LaGuardia Airport

Title 14 Code of Federal Regulations (CFR) Part 150
Final Noise Compatibility Program

Prepared for

June 2022

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 Avenue, Suite 200
Sacramento, CA 95816

and

Fitzgerald & Halliday, Inc.

KB Environmental Sciences, Inc.

Kimley-Horn and Associates, Inc.

Nicholas & Lence Communications

Planning Technology, Inc.

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

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PORT AUTHORITY NY NJ
AIR LAND RAIL SEA

June 8, 2022

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

Subject: Final LaGuardia Airport 14 CFR Part 150 Noise Compatibility Program and 2021 Noise Exposure Map Update Pursuant to Title 14 of the Code of Federal Regulations

Dear Mr. Brooks:

The Port Authority of New York and New Jersey (the Port Authority) is pleased to submit the Final Noise Compatibility Program (NCP) and supporting documentation, which includes the 2021 With Program Noise Exposure Map (NEM), for LaGuardia Airport (LGA). The attached Final NCP was prepared in accordance with 14 CFR Part 150, *Airport Noise Compatibility Planning*. The final recommendations included in this NCP are those of the Port Authority, not those of a consultant or third party.

The Final NCP reflects completion of the second phase of a full Part 150 Noise Compatibility Study. The first phase consisted of the NEMs, which were published and formally accepted by the Federal Aviation Administration (FAA) in May 2017. In advance of the Final NCP submittal, Noise Abatement Measure 1, "*Modify NTHNS and GLDMN Runway 13 RNAV SIDs to Direct Aircraft Away from Flushing, New York*" has been implemented by the FAA. 14 CFR Part 150, Appendix B, Sec. 150.3(b) indicates that an NCP must include "appropriately revised maps" if "the proposed noise compatibility program would yield maps differing from those previously submitted to FAA." As such, in accordance with 14 CFR Part 150 guidance, a future year NEM has been developed that represents the noise environment in the vicinity of LGA due to the implementation of NCP Noise Abatement Measure 1, referred to as the "2021 With Program NEM."

The Port Authority is grateful for the meaningful participation provided throughout this project by your office, the FAA NY TRACON, and the FAA Office of Airports. We look forward to continuing to work with the FAA during implementation of the NCP measures.

Please do not hesitate to contact me with any questions.

Sincerely,

DocuSigned by:
Charles R Everett Jr
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Charles R. Everett, Jr.
Director, Aviation
Port Authority of New York and New Jersey
4 World Trade Center
150 Greenwich Street, 18th Floor
New York, NY 10007

enc.

PORT AUTHORITY NY NJ
AIR LAND RAIL SEA

SPONSOR'S CERTIFICATION

The Noise Compatibility Program (NCP) for LaGuardia Airport is hereby submitted in accordance with 14 CFR Part 150. The Program was prepared with the best available information and is certified as true and complete to the best of my knowledge and belief.

The Noise Exposure Map (NEM) was submitted under separate cover in March 2017 and accepted by the Federal Aviation Administration on May 5, 2017. An update to the NEM, the 2021 With Program NEM, is included as a part of the Final NCP submittal to the Federal Aviation Administration.

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

It is further certified that adequate opportunity has been afforded to interested persons to submit their views, data, and comments concerning the formulation and adequacy of the NCP and the supporting documentation. The required public hearing was held virtually due to the COVID-19 pandemic restrictions on group gatherings on October 5, 2021 to obtain public comments related to the Port Authority-recommended NCP measures.

By: DocuSigned by: Charles R Everett Jr
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Title: Director, Aviation Department, Port Authority of New York and New Jersey

Date: 6/8/2022

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

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

PORT AUTHORITY NY NJ
AIR LAND RAIL SEA

SPONSOR'S CERTIFICATION

The Port Authority of New York and New Jersey (the Port Authority) has completed a comprehensive Title 14 Code of Federal Regulations (CFR) Part 150 Noise Exposure Map (NEM) for LaGuardia Airport.
This is to certify the following:

(1) The 2021 With Program NEM for LaGuardia Airport, and the associated documentation the Port Authority submitted in the Final Noise Compatibility Program (NCP) to the Federal Aviation Administration (FAA) under Title 14 CFR Part 150, Subpart B, Section 150.21, are true and complete as of December 31, 2021, 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 map, and of the descriptions of forecast aircraft operations.

(3) The "2021 With Program Noise Exposure Map" (Appendix I, 2021 With Program Map 1 of 6) accurately represents forecast conditions for calendar year 2021 as of December 31, 2021.

Though submittal of the Final NCP is occurring in June 2022, the operations at LaGuardia Airport are hereby certified to currently be consistent with the fleet mix, forecast operational levels, and flight procedures depicted for 2021 within this document, as of December 31, 2021. Further information regarding development of the fleet mix, forecast, and procedures can be found in Section 3.4.2, *Data for Developing the 2021 With Program NEM*, of the Final NCP. In advance of the Final NCP submittal, NCP Noise Abatement Measure 1, "*Modify NTHNS and GLDMN Runway 13 RNAV SIDs to Direct Aircraft Away from Flushing, New York*" (presented in Section 3.2 of the Final NCP) has been implemented by the FAA (NTHNS on May 21, 2020 and GLDMN on December 31, 2020). As such, in accordance with 14 CFR Part 150 guidance, a future year NEM has been developed that represents the noise environment in the vicinity of LGA due to the implementation of Final NCP Noise Abatement Measure 1, referred to as the "2021 With Program NEM." The Port Authority understands that once the 2021 With Program NEM is determined to be in compliance, it will serve as the official 2021 NEM of record for LGA.

DocuSigned by:
By: Charles R Everett Jr
A4FE189A8B2449D...

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

Date: 6/8/2022

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

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
I. Submitting And Identifying The NCP:			
A. Submission is properly identified:			
1. 14 C.F.R. Part 150 NCP?	X		The Cover Letter, submitted to the FAA with the Final NCP, indicates that this is a 14 CFR Part 150 NCP submission.
2. NEM and NCP together?	X		The Cover Letter, submitted to the FAA with the Final NCP, indicates that this is a 14 CFR Part 150 NCP submission with a 2021 With Program NEM reflecting the removal of Delta Air Lines' MD-88 aircraft types from LGA as well as the implementation of LGA Noise Abatement Measure 1. The removal of MD-88 aircraft types is discussed in Chapter 2, while LGA Noise Abatement Measure 1 is presented in Section 3.2 of this NCP.
3. Program revision? (To what extent has it been revised?)		X	The Cover Letter, submitted to the FAA with the Final NCP, indicates that this is the first ever LGA 14 CFR Part 150 NCP submission by the Port Authority of New York and New Jersey (Port Authority).
B. Airport and Airport sponsor's name are identified?	X		The Cover Letter, submitted to the FAA with the Final NCP, indicates that the Port Authority is the sponsor and operator of LGA.
C. NCP is transmitted by airport sponsor's cover letter?	X		The Cover Letter is being submitted to the FAA with the Final NCP.
II. Consultation (including public participation): [150.23]			
A. Documentation includes narrative of public participation and consultation process?	X		See Section 6.2 and Appendix F.
B. Identification of consulted parties:			
1. All parties in 150.23(c) consulted? -FAA ARP ADO & Region -FAA ATO & others -State officials -Public & Planning agencies within 65* -Other Federal officials w/local response for land uses w/in 65 -Air Carries (if applicable) -Other airport users to extent practicable	X		See Sections 6.1 through 6.4; Appendix D; and Appendix F.
2. Public and planning agencies identified?	X		See Section 6.3.2.
3. Agencies in 2, above, correspond to those affected by the NEM noise contours?	X		See Section 3.4, Section 6.3.2; and Appendix F.

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
C. Satisfies 150.23(d) requirements by:			
1. Documentation shows active and direct participation of parties in B., above?	X		See Sections 6.1 through 6.4; Appendix D; Appendix E; and Appendix F.
2. Active and direct participation of general public and opportunity to submit their views, data, and comments on the formulation and adequacy of the NCP?	X		See Section 6.2; Appendix D; Appendix E-1 through E-2; and Appendix F.
3. Participation was prior to and during development of NCP and prior to submittal to FAA?	X		See Section 6.2; Appendix D; Appendix E-1 through E-2; and Appendix F.
4. Indicates adequate opportunity afforded to all consulted parties to submit views, data, etc.?	X		See Section 6.2; Appendix D; Appendix E-1 through E-2; and Appendix F.
D. Evidence is included there was notice and opportunity for a public hearing on the final NCP?	X		See Section 6.2; Appendix D; Appendix E-1 through E-2; and Appendix F.
E. Documentation of comments:			
1. Includes summary of public hearing comments, if hearing was held?	X		See Section 6.2; and Appendix F.
2. Includes copy of all written material submitted to operator?	X		See Section 6.2; and Appendix F.
3. Includes operator's responses/disposition of written and verbal comments?	X		See Section 6.2; and Appendix F.
F. Is there written evidence from the appropriate office within the FAA that the sponsor received informal agreement to carry out proposed flight procedures?		X	The Port Authority has received no informal agreement to carry out proposed flight procedures recommended for inclusion in the LGA 14 CFR Part 150 NCP. Proposed flight procedures are given in Section 3.2.
III. NOISE EXPOSURE MAPS: [150.23, B150.3; 150.35(f)] (*This section of the checklist is not a substitute for the Noise Exposure Map checklist. It deals with maps in the context of the Noise Compatibility Program submission.*)			
A. Inclusion of NEMs and supporting documentation:	X		See Chapter 1, Chapter 2, Appendix I-1, and Appendix I-2.
1. Map documentation either included or incorporated by reference?	X		See Chapter 1, Chapter 2, Appendix I-1, and Appendix I-2.
2. Maps previously found in compliance by FAA?	X		The 2016 (Existing Conditions) NEM and 2021 (Future Conditions) NEM were found in compliance on May 5, 2017; see Appendix A. 2021 With Program NEM has not yet been found in compliance. See Chapter 1 and Section 3.4. The Cover Letter, submitted to the FAA with the Final NCP, indicates that the Port

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
			Authority is requesting a compliance determination for the 2021 With Program NEM.
3. FAA's compliance determination still valid? (a) Existing condition NEM represents conditions at the airport at the time of submittal of the NCP for FAA approval? (b) Forecast condition NEM represents conditions at the airport at least 5 years into the future from the date of submittal of the NCP to the FAA for approval? (c) Sponsor letter confirming elements (a) and (b), above, if date of submission is either different than the year of submittal of the previously approved NEMs or over 12 months from the date shown on the face of the NEM? (d) If (a) through (c) cannot be validated, the NEMs must be redone and resubmitted as per 150.21.		X	The 2016 (Existing Conditions) NEM is still valid. The 2021 (Future Conditions) NEM is no longer valid due to a change in fleet mix. The Port Authority is requesting a compliance determination for the 2021 With Program NEM as part of this submittal. If found in compliance by the FAA, the 2021 With Program NEM would become the new Future Conditions NEM. See Chapter 1, Section 3.4, and Appendix I-2. (a) Yes. (b) Yes. See Chapter 1 and Section 3.4. (c) Sponsor Letter confirms Items (a) and (b). Sponsor Letter will be submitted with the Final NCP. (d) Items (a) through (c) are valid. See Chapter 1 and Section 3.4.
4. Does 180-day period have to wait for map compliance finding?	X		Yes. The Port Authority is requesting a compliance determination for the 2021 With Program NEM. If found in compliance by the FAA, the 2021 With Program NEM would become the new Future Conditions NEM. See Chapter 1, Section 3.4, and Appendix I-2.
B. Revised NEMs submitted with program: (Review using NEM checklist if map revisions included in NCP submittal. Report the applicable findings in the spaces below after a full review using the NEM checklist and narrative.)	X		2021 With Program NEM submitted with Final NCP. See Chapter 1, Section 3.4; and Appendix I-2.
1. Revised NEMs included with program?	X		2021 With Program NEM submitted with Final NCP. See Chapter 1, Section 3.4; and Appendix I-2.
2. Has airport sponsor requested in writing that FAA make a determination on the NEM(s), showing NCP measures in place, when NCP approval is made?	X		The Cover Letter, submitted to the FAA with the Final NCP, indicates that the Port Authority is requesting a compliance determination for the 2021 With Program NEM.
C. If program analysis uses noise modeling:			
1. INM, HNM, or FAA-approved equivalent?	X		The INM Version 7.0d was used. See Chapter 3.
2. Monitoring in accordance with A150.5?		X	No noise monitoring was performed as part of this NCP, and no monitoring data was used to determine compatibility of land uses with aircraft noise. No monitoring data was used to "calibrate" the INM.
D. One existing condition and one forecast-year map clearly identified as the official NEMs?	X		The 2016 (Existing Conditions) NEM is identified. The Port Authority is requesting a compliance determination for the 2021 With Program NEM. If found in compliance by the FAA, the 2021

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
			With Program NEM would become the new Future Conditions NEM. See Chapter 1, Section 3.4, and Appendix I-2.
IV. CONSIDERATION OF ALTERNATIVES: [B150.7, 150.23(e)(2)]			
A. At a minimum, were the alternatives below considered, or if they were rejected was the reason for rejection reasonable and based on accurate technical information and local circumstances?			
1. Land acquisition and interests therein, including air rights, easements, and development rights?	X		See Section 4.4 and Appendix G.
2. Barriers, acoustical shielding, public building soundproofing	X		See Sections 4.2, 4.4, and Appendix G.
3. Preferential runway system	X		See Sections 3.2, 3.3, and Appendix G.
4. Voluntary flight procedures	X		See Section 3.2 and Appendix G.
5. Restrictions described in B150.7 (taking into account Part 161 requirements)	X		The Port Authority is recommending continuation of the existing LGA mandatory departure noise limit, which was established before the passage of the Airport Noise and Capacity Act of 1990. See Section 3.2 and Appendix G. No other restrictions are being recommended.
6. Other actions with beneficial impact not listed in the regulation	X		See Section 5.2 and Appendix G.
7. Other FAA recommendations (see D, below)		X	No other FAA recommendations.
B. Responsible implementing authority identified for each considered alternative?	X		See Chapter 3, Chapter 4, Chapter 5, and Appendix H.
C. Analysis of alternative measures:			
1. Measures clearly described? 2. Measures adequately analyzed? 3. Adequate reasoning for rejecting alternatives?	X		See Chapter 3, Chapter 4, Chapter 5, Appendix G, and Appendix H.
D. Other actions recommended by the FAA: As the FAA staff person familiar with the local airport circumstances, determine whether other actions should be added? (*List separately, or on back, actions and describe* discussions *with airport sponsor to have them included prior to the start of the 180-day cycle. New measures recommended by the airport sponsor must meet applicable public participation and consultation with officials before they can be submitted to the FAA for action. See E., below.*)			This section to be completed by the FAA.

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
V. ALTERNATIVES RECOMMENDED FOR IMPLEMENTATION: [150.23(e), B150.7(c); 150.35(b), B150.5]			
A. Document clearly indicates:			
1. Alternatives that are recommended for implementation?	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
2. Final recommendations are airport sponsor's, not those of consultant or third party?	X		As stated in the Cover Letter, which is being submitted to the FAA with the Final NCP, the final recommendations are those of the Port Authority, not those of a consultant or third party.
B. Do all program recommendations:			
1. Relate directly or indirectly to reduction of noise and noncompatible land uses? (*Note: All program recommendations, regardless of whether previously approved by the FAA in an earlier Part 150 study, must demonstrate a noise benefit if the airport sponsor wants FAA to consider the measure for approval in a program update. See E., below.*)	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
2. Contain description of each measure's relative contribution to overall effectiveness of program?	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
3. Noise/land use benefits quantified to extent possible to be quantified? *(Note: some program management measures cannot be readily quantified and should be described in other terms to show their implementation contributes to overall effectiveness of the program.)*	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
4. Does each alternative include actual/anticipated effect on reducing noise exposure within non-compatible area shown on NEM?	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
5. Effects based on relevant and reasonable expressed assumptions?	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
6. Does the document have adequate supporting data that the measure contributes to noise/land use compatibility?	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
C. Analysis appears to support program standards set forth in 150.35(b) and B150.5?	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
D. When use restrictions are recommended for approval by the FAA:			

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
1. Does (or could) the restriction affect Stage 2 or Stage 3 aircraft operations (regardless of whether they presently operate at the airport)? (If the restriction affects Stage 2 helicopters, Part 161 also applies.)		X	The Port Authority is recommending continuation of the existing LGA mandatory departure noise limit, which was established before the passage of the Airport Noise and Capacity Act of 1990. See Section 3.2.
2. If the answer to D.1 is yes, has the airport sponsor completed the Part 161 process and received FAA Part 161 approval for a restriction affecting Stage 3 aircraft? Is the FAA's approval documented? For restrictions affecting only Stage 2 aircraft, has the airport sponsor successfully completed the Stage 2 analysis and consultation process required by Part 161 and met the regulatory requirements, and is there evidenced by letter from FAA stating this fact?		X	The Port Authority is recommending continuation of the existing LGA mandatory departure noise limit, which was established before the passage of the Airport Noise and Capacity Act of 1990. See Section 3.2.
3. Are non-restrictive alternatives with potentially significant noise/compatible land use benefits thoroughly analyzed so that appropriate comparisons and conclusions among all alternatives can be made?		X	The Port Authority is recommending continuation of the existing LGA mandatory departure noise limit, which was established before the passage of the Airport Noise and Capacity Act of 1990. See Section 3.2.
4. Did the FAA regional or ADO reviewer coordinate the use restriction with APP-400 prior to making determination on start of 180-days?		X	The Port Authority is recommending continuation of the existing LGA mandatory departure noise limit, which was established before the passage of the Airport Noise and Capacity Act of 1990. See Section 3.2.
E. Do the following also meet Part 150 analytical standards?			
1. Recommendations that continue existing practices and that are submitted for FAA re-approval? *(Note: An airport sponsor does not have to request FAA re-approval if noise compatibility measures are in place from previously approved Part 150 studies. If the airport has implemented the measures as approved in the previous NCP, the measures may be reported and modeled as baseline conditions at the airport.)*	X		See Sections 3.2 and 5.2. The Port Authority is recommending continuation of the existing LGA mandatory departure noise limit, which was established before the passage of the Airport Noise and Capacity Act of 1990.
2. New recommendations or changes proposed at the end of the Part 150 process?	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
F. Documentation indicates how recommendations may change previously adopted noise compatibility plans, programs, or measures?	X		See Sections 3.2, 4.2, 4.3, and 5.2.
G. Documentation also:			
1. Identifies agencies that are responsible for implementing each recommendation?	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
2. Indicates whether those agencies have agreed to implement?	X		There are currently no written agreements to implement any of the recommended NCP measures. See Sections 3.2, 4.2, 4.3, and 5.2.
3. Indicates essential government actions necessary to implement recommendations?	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
H. Timeframe:			
1. Includes agreed-upon schedule to implement alternatives?		X	There is no agreed-upon schedule to implement alternatives. The Port Authority has provided anticipated schedules for each recommended NCP measure. See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
2. Indicates period covered by the program?	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
I. Funding/Costs:			
1. Includes costs to implement alternatives?	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
2. Includes anticipated funding sources?	X		See Sections 3.2, 4.2, 4.3, and 5.2; Appendix G; and Appendix H.
VI. PROGRAM REVISION: [150.23(e)(9)] Supporting documentation includes provision for revision? *(Note: Revision should occur when it is likely a change has taken place at the airport that will cause a significant increase or decrease in the DNL noise contour of 1.5 dB or greater over noncompatible land uses. See §150.21(d))*	X		See LGA Program Management Measure 10 in Section 5.2, Appendix G, and Appendix H.

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		The Port Authority is requesting a compliance determination for the 2021 With Program NEM. If found in compliance by the FAA, the 2021 With Program NEM would become the new Future Conditions NEM. See Chapter 1, Section 3.4, and Appendix I-2.
2. NEM and NCP together?	X		The Port Authority is requesting a compliance determination for the 2021 With Program NEM, which is included with this NCP. See Chapter 1, Section 3.4, and Appendix I-2.
3. Revision to NEMs FAA previously determined to be in compliance with Part 150?	X		The 2016 (Existing Conditions) NEM and the 2021 (Future Conditions) NEM were previously determined to be in compliance. See Appendix A. The Port Authority is requesting a compliance determination for the 2021 With Program NEM. If found in compliance by the FAA, the 2021 With Program NEM would become the new Future Conditions NEM. See Chapter 1, Section 3.4, and Appendix I-1.
B. Airport and Airport Operator's name are identified?	X		LGA and the Port Authority are identified in the maps presented in Appendix I-2.
C. NCP is transmitted by airport operator’s dated cover letter, describing it as a Part 150 submittal and requesting appropriate FAA determination?	X		The Cover Letter is being submitted to the FAA with the Final NCP.
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 3.4 and Appendix D.
B. Identification of consulted parties:			
1. Are the consulted parties identified?	X		See Section 3.4 and Appendix D.
2. Do they include all those required by 150.21(b) and A150.105(a)?	X		Required consulting parties are members of the LGA Technical Advisory Committee (TAC). See Section 3.4 and Appendix D.
3. Agencies in 2, above, correspond to those indicated on the NEM?	X		See Section 3.4 for the indication that the New York City Department of City Planning is the sole land use agency for all areas within the 2021 With Program NEM DNL 65 contours. This agency corresponds to the agency indicated on the 2021 With Program NEM presented in Appendix I-2.

AIRPORT NAME: LaGuardia Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
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	The Sponsor's Certification is being submitted to the FAA with the Final NCP.
D. Does the document indicate whether written comments were received during consultation and, if there were comments that they are on file with the FAA regional airports division manager?	X		See Chapter 6 and Appendix F. Written comments received during consultation, along with the Port Authority's comment responses, are included in Appendix F of the Final NCP and have been filed with the FAA regional airports division manager prior to submission of the Final NCP.
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	The 2016 (Existing Conditions) NEM was previously determined to be in compliance. See Appendix A. The Port Authority is requesting a compliance determination for the 2021 With Program NEM. If found in compliance by the FAA, the 2021 With Program NEM would become the new Future Conditions NEM. See Chapter 1, Section 3.4, and Appendix I-2.
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		The 2016 (Existing Conditions) NEM was previously determined to be in compliance. See Appendix A.
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 2021 With Program NEM is based on reasonable forecasts and other planning assumptions. Expected fleet mix, forecast operational levels, and flight procedures at LaGuardia Airport in the year 2021 are described in Chapter 2. The 2021 With Program NEM is dated for the fifth calendar year after 2016. See Section 3.4.
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; 2016 (Existing Conditions) NEM was previously determined to be in compliance by the FAA. See Appendix A.
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		The 2021 With Program NEM is based on forecast conditions including the removal of Delta Air Lines' MD-88 aircraft from LGA and the implementation of LGA Noise Abatement Measure 1. See Chapter 1, Section 3.2, and Section 3.4.

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
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		The 2021 With Program NEM is based on forecast conditions including the removal of Delta Air Lines' MD-88 aircraft from LGA and the implementation of LGA Noise Abatement Measure 1. See Chapter 1, Section 3.2, and Section 3.4.
b. Does the documentation specifically describe how these measures affect land use compatibilities depicted on the map?	X		The 2021 With Program NEM is based on forecast conditions including the removal of Delta Air Lines' MD-88 aircraft from LGA and the implementation of LGA Noise Abatement Measure 1. See Chapter 1, Section 3.2, and Section 3.4.
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))			The 2021 With Program NEM models program implementation. The 2021 With Program NEM is based on forecast conditions including the removal of Delta Air Lines' MD-88 aircraft from LGA and the implementation of LGA Noise Abatement Measure 1. See Chapter 1, Section 3.2, and Section 3.4.
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		The full-size plot of the 2021 With Program NEM is at a scale of 1 inch = 2,000 feet and is of sufficient scale to be clear and readable. It is provided in Appendix I-2. The 2021 With Program NEM supplemental Figure 3-33 is at a scale of 1 inch = 2,500 feet. The flight tracks and noise monitoring sites have not changed and can be found in Appendix I-2. The scale is indicated on the maps.
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 the full-size 2021 With Program NEM included in Appendix I-2.
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 the 2021 With Program NEM. See Appendix I-2.

AIRPORT NAME: LaGuardia Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
b. Runway configurations with runway end numbers	X		Runway configurations with runway end numbers are depicted on the 2021 With Program NEM. See Appendix I-2.
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 2021 With Program NEM in Appendix I-2.
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 contour. See the 2021 With Program NEM in Appendix I-2.
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 2021 With Program DNL 65 Contour. See the 2021 With Program NEM in Appendix I-2.
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 2021 With Program NEM in Appendix I-2.
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 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 2021 With Program NEM is based on forecast data representative of the selected year for the forecast NEM (2021). See Section 3.4.
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		The flight tracks used to produce the 2021 With Program NEM are described in Section 3.4. The flight track graphics can be found in Appendix I-2.
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 the 2021 With Program NEM in Appendix I-2.
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 the 2021 With Program NEM full-size plot in Appendix I-2, as well as the supplemental Figure 3-23.

[1] CNEL for California airports

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
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 the 2021 With Program NEM in Appendix I-2 as well as Table 3-24.
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 and explained on the map legend. See the 2021 With Program NEM in Appendix I-2.
4. Are compatible land uses, which would normally be considered noncompatible, explained in the accompanying narrative?	X		Several schools within the DNL 65 contour have been sound insulated; see Section 3.4.3 and the footnote on Table 3-24.
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 2021 With Program NEM is based are adequately described in the narrative. See Section 3.4.
2. Are the underlying technical data and planning assumptions reasonable?	X		The underlying technical data and planning assumptions are reasonable. See Section 3.4.
B. Calculation of Noise Contours:			
1. Is the methodology indicated?	X		The methodology is indicated. See Section 3.4.
a. Is it FAA approved?	X		The methodology is FAA approved. INM 7.0d was used. The LGA 14 CFR Part 150 Study began before the release of AEDT on May 29, 2015. At the time that the Study began, INM 7.0d was the latest FAA-approved noise model.
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 2016 (Existing Conditions) NEM and the 2021 With Program NEM. See Appendix G of the LGA NEM Report[2] and Section 3.4 of this NCP.
c. Has AEE approval been obtained for use of a model other than those that have previous blanket FAA approval?		X	Not applicable.

[2] *LaGuardia Airport, Title 14 Code of Federal Regulations (CFR) Part 150, Final Noise Exposure Map Report*, March 2017

AIRPORT NAME: LaGuardia Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
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 the 2021 With Program NEM. There are 13 aircraft that operate at LGA that are not 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 of the LGA NEM Report for FAA AEE's approval of the proposed INM aircraft substitutions; also see Section 3.4 of this NCP. 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 of the LGA NEM Report detail the user-defined aircraft profiles. FAA approval is provided in Appendix G-1 of the LGA NEM Report, and airline concurrence is in Appendix G-2 of the LGA NEM Report.
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 of the LGA NEM Report.
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, and no noise monitoring data was used to determine compatibility of land uses with aircraft noise. 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 2021 With Program NEM. The local jurisdiction has not adopted a lower standard than DNL 65. See Section 3.4.

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
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 the 2016 (Existing Conditions) NEM and the 2021 With Program NEM. See Table 1-1, Table 3-3, and Section 3.4.
2. Does the documentation indicate whether the airport operator used Table 1 of Part 150?	X		The documentation indicates that the airport operator used Table 1 of Part 150. See Section 1.7 and Table 1-2. 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 Department of City Planning land use categories. See Chapter 3 and Appendix D-1 of the LGA NEM Report.
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 land use data used for the 2021 With Program are the same as those used for the existing FAA-accepted 2021 (Future Conditions) NEM. The narrative for the previous 2021 (Future Conditions) NEM clearly indicates which adjustments were made to Table 1 of Part 150 and the local reasons for doing so. Section 3.3 of the LGA NEM Report 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 of the LGA NEM Report and Section 3.4 of this NCP.
(2) Does the narrative include the airport operator's complete substitution for table 1?	X		Section 3.3 of the LGA NEM Report discusses Table 1 and indicates how the compatibility guidelines apply to the conformed land uses developed for New York City and Nassau County. Land uses exposed to noise levels of DNL 65 and higher in the 2021 With Program NEM are described in Section 3.4 of this NCP. Further detail on land use categories can be found in Appendix D-1 of the LGA NEM Report.
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		Section 4.2 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.

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
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 Existing Conditions and 2021 With Program NEMs, but the symbolic representation indicates that they have been sound insulated. Also see Section 3.4, the footnotes on Table 2-6 and Table 2-7, and Appendix I-2.
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 3.4.
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 Certification letter is included with the Final NCP submission to the FAA.
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 Certification letter is included with the Final NCP submission to the FAA.

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CHAPTER 1
Introduction

This Noise Compatibility Program (NCP) documents the second and final phase of the Port Authority of New York and New Jersey's (Port Authority) Title 14 Code of Federal Regulations (CFR) Part 150 ("Airport Noise Compatibility Planning") Study for LaGuardia Airport (LGA). This NCP was prepared in accordance with the requirements of 14 CFR Part 150. The NCP presents the results of the Port Authority's Study of Airport-related noise exposure in the Airport environs and potential measures to minimize land uses surrounding LGA that are not compatible with Airport activities due to Airport-related noise exposure, as identified in the Noise Exposure Maps (NEMs) prepared during the first phase of the Study and subsequently revised. While development of the initial NEMs and NCP is voluntary, airport sponsors must have NEMs accepted by the Federal Aviation Administration (FAA) and NCP measures approved by the FAA in order for those NCP measures to be determined eligible for potential federal funding from the Airport Improvement Program (AIP).

The FAA accepted the Port Authority's 2021 forecast condition NEM contours. Since then, the COVID-19 public health emergency has resulted in a reduction of aircraft operations at LGA due to significant decreases in business and vacation travel. The severity and duration of these substantial contractions in aviation operations are unknown, but it is expected that demand and airline capacity will grow. Future NEM updates, as discussed in proposed Program Management Measure 9, would reflect updated aviation forecasts and changes to aircraft fleet mix.

The three primary objectives of the LGA 14 CFR Part 150 Study are listed below. This NCP document addresses the second and third objectives of the Study.

	Objectives	Study Phase
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 designations in 14 CFR Part 150, Appendix A, Table 1.	Noise Exposure Map Phase
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 Phase
3	Develop a comprehensive NCP that consists of Airport sponsor recommendations to the FAA to reduce future noise impacts to the surrounding communities.	

During the first phase of the Study, NEMs depicting existing and anticipated future aircraft noise exposure were developed. Noise exposure estimates in terms of the number of people, dwelling units, and noise-sensitive land uses exposed to aircraft noise levels of Day-Night Average Sound Level (DNL) 65 decibels (dB) and higher were also developed. The Existing Conditions NEM

reflected aircraft operations in the year 2016, and the Future Conditions NEM reflected forecast aircraft operations in the year 2021. These NEMs are hereafter referred to as the "2016 FAA-accepted NEM" and the "2021 FAA-accepted NEM." The NEMs and the assumptions used in their development are documented in the report *LaGuardia Airport, Title 14 Code of Federal Regulations (CFR) Part 150, Final Noise Exposure Map Report*, March 2017, which was accepted by the FAA on May 5, 2017 (the LGA NEM Report). The FAA's acceptance of the 2016 and 2021 NEMs for LGA is documented in **Appendix A**.

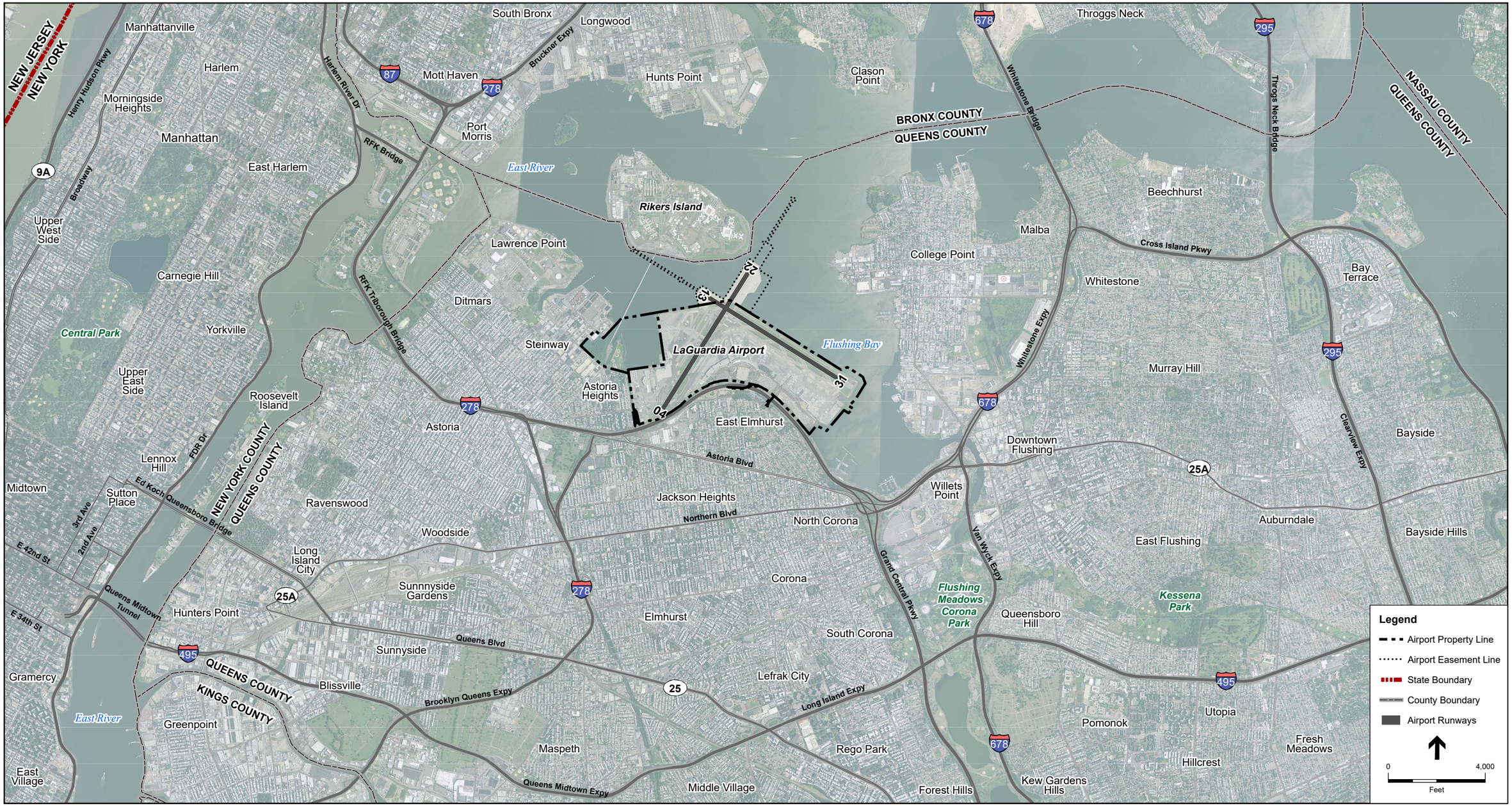
However, a few weeks prior to the submittal of the LGA NEM Report in March 2017, Delta Air Lines announced it would cease operations of its MD-88 aircraft at LGA on March 2, 2017. This announcement is provided on **page I-10** of **Appendix I-3**. In the interest of keeping the LGA 14 CFR Part 150 Study on schedule, the Port Authority decided to revise the 2021 FAA-accepted NEM during the NCP process to reflect the removal of Delta Air Lines' MD-88 aircraft from LGA's operational fleet. The resulting NEM is hereafter referred to as the "2021 Revised NEM" and was prepared in accordance with the requirements of 14 CFR Part 150 to account for changes in aircraft operations at LGA. A draft of the 2021 Revised NEM is presented in **Chapter 2** and **Appendix I-1** for public review and comment. The FAA checklists that outline the requirements for NCP and NEM documentation are located in this NCP before the Table of Contents. The associated supporting references in this document are identified within either the footnotes or appendices. This NCP relies upon the 2021 Revised NEM to illustrate the potential noise benefits of NCP measures recommended by the Port Authority.

1.1 Project Location and Airport 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 in **Figure 1-1**. The Airport and its environs are depicted in **Figure 1-2**.

1.1.1 Airport History

LGA 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 redeveloped 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 renamed 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 via a lease with New York City in 1947.



SOURCE: USDA, 2013 (Aerial); ESA, 2016 and 2019.

LaGuardia Airport 14 CFR Part 150 Study .140037

Figure 1-1

Airport Location Map

LaGuardia Airport

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SOURCE: USDA, 2013 (Aerial); ESA, 2016 and 2019.

LaGuardia Airport 14 CFR part 150 Study. 140037

Figure 1-2
Airport Vicinity Map
LaGuardia Airport

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Since 1959, the Port Authority has been active in addressing aircraft noise concerns including implementation of a voluntary school sound insulation program in the vicinity of the Port Authority airports; installation of an aircraft noise monitoring system in communities around LGA; and establishment of a fully staffed noise office to evaluate aircraft noise issues and educate local communities on aircraft noise and Airport operations. The Port Authority expended an estimated $238 million to voluntarily sound-insulate 21 schools in the vicinity of LGA, in part with $106 million in FAA AIP grants. Additional details about the Port Authority's noise programs are contained in Section 2.6 of the LGA NEM Report.

Contribution to Economy and Airport Development

In 2017, LGA was the 21st busiest commercial service airport in the United States, based on passenger traffic.[3] The Airport provides scheduled service primarily to destinations within the U.S. The FAA's National Plan of Integrated Airport Systems identifies LGA as a Large Hub Primary Commercial Service Airport. Large Hubs are those airports that each accounts for at least one percent of total U.S. passenger enplanements. The configurations of the major airfield and landside facilities at LGA are described in the LGA NEM Report.

1.2 14 CFR Part 150 Study Overview

In 2014, the Port Authority initiated its first-ever 14 CFR Part 150 Study for LGA. Coordination with representatives of jurisdictions in the vicinity of LGA, the FAA, Airport users, 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. **Section 6.1** contains further details about the TAC and its role in the 14 CFR Part 150 Study.

The Port Authority retained a team of consultants (Study Team) led by Environmental Science Associates (ESA) to assist in conducting the 14 CFR Part 150 Studies at LGA and the John F. Kennedy International Airport (JFK). An overview of the 14 CFR Part 150 Study process undertaken by the Port Authority and its Study Team is provided in **Figure 1-3**.

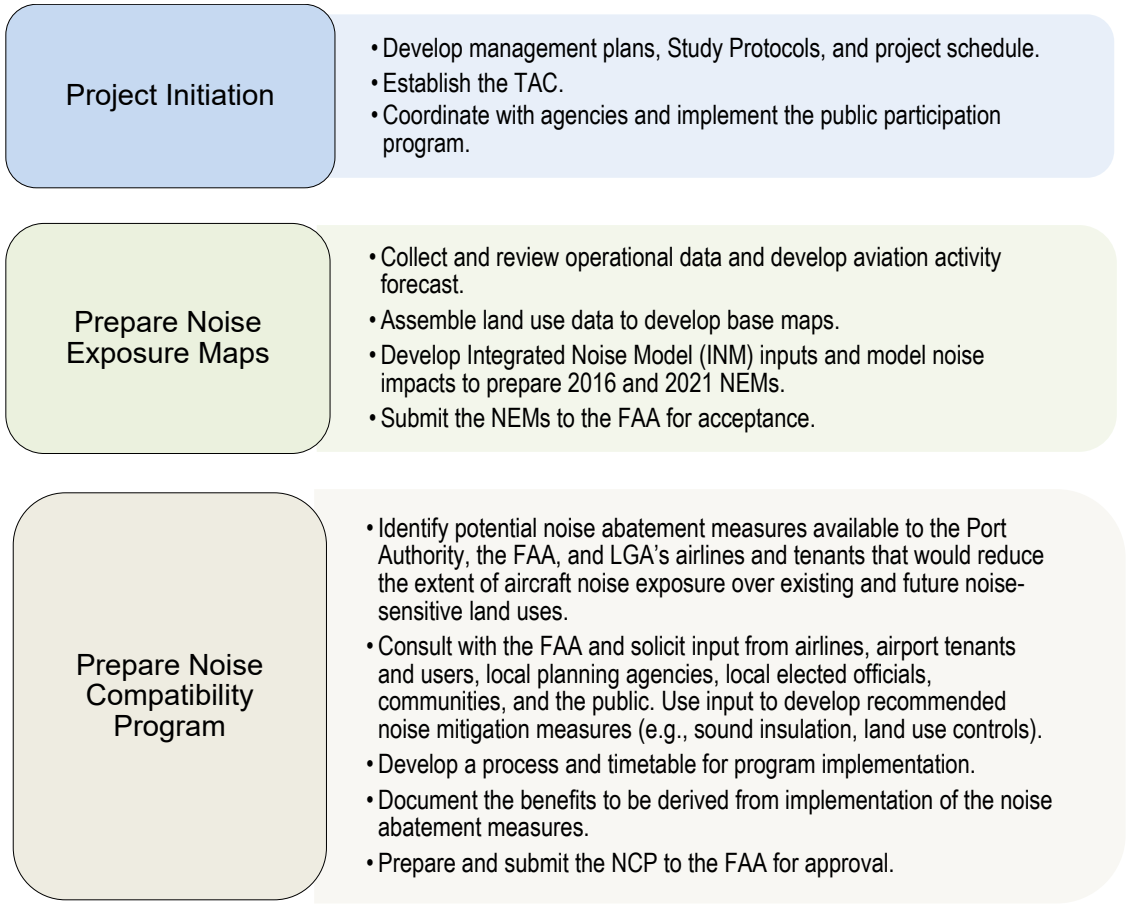
A unified Study Protocol document covering both the LGA and JFK 14 CFR Part 150 Studies was developed early in the Study process. The Study Protocol is presented in Appendix I of the LGA NEM Report and was reviewed by the TAC before being released to the public. The purpose of the Study Protocol was 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

[3] Port Authority of New York and New Jersey. *2017 Airport Traffic Report.* April 6, 2018.

- Land use designation and analysis methodology
- Study schedules, milestones, and deliverables

Figure 1-3
Overview of the 14 CFR Part 150 Process



1.2.1 Noise Exposure Maps

NEMs graphically depict aircraft noise exposure on and in the vicinity of an airport by presenting lines of equal DNL values. Aircraft DNL values represent the sound exposure produced by a 24-hour period of aircraft activity. DNL is described further in **Section 1.4** of this NCP. NEMs provide local communities an opportunity to visualize aircraft noise exposure in order to make better-informed decisions regarding existing and proposed noise-sensitive development in the vicinity of an airport. The original NEMs for the LGA 14 CFR Part 150 Study were published in Appendix M of the LGA NEM Report and accepted by the FAA on May 5, 2017. The FAA acceptance letter is presented in **Appendix A**.

The FAA-accepted LGA NEMs include two maps. The first NEM is LGA's 2016 FAA-accepted NEM, which depicts existing aircraft noise exposure and noncompatible land uses in the vicinity of the Airport. The 2016 FAA-accepted NEM was developed using FAA-approved aircraft

operation counts based on a combination of FAA data and LGA calendar year 2014 data.[4,5] The 2016 FAA-accepted NEM DNL contours are presented in **Figure 1-4**.

The second NEM is LGA's 2021 FAA-accepted NEM, which depicts aircraft noise exposure for five-year forecast conditions. The 2021 FAA-accepted NEM was developed using projected levels of aircraft activity at LGA in 2021, as derived from the Port Authority's aircraft operations forecast. In accordance with 14 CFR Part 150,[6] the 2021 FAA-accepted NEM represented conditions five years after the NEM date of submittal to the FAA. The 2021 FAA-accepted NEM DNL contours are presented in **Figure 1-5**. A public comment period was provided for the 2016 and 2021 FAA-accepted NEMs from September 22, 2016 to October 24, 2016. During the comment period, a Public Information Workshop was conducted, which 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 Public Information Workshop was to provide the public with the opportunity to review and comment on the draft versions of the NEMs. Further details on LGA's FAA-accepted NEMs, including the technical approach in developing them, are provided in Chapters 4 and 5 of the LGA NEM Report.

1.2.2 Noise Compatibility Program

An NCP contains noise control strategies that have been selected by an airport operator as measures for implementation as a result of a 14 CFR Part 150 Study. There are two primary types of strategies used for reducing aircraft noise exposure on noise-sensitive areas surrounding an airport: noise abatement strategies and noise mitigation strategies. 14 CFR Part 150 identifies a number of noise abatement and noise mitigation strategies that must be examined in every study.

Noise abatement strategies address noise generated at its source to lessen the noise impact on noncompatible land uses. Examples include changes in aircraft flight tracks, changes in runway use, and changes in departure profiles. Noise mitigation strategies address noise at the location of the receiver and include strategies such as sound insulation, management of how land is developed around an airport, and promotion of development that is compatible with airport operations.

The FAA distinguishes between noise mitigation strategies (i.e., at the receiver end) that reduce existing noncompatible uses and strategies that prevent or reduce the probability of additional noncompatible uses being established.[7] In the context of noise mitigation, strategies that reduce existing noncompatible uses are known as corrective strategies, and those that limit the establishment of additional noncompatible uses are known as preventive strategies. Corrective noise mitigation strategies focus on reducing interior noise exposure, such as through the application of

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

5 The Port Authority and a consultant (Landrum & Brown) developed the operational forecast for calendar year 2016 and 2021 aircraft activity using the FAA's 2014 Terminal Area Forecast for LGA (issued in January 2015), which was used as the baseline for developing the operational forecast for 2016 and 2021 activity. Calendar year 2014 information and data related to aircraft fleet mix and runway utilization provided a baseline for developing noise model inputs for the 2016 FAA-accepted NEM. The 2016 noise model inputs served as the basis for developing the noise model inputs for the 2021 FAA-accepted NEM. For further details, please see Section 4.3.1 and Appendix F-1 of the LGA NEM Report.

6 14 CFR Part 150, Sec. 150.21(a)(1).

7 14 CFR Part 150, Appendix B, Sec. 150.5(a).

sound insulation or the removal of the uses (e.g., land acquisition). Preventive mitigation strategies are intended to discourage the development of new noncompatible land uses using techniques, such as the application of zoning regulations and the modification of building codes.

In accordance with 14 CFR Part 150, Appendix B, Sec. 150.7(b), the following types of strategies were considered during the preparation of LGA's NCP:

1) Acquisition of land and interests therein: Discussed in **Section 4.4**.
2) Construction of barriers and acoustical shielding, including the soundproofing of public and private buildings: Discussed in **Sections 4.3** and **4.4**.
3) Implementation of a preferential runway use program: Discussed in **Sections 3.2** and **3.3**.
4) Implementation of restrictions on the use of the Airport by any type or class of aircraft based on the noise characteristics of those aircraft: Discussed in **Section 3.3**.
5) The use of flight procedures (including the modifications of flight tracks) to control the operation of aircraft to reduce exposure of individuals (or specific noise-sensitive areas) to noise in the area around the Airport: Discussed in **Sections 3.2** and **3.3**.
6) Other actions or combinations of actions that would have a beneficial noise control or abatement impact on the public: Discussed in **Section 5.2**.
7) Other actions recommended for analysis by the FAA for the Airport: Discussed in **Section 3.2**.

Each LGA noise abatement strategy was evaluated against the following eight criteria specified by the FAA in 14 CFR Part 150, Sec. 150.35(b) and Appendix B, Sec. 150.5:

1) Does the strategy reduce existing noncompatible land uses?
2) Does it prevent or discourage development of noncompatible land uses?
3) Does it impose an undue burden on interstate or foreign commerce?
4) Is it unjustly discriminatory toward particular aircraft operators?
5) Can it be revised if conditions change?
6) Does it derogate aviation safety or adversely affect the safe and efficient use of navigable airspace?
7) Does it meet both the goals and needs of the local community and those of the national air transportation system, to the extent practicable?
8) Can it be implemented in a manner consistent with all the powers and duties of the FAA Administrator?

After issuance of the Record of Approval (ROA) of an NCP, the FAA performs environmental, safety, and other types of reviews of each recommended noise abatement measure in the NCP prior to determining whether the measure can be implemented.

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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

*The PLUTO Transportation land use designations on LGA were updated to reflect new airport facilities that were constructed during the LGA Redevelopment Project.

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LaGuardia Airport 14 CFR Part 150 Study . 140037

Figure 1-4

2016 FAA-Accepted Noise Exposure Map DNL Contours
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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

*The PLUTO Transportation land use designations on LGA were updated to reflect new airport facilities that were constructed during the LGA Redevelopment Project.

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LaGuardia Airport 14 CFR Part 150 Study . 140037

Figure 1-5

2021 FAA-Accepted Noise Exposure Map DNL Contours
LaGuardia Airport

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Each noise mitigation strategy was evaluated against the following standard aviation industry criteria:[8]

1) Does it reduce existing noncompatible land uses?
2) Does it prevent or discourage development of noncompatible land uses?
3) Is it consistent with the policies of the Port Authority?
4) Is it consistent with the policies of the affected local jurisdictions?
5) Would it have a positive effect on existing and planned land use patterns in the Airport environs?
6) Can it be implemented under existing laws?
7) Is it economically, financially, and politically feasible?
8) How much time would be necessary for implementation?

Chapters 3, **4**, and **5** of this NCP present and summarize the evaluation of noise abatement and noise mitigation strategies as well as other types of strategies for improving compatibility of the Airport with its environs.

1.3 Roles and Responsibilities

1.3.1 Port Authority

The Port Authority, as the operator of LGA, is responsible for the development of information to support the noise compatibility planning effort. This support includes preparation of the aviation forecasts used in this 14 CFR Part 150 Study, coordination with Airport users related to operational procedures, interaction with local planners and elected officials related to land use compatibility, and the execution of public outreach strategies. In addition, to the extent that the Port Authority elects to pursue any of the FAA-approved noise abatement and mitigation measures in this NCP, the Port Authority would be responsible for implementing or assisting with both the implementation of the approved NCP measures and the application for FAA funds (AIP grants) associated with FAA-approved eligible items included in the NCP. A Port Authority-recommended and FAA-approved measure does not require the implementation of the measure, but merely allows the Port Authority to apply for AIP grants for eligible measures.

1.3.2 14 CFR Part 150 Study Technical Advisory Committee

After the initiation of the LGA 14 CFR Part 150 Study, the Port Authority formed a TAC. The purpose of the TAC was to provide varying perspectives and inputs to the NEM and NCP development process. The primary emphasis of TAC meetings was to create an atmosphere of understanding, awareness, and working together to derive strategies for improving the compatibility of LGA with its environs. Through an invitation from the Port Authority and a voluntary participation process as set forth in the TAC charter, the TAC brought together

[8] FAA Advisory Circular 150/5020-1, Chapter 3, Sections 2 through 4.

representatives from a broad spectrum of entities with interest in the 14 CFR Part 150 process and its outcome.[9] The TAC's role was advisory and its purpose was solely limited to this Study. The TAC provided opinions, advice, and guidance to the Study Team, but the Port Authority had the sole discretion to accept or reject the TAC recommendations. In addition to providing input, comments, and technical advice for the Study, the responsibility of each TAC member was to inform their respective organization, agency, and/or group of the Committee's discussions. The TAC included members that represent the Port Authority, the FAA, airlines, Airport business associations, government agencies with aviation and land use responsibilities, business groups, planning organizations, private sector interests (particularly in the aviation industry), and representatives of the affected communities in the Airport's environs.

1.3.3 Federal Aviation Administration

The FAA is responsible for reviewing an airport operator's NCP submitted under 14 CFR Part 150 and issuing an ROA. The FAA's review of the NCP encompasses the details of technical documentation, as well as broader issues related to safety and the constitutionality of recommended NCP measures. For each measure proposed in an NCP, the FAA is responsible for approving, disapproving, approving or disapproving in part, or stating that no action will be taken for the purposes of 14 CFR Part 150. Using the criteria presented in 14 CFR Part 150, Sec. 150.35(b) and Appendix B, Sec. 150.5, the FAA evaluates recommended measures and makes a determination as to whether or not certain conditions are met that would include or exclude those measures from consideration for approval or disapproval for the purposes of 14 CFR Part 150.

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

1) The Office of Environment and Energy (AEE)

   – The FAA's AEE (at FAA Headquarters) reviews complex technical, regulatory, and legal matters of national environmental policy significance.

2) The Air Traffic Organization (ATO)

   – The FAA's ATO includes air traffic controllers and support staff.

   – LGA's Air Traffic Control Tower staff provided significant input to the NCP review process in several technical areas, including safety implications, capacity effects, and implementation requirements for suggested noise abatement strategies.

   – The FAA's New York Terminal Radar Approach Control (NY TRACON) also provided input on suggested noise abatement strategies to the extent that their potential implementation might affect operational procedures and airspace at LGA and other nearby airports, including JFK, Newark Liberty International Airport (EWR), and Teterboro Airport (TEB).

3) The Office of Airports (APP)

   – Two groups in the FAA's Office of Airports were involved, including: (1) FAA Headquarters, ensuring consistency with 14 CFR Part 150 Regulations and reviews of

[9] The TAC charter and membership are presented in **Appendix D**.

national importance, and (2) the FAA's Eastern Region Office, responsible for determining whether the NCP Report satisfies all 14 CFR Part 150 requirements and final review of the NCP Report for adequacy in satisfying technical and legal requirements.

FAA approval specifically involves determining whether a recommended NCP measure meets requirements provided in 14 CFR Part 150, Sec. 150.33 ("Evaluation of Programs") and Sec. 150.35 ("Determinations; publications; effectivity"). It is important to note that FAA approval of an NCP measure does not obligate implementation of that measure. In particular, noise abatement measures approved by the FAA for the purposes of 14 CFR Part 150 may still require further reviews, such as environmental reviews under the National Environmental Policy Act (NEPA), and those reviews may indicate that implementation of an FAA-approved noise abatement measure is infeasible. Upon receipt of the FAA's ROA of this NCP, the Port Authority may begin implementation of FAA-approved program measures and apply for federal financial assistance to support implementation of eligible FAA-approved NCP measures at LGA.

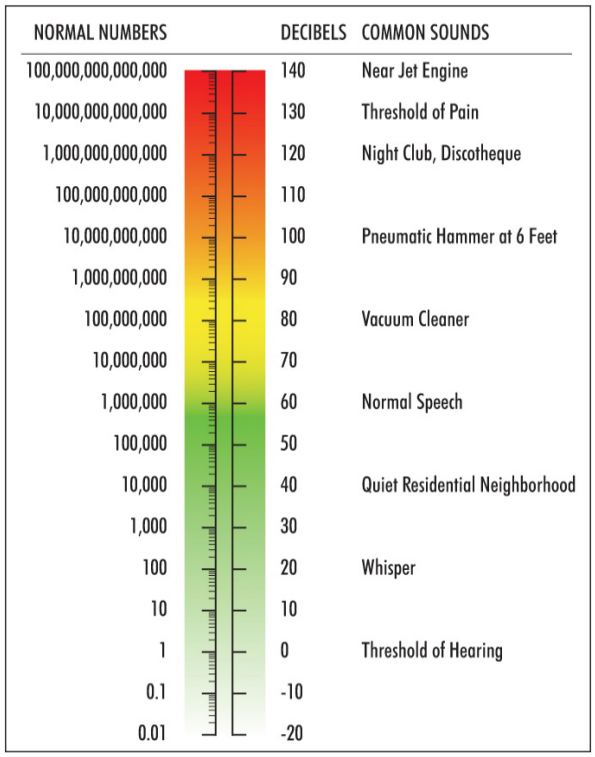
1.4 Noise Terminology

Sound is a wave of alternating high and low pressure levels that travels through the air; any undesirable sound is considered to be *noise*. The fundamental descriptors of sound are the *amplitude* and *frequency* of a sound, and different *noise metrics* are used to communicate this information. Amplitude is a direct measurement of a sound's magnitude and is expressed in dB. Because sound magnitudes exist across a very wide range in the physical world, the use of dB expresses sound magnitudes on a logarithmic scale; this converts wide ranges into numbers that are more easily understood. For example, a sound level of 70 dB has 10 times as much acoustic energy as a level of 60 dB, while a sound level of 80 dB has 100 times as much acoustic energy as a level of 60 dB. A sound that is 10 dB higher than another is usually perceived to be twice as loud. **Figure 1-6** shows dB levels of common sounds.

Frequency is a direct measurement of how rapidly a sound wave alternates between high and low pressures and is described in cycles per second, known as *Hertz* (Hz). The normal range of frequencies that a young adult can hear is 20 Hz to 20,000 Hz, while the frequency range for aircraft noise is typically 50 Hz to 5,000 Hz. Because the human ear is not sensitive to all frequencies, the magnitudes of individual aircraft noise events are typically determined through emphasis of frequencies where the human ear is most sensitive. These "frequency-weighted" magnitudes are expressed as *A-weighted decibels* (dBA).

To simultaneously describe both the magnitude and duration of an individual aircraft noise event, the single-event noise metric known as *Sound Exposure Level* (SEL) can be used. SEL expresses what magnitude would result if the entire noise event were to occur over a duration of one second. SEL is computed from instantaneous dBA levels that occur across the duration of the noise event.

Figure 1-6
Decibel Levels of Common Sounds



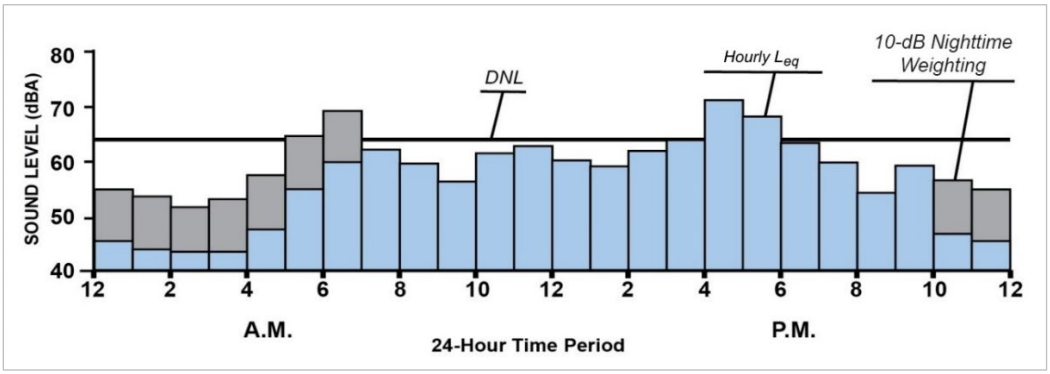
SOURCE: ESA, 2016.

To describe the average noise level of multiple events over a specific period of time, the cumulative noise metric known as *Equivalent Continuous Sound Level* (L_{eq}) can be used. To produce an L_{eq} value, all noise energy occurring during a specified period of time is averaged. L_{eq} can be measured for any time period, but typical L_{eq} time periods are 15 minutes, 1 hour, or 24 hours in length.

14 CFR Part 150 requires the use of the DNL noise metric for the LGA 14 CFR Part 150 Study.[10] DNL is a cumulative noise metric that accumulates the sound energy of multiple aircraft noise events occurring during a 24-hour period, resulting in a single value that represents the average noise level over that period. DNL values are expressed using dBA. In the calculation of DNL, sound events occurring during the *nighttime* (10:00:00 P.M. to 6:59:59 A.M.) are increased by a weighting of 10 dB to represent the increased sensitivity of people to noise that occurs at night. DNL can be calculated by averaging hourly L_{eq} values for each hour of the day, with a 10 dB weighting applied to the L_{eq} values for the nighttime hours. 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. **Figure 1-7** illustrates how DNL results from 24 hours of hourly L_{eq} values. Further details on aircraft noise are presented in Appendix C of the LGA NEM Report.

[10] 14 CFR Part 150, Appendix A, Sec. 150.3(b).

Figure 1-7
Illustration of DNL



SOURCE: ESA, 2016 and 2019.

1.5 FAA-Accepted 2016 and 2021 Noise Exposure Maps

The fundamental elements of an NEM are DNL contours for existing and forecast conditions, presented over base maps that depict an airport's layout; local land use control jurisdictions; major land use categories; discrete noise-sensitive "receptors"; and other information required by 14 CFR Part 150.[11] The LGA NEMs present DNL contours for 2016 and 2021 as well as noise-sensitive uses within the DNL 65 and higher contours for both years. The NEMs for the LGA 14 CFR Part 150 Study were published in Appendix M of the LGA NEM Report and accepted by the FAA on May 5, 2017. **Figure 1-4** shows the LGA 2016 DNL contours accepted by the FAA in 2017, while **Figure 1-5** shows the LGA 2021 DNL contours accepted by the FAA in 2017.

The DNL contours for the NEM and NCP phases of the LGA 14 CFR Part 150 Study were prepared using the Integrated Noise Model (INM).[12] The INM is an FAA-approved, industry-accepted tool for determining the cumulative effect of aircraft noise exposure around airports. The airport-specific information required by the INM includes both physical and operational data. The physical data include airfield geometry (i.e., runway locations and utilization), the elevation of the airfield, weather, and terrain data. Operational data include the number and types of aircraft operating at an airport and the three-dimensional flight trajectories of aircraft arriving to and departing from an airport. The Port Authority and Study Team performed substantial outreach to the public, aircraft operators, land use planning agencies, and other stakeholders regarding the development of the NEMs. Details of the outreach effort as well as public comments are presented in Appendices G, H, K, and L of the LGA NEM Report.

The DNL contours were then used in an analysis of land use and population to determine the numbers of residents and dwelling units exposed to DNL 65 and higher, as well as the numbers of non-residential noise-sensitive sites (such as places of worship, schools, and libraries) and historic

11 14 CFR Part 150, Appendix A, Sec. 150.101.

12 The LGA 14 CFR Part 150 Study was initiated in October of 2014, prior to the FAA's release of the Aviation Environmental Design Tool version 2b (AEDT 2b) on May 29, 2015 and the latest version AEDT 3c on March 6, 2020. When the Study began, INM 7.0d was the most current FAA-approved model for determining aircraft noise exposure around airports and was identified as the model required for use in this Study. The FAA approval of INM 7.0d for use in this Study can be found in Appendix G of the LGA NEM Report.

sites exposed to DNL 65 and higher. This analysis leveraged land use agency and U.S. Census Bureau data on population as well as types and locations of properties in the vicinity of LGA. **Table 1-1** provides a summary of residents, dwelling units, non-residential noise-sensitive sites, and historic sites exposed to DNL 65 and higher in the years 2016 and 2021 based on the NEMs accepted by the FAA in 2017. The complete LGA NEM Report with detailed information is available for review on the Port Authority website at: http://panynjpart150.com/LGA_FNEM.asp.

TABLE 1-1
HISTORIC SITES, NOISE-SENSITIVE SITES, AND POPULATION EXPOSED TO DNL 65 AND HIGHER – 2016 AND 2021 FAA-ACCEPTED NEMS

Noise Exposure	Total Area (Acres)	Dwelling Units	Population	Places of Worship	Schools[1]	Hospitals and Residential Healthcare	Historic Sites	Day Care Facilities[2]	Library
2016									
DNL 65-70	1,579.3	3,655	9,787	7	2	0	5	3	0
DNL 70-75	517.4	2	6	0	1	0	0	0	0
DNL 75+	339.1	0	0	0	0	0	0	0	0
Total	**2,435.8**	**3,657**	**9,793**	**7**	**3**	**0**	**5**	**3**	**0**
2021									
DNL 65-70	1554.7	3,802	10,255	7	2	2	13	3	0
DNL 70-75	502.5	4	12	0	1	0	0	0	0
DNL 75+	332.2	0	0	0	0	0	0	0	0
Total	**2,389.4**	**3,806**	**10,267**	**7**	**3**	**2**	**13**	**3**	**0**

NOTES:

These exposure data are in reference to the 2016 and 2021 NEMs accepted by the FAA in 2017. 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.

1 These schools were included in the School Soundproofing Program and are compatible with DNL 65 and higher (see Section 2.6.1 of the LGA NEM Report).

2 Tables 5-2 and 5-5 of the LGA NEM Report indicated that there was one day care facility in the DNL 70 – 75 contour range in the years 2016 and 2021. During the preparation of this NCP, a review of the noise-sensitive sites indicated that the day care facility is in the DNL 65 – 70 contour range in the years 2016 and 2021.

SOURCE: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

1.6 Draft 2021 Revised NEM DNL Contours

The Port Authority submitted the year 2016 and 2021 NEMs to the FAA for acceptance in late March 2017. However, a few weeks prior to that submittal, Delta Air Lines announced it would cease operations of its MD-88 aircraft at LGA on March 2, 2017. This announcement is provided on **page I-10** of **Appendix I-3**. In the interest of keeping the LGA 14 CFR Part 150 Study on schedule, the Port Authority decided to submit the NEMs for acceptance (with Delta Air Lines' MD-88 aircraft included), but promised that an updated 2021 NEM would be developed during the NCP process to reflect the removal of Delta Air Lines' MD-88 aircraft from LGA's operational fleet.

Accordingly, draft 2021 DNL contours reflecting the removal of the MD-88 aircraft have been prepared. They include the forecast changes in aircraft operations, aircraft fleet, and land use expected to occur by the year 2021. Preparation of the 2021 Revised NEM is described in **Chapter 2**, while the full-size draft 2021 Revised NEM and flight track exhibits are presented in **Appendix I-1**. Importantly, this NCP uses the 2021 Revised NEM as a basis for comparison in order to demonstrate the potential noise benefits of the Port Authority's recommended NCP measures.

1.7 Noise and Land Use Compatibility

The FAA has determined that the major land uses listed in 14 CFR Part 150, Appendix A, Table 1 (presented here as **Table 1-2**) are normally compatible with aircraft noise located within the DNL 65 contour. Therefore, when evaluating land use compatibility, attention is focused on land uses within the DNL 65 contour. The noise metric used for land use compatibility is DNL. Further details on aircraft noise are presented in **Section 1.4** of this NCP and in Appendix C of the LGA NEM report.

TABLE 1-2
14 CFR PART 150 LAND USE COMPATIBILITY WITH YEARLY DAY-NIGHT AVERAGE SOUND LEVELS

	Yearly Day-Night Noise Level (DNL) in decibels					
Land Use	**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

TABLE 1-2
14 CFR PART 150 LAND USE COMPATIBILITY WITH YEARLY DAY-NIGHT AVERAGE SOUND LEVELS

Land Use	Yearly Day-Night Noise Level (DNL) in decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
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

NOTES:

Numbers in parentheses 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.

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: 14 CFR Part 150, Appendix A, Table 1.

As shown in **Table 1-2**, noise-sensitive land uses such as residential, mobile home parks, transient lodging, schools, and outdoor music venues are considered noncompatible with noise exposure of DNL 65 and higher. Other noise-sensitive land uses, such as hospitals, nursing homes, churches, auditoriums, and concert halls are considered compatible with noise exposure of DNL 65 to 75, provided that appropriate noise attenuation is designed into the building's

structure. Commercial, manufacturing, and recreational land (e.g., parks, amusement parks, zoos, etc.) are generally less sensitive to noise and are considered compatible with noise exposure up to DNL 70 without noise attenuation and up to DNL 80 with appropriate noise attenuation. For the LGA 14 CFR Part 150 Study, the compatible and noncompatible land uses within the DNL 65 and higher contours were identified using the designations provided in **Table 1-2** to the extent that the designations were aligned with the New York City land use categories. Land use compatibility is described further in Chapter 3 and Appendix D-1 of the LGA NEM Report.

1.8 Report Organization

This NCP provides the technical documentation required under 14 CFR Part 150 for a Noise Compatibility Program for the Port Authority's recommended NCP measures. This NCP is organized as follows:

Chapter 1 Introduction

Chapter 2 2021 Revised Noise Exposure Map
Describes the preparation of the 2021 Revised NEM.

Chapter 3 Noise Compatibility Program – Noise Abatement Measures
Describes the existing LGA noise abatement program and presents recommended noise abatement measures for the LGA NCP. Also presents an NEM showing noise exposure in the vicinity of LGA reflecting the implementation of the LGA NCP as of the year 2021.

Chapter 4 Noise Compatibility Program – Land Use Measures
Describes existing land use measures associated with LGA and presents recommended land use measures for the LGA NCP.

Chapter 5 Noise Compatibility Program – Program Management Measures
Describes current program management measures associated with LGA and presents recommended program management measures for the LGA NCP.

Chapter 6 Stakeholder Engagement – Details consultation and public involvement activities associated with the LGA NCP.

Technical information, documentation, and maps are contained in the appendices to this NCP. The appendices are organized as follows:

Appendix A Federal Aviation Administration Letter of Acceptance for Noise Exposure Maps

Appendix B Glossary of Terms and Acronyms

Appendix C Supplemental Information Related to the Recommended Noise Abatement Measures

Appendix D Technical Advisory Committee

Appendix E Public Outreach

Appendix F Public Comments

Appendix G Noise Compatibility Program Strategies Suggested by Stakeholders

Appendix H Noise Compatibility Program Implementation Schedule

Appendix I 2021 Revised Noise Exposure Map and 2021 With Program Noise Exposure Map

The information required for compliance with 14 CFR 150.23(e)(8) is included within the text describing each NCP measure, as well as in Appendix H, including:

- The period covered by the program and the schedule for implementation of the program
- The persons responsible for implementation of each measure in the program
- For each measure, documentation supporting the feasibility of implementation, including any essential governmental actions, costs, and anticipated sources of funding, that will demonstrate that the program is reasonably consistent with achieving the goals of airport noise compatibility planning under this part

CHAPTER 2
2021 Revised Noise Exposure Map

The Port Authority submitted the 2016 and 2021 LGA NEMs to the FAA for acceptance in late March 2017. The NEMs for the LGA 14 CFR Part 150 Study were published in the LGA NEM Report and accepted by the FAA on May 5, 2017. However, a few weeks prior to the Port Authority's March submittal of the NEMs, Delta Air Lines announced that it would cease operations of its MD-88 aircraft at LGA on March 2, 2017. This announcement is provided on **page I-10** of **Appendix I-3**. The removal of the MD-88 aircraft and replacement with other aircraft types affects the noise environment in the vicinity of LGA because the MD-88 aircraft is one of the loudest aircraft operating in the U.S. commercial aircraft fleet during departure, but is one of the quietest aircraft operating in the U.S. commercial aircraft fleet during arrival.

In the interest of keeping the LGA 14 CFR Part 150 Study on schedule, the Port Authority decided to submit the NEMs for acceptance (with the Delta Air Lines' MD-88 aircraft included) in 2017, but promised that an updated 2021 NEM would be developed during the NCP process, which reflect the removal of Delta Air Lines' MD-88 aircraft from LGA's operational fleet and the MD-88's replacement with other aircraft types. This chapter presents the methods and data used to produce the noise contours that are depicted on the 2021 Revised NEM, which includes the removal of Delta Air Lines' MD-88 aircraft from LGA's operational fleet.

2.1 Noise Model and Day-Night Average Sound Level

The LGA 14 CFR Part 150 Study was initiated when the FAA's INM Version 7.0d was the required model for preparing noise contours.[13] As the Study is still ongoing, the 2021 Revised NEM has also been prepared using this version of the INM. The INM was used to produce contours to delineate specific levels of noise exposure. As discussed in detail in **Section 1.4** of this NCP, DNL, expressed in 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 an additional weight of 10 dB for those noise events occurring between 10:00:00 P.M. and 6:59:59 A.M. The DNL metric is the noise descriptor required by the FAA for aircraft noise exposure and land use compatibility planning under 14 CFR Part 150.

13 The FAA's AEDT replaced both the INM and Emissions and Dispersion Modeling System (EDMS) as the required tool for noise, fuel burn, and emissions modeling on May 29, 2015. Updating the aircraft noise exposure information in this 14 CFR Part 150 Study was not required because the Study and substantial work on the analysis of noise at LGA was initiated prior to May 29, 2015.

2.2 Data for Developing the 2021 Revised NEM

The following sections summarize the information used to develop the 2021 Revised NEM.

2.2.1 Forecast Annual Aircraft Operations and Fleet Mix

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. 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 LGA NEM forecast and the derivative forecast were approved by the FAA on March 28, 2016. The fleet mix used for the 2021 Revised NEM is identical to that used in the 2021 FAA-accepted NEM, except for the operations of MD-88 aircraft. The routes at LGA that were served by Delta Air Lines' MD-88 aircraft are now being served by Airbus A319, A320, and A321 aircraft. Delta Air Lines informed the Study Team that MD-88 operations would be evenly distributed among Airbus A319, A320, and A321 aircraft types (i.e., one-third of the MD-88 operations would go to each Airbus type). Based on a conversion of these aircraft types to INM aircraft types, the Study Team assumed that 66 percent of the 7,132 MD-88 operations[14] used for the 2021 FAA-accepted NEM should be changed to the INM aircraft type A320-211 and 34 percent to the A321-211 for the purpose of noise modeling. The aircraft type A320-211 was used to represent both the A319 and the A320 because the FAA's Office of Environment and Energy approved the INM aircraft A320-211 as the modeling substitute for the A319 with CFM56-5A5 engines on August 13, 2015. This approval is provided in Appendix G-1 of the LGA NEM Report. Correspondence with Delta Air Lines regarding aircraft types is included on **page I-12** of **Appendix I-3**. The number of forecast annual aircraft operations at LGA used in the production of the 2021 Revised NEM, by aircraft type, is summarized in **Table 2-1**.

2.2.2 Aircraft Operations by Time of Day

Aircraft operations modeled in the INM are assigned as occurring during daytime (7:00:00 A.M. to 9:59:59 P.M.) or nighttime (10:00:00 P.M. to 6:59:59 A.M.). **Table 2-2** summarizes the times of day in which aircraft arrivals and departures are expected to occur in 2021 (by percent of total operations), as used in the development of the 2021 Revised NEM. The Port Authority's 2014 Aircraft Noise and Operations Management System (ANOMS)[15] data served as the primary source for the types of operations (arrival or departure) and time-of-day information, since ANOMS captures actual arrival and departure times versus scheduled times. The 2021 Revised NEM assumes identical daytime and nighttime activity levels as the 2021 FAA-accepted NEM.

[14] Table 4-1 of the LGA NEM Report.

[15] ANOMS is an aircraft noise and flight track data collection system produced by EMS Brüel & Kjær, which is described further in **Section 5.1**.

TABLE 2-1
2021 REVISED NEM ANNUAL AIRCRAFT OPERATIONS BY INM AIRCRAFT TYPE

Aircraft Category	Aircraft Type	INM Aircraft Type	2021 Annual Operations
Widebody	Boeing 767-300	767400	30
		Widebody Total	***30***
Narrowbody	Boeing 757-200	757PW	576
		757RR	24
	Boeing 737-800 / 900	737800	37,923
	Boeing 737-600 / 700	737700	28,828
	Boeing 717-200	717200	20,530
	Airbus A321 / A321neo	A321-232	10,979
	Airbus A320 / A320neo	A320-211	28,986
		A320-232	27,338
	Airbus A319	A319-131	3,622
	MD-90	MD9025	1,134
		MD9028	5,445
	Embraer 190	EMB190	24,713
		Narrowbody Total	***190,098***
Regional Jet	Canadair RJ 700 / 900	CRJ9-ER	103,812
	Embraer 175	EMB175	48,192
	Embraer 170	EMB170	38,000
		Regional Jet Total	***190,004***
General Aviation	Business Jet	CL600	875
		CNA525C	93
		CNA55B	100
		CNA560E	274
		CNA560XL	775
		CNA680	413
		CNA750	762
		F10062	162
		GIV	738
		GV	1,056
		LEAR35	616
		MU3001	556
	Turboprop	CNA208	185
		CNA441	49
	Helicopter	B407	106
		S76	106
		SA355F	186
	Piston	GASEPV	50
		General Aviation Total	***7,102***
All Aircraft			**387,234**

NOTE: An aircraft operation is equivalent to one arrival/landing or one departure/takeoff.

SOURCES: *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 ESA, 2016, and KB Environmental Sciences, Inc., 2017 and 2020.

TABLE 2-2
2021 REVISED NEM AIRCRAFT OPERATIONS (ALL AIRCRAFT) BY TIME OF DAY

	Arrivals		Departures	
Study Year	**Day**	**Night**	**Day**	**Night**
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 ESA, 2016, and KB Environmental Sciences, Inc., 2017 and 2020.

2.2.3 Runway Use

Runway use refers to the frequency of when aircraft use a particular runway end for departures and arrivals. The runway utilization data were derived from LGA ANOMS data for calendar year 2014. The rates are forecast to remain constant for the 2021 study year. **Table 2-3** provides a summary of arrival and departure runway utilization as used in the production of the 2021 Revised NEM. These runway use assumptions are identical to those used in the 2021 FAA-accepted NEM.

TABLE 2-3
2021 REVISED NEM RUNWAY USE (ALL FIXED-WING AIRCRAFT)

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

SOURCES: KB Environmental Sciences, Inc., 2016 and 2020; Port Authority of New York and New Jersey, ANOMS data for calendar year 2014.

2.2.4 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. The 2014 data were used to develop the flight tracks for use in the INM. Flight corridors used 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 in Maps 2 through 6 of **Appendix I-1**. The INM flight track locations and utilization percentages used in the 2021 Revised NEM are identical to those developed for the 2021 FAA-accepted NEM.

2.2.5 Departure and Arrival Profiles

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. Discussions with representatives of various airlines that operate at LGA indicated that slower than INM default climb rates are observed partly because aircraft are departing with weights that are higher than the INM default takeoff weights, and partly because the takeoff thrust values identified by the airline personnel are lower than the default INM thrust values. These modifications result in a better depiction of the noise exposure around LGA and are identical to those used in the 2021 FAA-accepted NEM.

2.3 2021 Revised NEM Contours

The 2021 Revised NEM contours are depicted in **Figure 2-1** and are superimposed over a future land use map. The 2021 FAA-accepted NEM contours are also depicted in **Figure 2-1** to permit a visual comparison with the 2021 Revised NEM contours. In accordance with 14 CFR Part 150, the 2021 Revised NEM contours reflect the anticipated noise conditions based on Airport and operational data that are representative of the year 2021. The types and amounts of land uses within the DNL 65 and higher contours are provided in **Table 2-4**. The NYC Department of City Planning is the sole land use agency for all land within the 2021 Revised NEM DNL 65 contour. **Table 2-5** presents the estimated land area, number of dwelling units, and population exposed to DNL 65 and higher for the 2021 Revised NEM and the 2021 FAA-accepted NEM. **Table 2-6** presents historic sites, non-residential noise-sensitive sites, and total land area exposed to DNL 65 and higher for the 2021 Revised NEM and the 2021 FAA-accepted NEM. **Table 2-7** lists the historic sites and non-residential noise-sensitive sites exposed to DNL 65 and higher for the 2021 Revised NEM and the 2021 FAA-accepted NEM. Several schools within the DNL 65 contour have already been sound-insulated and are therefore considered compatible with aircraft noise levels of DNL 65 and higher, as indicated in the table. The full map set of the 2021 Revised NEM is included in **Appendix I-1**.

2.4 Stakeholder Engagement and Opportunities for Public Comment

The removal of MD-88 aircraft types from Delta Air Lines' fleet was discussed with the TAC and the public during TAC Meeting #12 on April 20, 2017. At that time, the Port Authority stated that any changes in the 2021 NEM would be reflected in the LGA NCP. The draft revised 2021 NEM DNL contours were presented during TAC Meeting #14 on October 19, 2017. Questions raised during the meetings were answered by the Port Authority and Study Team; the presentation slides and summary notes (including comments and responses) can be found in **Appendix D-7**. The draft 2021 Revised NEM will be provided at the LGA NCP public information workshops and public hearing described in Section 6.2.2. During the comment period for the Draft NCP, interested stakeholders had the opportunity to review and comment on the 2021 Revised NEM. Comments will receive written responses in the Final NCP.

TABLE 2-4
LAND USES EXPOSED TO DNL 65 AND HIGHER – 2021 REVISED NEM

Land Use Category	Land Uses Exposed to DNL 65 and Higher (acres)			
	DNL 65-70	DNL 70-75	DNL 75+	Total
Single- and Two-Family Residential	40.5	0.0	0.0	40.5
Multi-Family Residential	35.3	0.0	0.0	35.3
Mixed Residential and Commercial	6.8	0.0	0.0	6.8
Commercial and Office	39.5	2.6	0.0	42.1
Industrial and Manufacturing	56.9	11.4	0.0	68.3
Transportation, Right of Way, Parking, and Utilities	210.2	13.4	3.4	227.0
Public Facilities and Institutions	197.0	6.8	0.0	203.8
Open Space, Cemeteries, and Outdoor Recreation	25.3	4.9	0.0	30.2
Vacant	29.6	5.5	0.0	35.2
Airport Property	171.1	151.3	269.0	591.4
Water (Off Airport Property)	694.5	284.7	49.7	1028.8
Total	**1506.7**	**480.6**	**322.1**	**2309.4**

NOTE: Numbers may not add up due to rounding.

SOURCE: Planning Technology, Inc. and KB Environmental Sciences, Inc., 2018 and 2020.

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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

*The PLUTO Transportation land use designations on LGA were updated to reflect new airport facilities that were constructed during the LGA Redevelopment Project.

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Figure 2-1

2021 FAA-Accepted and Revised Noise Exposure Map DNL Contours LaGuardia Airport

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TABLE 2-5
RESIDENTIAL LAND USES, DWELLING UNITS, AND POPULATION EXPOSED TO DNL 65 AND HIGHER – 2021 FAA-ACCEPTED NEM AND 2021 REVISED NEM

	Land Area Exposed to DNL 65 and Higher (acres)			Number of Dwelling Units			Population		
Land Use Category	**2021 FAA-Accepted NEM**	**2021 Revised NEM**	**Difference**	**2021 FAA-Accepted NEM**	**2021 Revised NEM**	**Difference**	**2021 FAA-Accepted NEM**	**2021 Revised NEM**	**Difference**
Single-Family and Two-Family Residential	40.4	40.5	0.1	1,207	1,215	8	3,556	3,582	26
Multi-Family Residential	35.2	35.3	0.1	1,739	1,742	3	4,436	4,444	8
Mixed Residential and Commercial	6.5	6.8	0.3	860	833	-27	2,275	2,208	-67
Total	**82.1**	**82.6**	**0.5**	**3,806**	**3,790**	**-16**	**10,267**	**10,234**	**-33**

NOTE: Numbers may not add up due to rounding. Differences were computed by subtracting the 2021 FAA-accepted NEM results from the 2021 Revised NEM results. The household and population estimates provided above were developed using census block 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.

SOURCE: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.

TABLE 2-6
HISTORIC SITES, NON-RESIDENTIAL NOISE-SENSITIVE SITES, AND TOTAL LAND AREA EXPOSED TO DNL 65 AND HIGHER – 2021 FAA-ACCEPTED NEM AND 2021 REVISED NEM

Noise Exposure Map	**Total Land Area (acres)**	**Places of Worship**	**Schools[1]**	**Hospitals and Residential Healthcare**	**Historic Sites**	**Day Care Facilities**
2021 FAA-Accepted NEM	2,389.4	7	3	2	13	3
2021 Revised NEM	2,309.4	7	3	1	13	3
Difference	**-80.0**	0	**0**	**-1**	**0**	**0**

NOTE: Differences were computed by subtracting the 2021 FAA-accepted NEM from the 2021 Revised NEM results.

1. These schools were included in the School Soundproofing Program and are compatible with DNL 65 and higher (see Section 2.6.1 of the LGA NEM Report).

SOURCE: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.

TABLE 2-7
HISTORIC SITES AND NON-RESIDENTIAL NOISE-SENSITIVE SITES EXPOSED TO AIRCRAFT NOISE LEVELS OF DNL 65 AND HIGHER – 2021 FAA-ACCEPTED NEM AND 2021 REVISED NEM

Name	Address	Facility Type	Within 2021 FAA-Accepted NEM DNL 65 and Higher?	Within 2021 Revised NEM DNL 65 and Higher?
Idara Tableegh Ul-Islam	23-38 81st St	Place of Worship	Y	Y
Roman Catholic Church Our Lady of Fatima Convent	25-56 80th St	Place of Worship	Y	Y
Our Lady of Fatima Roman Catholic Church	25-02 80th St	Place of Worship	Y	Y
The Korean Church of Queens	23-27 89th St	Place of Worship	Y	Y
Ebenezer Baptist Church	36-12 Prince St	Place of Worship	Y	Y
Ebenezer Baptist Church	36-06 Prince St	Place of Worship	Y	Y
Gospel Calvary Church	134-28 Northern Blvd	Place of Worship	Y	Y
Monsignor McClancy Memorial High School	71-06 31st Ave	School[1]	Y	Y
Our Lady of Fatima School	25-38 80th St	School[1]	Y	Y
Vaughn College of Aeronautics & Technology	86-01 23rd Ave	School[1]	Y	Y
Independence Residences, Inc.	33-23 69th St	Health Care-Residential	Y	Y
New York Foundling Hospital	153 Stephens Ave	Health Care-Residential	Y	N
Jackson Heights Historic District	33-11 70th St, Queens	Historic Site	Y	Y
Jackson Heights Historic District	33-12 70th St, Queens	Historic Site / Attached Residence	Y	Y
Jackson Heights Historic District	33-14 70th St, Queens	Historic Site / Attached Residence	Y	Y
Jackson Heights Historic District	33-16 70th St, Queens	Historic Site / Attached Residence	Y	Y
Jackson Heights Historic District	33-18 70th St, Queens	Historic Site / Attached Residence	Y	Y
Jackson Heights Historic District	33-20 70th St, Queens	Historic Site / Attached Residence	Y	Y
Jackson Heights Historic District	33-22 70th St, Queens	Historic Site / Attached Residence	Y	Y
Empire Millworks Building, 1938	128-50 Willets Point Blvd	Historic Site	Y	Y
Hangar 3 (1939; Delano & Aldrich)	La Guardia Airport	Historic Site	Y	Y
Hangar 5 (1939; Delano & Aldrich)	La Guardia Airport	Historic Site	Y	Y
Hangar 7 (former sea plane hangar, ca. 1939)	La Guardia Airport	Historic Site	Y	Y
Marine Air Terminal	La Guardia Airport	Historic Site	Y	Y
Jackson Heights Historic District	Jackson Heights	Historic District[2]	Y	Y
Flushing Day Care Center, Inc.	36-06 Prince St	Day Care-Assisted Living	Y	Y
Grace Day Care Center, Inc.	89-00 23rd Ave	Day Care-Assisted Living	Y	Y
Metro Family Residence	87-02 23rd Ave	Day Care-Assisted Living	Y	Y

NOTES:

[1] This school was included in the School Soundproofing Program and is compatible with DNL 65+ (see Section 2.6.1 of the LGA NEM Report 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.

SOURCES: KB Environmental Sciences, Inc., 2020; ESA, 2020.

CHAPTER 3
Noise Compatibility Program – Noise Abatement Measures

Introduction

The Port Authority has implemented noise abatement measures at its airports for several decades; this implementation process substantially predates the Port Authority's 14 CFR Part 150 Studies. Noise abatement measures are those that control noise at the source. Such strategies include airport layout modifications, flight path changes, preferential runway use, and arrival and departure flight procedures. The intention of noise abatement in the NCP is to reduce the number of people and noise-sensitive sites exposed to aircraft noise levels of DNL 65 and higher.[16]

The 14 CFR Part 150 process requires a complete review of existing and potential noise abatement measures that could reduce the number of people exposed to DNL 65 and higher. This includes, at a minimum, a review of the following measures:[17]

- Changes in flight tracks
- Implementation of preferential runway use
- Changes in arrival and departure procedures
- Implementation of airport layout modifications
- Implementation of airport use restrictions

As presented in the LGA NEM Report (Section 2.2.4), LGA is located in one of the most highly congested airspaces in the country. LGA is within 25 miles of two other large-hub airports (JFK and EWR) and the airport with the most domestic business jet operations in the country (TEB[18]), and is within 50 miles of three other general aviation airports that serve the New York–New Jersey metropolitan area.[19] The number and types of noise abatement measures that can be implemented are consequently limited by the congested airspace and the need to prevent conflicts in the use of airspace.

16 14 CFR Part 150, Appendix A, Table 1.

17 14 CFR Part 150, Appendix B, Sec. 150.7(b).

18 FAA Business Jet Report: October 2019 Issue. Available: https://aspm.faa.gov/apmd/sys/bjpdf/b-jet-201910.pdf.

19 Large Hub airports are those airports that each account for at least 1 percent of total U.S. passenger enplanements. General aviation airports primarily serve civil aircraft that are not engaged in commercial air transport operations.

This chapter details the following eight noise abatement measures recommended for inclusion in this NCP:

- Modify NTHNS and GLDMN Runway 13 RNAV SIDs to Direct Aircraft Away from Flushing, New York
- Create New Runway 13 Departure Procedure with an Immediate Left Turn over Compatible Land Uses
- Implement Offset Approach to Runway 22 to Reduce Noise Exposure Over Clason Point.
- Reduce Runway 4 Departure Noise Over Clason Point
- Reduce Runway 13 Departures at Night
- Implement Noise Abatement Departure Profiles on a Voluntary Basis for Runways 4 and 13
- Implement Nighttime Optimized Profile Descent Procedures
- Continue Existing Mandatory Departure Noise Limit

3.1 Existing Aircraft Noise Abatement Program

The Port Authority has pursued aircraft noise abatement measures for several decades. In 1959, it established a mandatory aircraft departure noise limit of 112 Perceived Noise Decibels (PNdB) for aircraft departures.[20] PNdB expresses the perceived loudness of an individual aircraft noise event. To enforce the departure noise limit, the Port Authority installed an airport noise monitoring system, which originally consisted of three monitors. Currently, 10 monitors are located near LGA (**Figure 3-1**). The original system required manual correlation of measured noise levels with individual aircraft operations, but a system upgrade in 1992 added flight tracking and automated this process. The mandatory departure noise limit is a measure that was established before such measures were restricted by the Airport Noise and Capacity Act of 1990 (ANCA). Aircraft operators that violate the mandatory aircraft departure noise limit are contacted by the Port Authority and informed of the violation.

The passage of ANCA subsequently prohibited operation of Stage 2 aircraft, with a maximum weight above 75,000 pounds, in the United States after December 31, 1999. This prohibition provided noise benefits nationwide, including the communities surrounding LGA. ANCA also prevented the Port Authority from establishing additional operational restrictions on Stage 2 (or quieter, such as Stage 3) 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) prohibited operation of Stage 2 aircraft, with weights of 75,000 pounds or lower, within the 48 contiguous United States after December 31, 2015.

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

SOURCE: https://aircraftnoise.panynj.gov/aircraft-noise-monitors/lga-noise-monitor-locations, 2020; ESRI Mapping Services; ESA 2020.

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Figure 3-1

Noise Monitor Locations Proximate to the Airport
LaGuardia Airport

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On December 23, 1976, the FAA promulgated Noise Abatement Operating Restrictions in 14 CFR Part 91, which prohibit the operation of most domestic Stage 1 aircraft after January 1, 1985.[21,22] Consistent with the FAA's amendment to 14 CFR Part 91, the Port Authority prohibited[23] the use of Stage 1 aircraft at LGA, JFK, and EWR after January 1, 1985. In 1989, the Port Authority also prohibited the scheduling of additional nighttime flights of Stage 2 aircraft at LGA, JFK, and EWR.[24] Stage 3 aircraft operating at LGA, JFK, and EWR are not subject to the Stage 1 and Stage 2 use restrictions, as they meet the noise standards set forth in 14 CFR Part 36, Appendix B, Sec. 36.5(c).

Table 3-1 presents a timeline of noise abatement actions taken by the Port Authority, U.S. Congress, and the FAA. The table also highlights the Port Authority and federal actions that have provided noise benefits to communities in the vicinity of LGA.

Section 3.2 describes the Port Authority's noise abatement recommendations and analyzes these recommendations. **Section 3.3** identifies the noise abatement strategies that the Port Authority considered, but does not recommend including in this NCP, and explains why those strategies are not being recommended. **Section 3.4** presents a 2021 NEM representing the noise environment in the vicinity of LGA as a result of noise abatement measures that will be implemented in the year 2021, referred to as the "2021 With Program NEM."

To determine the potential benefits of the recommended noise abatement measures presented in **Section 3.2** of this NCP, the INM was used to model each measure by assigning the INM inputs as described in **Section 3.2**. As previously noted, the LGA 14 CFR Part 150 Study was initiated in October 2014, prior to the FAA's release of the AEDT on May 29, 2015. When the study began, INM 7.0d was the most current FAA-approved model for determining aircraft noise exposure around airports, and it was identified as the model required for use in this study. The FAA's approval of the use of INM 7.0d for this study can be found in Appendix G of the LGA NEM Report.

The INM uses data on aircraft operational counts, operating times of day, fleet mix, and altitude profiles to develop noise exposure contours. The INM accounts for each aircraft flight along flight tracks departing from, or arriving to, an airport during an annual average day. The flight tracks are coupled with information in the model's database relating to noise frequencies and magnitudes at varying distances and flight performance data for each type of aircraft. In general, the model computes and sums noise exposure at grid locations at ground level around an 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 exposure at user-defined points.[25]

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21 "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).

22 41 FR 56046, "Noise Abatement Operating Restrictions: Limitations for Certain Turbojets, Propeller-Driven Small Airplanes, and Agricultural-Operation and Fire Fighting Propeller-Driven Aircraft," December 23, 1976.

23 Available: https://aircraftnoise.panynj.gov/aircraft-noise-engagement-history/.

24 "Stage 2" aircraft meet the noise standards in 14 CFR Part 36, Appendix B, Sec. 36.5(b), originally established in 1969.

25 For the LGA 14 CFR Part 150 Study, the locations of non-residential noise-sensitive sites were represented as user-defined points.

TABLE 3-1
TIMELINE OF LGA NOISE ABATEMENT ACTIONS

Timeline of LGA Noise Abatement Actions

Event	1959	1976	1979	1984	1985	1989	1990	1991	1992	2000	2012	2014	2016	2017	2018
Port Authority establishes a noise limit at LGA of 112 Perceived Noise Decibels (PNdB) for aircraft departures and installs an airport noise monitoring system[1]	Port Authority														
FAA promulgates Noise Abatement Operating Restrictions in 14 CFR Part 91 prohibiting the operation of most domestic Stage 1 aircraft after January 1, 1985.[2,3]		FAA													
Congress passes the Aviation Safety and Noise Abatement Act (ASNA), requiring the FAA to establish processes for aircraft noise measurement and noise compatibility planning			Congress												
FAA promulgates 14 CFR Part 150, Airport Noise Compatibility Planning, in response to requirements of ASNA				FAA											
Consistent with the FAA's December 23, 1976 amendment to 14 CFR Part 91, Port Authority prohibits the use of Stage 1 aircraft at JFK, LGA, and EWR					Port Authority										
Port Authority prohibits the scheduling of nighttime flights of Stage 2 aircraft at JFK, LGA, and EWR[4]						Port Authority									
Congress passes the Airport Noise and Capacity Act of 1990 (ANCA), preventing airports nationwide from establishing additional operational restrictions on Stage 2 (or quieter) aircraft in flight without FAA approval							Congress								
FAA promulgates 14 CFR Part 161, Notice and Approval of Airport Noise and Access Restrictions, in response to requirements of ANCA								FAA							
Port Authority adds flight tracking to noise monitoring system, enabling automatic correlation of flights with noise events							Port Authority								
ANCA prohibits U.S. operations of Stage 1 and 2 aircraft with maximum weight above 75,000 pounds, providing noise benefits nationwide								Congress							
Congress passes the FAA Modernization and Reform Act of 2012 (FMRA)									Congress						
Port Authority initiates 14 CFR Part 150 Studies for JFK, LGA, EWR, and TEB									Port Authority						
FMRA prohibits U.S. operations of Stage 1 and Stage 2 aircraft with maximum weight at or below 75,000 pounds within the 48 contiguous United States											Congress				
FAA promulgates the Stage 5 noise standard; this standard is effective December 31, 2017 for new airplanes with a maximum takeoff weight of at least 121,254 pounds, and December 31, 2020 for new airplanes with a maximum takeoff weight of less than 121,254 pounds														FAA	
Congress passes the FAA Reauthorization Act of 2018															Congress

1. PNdB expresses the perceived loudness of an individual aircraft noise event. K.D. Kryter, "The Meaning and Measurement of Perceived Noise Level," Noise Control 6:5, Sept.-Oct., 1960, pp. 12-17; K.D. Kryter, "Scaling Human Reaction to Sound from Aircraft," Journal of the Acoustical Society of America, vol. 31, 1959, p.1415.
2. 41 FR 56046, "Noise Abatement Operating Restrictions: Limitations for Certain Turbojets, Propeller-Driven Small Airplanes, and Agricultural-Operation and Fire Fighting Propeller-Driven Aircraft," December 23, 1976.
3. "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).
4. "Stage 2" aircraft met the noise standards in 14 CFR Part 36, Appendix B, Section 36.5(b), originally established in 1969.

Note: Timeline is not to scale

For the analysis of noise abatement measures in this NCP, the INM-computed noise exposure associated with each measure was combined with demographic data from the U.S. Census Bureau and land parcel data provided by New York City to determine the land use and population potentially exposed to noise levels of DNL 65 and higher. To determine the potential benefits of each noise abatement measure, the 2021 Revised NEM was used for comparison. The 2021 Revised NEM is presented in **Chapter 2**. The potential benefits of each noise abatement measure were determined by calculating the changes in land use and population exposed to noise levels of DNL 65 and higher associated with each noise abatement measure in comparison with the 2021 Revised NEM.

3.2 Recommended Noise Abatement Measures

This section describes noise abatement measures recommended by the Port Authority, the potential benefits and implementation requirements (e.g., the party responsible for implementing a measure) for each measure, the estimated cost to implement, funding sources for the cost of implementation, and requirements to implement such measures, such as potential environmental review requirements. While many parties were involved in arriving at these recommendations, as discussed in **Section 1.3** and **Chapter 6**, the recommendations are solely those of the Port Authority and not those of the TAC, consultants, or other stakeholders.

Each recommended noise abatement measure in this NCP is a notional design that was developed in order to determine potential noise benefits. Any approved noise abatement measures would need to be developed in detail by the FAA. Precise implementation details, such as flight track locations and altitudes, developed by the FAA may differ from the notional noise abatement measure designs presented in this NCP, in order to adequately address safety, efficiency, and aircraft performance considerations. Detailed noise abatement measure designs may require environmental review under NEPA, which may yield different noise results than the results presented in this NCP. Contradictory results arising from subsequent environmental review efforts may be due to differences in approaches to noise abatement measure design or noise modeling methodology. Any NEM updates performed by the Port Authority in the future, in accordance with LGA Program Management Measure 9 (presented in **Section 5.2**), would reflect actual implementation of the NCP measures as of the date of those NEM updates.

The noise abatement measures being recommended by the Port Authority for the LGA NCP are discussed in detail below.

LGA Noise Abatement Measure 1: Modify NTHNS and GLDMN Runway 13 RNAV SIDs to Direct Aircraft Away from Flushing, New York

Description

NTHNS FOUR DEPARTURE (NTHNS procedure) and GLDMN FIVE DEPARTURE (GLDMN procedure) are existing Area Navigation (RNAV)[26] Standard Instrument Departure (SID)[27] procedures at LGA for turbojet aircraft. In both procedures, aircraft departing Runway 13 initially fly a magnetic heading of 134 degrees, then turn right toward the south (185 degrees) and fly toward the first waypoint (KIWIE), located approximately four nautical miles (NM) south of LGA. After reaching the KIWIE waypoint, aircraft then continue either to the south (toward the NTHNS waypoint) or turn back to the north (toward the GLDMN waypoint) and then on to other locations, as directed by Air Traffic Control (ATC). **Figure 3-2** provides a sample of historical flight tracks for aircraft flying these procedures, while the FAA diagrams for these procedures can be found on **pages C-2** and **C-3** of **Appendix C**.

The intention for the modification to the NTHNS and GLDMN procedures is for aircraft to turn to the south sooner after departure than they currently turn when following the existing NTHNS and GLDMN procedures, thereby reducing the likelihood that departing aircraft would overfly the populated areas of Flushing. This would be accomplished by adding a new waypoint at a location approximately 0.4 NM east of LGA, which would serve to direct aircraft away from populated areas of Flushing. The modification of the NTHNS and GLDMN procedures could reduce noncompatible land uses in Flushing. An illustration of the modification is provided in Figure 3-2.

Type of Measure

This measure is a flight procedure modification that could be used to achieve noise benefits within the airspace constraints and reduce exposure of noise-sensitive parcels and people to aircraft noise in the area around LGA. This flight procedure was implemented in May 2020.

Analysis

The FAA provided a draft description of the NTHNS and GLDMN procedure modifications in a Terminal Area Route Generation and Traffic Simulation (TARGETS) software file. The NY TRACON indicated that all aircraft currently flying the NTHNS and GLDMN procedures would be directed to fly the new procedure if it were to be implemented. It was assumed that aircraft that do not currently fly the NTHNS or GLDMN procedures would not be required to do so in the future. Using this information, the Study Team calculated the potential noise benefits of this procedure.

[26] RNAV procedures are flight procedures that typically use satellite navigation capabilities in RNAV-equipped aircraft, so that aircraft can be guided to precise locations without the need to use ground-based navigational aids. Most commercial aircraft are equipped with navigational systems that can follow RNAV procedures.

[27] SIDs are preplanned air traffic control procedures printed for pilot/controller use in graphic form to provide information regarding obstruction clearance and transition from the terminal area to the appropriate en route structure. SIDs are primarily designed for system enhancement and to reduce pilot/controller workload.

Potential Noise Benefits

Figure 3-3 shows the DNL 65, 70, and 75 contours from the modified NTHNS and GLDMN procedure analysis overlaid on residential land use with the 2021 Revised NEM contours. As shown in **Tables 3-2**, **3-3**, and the close-up contour plot in **Figure 3-4**, implementation of this NCP measure may shift the noise contours in the neighborhood westward, reducing the numbers of noncompatible land uses within the DNL 65 contour in Flushing. The shift in noise contours may also remove up to 750 people and 266 dwelling units from the DNL 65 contour. No new people or dwelling units would be added to the contours as a result of the shift, as the noise contours move closer toward compatible land uses. The tables compare the numbers of historic sites, non-residential noise-sensitive sites, and total land area exposed to noise levels of DNL 65 and higher for this NCP measure to the 2021 Revised NEM.

TABLE 3-2
RESIDENTIAL LAND USES EXPOSED TO DNL 65 AND HIGHER – 2021 REVISED NEM AND MODIFY NTHNS AND GLDMN RUNWAY 13 RNAV SIDS TO DIRECT AIRCRAFT AWAY FROM FLUSHING, NEW YORK (NOISE ABATEMENT MEASURE 1)

	Land Area Exposed to DNL 65 and Higher (acres)			Number of Dwelling Units			Population		
Land Use Category	**2021 Revised NEM**	**Noise Abatement Measure 1**	**Difference**	**2021 Revised NEM**	**Noise Abatement Measure 1**	**Difference**	**2021 Revised NEM**	**Noise Abatement Measure 1**	**Difference**
Single-Family and Two-Family Residential	40.5	40.3	-0.2	1,215	1,206	-9	3,582	3,551	-31
Multi-Family Residential	35.3	34.9	-0.4	1,742	1,682	-60	4,444	4,275	-169
Mixed Residential and Commercial	6.8	1.6	-5.2	833	636	-197	2,208	1,658	-550
Total	**82.6**	**76.8**	**-5.8**	**3,790**	**3,524**	**-266**	**10,234**	**9,484**	**-750**

NOTE: Numbers may not add up because of rounding. Differences were computed by subtracting the 2021 Revised NEM results from the noise abatement measure results. The household and population estimates provided above were developed using census block 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 in the different areas within the DNL 65 and higher contours.

SOURCES: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.

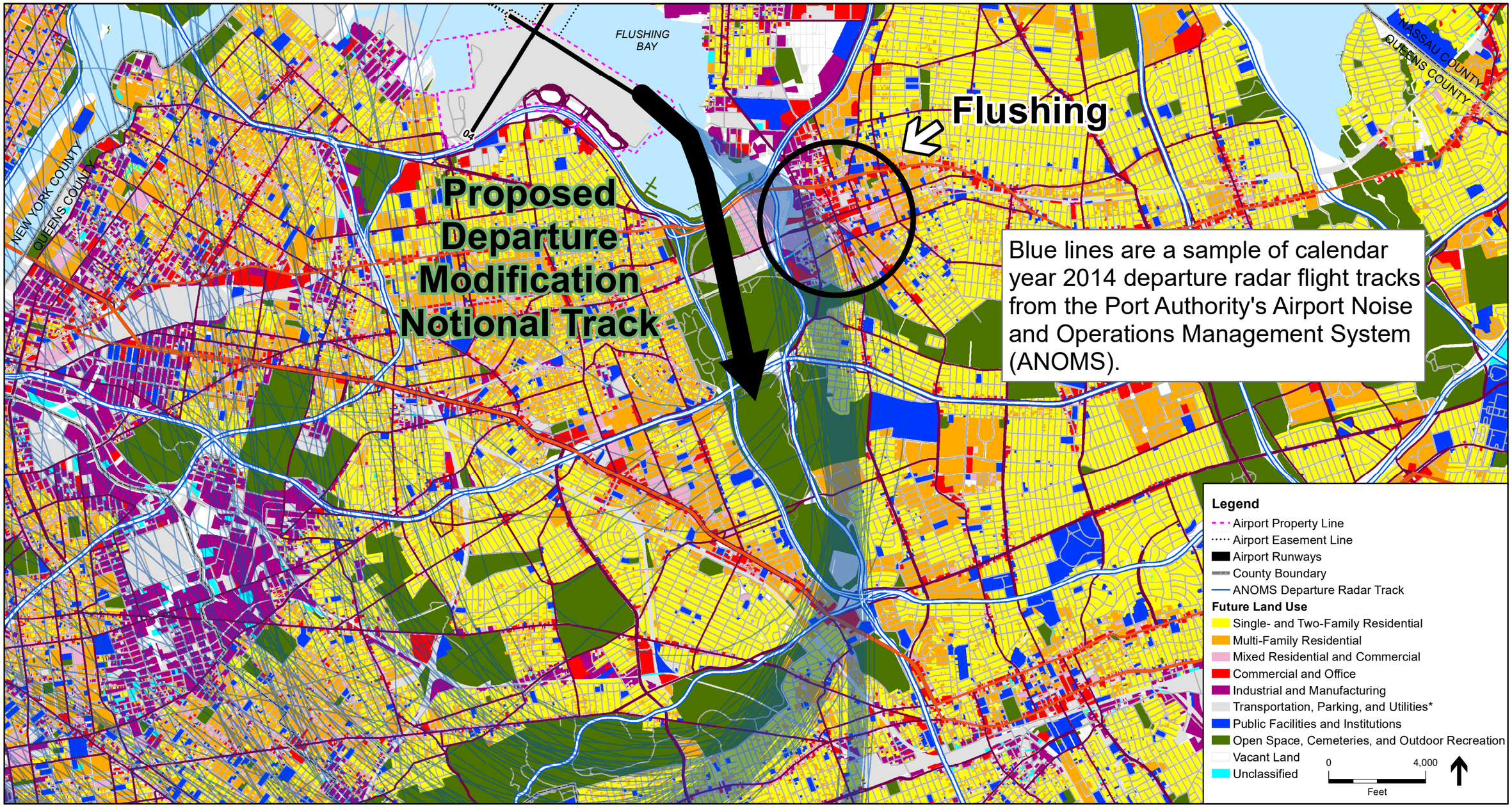
TABLE 3-3
HISTORIC SITES, NON-RESIDENTIAL NOISE-SENSITIVE SITES, AND TOTAL LAND AREA EXPOSED TO DNL 65 AND HIGHER – 2021 REVISED NEM AND MODIFY NTHNS AND GLDMN RUNWAY 13 RNAV SIDS TO DIRECT AIRCRAFT AWAY FROM FLUSHING, NEW YORK (NOISE ABATEMENT MEASURE 1)

Scenario	**Total Land Area (acres)**	**Places of Worship**	**Schools[1]**	**Hospitals and Residential Healthcare**	**Historic Sites**	**Day Care Facilities**
2021 Revised NEM	**2,389.4**	7	3	1	13	3
Noise Abatement Measure 1	**2309.4**	4	3	1	13	2
Difference	**-80.0**	**-3**	**0**	**0**	**0**	**-1**

NOTE: Differences were computed by subtracting the 2021 Revised NEM results from the noise abatement measure results.

1 These schools were included in the School Soundproofing Program and are compatible with DNL 65 and higher (see Section 2.6.1 of the LGA NEM Report).

SOURCES: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.



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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

*The PLUTO Transportation land use designations on LGA were updated to reflect new airport facilities that were constructed during the LGA Redevelopment Project.

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Figure 3-2

Sample of Existing NTHNS and GLDMN Flight Tracks with Proposed NTHNS and GLDMN Modifications
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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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

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Figure 3-3

DNL 65, 70, and 75 Contours - 2021 Baseline and Modify NTHNS and GLDMN Runway 13 RNAV SIDs to Direct Aircraft Away from Flushing, New York
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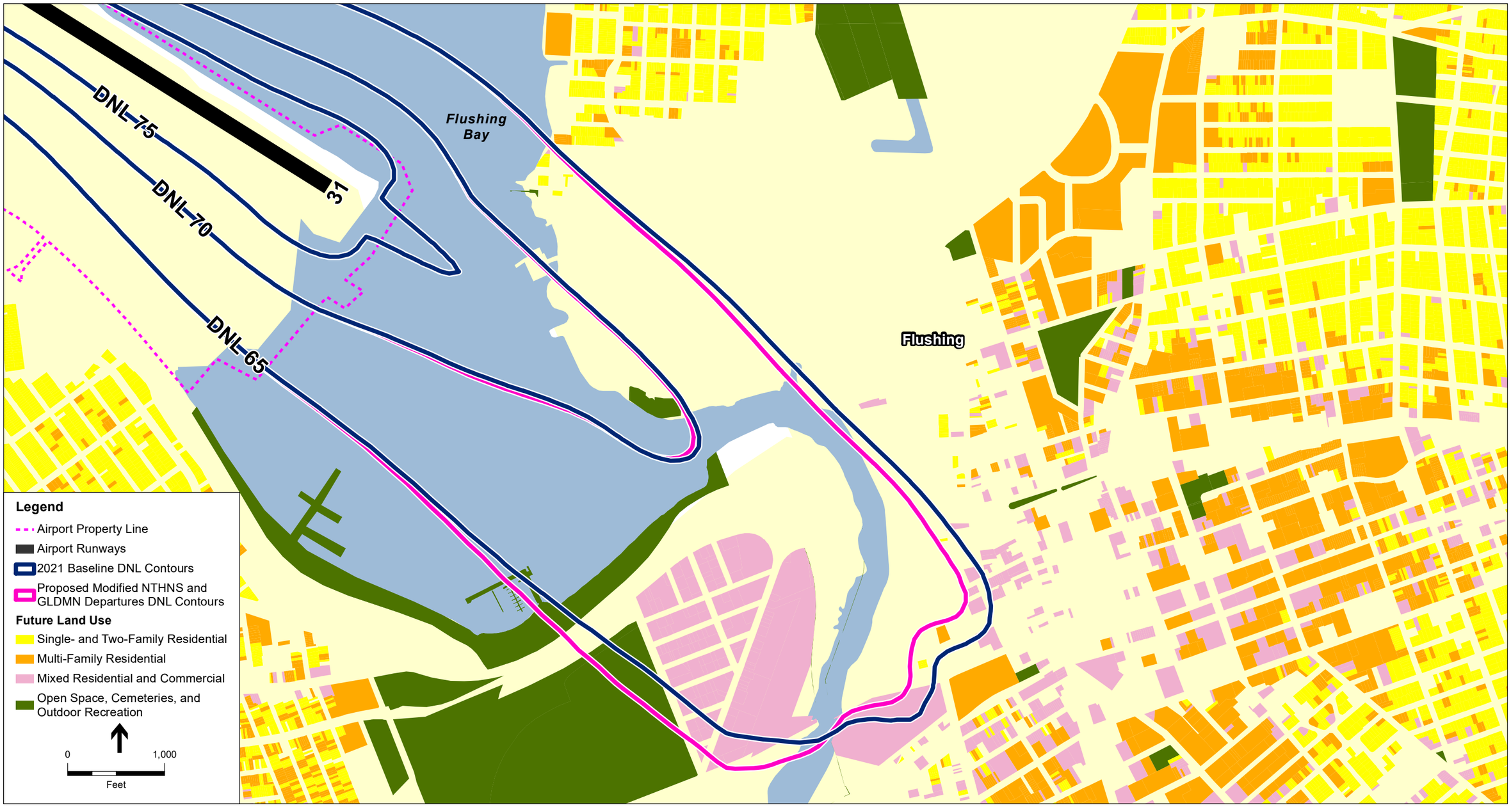

SOURCE: New York City Department of City Planning, MapPLUTO 15V1 - Tax lot/land use geographic information database, March 2015 - June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; INM 7.0d; KB Environmental Sciences, Inc., 2016; ESA, 2016 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

Figure 3-4

DNL 65, 70, and 75 Contours - 2021 Baseline and Modify NTHNS and GLDMN Runway 13 RNAV SIDs to Direct Aircraft Away from Flushing, New York
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Conclusion: *LGA Noise Abatement Measure 1: Modify NTHNS and GLDMN Runway 13 RNAV SIDs (Departures) to Direct Aircraft Away from Flushing, New York* could reduce the population exposed to noise levels of DNL 65 and higher by 750 in the neighborhood of Flushing, Queens, because the procedure would direct flights over areas that are not as densely populated. The analysis of this measure assumed that all aircraft currently flying the NTHNS and GLDMN procedures would fly the modified versions.

Table 3-4 summarizes implementation requirements along with the benefits and rationale for the recommendation of LGA Noise Abatement Measure 1.

TABLE 3-4
IMPLEMENTATION SUMMARY FOR LGA NOISE ABATEMENT MEASURE 1: MODIFY NTHNS AND GLDMN RUNWAY 13 RNAV SIDS TO DIRECT AIRCRAFT AWAY FROM FLUSHING, NEW YORK

Implementation Item	Discussion
Benefits	Potential reduction of up to 750 people in 266 dwelling units exposed to DNL 65 with implementation of the proposed procedure modifications.
Rationale	The Port Authority is recommending LGA Noise Abatement Measure 1 because it could cause aircraft departing from Runway 13 to turn earlier than they currently do to avoid the populated areas of Flushing, Queens, thereby reducing noise levels over residential land uses in that neighborhood.
Responsible Parties	Development and implementation of flight procedures is the sole responsibility of the FAA. This procedure was published in May 2020.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are internal to the FAA (e.g., ATO) and other coordinating agencies. These costs are unknown, and an FAA AIP grant would not be required.
Funding Sources	The FAA.
Requirements	Not applicable; this procedure was published in May 2020.
Estimated Schedule	The procedure was published in May 2020.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Noise Abatement Measure 2: Create New Runway 13 Departure Procedure with an Immediate Left Turn over Compatible Land Uses

Description

This NCP measure involves implementing a new departure procedure for Runway 13 that would direct aircraft to make a left turn shortly after takeoff. Aircraft would initiate the turn before reaching the Whitestone Expressway. This measure is intended to place aircraft over predominantly commercial and industrial land uses while avoiding residential areas in Flushing. This could reduce noncompatible land uses in Flushing. An illustration of the proposed procedure is shown in **Figure 3-5**.

Type of Measure

This measure is a flight procedure that would be used to achieve noise benefits within the airspace constraints and reduce exposure of noise-sensitive parcels and people to aircraft noise in the area around LGA.

Analysis

For the purposes of modeling, the Study Team prepared a departure flight track that would direct aircraft to the north before reaching the Whitestone Expressway; the track is centered over an area of compatible land use just east of LGA. A review of the airspace in the immediate vicinity of LGA identified that this procedure can be used only on a limited basis, so as not to conflict with other operating conditions. The procedure cannot be used by aircraft departing Runway 13 while other aircraft are arriving on Runway 22. This procedure can be used only when aircraft are departing Runway 13 and other aircraft are arriving on either Runway 4 or 13.

For modeling purposes, the total number of Runway 13 departures flying either the TNNIS RNAV or Flushing conventional departure procedures while LGA is in these operating configurations was quantified based on the 2014 ANOMS data. These operations were then assigned to the proposed new Runway 13 departure procedure. All other departure tracks remained unchanged. Using this information, the Study Team calculated the potential noise benefits of this procedure.

Potential Noise Benefits

Figure 3-6 shows the DNL 65, 70, and 75 contours from implementation of the NCP measure overlaid on residential land use, with the 2021 Revised NEM contours. As shown in **Tables 3-5** and **3-6** and the close-up contour plot in **Figure 3-7**, implementation of this NCP measure may shift the noise contours in the neighborhood of Flushing westward, resulting in a reduction of the numbers of noncompatible land uses within the DNL 65 contour in downtown Flushing, toward the lower-right-hand side of the figure. However, the measure may also shift the noise contours to the north in other parts of Flushing, as shown in the upper left-hand side of the figure, resulting in a slight increase in noise in that area. Additionally, as shown in the close-up contour plot in **Figure 3-8**, implementation of this NCP measure may shift the noise contours northward in the neighborhoods of Clason Point and Castle Hill in the Bronx, resulting in a slight increase in noise. Aircraft altitudes on the new procedure could range from 2,000 feet to 4,500 feet near Clason Point.

The shift in noise contours may remove a net number of 309 people and 114 dwelling units from the DNL 65 contour. **Table 3-5** compares the acres of residential land uses, numbers of dwelling units, and population exposed to noise levels of DNL 65 and higher for this NCP measure to the 2021 Revised NEM noise levels. **Table 3-6** compares the acres of total land uses, numbers of historic sites, and numbers of non-residential noise-sensitive sites exposed to noise levels of DNL 65 and higher for this NCP measure to the 2021 Revised NEM noise levels. **Table 3-7** compares the population and numbers of dwelling units exposed to DNL 65 and higher to the 2021 Revised NEM separately for Queens and the Bronx, showing that the measure may add 18 people and 6 dwelling units to the DNL 65 contour in the Bronx, while removing 327 people and 120 dwelling units from the DNL 65 contour in Queens.

TABLE 3-5
RESIDENTIAL LAND USES EXPOSED TO DNL 65 AND HIGHER – 2021 REVISED NEM AND CREATE NEW RUNWAY 13 DEPARTURE PROCEDURE WITH AN IMMEDIATE LEFT TURN OVER COMPATIBLE LAND USES (NOISE ABATEMENT MEASURE 2)

	Land Area Exposed to DNL 65 and Higher (acres)			Number of Dwelling Units			Population		
Land Use Category	**2021 Revised NEM**	**Noise Abatement Measure 2**	**Difference**	**2021 Revised NEM**	**Noise Abatement Measure 2**	**Difference**	**2021 Revised NEM**	**Noise Abatement Measure 2**	**Difference**
Single-Family and Two-Family Residential	40.5	40.7	0.2	1,215	1,214	-1	3,582	3,576	-6
Multi-Family Residential	35.3	35.1	-0.2	1,742	1,754	12	4,444	4,488	44
Mixed Residential and Commercial	6.8	2.1	-4.7	833	708	-125	2,208	1,861	-347
Total	**82.6**	**77.9**	**-4.7**	**3,790**	**3,676**	**-114**	**10,234**	**9,925**	**-309**

NOTE: Numbers may not add up because of rounding. Differences were computed by subtracting the 2021 Revised NEM results from the noise abatement measure results. The household and population estimates provided above were developed using census block 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 in the different areas within the DNL 65 and higher contours.

SOURCES: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.

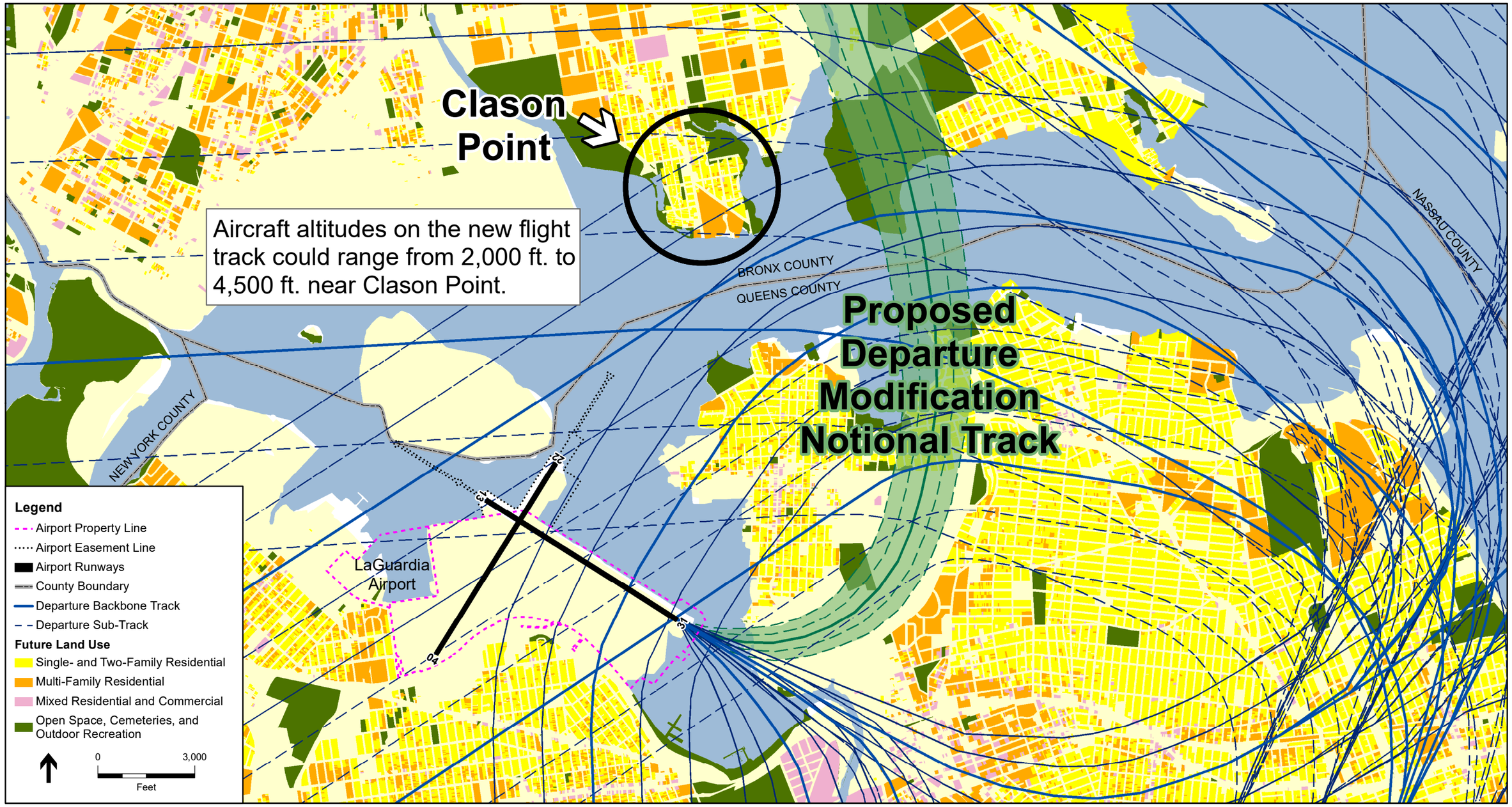
TABLE 3-6
HISTORIC SITES, NON-RESIDENTIAL NOISE-SENSITIVE SITES, AND TOTAL LAND AREA EXPOSED TO DNL 65 AND HIGHER – 2021 REVISED NEM AND CREATE NEW RUNWAY 13 DEPARTURE PROCEDURE WITH AN IMMEDIATE LEFT TURN OVER COMPATIBLE LAND USES (NOISE ABATEMENT MEASURE 2)

Scenario	**Total Land Area (Acres)**	**Places of Worship**	**Schools[1]**	**Hospitals and Residential Healthcare**	**Historic Sites**	**Day Care Facilities**
2021 Revised NEM	**2,309.4**	7	3	1	13	3
Noise Abatement Measure 2	**2,290.1**	4	3	1	13	2
Difference	**-19.3**	**-3**	**0**	**0**	**0**	**-1**

NOTE: Differences were computed by subtracting the 2021 Revised NEM results from the noise abatement measure results.

1. These schools were included in the School Soundproofing Program and are compatible with DNL 65 and higher (see Section 2.6.1 of the LGA NEM Report).

SOURCES: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.



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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

Figure 3-5

Runway 13 INM Departure Tracks and Proposed New Runway 13 Departure Procedure with an Immediate Left Turn over Compatible Land Uses
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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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

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Figure 3-6

DNL 65, 70, and 75 Contours - 2021 Baseline and Proposed New Runway 13 Departure Procedure with an Immediate Left Turn over Compatible Land Uses
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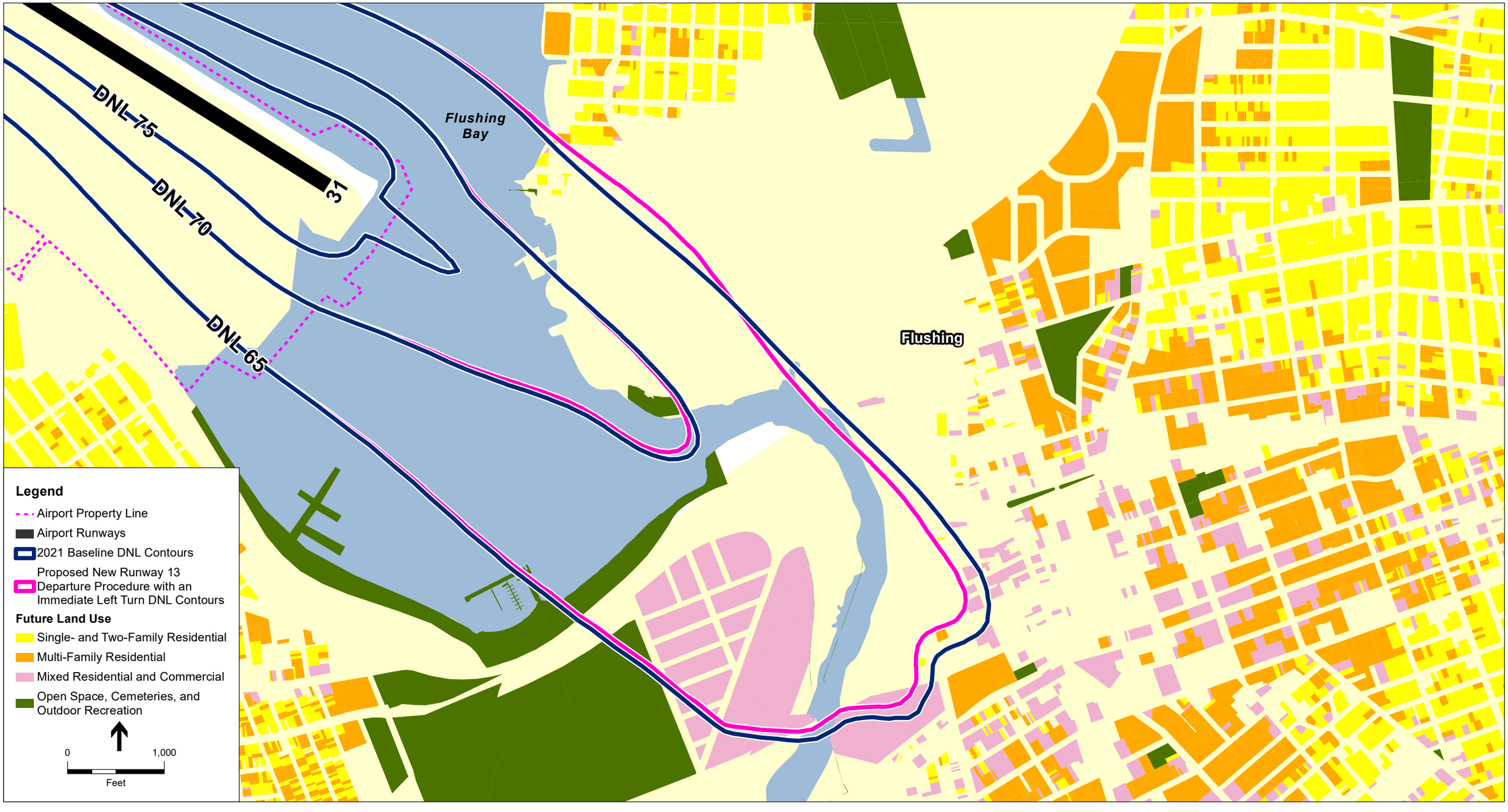

SOURCE: New York City Department of City Planning, MapPLUTO 15V1 - Tax lot/land use geographic information database, March 2015 - June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; INM 7.0d; KB Environmental Sciences, Inc., 2016; ESA, 2016 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

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Figure 3-7

DNL 65, 70, and 75 Contours - 2021 Baseline and Proposed New Runway 13 Departure Procedure with an Immediate Left Turn over Compatible Land Uses
Flushing

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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; ESA, 2017, 2018, and 2019; ESRI Mapping Services, 2019.

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Figure 3-8

DNL 65, 70, and 75 Contours - 2021 Baseline and Proposed New Runway 13 Departure Procedure with an Immediate Left Turn over Compatible Land Uses
Clason Point and Castle Hill

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TABLE 3-7
QUEENS AND BRONX DWELLING UNITS AND POPULATION EXPOSED TO DNL 65 AND HIGHER – 2021 REVISED NEM AND CREATE NEW RUNWAY 13 DEPARTURE PROCEDURE WITH AN IMMEDIATE LEFT TURN OVER COMPATIBLE LAND USES (NOISE ABATEMENT MEASURE 2)

	2021 Revised NEM			Noise Abatement Measure 2			Difference		
Category	**Queens**	**Bronx**	**Total**	**Queens**	**Bronx**	**Total**	**Queens**	**Bronx**	**Total**
Dwelling Units									
Single-Family and Two-Family Residential	712	503	**1,215**	705	509	**1,214**	-7	6	**-1**
Multi-Family Residential	689	1,053	**1,742**	701	1,053	**1,754**	12	0	**12**
Mixed Residential and Commercial	830	3	**833**	705	3	**708**	-125	0	**-125**
Total	**2,231**	**1,559**	**3,790**	**2,111**	**1,565**	**3,676**	**-120**	**6**	**-114**
Population									
Single-Family and Two-Family Residential	2,078	1,504	**3,582**	2,054	1,522	**3,576**	-24	18	**-6**
Multi-Family Residential	1,959	2,485	**4,444**	2,003	2,485	**4,488**	44	0	**44**
Mixed Residential and Commercial	2,199	9	**2,208**	1,852	9	**1,861**	-347	0	**-347**
Total	**6,236**	**3,998**	**10,234**	**5,909**	**4,016**	**9,925**	**-327**	**18**	**-309**

NOTE: Numbers may not add up because of rounding. Differences were computed by subtracting the 2021 Revised NEM results from the noise abatement measure results. The household and population estimates provided above were developed using census block 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 in the different areas within the DNL 65 and higher contours.

SOURCES: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.

Conclusion: *LGA Noise Abatement Measure 2: Create New Runway 13 Departure Procedure with an Immediate Left Turn over Compatible Land Uses* could reduce the population exposed to noise levels of DNL 65 and higher by 327 in the neighborhood of Flushing, Queens, by directing flights over areas that are less densely populated, but may increase the population exposed to noise levels of DNL 65 and higher in the Bronx by 18. The net reduction in people exposed may be 309.

The analysis assumes that aircraft currently departing Runway 13 and flying either the TNNIS RNAV or Flushing conventional departure procedures would be reassigned to the new proposed procedure only when aircraft are landing on Runway 4 or Runway 13 at LGA.

Table 3-8 summarizes implementation requirements along with the benefits and rationale for the recommendation of LGA Noise Abatement Measure 2.

TABLE 3-8
IMPLEMENTATION SUMMARY FOR LGA NOISE ABATEMENT MEASURE 2: CREATE A NEW RUNWAY 13 DEPARTURE PROCEDURE WITH AN IMMEDIATE LEFT TURN OVER COMPATIBLE LAND USES

Implementation Item	Discussion
Benefits	Potential net reduction of up to 309 people in 114 dwelling units exposed to DNL 65 with implementation of the proposed procedure.
Rationale	The Port Authority is recommending LGA Noise Abatement Measure 2 because it could reduce noise exposure over residential land uses in Flushing, Queens.
Responsible Parties	Development and implementation of flight procedures is the sole responsibility of the FAA. The Port Authority will request that the development process be initiated, and then will work with NY TRACON and other FAA personnel to further study and develop this procedure. Implementation of this measure may require an environmental study under NEPA; the FAA would be the responsible party to complete such a study.
Estimated Cost	The expected costs associated with the development and implementation of this procedure are internal to the FAA (e.g., ATO) and other coordinating agencies. These costs are unknown, and an FAA AIP grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require an environmental study under NEPA.
Estimated Schedule	The Port Authority will submit a request for procedure development within 6–12 months of the FAA's Record of Approval for the NCP. FAA design, testing, and implementation of the procedure typically could take 18–24 months, potentially up to 3 years, once the Port Authority requests initiation of the development process.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Noise Abatement Measure 3: Implement Offset Approach to Runway 22 to Reduce Noise Exposure Over Clason Point

Description

This NCP measure involves increasing the time that aircraft arriving to Runway 22 remain over water rather than overflying Clason Point and Castle Hill in the Bronx. Aircraft flying an Instrument Landing System[28] (ILS) approach to Runway 22 follow a path aligned with the runway for the last several miles of the approach (heading 224 degrees). An existing procedure, identified as the Localizer-type Directional Aid Alpha (LDA-A) approach to Runway 22, places aircraft arrivals on an offset path approximately 10 degrees (heading 234 degrees) until they are approximately 1 NM from the end of the runway. At this point, aircraft align with the runway and fly a straight-in approach. This procedure is known as an "offset approach" because for the majority of the approach, aircraft are not precisely aligned with the extended runway centerline. The FAA diagram for the procedure can be found on **page C-7** of **Appendix C**. This approach generally keeps aircraft east of Clason Point and Castle Hill in the Bronx.

The LDA-A approach to Runway 22 uses a navigational beacon to direct the aircraft on approach and is flown only in certain weather conditions. Developing an RNAV overlay of this current LDA-A offset approach may allow this procedure to be used more often and may reduce noncompatible land uses in the Clason Point and Castle Hills areas of the Bronx.

Type of Measure

This measure is a flight procedure that would be used to achieve noise benefits within the airspace constraints and reduce exposure of noise-sensitive parcels and people to aircraft noise in the area around LGA.

Analysis

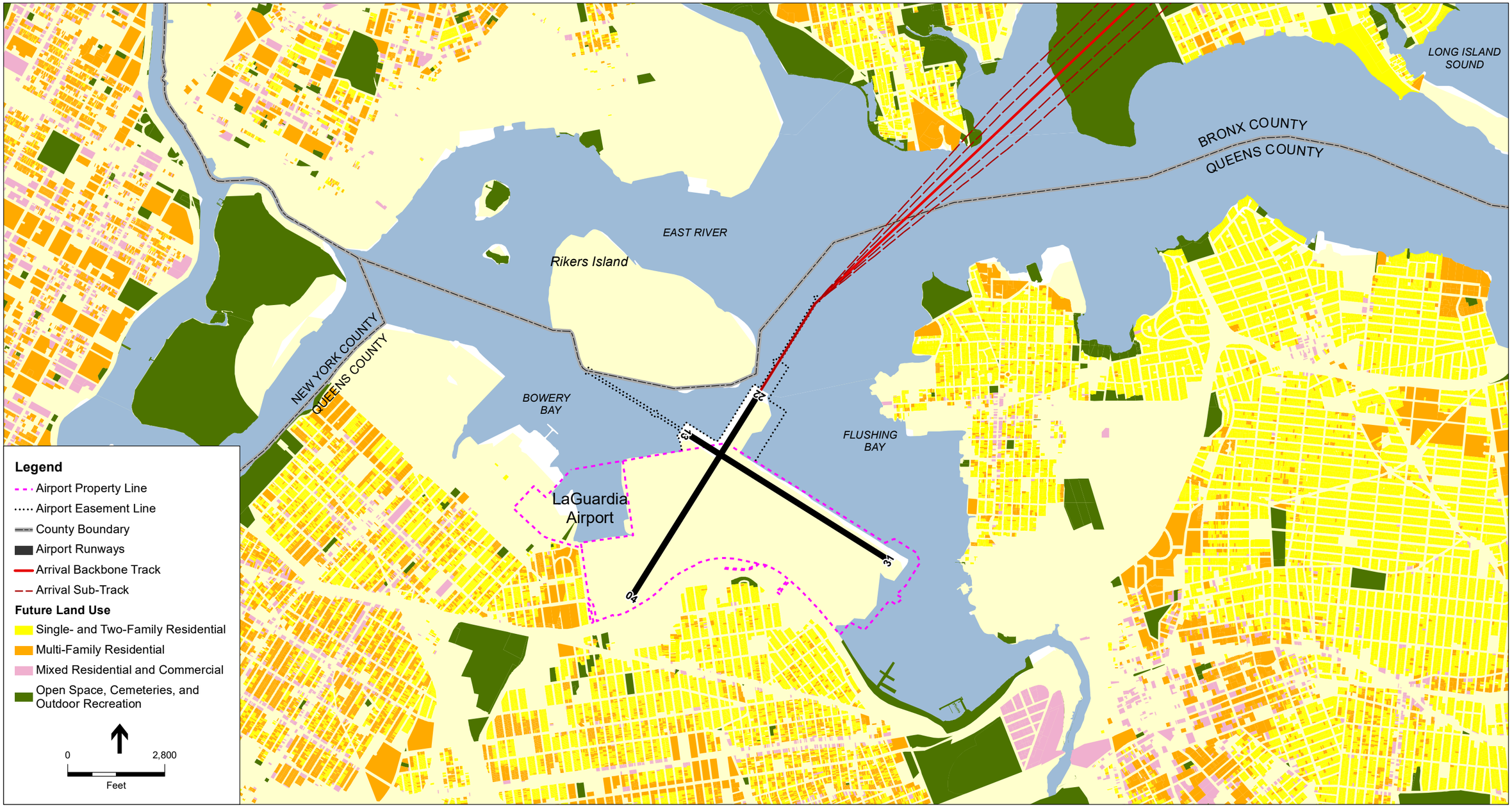
The FAA provided a draft description of an RNAV approach, overlaying the existing LDA-A approach to Runway 22, which depicted the proposed approach following a 234-degree heading until approximately 4 NM from the runway end, then turning to a heading of 239 degrees at a point approximately 1.75 NM from the runway end. From this point, aircraft continue on to intercept the extended runway centerline and then fly straight in to Runway 22 for the remainder of the approach.

The INM flight tracks representing this procedure are shown in **Figure 3-9**. The backbone track represents the procedure centerline and the sub-tracks represent potential variation of aircraft flight paths to the left or right of the procedure centerline. The Study Team, with input from the FAA, modeled 40 percent of arrivals (both day and night) to Runway 22 following this procedure. The FAA input is provided on **page E-208** of **Appendix E-8**. All other arrival track use remained unchanged.

[28] Instrument Landing System is a precision runway approach aid using two radio beams, which together provide pilots with both vertical and horizontal guidance during an approach to land.

Potential Noise Benefits

Figure 3-10 shows the DNL 65, 70, and 75 contours for this NCP measure overlaid on residential land use, with the 2021 Revised NEM contours. As shown in **Tables 3-9** and **3-10** and the close-up contour plot in **Figure 3-11**, implementation of this NCP measure may shift the noise contours southward, reducing the numbers of noncompatible land uses in the DNL 65 contour in the neighborhoods of Clason Point and Castle Hill in the Bronx. The shift in noise contours may also remove up to 1,580 people and 544 dwelling units from the DNL 65 contour. **Table 3-9** compares the acres of residential land uses, numbers of dwelling units, and population exposed to noise levels of DNL 65 and higher for this NCP measure to the 2021 Revised NEM noise levels. **Table 3-10** compares the acres of total land uses, numbers of historic sites, and numbers of non-residential noise-sensitive sites exposed to noise levels of DNL 65 and higher for this NCP measure to the 2021 Revised NEM noise levels.



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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

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Figure 3-9

Proposed Offset Approach to Runway 22
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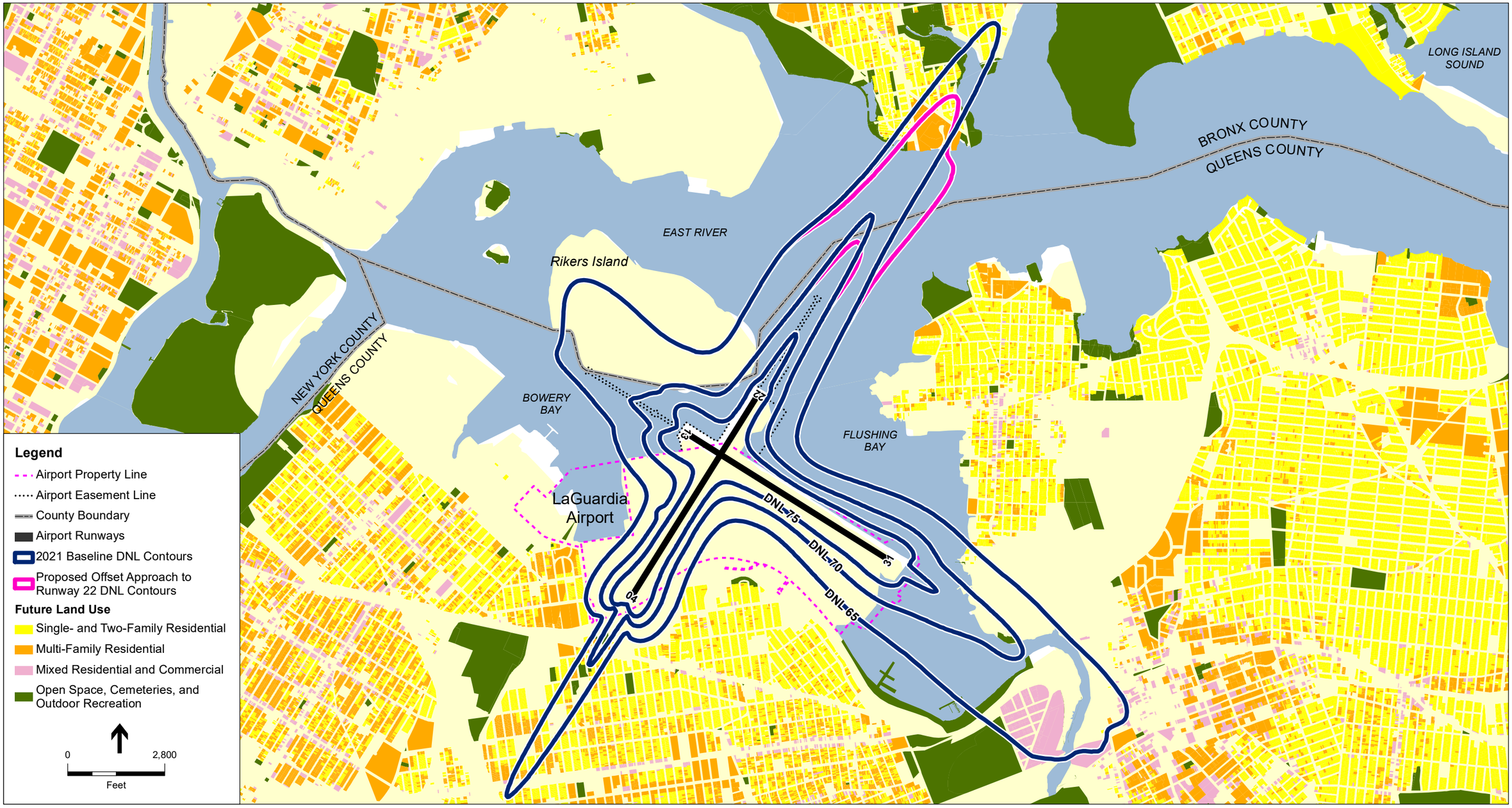

SOURCE: New York City Department of City Planning, MapPLUTO 15V1 - Tax lot/land use geographic information database, March 2015 - June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; INM 7.0d; KB Environmental Sciences, Inc., 2016; ESA, 2016 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

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Figure 3-10

DNL 65, 70, and 75 Contours - 2021 Baseline and Proposed Offset Approach to Runway 22 to Reduce Noise Exposure over Clason Point
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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; ESA, 2017 and 2019; ESRI Mapping Services, 2019.

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Figure 3-11

DNL 65, 70, and 75 Contours - 2021 Baseline and Proposed Offset Approach to Runway 22 to Reduce Noise Exposure over Clason Point
Clason Point and Castle Hill

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TABLE 3-9
RESIDENTIAL LAND USES EXPOSED TO DNL 65 AND HIGHER – 2021 REVISED NEM AND IMPLEMENT OFFSET APPROACH TO RUNWAY 22 TO REDUCE NOISE EXPOSURE OVER CLASON POINT (NOISE ABATEMENT MEASURE 3)

	Land Area Exposed to DNL 65 and Higher (acres)			Number of Dwelling Units			Population		
Land Use Category	**2021 Revised NEM**	**Noise Abatement Measure 3**	**Difference**	**2021 Revised NEM**	**Noise Abatement Measure 3**	**Difference**	**2021 Revised NEM**	**Noise Abatement Measure 3**	**Difference**
Single-Family and Two-Family Residential	40.5	22.8	-17.7	1,215	807	-408	3,582	2,370	-1,212
Multi-Family Residential	35.3	29.2	-6.1	1,742	1,609	-133	4,444	4,085	-359
Mixed Residential and Commercial	6.8	6.6	-0.2	833	830	-3	2,208	2,199	-9
Total	**82.6**	**58.6**	**-24.0**	**3,790**	**3,246**	**-544**	**10,234**	**8,654**	**-1,580**

NOTE: Numbers may not add up because of rounding. Differences were computed by subtracting the 2021 Revised NEM results from the noise abatement measure results. The household and population estimates provided above were developed using census block 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 in the different areas within the DNL 65 and higher contours.

SOURCES: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.

TABLE 3-10
HISTORIC SITES, NON-RESIDENTIAL NOISE-SENSITIVE SITES, AND TOTAL LAND AREA EXPOSED TO DNL 65 AND HIGHER – 2021 REVISED NEM AND IMPLEMENT OFFSET APPROACH TO RUNWAY 22 TO REDUCE NOISE EXPOSURE OVER CLASON POINT (NOISE ABATEMENT MEASURE 3)

Scenario	**Total Land Area (Acres)**	**Places of Worship**	**Schools[1]**	**Hospitals and Residential Healthcare**	**Historic Sites**	**Day Care Facilities**
2021 Revised NEM	2,309.4	7	3	1	13	3
Noise Abatement Measure 3	2,273.1	7	3	1	13	3
Difference	**-36.3**	**0**	**0**	**0**	**0**	**0**

NOTE: Differences were computed by subtracting the 2021 Revised NEM results from the noise abatement measure results.

1 These schools were included in the School Soundproofing Program and are compatible with DNL 65 and higher (see Section 2.6.1 of the LGA NEM Report).

SOURCES: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.

Conclusion: *LGA Noise Abatement Measure 3: Implement Offset Approach to Runway 22 to Reduce Noise Exposure Over Clason Point* could reduce the population exposed to noise levels of DNL 65 and higher by 1,580 in the neighborhoods of Clason Point and Castle Hill in the Bronx by directing more flights over water. The analysis of this measure assumed that 40 percent of arrivals (both day and night) to Runway 22 would use the proposed offset approach.

Table 3-11 summarizes implementation requirements along with the benefits and rationale for the recommendation of LGA Noise Abatement Measure 3.

TABLE 3-11
IMPLEMENTATION SUMMARY FOR LGA NOISE ABATEMENT MEASURE 3:
IMPLEMENT OFFSET APPROACH TO RUNWAY 22 TO REDUCE NOISE EXPOSURE OVER CLASON POINT

Implementation Item	Discussion
Benefits	Potential reduction of up to 1,580 people in 544 dwelling units exposed to DNL 65 with implementation of the proposed procedure.
Rationale	The Port Authority is recommending LGA Noise Abatement Measure 3 because aircraft arriving to Runway 22 would remain over water longer, thereby reducing noise levels over residential land uses in Clason Point and Castle Hill, in the Bronx.
Responsible Parties	Development and implementation of flight procedures is the sole responsibility of the FAA. The Port Authority will request that the development process be initiated, and then will work with NY TRACON and other FAA personnel to further study and develop this procedure. Implementation of this measure may require an environmental study under NEPA; the FAA would be the responsible party to complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are internal to the FAA (e.g., ATO) and other coordinating agencies. These costs are unknown, and an FAA AIP grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require the FAA to perform an environmental study under NEPA.
Estimated Schedule	The Port Authority will submit a request for procedure development within 6–12 months of the FAA's Record of Approval for the NCP. FAA design, testing, and implementation of the procedure typically could take 18–24 months, potentially up to 3 years once the Port Authority requests initiation of the development process.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Noise Abatement Measure 4: Reduce Runway 4 Departure Noise Over Clason Point

Description

This NCP measure involves increasing the use of an existing Runway 4 departure procedure to result in a reduced number of departures overflying Clason Point in the Bronx. The current LAGUARDIA FIVE DEPARTURE procedure indicates that aircraft departing Runway 4 are to initiate a right turn to a magnetic heading of 055 degrees shortly after takeoff. This places aircraft to the east of Clason Point to overfly water, and then compatible land use, while gaining altitude. Increasing the use of this turn may reduce noncompatible land uses in the Bronx. The FAA diagram for the procedure is shown on **page C-4** of **Appendix C**, while flight tracks of aircraft flying the procedure are shown in **Figure 3-12**.

Type of Measure

This measure is a flight procedure that could be used to achieve noise benefits within the airspace constraints and reduce exposure of noise-sensitive parcels and people to aircraft noise in the area around LGA.

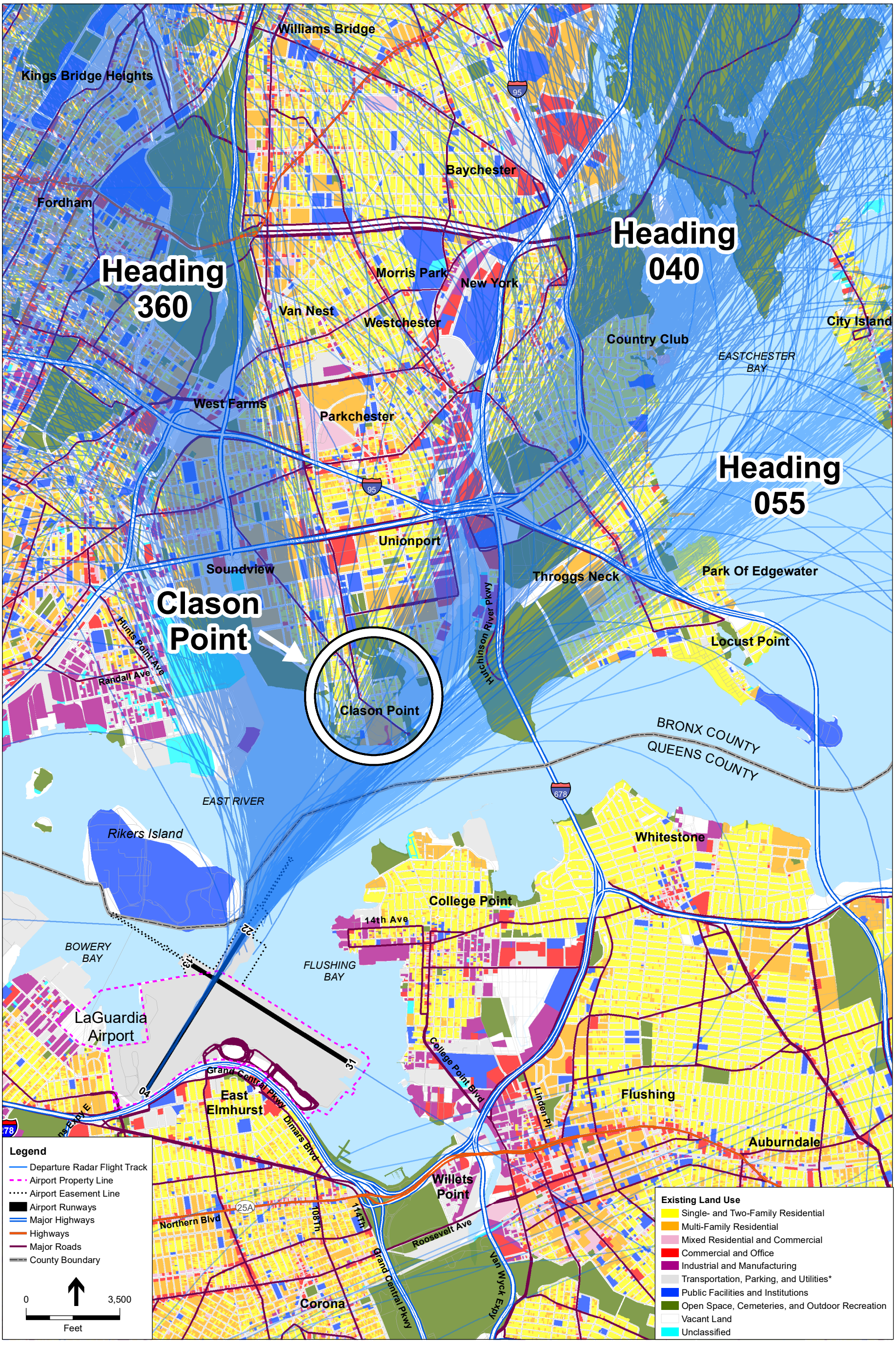
Analysis

The Study Team analyzed LGA Runway 4 departure flight tracks using 2014 ANOMS data to determine the percentage of aircraft that flew the 040 and 055 headings for both daytime and nighttime. The 2014 ANOMS data indicated that the departure track use for heading 040 at LGA was 8.4 percent of all departures in the daytime and 9.5 percent of all departures at night, while the track use for heading 055 was 1.4 percent in the daytime and 4.2 percent at night. In coordination with the Port Authority, the Study Team assumed that aircraft flying the 040 heading and then continuing to the northeast could likely fly a 055 heading. From a review of ANOMS data, it was determined that 2.5 percent of all departing aircraft at LGA flew the 040 heading and then continued on to the northeast in the daytime and nighttime. Therefore, aircraft that flew the 040 heading and ultimately continued on to the northeast were reassigned to the 055 heading, for the purposes of modeling this NCP measure. The track use for the 040 heading was therefore changed to 5.9 percent in the daytime and 7.0 percent at night for modeling purposes, while the track use for the 055 heading was changed to 3.9 percent in the daytime and 4.2 percent at night. All other departure track use remained unchanged.

The NY TRACON did indicate that this measure would require implementation of a new LGA RNAV arrival route to ensure safe separation between departing and arriving aircraft. Details of this potential arrival route were not available for modeling at the time of this analysis. Therefore, arrival flight tracks and flight track use remained unchanged from the 2021 Revised NEM for the purposes of modeling, and the noise contours associated with this recommended noise abatement measure do not reflect the potential implementation of a new LGA RNAV arrival route.

Potential Noise Benefits

Figure 3-13 shows the DNL 65, 70, and 75 contours for this NCP measure overlaid on residential land use, with the 2021 Revised NEM contours. As shown in **Tables 3-12** and **3-13** and the close-up contour plot in **Figure 3-14**, implementation of this NCP measure would shift the noise contours in the neighborhoods to the southwest, resulting in a reduction in the numbers of noncompatible land uses in the DNL 65 contour in the neighborhoods of Clason Point and Castle Hill in the Bronx. The shift in noise contours may also remove up to 159 people and 53 dwelling units from the DNL 65 contour. **Table 3-12** compares the acres of residential land uses, numbers of dwelling units, and population exposed to noise levels of DNL 65 and higher for this NCP measure versus the 2021 Revised NEM noise levels. **Table 3-13** compares the acres of total land uses, numbers of historic sites, and numbers of non-residential noise-sensitive sites exposed to noise levels of DNL 65 and higher for this NCP measure to the 2021 Revised NEM noise levels.



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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

*The PLUTO Transportation land use designations on LGA were updated to reflect new airport facilities that were constructed during the LGA Redevelopment Project.

Figure 3-12
Runway 4 Departures from Calendar Year 2014
ANOMS Data - All Headings Magnetic
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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

LaGuardia 14 CFR Part 150 Study. 140037

Figure 3-13

DNL 65, 70, and 75 Contours - 2021 Baseline and Proposed Reduce Runway 4 Departure Noise over Clason Point
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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

LaGuardia 14 CFR Part 150 Study. 140037

Figure 3-14

DNL 65, 70, and 75 Contours - 2021 Baseline and Proposed Reduce Runway 4 Departure Noise over Clason Point
Clason Point and Castle Hill

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TABLE 3-12
RESIDENTIAL LAND USES EXPOSED TO DNL 65 AND HIGHER – 2021 REVISED NEM AND REDUCE RUNWAY 4 DEPARTURE NOISE OVER CLASON POINT (NOISE ABATEMENT MEASURE 4)

	Land Area Exposed to DNL 65 and Higher (acres)			Number of Dwelling Units			Population		
Land Use Category	**2021 Revised NEM**	**Noise Abatement Measure 4**	**Difference**	**2021 Revised NEM**	**Noise Abatement Measure 4**	**Difference**	**2021 Revised NEM**	**Noise Abatement Measure 4**	**Difference**
Single-Family and Two-Family Residential	40.5	38.4	-2.1	1,215	1,162	-53	3,582	3,423	-159
Multi-Family Residential	35.3	35.0	-0.4	1,742	1,742	0	4,444	4,444	0
Mixed Residential and Commercial	6.8	6.8	0.0	833	833	0	2,208	2,208	0
Total	**82.6**	**80.2**	**-2.5**	**3,790**	**3,737**	**-53**	**10,234**	**10,075**	**-159**

NOTE: Numbers may not add up because of rounding. Differences were computed by subtracting the 2021 Revised NEM results from the noise abatement measure results. The household and population estimates provided above were developed using census block 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 in the different areas within the DNL 65 and higher contours.

SOURCES: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.

TABLE 3-13
HISTORIC SITES, NON-RESIDENTIAL NOISE-SENSITIVE SITES, AND TOTAL LAND AREA EXPOSED TO DNL 65 AND HIGHER – 2021 REVISED NEM AND REDUCE RUNWAY 4 DEPARTURE NOISE OVER CLASON POINT (NOISE ABATEMENT MEASURE 4)

Scenario	**Total Land Area (Acres)**	**Places of Worship**	**Schools[1]**	**Hospitals and Residential Healthcare**	**Historic Sites**	**Day Care Facilities**
2021 Revised NEM	2,309.4	7	3	1	13	3
Noise Abatement Measure 4	2,300.4	7	3	1	13	3
Difference	**-9.0**	**0**	**0**	**0**	**0**	**0**

NOTE: Differences were computed by subtracting the 2021 Revised NEM results from the noise abatement measure results.
1 These schools were included in the School Soundproofing Program and are compatible with DNL 65 and higher (see Section 2.6.1 of the LGA NEM Report).

SOURCES: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.

Conclusion: *LGA Noise Abatement Measure 4: Reduce Runway 4 Departure Noise over Clason Point* could reduce the population exposed to noise levels of DNL 65 and higher by 159 in the neighborhoods of Clason Point and Castle Hill in the Bronx by directing more flights over water. The analysis of the measure assumed that aircraft flying the 040 heading and continuing on to the northeast would be reassigned to the 055 heading, avoiding overflight of residential land use.

Table 3-14 summarizes implementation requirements along with the benefits and rationale for the recommendation of LGA Noise Abatement Measure 4.

TABLE 3-14
IMPLEMENTATION SUMMARY FOR LGA NOISE ABATEMENT MEASURE 4: REDUCE RUNWAY 4 DEPARTURE NOISE OVER CLASON POINT

Implementation Item	Discussion
Benefits	Potential reduction of up to 159 people in 53 dwelling units exposed to DNL 65 with implementation of the proposed procedure modifications.
Rationale	The Port Authority is recommending LGA Noise Abatement Measure 4 because aircraft departing from Runway 4 would remain over water longer, thereby reducing noise exposure over residential land uses in Clason Point and Castle Hill, in the Bronx.
Responsible Parties	Development and implementation of flight procedures is the sole responsibility of the FAA. The Port Authority will request that the development process be initiated, and then will work with NY TRACON and other FAA personnel to further study and develop this procedure. Implementation of this measure may require an environmental study under NEPA; the FAA would be the responsible party to complete such a study.
Estimated Cost to Implement	The expected costs associated with the development and implementation of this procedure are internal to the FAA (e.g., ATO) and other coordinating agencies. These costs are unknown, and an FAA AIP grant would not be required.
Funding Sources	The FAA.
Requirements to Implement	FAA approval. Implementation may require the FAA to perform an environmental study under NEPA.
Estimated Schedule	The Port Authority will submit a request for procedure development within 6–12 months of the FAA's Record of Approval for the NCP. FAA design, testing, and implementation of the procedure typically could take 18–24 months, potentially up to 3 years once the Port Authority requests initiation of the development process.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Noise Abatement Measure 5: Reduce Runway 13 Departures at Night

Description

This NCP measure involves reducing the number of departures from Runway 13 at night (10:00:00 P.M. to 6:59:59 A.M.). If a portion of aircraft currently departing Runway 13 were instead assigned to depart Runway 31, there would be a reduction in noise for noncompatible land uses to the east in Flushing and an increase in noise over compatible land uses immediately west of LGA. Elimination of all nighttime Runway 13 departures is not feasible because certain wind and weather conditions necessitate the use of Runway 13 for departures to meet aircraft safety and performance requirements.

Type of Measure

This measure is a type of preferential runway use program that would be used to reduce the exposure of individuals (or specific noise-sensitive areas) to noise in the area around LGA. Airport operators, however, do not have the authority to mandate which runways are used, but they do have an obligation to inform the FAA which runways are available, so that the FAA can then select among available runways for use by aircraft. In general, preferential runway use measures are recommended to the FAA with the understanding that they can only be implemented when operating conditions permit.

Analysis

The Study Team analyzed LGA runway use using 2014 ANOMS data to determine the percentage of aircraft that departed from Runways 13 and 31 at night. Hourly weather data for 2014 were reviewed and the identification of the weather conditions (wind speed and direction) for the maximum allowable use of Runway 31 departures was quantified. The wind speed and direction criteria for maximum allowable Runway 31 use were obtained from the FAA and are provided on **page C-8** of **Appendix C**. The analysis indicated that approximately three-fourths of the departures in 2014 from Runway 13 at night could be assigned to Runway 31. Therefore, for modeling purposes, approximately 75 percent of modeled Runway 13 departures at night were reassigned to Runway 31. All other runway use remained unchanged. It should be noted that weather conditions change from year to year, and this analysis quantified only the conditions in 2014.

Potential Noise Benefits

Figure 3-15 shows the DNL 65, 70, and 75 contours from implementation of the NCP measure overlaid on residential land use, with the 2021 Revised NEM contours. As shown in **Tables 3-15** and **3-16** and the close-up contour plot in **Figure 3-16**, implementation of this NCP measure may shift the noise contours to the northwest, resulting in a reduction in the numbers of noncompatible land uses in the DNL 65 contour in the Flushing neighborhood of Queens. The shift in noise contours may also remove up to 2,062 people and 730 dwelling units from the DNL 65 contour. **Table 3-15** compares the acres of residential land uses, numbers of dwelling units, and population exposed to noise levels of DNL 65 and higher for this NCP measure to the 2021 Revised NEM noise levels. **Table 3-16** compares the acres of total land uses, numbers of historic sites, and numbers of non-residential noise-sensitive sites exposed to noise levels of DNL 65 and higher for this NCP measure to the 2021 Revised NEM noise levels.

TABLE 3-15
RESIDENTIAL LAND USES EXPOSED TO DNL 65 AND HIGHER – 2021 REVISED NEM AND REDUCE RUNWAY 13 DEPARTURES AT NIGHT (NOISE ABATEMENT MEASURE 5)

	Land Area Exposed to DNL 65 and Higher (acres)			Number of Dwelling units			Population		
Land Use Category	**2021 Revised NEM**	**Noise Abatement Measure 5**	**Difference**	**2021 Revised NEM**	**Noise Abatement Measure 5**	**Difference**	**2021 Revised NEM**	**Noise Abatement Measure 5**	**Difference**
Single-Family and Two-Family Residential	40.5	39.7	-0.8	1,215	1,195	-20	3,582	3,517	-65
Multi-Family Residential	35.3	34.9	-0.4	1,742	1,682	-60	4,444	4,275	-169
Mixed Residential and Commercial	6.8	0.5	-6.3	833	183	-650	2,208	380	-1,828
Total	**82.6**	**75.1**	**-7.5**	**3,790**	**3,060**	**-730**	**10,234**	**8,172**	**-2,062**

NOTE: Numbers may not add up because of rounding. Differences were computed by subtracting the 2021 Revised NEM results from the noise abatement measure results. The household and population estimates provided above were developed using census block 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 in the different areas within the DNL 65 and higher contours.

SOURCES: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.

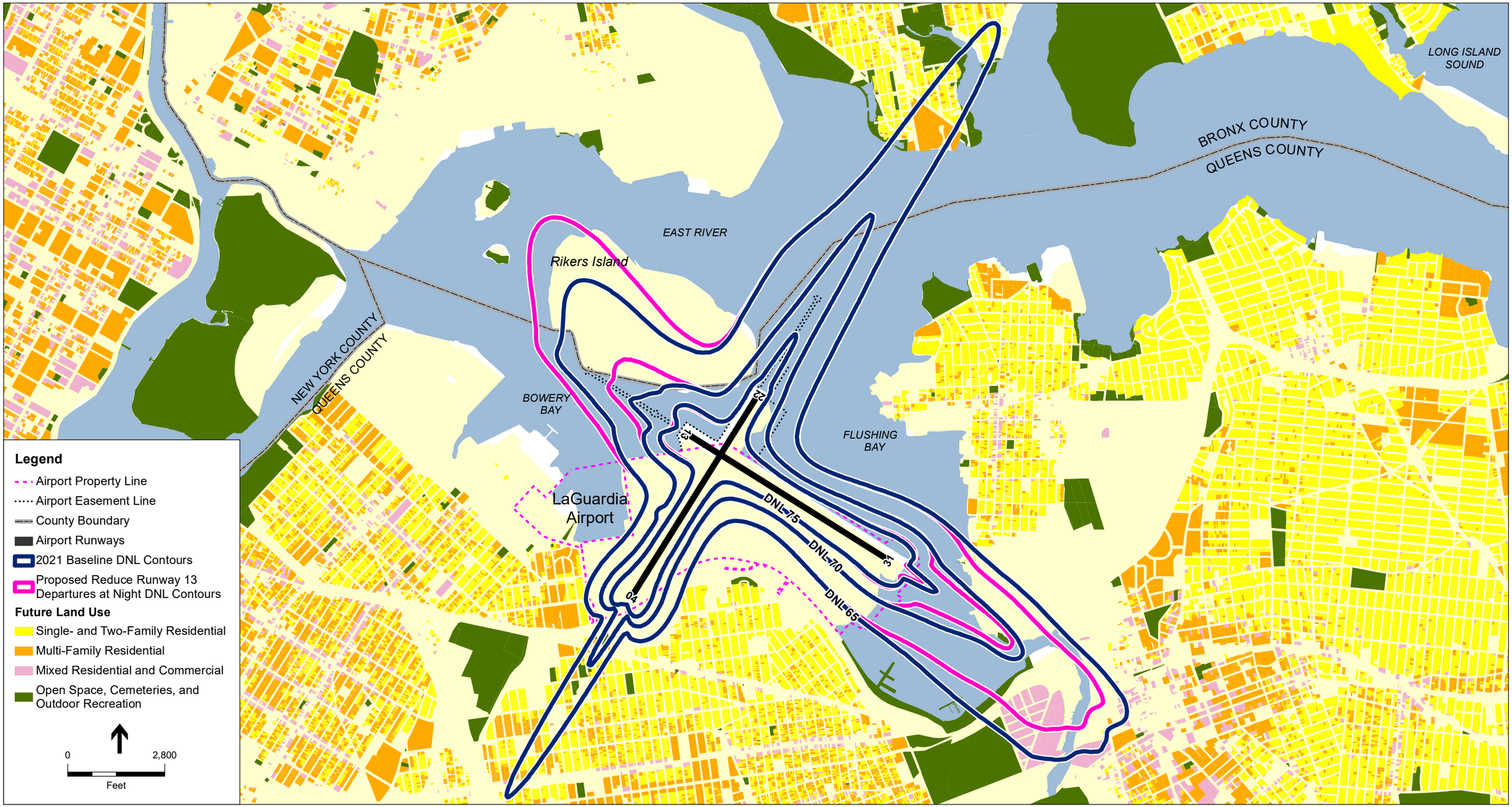
TABLE 3-16
HISTORIC SITES, NON-RESIDENTIAL NOISE-SENSITIVE SITES, AND TOTAL LAND AREA EXPOSED TO DNL 65 AND HIGHER – 2021 REVISED NEM AND REDUCE RUNWAY 13 DEPARTURES AT NIGHT (NOISE ABATEMENT MEASURE 5)

Scenario	**Total Land Area (Acres)**	**Places of Worship**	**Schools[1]**	**Hospitals and Residential Healthcare**	**Historic Sites**	**Day Care Facilities**
2021 Revised NEM	2,309.4	7	3	1	13	3
Noise Abatement Measure 5	2,324.2	4	3	1	13	2
Difference	**14.8**	**-3**	**0**	**0**	**0**	**-1**

NOTE: Differences were computed by subtracting the 2021 Revised NEM results from the noise abatement measure results.

1 These schools were included in the School Soundproofing Program and are compatible with DNL 65 and higher (see Section 2.6.1 of the LGA NEM Report).

SOURCES: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.



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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

LaGuardia 14 CFR Part 150 Study. 140037

Figure 3-15

DNL 65, 70, and 75 Contours - 2021 Baseline and Proposed Reduce Runway 13 Departures at Night
LaGuardia Airport

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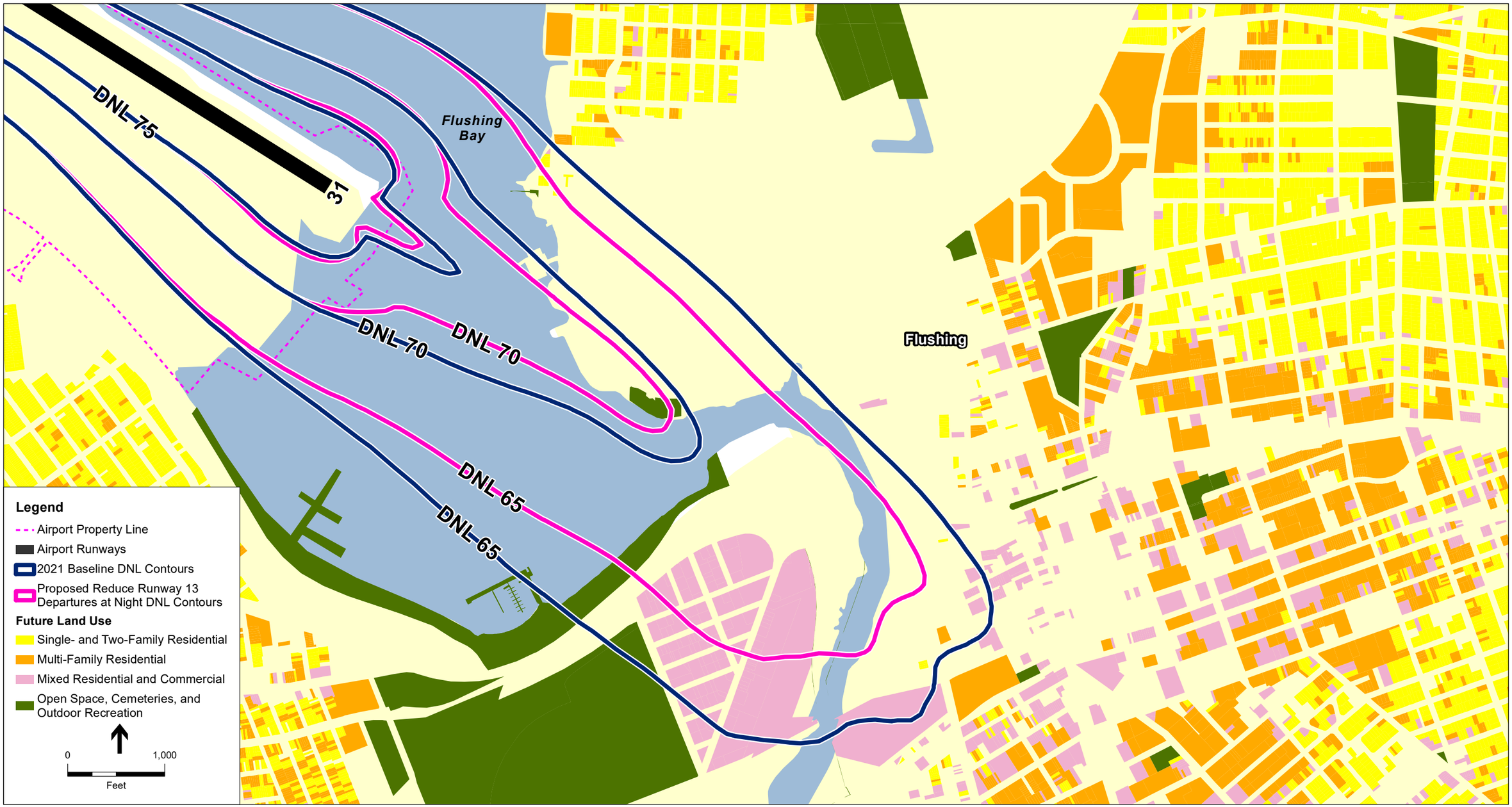

SOURCE: New York City Department of City Planning, MapPLUTO 15V1 - Tax lot/land use geographic information database, March 2015 - June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; INM 7.0d; ESA, 2017, 2018, and 2020; ESRI Mapping Services, 2019.

Figure 3-16

DNL 65, 70, and 75 Contours - 2021 Baseline and Proposed Reduce Runway 13 Departures at Night
Flushing

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Conclusion: *LGA Noise Abatement Measure 5: Reduce Runway 13 Departures at Night* could reduce the population exposed to noise levels of DNL 65 and higher by 2,062 in the neighborhood of Flushing, Queens, by reducing the frequency of nighttime overflights. Analysis of the measure assumed that approximately 75 percent of Runway 13 nighttime departures could be reassigned to Runway 31.

Table 3-17 summarizes implementation requirements along with the benefits and rationale for the recommendation of LGA Noise Abatement Measure 5.

TABLE 3-17
IMPLEMENTATION SUMMARY FOR LGA NOISE ABATEMENT MEASURE 5: REDUCE RUNWAY 13 DEPARTURES AT NIGHT

Implementation Item	Description
Benefits	Potential reduction of up to 2,062 people in 730 dwelling units exposed to DNL 65 with implementation of the proposed measure.
Rationale	The Port Authority is recommending LGA Noise Abatement Measure 5 because it could reduce noise exposure over residential land uses in Flushing, Queens, at night by redirecting aircraft over compatible land uses.
Responsible Parties	Selection among available runways for use by aircraft is the sole responsibility of the FAA. The Port Authority will request that the development process for this measure be initiated, and then will work with NY TRACON and other FAA personnel to further study and develop the measure. Implementation of this measure may require an environmental study under NEPA; the FAA would be the responsible party to complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are internal to the FAA (e.g., ATO) and other coordinating agencies. These costs are unknown, and an FAA AIP grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require the FAA to perform an environmental study under NEPA.
Estimated Schedule	The Port Authority will submit a request for procedure development within 6–12 months of the FAA's Record of Approval for the NCP. FAA design, testing, and implementation of the procedure typically could take 18–24 months, potentially up to 3 years once the Port Authority requests initiation of the development process.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

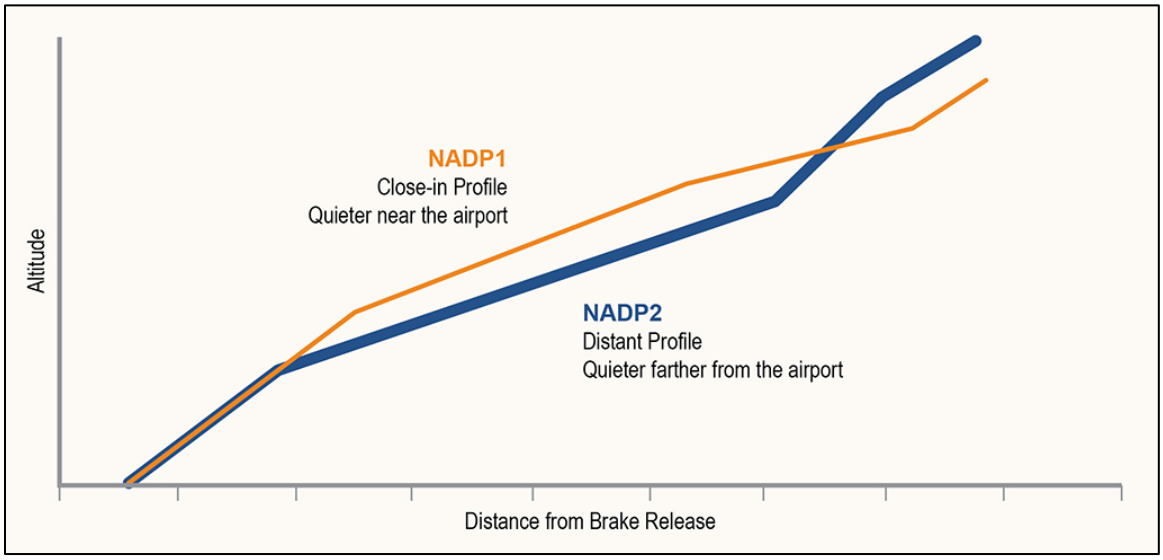
LGA Noise Abatement Measure 6: Implement Noise Abatement Departure Profiles on a Voluntary Basis for Runways 4 and 13

Description

This NCP measure involves the voluntary implementation of noise abatement departure profiles (NADPs), which are aircraft climb-out profiles that can provide noise reduction benefits. In 1993, the FAA published acceptable criteria for two safe NADPs for commercial jet aircraft: the close-in NADP, also known as NADP1, and the distant NADP, also known as NADP2 (FAA Advisory Circular [AC] 91-53A).[29] The close-in NADP provides noise reduction benefits to areas adjacent to an airport, whereas the distant NADP provides noise reduction benefits farther from an airport.

Figure 3-17 gives a general, comparative overview of both types of NADPs. The NADPs outline criteria for speed, thrust settings, and airplane configurations used in connection with the NADPs. The designs of NADPs and their frequencies of use are specific to individual aircraft operators and aircraft types. Airport operators cannot mandate the use of NADPs at an airport because airport operators do not have the authority to require specific operating profiles for aircraft in flight; implementation of NADPs is voluntary and at the choice of aircraft operators. However, FAA AC 91-53A encourages aircraft operators "to use the appropriate NADP when an airport operator requests its use to abate noise for either a close-in or distant community."

Figure 3-17
General Overview of NADP1 (Close-In) and NADP2 (Distant)



NOTE: Graphic is not to scale.

SOURCES: Civil Air Navigation Services Organization and Airports Council International, "Managing the Impacts of Aviation Noise – A Guide for Airport Operators and Air Navigation Service Providers," September 2015; ESA, 2020.

[29] The International Civil Aviation Organization's Doc 8168, *Procedures for Air Navigation Services – Aircraft Operations* (also known as PANS-OPS), provides international standards for designing instrument approach and departure procedures. These standards also cover two types of NADPs. NADP1 is intended to reduce noise for noise-sensitive communities located close to an airport, while NADP2 is intended to reduce noise for noise sensitive communities located farther from the airport. Within the United States, FAA AC 91-53A describes these types of NADPs as the "close-in NADP" and the "distant NADP," respectively.

Type of Measure

This measure is a flight procedure that could be used to achieve noise benefits within the airspace constraints and reduce exposure of noise-sensitive parcels and people to aircraft noise in the area around LGA.

Analysis

NADPs are specific to aircraft types and aircraft operators; therefore, they must be developed by aircraft operators themselves through detailed analyses and pilot training. The Study Team used the Port Authority's ANOMS data to develop aircraft vertical profiles used in the 2016 and 2021 FAA-accepted NEMs, as well as the 2021 Revised NEM. Throughout the LGA 14 CFR Part 150 Study process, aircraft operators participated in the TAC and provided input on their aircraft vertical profiles, including the use of NADPs. Therefore, these NEMs already reflect any existing use of NADPs by aircraft operators. Because NADP implementations vary by aircraft operator and aircraft type, the use of specific NADPs cannot be identified solely using ANOMS data. For the purposes of determining the potential noise reduction benefits of specific NADP1 or NADP2 implementations in the LGA 14 CFR Part 150 Study, the potential noise benefits of implementing NADP1 or NADP2 were estimated using FAA AC 91-53A and guidance from the INM User Guide. The INM User Guide provides guidance for modeling potential noise effects of generic NADP designs by specifying user-defined departure profiles in INM input files.

With this guidance, two separate modeling scenarios were created using the INM: (1) generic NADP1 departure profiles for the top nine aircraft types expected to operate most frequently at LGA in the year 2021 (which compose approximately 90 percent of Airport operations), and (2) generic NADP2 departure profiles for those same aircraft types. For all other aircraft types in both NADP modeling scenarios, the departure vertical profiles were kept identical to those used in the 2021 Revised NEM. See Appendix E of the LGA NEM Report for details of the baseline vertical profiles.

Potential Noise Benefits

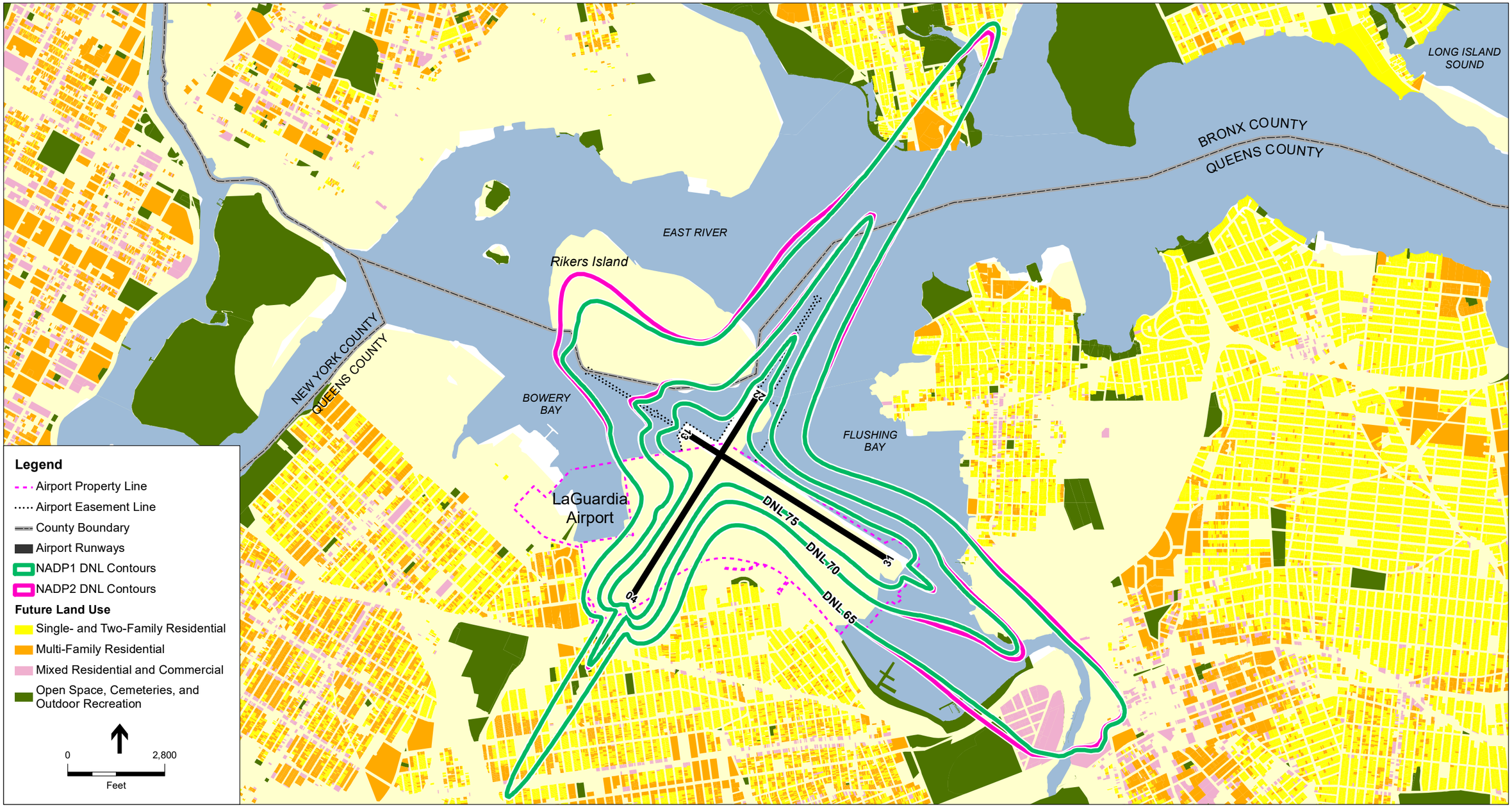
Figure 3-18 illustrates the noise contours associated with the implementation of NADP1 and NADP2 overlaid on residential land use. The DNL 65, 70, and 75 contours are plotted for both NADPs. The 2021 Revised NEM contours are not shown because they cannot be compared with the NADP1- and NADP2-related contours. This is because the 2021 Revised NEM contours were produced using an analysis of actual aircraft departure vertical profiles using historic radar data, while the NADP1- and NADP2-related contours were produced using generic NADP vertical profiles based on FAA AC 91-53A. Presenting the 2021 Revised NEM contours on the same figure would be misleading because they already include detailed departure profiles, while detailed departure profiles were not developed for the NADP1- and NADP2-related contours. NADPs are specific to aircraft type and aircraft operator, and the Port Authority cannot mandate their use at an airport; therefore, only generic NADP1 and NADP2 profiles are available for analysis.

As shown by the close-up NADP1- and NADP2-related DNL 65, 70, and 75 contours for Flushing, Queens, in **Figure 3-19**, implementation of NADP1 for Runway 13 departures may be more beneficial than implementation of NADP2 for this runway end. This is because NADP1 features a steeper climb close to the Airport, resulting in aircraft being at a higher altitude over Flushing than they would be if using the NADP2 profile.

As shown by the DNL 65 contour over the neighborhood of Clason Point in the Bronx in **Figure 3-20**, implementation of NADP2 for Runway 4 departures may be more beneficial than implementation of NADP1 for this runway end. This is because of the distance of Clason Point from LGA and the nature of NADP2, which is intended to reduce noise for communities farther from an airport. Aircraft flying the NADP2 profile when departing Runway 4 may be at higher altitudes and/or lower engine power levels over Clason Point than if they were to fly the NADP1 profile.

Modeling indicated negligible differences in NADP1 and NADP2 for Runway 22 departures, as shown in the close-up contour plot for Jackson Heights and Ditmars Steinway in **Figure 3-21**. This is because a minimal number of aircraft depart Runway 22 and the noise exposure in these neighborhoods is influenced mostly by aircraft arriving to Runway 4.

Table 3-18 compares the acres of residential land uses, numbers of dwelling units, and population exposed to noise levels of DNL 65 and higher for both the NADP1 and NADP2 profiles. **Table 3-19** compares the acres of total land uses, numbers of historic sites, and numbers of non-residential noise-sensitive sites exposed to noise levels of DNL 65 and higher for both the NADP1 and NAPD2 profiles.



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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

LaGuardia 14 CFR Part 150 Study. 140037

Figure 3-18

DNL 65, 70, and 75 Contours - NADP1 and NADP2
LaGuardia Airport

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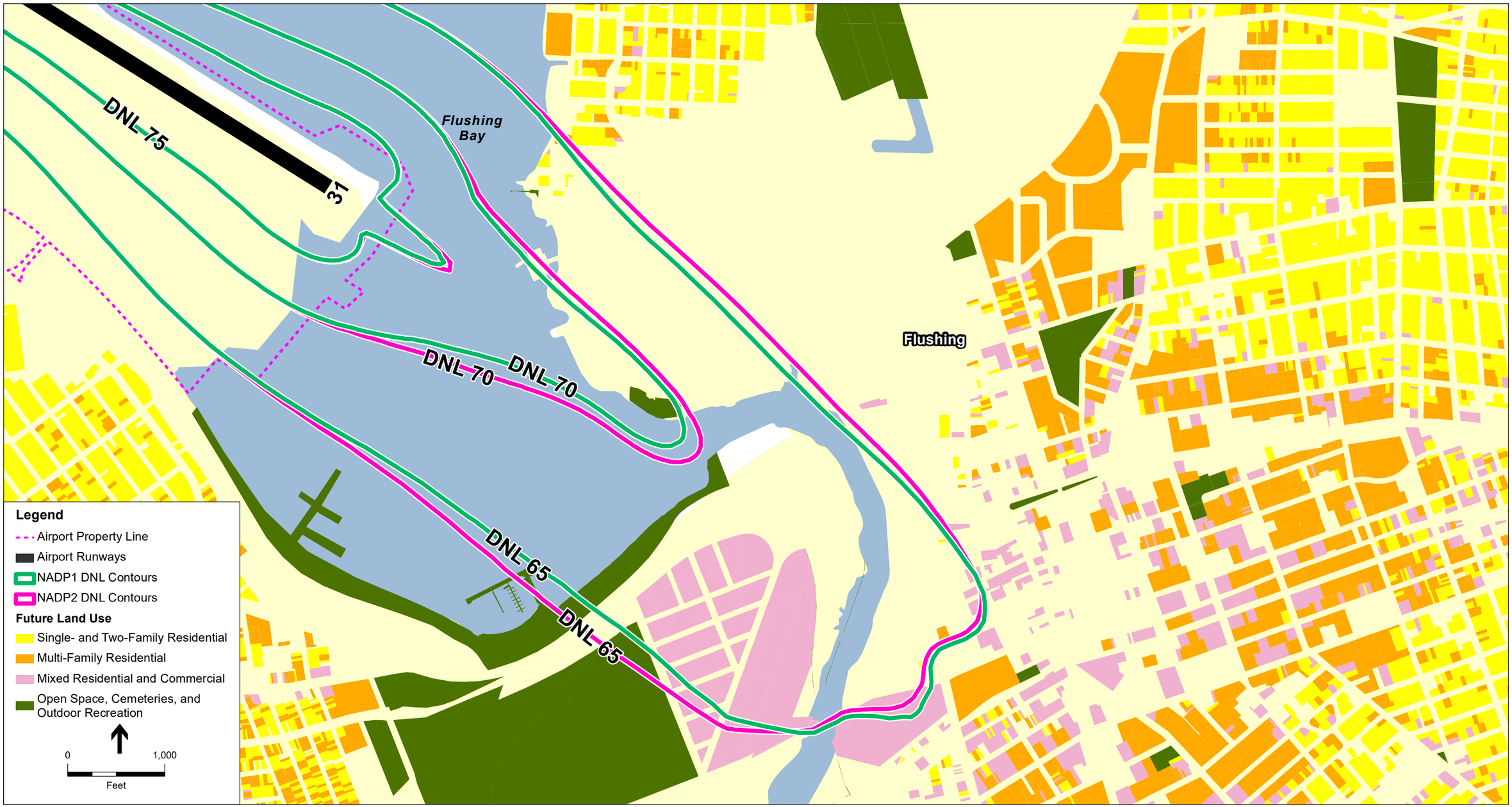

SOURCE: New York City Department of City Planning, MapPLUTO 15V1 - Tax lot/land use geographic information database, March 2015 - June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; INM 7.0d; KB Environmental Sciences, Inc., 2016; ESA, 2016 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

LaGuardia 14 CFR Part 150 Study. 140037

Figure 3-19

DNL 65, 70, and 75 Contours - NADP1 and NADP2
Flushing

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Castle Hill

Clason Point

Bronx River

Westchester Creek

East River

DNL 65

DNL 70

BRONX COUNTY

QUEENS COUNTY

Legend

- County Boundary
- NADP1 DNL Contours
- NADP2 DNL Contours

Future Land Use

- Single- and Two-Family Residential
- Multi-Family Residential
- Mixed Residential and Commercial
- Open Space, Cemeteries, and Outdoor Recreation

0 1,000

Feet

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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

Figure 3-20

DNL 65 and 70 Contours - NADP1 and NADP2
Clason Point and Castle Hill

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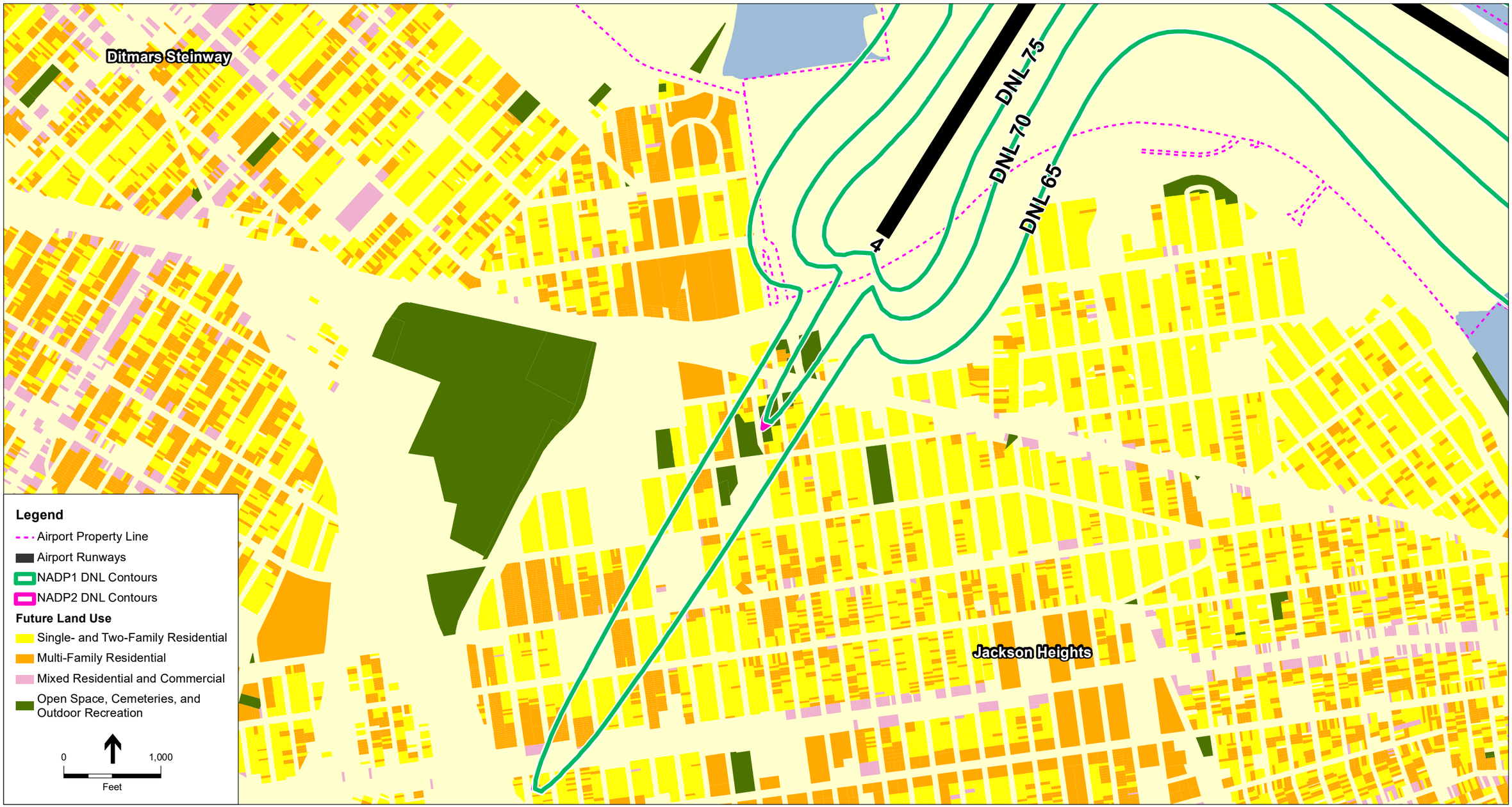

SOURCE: New York City Department of City Planning, MapPLUTO 15V1 - Tax lot/land use geographic information database, March 2015 - June 2015; Nassau County Department of Public Works Planning Division; Property classification and geographic information database, September 2015; INM 7.0d; KB Environmental Sciences, Inc., 2016; ESA, 2016 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

Figure 3-21
DNL 65, 70, and 75 Contours - NADP1 and NADP2
Jackson Heights and Ditmars Steinway

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TABLE 3-18
RESIDENTIAL LAND USES EXPOSED TO DNL 65 AND HIGHER – NADP1 AND NADP2

Land Use Category	Land Area Exposed to DNL 65 and Higher (acres)			Number of Dwelling Units			Population		
	NADP1	NADP2	Difference	NADP1	NADP2	Difference	NADP1	NADP2	Difference
Single-Family and Two-Family Residential	40.5	36.9	-3.6	1,225	1,156	-69	3,611	3,401	-210
Multi-Family Residential	35.3	35.0	-0.3	1,748	1,766	18	4,471	4,527	56
Mixed Residential and Commercial	5.3	3.1	-2.2	770	770	0	2,039	2,039	0
Total	**81.1**	**75.0**	**-6.1**	**3,743**	**3,692**	**-51**	**10,121**	**9,967**	**-154**

NOTE: Numbers may not add up because of rounding. Differences were computed by subtracting the NADP1 results from the NADP2 results. The household and population estimates provided above were developed using census block 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 in the different areas within the DNL 65 and higher contours.

SOURCES: Planning Technology, Inc. and KB Environmental Sciences, Inc., and ESA, 2017 and 2020.

TABLE 3-19
HISTORIC SITES, NON-RESIDENTIAL NOISE-SENSITIVE SITES, AND TOTAL LAND AREA EXPOSED TO DNL 65 AND HIGHER – NADP1 AND NADP2

Scenario	Total Land Area (Acres)	Places of Worship	Schools[1]	Hospitals and Residential Healthcare	Historic Sites	Day Care Facilities
NADP1	2,297.1	6	3	1	13	3
NADP2	2,412.9	7	3	1	13	3
Difference	115.8	1	0	0	0	0

NOTE: Differences were computed by subtracting the NADP1 results from the NADP2 results.

1 These schools were included in the School Soundproofing Program and are compatible with DNL 65 and higher (see Section 2.6.1 of the LGA NEM Report).

SOURCES: Planning Technology, Inc., KB Environmental Sciences, Inc., and ESA, 2017 and 2020.

Conclusion: *LGA Noise Abatement Measure 6: Implement Noise Abatement Departure Profiles on a Voluntary Basis for Runways 4 and 13* could reduce the number of noise-sensitive parcels and people exposed to noise levels of DNL 65 and higher in both Queens and the Bronx. The NADP selected for each runway end would be the NADP that provides the most benefit to nearby communities. NADP1 is the recommended procedure for departures from Runway 13, while NADP2 is the recommended procedure for departures from Runway 4 at LGA.

Table 3-20 summarizes implementation requirements along with the benefits and rationale for the recommendation of LGA Noise Abatement Measure 6.

TABLE 3-20
IMPLEMENTATION SUMMARY FOR LGA NOISE ABATEMENT MEASURE 6:
IMPLEMENT NOISE ABATEMENT DEPARTURE PROFILES ON A VOLUNTARY BASIS FOR RUNWAYS 4 AND 13

Implementation Item	Discussion
Benefits	Potential reduction of people and dwelling units in the DNL 65 contour in the Bronx and in Queens with implementation of the proposed profiles.
Rationale	The Port Authority is recommending LGA Noise Abatement Measure 6 because it could reduce noise exposure over residential land uses in both Queens and the Bronx. The NADP selected for each runway end would be the NADP that provides the most benefit to nearby communities. NADP1 is the recommended procedure for departures from Runway 13, while NADP2 is the recommended procedure for departures from Runway 4.
Responsible Parties	Pilots are responsible for the operation of their aircraft. The Port Authority will request that aircraft operators begin development of this measure and then will work with aircraft operators, NY TRACON, and other FAA personnel to further study and develop the measure. Implementation of this measure may require an environmental study under NEPA; the FAA would be the responsible party to complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are internal to the FAA (e.g., ATO), other coordinating agencies, and aircraft operators. These costs are unknown, and an FAA AIP grant would not be required.
Funding Sources	FAA funding, aircraft operator internal funding.
Requirements	FAA approval. Implementation of this measure may require the FAA to perform an environmental study under NEPA.
Estimated Schedule	Dependent on aircraft operators designing and implementing NADPs. Within 6–12 months of the FAA's Record of Approval for the NCP, the Port Authority will submit a request for profile development.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Noise Abatement Measure 7: Implement Nighttime Optimized Profile Descent Procedures

Description

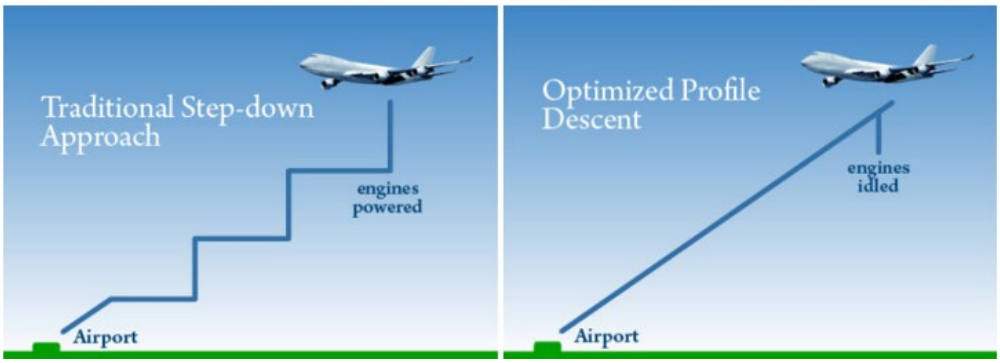
This NCP measure involves the implementation of Optimized Profile Descent (OPD) arrival profiles at LGA. An OPD is an arrival procedure that optimizes reduction of noise and air pollutant emissions by minimizing changes in thrust using a favorable initial flight path angle, and through strategic management of flaps and landing gear. Aircraft on an OPD are generally configured with flaps and landing gear, airspeed, and approach angle before they are five miles from the runway, mostly benefitting areas outside of the DNL 65 contour.

Because of the busy and complex nature of the region's airspace as a whole, aircraft are typically directed by air traffic controllers to hold at a constant altitude for a certain period of time and then directed to drop to a lower altitude and hold for a certain period of time. In congested airspace, aircraft may be required to follow a number of these steps prior to landing. OPDs are being recommended only during nighttime hours, given that the airspace is much less busy during the nighttime. The FAA ATO could examine whether the "step-downs" can be eliminated or reduced during these hours. **Figure 3-22** illustrates the OPD concept by comparing a notional OPD to a descent with hold-downs, where aircraft increase power and fly at constant altitude when instructed by ATC.

Type of Measure

This measure is a flight procedure that could be used to achieve noise benefits within the airspace constraints.

Figure 3-22
Comparison of a Notional OPD and Descent with Level Segments



NOTE: Graphic is not to scale.

SOURCE: Federal Aviation Administration, https://www.faa.gov/nextgen/library/media/getSmart_PBN.pdf.

Analysis

OPDs direct aircraft to descend to the runway with the minimal amount of engine power needed to land safely. Hold-downs that require high power settings for the level flight segments with conventional arrival procedures are generally eliminated. As a result, less noise is heard on the ground.

Potential Noise Benefits

The extent of the noise reduction on the ground compared to conventional arrival procedures varies by the specific airframe/engine combination and distance from the runway. OPDs generally reduce noise exposure in areas beyond the DNL 65 contour.

Conclusion: *LGA Noise Abatement Measure 7: Implement Nighttime Optimized Profile Descent Procedures* could reduce the aircraft noise levels for areas beyond the limit of the DNL 65 contour.

Table 3-21 summarizes implementation requirements along with the benefits and rationale for the recommendation of LGA Noise Abatement Measure 7.

TABLE 3-21
IMPLEMENTATION SUMMARY FOR LGA NOISE ABATEMENT MEASURE 7:
IMPLEMENT NIGHTTIME OPTIMIZED PROFILE DESCENT PROCEDURES

Implementation Item	Discussion
Benefits	No reduction of people or dwelling units exposed to DNL 65 with the proposed nighttime use of OPD procedures. However, this measure could reduce noise exposure in residential areas beyond the contours under the arrival flight paths.
Rationale	The Port Authority is recommending LGA Noise Abatement Measure 7 because it may be an effective way to reduce noise exposure in residential areas under the arrival flight path upon approach.
Responsible Parties	Development and implementation of flight procedures is the sole responsibility of the FAA. The Port Authority will request that the development process be initiated, and then will work with NY TRACON and other FAA personnel to further study and develop this procedure. Implementation of this measure may require an environmental study under NEPA; the FAA would be the responsible party to complete such a study.
Estimated Costs	The expected costs associated with the development and implementation of this procedure are internal to the FAA (e.g., ATO) and other coordinating agencies. These costs are unknown, and an FAA AIP grant would not be required.
Funding Sources	The FAA.
Requirements	FAA approval. Implementation may require an environmental study under NEPA.
Estimated Schedule	The Port Authority will submit a request for procedure development within 6–12 months of the FAA's Record of Approval for the NCP. FAA design, testing, and implementation of the procedure typically could take 18–24 months, potentially up to 3 years once the Port Authority requests initiation of the development process.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Noise Abatement Measure 8: Continue Existing Mandatory Departure Noise Limit

The Port Authority has pursued aircraft noise abatement measures for several decades. In 1959, the Port Authority established a mandatory aircraft departure noise limit of 112 PNdB for aircraft departures at LGA. Operators of aircraft that violate the departure noise limit at LGA are contacted by the Port Authority and notified of the violation. The existing monitoring system at LGA, which currently consists of 10 monitors, supports the Port Authority's enforcement of this departure noise limit. The departure noise limit is a measure that was established before such measures were restricted by ANCA in 1990 and is therefore "grandfathered," permitting the Port Authority to continue the measure. The Port Authority is recommending continuation of the existing departure noise limit, with no changes, to continue restricting operational activity that violates the limit. This provides benefits to communities in the vicinity of LGA.

Conclusion: *LGA Noise Abatement Measure 8: Continue Existing Mandatory Departure Noise Limit* provides noise benefits to communities in the vicinity of LGA by continuing enforcement of the mandatory 112 PNdB departure noise limit at LGA.

Table 3-22 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of LGA Noise Abatement Measure 8.

TABLE 3-22
IMPLEMENTATION SUMMARY FOR LGA NOISE ABATEMENT MEASURE 8: CONTINUE EXISTING MANDATORY DEPARTURE NOISE LIMIT

Implementation Item	Description
Benefits	Continuation of the existing mandatory departure noise limit provides noise benefits to communities in the vicinity of LGA by continuing enforcement of the mandatory 112 PNdB departure noise limit at LGA.
Rationale	The Port Authority is recommending LGA Noise Abatement Measure 9 because it is the continuation of an existing mandatory noise abatement measure with no changes, and the existing measure provides benefits to communities in the vicinity of LGA.
Responsible Parties	The Port Authority.
Estimated Costs	No funding is required to implement this measure, and the Port Authority will continue to enforce the existing mandatory departure noise limit.
Funding Sources	No funding required.
Requirements	Not applicable.
Estimated Schedule	This measure is already implemented; the Port Authority will continue to enforce the existing mandatory departure noise limit.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

3.3 Noise Abatement Strategies Considered but Not Recommended for Inclusion in This NCP

This section describes noise abatement strategies that the Port Authority considered but is not recommending for LGA. During development of the NCP, the Port Authority and Study Team reviewed 72 suggested noise abatement strategies raised by stakeholders that participated in the 14 CFR Part 150 Study process. As described below, the individual strategies fell within four major categories: (1) develop new or modify existing flight tracks, (2) modify the airfield layout or build noise barriers, (3) modify pilot procedures for operating aircraft, and (4) change operating frequencies by modifying runway use or imposing operating restrictions. A full list of suggested noise abatement strategies can be found in **Appendix G**.

Develop New or Modify Current Flight Tracks (Routes)

Numerous suggestions to create new flight tracks or modify current flight tracks for noise abatement purposes were reviewed. In general, adjustments to flight tracks for noise abatement can either concentrate noise over an area or disperse noise over a larger area.

The NY TRACON staff determined that some suggested modifications to aircraft flight track locations were not feasible to implement because they would require airspace and procedure modifications that are incompatible with other airports in the New York–New Jersey area. Such strategies are not recommended for inclusion in this NCP.

Suggestions to implement steeper glide slopes for aircraft arrivals were also received. The glide slope set by the FAA for aircraft arriving to LGA ranges between 3.0 and 3.1 degrees relative to the ground surface. Increases in glide slope near the Airport may reduce the ability of aircraft operators to maintain stabilized approaches, posing a safety hazard. Therefore, increases in glide slope near LGA are not recommended for inclusion in this NCP. However, increasing the glide slope farther from the Airport may have noise benefits outside the DNL 65 contour, so the Port Authority is instead recommending the implementation of nighttime OPDs at LGA (described in Section 3.2). The Port Authority expects to further evaluate changes to the glide slope by engaging with the FAA through the NAC.[30]

Some of the suggested strategies recommended moving flight tracks with the goal of moving noise over compatible land uses and features (such as non-residential areas, industrial parks, waterways, and large expressways). Given that there are residential areas of various densities in the immediate vicinity of LGA, it is not possible to avoid overflying all residential areas. There are limited opportunities to move flight tracks in the vicinity of LGA. However, the Port Authority has worked, and will continue to work, with the FAA to identify and promote the use of aircraft flight track locations that place aircraft over compatible land uses to the extent possible, given the multitude of factors that affect the operation of LGA. A number of noise abatement measures recommended for inclusion in this NCP involve potentially feasible modifications to flight procedures with the goal of moving noise over compatible land uses.

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

Suggestions to disperse flight tracks with the goal of spreading aircraft noise over a large area while not affecting the operational efficiency of the Airport were also received. The shifting or moving of noise from one populated area to another is inconsistent with the 14 CFR Part 150 requirement to develop an NCP that "reduces existing noncompatible uses and prevents or reduces the probability of the establishment of additional noncompatible uses."[31] Therefore, such strategies are not recommended for inclusion in this NCP. However, pursuant to Section 175 of the FAA Reauthorization Act of 2018,[32] the Port Authority, in consultation with the affected communities, will request that the FAA's NAC reevaluate all new or amended area navigation departure procedures that have the potential for using dispersal headings after this NCP has been approved.

Perform Construction to Modify the Airfield Layout or Add Noise Barriers

Suggested strategies that involve changing the LGA runway layout and other on-airfield modifications were reviewed. These included the construction of new runways, the realignment of the current runways, runway extensions, and the construction of noise barriers on LGA property or in neighborhoods.

Adding a new runway that is aligned to place more operations over water or changing the current runway layout for noise abatement is infeasible to implement at this time, as reconstructing/ changing the direction of the runways is not part of the existing LGA redevelopment plans and the analysis of the associated economic and environmental issues is outside the scope of this NCP. For the aforementioned reasons, adding a new runway is not being recommended for this NCP.

Under certain conditions, building noise barriers between noise sources and noise-sensitive land uses can reduce noise exposure. Noise barriers generally benefit only properties immediately adjacent to aircraft ground movements at an airport. There are no residential areas adjacent to LGA that would benefit from a noise barrier. Noise barriers deliver no noise benefit to noise-sensitive land uses that are exposed to noise from aircraft in flight. For a noise barrier to reduce noise, the line of sight between the source and receiver needs to be blocked. There is not a specific fixed distance from source to receiver where noise barriers are effective. However, the overall effectiveness of noise barriers depends on barrier construction and location, source location (including the height of aircraft engines above the ground), and atmospheric conditions. Additionally, noise barriers may also present an obstruction hazard to aircraft operations. The construction of barriers at airports also requires compliance with 14 CFR Part 77, "Safe, Efficient Use, and Preservation of the Navigable Airspace," the regulation that restricts the placement and height of structures near runways.

At LGA, the DNL 65 and higher contours over noise-sensitive areas result primarily from noise produced by aircraft in flight. Therefore, it is unlikely that the installation of a noise barrier would provide benefits to noncompatible land uses within the DNL 65 contour at LGA.

31 14 CFR Part 150, Appendix B, Sec. 150.5(a).

32 FAA Reauthorization Act of 2018, Public Law No. 115-254 (effective October 5, 2018).

For the aforementioned reasons, the construction of noise barriers is not recommended for inclusion in this NCP.

Modify Pilot Procedures for Operating Aircraft

The Study Team reviewed suggestions to modify the aircraft operating procedures that pilots follow. These included implementing speed reductions over residential areas, delaying the lowering of landing gear, and reducing engine thrust levels for departures. Pilot procedures such as thrust, speed, and landing gear schedules are aircraft- and operator-specific, and the Port Authority cannot mandate specific cockpit management procedures. The pilot-in-command has the sole authority to determine the procedures required for the safe operation of his or her aircraft, including speed, thrust and flap settings, and landing gear deployment. Certain voluntary modifications to pilot procedures could be discussed in the context of a voluntary Fly Quiet Program, presented in **Section 5.2**.

An analysis of departure thrust levels indicated that many aircraft already use reduced thrust levels for departures at LGA. This analysis is discussed in Section 4.5.3 of the LGA NEM Report.

Change Operating Frequencies by Modifying Runway Use or Imposing Operating Restrictions

The Study Team reviewed noise abatement strategies related to changing the runway use, limiting the times that a particular runway is in use, restricting aircraft from departing from a specific runway, and banning certain aircraft from operating at LGA altogether.

Changing the utilization rates for runways can direct noise exposure around an airport. Runway selection at an airport is dependent on several factors including wind speed and direction, cloud ceiling, airfield layout, operational efficiency, and the local airspace. Navigational aids and published arrival and departure procedures are also factors in runway selection. Permanently closing a runway to departures would be detrimental to airfield capacity and would not be consistent with the Port Authority's objective of meeting the needs of the traveling public. Nighttime runway use modifications are being recommended in the NCP to place aircraft over compatible land uses to the extent feasible, as shown in **Section 2.2**.

The Port Authority received suggestions to implement use restrictions for aircraft operating at LGA, including shifting operations to other airports, implementing or modifying landing fees based on aircraft noise characteristics, and limiting or prohibiting operations of certain aircraft. However, through the recommended noise abatement, land use, and programmatic measures set forth in this NCP, the Port Authority will have an NCP that, once approved and fully implemented, will eliminate noncompatible land uses without restricting aircraft operations. In addition, the Port Authority must abide by grant assurances in place with the FAA, one of which requires that no restrictions on operations be implemented by the airport authority.[33] Furthermore, no new restrictions can be implemented at LGA without successful completion of a 14 CFR Part 161 Study and approval by the FAA, which also requires that the Port Authority first implement noise control measures that do not require aircraft operating restrictions. Therefore, use restrictions are not

[33] 49 USC Section 47107(d).

recommended in this NCP. The Port Authority is instead recommending the continuation of the existing mandatory departure noise limit as LGA Noise Abatement Measure 9. This measure was established before passage of ANCA and the promulgation of 14 CFR Part 161.

3.4 2021 With Program Noise Exposure Map

14 CFR Part 150, Appendix B, Sec. 150.3(b) indicates that an NCP must include "appropriately revised maps" if "the proposed noise compatibility program would yield maps differing from those previously submitted to FAA." The FAA informed the Port Authority on December 12, 2019, that LGA Noise Abatement Measure 1, "Modify NTHNS and GLDMN Runway 13 RNAV SIDs to Direct Aircraft Away from Flushing, New York" (presented in **Section 3.2** of this NCP) is scheduled to be implemented by the FAA in May of 2020, in advance of the Final LGA NCP submittal. As such, in accordance with 14 CFR Part 150 guidance, the Study Team developed an NEM representing the noise environment in the vicinity of LGA due to implementation of LGA Noise Abatement Measure 1, referred to as the "2021 With Program NEM" in this NCP. The Port Authority is submitting the 2021 With Program NEM to the FAA for acceptance as the NEM representing aircraft operations at LGA in the year 2021.

This section presents the methods and data used to produce the noise contours that are depicted on the 2021 With Program NEM. Other recommended noise abatement measures in this NCP are not expected to be implemented in advance of the Final LGA NCP submittal and are, therefore, not represented in the 2021 With Program NEM. Any future NEM updates, as described in LGA Program Management Measure 9 in **Section 5.2**, would include changes in LGA's noise environment associated with noise abatement measures that are in place as of the date of NEM update.

3.4.1 Noise Model and Day-Night Average Sound Level

The LGA 14 CFR Part 150 Study was initiated when the FAA's INM Version 7.0d was the required model for preparing noise contours.[34] As the Study is still ongoing, this 2021 With Program NEM has also been prepared using this version of the INM. The INM was used to produce contours to delineate specific levels of noise exposure in DNL. DNL is described in **Section 1.4**. The DNL metric is the noise descriptor required by the FAA for aircraft noise exposure and land use compatibility planning under 14 CFR Part 150.

3.4.2 Data for Developing the 2021 With Program NEM

The following sections summarize the information used to develop the 2021 With Program NEM.

Forecast Annual Aircraft Operations and Fleet Mix

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

34 The FAA's AEDT replaced the INM and EDMS as the required tool for noise, fuel burn, and emissions modeling on May 29, 2015. Updating the aircraft noise exposure information in this 14 CFR Part 150 Study was not required because the Study and substantial work on the analysis of noise at LGA was initiated prior to May 29, 2015.

the LGA 14 CFR Part 150 Study. 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. The fleet mix used for the 2021 With Program NEM is identical to that used in the 2021 Revised NEM presented in **Chapter 2**. The number of forecast annual aircraft operations at LGA in 2021, by aircraft type, is summarized in **Table 2-1**.

Aircraft Operations by Time of Day

Aircraft operations modeled in the INM are assigned as occurring during daytime (7:00 A.M. to 9:59:59 P.M.) or nighttime (10:00 P.M. to 6:59:59 A.M.). The 2021 With Program NEM assumes identical daytime and nighttime activity levels as the 2021 Revised NEM presented in **Chapter 2**. **Table 2-2** summarizes the times of day in which aircraft arrivals and departures are expected to occur in 2021 (by percent of total operations). The Port Authority's 2014 ANOMS data served as the primary source for the types of operations (arrival or departure) and time-of-day information, since ANOMS captures actual arrival and departure times versus scheduled times.

Runway Use

Runway use refers to the frequency with which aircraft use each runway end for departures and arrivals. The runway utilization data were derived from LGA ANOMS data for calendar year 2014. The rates are forecast to remain constant for the 2021 study year. The runway use assumptions used to produce the 2021 With Program NEM are identical to those used in the 2021 Revised NEM presented in **Chapter 2**. **Table 2-3** provides a summary of arrival and departure runway utilization.

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. The 2014 data were used to develop the flight tracks for use in the INM. Flight corridors used 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 track locations and utilization percentages used in the 2021 With Program NEM are identical to those developed for the 2021 Revised NEM presented in **Chapter 2**, with the exception of a modification to the NTHNS and GLDMN departure procedures. This modification is described in LGA Noise Abatement Measure 1, "Modify NTHNS and GLDMN Runway 13 RNAV SIDs to Direct Aircraft Away from Flushing, New York," presented in **Section 3.2** of this NCP. The modification was included in the 2021 With Program NEM because LGA Noise Abatement Measure 1 is the only noise abatement measure in NCP that is scheduled to be implemented in advance of the Final LGA NCP submittal. The modification is intended to reduce noncompatible land uses in Flushing. The INM flight tracks used in the production of the 2021 With Program NEM are depicted in maps 2 through 6 of **Appendix I-2**.

Departure and Arrival Profiles

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. 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 takeoff weights, and partly because the takeoff thrust values identified by the airline personnel are lower than the default INM thrust values. These modifications result in a better depiction of the noise exposure around LGA and are identical to those used in the 2021 Revised NEM presented in **Chapter 2**.

3.4.3 2021 With Program NEM Contours

The 2021 With Program NEM contours are depicted in **Figure 3-23** and are superimposed over a future land use map. In accordance with 14 CFR Part 150, the 2021 With Program NEM contours reflect the anticipated noise conditions based on Airport and operational data that are representative of the year 2021. The types and amounts of land uses within the DNL 65 and higher contours are provided in **Table 3-23**, while the historic sites and non-residential noise-sensitive sites within the DNL 65 and higher contours are listed in **Table 3-24**. Several schools within the DNL 65 contour have already been sound-insulated and are therefore considered compatible with aircraft noise levels of DNL 65 and higher, as indicated in the table. The NYC Department of City Planning is the sole land use agency for all land within the draft 2021 With Program DNL 65 contour. **Tables 3-2** and **3-3** present the estimated residential land area, number of dwelling units, population, and number of noise-sensitive sites exposed to DNL 65 and higher for the 2021 With Program NEM, referred to as Noise Abatement Measure 1 in those tables, in comparison with the 2021 Revised NEM. The full-size map set of the 2021 With Program NEM is included in **Appendix I-2**.

TABLE 3-23
LAND USES EXPOSED TO DNL 65 AND HIGHER – 2021 WITH PROGRAM NEM

Land Use Category	Land Uses Exposed to DNL 65 and Higher (acres)			
	DNL 65-70	DNL 70-75	DNL 75+	Total
Single- and Two-Family Residential	40.3	0.0	0.0	40.3
Multi-Family Residential	34.9	0.0	0.0	34.9
Mixed Residential and Commercial	1.6	0.0	0.0	1.6
Commercial and Office	35.9	2.3	0.0	38.2
Industrial and Manufacturing	53.2	10.8	0.0	64.0
Transportation, Right of Way, Parking, and Utilities	208.4	13.3	3.4	225.1
Public Facilities and Institutions	197.0	6.8	0.0	203.8
Open Space, Cemeteries, and Outdoor Recreation	33.7	4.9	0.0	38.6
Vacant	28.7	5.5	0.0	34.3
Airport Property	171.3	151.4	269.0	591.7
Water (Off Airport Property)	698.2	285.0	49.7	1032.8
Total	**1,503.1**	**479.9**	**322.1**	**2,305.1**

NOTE: Numbers may not add up due to rounding.
SOURCE: Planning Technology, Inc. and KB Environmental Sciences, Inc., 2018 and 2020.

TABLE 3-24
HISTORIC SITES AND NON-RESIDENTIAL NOISE-SENSITIVE SITES EXPOSED TO AIRCRAFT NOISE LEVELS OF DNL 65 AND HIGHER – 2021 REVISED NEM AND 2021 WITH PROGRAM NEM

Name	Address	Facility Type	Within 2021 Revised NEM DNL 65 and Higher?	Within 2021 With Program NEM DNL 65 and Higher?
Idara Tableegh Ul-Islam	23-38 81st St	Place of Worship	Y	Y
Roman Catholic Church Our Lady Of Fatima Convent	25-56 80th St	Place of Worship	Y	Y
Our Lady Of Fatima Roman Catholic Church	25-02 80th St	Place of Worship	Y	Y
The Korean Church of Queens	23-27 89th St	Place of Worship	Y	Y
Ebenezer Baptist Church	36-12 Prince St	Place of Worship	Y	N
Ebenezer Baptist Church	36-06 Prince St	Place of Worship	Y	N
Gospel Calvary Church	134-28 Northern Blvd	Place of Worship	Y	N
Monsignor McClancy Memorial High School	71-06 31st Ave	School[1]	Y	Y
Our Lady of Fatima School	25-38 80th St	School[1]	Y	Y
Vaughn College of Aeronautics & Technology	86-01 23rd Ave	School[1]	Y	Y
Independence Residences, Inc.	33-23 69th St	Health Care-Residential	Y	Y
New York Foundling Hospital	153 Stephens Ave	Health Care-Residential	N	N
Jackson Heights Historic District	33-11 70th St, Queens	Historic Site	Y	Y
Jackson Heights Historic District	33-12 70th St, Queens	Historic Site / Attached Residence	Y	Y
Jackson Heights Historic District	33-14 70th St, Queens	Historic Site / Attached Residence	Y	Y
Jackson Heights Historic District	33-16 70th St, Queens	Historic Site / Attached Residence	Y	Y
Jackson Heights Historic District	33-18 70th St, Queens	Historic Site / Attached Residence	Y	Y
Jackson Heights Historic District	33-20 70th St, Queens	Historic Site / Attached Residence	Y	Y
Jackson Heights Historic District	33-22 70th St, Queens	Historic Site / Attached Residence	Y	Y
Empire Millworks Building, 1938	128-50 Willets Point Blvd	Historic Site	Y	Y
Hangar 3 (1939; Delano & Aldrich)	La Guardia Airport	Historic Site	Y	Y
Hangar 5 (1939; Delano & Aldrich)	La Guardia Airport	Historic Site	Y	Y
Hangar 7 (former sea plane hangar, ca. 1939)	La Guardia Airport	Historic Site	Y	Y
Marine Air Terminal	La Guardia Airport	Historic Site	Y	Y
Jackson Heights Historic District	Jackson Heights	Historic District[2]	Y	Y
Flushing Day Care Center, Inc.	36-06 Prince St	Day Care-Assisted Living	Y	N
Grace Day Care Center, Inc.	89-00 23rd Ave	Day Care-Assisted Living	Y	Y
Metro Family Residence	87-02 23rd Ave	Day Care-Assisted Living	Y	Y

NOTES:

1 This school was included in the School Soundproofing Program, and is compatible with DNL 65 and higher (see Section 2.6.1 of the LGA NEM Report 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.

SOURCES: KB Environmental Sciences, Inc., 2020; ESA, 2020.

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 and 2020; ESRI Mapping Services, 2019; Google Earth Aerial Imagery Research, Image © 2020 CNES/Airbus.

*The PLUTO Transportation land use designations on LGA were updated to reflect new airport facilities that were constructed during the LGA Redevelopment Project.

LaGuardia Airport 14 CFR Part 150 Study . 140037

Figure 3-23

2021 With Program Noise Exposure Map DNL Contours
LaGuardia Airport

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3.4.3 Stakeholder Engagement and Opportunities for Public Comment

The draft 2021 With Program NEM was provided at the LGA NCP public information workshop and public hearing described in Section 6.2.2. During the comment period for the LGA Draft NCP, interested stakeholders had the opportunity to review and comment on the 2021 With Program NEM. Comments received written responses in the Final NCP.

3.5 Summary of Recommended Noise Abatement Measures

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

Measures Already in Place at LGA

- Continue Existing Mandatory Departure Noise Limit
- Modify NTHNS and GLDMN Runway 13 RNAV SIDs to Direct Aircraft Away from Flushing, New York

Measures to Be Initiated at LGA within One Year of FAA Record of Approval

- Create New Runway 13 Departure Procedure with an Immediate Left Turn over Compatible Land Uses
- Implement Offset Approach to Runway 22 to Reduce Noise Exposure Over Clason Point
- Reduce Runway 4 Departure Noise Over Clason Point
- Reduce Runway 13 Departures at Night
- Implement Noise Abatement Departure Profiles on a Voluntary Basis for Runways 4 and 13
- Implement Nighttime Optimized Profile Descent Procedures

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CHAPTER 4
Noise Compatibility Program – Land Use Measures

Land use measures address aircraft noise in areas of high noise exposure that cannot be eliminated through the implementation of noise abatement measures as described in Chapter 3. Pursuant to the requirements of 14 CFR Part 150,[35] this chapter evaluates corrective and preventive land use measures. Corrective land use measures, which are typically implemented by an airport operator, are measures intended to mitigate noise exposure at the locations of existing noncompatible land uses. Such measures include land acquisition and sound insulation treatments of structures. In contrast, preventive measures prohibit the introduction of new noncompatible land uses and/or notify potential buyers of properties affected by aircraft noise; such measures are typically implemented by the local planning and zoning jurisdictions. 14 CFR Part 150, Appendix B, Sec. 150.7(b) requires an airport operator to analyze "[a]cquisition of land and interests therein" as well as "[t]he construction of barriers and acoustical shielding, including the soundproofing of public buildings." This NCP discusses these measures in Sections 4.2 and 4.4.

The FAA has no regulatory authority to control land uses around airports, and recognizes that state and local governments are responsible for land use planning, zoning, and regulation. The Port Authority also does not have any jurisdiction over land uses. However, as a condition of receipt of FAA funding for airport development projects, an airport operator must provide the FAA with written assurances that "appropriate action, including the adoption of zoning laws have been or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations including the landing and takeoff of aircraft . . ."[36] In response to this FAA requirement, this NCP discusses preventive land use measures in Sections 4.3 and 4.4.

This chapter details the following three land use measures recommended for inclusion in this NCP:

1. Sound-Insulate Eligible Dwelling Units
2. Sound-Insulate Eligible Non-Residential Noise-Sensitive Structures
3. Include Aircraft Noise in Real Estate Disclosures

Table 1 of 14 CFR Part 150 (presented in this NCP as **Table 1-2**) identifies land uses surrounding an airport that are acceptable within the DNL 65, 70, and 75 contours. The table implies that virtually all land uses outside of the DNL 65 contour are compatible with aircraft noise. For the

[35] 14 CFR Part 150, Appendix B, Sec. 150.7(b).

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

LGA 14 CFR Part 150 Study, the compatible and noncompatible land uses within the DNL 65 and higher contours were identified using the designations provided in **Table 1-2** to the extent that the designations were aligned to the New York City land use categories. Land use compatibility is described further in Chapter 3 and Appendix D-1 of the LGA NEM Report. Corrective measures are applicable to off-airport land within the DNL 65 contour. Preventive measures can be applied to both within and outside of the DNL 65 contour to discourage development of noise-sensitive land uses near an airport.

4.1 Existing Land Use Measures

Prior to initiating this 14 CFR Part 150 Study, the Port Authority voluntarily implemented a school sound insulation program. Since the program began in 1983, 21 schools in the vicinity of LGA have been sound-insulated to reduce noise impacts. Total program expenditures for the 21 schools exceeded $238 million, which was paid for, in part, with approximately $106 million in FAA AIP grants. The soundproofing program included acoustic windows, insulation, ventilation, and air conditioning. An internal noise analysis was performed to determine whether schools were located within the DNL 65 contour before being sound-insulated.

Table 4-1 provides additional information related to each of the 21 schools, including the year in which each school was sound insulated and the estimated number of students in attendance in the 2015–2016 school year. It is important to note that after a school has been insulated, it is considered a compatible use for the purposes of 14 CFR Part 150. The locations of the schools are shown in **Figure 4-1**. The following four schools are located within the 2021 With Program DNL 65 contour:

- Our Lady of Fatima
- College of Aeronautics (Vaughn)
- Lexington School for Deaf Jackson
- Monsignor McClancy Memorial High School

SOURCE: Port Authority, 2015; New York City Department of Education, 2016; National Center for Education Statistics, 2016; ESRI Mapping Services; ESA 2020.

LaGuardia Airport 14 CFR Part 150 Study . 140037

Figure 4-1

Port Authority School Soundproofing Program
LaGuardia Airport

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TABLE 4-1
PORT AUTHORITY SCHOOL SOUNDPROOFING PROGRAM AT LGA

	School	Neighborhood / Borough	2015–2016 Year Students	Sound Insulation Program Completion Year	Within 2021 With Program DNL 65 Contour?[1]
1	I.S. 52X	Bronx	2,593	2001	N
2	Our Lady of Fatima	Jackson Heights	550	1989	Y
3	P.S. 120Q	Flushing	1,068	1989	N
4	P.S. 143Q	Corona	1,725	1990	N
5	P.S. 161X	Bronx	562	1992	N
6	6 P.S. 165Q	Flushing	761	1992	N
7	P.S. 219Q	Flushing	687	1991	N
8	8 P.S. 62X	Bronx	781	1995	N
9	St. Ann	Flushing	Permanently Closed	2001	N
10	St. Sebastian	Woodside	440	1998	N
11	College of Aeronautics (Vaughn)	Flushing	1,635	2012	Y
12	John Bowne High School	Flushing	3,694	2010	N
13	Lexington School for Deaf Jackson	Jackson Heights	496	2007	N
14	Monsignor McClancy Memorial High School	East Elmhurst	520	2010	Y
15	P.S. 146B	Bronx	453	2009	N
16	P.S. 5X	Bronx	689	2009	N
17	Samuel Gompers Vocational School	Bronx	Permanently Closed	2010	N
18	St. Anselm	Bronx	548	2010	N
19	St. Athanasius	Bronx	360	2010	N
20	St. Michael – Most Holy Redeemer	Flushing	224	2010	N
21	St. Pius V (Elementary)	Bronx	227	2007	N

NOTE:
1 The 2021 With Program NEM is described in **Chapter 2**.

SOURCES: Port Authority, 2015; New York City Department of Education, 2016; National Center for Education Statistics, 2016; ESA, 2020.

4.2 Recommended Corrective Land Use Measures

This section describes *corrective* land use measures that are recommended as part of the LGA NCP. Benefits of the land use measures were analyzed using the 2021 With Program NEM contours, which represent the noise exposure in the vicinity of LGA as a result of NCP implementation. The 2021 With Program NEM is presented in **Section 3.4**.

LGA Land Use Measure 1: Sound-Insulate Eligible Dwelling Units

Types of dwelling units include, but are not limited to, single-family units, multi-family units (up to and including high-rise apartment buildings), and mixed-use structures with retail on the

ground floor and residential units above. Sound insulation programs provide compatible noise environments inside structures as a means to mitigate aircraft noise exposure. Sound insulation treatments may include window and door replacement, caulking, weather stripping, and positive air ventilation.[37] Positive ventilation systems use a fan to draw outside air into an indoor space, pressurizing the space. Indoor air is exhausted out of the building through sound-insulated exterior openings.[38] Ventilation-only treatments are limited to structures where positive ventilation does not already exist.

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

In residential sound insulation programs funded, in part, by FAA AIP grants, a dwelling unit is eligible for sound insulation only if it meets all of the criteria set forth in the *AIP Handbook*,[39] Appendix R.[40] A dwelling unit is not eligible for federally funded sound insulation just by virtue of its location inside the DNL 65 contour. Rather, to be eligible, the dwelling unit must meet the following criteria:

1. It must be located within the DNL 65 contour of an FAA-approved NEM.
2. It must have been constructed before publication of FAA-approved DNL contours.[41] Dwelling units constructed in the vicinity of LGA after April 9, 2014, are not eligible for federally funded sound insulation.[42]
3. It must be in compliance with the local building code.[43]
4. It must have an average noise level in *habitable* rooms above DNL 45 (with windows closed).

37 The purpose of the positive air ventilation is to allow for the replacement windows and doors to remain closed to provide the sound insulation benefit to the residents.

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

39 FAA Order 5100.38D, Airport Improvement Program Handbook, dated 9/30/2014.

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

41 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 noncompatible uses resulting from airport expansion may be eligible for funding consideration. For LGA, DNL 65, 70, and 75 contours were first made available to the public on April 9, 2014.

42 Notice of Availability, Request for Comment and Notice of Public Hearing, Draft Environmental Assessment, Draft DOT Section 4(f) Evaluation, Central Terminal Building Redevelopment Program, LaGuardia Airport, Flushing, New York. New York Daily News, April 9, 2014, p. 46.

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

According to Table C-5 of the *AIP Handbook*, mobile dwelling units are not eligible for FAA-funded sound insulation because FAA has determined that there are no effective sound insulation methods or materials for mobile homes.

According to 14 CFR Part 150, Appendix A, Sec. 101, a noise-sensitive land use is considered compatible and, therefore, not eligible for sound insulation funded by FAA AIP grants "if the self-generated noise from a given use and/or the ambient noise from other non-aircraft and non-airport uses is equal to or greater than the noise from aircraft and airport sources." Ambient noise refers to the non-aircraft noise in the vicinity of the land use being investigated for eligibility. Noise exposure generally increases as intensity of development increases, ranging from rural to suburban to urban to dense urban environment. The five boroughs of New York City include land uses that can be classified at the denser end of this range. Through a review of these classifications relative to LGA, it can be determined that areas in proximity to LGA generally fall within the urban to dense urban classification. The areas closest to the Airport would be classified as urban or dense urban. Information from the Port Authority's ANOMS indicates that community noise exposure at the noise monitors placed around LGA ranges from around DNL 50 to greater than DNL 70 and, in many cases, exceeds the DNL values for aircraft noise measurements at those sites. Section 3.3.2 of the LGA NEM Report discusses ambient and self-generated noise in further detail.

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

In addition, pursuant to Appendix R-10 of the *AIP Handbook*, an airport sponsor may "consider the use of neighborhood equity when a few residences in the eligible noise contour threshold (per Paragraph R-6) that do not meet the interior noise level requirements are scattered among residences that do meet the interior noise level criteria." The FAA has the option of approving requests from the airport sponsor for consideration of neighborhood equity; the FAA is not obligated to approve such requests. The residences under consideration would have to meet all other eligibility requirements, such as having been constructed before publication of FAA-accepted noise contours.

The FAA also has discretion to fund sound insulation for dwelling units located in structures that contain a mix of residential and commercial uses (e.g., buildings with retail on the first floor and

apartments in upper floors).[44] In addition, a modular structure that has a noise-sensitive use may be eligible for federally funded sound insulation if the structure is permanent and meets the building requirements for non-modular structures, as given in Appendix R of the *AIP Handbook*.

The following dwelling units may be eligible for federally funded positive ventilation systems, but the FAA is not obligated to provide funding for such systems:

- Dwelling units that qualify for sound insulation and do not have existing positive ventilation systems
- Dwelling units that do not qualify for sound insulation and do not have existing positive ventilation yet require it so that exterior doors and windows can be kept closed to obtain the noise-level reduction required for compatibility

Dwelling units that do not have positive ventilation systems and are determined to be eligible for federally funded positive ventilation systems would be divided into two groups:

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

In exchange for accepting sound insulation under LGA Land Use Measure 1, the property owner must provide to the Port Authority an avigation easement. An avigation easement is a conveyance of airspace over property for use by an airport. The property owner has restricted use of their property subject to the airport sponsor's easement for overflight and other applicable restrictions on the use and development of the parcel. Avigation easements run with the land (i.e., are attached to the property for as long as the easement is in effect). Therefore, an avigation easement binds future property owners and informs them of the property's exposure to aircraft noise while also restricting use of the parcel as described in the avigation easement. If the FAA approves LGA Land Use Measure 1, the Port Authority would develop a noise mitigation protocol containing various details of noise mitigation measure implementation, including language regarding avigation easements. The avigation easement will be attached to the property deed in perpetuity.

Based on the 2021 With Program NEM described in **Chapter 2**, there are 3,524 dwelling units and 9,484 people located in the DNL 65 contour, excluding block rounding. These include seven historic residences in the Jackson Heights Historic District (all are located in Jackson Heights, a neighborhood of Queens, NY):[45]

- 33-11 70th St
- 33-12 70th St
- 33-14 70th St
- 33-16 70th St

[44] 14 CFR Part 150, Appendix A, Table 1 (included in this NCP Report as Table 1-2) indicates that residential land uses are not compatible with aircraft noise exposure of DNL 65 and higher.

[45] These seven residences are listed on the National Register of Historic Places. See Appendix D-2 of the LGA NEM Report.

- 33-18 70th St
- 33-20 70th St
- 33-22 70th St

For the purposes of this NCP, the Port Authority and Study Team produced initial estimates of sound insulation costs for dwelling units. Costs to complete sound insulation for dwelling units were estimated based on recent residential sound insulation projects in the northeastern United States, adjusted to reflect construction costs in the New York–New Jersey metropolitan area. This includes data from the first four phases of the sound mitigation program for T.F. Green Airport in Rhode Island (2013 through 2015),[46] which is a recent noise mitigation program with similar dwelling unit construction types, along with a review of New York and New Jersey construction cost indices in RSMeans data from Gordian.[47] The sound insulation construction cost per dwelling unit is estimated to range from approximately $30,000 to $70,000 (in 2018 dollars), with a weighted average estimated cost of $50,000 per dwelling.[48] Potential cost escalations associated with sound-insulating the seven historic residences in the Jackson Heights Historic District were not considered for the purposes of this analysis. Based on soft costs (project administration, legal, etc.) associated with recent residential sound insulation projects in the northeastern United States and based on the Port Authority's experience with the school sound insulation program, costs other than actual construction costs are estimated to be approximately 30 percent of construction costs. A 15 percent contingency was added to that estimation for unforeseen conditions that may be encountered during construction. Assuming 92 percent of the 3,524 dwelling units within the 2021 With Program DNL 65 contour are eligible for sound insulation[49] (3,242 units) and 100 percent participation in the program by owners of eligible units, the Port Authority estimates a cost of approximately $183 million (in 2018 dollars) to complete the LGA residential sound insulation program (construction costs plus soft costs) for the purposes of this NCP.

The sound insulation program may also include positive ventilation for dwelling units, depending on sound insulation requirements to be determined for dwelling units on an individual basis. Assuming that 8 percent of the 3,524 dwelling units within the 2021 With Program DNL 65 contour would not be eligible for sound insulation (282 dwelling units), the Port Authority produced a cost estimation for providing positive ventilation to the 282 dwelling units, assuming a construction cost of approximately $20,000 per dwelling unit. This estimate is based on recent conversations with sound insulation program management consultants and available construction cost index data.[50] Based on soft costs (e.g., project administration, legal, etc.) associated with recent residential sound insulation projects in the northeastern United States and based on Port

46 Available: https://www.pvdairport.com/corporate/environment/voluntary-sound-mitigation.

47 RSMeans data from Gordian is a database of North America construction costs. Available: https://www.rsmeans.com/.

48 The weighted average sound insulation construction cost was calculated based on the construction cost per square foot of different dwelling types (e.g., single-family, two-family, etc.), the number of dwelling units of those types, and the total square footage of those dwelling unit types estimated to reside within the DNL 65 contour.

49 Based on field observations of the presence/absence of storm windows on a sample of properties around LGA, and data from the T.F. Green Airport sound mitigation program (2013–2015), it is estimated that 8% of the 3,524 dwelling units within the 2021 With Program DNL 65 contour would not be eligible for sound insulation.

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

Authority experience with the school sound insulation program, costs other than actual construction costs were estimated to be approximately 30 percent of construction costs. A 15 percent contingency to account for unforeseen conditions that may be encountered during construction was added. The total cost of providing positive ventilation to the 282 dwelling units is, therefore, estimated by the Port Authority to be approximately $8.1 million.

Including sound insulation for the approximately 3,242 units that may be eligible for sound insulation (which may include positive ventilation), plus the cost of providing only positive ventilation to the 282 dwelling units that may only be eligible for positive ventilation, the total cost of LGA Land Use Measure 1 is, therefore, estimated by the Port Authority to be approximately $191 million. The dwelling units are not automatically eligible for sound insulation or positive ventilation, as described in earlier paragraphs. If LGA Land Use Measure 1 is approved by the FAA, the Port Authority would then develop a noise mitigation protocol describing details of a noise mitigation program. The protocol would contain details of eligibility determinations, including consideration of building construction dates and other factors described above. In implementing LGA Land Use Measure 1 (if approved by FAA), the Port Authority will follow FAA's guidelines as outlined in the AIP Handbook for a residential sound insulation program (i.e., starting at the highest level of noise exposure within the noise contour areas moving outwards to the DNL 65).

Once sound insulation programs are well established and proceeding at a relatively regular pace, airport operators typically can install sound insulation in about 50 to 250 dwelling units per year. The Port Authority anticipates that it would take several decades to complete the insulation of all eligible dwelling units in the communities near LGA due to availability of FAA AIP grant funding,[51] the length of the construction season in the region, and other factors. Because of inflation, the costs per dwelling unit will increase over time. Therefore, total program costs will be higher than what is projected in 2018 dollars.

The Port Authority intends to fund a maximum of 80 percent of residential sound insulation and positive ventilation with FAA AIP grants and at least the remaining 20 percent with fees paid by users of LGA pursuant to an agreement between the users and the Port Authority. Eighty percent of the eligible costs of sound insulation and positive ventilation could be funded with AIP grants; however, not all contingencies and soft costs may be eligible for AIP funding.

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

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

Table 4-2 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of LGA Land Use Measure 1.

TABLE 4-2
IMPLEMENTATION SUMMARY FOR LGA LAND USE MEASURE 1:
SOUND-INSULATE ELIGIBLE DWELLING UNITS

Implementation Item	Description
Benefits	Sound insulation treatments provide adequate noise reduction inside people's homes for compatibility with indoor activities. Once treated, a property is considered compatible with aircraft noise. These treatments may include sound insulation as well as stand-alone positive ventilation systems.
Rationale	The Port Authority is recommending LGA Land Use Measure 1 because it could be an effective way to provide appropriate noise level reduction inside dwelling units.
Responsible Parties	The Port Authority.
Estimated Costs	$191 million to provide sound insulation treatments, assuming that approximately 92 percent of the 3,524 dwelling units (3,242 dwelling units) would be eligible for sound insulation and approximately 8 percent of the 3,524 dwelling units (282 dwelling units) may only be eligible for positive ventilation, subject to the assumptions and limitations set forth in Section 4.2.
Funding Sources	Up to 80 percent FAA AIP and at least 20 percent Port Authority. Costs borne by the Port Authority would be recovered through fees paid by LGA users pursuant to an agreement between them and the Port Authority.
Requirements	FAA approval; identification of eligible properties; and Port Authority to secure funding to sound-insulate properties.
Estimated Schedule	The Port Authority will seek to request federal financial assistance to set up a sound insulation program for LGA when economic conditions recover following the COVID-19 pandemic and after any updates of the NEMs, if necessary. Consistent with Part 150 requirements, the Port Authority will evaluate any changes in the noise environment at LGA and notify the FAA whether the NEM continues to be a reasonable representation of current and/or forecast conditions at LGA or submit an updated NEM to the FAA for acceptance. The noise mitigation program set up task will determine the implementation schedule for LGA Land Use Measure 1.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

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

Non-residential noise-sensitive structures, according to current FAA land use compatibility designations,[52] include public use facilities such as schools and places of worship, hospitals and residential healthcare facilities, day care facilities, and libraries. Sound insulation programs provide compatible noise environments inside structures to mitigate aircraft noise exposure. Sound insulation treatments may include window and door replacement, caulking, weather stripping, and positive air ventilation.

The purpose of sound insulation is to provide an average interior DNL[53] of 45 or below and to provide at least a 5 dB improvement to the noise level reduction of the structure with the installation of the treatments. All eligibility requirements in Appendix R of the *AIP Handbook* must be met. Several key eligibility requirements are summarized in the text presenting LGA Land Use Measure 1.

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

1) It must be located within the DNL 65 contour of an FAA-approved NEM.
2) It must have been constructed before publication of FAA-approved DNL contours. In the case of LGA, FAA-approved DNL contours were first made available to the public on April 9, 2014. Therefore, structures constructed in the vicinity of LGA after April 9, 2014, are not eligible for federally funded sound insulation.
3) It must be in compliance with the local building code.
4) It must have an average noise level in *habitable* rooms above DNL 45 (with windows closed).

According to Table C-5 of the *AIP Handbook*, the FAA may not authorize the installation of sound insulation for structures with non-residential noise-sensitive land uses that are located in temporary commercial facilities (e.g., a house of worship or day care facility under lease in a retail/commercial facility).

The following structures may be eligible for federally funded positive ventilation systems:

- Structures that qualify for sound insulation and do not have existing positive ventilation systems

[52] 14 CFR Part 150, Appendix A, Table 1.

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

- Structures that do not qualify for sound insulation and do not have existing positive ventilation yet but require it so that exterior doors and windows can be kept closed to obtain the noise-level reduction required for compatibility

Structures that do not have positive ventilation systems and are determined eligible for federally funded positive ventilation systems would be divided into two groups:

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

The 2021 With Program DNL contours do not include any schools that did not receive sound insulation treatments during previous Port Authority sound insulation programs. The 2021 With Program contours include four places of worship and two day care facilities, for a total of six non-residential noise-sensitive structures within the DNL 65 contour. Independence Residences, Inc., a health care facility, is located in a dwelling unit and is, therefore, included in Land Use Measure 1 (Sound-Insulate Eligible Dwelling Units) instead of in Land Use Measure 2. See Chapter 5 of the LGA NEM Report for more information about this facility. To estimate the cost of sound insulation for these structures, the RSMeans Square Foot Cost Estimating Guide[54] and information from similar projects at other airports were reviewed. Square footage of each structure was determined through the use of high-resolution aerial photography and Google Street View. Additional factors evaluated for each site included:

- Historic registration status as given by the New York City Landmarks Preservation Commission;[55]
- Existence of air conditioning/positive ventilation;
- A significant number of windows (including stained glass windows); and,
- Overall condition of the structure (good, fair, or poor).

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

The Port Authority estimates a cost of $89 million to provide sound insulation treatments to approximately six non-residential noise-sensitive structures, which is approximately 92 percent of the six non-residential noise-sensitive structures identified. These sound insulation treatments may also include positive ventilation, depending on sound insulation requirements to be determined for each structure on an individual basis. The six identified non-residential noise-sensitive structures are shown in **Table 4-3**. The following historic sites are contained within the 2021 With Program DNL 65 contour, but are not noise-sensitive and therefore are not eligible for

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

55 https://www1.nyc.gov/site/lpc/index.page. Last accessed: March 19, 2019.

sound insulation: Empire Millworks Building, LGA Hangar 3, LGA Hangar 5, LGA Hangar 7, and the Marine Air Terminal. See Appendix D-2 of the LGA NEM Report for more information about these sites.

TABLE 4-3
NON-RESIDENTIAL NOISE-SENSITIVE STRUCTURES POTENTIALLY ELIGIBLE FOR SOUND INSULATION

Name[1]	Facility Type	Address	Borough	Within 2016 FAA-Accepted NEM DNL 65 Contour?	Within 2021 With Program NEM DNL 65 Contour?
Idara Tableegh Ul-Islam	Place of Worship	23-38 81st St	Queens	Yes	Yes
Roman Catholic Church Our Lady of Fatima Convent	Place of Worship	25-56 80th St	Queens	Yes	Yes
Our Lady of Fatima Roman Catholic Church	Place of Worship	25-02 80th St	Queens	Yes	Yes
The Korean Church of Queens	Place of Worship	23-27 89th St	Queens	Yes	Yes
Grace Day Care Center, Inc.	Day Care-Assisted Living	89-00 23rd Ave	Queens	Yes	Yes
Metro Family Residence	Day Care-Assisted Living	87-02 23rd Ave	Queens	Yes	Yes

NOTE:
1 It is estimated that approximately 8 percent of the listed non-residential noise-sensitive structures will later be found not to qualify for sound insulation.

SOURCES: KB Environmental Sciences, Inc., 2020; ESA, 2020.

For the purposes of NCP cost estimation, it is assumed that one non-residential noise-sensitive structure listed in the table (approximately 8 percent) will not qualify for sound insulation.[56] The Port Authority produced an approximated cost estimation for providing positive ventilation without sound insulation to this one non-residential noise-sensitive structure, assuming a construction cost of $150,000. This estimate is based on recent conversations with sound insulation program management consultants and available construction cost index data.[57] To estimate the cost of positive ventilation for the one non-residential noise-sensitive structure, the RSMeans Square Foot Cost Estimating Guide[58] and information from similar projects at other airports were reviewed. To provide a basis for cost estimation, the square footage of each structure was determined using high-resolution aerial photography and Google Street View. Additional factors evaluated for each site included:

- Historic registration status as given by the New York City Landmarks Preservation Commission;[59]

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

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

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

59 https://www1.nyc.gov/site/lpc/index.page. Last accessed: March 19, 2019.

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

A 10 percent contingency was then added for design, along with an additional 15 percent contingency for unforeseen conditions that may be encountered during construction. An estimate of soft costs (project administration, legal, etc.) associated with installation of positive ventilation was assumed to be similar to the soft costs associated with residential sound insulation, which was estimated to be approximately 30 percent of the construction costs. The total cost of providing positive ventilation to the one non-residential noise-sensitive structure is, therefore, estimated by the Port Authority to be approximately $233,000.

Including sound insulation for the six non-residential noise-sensitive structures that may be eligible for sound insulation, plus the cost of providing positive ventilation to the one non-residential noise-sensitive structure that may only be eligible for positive ventilation, the total cost of LGA Land Use Measure 2 is, therefore, estimated by the Port Authority to be approximately $86 million. The non-residential noise-sensitive structures are not automatically eligible for sound insulation or positive ventilation, as described in earlier paragraphs. If LGA Land Use Measure 2 is approved by the FAA, the Port Authority would then develop a noise mitigation protocol describing details of a noise mitigation program. The protocol would contain details of eligibility determinations, including consideration of building construction dates and other factors described above.

The Port Authority intends to fund a maximum of 80 percent of non-residential noise-sensitive structure sound insulation and positive ventilation with FAA AIP grants and at least the remaining 20 percent with fees paid by users of LGA pursuant to an agreement between the users and the Port Authority. Eighty percent of the eligible costs of sound insulation and positive ventilation could be funded with AIP grants; however, not all contingencies and soft costs may be eligible for AIP funding.

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

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

TABLE 4-4
IMPLEMENTATION SUMMARY FOR LGA LAND USE MEASURE 2:
SOUND-INSULATE ELIGIBLE NON-RESIDENTIAL NOISE-SENSITIVE STRUCTURES

Implementation Item	Description
Benefits	Sound insulation treatments provide noise reduction inside noise-sensitive structures for compatibility with indoor activities. Once treated, the property is considered compatible.
Rationale	The Port Authority is recommending LGA Land Use Measure 2 because it could be an effective way to provide appropriate noise level reduction inside eligible non-residential noise-sensitive structures.
Responsible Parties	The Port Authority.
Estimated Costs	$86 million to provide sound insulation treatments, assuming that approximately 92 percent of the six non-residential noise-sensitive structures (five non-residential noise-sensitive structures) would be eligible for sound insulation and the one remaining non-residential noise-sensitive structure may only be eligible for positive ventilation, subject to the assumptions and limitations set forth in Section 4.2.
Funding Sources	Up to 80 percent FAA AIP and at least 20 percent Port Authority. Costs borne by the Port Authority would be recovered through fees paid by LGA users pursuant to an agreement between them and the Port Authority.
Requirements	FAA approval; identification of eligible properties; and Port Authority to secure funding to sound-insulate properties.
Estimated Schedule	The Port Authority will seek to request federal financial assistance to set up a sound insulation program for LGA when economic conditions recover following the COVID-19 pandemic and after any updates to the NEMs, if necessary. Consistent with Part 150 requirements, the Port Authority will evaluate any changes in the noise environment at LGA and notify the FAA whether the NEM continues to be a reasonable representation of current and/or forecast conditions at LGA or submit an updated NEM to the FAA for acceptance. The noise mitigation program set up task will determine the implementation schedule for LGA Land Use Measure 2.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

4.3 Recommended Preventive Land Use Measures

Based on the experience of other airports and according to the FAA, the preventive land use measures discussed in this section can be effective in preventing the development of new noncompatible land uses. It is up to state and local governments to decide whether to pursue preventive land use measures to reduce noncompatible land use. Consistent with the requirements of 14 CFR Part 150, Appendix A, Sec. 150.123, the Port Authority met with land use planning entities in the communities surrounding LGA[60] to educate them about preventive land use measures and to learn their level of interest in potentially pursuing any of these approaches. A summary of those meetings is set forth in Section 6.3.2 of this NCP, and meeting notes are provided in **Appendices E-3** through **E-5**.

Based on this outreach, the land use planning agencies expressed willingness to explore preventive land use measures in the future, but were not at this time prepared to take action on most preventive measures discussed. At least one of the planning agencies expressed a preference for the Port Authority to focus on developing voluntary measures that would incentivize property owners to install noise mitigation rather than the jurisdictions themselves implementing preventive land use measures through changes in zoning or building codes. For further details on the discussions with land use agencies, see **Appendices E-3** through **E-5**.

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

LGA Land Use Measure 3: Include Aircraft Noise in Real Estate Disclosures

Real estate disclosure is a preventive land use strategy that is focused on raising property buyers' awareness of aircraft noise impacts. Real estate disclosures provide the opportunity for prospective buyers to learn about the property and the seller's experience in it. Such disclosures can inform buyers while also protecting the sellers from future legal action by revealing issues that can negatively affect the value, usefulness or enjoyment of the property.[61] Some communities near airports include aircraft noise in real estate disclosure forms to ensure that the buyer is aware that the property is in the vicinity of an airport.

60 The Port Authority invited the City of Long Beach, Nassau County, National Park Service, New York City Department of Buildings, New York City Department of City Planning, Office of Congressman Tom Suozzi, Queens Borough President's Office, Town of Hempstead, Town of North Hempstead, Village of Lawrence, Village of Valley Stream, and the Village of Woodsburgh to land use planning discussions. All attended except the Village of Woodsburgh and Village of Valley Stream.

61 https://www.zillow.com/blog/real-estate-disclosures-62807.

The decision whether to pursue such a policy is an issue for government entities to decide. However, should any state and/or local governments wish to evaluate this preventive land use measure, the Port Authority would be available to assist in any such evaluation. In particular, discussions with New York City suggested that New York City may support aircraft noise real estate disclosures. For further details on the discussions with land use agencies, see **Appendices E-3** through **E-5**.

Conclusions: *LGA Land Use Measure 3: Include Aircraft Noise in Real Estate Disclosures.* This could help inform buyers of aircraft noise while also protecting the sellers from future legal action by revealing issues that can negatively affect the value, usefulness, or enjoyment of the property.

Table 4-5 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of LGA Land Use Measure 3.

TABLE 4-5
IMPLEMENTATION SUMMARY FOR LGA LAND USE MEASURE 3:
INCLUDE AIRCRAFT NOISE IN REAL ESTATE DISCLOSURES

Implementation Item	Description
Benefits	Including aircraft noise in real estate disclosures could provide the opportunity for prospective buyers to learn about aircraft noise exposure at the property and the seller's experience of it.
Rationale	The Port Authority is recommending LGA Land Use Measure 3 because it could help inform buyers of aircraft noise while also protecting the sellers from future legal action by revealing issues that can negatively affect the value, usefulness, or enjoyment of the property, and because one jurisdiction expressed interest in such a measure.
Responsible Parties	Land use jurisdictions.
Estimated Costs	The expected costs associated with development and implementation of this measure are unknown at this time.
Funding Sources	Land use jurisdictions.
Requirements	The decision whether to pursue such a policy is an issue for government entities to decide. The Port Authority will respond promptly to any request by a state and/or local government for assistance in evaluating this preventive land use measure.
Estimated Schedule	Not scheduled at this time.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

4.4 Land Use Strategies Considered but Not Recommended for Inclusion in This NCP

The Port Authority considered, but does not recommend the following land use strategies as part of the LGA NCP.

Acquire Noncompatible Residential Parcels

Acquisition of noncompatible residential parcels is a corrective land use strategy because it reduces noncompatible land use by converting the noncompatible land use to a compatible land use. Land acquisition is the most effective means available to airports under 14 CFR Part 150 to change the land use from noncompatible to compatible with aircraft noise exposure. However, the acquisition of residential properties has the potential to fragment established neighborhoods and communities depending on the number of property owners that voluntarily choose to sell their property.

***Reason for not recommending for inclusion in this NCP*:** Acquisition of noncompatible residential parcels has the potential to fragment established neighborhoods and communities. See Proposed Land Use Strategy #4 on **page G-33** of **Appendix G.**

Implement Sound Attenuation for New Development

Implementing sound attenuation for new development would involve revision of building codes. The main purpose of building codes is to protect public health, safety, and general welfare as they relate to the construction and occupancy of structures. Building codes are codified and enacted into law within a particular jurisdiction. Local jurisdictions interested in reducing aircraft noise exposure can amend their building codes to specify a required interior noise level in terms of DNL and/or a specific noise level reduction in terms of Sound Transmission Class,[62] Outdoor to Indoor Transmission Class,[63] or both.

During the NCP phase of the 14 CFR Part 150 Study, the Port Authority held several discussions with land use agencies. New York City's current building code does not address noise that emanates from sources outside of a building and does not have sound-attenuating construction requirements for exterior walls to mitigate outside noise. New York City representatives advised that amending the building code to address external-source noise mitigation would require coordination among multiple New York City agencies and is not of interest at this time. Although New York City has not expressed an interest in pursuing such amendments of its building code at this time, the Port Authority would be available to assist New York City should it elect to pursue raising minimum building standards as a measure in future updates to the NCP. For further details on the discussions with land use agencies, see **Appendices E-3** through **E-5**.

***Reason for not recommending for inclusion in this NCP*:** Implementing sound attenuation for new development is not of interest to land use agencies at this time. See Proposed Land Use

62 Sound Transmission Class is a rating of how well a building wall attenuates airborne sound. See ASTM E413, "Classification for Rating Sound Insulation."

63 Outdoor to Indoor Transmission Class is a rating of the noise reduction provided by a structure. See ASTM E1332, "Standard Classification for Rating Outdoor-Indoor Sound Attenuation."

Strategy #5 on **page G-33** of **Appendix G**. For further details on the discussions with land use agencies, see **Appendices E-3** through **E-5**.

Acquire Avigation Easements

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

As set forth in Section 4.2, the Port Authority will require avigation easements in exchange for installation of sound insulation. Avigation easements can also be obtained in exchange for compensation, but the Port Authority is not recommending that as a mitigation measure. Easement acquisition as a stand-alone measure would require payment to the parcel owner in accordance with FAA AC 150-5100-17, "Land Acquisition and Relocation Assistance for Airport Improvement Program (AIP) Assisted Projects," Section 2.2.8, "Appraisal of Avigation Easements Acquired for Airport Operations and Standards." The Port Authority is not recommending acquisition of easements other than avigation easements in conjunction with sound insulation and positive ventilation.

Reason for not recommending for inclusion in this NCP: Avigation easements do not reduce noise and therefore do not reduce the number of noncompatible structures within the DNL 65 contour. See Proposed Land Use Strategy #6 on **page G-34** of **Appendix G**. The Port Authority will require avigation easements in exchange for installation of sound insulation, as set forth in Section 4.2.

Implement Rezoning of Land Uses

The creation or revision of zoning rules is a preventive land use strategy because it is focused on reducing or preventing construction of future noncompatible uses in areas impacted by aircraft noise.

Reason for not recommending for inclusion in this NCP: During the NCP phase of the 14 CFR Part 150 Study, the Port Authority held several discussions with land use agencies. In general, land use agencies did not support rezoning to promote compatible land use. For further details on the discussions with land use agencies, see **Appendices E-3** through **E-5**. Furthermore, the communities surrounding LGA are already heavily developed, limiting the effectiveness of rezoning. The Port Authority does not have jurisdiction over zoning codes, but would work with land use and regulatory agencies if they are interested in pursuing noise-related zoning code changes specifically focused toward new development, and may reconsider this as a measure in

future updates to the NCP. See Proposed Land Use Strategies #7 and #8 on **page G-34** of **Appendix G**.

Establish Transferable Development Rights

Transferable Development Rights (TDR) is a zoning technique that redirects development from a location where development is not desired by the jurisdiction to a location that the jurisdiction considers to be best suited for development. Under a TDR program, development rights are treated as a separate article of property that can be sold to a noncontiguous parcel or even to land owned by someone else. In the case of aircraft-related noise, TDR could be used to direct development of noise-sensitive land uses to areas of less noise impact. However, TDR does not reduce noise by itself.

Reason for not recommending for inclusion in this NCP: TDR does not reduce noise and therefore does not reduce the number of noncompatible structures within the DNL 65 contour. This strategy also was not supported by land use agencies. See Proposed Land Use Strategy #9 on **page G-35** of **Appendix G**. For further details on the discussions with land use agencies, see **Appendices E-3** through **E-5**.

Provide Purchase Assurances for Properties in the DNL 65 Contour

This strategy involves the Port Authority agreeing to acquire noise-impacted properties as a purchaser of last resort.

Reason for not recommending for inclusion in this NCP: The Port Authority's recommended NCP measures, once approved and implemented, will make noncompatible land uses compatible with airport operations. Therefore, purchase assurances will not be necessary for properties located within the DNL 65 contour. See Proposed Land Use Strategy #10 on **page G-35** of **Appendix G**.

Add a Notice on Deeds

Property deeds are legal instruments that are used to transfer property from an owner to a new owner. This suggested strategy would involve adding written notices of aircraft noise exposure to property deeds.

Reason for not recommending for inclusion in this NCP: The Port Authority understands that the intention of the suggested strategy is to help potential property buyers be aware of aircraft noise exposure. The measure to include aircraft noise in real estate disclosures, as shown in Section 4.2, captures this intention. Furthermore, adding notices on deeds was not supported by land use agencies. For further details on the discussions with land use agencies, see **Appendices E-3** through **E-5**. See Proposed Land Use Strategy #11 on **page G-36** of **Appendix G**.

4.5 Summary of Recommended Land Use Measures

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

Measures with Schedule Dependent Upon External Factors/Pandemic Recovery

- Sound-Insulate Eligible Dwelling Units
- Sound-Insulate Eligible Non-Residential Noise-Sensitive Structures

Measures Not Scheduled at This Time

- Include Aircraft Noise in Real Estate Disclosures

CHAPTER 5
Noise Compatibility Program – Program Management Measures

Program management measures would enable the Port Authority to monitor the implementation and compliance of the recommended noise abatement and land use measures in Chapters 3 and 4 of this NCP, as well as enhance the stakeholders' understanding of aircraft noise. Program management measures are critical to the success of the NCP. This chapter details the following 12 program management measures recommended for inclusion in this NCP:

- Maintain Noise Office
- Maintain Noise and Operations Management System
- Maintain Public Flight Tracking Portal
- Maintain Noise Complaint Management System
- Maintain Noise Office Website
- Continue Community Outreach Activities
- Establish and Manage a Fly Quiet Program
- Make Aircraft Noise Contours Available in a Geographic Information System (GIS)
- Update the Noise Exposure Map
- Update the Noise Compatibility Program
- Post Monthly Color-Coded DNL Values on Port Authority Website
- The Port Authority to Coordinate with the FAA on Development and Implementation of NextGen Procedures

5.1 Existing Program Management Measures

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

- **Noise Office**

  The Port Authority's Noise Office, which was established in 2014, manages the noise programs for LGA, JFK, EWR, and TEB, including the 14 CFR Part 150 Studies for each airport. Currently, six full-time Port Authority employees staff the Noise Office, providing public liaising as well as management of the noise monitoring, flight tracking, and complaint

management systems in place. The Noise Office operates as the principal office for receiving and responding to aircraft noise complaints from the public and interfacing with stakeholder representatives, noise-impacted communities, and airport users. Noise Office staff regularly communicate with FAA personnel, aircraft operators, community members, and aviation industry associations about aircraft noise. In addition, the Noise Office investigates and responds to aircraft noise complaints, compiles data for reports to the public and FAA, operates and maintains the Port Authority's Noise and Operations Management System (NOMS) and the public flight tracking portal system, participates in community meetings to discuss aircraft noise issues, and meets with elected officials to discuss aircraft noise issues.

- **Noise and Operations Management System**

  The Port Authority first established a noise monitoring system for LGA in 1959, consisting of three monitors. The original system required manual correlation of measured noise levels with individual aircraft operations; a system upgrade in 1992 added flight tracking and automated this process. The current NOMS is a system called ANOMS, a product of EMS Brüel & Kjær.[64] This product was installed in 2013 and collects noise monitoring data in the vicinity of LGA using permanent and portable noise monitors. The current contract extends through 2022. It receives flight tracking data from the FAA and can link noise events and complaints to specific aircraft operations. In addition to providing reliable airport operations and noise monitoring data, ANOMS allows investigation and validation of noise complaints, and provides historical data on runway use, flight tracks, and weather. ANOMS data is used by the Port Authority to enforce the departure noise limit of 112 PNdB. For further details, see Section 2.6.5 of the LGA NEM Report. Currently, 10 monitors are located near LGA, as shown in **Figure 3-1**. Of the 10 noise monitors, one noise monitor is located within the 2021 With Program NEM DNL 65 contour. This monitor can be seen in Map 1 of the full-size 2021 With Program NEM in **Appendix I-1**.

- **Public Flight Tracking Portal (WebTrak)**

  The public can view aircraft movements within the New York metropolitan area using the Port Authority's public flight tracking portal, which was established in 2014. The current flight tracking portal is named WebTrak, a public access component of ANOMS located on the Port Authority's website. For each aircraft, WebTrak provides specific information regarding aircraft type, altitude, origin and destination airports, and flight identification. Noise level readings at the noise monitors near each airport are also shown in A-weighted instantaneous sound pressure level readings. The public can use WebTrak to submit a noise complaint to the Port Authority via a link to an online web form. The Port Authority also posts runway closure information in a pop-up window on the main WebTrak web page, which is updated on a weekly basis.

- **Noise Complaint Management System (PlaneNoise®)**

  The Port Authority collects and manages noise complaint information from each of the airports in its system. An electronic noise complaint management system was implemented in 2012. The current noise complaint management system is named PlaneNoise®. There are three primary means of filing an aircraft noise complaint: (1) a form on the Port Authority's website, (2) a dedicated noise complaint hotline, or (3) the WebTrak website. Noise complaints are collected with the help of the Port Authority's PlaneNoise® complaint management system. Each complaint received is compiled in a database, verified for accuracy, analyzed, and mapped for reporting. The Port Authority provides noise complaint reports to the FAA on a monthly basis for informational purposes.

64 Available: https://www.emsbk.com/anoms/

- **Noise Office Website**

  The Port Authority maintains a Noise Office website, which provides links to web pages describing the Port Authority's various noise management programs. The Noise Office website was established in 2015. These include links to submit a noise complaint, WebTrak, noise monitoring, data reports, and airport community roundtables. The noise information website also contains a link to frequently asked questions (FAQs) and a central web page for each of the Port Authority's LGA, JFK, EWR, and TEB 14 CFR Part 150 Studies.

- **Community Outreach**

  The Port Authority, in collaboration with the FAA and representatives of communities surrounding its airports, facilitated the development of airport community roundtables for LGA, JFK, EWR, and TEB. Each community roundtable meets on a regular basis to provide opportunities for its members to maintain open communication with the Port Authority and the FAA, seeking mutual and feasible ways to manage aircraft noise impacts. The Port Authority and the FAA participate in the New York Community Aviation Roundtable (NYCAR), which was established in 2014.

5.2 Recommended Program Management Measures

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

LGA Program Management Measure 1: Maintain Noise Office

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

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

Table 5-1 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of LGA Program Management Measure 1.

TABLE 5-1
IMPLEMENTATION SUMMARY FOR LGA PROGRAM MANAGEMENT MEASURE 1: MAINTAIN EXISTING NOISE OFFICE

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

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Program Management Measure 2: Maintain Noise and Operations Management System

The Port Authority's NOMS supports the investigation of noise complaints as well as communication with the public about the noise environment associated with LGA. ANOMS also retains historical data so that noise and operational trends can be determined. Maintenance of the NOMS will enable the Port Authority to investigate noise complaints and provide a means to monitor adherence to NCP noise abatement measures for LGA. Of the 10 noise monitors in the current LGA NOMS, one noise monitor is located within the 2021 With Program NEM DNL 65

contour. This monitor can be seen in Map 1 of the full-size 2021 With Program NEM in **Appendix I-1**.

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

Table 5-2 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of LGA Program Management Measure 2.

TABLE 5-2
IMPLEMENTATION SUMMARY FOR LGA PROGRAM MANAGEMENT MEASURE 2: MAINTAIN NOISE AND OPERATIONS MANAGEMENT SYSTEM

Implementation Item	Discussion
Benefits	The NOMS enables the Port Authority Noise Office to correlate noise monitoring data with individual aircraft operations at LGA. This supports the investigation of noise complaints as well as communication with the public about the noise environment associated with LGA.
Rationale	The Port Authority is recommending LGA Program Management Measure 2 because the NOMS is a key tool used by the Noise Office.
Responsible Parties	The Port Authority.
Estimated Costs	The FAA does not fund program operating expenses. The Port Authority will continue to fund the maintenance of the existing system. However, if a system upgrade and/or replacement is needed in the future, the cost is expected to be to be approximately $90,000. If any of the existing noise monitors need to be replaced and/or upgraded in the future, the cost for hardware and installation of each noise monitor is expected to be approximately $35,000. These cost estimates are determined based on the development of the existing system as a baseline with added future anticipated cost for system upgrades and/or replacement. If any noise monitor located within the DNL 65 contour needs replacement and/or upgrade, the cost for the replacement and/or upgrade may be eligible to be partially funded by the FAA.
Funding Sources	For replacement and/or upgrades of any noise monitor located within the DNL 65 contour: 80 percent FAA AIP and 20 percent Port Authority. For other system components: The Port Authority. Costs borne by the Port Authority would be recovered through fees paid by LGA users pursuant to an agreement between them and the Port Authority.
Requirements	FAA approval of this measure; and Port Authority to secure funding for system replacement and/or upgrades.
Estimated Schedule	This measure is already implemented; the Port Authority will continue to maintain the existing NOMS. Within three years of the FAA's Record of Approval, the Port Authority will attempt to request a federal grant for system replacement and/or upgrades.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Program Management Measure 3: Maintain Public Flight Tracking Portal

The existing public flight tracking portal is an internet-based system that allows the public to view aircraft movements in the New York area via a website. The flight tracking portal provides a public interface for the Port Authority's NOMS and is therefore a key communication and educational tool used by the Noise Office.

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

Table 5-3 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of LGA Program Management Measure 3.

TABLE 5-3
IMPLEMENTATION SUMMARY FOR LGA PROGRAM MANAGEMENT MEASURE 3: MAINTAIN PUBLIC FLIGHT TRACKING PORTAL

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

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Program Management Measure 4: Maintain Noise Complaint Management System

The existing noise complaint management system is used by the Port Authority to collect and manage noise complaint information from each of the airports in its system. The Port Authority provides noise complaint reports to the FAA on a monthly basis for informational purposes. The use of a noise complaint management system enables the Noise Office to efficiently respond to noise complaints and gain insights from noise complaint data.

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

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

TABLE 5-4
IMPLEMENTATION SUMMARY FOR LGA PROGRAM MANAGEMENT MEASURE 4: MAINTAIN A NOISE COMPLAINT MANAGEMENT SYSTEM

Implementation Item	Discussion
Benefits	The existing noise complaint management system, provided by PlaneNoise, enables the Port Authority Noise Office to efficiently collect and report noise complaints associated with aircraft operations at LGA. This supports the Noise Office function of communicating with the public about the impacts of operations at LGA.
Rationale	The Port Authority is recommending LGA Program Management Measure 4 because the existing noise complaint management system supports the function of the Noise Office.
Responsible Parties	The Port Authority.
Estimated Costs	The FAA does not fund operating expenses. The Port Authority will continue to fund the maintenance of the existing system. However, if a system upgrade and/or replacement is needed in the future, the cost is expected to be to be approximately $4,000. The cost estimate is determined based on the development of the existing system as a baseline with added future anticipated cost for system upgrades and/or replacement. The cost for the implementation of this measure is eligible to be partially funded by the FAA.
Funding Sources	For system upgrades: 80 percent FAA AIP and 20 percent Port Authority. Costs borne by the Port Authority would be recovered through fees paid by LGA users pursuant to an agreement between them and the Port Authority.
Requirements	FAA approval of this measure; and Port Authority to secure funding for the system upgrades.
Estimated Schedule	This measure is already implemented; the Port Authority will continue to maintain the existing noise complaint management system. Within three years of the FAA's Record of Approval, the Port Authority will attempt to request a federal grant for system replacement and/or upgrades.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Program Management Measure 5: Maintain Noise Office Website

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

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

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

TABLE 5-5
IMPLEMENTATION SUMMARY FOR LGA PROGRAM MANAGEMENT MEASURE 5: MAINTAIN NOISE OFFICE WEBSITE

Implementation Item	Discussion
Benefits	The existing Noise Office website provides links to the Port Authority's publicly available information and services associated with the noise environment at LGA. This supports the Noise Office function of communicating with the public about the impacts of operations at LGA.
Rationale	The Port Authority is recommending LGA Program Management Measure 5 because the existing Noise Office website supports the function of the Noise Office.
Responsible Parties	The Port Authority.
Estimated Costs	The FAA does not fund program operating expenses. The Port Authority will continue to fund maintenance and upgrades of the Noise Office website.
Funding Sources	The Port Authority. Costs borne by the Port Authority would be recovered through fees paid by LGA users pursuant to an agreement between them and the Port Authority.
Requirements	Not applicable.
Estimated Schedule	This measure has already been implemented; the Port Authority will continue to maintain and upgrade the Noise Office website.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Program Management Measure 6: Continue Community Outreach Activities

The Port Authority facilitated the development of the NYCAR in 2014 in collaboration with FAA and representatives of nearby communities. The Port Authority and the FAA have non-voting advisory status on the NYCAR, as indicated in the NYCAR by-laws.[65]

The Roundtable has a subcommittee specifically focused on LGA operations. The Roundtable meets on a regularly scheduled basis to provide ongoing communication with the Port Authority and the FAA, seeking mutual and feasible ways to manage aircraft noise impacts. The Noise Office leverages these types of in-person outreach activities to support and maintain meaningful dialogue with communities, the FAA, and other aviation stakeholders regarding aircraft noise.

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

Table 5-6 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of LGA Program Management Measure 6.

TABLE 5-6
IMPLEMENTATION SUMMARY FOR LGA PROGRAM MANAGEMENT MEASURE 6: CONTINUE COMMUNITY OUTREACH ACTIVITIES

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

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

65 Available: https://aircraftnoise.panynj.gov/nycar-by-laws/

LGA Program Management Measure 7: Establish and Manage a Fly Quiet Program

A Fly Quiet Program is a voluntary collaboration of the airport proprietor, aircraft operators, and air traffic controllers that encourages pilots and air traffic controllers to use noise abatement flight procedures and preferential runways. It also typically includes an aircraft operator/pilot awareness campaign with promotional materials (e.g., handouts/flyers, signage, and other educational materials) to ensure pilots know about the recommended noise abatement procedures at the Airport. Adherence to the Fly Quiet Program would benefit surrounding noncompatible land uses by reducing aircraft noise on both a single event and cumulative basis, in part through encouraging aircraft operators to proactively reduce aircraft noise levels. The exact reduction in aircraft noise levels would be dependent on the level of adherence to the Program. The Port Authority would hire a consultant to develop the program.

The Port Authority recommends initiating a voluntary Fly Quiet Program for LGA. The Fly Quiet Program would be used to facilitate implementation of recommended noise abatement measures approved by the FAA. The Fly Quiet Program would also be used as a forum for developing and discussing noise abatement measures that may provide benefits outside of the 14 CFR Part 150 process. The Noise Office would monitor aircraft operator adherence to the voluntary noise abatement procedures through the Fly Quiet Program and would issue a report describing this adherence. The program would also include the preparation of comprehensive reports of DNL values at noise monitors using the data acquired and maintained in the Port Authority's NOMS. The Fly Quiet noise reports would be published on the Noise Office website to document the progress of the program and shared with various stakeholders including, but not limited to, the FAA, NYCAR members, land use planners, and aircraft operators.

Conclusions: *LGA Program Management Measure 7: Establish and Manage a Fly Quiet Program*. This could enable the collaborative development and management of solutions to abate noise from aircraft operations at LGA. The program could include engagement with pilots, aircraft operators, airlines, FAA air traffic controllers, and other stakeholders at LGA.

Table 5-7 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of LGA Program Management Measure 7.

TABLE 5-7
IMPLEMENTATION SUMMARY FOR LGA PROGRAM MANAGEMENT MEASURE 7: ESTABLISH AND MANAGE A FLY QUIET PROGRAM

Implementation Item	Discussion
Benefits	Establishment and management of a Fly Quiet Program will enable the collaborative development and management of solutions for abating noise from aircraft operations at LGA.
Rationale	The Port Authority is recommending LGA Program Management Measure 7 so that aircraft noise can be collaboratively abated and managed at LGA.
Responsible Parties	The Port Authority.
Estimated Costs	Based on previous efforts at other airports, establishment of a Fly Quiet Program may cost approximately $150,000.
Funding Sources	80 percent FAA AIP and 20 percent Port Authority. Costs borne by the Port Authority would be recovered through fees paid by LGA users pursuant to an agreement between them and the Port Authority.
Requirements	FAA's approval of this measure; and Port Authority to develop the Fly Quiet Program.
Estimated Schedule	Within 2 years of the FAA's Record of Approval for the NCP, the Port Authority will attempt to initiate development of the Fly Quiet Program.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Program Management Measure 8: Make Aircraft Noise Contours Available in a Geographic Information System (GIS)

An interactive NEM (presenting DNL 65 and higher contour lines) can provide the public, land use planning agencies, and other stakeholders with easy access to an airport's noise contours to enhance awareness and decision-making regarding aircraft noise. This measure would involve the Port Authority providing a Google Earth file (or other readily useable file) of the LGA 2021 With Program DNL 65, 70, and 75 dB contours to the public for download. The Port Authority could also host a map on its Noise Office website that would include these GIS layers as a downloadable file containing noise contour shapes for easy viewing by interested parties.

Interactive noise contour maps for LGA were developed as part of this Study, containing the 2016 and 2021 NEMs accepted by the FAA in 2017. Those maps allow users to determine whether their residence or any other noise-sensitive building is within or outside of the DNL 65 contours. They were favorably received when showcased at the LGA draft NEM workshops and

subsequently posted for public access on the LGA 14 CFR Part 150 website. It is the Port Authority's intention to maintain public access to these maps, while including the LGA 2021 With Program NEM after it is accepted by the FAA.

The Port Authority will also provide the 2021 With Program DNL 65, 70, and 75 contours to the local planning agencies with land uses within the contour boundaries.

Conclusions: LGA *Program Management Measure 8: Make Aircraft Noise Contours Available in a Geographic Information System (GIS).* This could provide the public, land use planning agencies, and other stakeholders with easy access to LGA 2021 With Program noise contours to enhance awareness and decision-making regarding aircraft noise.

Table 5-8 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of LGA Program Management Measure 8.

TABLE 5-8
IMPLEMENTATION SUMMARY FOR LGA PROGRAM MANAGEMENT MEASURE 8: MAKE CONTOURS AVAILABLE IN A GEOGRAPHIC INFORMATION SYSTEM (GIS)

Implementation Item	Discussion
Benefits	Making LGA noise contours available in a GIS will provide the public, land use planning agencies, and other stakeholders with easy access to Future Conditions noise contours.
Rationale	The Port Authority is recommending LGA Program Management Measure 8 to provide easy access to the LGA 2021 With Program noise contours that could enhance awareness and decision-making for interested parties regarding aircraft noise.
Responsible Parties	The Port Authority.
Estimated Costs	No FAA funding is required to implement, and the Port Authority will add the 2021 With Program NEM to the existing interactive noise contour map.
Funding Sources	Not applicable.
Requirements	Not applicable.
Estimated Schedule	Within one year of FAA approval of this measure, the Port Authority will add the 2021 With Program NEM to the existing interactive noise contour map exhibit.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Program Management Measure 9: Update the Noise Exposure Map

The FAA requires that an airport operator maintain NEMs that reflect current or reasonably projected conditions in order to obtain FAA funding for noise programs. Specifically, 14 CFR Part 150, Sec. 150.21(d), states that an airport operator shall "promptly prepare and submit a revised noise exposure map" if any change in the operation of the airport creates a "substantial, new noncompatible use" or a "significant reduction in noise over existing noncompatible uses"

that is not reflected on the FAA-accepted NEM on record. The former condition reflects an increase of DNL 1.5 dB in terms of the DNL over noncompatible uses or over uses that are made noncompatible by the noise increase, while the latter condition reflects a reduction of DNL 1.5 dB over uses that were formerly noncompatible but are made compatible by the noise reduction.

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

Conclusions: *LGA Program Management Measure 9: Update the Noise Exposure Map.* This will enable the Port Authority to meet the requirements of 14 CFR Part 150, Sec. 150.21(d), if applicable changes in the noise environment occur at LGA.

Table 5-9 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of LGA Program Management Measure 8.

TABLE 5-9
IMPLEMENTATION SUMMARY FOR LGA PROGRAM MANAGEMENT MEASURE 9: UPDATE THE NOISE EXPOSURE MAP

Implementation Item	Discussion
Benefits	Updating the NEM will enable the Port Authority to meet the requirements of 14 CFR Part 150 if applicable changes in the noise environment occur at LGA.
Rationale	The Port Authority is recommending LGA Program Management Measure 9 to meet the requirements of 14 CFR Part 150, Sec. 150.21(d).
Responsible Parties	The Port Authority.
Estimated Costs	Based on the cost of the LGA NEM development process, an NEM update may cost approximately $2 million. This estimate is based on costs for recent large airport 14 CFR Part 150 studies that the Study Team has participated in, including the NEM phase of the LGA 14 CFR Part 150 Study.
Funding Sources	80 percent FAA Airport Improvement Program and 20 percent Port Authority. Costs borne by the Port Authority would be recovered through fees paid by LGA users pursuant to an agreement between them and the Port Authority.
Requirements	FAA's approval of this measure, and Port Authority to secure funding for the update of the NEM when warranted.
Estimated Schedule	The Port Authority anticipates updating the NEMs when operations at LGA stabilize from the COVID-19 pandemic. Thereafter, the Port Authority expects to update the NEM in accordance with Section 174 of the FAA Reauthorization Act of 2018.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Program Management Measure 10: Update the Noise Compatibility Program

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

Conclusions: *LGA Program Management Measure 10: Update the Noise Compatibility Program.* This will enable the Port Authority to meet the requirements of 14 CFR Part 150, Sec. 150.23(e)(9), if made necessary by a revision of the NEMs for LGA.

Table 5-10 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of LGA Program Management Measure 10.

TABLE 5-10
IMPLEMENTATION SUMMARY FOR LGA PROGRAM MANAGEMENT MEASURE 10: UPDATE THE NOISE COMPATIBILITY PROGRAM

Implementation Item	Discussion
Benefits	Updating the NCP will enable the Port Authority to meet the requirements of 14 CFR Part 150 if a revision of the NCP is made necessary by a revision of the NEM for LGA.
Rationale	The Port Authority is recommending LGA Program Management Measure 10 to meet the requirements of 14 CFR Part 150, Sec. 150.23(e)(9).
Responsible Parties	The Port Authority.
Estimated Costs	Based on the Port Authority's experience with this Study, an NCP update may range from $300,000 to $2 million.
Funding Sources	80 percent FAA AIP and 20 percent Port Authority. Costs borne by the Port Authority would be recovered through fees paid by LGA users pursuant to an agreement between them and the Port Authority.
Requirements	FAA's approval of this measure; and Port Authority to secure funding for the update of the NCP when appropriate.
Estimated Schedule	Within two years of FAA acceptance of a revised NEM, the Port Authority will attempt to initiate a review of the NCP to determine if a revision is necessary.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

LGA Program Management Measure 11: Post Monthly Color-Coded DNL Values on Port Authority Website

Noise monitoring reports with color-coded values could help the public, land use planning agencies, and other stakeholders easily understand the noise environment in the vicinity of LGA to enhance awareness and decision-making regarding aircraft noise. This measure would involve the Port Authority providing noise monitoring reports with monthly DNL values for each noise monitor that are coded with different colors based on which ranges the values fall into, such as DNL 60.0 to 64.9, DNL 65 to 69.9, and so on.

Noise monitoring reports with color-coded values are currently available on the Port Authority's aircraft noise website.[66] It is the Port Authority's intention to continue providing these reports.

Conclusions: *LGA Program Management Measure 11: Post Monthly Color-Coded DNL Values on Port Authority Website.* This could help the public, land use planning agencies, and other stakeholders easily understand the noise environment in the vicinity of LGA to enhance awareness and decision-making regarding aircraft noise.

Table 5-11 provides a summary of implementation requirements along with the benefits and rationale for the recommendation of LGA Program Management Measure 11.

TABLE 5-11
IMPLEMENTATION SUMMARY FOR LGA PROGRAM MANAGEMENT MEASURE 11: POST MONTHLY COLOR-CODED DNL VALUES ON PORT AUTHORITY WEBSITE

Implementation Item	Discussion
Benefits	Posting monthly color-coded DNL values on the Port Authority website could provide the public, land use planning agencies, and other stakeholders with easily understandable information about the noise environment in the vicinity of LGA.
Rationale	The Port Authority is recommending LGA Program Management Measure 11 to provide easy access to noise reports that could enhance awareness and decision-making for interested parties regarding aircraft noise.
Responsible Parties	The Port Authority.
Estimated Costs	No FAA funding is required to implement, and the Port Authority has used available information and methods to make the color-coded reports available.
Funding Sources	No funding required.
Requirements	Not applicable.
Estimated Schedule	This measure has already been implemented. The Port Authority will continue providing these reports.

SOURCES: Port Authority and ESA, 2018 and 2020.

66 https://aircraftnoise.panynj.gov/reports/

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

Description

The Port Authority supports the FAA's efforts to modernize the air transportation system to make flying safer, more efficient, and more predictable. The FAA's Next Generation Air Transportation System (NextGen) is a comprehensive overhaul of the National Airspace System to make air travel more convenient and dependable, while ensuring that flying is as safe, secure, and convenient as possible. Through NextGen, the FAA seeks to build the capability to guide and track aircraft more precisely and efficiently to save fuel and reduce noise and air pollution.[67]

A key NextGen technology is Performance Based Navigation, which uses satellites to guide aircraft along precise flight paths.[68] These precise flight paths often result in the concentration of aircraft within narrow flight corridors. Because the use of NextGen procedures to guide aircraft along precise flight paths can increase the frequency of overflights of areas below the concentrated flight paths, the Port Authority recommends that the FAA coordinate closely with the Port Authority if and when it evaluates the implementation of NextGen flight procedures in the greater New York/New Jersey region.

The FAA's NextGen implementation involves managing flight procedures for numerous airports in the region and is not specific to LGA. The Port Authority is a member of the NextGen Advisory Committee (NAC),[69] a federal advisory committee that makes recommendations to the FAA regarding the possible implementation of NextGen in the New York/New Jersey/ Philadelphia airspace; this includes air traffic and airspace management recommendations. Through participation in the NAC, the Port Authority can provide its insight for FAA consideration regarding future airspace and procedure designs for the region as a whole. The Port Authority expects to continue that collaborative approach. As a collaborating member of the NAC, the Port Authority can advance measures for further FAA evaluation by either directly engaging with the FAA's NY TRACON or submitting measures to the NAC for its consideration.

Additionally, the FAA is working on ways to reduce the concentration of aircraft that results from the implementation of NextGen departure procedures. To address community concerns about the concentration of aircraft on particular flight procedures, Congress enacted legislation requiring the FAA to consider dispersal headings[70] when the FAA is proposing a new NextGen departure procedure or amending an existing procedure below 6,000 feet over noise-sensitive areas. "Dispersal headings" is a term used to describe the use of more than one departure heading from a runway, which may result in a reduced concentration of departing aircraft over areas close to the Airport. Reducing the concentration of aircraft departures through the use of dispersal headings may assist in balancing noise exposure.

67 Available: https://www.faa.gov/nextgen/. Last accessed March 20, 2019.

68 Available: https://www.faa.gov/nextgen/how_nextgen_works/new_technology/pbn/in_depth/. Last accessed March 20, 2019.

69 Available: https://www.faa.gov/about/office_org/headquarters_offices/ang/nac/. Last accessed March 20, 2019.

70 Section 175 – Addressing Community Noise Concerns. FAA Reauthorization Act of 2018, Public Law No. 115-254 (effective October 5, 2018).

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

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

Table 5-12 summarizes implementation requirements along with the benefits and rationale for the recommendation of LGA Program Management Measure 12.

TABLE 5-12
IMPLEMENTATION SUMMARY FOR LGA PROGRAM MANAGEMENT MEASURE 12:
THE PORT AUTHORITY TO COORDINATE WITH THE FAA ON IMPLEMENTATION OF NEXTGEN PROCEDURES

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

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

5.3 Program Management Strategies Considered but Not Recommended for Inclusion in This NCP

The Port Authority considered, but does not recommend the following program management measures as part of the LGA NCP.

Add More Noise Monitors Throughout Queens and Increase Noise Monitor Analysis Capabilities

The Port Authority operates the NOMS that collects noise-monitoring data in the vicinity of LGA using permanent and portable noise monitors. Currently, the NOMS includes 10 noise monitors in proximity to LGA and can also link noise events and complaints to specific aircraft operations. The Port Authority received a number of suggestions to add more noise monitors and deploy functionality to increase noise monitor analysis capabilities.

***Reason for not recommending for inclusion in this NCP*:** At this time, the Port Authority is not recommending additional noise monitors because its current noise monitors provide coverage of multiple neighborhoods in the vicinity of LGA, including several neighborhoods in Queens and one neighborhood in the Bronx. The noise monitoring system strives to distinguish between aircraft and community noise, and will be upgraded with future technological advances as appropriate. See Proposed Program Management Strategies #12 through #15 on **page G-37** of **Appendix G**.

Consider Other Measures Such as High-Speed Rail from New York to Islip and Newburgh Airports

This strategy involves the Port Authority improving transportation access to other airports by way of new or improved rail and other transportation infrastructure in an attempt to reduce demand at LGA.

***Reason for not recommending for inclusion in this NCP*:** The suggested strategy implies that improving ground transportation access to other airports would reduce operations at LGA by encouraging airline use of other airports instead. However, the Port Authority does not have control over airline flight schedules or the factors considered in their production. Therefore, the Port Authority is not recommending this measure for inclusion in the LGA NCP. See Proposed Program Management Strategy #16 on **page G-38** of **Appendix G**.

Multiple Suggestions of Aircraft Technology Changes

A number of stakeholders suggested that quieter aircraft technologies be incentivized for aircraft using LGA. These include the use of winglets and the installation of vortex generators on Airbus A320 aircraft. Noise-reducing technologies are already being explored by aircraft manufacturers, aircraft operators, the FAA, the National Aeronautics and Space Administration, the International Civil Aviation Organization, and others. The interactions between aircraft technologies, operating characteristics, and noise are complex, and aircraft designs must be evaluated and tested on a case-by-case basis to determine noise profiles. Under 14 CFR Part 36, the FAA is solely responsible for establishing domestic aircraft noise standards and certifying new aircraft to those standards.

***Reason for not recommending for inclusion in this NCP*:** The Port Authority does not have direct control over aircraft technologies that could affect noise levels and thus cannot suggest specific aircraft technologies to aircraft operators. However, as discussed in Section 5.2, the Port Authority is recommending the implementation of a Fly Quiet program, which may encourage the use of newer/quieter aircraft at LGA. See Proposed Program Management Strategies #17 through #19 on **page G-38** of **Appendix G**.

Provide Noise-Related Training to Pilots Operating at LGA

The Port Authority received several suggestions to provide training to pilots on noise issues related to LGA operations.

***Reason for not recommending for inclusion in this NCP*:** The Port Authority does not have direct control over aircraft operating procedures. However, as discussed in Section 5.2, the Port Authority is recommending the implementation of a Fly Quiet program, which may encourage the use of noise-reducing operating procedures at LGA. See Proposed Program Management Strategies #20 and #21 on **page G-39** of **Appendix G**.

5.4 Summary of Recommended Program Management Measures

Appendix H summarizes the full list of recommended program management measures.

Measures Already Implemented

- Maintain Existing Noise Office
- Maintain Noise and Operations Management System
- Maintain Public Flight Tracking Portal
- Maintain Noise Complaint Management System
- Maintain Noise Office Website
- Continue Community Outreach Activities
- Post Monthly Color-Coded DNL Values On Port Authority Website

Measures to Be Initiated at LGA within 1 Year of FAA Record of Approval

- Make Aircraft Noise Contours Available in a Geographic Information System (GIS)

Measures to Be Initiated at LGA within 2 Years of FAA Record of Approval

- Establish and Manage a Fly Quiet Program

Measures to Be Implemented on an Ongoing Basis

- The Port Authority to Coordinate with the FAA on Development and Implementation of NextGen Procedures

Measures for Which a Schedule Has Not Yet Been Determined

- Update the Noise Exposure Map
- Update the Noise Compatibility Program

CHAPTER 6
Stakeholder Engagement

14 CFR Part 150 Sec. 150.23(c) requires development of an NCP and associated documentation:

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

14 CFR Part 150, Sec. 150 23(d) requires airport operators to provide "adequate opportunity for the active and direct participation" of the following stakeholders:

- States
- Public and planning agencies in the areas surrounding the airport
- Aeronautical users of the airport (e.g., airlines, fixed base operators, based aircraft operators)
- The general public

The New York City Department of City Planning is the sole land use agency for the land within the 2016 FAA-accepted DNL 65 contour and the 2021 With Program DNL 65 contour.

The Port Authority provided opportunities for meaningful public engagement and participation in development of the NCP. Agency consultation and public involvement efforts undertaken for this 14 CFR Part 150 Study are discussed in this chapter.

6.1 Technical Advisory Committee

The 14 CFR Part 150 Study process benefits from the creation and participation of a TAC. In general, the TAC serves several important functions, such as:

- Representing a broad range of stakeholder groups
- Receiving information about the Study and sharing it with TAC members' organizations
- Providing timely input to the Study
- In some cases, providing technical advice to the Study Team

6.1.1 Formation of the TAC

Pursuant to the Study Protocol in Appendix I of the LGA NEM Report, Section 2.5, the Port Authority formed a TAC to provide input into the 14 CFR Part 150 Study prepared for LGA. In order for the TAC to be effective and to be representative of all of the key perspectives, the Port Authority invited a diverse group of key stakeholders including, but not limited to, community representatives, airlines and other aircraft operators, local municipalities and jurisdictions, and land use planners. While representation needed to be broad, the TAC also needed to remain a reasonable size so that deliberations were efficient. A summary of the TAC meetings, including dates and topics discussed, is provided below.

6.1.2 Membership

The LGA TAC meetings were open to the public, and a standing agenda item was provided to offer the opportunity for public comments and discussion at every TAC meeting. Meeting announcements were sent to all TAC members (see **Appendix D** for a list of members) and posted on the Port Authority's website.[71] The LGA TAC served an advisory function only, meaning that the TAC was able to offer opinions, advice, and guidance for the Study, but the Port Authority had the sole discretion to accept or reject the TAC recommendations in accordance with 14 CFR Part 150. The Port Authority is the sponsor of the 14 CFR Part 150 Study and the owner and operator of LGA, and was a member of the TAC. The FAA, as the primary funding agency for the Study and as the approval authority, served as a key advisor of the TAC.

6.1.3 Summary of TAC Meetings

All TAC meeting materials associated with the NCP phase of this Study, including a list of TAC members, agendas, sign-in sheets, presentations, and meeting notes, are provided in **Appendix D** along with a list of TAC members. TAC Meetings #1 through #9 focused solely on the LGA NEM development and are not detailed in **Appendix D** or in this section; see Section 6.2 of the LGA NEM Report for summaries of those TAC Meetings. TAC Meeting #10 featured a review of both NEM and NCP material, and TAC Meetings #11 through #17 were devoted to the NCP development. Descriptions of TAC Meetings #10 through #17 are shown in **Table 6-1**.

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

TABLE 6-1
SUMMARY OF TAC MEETINGS #10 THROUGH #17

Meeting Number	Date	Theme	Description
10	Dec 15, 2016	Noise abatement strategies	• Summary of TAC meetings #1 through #9 • Hypothetical "what-if" scenarios involving operational changes and noise • Summary of key LGA flight procedures • Discussion of potential LGA noise abatement strategies
11	Feb 16, 2017	Land use strategies	• Contributions of arrivals and departures to LGA noise exposure • Summary of FAA responses to NCP strategies submitted for approval by other airport operators from 2000 through 2016 • Summary of land use strategy types • Discussion of potential LGA land use strategies
12	Apr 20, 2017	Noise abatement and program management strategies	• Removal of MD-88 aircraft from Delta Air Lines' fleet at LGA • Preliminary noise abatement strategies to be modeled • Types of programmatic strategies • Existing Port Authority programmatic strategies • Programmatic strategies suggested by the TAC and the public
13	Jun 22, 2017	Noise abatement strategies	• Refinement of noise abatement strategies to be modeled • Notification to the TAC that noise abatement strategies submitted after Meeting 13 will be considered for inclusion in the NCP but cannot be modeled • Feedback from FAA on preliminary noise abatement strategies to be modeled • LGA NCP preliminary outline
14	Oct 19, 2017	Noise abatement strategies	• Update on overall Study status • Draft 2021 Revised NEM DNL contours • Preliminary draft noise abatement strategies modeling results
15	Dec 14, 2017	Noise abatement strategies	• Review of key information from previous TAC meetings • Summary of public involvement to date • Common themes for LGA noise abatement strategies • List of all noise abatement strategies received to date
16	Jun 7, 2018	Noise abatement strategies	• Noise abatement strategies that may be recommended for the LGA NCP • TAC member noise abatement strategy polling results • Status of LGA NCP
17	Oct 17, 2019	Noise abatement, land use, and program management measures	• Noise abatement strategies that may be recommended for the LGA NCP update • Land use measures that may be recommended for the LGA NCP • Program management measures that may be recommended for the LGA NCP

SOURCE: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

6.2 Public Workshops, Public Hearing and Other Stakeholder Opportunities to Comment

Members of the public who have an interest in the LGA 14 CFR Part 150 Study were encouraged by the Port Authority to stay informed of the Study's progress by visiting the Study's website, attending and providing comments at TAC meetings, participating in public workshops and public hearings, and submitting comments on the draft documents prepared for submittal to the FAA over the course of the Study.

6.2.1 Public Outreach

The Study Team worked with the Port Authority to identify meeting locations, create and distribute press releases about the public meetings, inform media and elected officials about the public meetings, and develop supporting media materials for each meeting. This also included handling all logistics for securing space and ensuring that spaces were Americans with Disabilities Act-accessible and (to the extent possible) public transit-accessible. The Study Team members, as well as Port Authority staff, served as facilitators at various stations at the public workshops and answered questions from the public. A brief summary sheet and comment forms were provided at each workshop.

The LGA 14 CFR Part 150 Study featured several public workshops during the NEM phase of the Study: to introduce the project and the development of the NEMs, and then to present the NEM contours and land use compatibility analysis results. These workshops are summarized in **Table 6-2**. The LGA NEM Report contains all public workshop materials in Appendix K, beginning on page K-2. Copies of workshop materials, presentations, and the Final LGA NEM Report are available on the Port Authority website.[72]

TABLE 6-2
SUMMARY OF PUBLIC WORKSHOPS THAT OCCURRED DURING THE NEM PHASE OF THE LGA 14 CFR PART 150 STUDY

Meeting Number	Purpose	Date	Time	Location	Material Location
1	Introduction to the LGA 14 CFR Part 150 Study; overview of the Study process	Jun 16, 2015	6:00 p.m. to 8:00 p.m.	New York LaGuardia Airport Marriott 102-05 Ditmars Blvd. East Elmhurst, NY 11369	Appendix K-1 of the LGA NEM Report
2	Introduction to the LGA 14 CFR Part 150 Study; overview of the Study process	Oct 29, 2015	6:00 p.m. to 8:00 p.m.	Nassau Community College One Education Dr. Garden City, NY 11530	Appendix K-2 of the LGA NEM Report
3	Model inputs, draft DNL contours, and draft noise exposure analysis results	Sep 29, 2016	6:00 p.m. to 9:00 p.m.	New York LaGuardia Airport Marriott 102-05 Ditmars Blvd. East Elmhurst, NY 11369	Appendix K-3 of the LGA NEM Report

SOURCE: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2019

[72] Available: http://panynjpart150.com/LGA_homepage.asp.

6.2.2 Public Information Workshop and Hearing

A Notice of Availability of the LGA Draft NCP was published in local newspapers in English, Greek, Spanish, and Chinese languages at the start of the public comment period. These notices included details on the public information workshop and public hearing. The Port Authority also published notices on their webpage that included links to the LGA Draft NCP. Elected officials and other interested stakeholders were notified via e-mail. Notice materials for the Draft NCP, and public information workshop and public hearing, are included in **Appendix E**. The Port Authority made the LGA Draft NCP available for public review and comment from September 1, 2021 through October 15, 2021. At the beginning of the public comment period, copies of the LGA Draft NCP were made available for public review in the following manners:

- The Port Authority website at: http://panynjpart150.com/LGA_DNCP.asp
- By hardcopy, CD-ROM, or flash drive to members of the public through calling the Port Authority at 212-435-3880 and specifically indicating lack of access to a computer or the internet

The LGA Draft NCP was the primary topic of the NCP public information workshop for this 14 CFR Part 150 Study, which was held on October 5, 2021. In conjunction with the public information workshop, the Port Authority held a public hearing. At this hearing, the public had the opportunity to provide oral comments on the LGA Draft NCP. These comments were memorialized by a stenographer to be considered by FAA in their decision-making process. The final NCP documentation includes these recorded public comments, along with the Port Authority's responses, in **Appendix F**. The final NCP document also contains all materials from the public information workshop and public hearing in **Appendix E**.

Due to the ongoing public health emergency associated with COVID-19 and consistent with the Port Authority's intent to protect the health and safety of the community, the final public information workshop and public hearing on the LGA Draft NCP were conducted as internet/ phone-based public meetings. **Table 6-3** lists the date, times, and registration link for the internet/ phone-based public information workshop and public hearing, and indicates where in this NCP the public information workshop materials can be found. For participants without internet access, no advance registration was necessary. The following phone information was provided to access the public information workshop and/or public hearing:

Phone Number: 1-888-788-0099
Webinar ID (access code): 828 9077 6789

TABLE 6-3
DATE, TIMES, AND REGISTRATION LINK FOR THE LGA NCP PUBLIC INFORMATION WORKSHOP AND PUBLIC HEARING

Meeting	Date	Time	Registration Link	Location of Presentation Materials
Public Information Workshop	October 5, 2021	5:00 P.M. to 6:30 P.M.	https://bit.ly/lgapart150	Appendix E
Public Hearing	October 5, 2021	7:00 P.M. to 9:00 P.M.		

SOURCES: Port Authority and ESA, 2021.

6.2.3 Summary of Public Comments

Throughout the NCP phase of the LGA 14 CFR Part 150 Study, members of the public could submit comments on the study to the Port Authority by using a dedicated Port Authority email address at NYPart150@panynj.gov. The Port Authority received seven public comments through email before the LGA Draft NCP comment period of September 1, 2021 through October 15, 2021. The most frequent public comments received before the LGA NCP comment period are summarized in **Table 6-4**.

TABLE 6-4
MOST FREQUENT PUBLIC COMMENTS RECEIVED BEFORE THE LGA DRAFT NCP COMMENT PERIOD

Comment Category	Description
Noise Abatement Strategies	Suggestion to use artificial intelligence and machine learning to optimize aircraft flight paths
Noise Impacts	Impacts of aircraft overflights on the Broadway-Flushing Historic District
Noise Abatement Strategies	Suggested noise abatement procedures for LGA departures

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2020.

All public and stakeholder comments received during the LGA Draft NCP comment period and public hearing identified in Section 6.2.2 are included in **Appendix F.** Six submittals containing comments were received during the comment period on the LGA Draft NCP Report and four individuals provided oral comments during the public hearing. Comment responses were developed subsequent to the public information workshops and public hearing and after the comment period on the LGA Draft NCP closed. These comment submittals and their associated responses are included in **Appendix F**. The most common topics identified in the public comments received during the comment period on the LGA Draft NCP include the following:

- Part 150 Study regulations and guidelines
- Public meetings and outreach
- Stakeholder roles and responsibilities
- Use of DNL and the DNL 65 threshold

- Recommended noise abatement, land use, and program management measures included in the NCP
- Eligibility for sound insulation
- Arrival and departure procedures
- Health effects of noise

6.3 Public and Planning Agency Coordination

As described in the beginning of this chapter, 14 CFR Part 150 requires airport operators to consult with various stakeholders throughout the 14 CFR Part 150 Study process, including public and planning agencies, local jurisdictions, aviation users, and other interested parties. Numerous meetings were conducted to discuss the 14 CFR Part 150 Study with local community groups throughout the development of the NCP. The Port Authority and its 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. Additional elements of the public outreach program implemented by the Port Authority are summarized below.

6.3.1 Presentations to the NYCAR and Community Groups

During the NCP phase of the LGA 14 CFR Part 150 Study, the Port Authority presented brief updates on the Study to the NYCAR and various community groups. The Port Authority's presentations focused on the status of the Study as well as updates on the development of potential NCP strategies. The NYCAR is composed of state and local elected officials and New York City Community Boards as voting members, as well as the Port Authority and the FAA as advisory (non-voting) representatives. The NYCAR has two sub-committees, to represent communities around LGA and JFK. The general public may attend to observe all of NYCAR's proceedings. Materials presented by the Port Authority at these meetings during the NCP phase of the Study are located in **Appendix E**. Summaries of the presentations are given in **Table 6-5**.

TABLE 6-5
SUMMARY OF PRESENTATIONS MADE BY THE PORT AUTHORITY TO NYCAR AND COMMUNITY GROUPS

Meeting Date	Attendee Groups	Subject Matter
Jul 12, 2017	NYCAR	The Port Authority presented the statuses of the LGA and JFK 14 CFR Part 150 Studies, with a focus on FAA acceptance of the NEMs and the upcoming NCP phase.
Jul 26, 2017	Eastern Queens Alliance	The Port Authority presented the statuses of the LGA and JFK 14 CFR Part 150 Studies, with a focus on FAA acceptance of the NEMs and the upcoming NCP phase.
June 4, 2018	NYCAR	The Port Authority presented the status of the NCP phase of the LGA and JFK 14 CFR Part 150 Study, as well as common themes of NCP strategies that may or may not be feasible to implement.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2019.

6.3.2. Land Use Jurisdictional Meetings

14 CFR Part 150, Appendix B, Sec. 150.23(d) requires that an airport operator provide active and direct participation of the public and planning agencies in the areas surrounding an airport during the NCP phase of a 14 CFR Part 150 Study. The New York City Department of City Planning is the sole public agency with zoning and planning authority for land within the 2021 With Program NEM DNL 65 contour.

In 2017, the Port Authority and its consultants held several meetings with local land use agencies in the vicinities of JFK and LGA. Open invitations were extended toward land use agencies in New York City and Nassau County. The Port Authority and the Study Team explained how the following land use strategies could be used to reduce noncompatible land uses:

- Building code revisions
- Real estate fair disclosure requirements
- Avigation easements
- Noise overlay zoning techniques

Each jurisdiction expressed interest in the results of the Study and requested to remain informed throughout the Study process. The meetings in which the LGA 14 CFR Part 150 Study was discussed are summarized in **Table 6-6**, and the notes and presentations can be found in **Appendices E-3** through **E-5**.

TABLE 6-6
SUMMARY OF PRESENTATIONS MADE BY THE PORT AUTHORITY TO LAND USE AGENCIES

Meeting Date	Jurisdictions in Attendance	Brief Description
Apr 12, 2017	City of New York, Town of North Hempstead	• LGA 14 CFR Part 150 Study introduction • LGA 2016 and 2021 DNL contours and noise impacts • FAA land use compatibility criteria • Land use strategy discussion
Jun 20, 2017	City of New York, Town of North Hempstead	• LGA and JFK 14 CFR Part 150 Studies status update • Land use strategy discussion

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2019.

6.4 Other Opportunities for Stakeholder Engagement and Public Input

6.4.1 Study-Specific Meetings

The Port Authority simultaneously conducted 14 CFR Part 150 Studies at LGA, JFK, EWR, and TEB. The Port Authority, as the operator of all four airports, was responsible for the four studies and managed the consulting teams led by ESA for the LGA and JFK studies and by the consulting firm HMMH for the EWR and TEB studies. As the evaluation of noise abatement and mitigation strategies began in the NCP phases of the four studies, the Port Authority initiated regular cross-

team meetings to discuss potential NCP strategies, ways of maintaining consistency and efficiency between the studies, and any issues that could potentially affect the NCP processes.

The Port Authority and its consultants also conducted a series of joint meetings with FAA and aircraft operators during the course of the Study to review potential noise abatement strategies. The intent of those meetings was to obtain necessary information and guidance for the NCP noise abatement strategies, while also utilizing the FAA as a resource in the most efficient way possible.

Based on input from the TAC, the FAA, the aircraft operators, and the Port Authority, the Study Teams developed a list of suggested noise abatement strategies. These strategies were shared with the FAA ATO to determine whether there were any potential issues or constraints associated with the suggested noise abatement strategies. The FAA reviewed the initial list of potential strategies and provided initial feedback to the Study Team on which noise abatement strategies may be feasible to implement. The FAA ATO also evaluated some of the proposed strategies in greater detail and provided comments back to the Study Teams. On November 10, 2016, the FAA presented a webinar to the Study Teams, TAC members, and the interested public about the complexity of the New York–New Jersey airspace, and how aircraft locations and altitudes must be actively managed by air traffic controllers to maintain safe separation of aircraft in a variety of weather conditions. A link to this webinar can be found on the LGA 14 CFR Part 150 website.[73]

Additional meetings were held among the Port Authority, the Study Teams, and the FAA ATO throughout 2017, as the potential noise abatement strategies were evaluated and discussed. In addition, a number of aircraft operators and the FAA participated in meetings to review and discuss suggested noise abatement strategies in the first quarter of 2018. Their input helped to finalize the potential measures evaluated for LGA's NCP. **Table 6-7** summarizes these meetings. Copies of the agendas, presentations, and meeting notes are provided in **Appendices E-6** through **E-16**.

TABLE 6-7
SUMMARY OF DISCUSSIONS BETWEEN THE PORT AUTHORITY, THE FAA, AND AIRCRAFT OPERATORS

Meeting Date	Attendee Groups	Discussion Topics
Jan 20, 2017	Port Authority, ESA, FAA NY TRACON, FAA Office of Airports	• Draft LGA and JFK DNL contours • Potential noise abatement strategies suggested to date
Feb 22, 2017	Port Authority, ESA, FAA NY TRACON, FAA Office of Airports	• Follow-up discussions of noise abatement strategies originally presented on January 20, 2017 • Additional thoughts from NY TRACON on noise abatement strategy feasibility
Apr 20, 2017	Port Authority, ESA, FAA NY TRACON, FAA Office of Airports	• Presentation of technical memo on information required for modeling specific LGA and JFK noise abatement strategies that may be feasible to implement • NY TRACON initial responses to technical memo
May 24, 2017	Port Authority, HMMH, ESA, FAA NY TRACON, FAA Office of Airports	• Possible noise abatement procedures at all four NY/NJ airports

[73] http://panynjpart150.com/LGA_links.asp.

TABLE 6-7
SUMMARY OF DISCUSSIONS BETWEEN THE PORT AUTHORITY, THE FAA, AND AIRCRAFT OPERATORS

Meeting Date	Attendee Groups	Discussion Topics
Jul 5, 2017	Port Authority, ESA, FAA NY TRACON, FAA Office of Airports	• Presentation of additional technical memo on information required for modeling specific LGA and JFK noise abatement strategies that may be feasible to implement • NY TRACON responses to technical memo
Sep 8, 2017	Port Authority, HMMH, ESA, FAA AEE, FAA Office of Airports, FAA NY TRACON, FAA ATO Eastern Service Center Operations Support Group, American Airlines, Delta Airlines, FedEx, JetBlue, Southwest Airlines, United Airlines, United Parcel Service	• Presentation regarding flyability of numerous suggested noise abatement procedures • Airline initial reactions to suggested procedures from the perspective of flyability
Oct 6, 2017	Port Authority, HMMH, ESA, FAA NY TRACON, FAA Office of Airports, FAA ATO Eastern Service Center Operations Support Group	• Discussion with FAA on flyability of noise abatement strategies and initial airline reactions
Nov 3, 2017	Port Authority, HMMH, ESA, FAA AEE, FAA Office of Airports, FAA NY TRACON, FAA Flight Standards Division, FAA ATO Eastern Service Center Operations Support Group, FAA ATO Central Service Center Planning & Requirements Group, American Airlines, Delta Air Lines, FedEx, JetBlue, Southwest Airlines, United Airlines, United Parcel Service	• Further discussion with airlines on potential noise abatement procedures at LGA, JFK, EWR, and TEB
Nov 16, 2017	Port Authority, HMMH, ESA, FAA NY TRACON, FAA Office of Airports	• Follow-up discussion with FAA on Nov 3, 2017, discussion with airlines on noise abatement procedures
Feb 5, 2018	Port Authority, ESA, FAA NY TRACON, FAA Office of Airports	• Discussion with FAA on LGA noise abatement strategies and related comments received from the TAC and the public
Feb 16, 2018	Port Authority, ESA, FAA NY TRACON, FAA Office of Airports	• Follow-up discussion with FAA on LGA noise abatement strategies
Apr 12, 2018	Port Authority, ESA, FAA Office of Airports, HMMH, Fitzgerald & Halliday, Inc. (FHI)	• Discussion with FAA on NCP schedules for Port Authority 14 CFR Part 150 studies as well as whether there is potential to implement noise abatement strategies through the NEC initiative • Discussion of content for upcoming TAC meetings
Feb 5, 2019	Port Authority, ESA, FAA Office of Airports, Vanasse Hangen Brustlin, Inc. (VHB)	• Follow-up discussion with FAA on LGA 2021 NEM regarding removal of Delta Air Lines MD-88 aircraft from LGA

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2020.

6.4.2 Newsletters

Another component of the public outreach program implemented by the Port Authority included the distribution of periodic newsletters to keep the public and other 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 E-17**.

Table 6-8 provides information on the newsletters related to the NCP phase.

TABLE 6-8
SUMMARY OF NEWSLETTERS RELATED TO THE NCP PHASE OF THE LGA 14 CFR PART 150 STUDY

Date	Subject Matter
Winter 2017	Provided information about the purpose of an NCP and the different types of NCP strategies.
Spring 2017	Provided further details on the status of noise abatement, land use, and programmatic strategy development.
Winter 2018	Provided a summary of noise abatement strategy themes.

SOURCES: Port Authority, KB Environmental Sciences, Inc., and ESA, 2018 and 2019.

6.4.3 Elected Officials

Several elected officials were actively engaged throughout the LGA 14 CFR Part 150 process. The elected official email contact list included public officials representing the New York City boroughs of Brooklyn, Queens, and the Bronx; the New York State Governor's office; State Senate and Assembly members; United States House 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 of the LGA NEM Report.

6.4.4 Newspaper Articles

The Study 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 14 CFR Part 150 Studies being conducted by the Port Authority at JFK, EWR and TEB. Copies of the articles are provided in **Appendix E-18**.

6.4.5 Project Website

A website[74] 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, the Draft NEM Report and NEMs, the LGA Draft NCP, and project newsletters
- Links to the FAA's Airport Noise Program fact sheet and the Port Authority's WebTrak website
- FAQs

[74] http://panynjpart150.com/LGA_homepage.asp. Last accessed: August 13, 2021.

- Port Authority contact information
- Links to the Port Authority's other 14 CFR Part 150 Study websites
- A link for interested parties to join the LGA 14 CFR Part 150 mailing list to receive project updates and announcements