STAGE LENGTH (ALL AIRCRAFT)

Study Year	Stage Length					
	1	2	3	4	5	6
2016	48.75%	42.33%	8.89%	0.03%	<0.01%	<0.01%
2021	48.50%	42.82%	8.64%	0.04%	<0.01%	<0.01%

NOTE: Values may not add to 100 percent due to rounding. No aircraft exceeded departure Stage Length 6.
SOURCE: KB Environmental Sciences, Inc., 2016; Port Authority of New York and New Jersey, Airport Noise and Operations Management System (ANOMS) data for calendar year 2014.

4.4 Meteorological Conditions

The INM accounts for the influences of meteorological conditions on aircraft performance and atmospheric sound absorption. As specified by the user, the INM uses temperature and relative humidity to calculate atmospheric absorption coefficients, which in turn are used to adjust standard aircraft performance noise-power-distance curve levels.

While the Study Protocol in **Appendix I, Section 6.5.1**, references use of 2014 meteorological data, it was subsequently determined that the 30-year average meteorological data were more representative of typical conditions at LGA for the purposes of noise modeling. The 30-year average meteorological data at LGA (Weather Station ID: WBAN 14732) were obtained from the National Climate Data Center (NCDC). The 30-year averages recorded at the station are 56 degrees Fahrenheit, 63 percent relative humidity, and 30.01 inches of mercury while the 2014 average conditions recorded at the station are 54.4 degrees Fahrenheit, 59 percent relative humidity, and 30.02 inches of mercury. The average headwind for each operating configuration could not be readily calculated due to the operating configuration of the airport (use of intersecting runways) and the influence of other airports on the operating configuration in use at LGA. As per the Study Protocol, the INM default headwind of 8 knots was used for both 2016 and 2021.

4.5 Airport Operational Information

Operational inputs necessary to model noise levels in INM include runway utilization, the locations of the aircraft flights, and flight track utilization. Additionally, user-defined departure and arrival profiles were developed for several aircraft that routinely operated following profiles that differ from the INM default profiles (also known as “standard profiles”). This is detailed further in this section.

4.5.1 Runway Use

Runway use refers to the frequency with which aircraft utilize each runway end for departures and arrivals. The more often a runway is used, the more noise is generated in areas located off each end of that runway. As per the Study Protocol in **Appendix I, Section 6.5.10**, runway utilization data were derived from LGA ANOMS data for calendar year 2014. Overall, 52.4% of all operations occur on Runway 13-31 and the remaining 47.6% occur on Runway 4-22. The present runway utilization rates are forecast to remain constant for the 2016 and 2021 study years. **Tables 4-5 and 4-6** provide a summary of arrival and departure runway utilization. A detailed discussion of runway use and a breakout of arrival and departure runway utilization by aircraft type are provided in **Appendix F-2**.

TABLE 4-5
ARRIVAL RUNWAY USE (ALL FIXED-WING AIRCRAFT)

Arrivals (Time of Day)	Runway 4	Runway 22	Runway 13	Runway 31
Daytime Arrivals	20.36%	47.88%	2.61%	29.15%
Nighttime Arrivals	18.64%	45.76%	6.12%	29.49%

NOTE: Does not include helicopter operations. Values may not add to 100 percent due to rounding.
SOURCE: KB Environmental Sciences, Inc., 2016; Port Authority of New York and New Jersey, ANOMS data for calendar year 2014.

TABLE 4-6
DEPARTURE RUNWAY USE (ALL FIXED-WING AIRCRAFT)

Departures (Time of Day)	Runway 4	Runway 22	Runway 13	Runway 31
Daytime Departures	26.17%	1.18%	47.35%	25.30%
Nighttime Departures	25.75%	1.67%	45.01%	27.57%

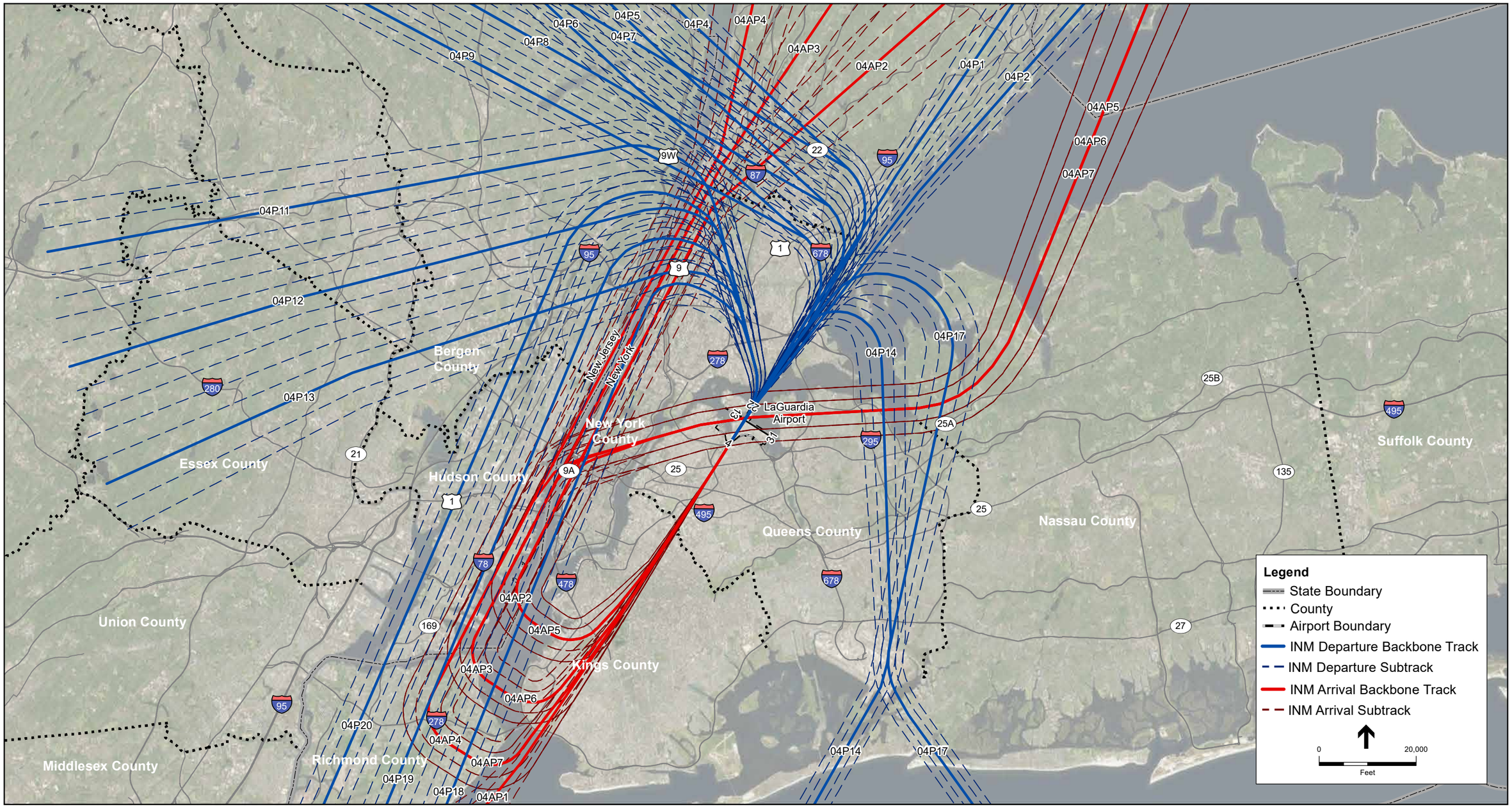
NOTE: Does not include helicopter operations. Values may not add to 100 percent due to rounding.
SOURCE: KB Environmental Sciences, Inc., 2016; Port Authority of New York and New Jersey, ANOMS data for calendar year 2014.

4.5.2 Flight Tracks and Utilization

Flight tracks refer to the route an aircraft follows when arriving to or departing from a runway. To identify flight tracks that represent annual average day conditions at LGA, aircraft arrival and departure data from the Port Authority's ANOMS were reviewed for calendar year 2014, as per the Study Protocol in **Appendix I, Section 6.5.11**. The 2014 data were used to develop the flight tracks for use in the INM. The 2014 data provided information on the following:

- Arrival and departure paths
- Arrival and departure times
- Arrival and departure profiles
- Departure Stage Lengths

Flight corridors utilized by arriving and departing aircraft to and from each runway end were reviewed and a series of centerlines of the flight corridors (backbone tracks) were established. These tracks were dispersed within the INM to generate sub-tracks in order to distribute the aircraft within each of the primary flight corridors. The INM flight tracks are depicted on **Figures 4-2 through 4-5**. Additional graphics that provide a more detailed depiction of LGA's arrival and departure flight tracks are provided in **Appendix E** and large-scale drawings are included in **Appendix M**. The flight tracks and their respective utilization rates are forecast to remain constant for the 2016 and 2021 study years. Flight track utilization, by time of day, is provided in **Tables 4-7** and **4-8**.



SOURCE: NAIP, 2013; KB Environmental Sciences Inc., 2016.
NOTE: INM - Integrated Noise Model.

LaGuardia Airport 14 CFR Part 150 Study . 140037

Figure 4-2
INM Flight Tracks - Runway 4
LaGuardia Airport

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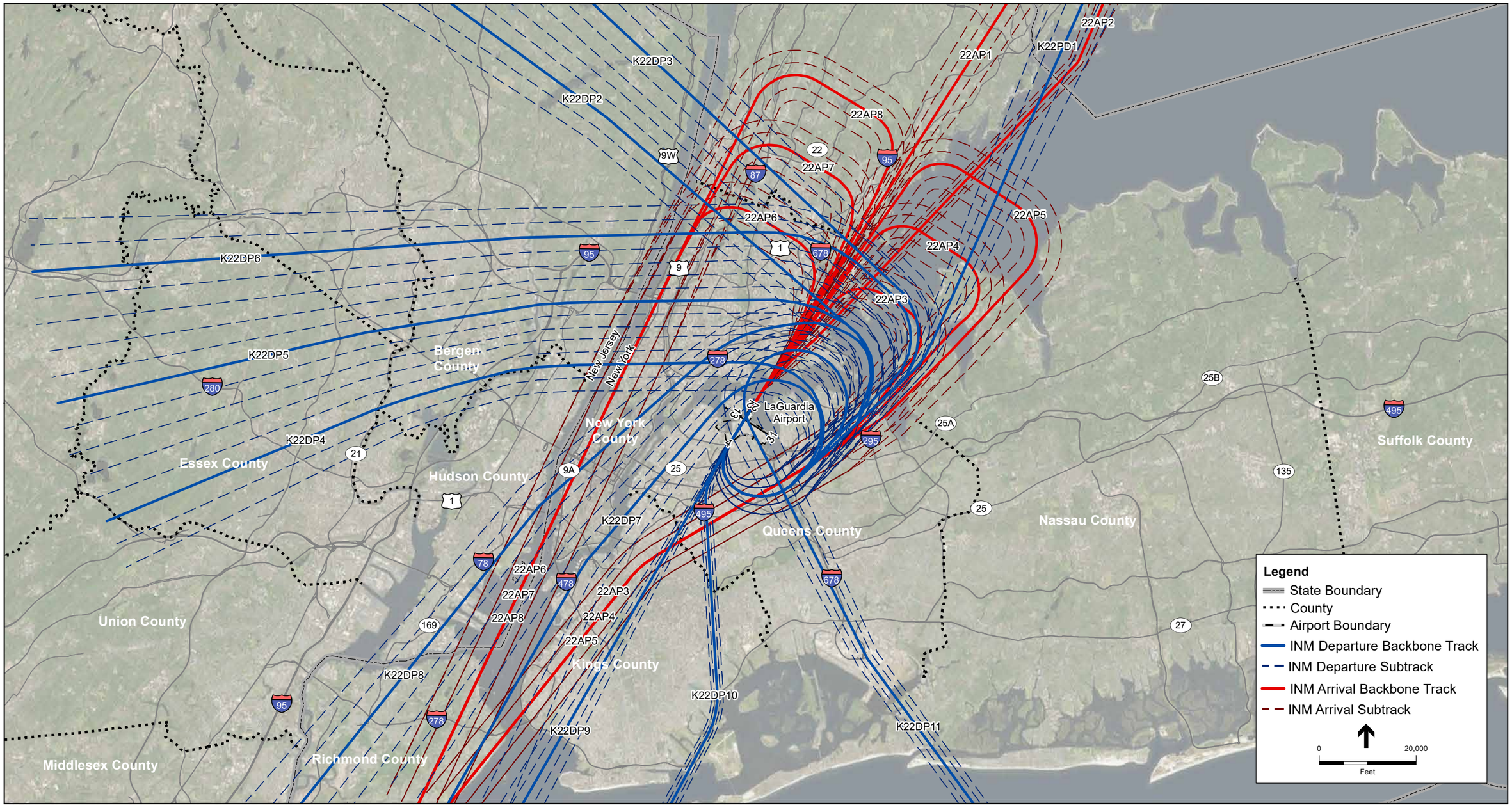

SOURCE: NAIP, 2013; KB Environmental Sciences Inc., 2016.
NOTE: INM - Integrated Noise Model.

Figure 4-3
INM Flight Tracks - Runway 22
LaGuardia Airport

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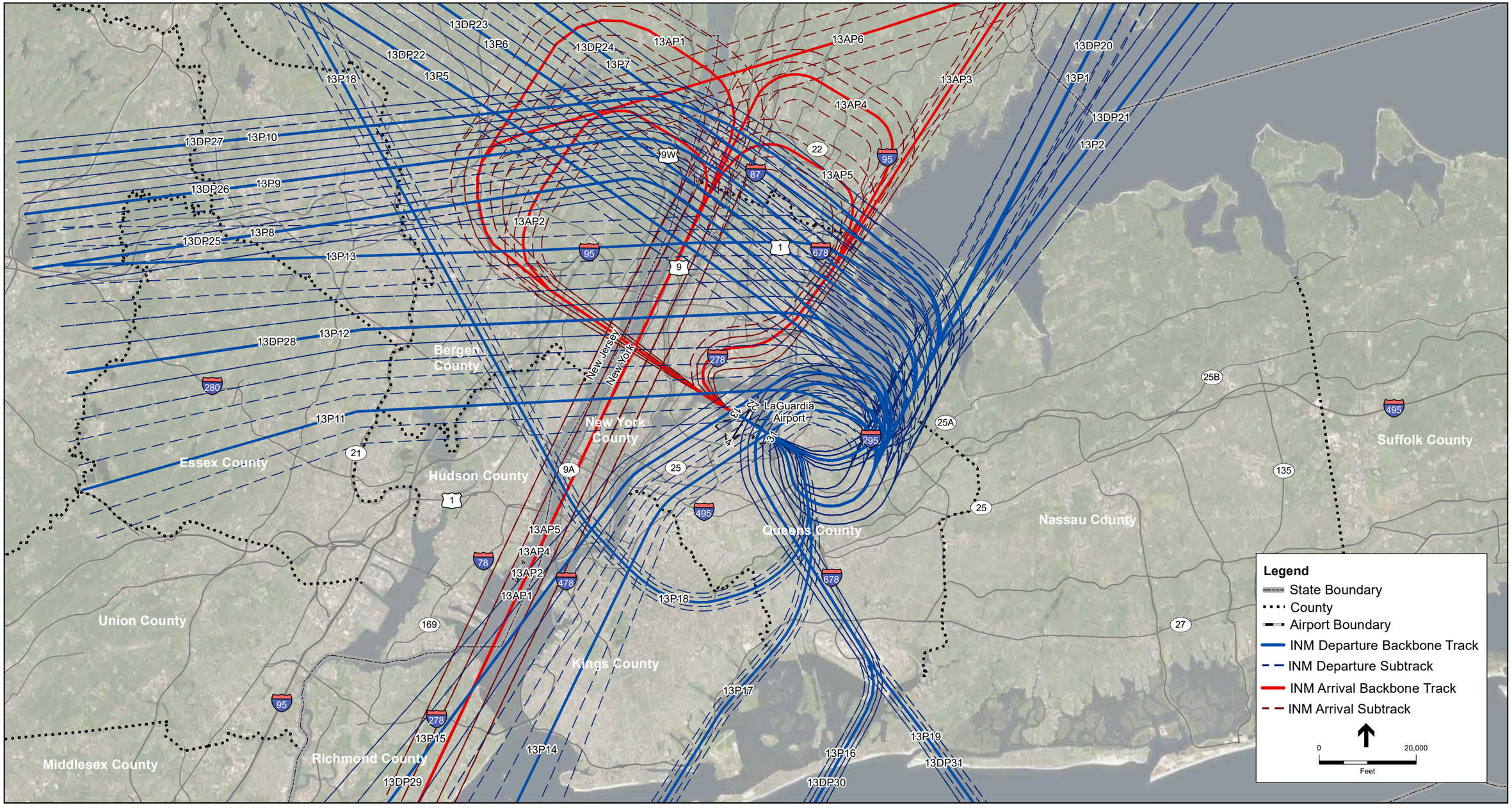

SOURCE: NAIP, 2013; KB Environmental Sciences Inc., 2016.
NOTE: INM - Integrated Noise Model.

Figure 4-4
INM Flight Tracks - Runway 13
LaGuardia Airport

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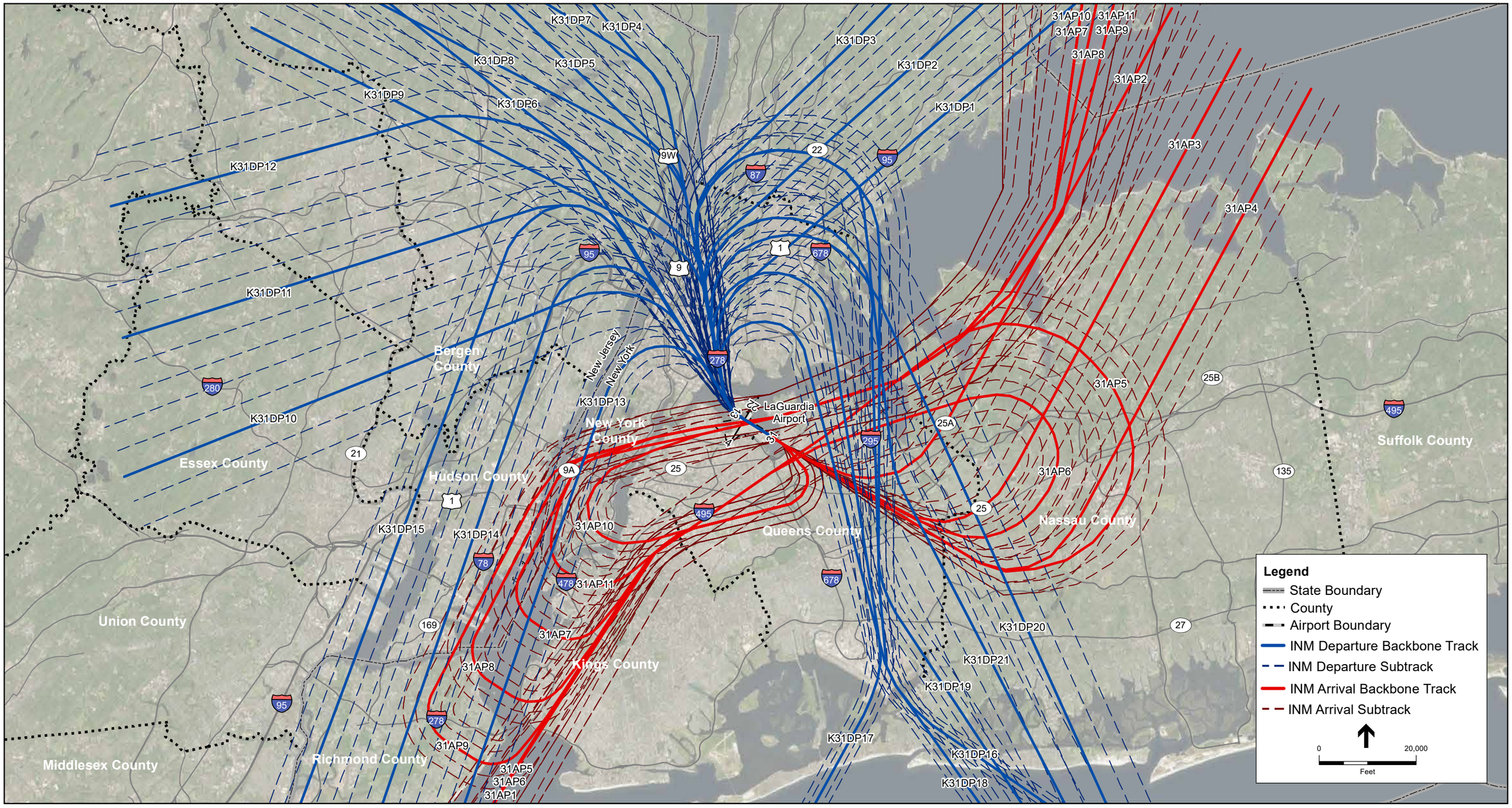

SOURCE: NAIP, 2013; KB Environmental Sciences Inc., 2016.
NOTE: INM - Integrated Noise Model.

Figure 4-5
INM Flight Tracks - Runway 31
LaGuardia Airport

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TABLE 4-7
ARRIVAL FLIGHT TRACK USE

Flight Track	Daytime	Nighttime	Flight Track	Daytime	Nighttime
	Runway 4			**Runway 22**	
04AP1	79.10%	82.70%	22AP1	20.00%	0.01%
04AP2	6.20%	4.90%	22AP2	1.20%	5.90%
04AP3	6.00%	4.70%	22AP3	16.70%	22.79%
04AP4	6.00%	4.70%	22AP4	16.20%	22.00%
04AP5	0.90%	1.00%	22AP5	16.20%	22.00%
04AP6	0.90%	1.00%	22AP6	10.10%	9.30%
04AP7	0.90%	1.00%	22AP7	9.80%	9.00%
			22AP8	9.80%	9.00%
Total	**100.00%**	**100.00%**	**Total**	**100.00%**	**100.00%**
	Runway 13			**Runway 31**	
13AP1	22.70%	28.40%	31AP1	76.10%	75.10%
13AP2	22.70%	28.30%	31AP2	1.80%	2.30%
13AP3	16.30%	5.10%	31AP3	1.70%	2.20%
13AP4	17.30%	15.90%	31AP4	1.70%	2.20%
13AP5	17.30%	15.90%	31AP5	2.60%	5.10%
13AP6	3.70%	6.40%	31AP6	2.60%	5.10%
			31AP7	2.70%	1.60%
			31AP8	2.70%	1.60%
			31AP9	2.70%	1.60%
			31AP10	2.70%	1.60%
			31AP11	2.70%	1.60%
Total	**100.00%**	**100.00%**	**Total**	**100.00%**	**100.00%**
Helipad H1					
HA1	50.00%	50.00%			
HA2	50.00%	50.00%			
Total	**100.00%**	**100.00%**			

SOURCE: KB Environmental Sciences, Inc., 2016; Port Authority of New York and New Jersey, Airport Noise and Operations Management System (ANOMS) data for calendar year 2014.

TABLE 4-8
DEPARTURE FLIGHT TRACK USE

Flight Track	Daytime	Nighttime	Flight Track	Daytime	Nighttime
	Runway 4			**Runway 22**	
04P1	5.20%	6.50%	K22DP1	10.90%	9.50%
04P2	5.20%	6.50%	K22DP2	10.30%	11.20%
04P4	3.00%	3.50%	K22DP3	10.30%	11.20%
04P5	2.90%	3.40%	K22DP4	13.70%	12.80%
04P6	2.90%	3.40%	K22DP5	13.40%	12.40%
04P7	4.60%	5.80%	K22DP6	13.40%	12.40%
04P8	4.50%	5.60%	K22DP7	7.60%	7.50%
04P9	4.50%	5.60%	K22DP8	7.60%	7.50%
04P11	15.80%	13.80%	K22PD9	2.60%	4.30%
04P12	15.30%	13.40%	K22DP10	5.70%	5.60%
04P13	15.30%	13.40%	K22DP11	4.50%	5.60%
04P14	2.30%	2.70%			
04P17	2.20%	0.60%			
04P18	5.50%	5.40%			
04P19	5.40%	5.20%			
04P20	5.40%	5.20%			
Total	**100.00%**	**100.00%**	**Total**	**100.00%**	**100.00%**
	Runway 13			**Runway 31**	
13P1	4.10%	3.50%	K31DP1	3.40%	4.00%
13P2	4.10%	3.50%	K31DP2	3.30%	3.90%
13P5	4.20%	5.20%	K31DP3	3.30%	3.90%
13P6	4.10%	5.00%	K31DP4	3.20%	3.40%
13P7	4.10%	5.00%	K31DP5	3.10%	3.30%
13P8	2.40%	1.40%	K31DP6	3.10%	3.30%
13P9	2.30%	1.40%	K31DP7	4.50%	5.40%
13P10	2.30%	1.40%	K31DP8	4.40%	5.20%
13P11	7.90%	8.50%	K31DP9	4.40%	5.20%
13P12	7.60%	8.20%	K31DP10	15.30%	14.20%
13P13	7.60%	8.20%	K31DP11	15.20%	13.60%
13P14	3.50%	3.40%	K31DP12	15.20%	13.60%
13P15	3.50%	3.40%	K31DP13	5.40%	5.90%
13P16	1.00%	1.10%	K31DP14	5.30%	5.70%
13P17	4.50%	5.60%	K31DP15	5.30%	5.70%
13P18	4.00%	10.90%	K31DP16	0.20%	0.10%
13P19	0.60%	0.30%	K31DP17	2.20%	2.80%
13DP20	2.10%	2.80%	K31DP18	0.80%	0.20%
13DP21	2.10%	2.80%	K31DP19	0.80%	0.20%
13DP22	1.90%	2.00%	K31DP20	0.80%	0.20%
13DP23	1.80%	2.00%	K31DP21	0.80%	0.20%
13DP24	1.80%	2.00%			
13DP25	1.10%	0.70%			
13DP26	1.10%	0.60%			
13DP27	1.10%	0.60%			
13DP28	12.30%	6.60%			
13DP29	5.20%	2.60%			
13DP30	0.70%	0.80%			
13DP31	1.00%	0.50%			
Total	**100.00%**	**100.00%**	**Total**	**100.00%**	**100.00%**

TABLE 4-8
DEPARTURE FLIGHT TRACK USE (CONTINUED)

Flight Track	Daytime	Nighttime
Helipad H1		
HD1	50.00%	0.00%
HD2	50.00%	0.00%
Total	**100.00%**	**0.00%**

SOURCE: KB Environmental Sciences, Inc., 2016; Port Authority of New York and New Jersey, Airport Noise and Operations Management System (ANOMS) data for calendar year 2014.

4.5.3 Departure and Arrival Profiles

As per the Study Protocol in **Appendix I, Section 6.5.8**, aircraft arrival and departure flight profile data contained in the Port Authority's ANOMS were reviewed. Based on this review, it was determined that modifications to the standard INM arrival and departure profiles were required for the LGA 14 CFR Part 150 Study, to better represent how aircraft operate to and from LGA. These modifications result in a better depiction of the noise levels around LGA.

During the review of the radar arrival tracks in ANOMS, the arrival profile altitude data showed that many aircraft fly a level-flight segment at altitudes below 6,000 feet above ground level (AGL) for several nautical miles, often starting at points more than 20 nautical miles from the aircraft's touchdown location on the runway. These flight altitudes differ considerably from the standard INM arrival profiles. The review of radar departure profiles also revealed that many aircraft departing LGA actually climb at a slower rate than the INM's standard departure profiles. Discussions with representatives of various airlines that operate at LGA indicated that the slower climb rates are seen partly because aircraft are departing with weights that are higher than the INM default take-off weights, and partly because the take-off thrust values identified by the airline personnel are lower than the default INM thrust values. For these two reasons, aircraft departing LGA are often lower to the ground during departure when compared to the INM standard departure profiles.

An analysis of LGA arrival and departure profile data was conducted for the ten aircraft types that generated a majority (approximately 83 percent) of the total aircraft operations at the airport in calendar year 2014. It was determined that developing user-defined arrival and departure profiles for all aircraft types in the data set was not practical. **Table 4-9** lists the INM aircraft types for which user-defined arrival and departure flight profiles were developed for the LGA 14 CFR Part 150 study. Included in the list is the INM aircraft type MD83 – this INM aircraft type represents one of the loudest aircraft on departure that operates at LGA.

TABLE 4-9
AIRCRAFT SELECTED FOR USER-DEFINED PROFILES

INM Aircraft Type	Annual Operations (2014)	Percent of Total Operations (2014)
CRJ9-ER	92,852	25%
737800	37,087	10%
EMB175	32,951	9%
A320-211	26,310	7%
A320-232	24,118	7%
737700	23,446	6%
EMB190	21,240	6%
EMB170	20,885	6%
MD83	18,203	5%
717200	6,239	2%
Total	**303,331**	**83%**

SOURCE: KB Environmental Sciences, Inc., 2016.

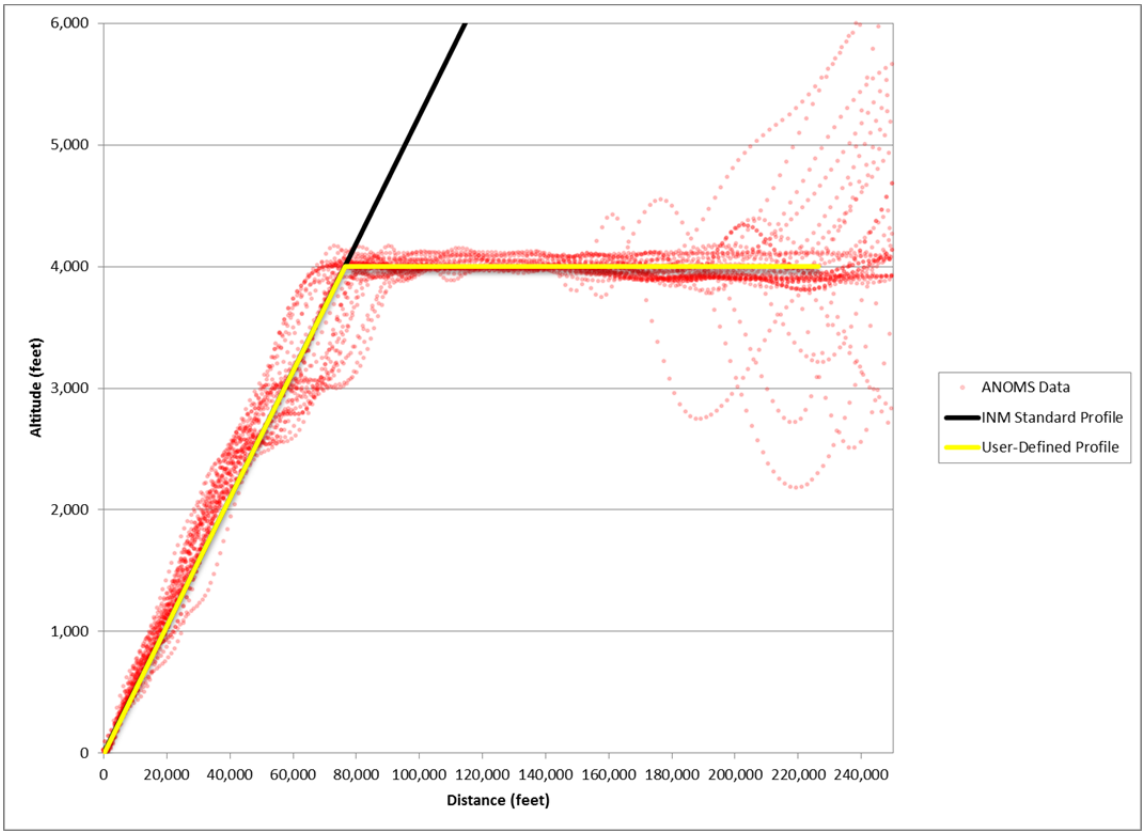
4.5.3.1 Arrival Profiles

All available LGA radar arrival flight tracks for calendar year 2014 were downloaded from the Port Authority's ANOMS. The aircraft flight profiles that traverse through the Aircraft Profile Study Area (an area defined by a nine nautical mile radius centered on LGA) were charted. This area is the area where aircraft operations are most likely to affect the DNL contours. The altitude and distance information charted from the actual ANOMS data were compared to the INM standard profiles for each of the ten aircraft listed in **Table 4-9**. Three graphs were developed for each aircraft: Altitude vs. Distance, Speed vs. Distance, and Thrust vs. Distance. Samples of these graphs for the INM aircraft type CRJ9-ER are shown on **Figures 4-6** through **4-8** with comparisons to the INM standard profiles and the user-defined profiles developed for this study.

Figures depicting INM flight tracks for all four runway ends and the limits of the Aircraft Profile Study Area were developed and provided to the New York Terminal Radar Approach Control (TRACON).[32] The assigned altitudes for aircraft on the tracks within the study area were reviewed and discussed with TRACON personnel. The discussions were consistent with the altitude data in the ANOMS and the need to develop user-defined arrival profiles for the INM.

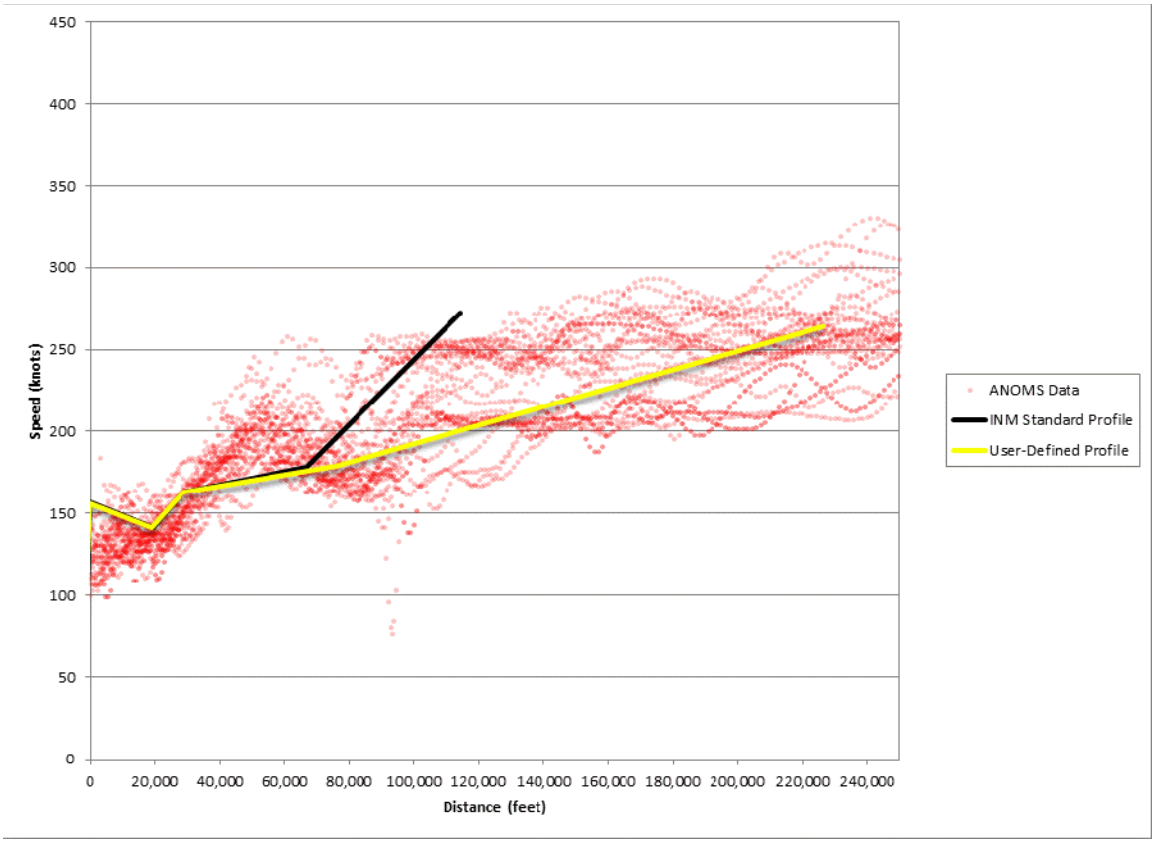
User-defined profiles were developed for each of the ten INM aircraft types listed in **Table 4-9** to ensure a positive correlation between the modeled profiles in the INM and the actual ANOMS altitude data. The methods used to develop the user-defined aircraft arrival profiles are discussed in more detail on **Page E-19** of **Appendix E-2**.

[32] A Terminal Radar Approach Control (TRACON) facility houses FAA air traffic controllers that guide aircraft approaching and departing airports – generally those within a 30 to 50 mile radius up to 10,000 feet, as well as aircraft flying over that airspace. Once an aircraft that is landing is within five miles of an airport and below 2,500 feet, TRACON controllers hand the aircraft off to the airport's ATCT.



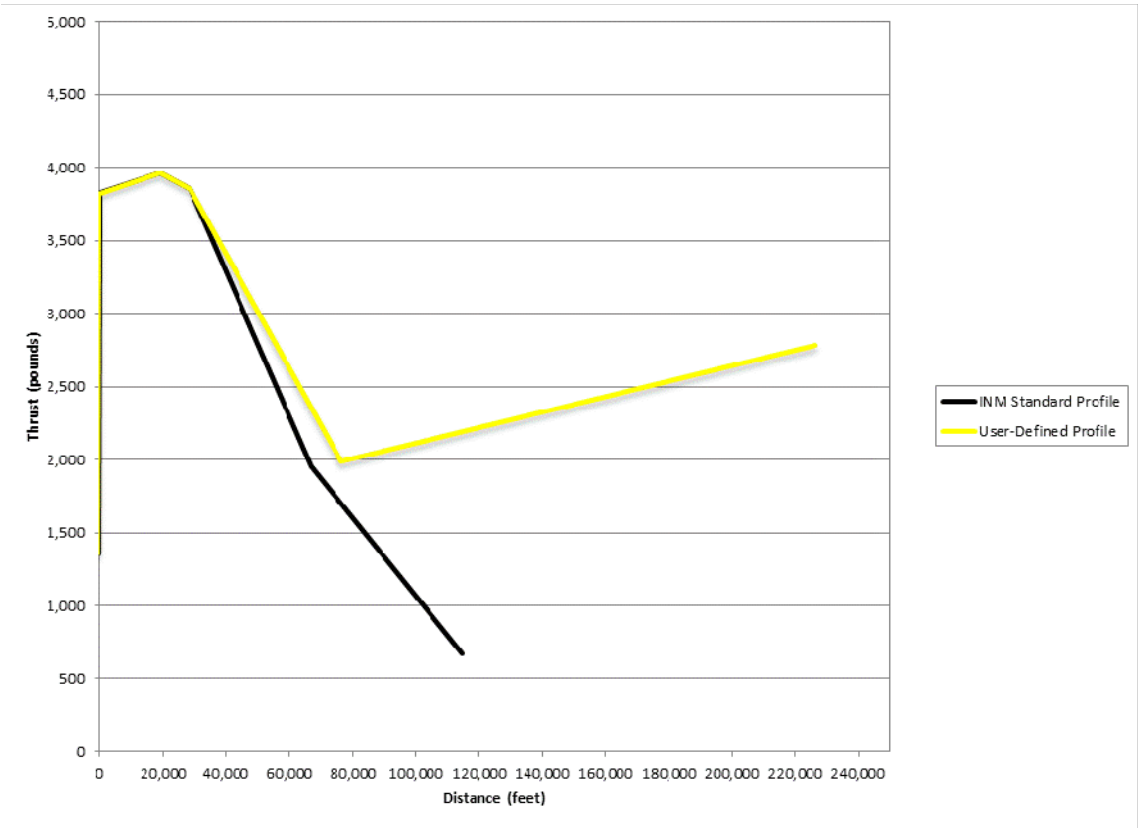
NOTE: ANOMS: Airport Noise and Operations Monitoring System. INM: Integrated Noise Model. Altitude is feet above field elevation (AFE). Distance is feet from touchdown point.
SOURCE: KB Environmental Sciences, Inc., 2016.

Figure 4-6
Altitude vs. Distance for CRJ9-ER Arrivals



NOTE: ANOMS: Airport Noise and Operations Monitoring System. INM: Integrated Noise Model. Altitude is feet above field elevation (AFE). Distance is feet from touchdown point.
SOURCE: KB Environmental Sciences, Inc., 2016.

Figure 4-7
Speed vs. Distance for CRJ9-ER Arrivals



NOTE: ANOMS: Airport Noise and Operations Monitoring System. INM: Integrated Noise Model. Altitude is feet above field elevation (AFE). Distance is feet from touchdown point.
SOURCE: KB Environmental Sciences, Inc., 2016.

Figure 4-8
Thrust vs. Distance for CRJ9-ER Arrivals

4.5.3.2 Departure Profiles

LGA departures that occurred in April 2014 and October 2014 for each of the ten INM aircraft types listed in **Table 4-9** were downloaded from the ANOMS. Because aircraft climb performance is affected by atmospheric temperature, these two months were selected as the time periods most appropriate for use in the comparison of the standard INM profiles to the actual ANOMS altitude data. The average temperature for these two months is the closest to the 30-year average annual temperature of 56° Fahrenheit recorded at LGA, which is the temperature used in the INM for this study.

The portion of each radar track profile up to an altitude of 10,000 feet was charted. An altitude of 10,000 feet was used as the limit of the departure profile analysis. The altitude and distance information charted from the ANOMS data were compared to the INM standard profiles for each of the ten aircraft. Three graphs were developed for each aircraft: Altitude vs. Distance, Speed vs. Distance, and Thrust vs. Distance. This comparison demonstrated that the aircraft were climbing at slower climb rates and ground speeds than the standard INM departure profiles; therefore, user-

defined departure profiles were needed. Samples of these graphs for the INM aircraft type CRJ9-ER are shown on **Figures 4-9** through **4-11**, including comparisons to INM standard profiles and the user-defined profiles used in this study.

User-defined profiles were developed for each of the ten aircraft to ensure a closer correlation between the modeled profiles in the INM and the actual ANOMS altitude and speed data. The full detailed methodology used to develop the user-defined aircraft departure profiles used in the INM is included on **Page E-20** of **Appendix E-2**.

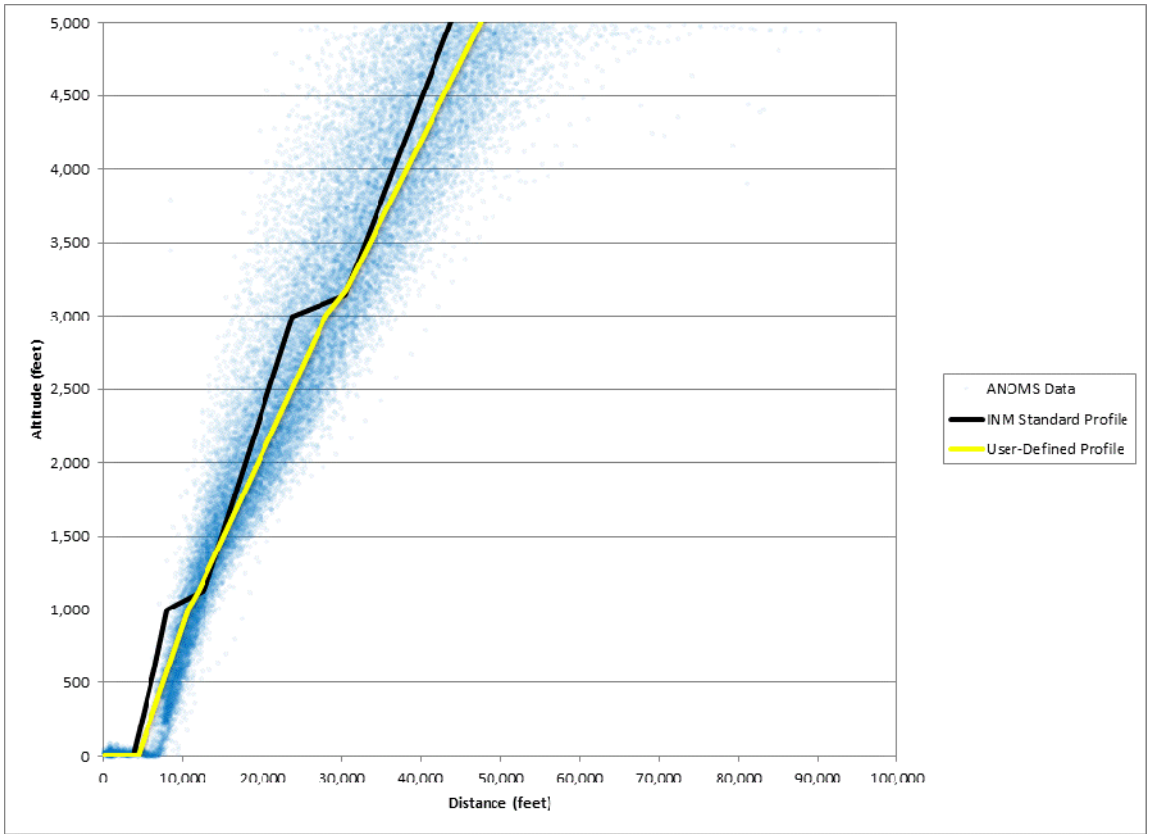
4.5.3.3 Airline Concurrence and FAA Approval

The Port Authority transmitted the user-defined arrival and departure profile altitude, speed and thrust charts to the airlines that operate the aircraft types and requested their review and concurrence that the user-defined profiles fall within reasonable bounds, in terms of the performance of the aircraft while operating at LGA. The signed airline concurrence letters are included in **Appendix G-2**. The user-defined arrival and departure profiles were approved by the FAA for use in the LGA 14 CFR Part 150 Study. The FAA's approval letter is included in on **Page G-20** of **Appendix G-1**.

4.6 Airport Noise Monitoring

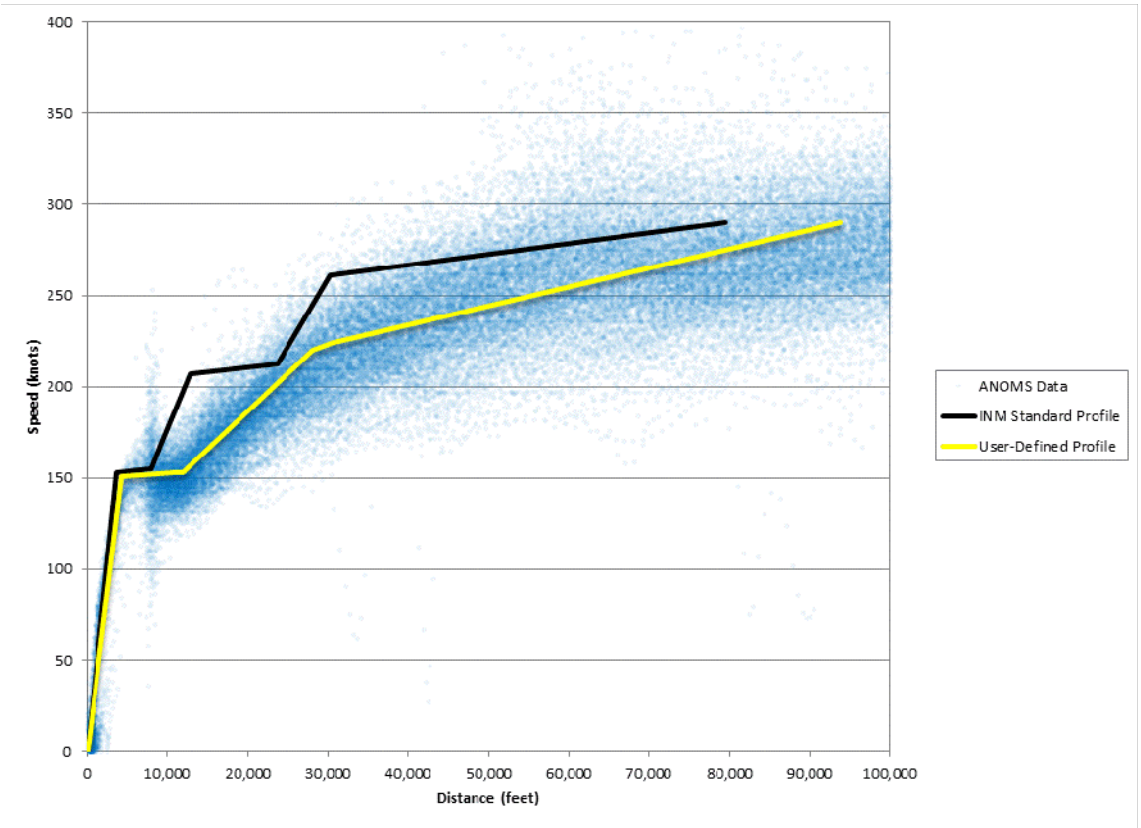
The locations of the LGA noise monitoring stations from which data were obtained for this study are depicted on **Figure 4-12**. As per the Study Protocol in **Appendix I, Section 6.6**, the Port Authority provided monthly noise level data (energy averages) for the monitoring stations near LGA for the year 2014. By request of the TAC, the Port Authority also provided monthly noise level data for the year 2015. This information is provided in **Table 4-10**. The data, expressed in DNL, provide information regarding aircraft noise in communities around LGA. It should be noted that only partial year information is available for many of the monitoring sites and that the closure and reconstruction of Runway 4L-22R at JFK in 2015 affected runway use at LGA in that year.

The noise monitoring information provided in this report is for informational purposes only. Due to the possibility of other ambient noise sources affecting the noise levels at the monitoring sites, the FAA does not allow noise monitoring data to be used to "calibrate" the INM. Therefore, noise monitoring data were not used as an INM input.



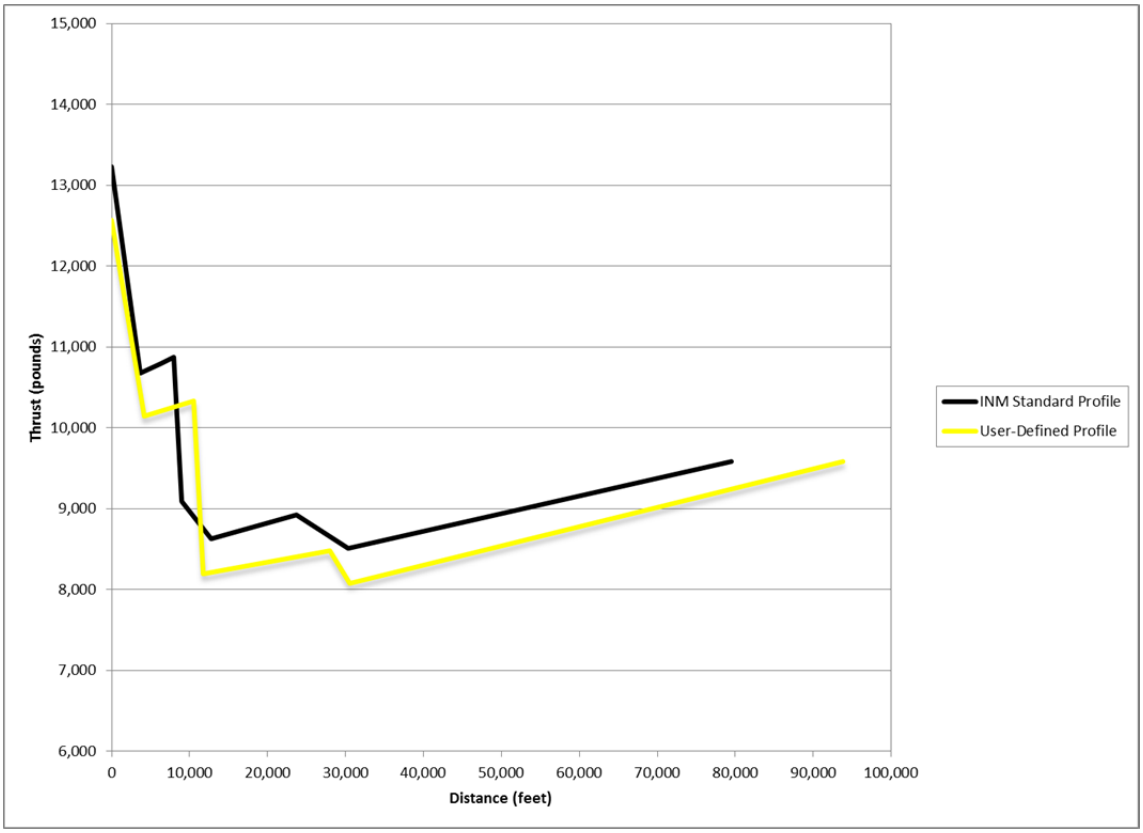
NOTE: ANOMS: Airport Noise and Operations Monitoring System. INM: Integrated Noise Model. Altitude is feet above field elevation (AFE). Distance is feet from start of takeoff roll.
SOURCE: KB Environmental Sciences, Inc., 2016.

Figure 4-9
Altitude vs. Distance for CRJ9-ER Stage Length 1 Departures



NOTE: ANOMS: Airport Noise and Operations Monitoring System. INM: Integrated Noise Model. Altitude is feet above field elevation (AFE). Distance is feet from start of takeoff roll.
SOURCE: KB Environmental Sciences, Inc., 2016.

Figure 4-10
Speed vs. Distance for CRJ9-ER Stage Length 1 Departures



NOTE: ANOMS: Airport Noise and Operations Monitoring System. INM: Integrated Noise Model. Altitude is feet above field elevation (AFE). Distance is feet from start of takeoff roll.
SOURCE: KB Environmental Sciences, Inc., 2016.

Figure 4-11
Thrust vs. Distance for CRJ9-ER Stage Length 1 Departures

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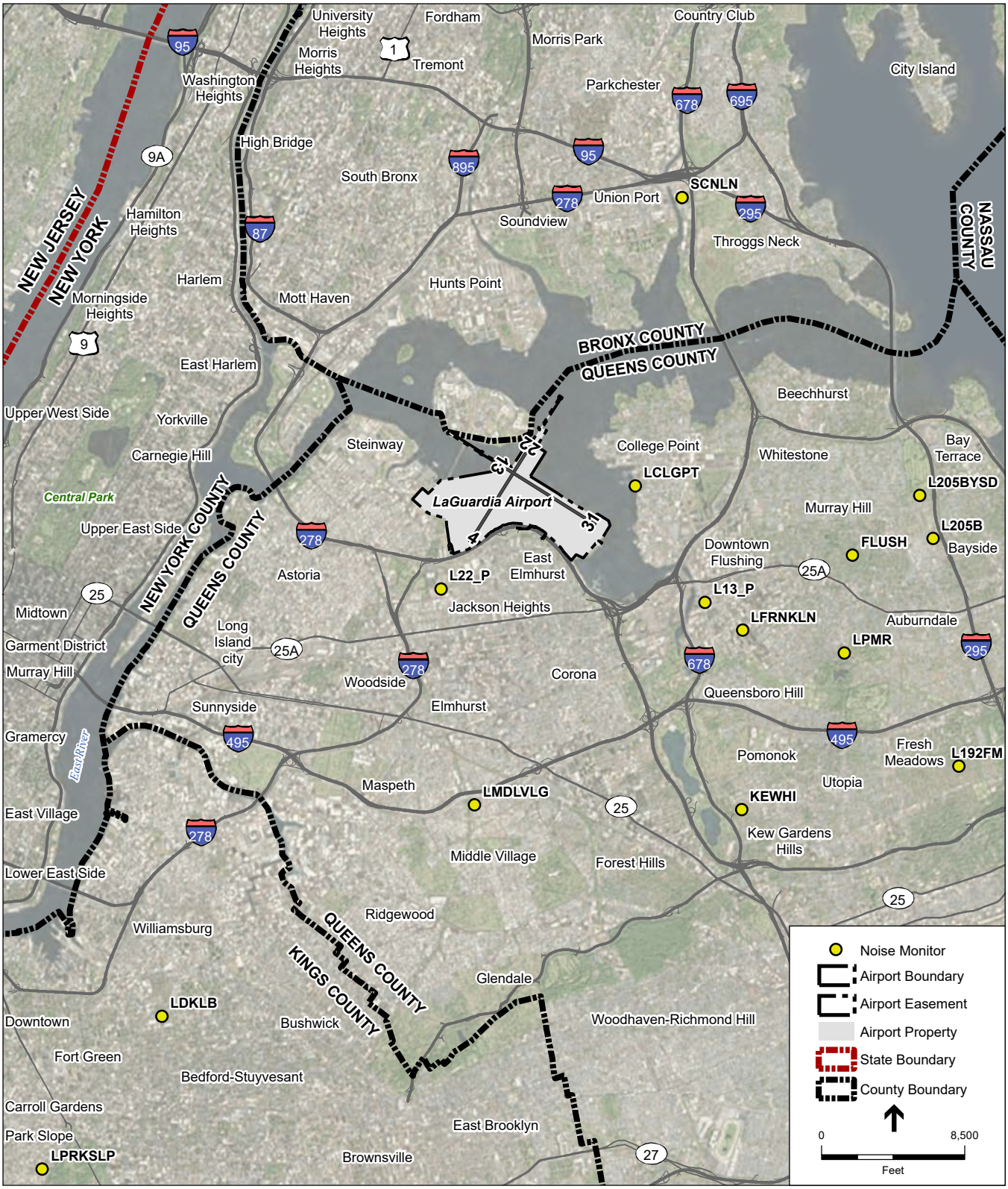

SOURCE: PANYNJ, 2016; ESA, 2016

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Figure 4-12

Noise Monitor Locations
LaGuardia Airport

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TABLE 4-10
AVERAGE MONTHLY NOISE MONITORING DATA (AIRCRAFT DNL) – 2014 AND 2015

Month	Noise Monitoring Stations in the Vicinity of LGA												
	L13_P	L22_P	FLUSH[1]	KEWHI	SCNLN	L205BYSD[2]	LFRNKLN	LDKLB	LCLGPT	LMDLVLG	LPRKSLP	LPMR	L205B
2014													
Jan-14	61.6	66.8	61.8	59.3	64.6	--	--	--	--	--	--	--	--
Feb-14	61.8	67.9	57.4	58.9	63.4	--	--	--	--	--	--	--	--
Mar-14	68.3	70.1	57.6	57.0	63.2	--	--	--	--	--	--	--	--
Apr-14	69.6	68.6	60.2	58.8	60.1	--	--	--	--	--	--	--	--
May-14	67.7	70.5	60.0	58.2	66.0	--	--	--	--	--	--	--	--
Jun-14	68.2	68.4	62.1	57.5	65.3	56.0	--	--	--	--	--	--	--
Jul-14	68.3	65.4	60.6	57.9	65.1	54.8	--	--	--	--	--	--	--
Aug-14	67.5	67.5	61.1	56.0	64.3	55.3	63.2	--	--	--	--	--	--
Sep-14	67.0	69.4	60.6	57.2	61.7	55.2	64.1	58.5	--	--	--	--	--
Oct-14	67.0	68.8	--	56.8	64.0	55.0	64.7	57.4	--	--	--	--	--
Nov-14	65.7	65.4	--	55.2	64.5	53.3	63.6	55.0	--	--	--	--	--
Dec-14	67.9	72.9	--	56.8	62.9	53.4	63.6	59.3	--	--	--	--	--
Yearly Average	**67.2**	**69.0**	**60.4**	**57.6**	**64.0**	**54.8**	**63.9**	**57.8**	**--**	**--**	**--**	**--**	**--**
2015													
Jan-15	65.3	68.8	--	54.0	62.2	50.6	62.3	55.2	--	--	--	--	--
Feb-15	67.5	68.4	--	54.6	62.1	51.4	64.6	54.0	59.1	54.7	--	--	--
Mar-15	67.0	71.8	--	55.7	64.0	54.0	63.6	57.3	61.0	54.7	--	--	--
Apr-15	68.3	70.6	--	58.8	64.9	55.3	63.0	57.8	62.6	57.1	--	--	--
May-15	69.0	68.8	--	59.7	65.3	56.6[2, 3]	61.0	55.1	63.3	54.9	--	--	--
Jun-15	69.0	70.6	--	59.8	64.7	--	60.9	58.1	62.9	54.4	--	--	--
Jul-15	68.5	68.2	--	58.5	65.1	--	60.2	54.6	61.7	57.0	52.9	--	--
Aug-15	68.4	69.6	--	57.1	65.4	--	59.5	54.9	60.8	55.6	52.6	--	--
Sep-15	70.2	72.1	--	59.2	64.3	--	62.9	--	61.7	52.5	53.9	--	--
Oct-15	68.3	71.9	--	57.4	64.6	--	64.0	--	60.4	55.8	54.7	--	--
Nov-15	69.3	71.3	--	57.8	64.1	--	61.7	--	62.3	57.1	54.7	58.0[3]	--
Dec-15	--[4]	72.1	--	59.2	65.3	--	63.5	--	62.9	53.6	53.6	58.0	57.7[3]
Yearly Average	**68.4**	**70.6**	**--**	**58.0**	**64.5**	**54.1**	**62.5**	**56.1**	**61.9**	**55.4**	**53.8**	**58.0**	**57.7**

SOURCE: Port Authority, 2016

[1] The FLUSH monitoring station was removed in October 2014.

[2] The L2015BYSD monitoring station was removed in May 2015.

[3] Only partial monthly data available.

[4] Monitoring station was out of service due to technical problems.

Data presented are monthly logarithmic averages.

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CHAPTER 5
2016 and 2021 Noise Exposure

5.1 Introduction

This chapter presents the 2016 Existing Conditions and 2021 Future Conditions DNL contours for LGA. As discussed in **Chapter 4**, the contours show how noise from aircraft operations is distributed over the surrounding area. This chapter also quantifies the types of land uses and population within the DNL 65 and higher contours, identifies land use compatibility using FAA guidelines, and shows the noise sensitive locations.

Title 14 CFR Part 150 requires that the aircraft noise exposure for the year of submittal (in this case 2016) and for a future year (2021) be developed. The DNL 65, DNL 70, and DNL 75 contours are the only contours required by the FAA for inclusion in a 14 CFR Part 150 Study and for the agency's acceptance of the Noise Exposure Maps (NEMs). Specific elements that are required to be included on the existing and future NEMs and required supplemental graphics are identified in 14 CFR Part 150. These include depictions of noise sensitive sites within the DNL 65 contour. While noise sensitive sites outside of the DNL 65 contour are sometimes shown on NEMs for 14 CFR Part 150 studies, it was found that inclusion of these sites for the LGA 14 CFR Part 150 Study would obscure the land use types and geographic features on the NEMs due to the high number of sites. 14 CFR Part 150 requires the NEMs to be of a quality sufficient to discern "streets and other identifiable geographic features." The official LGA 2016 and 2021 NEMs are included in **Appendix M** of this report. The 2021 Future Conditions NEM reflects noise exposure levels around LGA that would occur without the implementation of a Noise Compatibility Program.

5.2 2016 Noise Exposure

Figure 5-1 presents the 2016 Existing Conditions DNL contours superimposed on an existing land use map. In accordance with 14 CFR Part 150, the DNL 65, DNL 70, and DNL 75 contours are shown.[33] Furthermore, the contours accurately represent noise based on airport and operational data that are representative of the year 2016, as described in **Section 4.3**. The figure also depicts community and geographic reference points, such as LGA's boundary and runways, county-level political boundaries, area roads and highways, and waterbodies. This figure assists

[33] Maps depicting the DNL 60 and DNL 55 contours for 2016 and 2021 are provided in Appendix J. These maps are provided for informational purposes only.

in understanding the geographic relationship of LGA's DNL contours to the surrounding community.

The long, relatively narrow shapes of the contours extending off both ends of Runway 4-22 are consistent with a runway that is primarily used for arrivals. The wider, more varied shapes of the contours located off both ends of Runway 13-31 are consistent with a runway that is heavily used by departures. The DNL 65 contour extends to the northeast into the Bronx and to the southeast over Willets Point into Flushing. To the northwest, northeast and southeast, a large percentage of the DNL 65 and higher contours are located over water and partially encompass Rikers Island. Small bumps in the sides of the contours to the northeast and northwest reflect the influence of departure turns. The three lobes at the end of the DNL 65 contour to the southeast reflect the influence of the Whitestone departure from Runway 13, the Expressway Visual approach to Runway 22, and the Localizer approach to Runway 31, from west to east, respectively. The TNNIS SIX DP from Runway 13 also contributes to the easternmost lobe over Flushing.

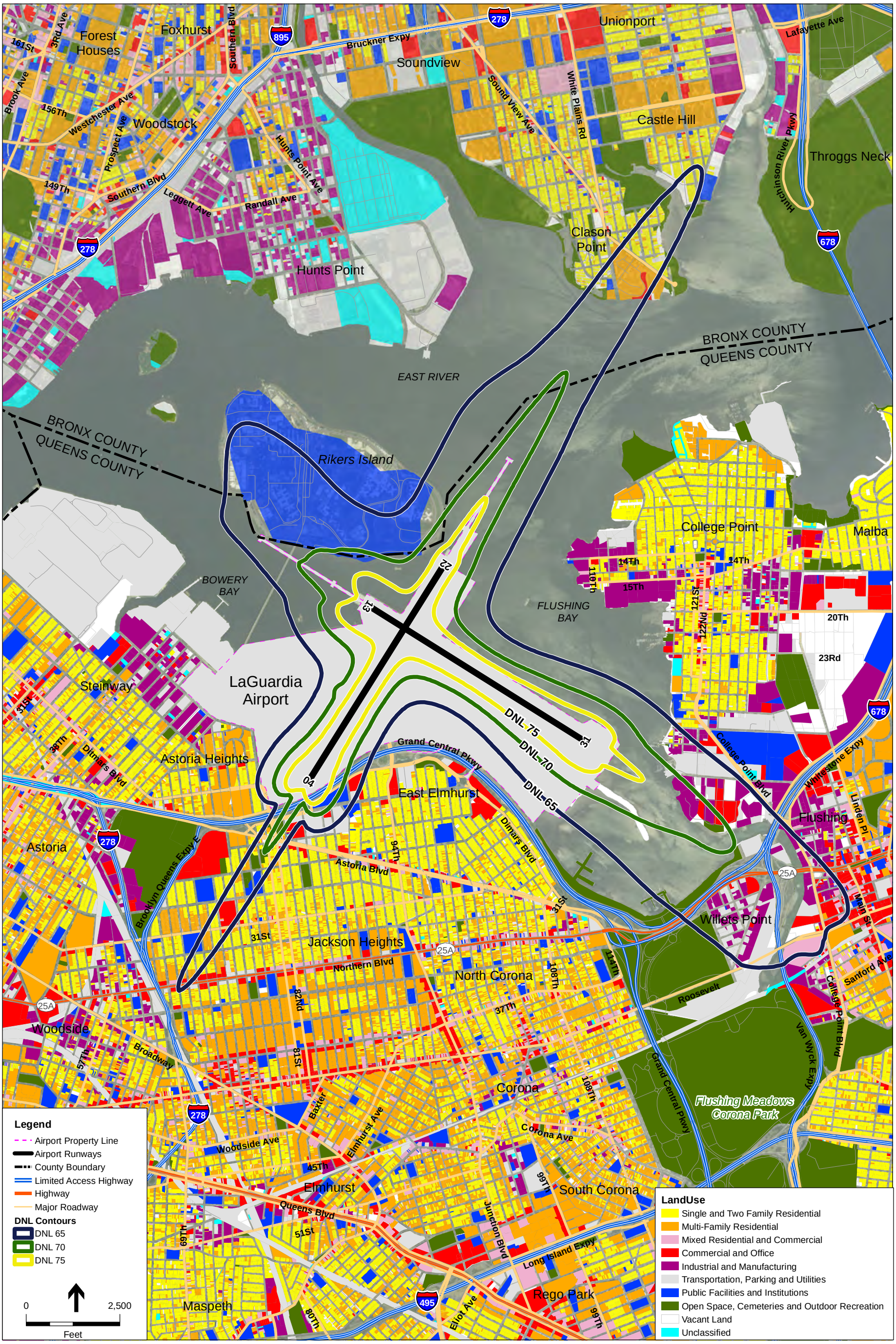
5.2.1 Land Use Compatibility - 2016

The total area encompassed by the 2016 DNL 65 contour is 2,435.8 acres. Land uses located within the 2016 DNL 65 and higher contours were identified by overlaying the contours on parcel-level land use data provided by the City of New York. The total acres for each land use category within the DNL 65 and higher contours are shown in **Table 5-1**. The New York City (NYC) Department of City Planning is the sole land use agency for all land within the 2016 DNL 65 contour.

The FAA's Land Use Compatibility Guidelines discussed in **Section 3.3** show that noise-sensitive land uses such as residential, mobile home parks, transient lodging (e.g., hotels and motels), schools, and outdoor music venues are not compatible with noise levels of DNL 65 or higher. Other noise-sensitive land uses such as hospitals, nursing homes, churches, auditoriums, and concert halls are generally compatible with noise levels between DNL 65 and DNL 75 when measures that achieve an outdoor-to-indoor Noise Level Reduction (NLR) of 25 to 30 decibels are incorporated into the structures.[34] Commercial, manufacturing, and recreational land (parks, amusement parks, zoos, etc.) are generally less sensitive to noise and considered compatible with noise levels up to DNL 70 without an NLR and up to DNL 80 with NLR of 25 to 30 decibels.

As shown in **Table 5-1**, the 2016 NEM DNL 65 and higher contours contain approximately 38 acres of Single-Family and Two-Family Residential, 35 acres of Multi-Family Residential, and 13 acres of Mixed-Residential Commercial land uses. As shown in **Table 5-1**, aside from Water and Airport Property, the majority of the land uses exposed to aircraft noise of DNL 65 and higher in 2016 are Transportation, Right of Way, Parking, and Utilities (approximately 250 acres) and Public Facilities and Institutions (approximately 230 acres). There are 35 acres of recreational land (Open Space, Cemeteries, and Outdoor Recreation) within the 2016 NEM, which includes 30 parks and one yacht club; all are compatible land uses (see **Table 3-1**).

[34] Normal residential construction can be expected to provide an outdoor-to-indoor NLR of 20 dB.



SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; INM 7.0d; KB Environmental Sciences, Inc., 2016; ESA, 2016; ESRI Mapping Services.

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Figure 5-1

2016 DNL Contours

LaGuardia Airport

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TABLE 5-1
LAND USES EXPOSED TO DNL 65 AND HIGHER – 2016

Land Use Category	Land Uses Exposed to DNL 65 and Higher (acres)				Households	Population
	DNL 65-70	DNL 70-75	DNL 75+	Total		
Single and Two Family Residential	37.6	0.0*	0.0	37.6	1,129	3,312
Multi-Family Residential	34.7	0.0	0.0	34.7	1,715	4,370
Mixed Residential and Commercial	13.1	0.0	0.0	13.1	813	2,111
Commercial and Office	39.9	3.4	0.0	43.3	-	-
Industrial and Manufacturing	60.4	13.3	0.0	73.7	-	-
Transportation, Right of Way, Parking and Utilities	227.4	13.6	5.2	246.4	-	-
Public Facilities and Institutions	223.3	10.5	0.2	234.0	-	-
Open Space, Cemeteries, and Outdoor Recreation	31.3	4.3	0.0	35.6	-	-
Vacant	30.0	6.6	0.0	36.6	-	-
Airport Property	172.6	152.5	278.2	603.3	-	-
Water (Off Airport Property)	709.0	313.2	55.6	1,077.8	-	-
Total	**1,579.3**	**517.4**	**339.1**	**2,435.8**	**3,657**	**9,793**

NOTE: Numbers may not add up, due to rounding.
*Single and Two Family Residential uses within the DNL 70-75 contour total 0.003 acres, which does not appear in the table due to rounding.
SOURCE: Planning Technology, Inc. and Environmental Science Associates, 2016.

5.2.2 Population within 2016 DNL Contours

Table 5-2 presents the estimated number of households, population and the noise sensitive sites exposed to DNL 65 and higher in 2016. Based on population data by census block from the U.S. Census Bureau's 2010 Decennial Census (as per the Study Protocol in **Appendix I, Section 6.9.1**) and parcel data provided by the City of New York, approximately 3,660 households would be exposed to aircraft noise of DNL 65 and higher in 2016.

The population exposed to aircraft noise of DNL 65 and higher was determined by calculating the average number of persons per household in each census block within the DNL 65 and higher contours and multiplying that number by the number of households (using the New York City household data) within each census block (or portion thereof located within the DNL 65 and higher contours). The population within each individual block (or portion thereof) was then summed to quantify the total number of persons within the DNL 65 and higher contours. The total population exposed to aircraft noise of DNL 65 and higher was estimated to be approximately 9,800 persons.

Three schools are located within the DNL 65 and higher contours: Monsignor McClancy Memorial High School, Our Lady of Fatima School, and Vaughn College of Aeronautics & Technology. These schools were insulated as part of the Port Authority's School Soundproofing Program (see **Section 2.6.1** for additional information), and are compatible with DNL 65 and higher.

TABLE 5-2
NOISE SENSITIVE SITES EXPOSED TO DNL 65 AND HIGHER – 2016

Noise Level	Total Area (Acres)	Households[1]	Population[1]	Places of Worship	Schools[2]	Hospitals and Residential Healthcare	Historic Resources	Day Care
2016								
DNL 65-70	1,579.3	3,655	9,787	7	2	0	5	2
DNL 70-75	517.4	2	6	0	1	0	0	1
DNL 75+	339.1	0	0	0	0	0	0	0
Total	**2,435.8**	**3,657**	**9,793**	**7**	**3**	**0**	**5**	**3**

NOTES:
[1] The household and population estimates provided above were developed using census block-level demographic data from the 2010 Decennial Census and New York City housing data. This approach provided an average number of persons per household for each individual census block, which accounted for changes in land use, housing types, and residential density within the different areas in the DNL 65 and higher contours.

[2] These schools were included in the School Soundproofing Program, and are compatible with DNL 65 and higher (see Section 2.6.1).

SOURCE: Planning Technology, Inc. and Environmental Science Associates, 2016.

5.2.3 Airport Noise Monitoring Comparison

As described in **Section 4.6** and shown in **Table 4-10**, LGA noise monitoring station data were compiled for 2014 and 2015 monthly and annual averages. The data, expressed in DNL, provide information regarding aircraft noise in communities around LGA. The annual average aircraft noise levels (energy average) from the Port Authority's noise monitoring stations and the modeled aircraft noise levels calculated by the INM for 2016 were compared, and the measured and modeled DNL values are shown in **Table 5-3**. The comparison of measured and predicted DNL values was limited to the existing (2016) conditions.[35]

The differences between the monitoring station data and the INM modeling results were reviewed. Differences between actual and modeled noise levels were attributed to periods of time when noise monitors were inoperable and when ambient noise was recorded by the noise monitors and incorrectly identified as aircraft noise. The FLUSH monitor appears to have a difference of 5.5 dB; however, the noise monitor was recording wind moving through a nearby tree when aircraft were near, resulting in inaccurate noise level readings. Additionally, closure and reconstruction of Runway 4L-22R at JFK in 2015 affected runway use at LGA in that year and differences in fleet mix and activity levels between 2014 and 2016 affect the relative noise exposure for those years.

The noise monitoring information provided in this report is for informational and comparison purposes only. Because of the limited monitoring collection periods (partial years) for most sites and the difference in operational conditions between the measured and modeled conditions, these comparisons do not provide a direct basis of comparison. The DNL contours for the NEMs for this 14 CFR Part 150 Study were those generated by the INM only. 14 CFR Part 150 does not provide for use of noise monitoring data to "calibrate" the INM.

[35] See Section 6.6 of the Study Protocol (Appendix I).

TABLE 5-3
COMPARISON OF NOISE MONITORING DATA AND INM PROJECTED NOISE LEVELS (AIRCRAFT DNL)

Monitoring Stations	2014 (Actual)	2015 (Actual)	2016 INM (Projected)
L13_P	67.2	68.4[3]	65.5
L22_P	69.0	70.6	69.1
FLUSH[1]	60.4[3]	--	54.9
KEWHI	57.6	58.0	56.9
SCNLN	64.0	64.5	62.3
L205BYSD[2]	54.8[3]	54.1[3]	53.8
LFRNKLN	63.9[3]	62.5	63.3
LDKLB	57.8	56.1[3]	54.8
LCLGPT	--	61.9[3]	59.0
LMDLVLG	--	55.4[3]	54.2
LPRKSLP	--	53.8[3]	52.3
LPMR	--	58.0[3]	56.5
L205B	--	57.7[3]	55.5

SOURCE: Port Authority, 2015; Environmental Science Associates, 2016.
[1] The FLUSH monitoring station was removed in October 2014 at the request of the homeowner.
[2] The L2015BYSD monitoring station was removed in May 2015; only partial data for that month.
[3] Information is based on partial year averages (see **Table 4-10**).
Data presented are monthly energy averages.

5.3 2021 Noise Exposure

The 2021 Future Conditions DNL contours are depicted on **Figure 5-2**. Similar to **Figure 5-1**, the 2021 contours are superimposed over a future land use map. In accordance with 14 CFR Part 150, the 2021 contours reflect the anticipated noise conditions based on airport and operational data that are representative of the year 2021, as described in **Section 4.3**. As discussed in **Section 2.2.3**, there are no future or planned airport development projects that are expected to substantially affect airside operations in the year 2021. The size and shape of the 2021 DNL contours is very similar to the 2016 contours, with minor changes. The 2021 DNL contours associated with arrivals (primarily southeast and northeast of the Airport) extend outward slightly, reflecting the increase in activity between 2016 and 2021 and the replacement of the relatively quiet (on arrival) MD-80 aircraft. Because this aircraft is the noisiest currently in operation at the airport from a departure standpoint, an overall slight decrease in the size of the 2021 DNL contours is observed for those portions of the contours primarily influenced by departures. The 2021 DNL contours are slightly smaller in the areas northwest and southeast of LGA which are corridors more heavily used by quieter departing aircraft.

5.3.1 Land Use Compatibility - 2021

The total area encompassed by the 2021 DNL 65 and higher contours is 2,389.4 acres. The type and amount of land uses within the DNL 65 and higher contours is provided in **Table 5-4**. As shown in **Table 5-4**, the 2021 DNL 65 and higher contours contain approximately 40 acres of Single Family and Two Family Residential, 35 acres of Multi-Family Residential, and 7 acres of Mixed-Residential Commercial land uses. The majority of the land uses, excluding Water and Airport Property, exposed to aircraft noise of DNL 65 and higher in 2021 are Transportation, Right of Way, Parking, and Utilities (approximately 240 acres) and Public Facilities and Institutions (approximately 220 acres). There are approximately 38 acres of recreational land (Open Space, Cemeteries, and Outdoor Recreation) within the 2021 NEM, which includes 31 parks and one yacht club; all are compatible land uses (see **Table 3-1**). As with the 2016 DNL 65 contour, the NYC Department of City Planning is the sole land use agency for all land within the 2021 DNL 65 contour.

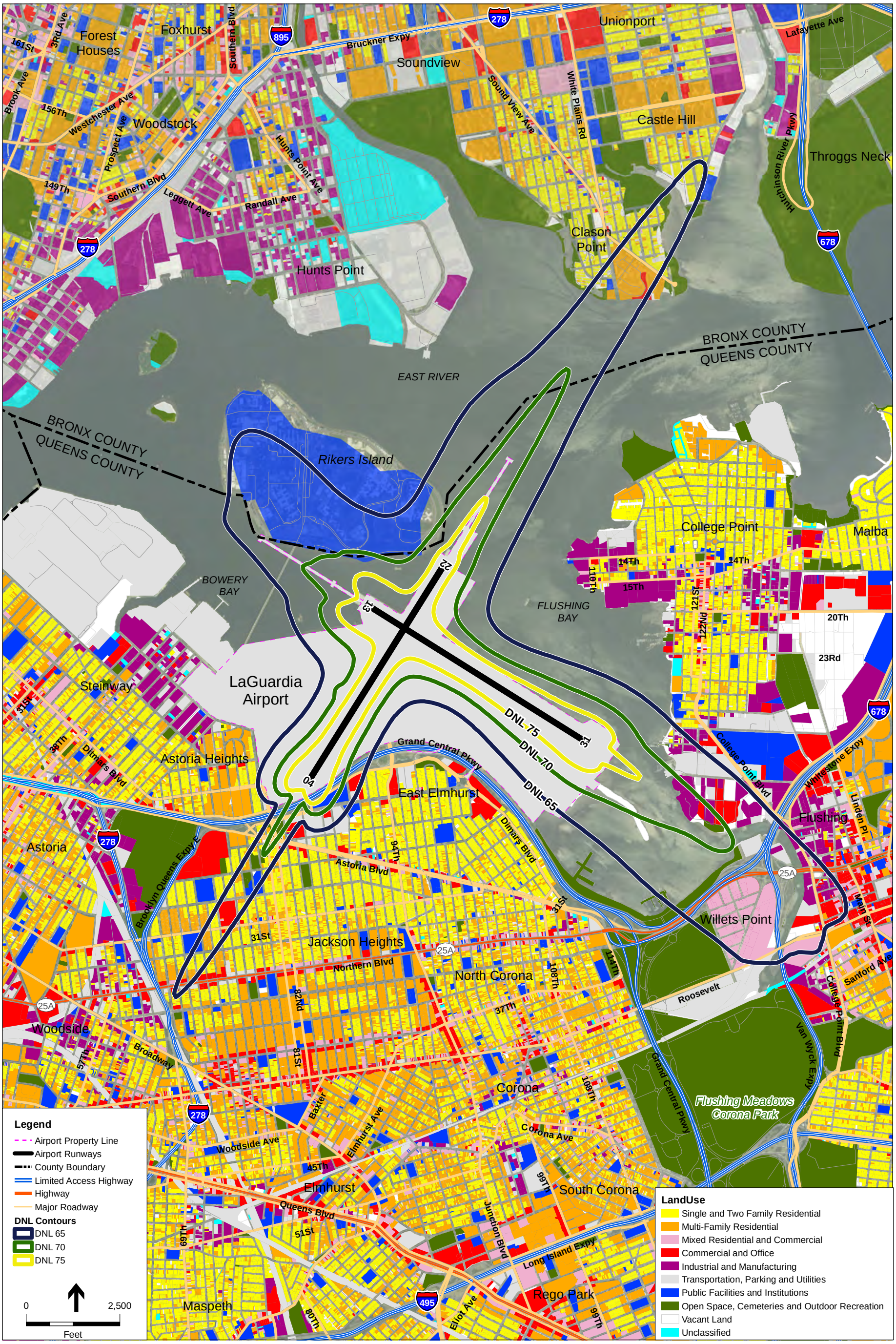
TABLE 5-4
LAND USES EXPOSED TO DNL 65 AND HIGHER – 2021

Land Use Category	Land Uses Exposed to DNL 65 and Higher (acres)				Households	Population
	DNL 65-70	DNL 70-75	DNL 75+	Total		
Single and Two Family Residential	40.4	0.0*	0.0	40.4	1,207	3,556
Multi-Family Residential	35.2	0.0	0.0	35.2	1,739	4,436
Mixed Residential and Commercial	6.5	0.0	0.0	6.5	860	2,275
Commercial and Office	40.2	3.0	0.0	43.2	-	-
Industrial and Manufacturing	59.4	12.4	0.0	71.8	-	-
Transportation, Right of Way, Parking and Utilities	222.7	13.8	5.0	241.5	-	-
Public Facilities and Institutions	212.8	8.4	0.1	221.3	-	-
Open Space, Cemeteries, and Outdoor Recreation	33.0	4.7	0.0	37.7	-	-
Vacant	29.6	6.0	0.0	35.6	-	-
Airport Property	172.2	152.3	274.9	599.4	-	-
Water (Off Airport Property)	702.7	301.9	52.2	1,056.8	-	-
Total	**1,554.7**	**502.5**	**332.2**	**2,389.4**	**3,806**	**10,267**

NOTE: Numbers may not add up, due to rounding.
* Single and Two Family Residential uses within the DNL 70-75 contour total 0.011 acres, which does not appear in the table due to rounding.
SOURCE: Planning Technology, Inc. and Environmental Science Associates, 2016.

5.3.2 Population within 2021 DNL Contours

Table 5-5 presents the estimated number of households, population and the noise sensitive sites exposed to DNL 65 and higher in 2021. Based on population census block data from the U.S. Census Bureau's 2010 Decennial Census (as per the Study Protocol in **Appendix I, Section 6.9.1**) and parcel data provided by the City of New York, the total number of households and population exposed to aircraft noise of DNL 65 and higher would be approximately 3,800 and 10,270, respectively in 2021. This is an increase of approximately 150 households and 475 people, as a result of the increase in aircraft operations and the types of aircraft forecasted to operate in 2021.



SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; INM 7.0d; KB Environmental Sciences, Inc., 2016; ESA, 2016; ESRI Mapping Services.

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Figure 5-2

2021 DNL Contours

LaGuardia Airport

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TABLE 5-5
NOISE SENSITIVE SITES EXPOSED TO DNL 65 AND HIGHER – 2021

Noise Level	Total Area (Acres)	Households[1, 2]	Population[1, 2]	Places of Worship	Schools[3]	Hospitals and Residential Healthcare	Historic Resources	Day Care
2021								
DNL 65-70	1,554.7	3,802	10,255	7	2	2	13	2
DNL 70-75	502.5	4	12	0	1	0	0	1
DNL 75+	332.2	0	0	0	0	0	0	0
Total	**2,389.4**	**3,806**	**10,267**	**7**	**3**	**2**	**13**	**3**

NOTES:
1. The household and population estimates provided above were developed using census block demographic data from the 2010 Decennial Census and New York City data. This approach provided an average number of persons per household for each individual census block, which accounted for changes in land use, housing types, and residential density within the different areas in the DNL 65 and higher contours.
2. Because the timing and extent of planned residential development within the DNL 65 contour is uncertain, the household and population estimates in this table do not include potential housing units associated with the Willets Point Development Plan and construction of additional housing units at the Sky View Parc condominium complex.
3. These schools were included in the School Soundproofing Program, and are compatible with DNL 65 and higher (see Section 2.6.1).

SOURCE: Planning Technology, Inc. and Environmental Science Associates, 2016.

By 2021, the number of households and residences within the DNL 65 could be higher than that estimated in **Table 5-5**, but the increase would not be associated with aircraft arriving to and departing from LGA. Two planned development projects would increase the number of housing units within the DNL 65 contour. The first development project is the expansion of the Sky View Parc condominiums in Flushing, east of Willets Point. The three condominium buildings, which are located within the 2016 and 2021 DNL 65 contours, have 449 units. Phased construction is underway that would provide, at full build-out, approximately 795 additional units at Sky View Parc. The existing Sky View Parc condominiums were included in the housing unit and population counts for both 2016 and 2021. However, the additional units were not included in the 2021 housing unit and population counts in **Table 5-4** because of the uncertainty of the timing of the phased development and the number of actual units that would be occupied in 2021.

Secondly, the Willets Point Development Plan, approved by the City Planning Commission in 2013, is a plan to develop a mixed-use residential and commercial district approximately one mile from (and adjacent to the approach to) Runway 31. This phased development is located entirely within the 2016 and 2021 DNL 65 contours. Presently, no housing units associated with this development plan have been constructed. The Willets point Development Plan, at full build-out, would result in approximately 5,500 new housing units in the DNL 65 contour. The associated increase in population is projected to be 14,800 people. At this time, the implementation schedule and the number of housing units that would be constructed and occupied at Willets Point in 2021 is uncertain. Therefore, the housing units were not included in the 2021 housing unit and population counts in **Table 5-5**.

5.4 Noise Sensitive Sites

As per the Study Protocol in **Appendix I, Section 6.9.3**, **Table 5-6** presents information regarding noise sensitive facilities (e.g., schools, religious facilities, hospitals, and structures

listed in the National Register of Historic Places) exposed to aircraft noise of DNL 65 and higher. It should be noted that four of these historic sites are located on airport property and eight sites are located within the Jackson Heights Historic District. As shown in **Table 5-2** and **Table 5-5**, three schools, three daycare facilities, and seven places of worship are estimated to be exposed to aircraft noise of DNL 65 and higher in both 2016 and 2021. All three schools in the 65 DNL contour were part of the School Soundproofing Program and are presently compatible with aircraft noise levels of DNL 65 and higher (see **Section 2.6.1**). Five historic resources listed in the National Register of Historic Places are exposed to aircraft noise of DNL 65 and higher in 2016 and 8 additional historic resources, for a total of 13, would be exposed to DNL 65 and higher in 2021 (see **Table 5-5**). In 2016, no hospitals would be exposed to aircraft noise of DNL 65 and higher. In 2021, two residential healthcare facilities would be exposed to aircraft noise of DNL 65 and higher. **Table 5-6** provides the names and addresses of the noise sensitive sites exposed to aircraft noise of DNL 65 and higher in 2016 and 2021. All are in the Borough of Queens, NY.

TABLE 5-6
NOISE SENSITIVE SITES EXPOSED TO
AIRCRAFT NOISE OF DNL 65 AND HIGHER – 2016 AND 2021

Name	Address	Facility Type	Within 2016 DNL 65 and Higher?	2016 DNL Value If Yes	Within 2021 DNL 65 and Higher?	2021 DNL Value if Yes
Idara Tableeghul-Isla	23-38 81st St	Place of Worship	Y	66.0	Y	66.0
Roman Catholic Church Our Lady Of Fatima Convent	25-56 80th St	Place of Worship	Y	65.2	Y	65.2
Our Lady Of Fatima Roman Catholic Church	25-02 80th St	Place of Worship	Y	66.8	Y	66.9
Korean Church of the Queens	23-27 89th St	Place of Worship	Y	66.6	Y	66.4
Ebenezer Baptist Church	36-12 Prince St	Place of Worship	Y	65.2	Y	65.2
Ebenezer Baptist Church	36-06 Prince St	Place of Worship	Y	65.3	Y	65.2
Gospel Calvary Church	134-28 Northern Blvd	Place of Worship	Y	65.4	Y	65.4
Monsignor McClancy Memorial High School	71-06 31st Ave	School[1]	Y	65.3	Y	65.4
Our Lady of Fatima School	25-38 80th St	School[1]	Y	66.8	Y	66.9
Vaughn College of Aeronautics & Technology	86-01 23rd Ave	School[1]	Y	72.2	Y	72.0
Independence Residences, Inc.	33-23 69th St	Health Care-Residential	N		Y	65.0
New York Foundling Hospital	153 Stephens Ave	Health Care-Residential	N		Y	65.0
Jackson Heights Historic District	33-11 70th St, Queens	Historic Site	N		Y	65.1
Jackson Heights Historic District	33-12 70th St, Queens	Historic Site / Attached Residence	N		Y	65.1

TABLE 5-6
NOISE SENSITIVE SITES EXPOSED TO
AIRCRAFT NOISE OF DNL 65 AND HIGHER – 2016 AND 2021 (CONTINUED)

Name	Address	Facility Type	Within 2016 DNL 65 and Higher?	2016 DNL Value If Yes	Within 2021 DNL 65 and Higher?	2021 DNL Value if Yes
Jackson Heights Historic District	33-14 70th St, Queens	Historic Site / Attached Residence	N		Y	65.1
Jackson Heights Historic District	33-16 70th St, Queens	Historic Site / Attached Residence	N		Y	65.1
Jackson Heights Historic District	33-18 70th St, Queens	Historic Site / Attached Residence	N		Y	65.1
Jackson Heights Historic District	33-20 70th St, Queens	Historic Site / Attached Residence	N		Y	65.1
Jackson Heights Historic District	33-22 70th St, Queens	Historic Site / Attached Residence	N		Y	65.0
Empire Millworks Building, 1938	128-50 Willets Point Blvd	Historic Site	Y	67.6	Y	67.5
Hangar 3 (1939; Delano & Aldrich)	La Guardia Airport	Historic Site	Y	65.9	Y	65.7
Hangar 5 (1939; Delano & Aldrich)	La Guardia Airport	Historic Site	Y	67.1	Y	66.9
Hangar 7 (former sea plane hangar, ca. 1939)	La Guardia Airport	Historic Site	Y	65.7	Y	65.5
Marine Air Terminal	La Guardia Airport	Historic Site	Y	65.4	Y	65.2
Jackson Heights Historic District	Jackson Heights	Historic District[2]	Y	65.0	Y	65.2
Flushing Day Care Center, Inc.	36-06 Prince St	Day Care-Assisted Living	Y	65.3	Y	65.2
Grace Day Care Center, Inc.	89-00 23rd Ave	Day Care-Assisted Living	Y	65.8	Y	65.7
Metro Family Residence	87-02 23rd Ave	Day Care-Assisted Living	Y	68.7	Y	68.5

SOURCE: ESA, 2016.
[1] This school was included in the School Soundproofing Program, and is compatible with DNL 65+ (see Appendix C for additional information).
[2] To calculate the DNL value for the Jackson Heights Historic District, an INM noise receptor location point was placed at the northwest corner of the land use polygon representing the District.

5.5 Comparison of 2016 and 2021 NEMs

A comparison of the 2021 to the 2016 DNL contours show that the land area encompassed by the DNL 65 and higher contours in 2021 would be 46.4 acres smaller than the area encompassed by the 2016 contours (see **Table 5-7**). However, the amount of non-compatible Single and Two-Family Residential and Multi-Family Residential land uses within the 2021 DNL 65-70 contour would increase by 3.3 acres. With respect to housing units, 149 more units and 474 more people would be exposed to noise levels of DNL 65 or greater in 2021, when compared to 2016 (see **Table 5-8**). As discussed in **Section 5.3.2**, residential development is expected to occur within the

DNL 65 contour between 2016 and 2021. However the actual number of new housing units is uncertain and could not be quantified at this time. **Figures 5-3** through **5-6** depict comparisons of the 2016 and the 2021 DNL contours by runway end.

TABLE 5-7
LAND USE CHANGE – 2016 to 2021

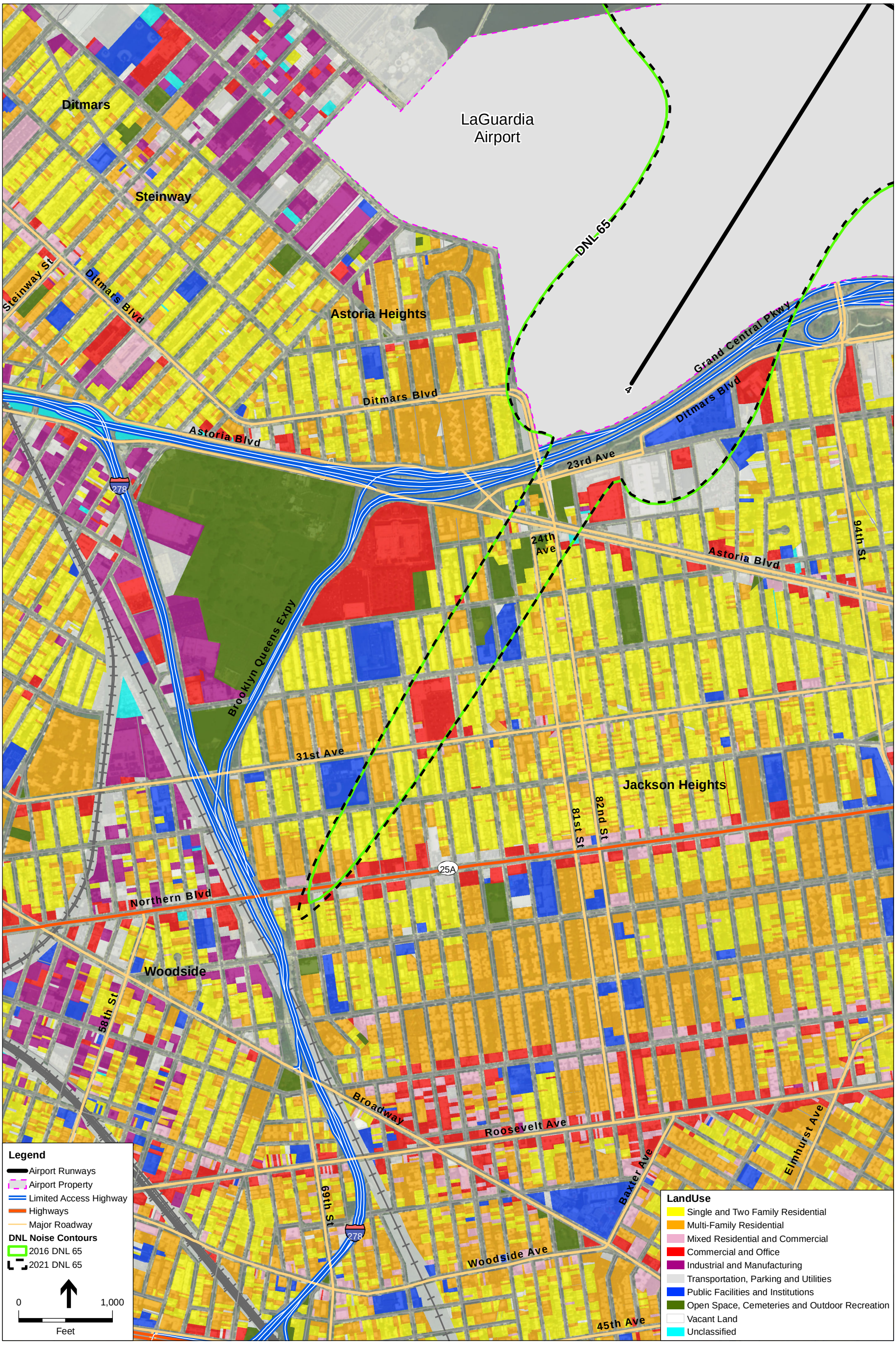
Land Use Category	Net Changes in Acreage by Land Use			
	DNL 65-70	DNL 70-75	DNL 75+	Total
Single and Two Family Residential	2.8	0.0	0.0	2.8
Multi-Family Residential	0.5	0.0	0.0	0.5
Mixed Residential and Commercial	-6.6	0.0	0.0	-6.6
Commercial and Office	0.3	-0.4	0.0	-0.1
Industrial and Manufacturing	-1.0	-0.9	0.0	-1.9
Transportation, Right of Way, Parking and Utilities	-4.7	0.2	-0.2	-4.7
Public Facilities and Institutions	-10.5	-2.1	-0.1	-12.7
Open Space, Cemeteries, and Outdoor Recreation	1.7	0.4	0.0	2.1
Vacant	-0.4	-0.6	0.0	-1.0
Airport Property	-0.4	-0.2	-3.3	-3.9
Water (Off Airport Property)	-6.3	-11.3	-3.4	-21.0
Total	**-24.6**	**-14.9**	**-6.9**	**-46.4**

NOTE: Numbers may not add up, due to rounding.
SOURCE: Planning Technology, Inc. and Environmental Science Associates, 2016.

TABLE 5-8
NOISE EXPOSURE CHANGE – 2016 to 2021

Noise Level	Households	Population	Places of Worship	Schools	Hospitals and Residential Healthcare	Historic Resources	Day Care
DNL 65-70	147	468	0	0	2	8	0
DNL 70-75	2	6	0	0	0	0	0
DNL 75+	0	0	0	0	0	0	0
Total	**149**	**474**	**0**	**0**	**0**	**8**	**0**

SOURCE: Planning Technology, Inc., 2016.



SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; INM 7.0d; KB Environmental Sciences, Inc., 2016; ESA, 2016; ESRI Mapping Services.

Figure 5-3

2016 and 2021 DNL 65 Noise Contours - Runway End 4
LaGuardia Airport

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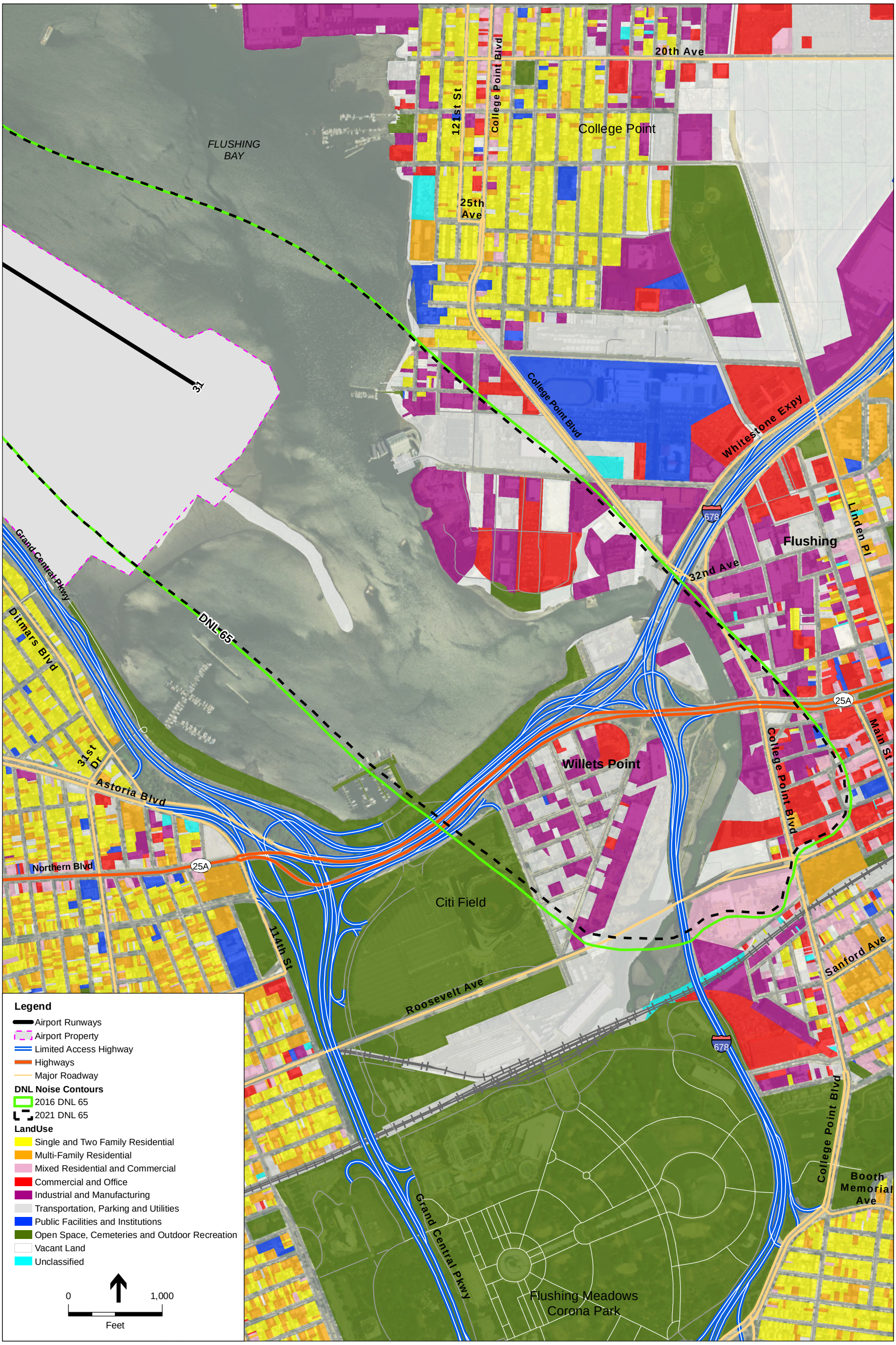

SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; INM 7.0d; KB Environmental Sciences, Inc., 2016; ESA, 2016; ESRI Mapping Services.

Figure 5-4

2016 and 2021 DNL 65 Noise Contours - Runway End 31
LaGuardia Airport

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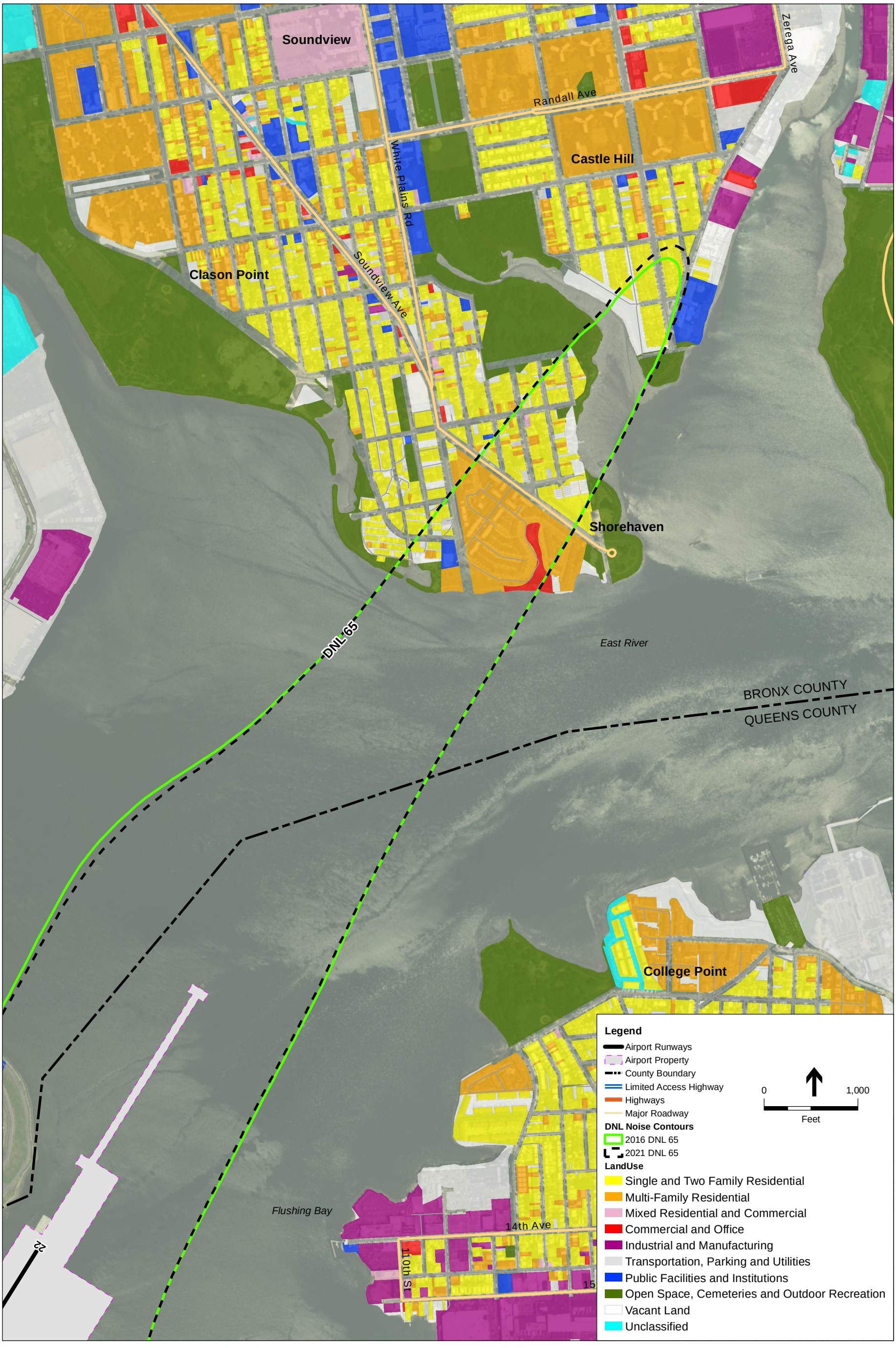

SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; INM 7.0d; KB Environmental Sciences, Inc., 2016; ESA, 2016; ESRI Mapping Services.

Figure 5-5

2016 and 2021 DNL 65 Noise Contours - Runway End 22

LaGuardia Airport

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SOURCE: New York City Department of City Planning, MapPLUTO 15V1- Tax lot/land use geographic information database, March 2015- June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; INM 7.0d; KB Environmental Sciences, Inc., 2016; ESA, 2016; ESRI Mapping Services.

Figure 5-6
2016 and 2021 DNL 65 Noise Contours - Runway End 13
LaGuardia Airport

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CHAPTER 6
Consultation and Public Involvement

6.1 Introduction

Title 14 Code of Federal Regulations (CFR) Part 150 §150.21(b) and §A150.105(a) require that Noise Exposure Maps (NEMs) and documentation submitted to be developed and prepared

> *"in consultation with states, public agencies and planning agencies whose area, or any portion of whose area, of jurisdiction is within the DNL 65 dB contour depicted on the map, FAA regional officials, and other Federal officials having local responsibility for land uses depicted on the map. This consultation must include regular aeronautical users of the airport."*

Consultation required by 14 CFR Part 150 includes the following entities:

- Aviation users (e.g., airlines, fixed base operators, based aircraft operators);
- Jurisdictional authorities with land located within the DNL 65 or greater contours (New York City is the sole land use agency for land located within the DNL 65 or greater); and
- Interested parties (i.e., the public).

The Port Authority implemented a proactive agency consultation and public involvement program that exceeded the requirements of 14 CFR Part 150. The Port Authority provided opportunities for meaningful public engagement and participation in development of the NEMs. Agency consultation and public involvement efforts undertaken for this 14 CFR Part 150 Study are discussed in this chapter.

6.2 Technical Advisory Committee

As per the Study Protocol in **Appendix I, Section 2.5**, the Port Authority formed a Technical Advisory Committee (TAC), the purpose of which is to provide input into the 14 CFR Part 150 Study prepared for LaGuardia Airport (LGA). The TAC is composed of members that represent the Port Authority, local communities, airlines, airline and airport business associations, local governments, business groups, planning organizations, and the FAA. The TAC members for the LGA 14 CFR Part 150 Study are listed in **Table 6-1**.

The TAC's role is advisory and its purpose is solely limited to this Study. The TAC may offer opinions, advice and guidance to the Study, but the Port Authority has the sole discretion to accept or reject the TAC recommendations. In addition to providing input and technical advice

for the study, a responsibility of each TAC member is to inform their respective organizations of the Committee's discussions.

Space for the TAC meetings is limited. However, the TAC meetings are open to the public. In order to promote balanced and constructive interaction among the TAC members, members of the public are asked to refrain from commenting during TAC member discussions. Each TAC meeting has a specific agenda item for public comments.

TABLE 6-1
LGA 14 CFR PART 150 STUDY TECHNICAL ADVISORY COMMITTEE MEMBERS

Organization Represented	Representative(s)	Alternate Representative(s)
Port Authority		
Aviation Noise Office	Kelly Mitchell	Adeel Yousuf
Airport General Manager's Office	Anthony Vero	Chris Rhoads
Community Group(s)		
NY Community Airport Roundtable (NYCAR)	Warren Schreiber	Marilyn Chapoteau
Queens Quiet Skies	Janet McEneaney	Brian Will Philip Konigsberg
Airlines and/or Airlines Associations		
Delta Airlines	Robert Goldman	Mark Hopkins
NY Airport Liaison	Debbie Bearden	Sal Debono (AvAirPros)
United Airlines	Glenn Morse	--
Fixed Base Operators		
Sheltair	Zendra Spence	Cesar Rizik
Airline Business Organizations and/or Airport Business		
Market Place Development (*Resigned from TAC in October 2016*)	Lillian Tan	Margherite LaMorte or Jeff Drucker
Aviation Development Council	Bill Huisman	--
Chamber of Commerce/Business Organization/Economic Development		
NYC Economic Development Corp	David A. Hopkins	--
Queens Chamber of Commerce	Thomas J. Grech	--
Local Governments		
Queens Borough President	Jasmine Narang	Jack Leibler
Town of North Hempstead/Quietskies.net	Len Schaier	Marilyn Chapoteau
Planning Organizations		
Nassau County Planning	Sean E. Sallie, AICP	Mark Buttice
Town of North Hempstead	Michael Levine	Neal Stone, AICP
NYC Department of City Planning	Scott Solomon	--
Environmental - Noise		
NYC Department of Environmental Protection	Charles Shamoon	Chung S. Chan
Federal Aviation Administration (FAA)		
Airport Division	Andrew Brooks	Lindsay Butler
New York Airports District Office	David Sanchez	Suki Gill
New York Terminal Radar Approach Control (TRACON)	Steve McClain	Kimberly Clarke
LGA Airport Traffic Control Tower (ATCT)	James Law	Laura Stensland
New York Flight Standards Division (FSDO)	Tom Malone	Dave Swanson

SOURCE: Port Authority of New York and New Jersey, 2016.

A summary of the TAC Committee Meetings, including dates and topics discussed, is provided below. Meeting announcements are sent to all TAC members (see **Table 6-1** for a list of members) and posted on the Port Authority's website.[36] All TAC meeting materials including agendas, sign-in sheets, presentations, and meeting notes are provided in **Appendix H**.

TAC Meeting #1 (June 9, 2015) - Introduction to the Technical Advisory Committee

The first TAC meeting introduced the committee members; discussed the background, purpose, and objectives of the LGA 14 CFR Part 150 Study; reviewed the TAC's role in the Study; and reviewed the committee's charter and participation agreement. The Study Protocol and project schedule were discussed at the meeting.

TAC Meeting #2 (August 4, 2015) – Principles of Noise

The second TAC meeting provided an overview of acoustic principles, noise metrics, and aircraft noise assessment methods. The data collection process to be used for the LGA 14 CFR Part 150 Study was reviewed.

TAC Meeting #3 (October 7, 2015) - 14 CFR Part 150 Study Requirements

The third TAC meeting reviewed the federal regulation (14 CFR Part 150) and requirements to complete the Study. Noise modeling inputs were also reviewed. The meeting also provided an update on the Study Protocol and reviewed the airport activity forecast.

TAC Meeting #4 (December 8, 2015) – Land Use and Noise Model Inputs

The fourth TAC meeting reviewed the preliminary Existing Land Use map and preliminary noise modeling inputs (aircraft flight tracks and departure/arrival altitude profiles).

TAC Meeting #5 (March 16, 2016) – Noise Model Inputs

The fifth TAC meeting reviewed information related to the aviation activity forecast developed for the LGA 14 CFR Part 150 Study. Samples of "custom" (user-defined) arrival and departure profiles developed for LGA to better represent aircraft activity (in comparison with standard profiles) were also presented at this meeting.

TAC Meeting #6 (April 12, 2016) – Aircraft Noise Levels

The sixth TAC meeting provided updates on the Central Terminal Building, Perimeter Rule, and FAA approval of the forecast and noise modeling inputs. The focus of the meeting was to review user-defined profiles and provide a comparison of sound levels produced by the common commercial aircraft operating at LGA.

TAC Meeting #7 (June 21, 2016) – Aircraft Noise Contours

The seventh TAC meeting provided updates on the user-defined profiles and reviewed the preliminary draft noise exposure contours generated for LGA.

[36] http://panynjpart150.com/LGA_homepage.asp

TAC Meeting #8 (August 16, 2016) – Noise Exposure Analysis

At the eighth TAC meeting, the Study Team provided additional details regarding the preliminary draft noise exposure analysis and presented information regarding land use acreages, numbers of people, and numbers of noise sensitive sites exposed to noise levels of DNL 65 and higher in 2016 and 2021. The Study Team also described the preliminary draft LGA NEM Report and provided an overview regarding the second phase of the 14 CFR Part 150 Study – the Noise Compatibility Program.

TAC Meeting #9 (October 20, 2016) – LGA Noise Control Measures

At the ninth TAC meeting, the Study Team briefly summarized the status of the Draft LGA NEM Report. The Study Team described the importance of TAC involvement during the upcoming NCP phase of the 14 CFR Part 150 study and detailed the required elements of an NCP. The Study Team also summarized existing noise control measures associated with LGA and collected the TAC members' initial input on potential noise control measures to consider in the NCP phase.

TAC Meeting #10 (December 15, 2016) – Noise Abatement Measures

At the tenth TAC meeting the Study Team briefly summarized the nine prior TAC meetings, and then presented hypothetical "what-if" scenarios illustrating the effects of certain operational changes on the noise levels surrounding LGA. The Study Team summarized key arrival and departure procedures at LGA, gave a brief reminder of high-level noise abatement strategies, and discussed potential noise abatement measures with the TAC.

6.3 Public Information Workshops, Draft LGA NEM Report, and Public Comments

During the course of the LGA 14 CFR Part 150 Study, the Port Authority accepted comments from the public and held several Public Information Workshops. The first Public Information Workshop was held at the beginning of the Study process, and the second Public Information Workshop was held after the release of the Draft NEM Report. Details of the Workshops, release of the Draft NEM Report, and public comments are below.

6.3.1 First Public Information Workshop

The first Public Information Workshop for the LGA 14 CFR Part 150 Study was held on June 16, 2015 at the New York LaGuardia Airport Marriott hotel in East Elmhurst, NY from 6:00 P.M. to 8:00 P.M. Approximately 30 people attended and participated in the Workshop, including press and public officials (see sign-in sheets included in **Appendix K-1** starting on **Page K-19**). The purpose of this Public Information Workshop was to inform the public about the 14 CFR Part 150 Study being initiated for LGA, discuss the Study process and requirements, and solicit input to be considered during the Study by inviting the public to submit written comments at the Workshop. The information presented provided an overview of the Study process, the need for the Study, what the potential outcomes could be, how to provide comments and stay involved, and other relevant information related to the Study. Workshop informational materials included

presentation boards and a handout. Copies of the handout were also available at the meeting in the following languages: Spanish, Russian, Chinese, Greek, and Italian. Copies of the Public Information Workshop notice, sign-in sheets, presentation materials, handout, and comments received are provided in **Appendix K-1**.

In response to community requests, an additional Public Information Workshop was held at the Nassau County Community College in Garden City, NY on October 29, 2015 to provide communities another opportunity to learn about the study. The information presented at this Workshop was the same as described above, and invited the public to submit written comments. Materials related to this Workshop are provided in **Appendix K-2**. Public comments received at both Workshops, as well as the responses to those comments, are included in **Appendix L** and summarized in **Section 6.3.3**.

6.3.2 Draft NEM Report and Second Public Information Workshop

The Draft LGA NEM Report was released to the public on September 22, 2016. Printed copies were made available at the following locations:

LaGuardia Airport,
Hangar 7 Center, 3rd Floor
Flushing, NY 11371

Queens Library – Flushing Branch
41-17 Main Street
Flushing, NY 11355

Queens Library – Jackson Heights Branch
35-51 81 Street
Jackson Heights, NY 11372

An electronic copy was also made available at http://panynjpart150.com/LGA_DNEM.asp.

A Public Information Workshop was held after the publication of the Draft NEM Report. The Workshop took place on September 29, 2016 at the New York LaGuardia Airport Marriott hotel in East Elmhurst, NY from 6:00 P.M. to 9:00 P.M. The purpose of the Workshop was to obtain feedback about the Draft NEMs. **Appendix K** contains Workshop materials. Public comments received during the comment period, as well as the responses to those comments, are included in **Appendix L** and summarized in **Section 6.3.3**.

The public comment period opened on September 22, 2016 with the release of the Draft LGA NEM Report, and closed on October 24, 2016. During the comment period, comments were submitted electronically to NYPART150@panynj.gov, in person at the Public Information Workshop described above, or by mail to:

Port Authority of NY & NJ
Aviation Department
ATTN: Noise Office - NY Part 150 Study
4 World Trade Center
150 Greenwich Street, 18th floor
New York, NY 10007

6.3.3 Public Comments Received

During the course of the LGA 14 CFR Part 150 Study, the Port Authority received 40 comment letters from the public. Of these comment letters, 18 were received during the official LGA Draft NEM public comment period (September 22, 2016 to October 24, 2016), including during/following the first Public Information Workshop, and 22 were received before the public comment period. The Port Authority received comment submissions from the public through email, postal mail, and in writing at the Public Information Workshops. Many of the comment submissions contained multiple comments. A summary of the ten most frequent comment categories is provided in **Table 6-2**, in descending order from most frequent comments received. All Public comments received during the course of the LGA 14 CFR Part 150 Study (including comments submitted at the Public Information Workshops), as well as the responses to those comments, are included in **Appendix L**.

TABLE 6-2
MOST FREQUENT PUBLIC COMMENTS RECEIVED

Comment Category	Description
Quality of Life	The effects of LGA aircraft operations on quality of life
Administrative	Port Authority communication and processes
Aircraft Flight Procedures	Flight paths and altitudes flown by aircraft
Frequency and Volume of Aircraft Operations	Number of aircraft operations occurring during certain time periods
Noise Monitoring	The Port Authority's noise monitor network, and use of noise monitor data in the LGA 14 CFR Part 150 Study
Noise Exposure Maps (NEMs)	Locations of noise contours on the Noise Exposure Maps, and the methodology used to produce noise contours
Data Collection	The collection and use of data to produce Noise Exposure Maps
Noise Complaint	Complaints about noise exposure
Noise Compatibility Program (NCP) Measures	Suggested noise abatement, administrative, or other NCP measures
Public Meetings/Participation	Methods of public participation in the LGA 14 CFR Part 150 Study, including the locations and times of Public Information Workshops

SOURCES: Port Authority of New York and New Jersey and Environmental Science Associates, 2017.

6.4 Other Public Outreach and Meetings

Additional elements of the public outreach program implemented by the Port Authority for the LGA 14 CFR Part 150 Study are summarized below.

6.4.1 Study-Specific Meetings

Numerous meetings to discuss the 14 CFR Part 150 Study were held with local, regional, and federal agencies and government officials throughout the development of the NEMs. Port Authority staff and their consultants also met with local and regional planning organizations and the planning departments of towns and villages in the study area to discuss the 14 CFR Part 150 Study and obtain current zoning, land use, and population data. Meetings were also held with the FAA New York Terminal Radar Approach Control facility (TRACON), FAA's Airspace Operations Group within the FAA Air Traffic Organization's Airspace Services Directorate, and

the LGA Airport Traffic Control Tower (ATCT) managers to discuss airspace, routing of aircraft, and existing and potential future instrument approach and departure procedures. A summary of these meetings, including dates and topics discussed, is provided below.

August 3, 2015 – FAA TRACON

Port Authority staff and their consultants met with FAA's New York TRACON and toured the TRACON facility. FAA's TRACON representatives also conducted a presentation about the area airspace to help the Study Team better understand the region's operational constraints.

August 4, 2015 – FAA LGA and JFK Air Traffic Control Towers

Port Authority staff and their consultants met with the FAA's LGA and JFK Air Traffic Control representatives. The purpose of this meeting was to discuss the airspace structure for LGA and JFK as it relates to the development of the noise modeling efforts for the Part 150 Studies.

December 9, 2015 – FAA LGA and JFK Air Traffic Control Towers

Port Authority staff and their consultants met with the FAA's LGA and JFK Air Traffic Control representatives. The purpose of this meeting was to discuss the LGA and JFK 14 CFR Part 150 Studies and the operational factors being developed for the purposes of noise modeling.

December 16, 2015 – FAA TRACON

Port Authority staff conducted a webinar with the FAA's New York TRACON. The purpose of this webinar was to clarify certain operating conditions in place during the 2014 calendar year and determine what adjustments need to be considered when determining future operating conditions (i.e., changes in airspace operation, procedures, and runway use) in 2016 and 2021.

January 28, 2016 – FAA Office of Environment and Energy

Port Authority staff and their consultants conducted an initial call with the FAA's Office of Environment and Energy representatives. The purpose of this call was to discuss User-Defined Altitude Profile Submission methodology for Port Authority of New York and New Jersey Part 150 Studies at LGA, JFK, EWR, and TEB airports.

March 28, 2016 – FAA Office of Environment and Energy

Port Authority staff and their consultants conducted a follow-up call with the FAA's Office of Environment and Energy representatives. The purpose of this call was to review their comments on the Technical Memorandum describing the User-Defined Altitude Profiles for Port Authority of New York and New Jersey Part 150 Studies at LGA and JFK airports.

April 29, 2016 – FAA Office of Environment and Energy

Port Authority staff and their consultants conducted a call with the FAA's Office of Environment and Energy representatives. The purpose of this call was to resolve any final questions on the User-Defined Altitude Profile Technical Memorandum for Port Authority of New York and New Jersey Part 150 Studies at LGA and JFK airports.

July 7, 2016 – FAA Air Traffic Organization/TRACON

Port Authority staff and their consultants conducted a call with the FAA's Air Traffic Organization. The purpose of this call was to conduct a follow-up and review how future flight procedures would be addressed during modeling of the future (2021) scenario in the Part 150 process.

August 30, 2016 – FAA Airspace Operations Group

Port Authority staff and their consultants met with the FAA's Airspace Operations Group, located within the FAA Air Traffic Organization's Mission Support Services Service Unit, Airspace Services Directorate. The purpose and status of the LGA 14 CFR Part 150 Study was presented to a representative of the Airspace Operations Group and the NCP phase of the study was discussed.

November 10, 2016 – FAA New York Airspace Webinar

The FAA's New York TRACON hosted a public webinar that provided an overview of the New York airspace and focused on elements of its complexity.[37] In particular, the webinar highlighted the overlapping airspace boundaries and flight procedures associated with multiple airports in the New York area. The webinar also used animations to illustrate the high volume of air traffic that occurs in the region. Port Authority staff, members of the consulting team, LGA TAC members, and members of the interested public participated in the airspace webinar.

6.4.2 Newsletters

Another component of the public outreach program implemented by the Port Authority included periodic newsletters that kept the public and interested parties informed about the Study. The newsletters were posted on the LGA 14 CFR Part 150 Study project website (in PDF format). Copies of the newsletters are provided in **Appendix K-3**.

The Fall 2015 newsletter (*published in November 2015*) contained information about the Study, who is conducting the study, and how to stay involved. The Winter 2016 newsletter (*published in February 2016*) contained Study updates and information on the TAC, the project schedule, and how to stay involved. The Summer 2016 newsletter (*published in August 2016*) contained images of the preliminary draft DNL contours, draft noise exposure information, and information on the NCP process and upcoming public workshops.

6.4.3 Elected Officials

Several elected officials were actively engaged through the NEM development process. The elected official email contact list included public officials representing the New York City boroughs of Brooklyn, Queens and the Bronx; and those representing Nassau County, as well as the Governor's office, State Senate and Assembly Members, United States Representatives and New York's two United States Senators. Copies of correspondence between the Port Authority and these officials are provided in **Appendix G-3**.

[37] https://attendee.gotowebinar.com/register/1209238868691416580

6.4.4 Newspaper Articles

The Port Authority's consultant team maintained a file throughout the Study containing copies of newspaper articles and publications that discussed or referenced the LGA 14 CFR Part 150 Study and the other Part 150 studies being conducted by the Port Authority at John F. Kennedy International Airport, Newark Liberty International Airport, and Teterboro Airport. Copies of the articles are provided in **Appendix K-4**.

6.4.5 LGA 14 CFR Part 150 Information Website

A website[38] was developed and published for the LGA 14 CFR Part 150 Study. The website made Study-related information and documents available to stakeholders, agencies, and the general public. Information and documents available on the website included:

- Project announcements;
- Project schedule information and schedule updates;
- Upcoming project meetings;
- Project documents, including the LGA 14 CFR Part 150 Study Protocol, TAC Meeting materials, Public Information Workshop materials, Draft NEM report and maps, 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 14 CFR Part 150 Study websites; and
- A link for interested parties to join the LGA 14 CFR Part 150 mailing list to receive project updates and announcements.

[38] http://panynjpart150.com/LGA_homepage.asp

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