

**DRAFT**

**Burlington International Airport**  
**14 CFR Part 150 Update**  
**Noise Compatibility Program Update**



October 2019

Prepared for:

**City of Burlington, Vermont**  
1200 Airport Drive, #1  
Burlington, VT 05403

Prepared by:

**The Jones Payne Group**  
**&**  
**HMMH**





Burlington International Airport  
14 CFR Part 150 Update  
Noise Compatibility Program Update

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Prepared for:

**City of Burlington, Vermont**

Burlington International Airport  
1200 Airport Drive, Suite 1  
South Burlington, Vermont 05403

Prepared by:

Diane Carter (The Jones Payne Group)  
Andrew Walter (The Jones Payne Group)  
Brandon Robinette (HMMH)



**The Jones Payne Group, Inc.**  
123 North Washington St, 3<sup>rd</sup> Floor  
Boston, MA 02114



**HMMH**  
77 South Bedford St  
Burlington, MA 01803





## Sponsor's Certification

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### CERTIFICATION

The City of Burlington has completed a comprehensive update of the Title 14 Code of Federal Regulations (CFR) Part 150 Noise Exposure Map for the Burlington International Airport.

1. The Noise Compatibility Program and Noise Exposure Maps (included by reference) and associated documentation for the Burlington International Airport submitted in this volume to the Federal Aviation Administration under Federal Aviation Regulations Part 150, Subpart B, Section 150.21, are true and complete under penalty of 18 U.S.C. Part 1001;
2. Pursuant to 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 proposed Noise Compatibility Program elements are recommended by the City of Burlington, Vermont and not by a consultant or other third party.

By: Eugene E. Richards, III

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Title: Director of Aviation

Date: \_\_\_\_\_

Airport Name: Burlington International Airport

Airport Owner/Operator: The City of Burlington, Vermont

Address: 1200 Airport Drive, #1, S. Burlington, VT 05403



## Sponsor's Certification

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**TABLE OF CONTENTS**

1 INTRODUCTION ..... 1

1.1 Purpose and Request for FAA Determination ..... 1

1.2 Organization of this Document ..... 2

2 PART 150 OVERVIEW ..... 3

2.1 Noise Exposure Maps ..... 3

2.2 Noise Compatibility Program ..... 3

2.3 Project Roles and Responsibilities ..... 4

2.3.1 The City of Burlington, Vermont ..... 4

2.3.2 Consulting Team ..... 4

2.3.3 Federal Aviation Administration (FAA) ..... 4

2.4 Noise / Land Use Compatibility Guidelines ..... 4

2.5 FAA Noise Compatibility Program Checklist ..... 8

3 EXISTING NOISE COMPATIBILITY PROGRAM ..... 13

3.1 Airport Operations Measures ..... 13

3.1.1 Extension of Taxiway G ..... 13

3.1.2 Terminal Power Installation and APU/GPU Restrictions ..... 13

3.1.3 Nighttime Bi-direction Runway Use ..... 14

3.1.4 Noise Abatement Flight Paths for Runway 15 and 33 Departures, and 15 Arrivals ..... 14

3.1.5 Voluntary Limits of Military C-5A Training ..... 14

3.1.6 Voluntary Minimization of F-16 Multiple Aircraft Flights ..... 14

3.1.7 Voluntary Army Guard Helicopter Training Controls ..... 14

3.2 Monitoring and Review Elements ..... 15

3.2.1 Ongoing Monitoring and Review of Noise Exposure Map (NEM) and Noise Compatibility Program (NCP) Status ..... 15

3.2.2 Flight Track Monitoring ..... 15

3.3 Land Use Measures ..... 15

3.3.1 Land Acquisition and Relocation ..... 15

3.3.2 Sound Insulation ..... 16

3.3.3 Easement Acquisition Related to Soundproofing ..... 16

3.3.4 Airport Zoning Overlay District ..... 16

3.3.5 Easement Acquisition for New Development ..... 16

3.3.6 Real Estate Disclosure ..... 16

4. RECOMMENDED NOISE COMPATIBILITY PROGRAM REVISION ..... 17



## Table of Contents

---

4.1	Ongoing Monitoring and Review of Noise Exposure Map (NEM) and Noise Compatibility Program (NCP) Status.....	17
4.2	Noise Monitoring and Flight Track Monitoring .....	18
4.3	Land Acquisition and Relocation.....	18
4.4	Sound Insulation of Residential Structures .....	20
4.5	Sound Insulation of Noise Sensitive Buildings.....	21
4.6	Purchase Assurance for Residential Structures.....	21
4.7	Sales Assistance for Residential Structures .....	22
4.8	Purchase of Avigation Easement for Noise – Measure to be Removed.....	23
4.9	Noise Barrier Analysis – Measure Not Recommended for Implementation .....	24
4.10	Program Costs .....	25
5	ACCEPTED NOISE EXPOSURE MAPS .....	26
5.1	FAA-Accepted 2018 and 2023 Noise Exposure Maps .....	26
5.2	Dates of Noise Exposure Maps .....	27
5.3	Noise Exposure Maps Public Consultation.....	27
5.4	Noise / Land Use Compatibility Guidelines .....	27
5.5	Land Uses with the Noise Exposure Maps .....	27
6	PUBLIC CONSULTATION.....	32

### LIST OF TABLES

Table 1:	FAR Part 150 Noise / Land Use Compatibility Guidelines.....	6
Table 2:	Part 150 Noise Compatibility Program Map Checklist .....	8
Table 3:	Estimated Costs by Program.....	25
Table 4:	Estimated Population within 2018 and 2023 Day-Night Average Sound Level (DNL) Contours, with Existing Noise Compatibility Program, as Currently Implemented.....	29

### LIST OF FIGURES

Figure 1	2018 Existing Condition Noise Exposure Map .....	30
Figure 2	2023 Forecast Condition Noise Exposure Map .....	31

APPENDIX A	FAA RECORD OF APPROVAL ON 1989 NCP SUBMISSION
APPENDIX B	FAA RECORD OF APPROVAL ON 2008 NCP MODIFICATION
APPENDIX C	NOTICES, BACKGROUND MATERIAL, SIGN-IN SHEETS, AND COMMENTS RELATED TO PART 150 PUBLIC CONSULTATIONS



# 1 INTRODUCTION

Part 150 of the Federal Aviation Regulations (FAR) “Airport Noise Compatibility Planning”<sup>1</sup> sets forth standards for airport operators to use in documenting noise exposure in the airport environs and establishing programs to minimize noise-related land use incompatibilities. A formal submission to the Federal Aviation Administration (FAA) under Part 150 includes documentation for two principal elements: (1) Noise Exposure Maps (NEMs) and (2) a Noise Compatibility Program (NCP).

The City of Burlington, Vermont (the City) conducted its first Part 150 study for Burlington International Airport (BTV)<sup>2</sup> in 1987-90. The study culminated in submission of two volumes of documentation to the Federal Aviation Administration (FAA): (1) NEM documentation for 1989 and 1993, and (2) a proposed Noise Compatibility Program (NCP).<sup>3</sup> The FAA found the NEM in compliance with Part 150 requirements on March 27, 1990, and provided a Record of Approval (ROA) for the NCP on September 21, 1990 (Appendix A). Most recently, on September 24, 2019, the City submitted a new NEM update for the years 2018 and 2023. The FAA found the NEM in compliance with Part 150 requirements on September 20, 2019.<sup>4</sup>

This document presents the updated NCP submission, with noise contours and related documentation for 2018 existing conditions and 2023 forecast conditions. The noise contours and other NEM-related information presented in this document are drawn directly, without revision, from the BTV NEM submission accepted by FAA on September 24, 2019.

The City of Burlington, Vermont will consider future revisions to the NCP in the event of major changes to the:

- ✓ BTV NEMs,
- ✓ BTV layout or
- ✓ Applicable state or federal laws, regulations and associated funding guidelines.

## 1.1 Purpose and Request for FAA Determination

The City of Burlington, Vermont is proposing to modify its existing Noise Compatibility Program to reflect the consensus among the affected jurisdictions of the impacts of aircraft operations at BTV and the desire to preserve the residential areas located near the airport and ensure the communities remain stable and continue to provide a source of affordable housing for the region. This document presents an NCP update submission to the FAA. With this document, the City of Burlington, Vermont is requesting FAA approval to support continued participation in the FAA Airport Improvement Program (AIP).

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<sup>1</sup> 14 Code of Federal Regulations (14 CFR) Part 150.

<sup>2</sup> This report uses the FAA’s three-letter identifier, “BTV”, as an abbreviated form of referring to the airport.

<sup>3</sup> “FAR Part 150 Airport Noise Compatibility Planning Study, Volume 1: Noise Exposure Map,” June 1989, and “Volume 2: Noise Compatibility Program,” November 1989, prepared by Reynolds, Smith and Hills, and Harris Miller Miller & Hanson Inc.

<sup>4</sup> Federal Register/ Vol 84, No. 197/Thursday, October 10, 2019, pg. 54726.

### 1.2 Organization of this Document

This document is divided into the following Chapters.

- ✓ Chapter 2 provides an overview of the Part 150 process, discusses the organizations involved and their respective role. This chapter also has the FAA's NCP checklist and reviews the noise/land use compatibility guidelines.
- ✓ Chapter 3 presents the existing NCP and its status.
- ✓ Chapter 4 proposes the changes to the NCP itself update including the costs and eligibility requirements.
- ✓ Chapter 5 presents the current Noise Exposure Maps that were accepted by FAA in September 2019. This chapter reviews the NEMs and presents housing and population counts.
- ✓ Chapter 6 reviews the public consultation process used in the development of this NCP document.

This document also has appendices that present the FAA's 1990 Record of Approval (Appendix A) and FAA's 2008 Record of Approval (Appendix B).

## 2 PART 150 OVERVIEW

Part 150 sets forth a process for airport proprietors to follow in developing and obtaining FAA approval of programs to reduce or eliminate incompatibilities between aircraft noise and surrounding land uses. Part 150 prescribes specific standards and systems for:

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

### 2.1 Noise Exposure Maps

The NEMs describe the airport layout and operations, aircraft-related noise exposure, land uses in the airport environs and the resulting noise/land use compatibility situation. The NEMs must address two time frames: (1) data representing the year of submission (the "existing conditions") and (2) the fifth calendar year following the year of submission (the "forecast conditions"). Part 150 requires more than a simple "map" to provide all the necessary information in an NEM. In addition to the graphics, requirements include extensive tabulated information and text discussion. At most airports, even the necessary graphic information is too extensive to present in a single figure. Therefore, the NEM documentation includes graphic depiction of existing and future noise exposure resulting from aircraft operations and of land uses in the airport environs. The NEM documentation must describe the data collection and analysis undertaken in its development.

The current NEMs were accepted by FAA on September 24, 2019 and consider existing condition noise contours based on 2018 activity levels and five year forecast contours for 2023. The proposed NCP update will not affect the current NEMs. The current NEMs are incorporated by reference and presented in Chapter 5 of this document.

### 2.2 Noise Compatibility Program

The NCP is essentially a list of the actions the airport proprietor proposes to undertake to minimize existing and future noise/land use incompatibilities. The NCP documentation must recount the development of the program, including a description of all measures considered, the reasons that individual measures were accepted or rejected, how measures will be implemented and funded, and the predicted effectiveness of individual measures and the overall program.

Official FAA acceptance of the Part 150 submission and approval of the NCP does not eliminate requirements for formal environmental assessment of any proposed actions pursuant to requirements of the National Environmental Policy Act (NEPA). However, acceptance of the submission is a prerequisite to application for funding of implementation actions.

This document presents the proposed NCP Update using noise contours based on 2018 activity levels and five year forecast contours for 2023 in order to ensure consistency with the current NEMs.

### 2.3 Project Roles and Responsibilities

Several groups have been involved in the Part 150 NCP Update, including the City of Burlington, Vermont, the consulting team, the FAA and a Technical Advisory Committee comprised of representatives from the affected jurisdictions.

#### 2.3.1 The City of Burlington, Vermont

As the "airport operator", the City of Burlington, Vermont (the City) has authority over all Part 150 study elements and submission. It is responsible for preparation of both the NEM and NCP. For the NCP, the City is responsible for conducting NCP analysis and selecting the elements to be included in the NCP when it is submitted to the FAA for review. It is also responsible for pursuing implementation of approved NCP measures.

The City of Burlington, Vermont retained a team of consultants to conduct the technical work required to fulfill Part 150 analysis and documentation requirements. Section 2.3.2 describes the composition of the consulting team and the general assignment of responsibilities among its members.

#### 2.3.2 Consulting Team

The NCP update consulting team consists of The Jones Payne Group who is responsible for project management and serves as the technical lead. Harris Miller Miller & Hanson Inc. (HMMH), as a sub-consultant to The Jones Payne Group is responsible for providing technical support specifically related to the noise measurement and modelling.

#### 2.3.3 Federal Aviation Administration (FAA)

The FAA has ultimate review authority over the NCP submitted under Part 150. The FAA's review of the NCP encompasses the details of technical documentation as well as broader issues of safety and constitutionality of recommended noise abatement alternatives.

Typically FAA involvement includes participation by staff from multiple divisions of the FAA (e.g. Airports, Air Traffic, etc.) and multiple levels (e.g. local Air Traffic Control Tower, Airports District Office, Region, and Headquarters). Given that this NCP update recommends only a change to a compatible land use element of the NCP, the Airports Division has provided the most input and guidance to date, and is likely to be the only division that performs detailed review of this document. In addition, the FAA has recently delegated a majority of NCP review responsibilities to the Region, so review at other levels is likely to be limited. The FAA's New England Region office has been highly involved in this process to date, and has provided extensive guidance and support.

### 2.4 Noise / Land Use Compatibility Guidelines

Part 150 requires that airports use a measure of cumulative noise called the Day-Night Average Sound Level (DNL) to depict noise exposure associated with airport operations during the existing and forecast condition calendar years.

Part 150 provides a table of DNL-based land use compatibility guidelines.<sup>5</sup> Table 1 reproduces those guidelines. Note 1 for the table clearly states that the guidelines are not federally mandated criteria:

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<sup>5</sup> Part 150 Appendix A, Table 1

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.

FAA will accept alternate land use compatibility designations only if the airport bases them on criteria that local land-use control jurisdictions have formally adopted and rigorously enforced. The municipalities surrounding BTV have not taken steps of this type. Therefore, the City has adopted the Part 150 guidelines for this NCP update study, as it has in previous studies.

These Part 150 guidelines represent compilation of extensive scientific research into noise-related activity interference and attitudinal response. However, reviewers should recognize the highly subjective nature of response to noise, and that special circumstances can affect individuals' tolerance. For example, high non-aircraft noise levels can reduce the significance of aircraft noise, such as in areas exposed to relatively high levels of traffic noise. Alternatively, residents of areas with unusually low background levels may find relatively low levels of aircraft noise annoying.

Expectation and experience may affect response. People may get used to a level of exposure that guidelines indicate may be unacceptable, and changes in exposure may generate response that is far greater than that which the guidelines might suggest.

The cumulative nature of DNL means that the same level of noise exposure can be achieved in an essentially infinite number of ways. For example, a reduction in a small number of relatively noisy operations may be counterbalanced by a much greater increase in relatively quiet flights, with no net change in DNL.

Part 150 guidelines indicate that all uses normally are compatible with aircraft noise exposure below 65 dB DNL. This limit is supported in a formal way by U. S. Department of Housing and Urban Development (HUD) standards that address whether sites are eligible for federal funding support. These standards, set forth in Title 24 Part 51 of the Code of Federal Regulations, define areas with DNL exposure not exceeding 65 dB as acceptable for funding. Areas exposed to noise levels between DNL 65 dB and 75 dB are "normally unacceptable," and require special abatement measures and review. Those at 75 dB and above are "unacceptable" except under very limited circumstances.

Table 1: FAR Part 150 Noise / Land Use Compatibility Guidelines

Land Use	Yearly Day-Night Average Sound Level, DNL, in Decibels (Key and notes on following page)					
	<65	65-70	70-75	75-80	80-85	>85
<b>Residential Use</b>						
Residential other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home park	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
<b>Public</b>						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
<b>Commercial Use</b>						
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
<b>Manufacturing and Production</b>						
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
<b>Recreational</b>						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Key to Table 1:

- **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.

## Chapter 2 – PART 150 OVERVIEW

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Notes for Table 1:

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

- (1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 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 started 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 the 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 the 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 the normal noise level is low.
- (5) Land use compatible provided special sound reinforcement systems are installed.
- (6) Residential buildings require an NLR of 25.
- (7) Residential buildings require an NLR of 30 (8) Residential buildings not permitted.

## 2.5 FAA Noise Compatibility Program Checklist

The FAA has developed checklists for their internal use in reviewing NEM and NCP submissions. The FAA prefers that the Part 150 documentation include copies of the checklists. Table 2 presents a completed copy of the NCP checklist for this update.

**Table 2: Part 150 Noise Compatibility Program Map Checklist**

FAR PART 150 NOISE COMPATIBILITY PROGRAM CHECKLIST--PART I			
Airport Name: Burlington International Airport	REVIEWER:		
	Yes/No/NA	Page/Other Reference	Notes/Comments
I. Submitting And Identifying The NCP:			
A. Submission is properly identified:	Yes		
1. 14 C.F.R. 150 NCP?	Yes	Cover letter, Chapter 1	
2. NEM and NCP together?	No	Chapter 5	The FAA Accepted NEM update in September 2019
3. Program Revision? (To what extent has it been revised?)	Yes	Cover letter, Chapter 4	Modification and addition of new land use measures. Modification to monitoring and review elements.
B. Airport and Airport Operator's name identified?	Yes	Certification page	
C. NCP transmitted by airport operator's cover letter?	Yes	Cover letter	
II. Consultation (including public participation): [150.23]			
A. Documentation includes narrative of public participation and consultation process?	Yes	Chapter 6	
B. Identification of consulted parties:			
1. All parties in 150.23(c) consulted?	Yes	Chapter 6	
2. Public and planning agencies identified?	Yes	Chapter 6	
3. Agencies in 2. above, correspond to those affected by the NEM noise contours?	Yes	Chapter 6	
C. Satisfies 150.23(d) requirements:			
1. Documentation shows active and direct participation of parties in B., above?	Yes	Chapter 6	
2. Active and direct participation of general public and opportunity to submit their views, data, and comments on the formulation and adequacy of the NCP??	Yes	Chapter 6	
3. Participation was prior to and during development of NCP and prior to submittal to FAA?	Yes	Chapter 6	
4. Indicates adequate opportunity afforded to all consulted parties to submit views, data, etc.?	Yes	Chapter 6	
D. Evidence included there was notice and opportunity for a public hearing on the final NCP?	Yes	Chapter 6 Appendix B	
E. Documentation of comments:			

**Chapter 2 – PART 150 OVERVIEW**

<b>FAR PART 150 NOISE COMPATIBILITY PROGRAM CHECKLIST--PART I</b>			
<b>Airport Name: Burlington International Airport</b>		<b>REVIEWER:</b>	
	<b>Yes/No/NA</b>	<b>Page/Other Reference</b>	<b>Notes/Comments</b>
1. Includes summary of public hearing comments, if hearing was held?	Yes	Chapter 6 Appendix B Appendix C	
2. Includes copy of all written material submitted to operator?	Yes	Chapter 6 Appendix B	
3. Includes operator's response/disposition of written and verbal comments?	Yes	Chapter 6	
F. Is there written evidence from the appropriate office within the FAA that the sponsor received informal agreement to carry our proposed flight procedures?	N/A		No change in flight procedures proposed.
<b>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.)</b>			
<b>A. Inclusion of NEMs and supporting documentation:</b>			
1. Map documentation either included or incorporated by reference?	Yes	Chapter 5	
2. Maps previously found in compliance by FAA?	Yes	Chapter 5	
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 on 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 per 150.21.	Yes	Chapter 5	
4. Does 180-day period have to wait for map compliance finding?	No		The NEM was accepted by FAA September 2019
<b>B. Revised NEMs submitted with program: (Review using NEM checklist if map revisions included in NCP submittal. Report the applicable finds in the spaces below after a full review using the NEM checklist and narrative.)</b>			
1. Revised NEMs included with program?	No		NCP will not change NEMs
2. Has airport operator requested in writing that FAA make a determination on the NEM(s), showing NCP measures in place, when the NCP approval is made?	No		The NEM was accepted by FAA September 2019
<b>C. If program analysis uses noise modeling:</b>			
1. INM, HNM or FAA-approved equivalent?	Yes	See NEM	
2. Monitoring in accordance with A150.5?	N/A	See NEM	



**Chapter 2 – PART 150 OVERVIEW**

<b>FAR PART 150 NOISE COMPATIBILITY PROGRAM CHECKLIST--PART I</b>			
<b>Airport Name: Burlington International Airport</b>	<b>REVIEWER:</b>		
	<b>Yes/No/NA</b>	<b>Page/Other Reference</b>	<b>Notes/Comments</b>
D. One existing condition and one forecast-year map clearly identified as the official NEMs?	Yes	Figure 1 and Figure 2	These maps are from the current NEM
<b>IV. CONSIDERATION of ALTERNATIVES: [B150.7, 150.23(e)]</b>			
A. At a minimum, were the alternatives below considered, or if they were rejected was the reason for the rejection reasonable and based on accurate technical information and local circumstances?			
1. Land acquisition and interests therein, including air rights, easements, and development rights?	Yes	Chapter 3, Chapter 4 and Appendix A	
2. Barriers, acoustical shielding, public building soundproofing	Yes	Chapter 3 and Appendix A	
3. Preferential runway system	Yes	Chapter 3 and Appendix A	Previous NCP
4. Voluntary flight procedures	Yes	Chapter 3 and Appendix A	Previous NCP
5. Restrictions described in B150.7 (taking into account Part 161 requirements)	Yes	Chapter 3 and Appendix A	Previous NCP
6. Other actions with beneficial impact not listed in the regulation	Yes	Chapter 4	
7. Other FAA recommendations (see D, below)	N/A		None received to date
B. Responsible implementing authority identified for each considered alternative?	Yes	Chapter 4	
C. Analysis of alternative measures:			
1. Measures clearly described?	Yes	Chapter 4	
2. Measures adequately analyzed?	Yes	Chapter 4	
3. Adequate reasoning for rejecting alternatives?	Yes	Chapter 4	
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.)	N/A		None received to date
<b>V. ALTERNATIVES RECOMMENDED for IMPLEMENTATION: [150.23(e), B150.7(c); 150.35(b), B150.5]</b>			
A. Document clearly indicates:			
1. Alternatives that are recommended for implementation?	Yes	Chapter 4	
2. Final recommendations are airport sponsors, not those of consultant or third party?	Yes	Cover letter, Certification	
B. Do all program recommendations:			



## Chapter 2 – PART 150 OVERVIEW

FAR PART 150 NOISE COMPATIBILITY PROGRAM CHECKLIST--PART I			
Airport Name: Burlington International Airport	REVIEWER:		
	Yes/No/NA	Page/Other Reference	Notes/Comments
1. Relate directly or indirectly to reduction of noise and incompatible land uses? (Note: All program recommendations, regardless of whether previously approved by the FAA in an earlier Part 150 study, must demonstrate a noise benefit if the airport sponsor wants FAA to consider the measure for approval in a program update. See E., below.)	Yes	Chapter 3 and Chapter 4	
2. Contain description of each measure's relative contribution to overall effectiveness contribution to overall effectiveness of program?	Yes	Chapter 3 and Chapter 4	
3. Noise/land use benefits quantified to extent possible? (Note: some program management measures cannot be readily quantified and should be described in other terms to show their implementation contributes to overall effectiveness of the program.)	Yes	Chapter 4	
4. Does each alternative include actual/anticipated effect on reducing noise exposure within incompatible areas shown on NEM?	Yes	Chapter 3 and Chapter 4	
5. Effects based on relevant and reasonable expressed assumptions?	Yes	Chapter 4	
6. Does the document have adequate supporting data that the measure contributes to noise/land use compatibility?	Yes	Chapter 4	
C. Analysis appears to support program standards set forth in 150.35(b) and B150.5?	Yes	Chapter 3 and Chapter 4	
D. When use restrictions are recommended for approval by the FAA:			
1. Does (or could) the restrictions affect Stage 2 or Stage 3 aircraft operations (regardless of whether they presently operate at the airport)? If the restriction affects Stage 2 helicopters, Part 161 also applies.)	N/A		
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?	N/A		
Are non-restrictive alternatives with potentially significant noise/compatible land use benefits thoroughly analyzed so that appropriate comparisons and conclusions among all alternatives can be made?	N/A		
4. Did the FAA regional or ADO reviewer coordinate the use restriction with APP-400 prior to making determination on start of 180-days?	N/A		

**Chapter 2 – PART 150 OVERVIEW**

<b>FAR PART 150 NOISE COMPATIBILITY PROGRAM CHECKLIST--PART I</b>			
<b>Airport Name: Burlington International Airport</b>	<b>REVIEWER:</b>		
	<b>Yes/No/NA</b>	<b>Page/Other Reference</b>	<b>Notes/Comments</b>
<b>E. Do the following also meet Part 150 analytical standards?</b>			
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 140 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.)	N/A		
2. New recommendations or changes proposed at the end of the Part 150 process?	N/A		
<b>F. Documentation indicates how recommendations may change previously adopted noise compatibility plans, programs or measures?</b>	Yes	Chapter 4	
<b>G. Documentation also:</b>			
1. Identifies agencies that are responsible for implementing each recommendation?	Yes	Chapter 4	
2. Indicates whether those agencies have agreed to implement?	Yes	Chapter 4	
3. Indicates essential government actions necessary to implement recommendations?	Yes	Chapter 4	
<b>H. Timeframe:</b>			
1. Includes agreed-upon schedule to implement alternatives?	Yes	Chapter 4	
2. Indicates period covered by the program	Yes	Chapter 4	
<b>I. Funding/Costs:</b>			
1. Includes costs to implement alternatives?	Yes	Chapter 4	
2. Includes anticipated funding sources?	Yes	Chapter 4	
<b>VI. PROGRAM REVISION: [150.23(e)(9)]</b>			
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 contours of 1.5 dB or greater over noncompatible land uses. See 150.21(d))	Yes	Chapter 1	



### 3 EXISTING NOISE COMPATIBILITY PROGRAM

The existing Noise Compatibility Program (NCP) includes 15 FAA-approved measures with a mix of operational, implementation, and land use elements. The FAA’s 2008 Record of Approval (ROA), for the 2008 NCP submission, listed NCP elements in the order presented below. The 2008 NCP, and associated ROA, revised a single measure. Appendix A presents a copy of the 2008 ROA.

The following discussion of the NCP has been organized in the same manner as the FAA’s 2008 ROA. The 2018 and 2023 NEM are based on empirical data reflecting the current implementation status of these noise abatement measures. The United State Air Force’s Record of Decision for the F-35A Operational Basing Environmental Impact Statement (USAF EIS)<sup>6</sup> agreed to adhere to the 2008 NCP.

Note that the Airport is currently undergoing an update to the NCP. Submission of the updated NCP to the FAA is anticipated to occur in late 2019 or early 2020. A determination of program compliance with Part 150, by the FAA, is followed by a 180-day approval period for any new NCP.

#### 3.1 Airport Operations Measures

##### 3.1.1 Extension of Taxiway G

Taxiway G would be extended from the existing intersection with Taxiway A to Taxiway C, remaining parallel with Runway 15/33 in order to reduce noise levels for residents along Airport Drive (2008 ROA Measure 1).

*Status: In progress. The FAA approved the extended Taxiway G at the planning level; it is shown on the updated 2012 Airport Layout Plan. Current Taxiway G is on the northwest side of the airfield and current Taxiway K is on the southeast side. The complete Taxiway G extension will create a single taxiway parallel to Runway 15-33 and linking to the current Taxiway K. Construction of the first phase, at current Taxiway K, started early November 2015 and was completed in July 2016. Construction of the second phase started in October 2016 and was completed in October 2018. The final phase of construction is scheduled to commence in 2020. The 2018 NEM reflects the varying taxiway layout for the year, and the 2023 NEM reflects the forecasted taxiway layout including the extended Taxiway G.*

##### 3.1.2 Terminal Power Installation and APU/GPU Restrictions

Installation of terminal power hookups for aircraft would reduce the need for aircraft to use internal auxiliary power units (APU) or ground power units (GPU). Following the installation, a rule prohibiting the use of APUs or GPUs between 10:00 p.m. and 7:00 a.m., would be put in place (2008 ROA Measure 2).

*Status: Not fully implemented. The Airport terminal now has “aircraft ground power” (referred to as “terminal power hooks” in the ROA and the 1989 NCP document) capability at all eleven Passenger Boarding Bridges. The Airport will not be implementing the GPU/APU rule between 10:00 p.m. and 7:00 a.m., as a too many flights arrive/depart during those hours. However, use of ground power is required for all aircraft in proximity to an available hookup.*

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<sup>6</sup> Document was released September 2013. The Air Force issued a Record of Decision (ROD) December 2, 2013. The documents are available at <http://www.158fw.ang.af.mil/f-35information.asp>

### 3.1.3 Nighttime Bi-direction Runway Use

To minimize late-night operations over the City of Winooski, the air traffic control tower would use Runway 15 for departure and Runway 33 for arrivals, traffic conditions permitting (2008 ROA Measure 3).

*Status: Not implemented. The BTV ATCT is closed from midnight until 5:00 a.m., which makes implementation of this measure infeasible during these hours. The ATCT has not implemented the procedure during the remaining DNL “nighttime” hours; i.e., from 6:00 to 7:00 a.m.*

### 3.1.4 Noise Abatement Flight Paths for Runway 15 and 33 Departures, and 15 Arrivals

New procedures<sup>7</sup> would have civil aircraft fly over less populated areas. Runway 33 departures would turn to a heading of 310 degrees. Runway 15 departures would turn to a heading of 180 degrees (2008 ROA Measure 4).

*Status: Not fully implemented. Current procedures involve assignments that result in: (1) most west-bound Runway 15 departures making initial turns to a heading of 190, (2) most west-bound Runway 33 departures maintaining runway heading until past the City of Winooski, and (3) most east-bound Runway 33 departures initiating right hand turns over the City of Winooski.*

### 3.1.5 Voluntary Limits of Military C-5A Training

An informal agreement with the military limits C-5A operations to only necessary takeoffs and landings (2008 ROA Measure 5).

*Status: Not fully implemented. An agreement is not currently in place, however (1) BTV operations strongly discourage C-5 training at the Airport, because the runways are only 150 feet wide and wake turbulence from C-5 operations tear up the runway-edge lighting, (2) historically the military has always coordinated the arrival of a C-5 with BTV Operations because of the constraints on the airfield, and (3) all transient military aircraft are limited to two practice approaches*

### 3.1.6 Voluntary Minimization of F-16 Multiple Aircraft Flights

Military personnel will schedule as many single-aircraft, as opposed to multiple-aircraft, flights as possible (2008 ROA Measure 6).

*Status: Not fully implemented. Most VTANG flights require between 2 and 4 aircraft, depending on mission and tactical scenario. Multiple-aircraft flights typically operate with some distance between individual aircraft, so that the aircraft do not produce their maximum noise levels at the same locations at the same time; while aircraft are operating close in time, they are not simultaneous in most cases.*

### 3.1.7 Voluntary Army Guard Helicopter Training Controls

The National Guard helicopter training operations will be conducted away from the Airport when conditions permit. In terms of long range planning, the Guard should consider consolidating operations at Camp Johnson (2008 ROA Measure 7).

*Status: Not implemented. The Vermont Army National Guard has continued training operations at BTV.*

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<sup>7</sup> “New procedures” was the language used in the 1989 NCP.

### 3.2 Monitoring and Review Elements

#### 3.2.1 Ongoing Monitoring and Review of Noise Exposure Map (NEM) and Noise Compatibility Program (NCP) Status

This measure provides for revision of the NEM and NCP, citing three examples: changes in airport layout, unanticipated changes in the level of airport activity, and non-compliance with the NCP. (2008 ROA Measure 8).

*Status: Not fully implemented. The City of Burlington, Vermont updated the BTV NEM in 1997, 2006 and 2015. This documentation represents the second NCP update. The City updated the NCP in 2008. A standing Sound Committee meets quarterly throughout the year.*

#### 3.2.2 Flight Track Monitoring

Utilization of an outside firm to perform flight track analysis of radar data on a temporal sampling basis (2008 ROA Measure 9).

*Status: Not fully implemented. The City is moving forward with prospective companies that analyze flight track data.*

### 3.3 Land Use Measures

Most of the following land use measures require noise contours, and would use the 2018 and 2023 NEM. As discussed in Section 1.2, the City recommends using the extents of the 2023 NEM contours for land use planning.

#### 3.3.1 Land Acquisition and Relocation

Noncompatible land use includes residences within the 65 dB DNL contour in the 1997, 2006, and 2015 NEM. This program is voluntary. Eligible property owners will be paid fair market value for their property at the highest and best rate, and provided relocation assistance in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the “Uniform Act”) and implementation of Department of Transportation (DOT) regulations. The City, in coordination with applicable jurisdiction, will conduct studies to define program boundaries and to identify options for compatible reuse of the acquired properties.

The City, and the applicable jurisdiction, will develop a land use plan for the area surrounding the Airport that is impacted by noise. This effort will follow the guidance contained in the FAA document “Management of Acquired Noise Land: Inventory Reuse Disposal” dated January 30, 2008, or later superseding documents. (2008 ROA Measure 10).

*Status: Implemented. The City has purchased some, and is in the process of purchasing additional, permanent residences in the 65 dB DNL contour. Since the start of federal Fiscal Year 2007 (started October 1, 2006) through September 2015, the FAA has issued 12 grants to the City of Burlington totaling approximately \$32.6 million. The extent of the acquisition area is coordinated with the local land use jurisdiction, in particular the City of South Burlington, and with residential property owners. Note: As with most grant programs, the FAA does have additional eligibility requirements asides from the property being within the 65 dB DNL NEM contour. FAA’s eligibility requirements are best described in FAA’s Airport Improvement Program (AIP) Handbook.<sup>8</sup>Both the City and*

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<sup>8</sup> FAA’s current guidance, policy and procedures are documented in FAA Order 5100.38D “Airport Improvement Program (AIP)”

other local municipalities have expressed an interest in ending the voluntary acquisition program and transitioning to other mitigation options. The City's recommendation regarding future of the Land Acquisition and Relocation measure will be discussed in Chapter 4.

### 3.3.2 Sound Insulation

Qualified compatible residential and noise sensitive land uses within the 65 and 70 dB DNL contours, and qualified compatible non-residential land uses in the 75 dB DNL contour, would be included in a sound insulation program (2008 ROA Measure 11).

*Status: Not implemented. To date, the City has chosen to apply available funding to land acquisition. The City intends to start a sound insulation program to provide mitigation for properties eligible, properties that are not included in the land acquisition and relocation program. As with most grant programs, the FAA does have additional eligibility requirements besides from the property being within the 65 dB DNL NEM contour. Other requirements do include, but may not be limited to, an evaluation of the existing structure and when the property was built. FAA's sound insulation eligibility requirements are best described in FAA's AIP Handbook<sup>9</sup>*

### 3.3.3 Easement Acquisition Related to Soundproofing

The City would attempt to negotiate aviation easements within the 65 dB DNL contour, in return for sound attenuation assistance (2008 ROA Measure 12).

*Status: Not implemented. To date, the City has chosen to apply available funding to land acquisition. However, with a future sound insulation program the City has determined it will not require aviation easements. This recommendation is included in Chapter 4.*

### 3.3.4 Airport Zoning Overlay District

Land use measure that would restrict uses which are highly sensitive to noise and could also feature construction standards for sound insulation (2008 ROA Measure 13).

*Status: Not implemented. Although a formal Airport Zoning Overlay District has not been adopted, the City of South Burlington has actively worked to consider airport noise when addressing land-use decisions around the Airport.*

### 3.3.5 Easement Acquisition for New Development

Easements would be obtained for new development within the 65, 70 and 75 dB DNL contours (2008 ROA Measure 14).

*Status: Not implemented*

### 3.3.6 Real Estate Disclosure

A real estate disclosure policy would be developed for land uses within the 65 DNL contour, and implemented through revisions to zoning ordinances (2008 ROA Measure 15).

*Status: Not implemented. The Airport has not actively encouraged the use of Real Estate Disclosures for properties within the 65 dB DNL. However, outside the Part 150 process, a disclosure of airport noise, particularly related to anticipate changes of Vermont Air National Guard Aircraft, has been included in many real estate transactions.*

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<sup>9</sup> See footnote 28 for the AIP Handbook's citation. In particular, see appendix sections C-5 and R of the AIP Handbook effective February 26, 2019

## 4. RECOMMENDED NOISE COMPATIBILITY PROGRAM REVISION

This NCP update proposes modifications to the existing NCP, including new measures and modifications to previously approved measures to develop a more robust noise mitigation program focused on community-based programs which are designed to preserve and enhance the existing land use rather than a program focused on changing the existing land use. The City prefers the local surrounding residential areas to remain as a source of affordable housing and stability for the area. All programs are recommended to be voluntary.

The approval of the 2019 NCP update by the FAA does not commit the FAA or the City to the costs or the implementation schedule listed in this document. This information is provided here as a planning tool to assist in the implementation of the NCP. Implementation of the recommended measures is at the discretion of the City and subject to available funding from both the FAA and the City.

For the recommended measures the required information regarding each measure per 14 CFR Part 150 guidance is provided<sup>10</sup>. This information includes:

- ✓ A description of the measure;
- ✓ The relationship to the previous NCPs;
- ✓ The anticipated effect on land use compatibility;
- ✓ The party (or parties) responsible for implementation;
- ✓ The steps necessary for implementation, its anticipated cost, and the projected timing for implementation; and
- ✓ The effects, if any, to other planning programs and other measures.

### 4.1 Ongoing Monitoring and Review of Noise Exposure Map (NEM) and Noise Compatibility Program (NCP) Status

**Description:** This measure provides for revision of the NEM and NCP, citing three examples: changes in airport layout, unanticipated changes in the level of airport activity, and non-compliance with the NCP. This measure also included the recommendation of the Technical Advisory Committee (TAC) as a Noise Abatement Committee and purchase of a permanent noise monitoring system (2008 ROA Measure 8).

**Relationship to Previous NCP:** This was a measure contained in the FAA’s 2008 ROA, Noise and Monitoring Review Element, Measure #08.

**Anticipated Effect on Land Use Compatibility:** This measure does not directly improve land use compatibility. It does provide the City with the ability to monitor changes in aircraft operations and update the noise compatibility program.

**Responsible Parties:** City of Burlington

**Steps Necessary for Implementation:**

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<sup>10</sup> Detailed information regarding the Technical Advisory Committee’s review of each measure and the resulting recommendations can be found in the appendices of this document.

FAA Request Action: No new FAA action is required.

Steps: N/A

Costs: The estimated cost for a future NEM update is \$500,000 to \$1,000,000. A fully NEM/NCP update is estimated at \$1,000,000 to \$1,500,000.

Schedule: The City recommends the NEM and NCP documents are updated when necessitated by operational changes. The Airport is committed with the Vermont Air National Guard to a joint NEM update one year after Full Operational Capability (FOC) of the F35A aircraft is attained. This update is anticipated to be funded in FFY2021.

### 4.2 Noise Monitoring and Flight Track Monitoring

**Description:** Utilization of an outside firm to perform flight track analysis of radar data on a temporal sampling basis

**Relationship to Previous NCP:** This was a measure contained in the FAA’s 2008 ROA, Noise and Monitoring Review Element, Measure #09.

**Anticipated Effect on Land Use Compatibility:** This measure does not directly improve land use compatibility. It does provide the City with the ability to monitor aircraft flight tracks and associated noise events.

**Responsible Parties:** City of Burlington

#### **Steps Necessary for Implementation:**

FAA Request Action: FAA approval of measure.

Steps: N/A

Costs: The estimated cost for an operations and flight tracking system is \$500,000 to \$1,000,000.

Schedule: The City can purchase and install the system upon approval of the measure and securing FAA funding.

**Effects on Other Programs & Measures:** This measure will assist the City in obtaining actual flight tracking data to be utilized in future NEM updates.

### 4.3 Land Acquisition and Relocation

**Description:** The City of Burlington, Vermont (the “City”) proposes to modify the existing Land Acquisition and Relocation Program to limit the eligibility to the structures where the majority of the non-compatible structure is located within the 75 dB DNL contour. As with the current NCP, this program is voluntary. Eligible property owners will be paid fair market value for their property at Fair Market Value, and provided relocation assistance in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the “Uniform Act”)

## Chapter 4 – RECOMMENDED NOISE COMPATIBILITY PROGRAM REVISION

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and implementing Department of Transportation (DOT) regulation.<sup>11</sup> The City, in coordination with the applicable jurisdiction, developed a Noise Land Inventory and Reuse Plan for the acquired properties.<sup>12</sup>

The City, as a part of any land acquisition project, will coordinate the removal of structures with the jurisdiction within which the program is implemented. Where deemed appropriate by both parties and as may be required by local zoning or development regulations, appropriate shrubs, plantings and screened fencing will be installed as a buffer between the land acquired and adjacent properties. The planting and screening plan is to be coordinated with and approved by the applicable jurisdiction/review agency.

**Relationship to Previous NCP:** This will be a revision to the FAA’s 2008 ROA Land Use Measure #10, which included mobile homes within the 65 DNL contour and residence within the 70 DNL contour. The City along with input from the affected jurisdiction, City of South Burlington, and the residents of the affected neighborhood have requested this measure be modified to apply only to the 75 DNL and higher contours.

**Anticipated Effect on Land Use Compatibility:** This measure converts incompatible land use to uses that are more compatible with aircraft noise levels.

**Responsible Parties:** City of Burlington

### **Steps Necessary for Implementation:**

FAA Request Action: FAA approval of modification to measure.

Steps: The City shall identify the eligible property owners and approach them regarding the sale of their property.

Costs: There are approximately 13 residential units that are located within the 2023 75 DNL contour. An average cost of \$339,000 per unit for acquisition and relocation the total cost to implement this measure if all units participated would be \$4,068,000.<sup>13</sup>

Schedule: This measure could be implemented upon receipt of the FAA Record of Approval based on the availability of funding. It should be noted that several parcels have been included in prior phases of this program and the property owners have been reluctant to sell their homes.

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<sup>11</sup> Each property considered for inclusion in the program also must meet any other eligibility requirements that the FAA may adopt. For example, consistent with FAA policy guidance set out in 14 CFR Part 150, Docket No. 28149, “Final Policy on Part 150 Approval of Noise Mitigation Measures: Effect on the Use of Federal Grants for Noise Mitigation Projects”, effective October 1, 1998, new non-compatible land uses established after that date within October 1, 1998, will not be eligible for acquisition.

<sup>12</sup> Noise Land Inventory and Reuse Plan Update, Burlington International Airport, 2017, CHA Consulting, Inc.

<sup>13</sup> Estimated cost is based upon the average of the 2017 property purchases by Burlington International Airport

**Effects on Other Programs & Measures:** This measure may affect the residential sound insulation program should owners whose properties are primarily located outside the 75 DNL decline acquisition and elect to participate in sound insulation.

### 4.4 Sound Insulation of Residential Structures

Qualified incompatible residential land uses within the 65 and up to the 75 dB DNL contours and residential land use located within the 75 dB DNL noise contours where the majority of the parcel is located outside the 75 dB DNL contour would be included in a sound insulation program. For qualified properties, the City will provide an acoustical treatment package designed to reduce interior noise levels to 45 DNL and a minimum reduction of 5 dB from the existing interior noise level in accordance with FAA guidelines<sup>14</sup>.

**Relationship to Previous NCP:** This will be a revision to the FAA’s 1990 ROA Land Use Measure #11. The previous NCP contains an approval for “sound proofing” for residences in the 65 DNL and 70 DNL noise contour. This measure seeks to supplement that measure to provide for sound insulation to residences in the 75 DNL contour in which the structure is primarily outside the 75 DNL contour. The City recognizes these parcels are not contiguous to the existing acquisition area and acquisition could create an adverse impact on the surrounding neighborhood.

**Anticipated Effect on Land Use Compatibility:** This measure converts incompatible land use to uses that are more compatible with aircraft noise levels.

**Responsible Parties:** City of Burlington

#### Steps Necessary for Implementation:

FAA Request Action: FAA approval of modification to measure.

Steps: The City shall identify the eligible property owners and approach them with the opportunity to receive an acoustical treatment package.

Costs: There are approximately 2,627 residential units that are located within the 2023 NEM 65 and 70 DNL contours. There are 878 single family units and 1,749 multi-family units. The estimated costs to provide sound insulation average \$45,000 per unit for single family homes and \$25,000 per unit for multi-family buildings. The total cost to implement this measure if all units participated would be \$83,235,000.<sup>15</sup>

Schedule: This measure could be implemented upon receipt of the FAA Record of Approval and based on the availability of funding.

**Effects on Other Programs & Measures:** The level of participation for this program will depend upon FAA approval of and participation in the other recommended land use measures.

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<sup>14</sup> FAA Order 5100.38D “Airport Improvement Program Handbook”, Appendix R “Noise Compatibility Planning/Projects”, Change 1, effective date February 26, 2019.

<sup>15</sup> Estimated cost is based upon 2017 costs from other New England Region sound insulation programs.

### 4.5 Sound Insulation of Noise Sensitive Buildings

Qualified incompatible non-residential land uses within the 65 and up to the 75 dB DNL contours would be included in a sound insulation program. For qualified properties, the City will provide an acoustical treatment package designed to reduce interior noise levels to 45 DNL and a minimum reduction of 5 dB from the existing interior noise level in accordance with FAA guidelines<sup>16</sup>.

**Relationship to Previous NCP:** This measure was included in the FAA’s 1990 ROA, Land Use Measure #11.

**Anticipated Effect on Land Use Compatibility:** This measure converts incompatible land use to uses that are more compatible with aircraft noise levels.

**Responsible Parties:** City of Burlington

#### **Steps Necessary for Implementation:**

FAA Request Action: FAA approval of modification to measure.

Steps: The City shall identify the eligible property owners and approach them with the opportunity to receive an acoustical treatment package.

Costs: There are approximately 24 noise sensitive buildings, including places of worship, learning centers and care centers, are located within the 65 and 70 DNL contours. Costs for these structures have not been developed. However, the City is considering the providing secondary treatments to the Chamberlin Elementary School in South Burlington. A preliminary cost estimate for this project is \$2.5 million. It is anticipated the City will prioritize the sound insulation of residential structures and given financial constraints it is unlikely these buildings will receive treatment prior to the next NEM Update which is anticipated in federal fiscal year 2021.

Schedule: This measure could be implemented upon receipt of the FAA Record of Approval and based on the availability of funding.

**Effects on Other Programs & Measures:** Implementation of this measure at this time would be cost prohibitive given the City’s current level of available funding.

### 4.6 Purchase Assurance for Residential Structures

Qualified incompatible residential structures within the 65 DNL up to the 75 DNL contours would be included in a purchase assurance program. The City would acquire the home in exchange for an avigation easement, provide sound insulation and resell the home on the open market for fair market value. Proceeds from the sale of the home would be utilized to fund further noise mitigation programs. This measure pertains to eligible properties within the 65 dB DNL noise level or higher for which the land use is considered non-compatible. (49 USC § 47502, as implemented by Table 1 of Appendix A in 14 CFR part 150). An avigation easement will be required.

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<sup>16</sup> FAA Order 5100.38D “Airport Improvement Program Handbook”, Appendix R “Noise Compatibility Planning/Projects”, Change 1, effective date February 26, 2019.

**Relationship to Previous NCP:** This is a new measure

**Anticipated Effect on Land Use Compatibility:** This measure converts incompatible land use to uses that are more compatible with aircraft noise levels.

**Responsible Parties:** City of Burlington

**Steps Necessary for Implementation:**

FAA Request Action: FAA approval measure.

Steps: The City shall identify the eligible property owners and approach them with the opportunity to sell their residence to the City. Upon acquisition, the City would include property in the sound insulation program presuming the property qualifies for acoustical treatment under federal guidelines. Upon receipt of an acoustical treatment package, the home would be placed on the open market for sale with an aviation easement attached. If the home does not qualify for sound insulation, an aviation easement will be placed on the property and sold on the open market. Proceeds from the sale would be used to fund further noise mitigation efforts.

Costs: There are 878 single family units located within the 65 and 70 DNL contours. The estimated average cost is \$341,000 per parcel. (This includes \$296,000 to acquire a single family home plus \$45,000 for an acoustical treatment package). The total cost to implement this measure if all units participated would be \$299,398,000.<sup>17</sup>

Schedule: This measure could be implemented upon receipt of the FAA Record of Approval based on the availability of funding.

**Effects on Other Programs & Measures:** The level of participation for this program will depend upon FAA approval of and participation in the other recommended land use measures.

### 4.7 Sales Assistance for Residential Structures

Qualified incompatible residential structures within the 65 and 70 DNL contours which are not eligible for sound insulation would be included in a sales assistance program. In exchange for an aviation easement, the City would provide an incentive to assure homeowners receive fair market value for the sale of their home on the open market. Land use includes eligible properties within the 65 dB DNL noise level or higher for which the land use is not considered to be compatible<sup>18</sup>. (49 USC § 47502, as implemented by Table 1 of Appendix A in 14 CFR part 150). An aviation easement will be required.

**Relationship to Previous NCP:** This is a new measure

**Anticipated Effect on Land Use Compatibility:** This measure converts incompatible land use to uses that are more compatible with aircraft noise levels.

**Responsible Parties:** City of Burlington

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<sup>17</sup> Estimated cost is based upon 2017 costs from other New England Region sound insulation programs

<sup>18</sup> FAA Order 5100.38D “Airport Improvement Program Handbook”, Appendix R “Noise Compatibility Planning/Projects”, Change 1, effective date February 26, 2019.

### Steps Necessary for Implementation:

FAA Request Action: FAA approval measure.

Steps: The City shall identify the eligible property owners and approach them with the opportunity to sell their residence with the City providing assistance. The City will provide assistance with the sale of their property on the open market as well as an incentive to ensure the Fair Market Value is obtained. Prior to the sale of the home, the owner must convey an avigation easement. Participation in the program will be limited based upon a market absorption study to ensure property values are maintained in the affected neighborhoods.

Costs: There are 878 single family units located within the 65 and 70 DNL contours. The estimated maximum differential payment would be 20% of the average home cost for a single family home would be \$59,000<sup>19</sup>. The total cost to implement this measure if all units participated would be \$51,977,600.<sup>20</sup> The City does not anticipate full participation of this measure particularly if other measures, such as sound insulation, are approved.

Schedule: This measure could be implemented upon receipt of the FAA Record of Approval based on the availability of funding.

**Effects on Other Programs & Measures:** The level of participation for this program will depend upon FAA approval of and participation in the other recommended land use measures.

### 4.8 Purchase of Avigation Easement for Noise – Measure to be Removed

The acquisition of an avigation easement for new development within the 65, 70 and 75 DNL contours.

**Relationship to Previous NCP:** This was a measure contained in the FAA's 1990 ROA, Land Use Measure #14.

**Anticipated Effect on Land Use Compatibility:** This measure converts incompatible land use to uses that are more compatible with aircraft noise levels.

**Responsible Parties:** City of Burlington

### Steps Necessary for Implementation:

FAA Request Action: This measure will not be continued. No FAA action is required.

Steps: N/A

Costs: N/A

Schedule: N/A

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<sup>19</sup> Estimated cost is based upon the average single family residence purchased by Burlington International Airport is \$296,000.

<sup>20</sup> Estimated cost is based upon 2017 costs from other New England Region sound insulation programs

**Effects on Other Programs & Measures:** This measure is not being carried forward since new development will not be eligible for noise mitigation.

### 4.9 Noise Barrier Analysis – Measure Not Recommended for Implementation

Physical barriers can be effective means of reducing noise exposure in certain situations. Barriers are commonly used along roadways and near stationary noise sources to minimize the propagation of noise to adjacent communities. Barriers can be effective at airports in containing the noise at runup locations, and airport buildings can offer some shielding from gate and taxiing operations. Barriers near runways to block takeoff and landing noise are generally not practical due to airspace restrictions.

A significant constraint limiting the effectiveness of barriers at airports is the requirement to limit the height of obstacles in the airport environs. The heights of objects near an airport's runways are limited by 14 CFR Part 77<sup>21</sup>, which defines imaginary surfaces above the airfield that cannot be penetrated by structures or other objects on the ground. These surfaces include a horizontal rectangle including and adjacent the runway, and sloping surfaces rising from this horizontal surface at a slope of 1:7 (rise: run) to the sides of the runway, and 1:50 from the ends of the runway. This severely limits the ability to build a barrier both high enough and close enough to the runway to be effective in blocking takeoff roll and landing roll noise.

For taxiways and runup areas sufficiently distant from runways, the 14 CFR Part 77 constraints may allow structures or barriers of sufficient height to provide effective shielding.

If a barrier cannot be placed close to the noise source, its effectiveness will be greatest if it can be placed close to the receiver location. This means that a high wall built adjacent to residences providing acoustic blockage, may result in visual or aesthetic intrusion to these residents. In such cases, the community would need to balance the visual intrusion against the expected noise benefits of such a structure.

In accordance with Appendix R “Noise Compatibility Planning/Projects” of the Federal Aviation Administration (FAA) Order 5100.38D Airport Improvement Program Handbook<sup>22</sup> (AIP Handbook), a noise barrier must be able to reduce aircraft noise levels by at least 5 dB<sup>23</sup>. If construction of a noise barrier is funded through the Part 150 program, any residences receiving a 5 dB reduction in DNL would be considered mitigated and would likely not maintain eligibility for other mitigation measures such as sound insulation or acquisition.

**Relationship to Previous NCP:** This was a measure analyzed in the 2008 NCP Update and not recommended for implementation.

**Anticipated Effect on Land Use Compatibility:** This measure converts incompatible land use to uses that are more compatible with aircraft noise levels.

**Responsible Parties:** City of Burlington

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<sup>21</sup> Height restrictions are regulated by 14 CFR Part 77 “Objects Affecting Navigable Airspace” and other associated FAA documents.

<sup>22</sup> FAA Order 5100.38D “Airport Improvement Program Handbook”, Appendix R “Noise Compatibility Planning/Projects”, effective date February 26, 2019.

<sup>23</sup> FAA Order 5100.38D Appendix R, Table R-6 “Noise Compatibility Planning/Project Requirements”, m. “Noise Mitigation Measures – On-airport Noise Barriers” Paragraph (4): “The project must reduce noise to a land use noncompatible with aircraft noise by at least 5 dB.”

**Steps Necessary for Implementation:**

FAA Request Action: No FAA action is required.

Steps: N/A

Costs: N/A

Schedule: N/A

**Effects on Other Programs & Measures:** This measure is not being carried forward.

**4.10 Program Costs**

The costs of each individual measure are detailed earlier in this chapter. The total estimated cost for all NCP recommendations, which includes the continuation of some program measures, is between \$4,068,000 and \$299,398,000. This range of costs is based upon all properties participating in a single program. The City intends to offer sound insulation as the primary mitigation measure. Sales assistance will be offered to those properties which do not qualify for sound insulation. The purchase assurance program is intended to be offered to persons who wish to relocate outside the impacted area. The City intends to develop a noise mitigation implementation plan with the assistance of the Airport’s Sound Committee to develop policy, procedures, schedules and anticipated annual program budgets to further develop the approved mitigation measures.

Funding for the approved mitigation measures is anticipated from FAA, State of Vermont, and the City in accordance with AIP guidelines.<sup>24</sup>

The following table presents the recommended mitigation programs, the number of eligible properties, the estimate cost per unit and the total cost if all properties participated.

**Table 3: Estimated Costs by Program**

<b>Mitigation Measure</b>	<b>Potentially Eligible Units</b>	<b>Estimated Cost Per Unit</b>	<b>Estimate Cost based on 100% Participation</b>
Land Acquisition & Relocation	13	\$339,000	\$4,068,000
Residential Sound Insulation	2,627	\$45,000 (single family) \$25,000 (multi-family)	\$83,235,000
Purchase Assurance	878	\$341,000	\$299,398,000
Sales Assistance	878	\$59,000	\$51,977,600

Source: JPG (2019),

<sup>24</sup> The current funding ratio is approximately FAA – 90%, State of Vermont – 0%, and the Airport -10%.

### 5 ACCEPTED NOISE EXPOSURE MAPS

As discussed in detail in the 2018 NEM, the fundamental noise elements of an NEM are Day-Night Average Sound Level (DNL) contours for existing and five-year forecast conditions, presented over base maps depicting the airport layout, local land use control jurisdictions, major land use categories, discrete noise-sensitive “receptors”, and other information required by Part 150. The City of Burlington, Vermont submitted the revised NEMs for 2018 and 2023 to the FAA September 2019 based on 2018 data. The FAA found that the NEMs are in compliance with Part 150 on September 24, 2019.

This NCP update does not propose any new measures, or changes to existing measures, that would change the NEM DNL contours. In addition, current aircraft operations at BTV have not changed by less than fifteen percent in aggregate compared to the 2018 NEM operations.<sup>25</sup> Therefore, the 2018 NEM and 2023 NEM are still valid and are incorporated by reference.

The complete NEM document and copies of the FAA’s evaluation are available for examination at the following locations:

- The City of Burlington, Vermont  
1200 Airport Drive, Suite 1  
South Burlington, VT 05403  
Federal Aviation Administration
- New England Region Airports Division  
12 New England Executive Park  
Burlington, MA 01803

This Chapter provides a summary of the September 2019 NEM document for reference purposes.

Among civilian aircraft, Terminal Area Forecast (TAF) anticipates a notable shift from smaller aircraft to larger aircraft over the course of the study period. This results in a decrease of more than 20% in total commercial operations, while passenger numbers are forecast to increase moderately.

#### 5.1 FAA-Accepted 2018 and 2023 Noise Exposure Maps

Figure 1 presents the existing condition NEM for 2018 operations. Figure 2 presents the FAA accepted forecast condition NEM for 2023 operations with the existing airport layout and the existing NCP. These figures reproduce Figures 12 and 13, respectively, in the September 2019 NEM volume, which the FAA found in compliance with Part 150 requirements in September 2019. They are included in this submission for reference purposes.

The figures present noise contours for 2018 operations and 2023 forecast operations on a map depicting land uses, in generalized Part 150 land use categories. The land uses are color-coded. Consistent with Part 150 requirements, the figures also depict airport, municipal, and county boundaries, and discrete noise sensitive receptors (e.g., educational facilities and houses of worship) within the 65 dB DNL contours (some discrete noise sensitive receptors outside the 65 dB DNL contours are shown for reference, but do not represent a full inventory and are not required for Part

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<sup>25</sup> The Noise Exposure Map Checklist Part II is available at [http://www.faa.gov/airports\\_airtraffic/airports/environmental/airport\\_noise/part\\_150/checklists/](http://www.faa.gov/airports_airtraffic/airports/environmental/airport_noise/part_150/checklists/)

150). The 80 dB and 85 dB DNL contours are not shown, as they are completely on airport property and/or do not include any potentially noncompatible land uses.

As discussed in Section 3.4 the City of Burlington, Vermont has used FAA’s compatibility guidelines (as set forth in Part 150) for determination of land use compatibility in the development of NEMs. Table 2 of this document reproduces those guidelines. Section 5.5 identifies the potentially non-compatible land uses within the NEMs, based on those guidelines.

### 5.2 Dates of Noise Exposure Maps

The 2019 existing condition NEM contained in Figure 1 of this volume (also Figure 12 in the September 2019 NEM volume) was found in compliance with Part 150 requirements. As discussed in Section 5.1, the approved NEM accurately represents existing conditions as of the date of submission of this document. As also discussed in those sections, the forecast condition NEM presented as Figure 2 (also Figure 13 in the NEM volume), also accurately represents forecast conditions with the existing airport layout and existing NCP. The 2018 NEM was modeled with 68,042 annual operations (Table 7 of the 2018 NEM Update). Civilian and transient military aircraft operations are based on a twelve month data sample obtained from Vector Airport Systems, LLC, covering the period of November 1, 2017 through October 31, 2018. These 2017/2018 operations counts were scaled to the FAA Terminal Area Forecast (TAF) for 2018 and 2023 to determine the operations totals for the NEM study years. Due to the expected retirement of MD-88 aircraft, operations by these aircraft were assigned to Airbus 319 aircraft for the 2023 case.

Based military operations were developed from multiple sources. Forecast F-35A operations for 2023 were taken from the modeling data used in the USAF EIS “ANG Scenario 1”, and existing F-16C operations for 2018 were developed based on input from the VTANG. Because the USAF EIS modeling data used 228 annual flying days, average daily F-35A operations were scaled to represent 365 annual operating days according to 14 CFR Part 150s definition of average annual day for the purposes of an NEM. Both the NEM and the USAF EIS assume the same number of annual operations for the F-35A aircraft. Existing 2018 and forecast 2023 operations for the UH-72 and HH-60M helicopter were provided by the Vermont Army National Guard (VTARNG).

### 5.3 Noise Exposure Maps Public Consultation

As outlined in Part 150, a period of public consultation on the proposed NEM is required. The documentation of the NEM public consultation can be found in the NEM document.

### 5.4 Noise / Land Use Compatibility Guidelines

Part 150 provides the FAA's recommended guidelines for noise-land use compatibility evaluation. Section 2.4 and Table 1 presented these guidelines and discussed that the City has adopted the Part 150 guidelines for this NCP update, as it has in previous studies. The land use compatibility guidelines documented in Section 2.4 and Table 1 were also used for, and included in, the 2018 NEM.

### 5.5 Land Uses with the Noise Exposure Maps

The objective of airport noise compatibility planning is to promote the compatible growth and development of airports with their surrounding communities. The City of Burlington, Vermont utilizes the FAA’s land-use compatibility guidelines, as set forth in 14 CFR Part 150, Appendix A, Table 1, which is reproduced in Table 1 of this document. As the table indicates, the FAA considers

all land uses to be compatible with aircraft-related DNL levels below 65 dB. Between 65 dB DNL and 70 dB DNL, only mobile home parks, outdoor music shells, and amphitheaters are considered outright incompatible. Residences, schools, churches, auditoriums, concert halls, hospitals, and nursing homes are considered compatible with adequate interior-to-exterior noise-level reduction (NLR).

The NEM base map depicts existing land uses, according to major categories identified in the Part 150 guidelines, including residential, commercial, exempt commercial, industrial, and agriculture/forest. The “industrial” classification includes warehouse, light manufacturing, assembly and heavy commercial uses. Where industrial, office and other commercial uses are intermixed; the figure indicates the most common use.

As mentioned previously, Figure 1 and Figure 2 present the FAA-accepted NEMs for 2018 and 2023, respectively. Comparison of the 2018 and 2023 contours show that the area within the 65 dB DNL contours is expected to increase in all directions for the 2023 forecast year, resulting in increases to noncompatible land uses. The most notable increases occur to the northwest and southeast of the airfield in line with Runway 15/33, while areas adjacent to the runway show a still notable but lesser degree of expansion. It should be noted, however, that 2018 represents an atypically low level of operations by the VTANG, due to removal of F-16C aircraft from their inventory in preparation for the arrival of the first F-35A aircraft in 2019. Furthermore, runway construction in 2018 hindered the use of afterburners for F-16C departures during much of the year. These two factors combined, result in the 2018 65 dB DNL contour being notably reduced in extent relative to the prior 2015 and 2020 NEMs. These circumstances unique to 2018 result in greater increases to the area within the 65 dB DNL contour from the existing condition to the forecast condition than would be encountered when comparing forecast conditions to a typical historic year of unimpeded VTANG operations.

These changes will create an increase in non-compatible land use for the 2023 NEM compared to the 2018 NEM.

### *The City recommends using the 2023 NEMs for future land- use planning*

Table 3 presents the estimated residential population within the 2018 and 2023 contours. These estimates were developed by counting the dwelling units within the contours and assuming that there are 2.32 residents in each dwelling unit, which was the average household size within the wholly encompassed Census blocks within the combined outer limit of the 2018 and 2023 65 dB DNL contours based on US census data.

The table presents estimates of the number of residential dwelling units and corresponds to the color-coded residential land use presented in Figure 1 and Figure 2. If a parcel was intersected by a contour, the entire parcel, and associated population, was assumed to experience the higher interval level.

The estimated dwelling and population counts include occupied residential properties owned by the City, including properties purchased under NCP implementation grants or other FAA grants to date, where the residential use has not yet been converted to a compatible use.

**Table 4: Estimated Population within 2018 and 2023 Day-Night Average Sound Level (DNL) Contours, with Existing Noise Compatibility Program, as Currently Implemented**

Day-Night Average		2018 Existing Conditions Noise Exposure Map	2023 Forecast Conditions Noise Exposure Map
65-70 dB Contour	Estimated Residential Dwelling Units	156	2,344
	<b>Estimated Population</b>	<b>362</b>	<b>5,438</b>
70-75 dB Contour	Estimated Residential Dwelling Units	8	283
	<b>Estimated Population</b>	<b>19</b>	<b>657</b>
75 dB or Greater	Estimated Residential Dwelling Units	0	13
	<b>Estimated Population</b>	<b>0</b>	<b>30</b>

Source: JPG (2019), US Census (2010)

Notes:

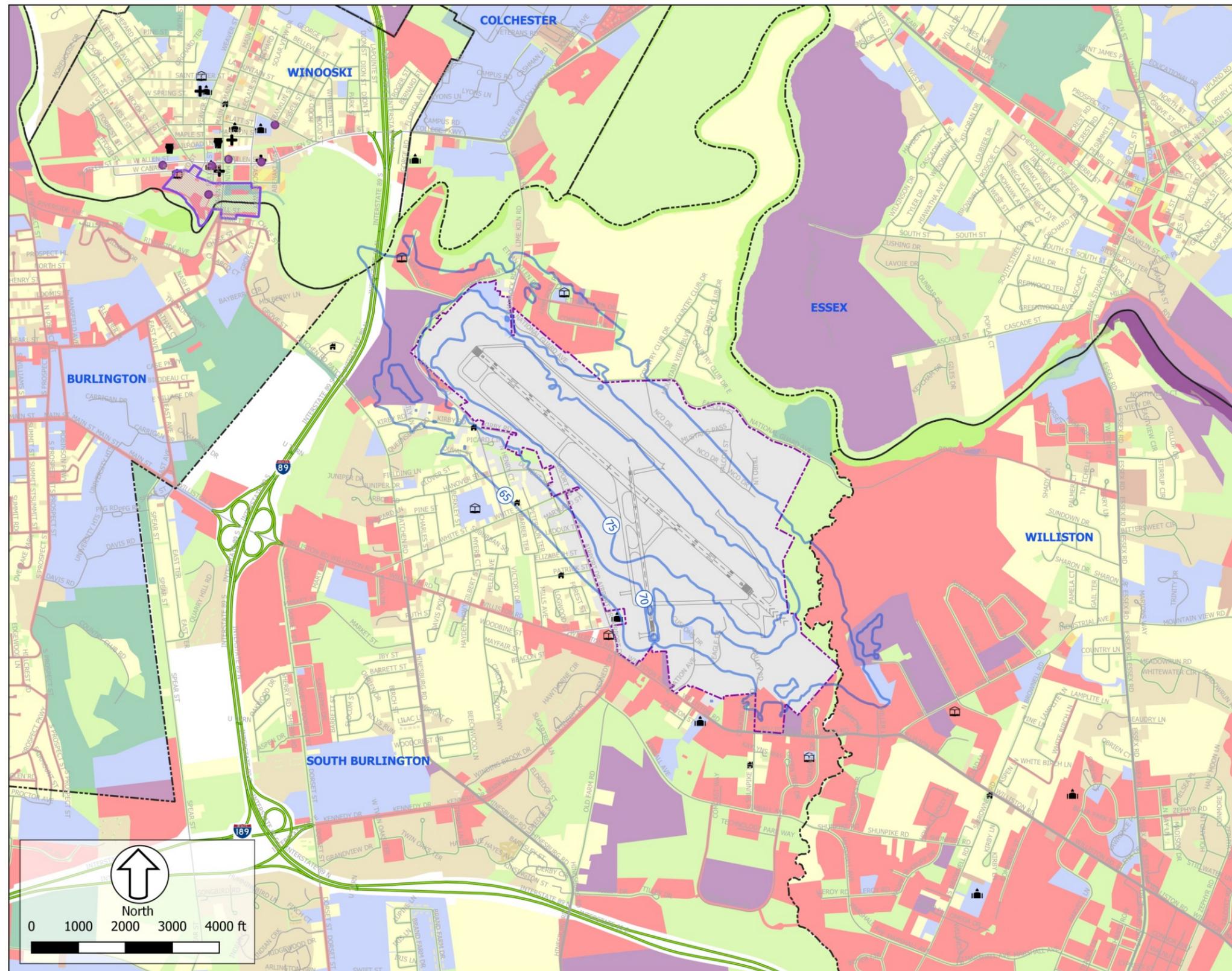
- 1) Includes estimated units at: 303 Lime Kiln Rd. (18); 305 Lime Kiln Rd. (18); 325 Lime Kiln Rd. (40); 327 Lime Kiln Rd. (40); 331 Lime Kiln Rd. (40); 378 Lime Kiln Rd. (24); 380 Lime Kiln Rd. (24); 418 Lime Kiln Rd. (24)
- 2) Includes estimated units at: 81 E Allen St. (2); 20 W Canal St. (96); 79 W Canal St. (24); 23 Weaver Ln. (4); 4 Weaver Ln. (2); 240 E Allen St. (0); 114 Main St. (5); 54 Leclair St. (2); 158 Main St. (6); 167 Main St. (3); 99 Weaver St. (3) –
- 3) No city records available for 109 Mulberry Ln. and 116 Mulberry Ln.
- 4) Includes estimates for 1 Abeanki Way (26)
- 5) Includes 106 E Allen St., which is a new building with an unknown unit count.

Additional:

A single family parcel has a single dwelling on the property while a multi-family parcels has two or more dwelling units. All units are assumed to have an average population of 2.32, based on US Census data.

Each property considered for inclusion in the program also must meet any other eligibility requirements that the FAA may adopt. For example, consistent with FAA policy guidance set out in 14 CFR Part 150, Docket No. 28149, “Final Policy on Part 150 Approval of Noise Mitigation Measures: Effect on the Use of Federal Grants for Noise Mitigation Projects”, effective October 1, 1998, new non-compatible land uses established after that date within October 1, 1998, will not be eligible for acquisition. Current FAA guidelines are probably best described in the FAA’s Airport Improvement Program (AIP) Handbook, September 30, 2019.

Figure 1: 2018 Existing Condition Noise Exposure Map



PART 150 - NOISE EXPOSURE MAP UPDATE

**Figure 12**  
2018 Existing Conditions Noise Exposure Map

- 2018 DNL Contour
- Town Boundary
- Airport Property Boundary
- Historic Districts
- Historic Sites
- Local Roads
- Major Roads
- Highways
- Education
- Health Care
- Place of Worship
- Public Gathering
- Residential

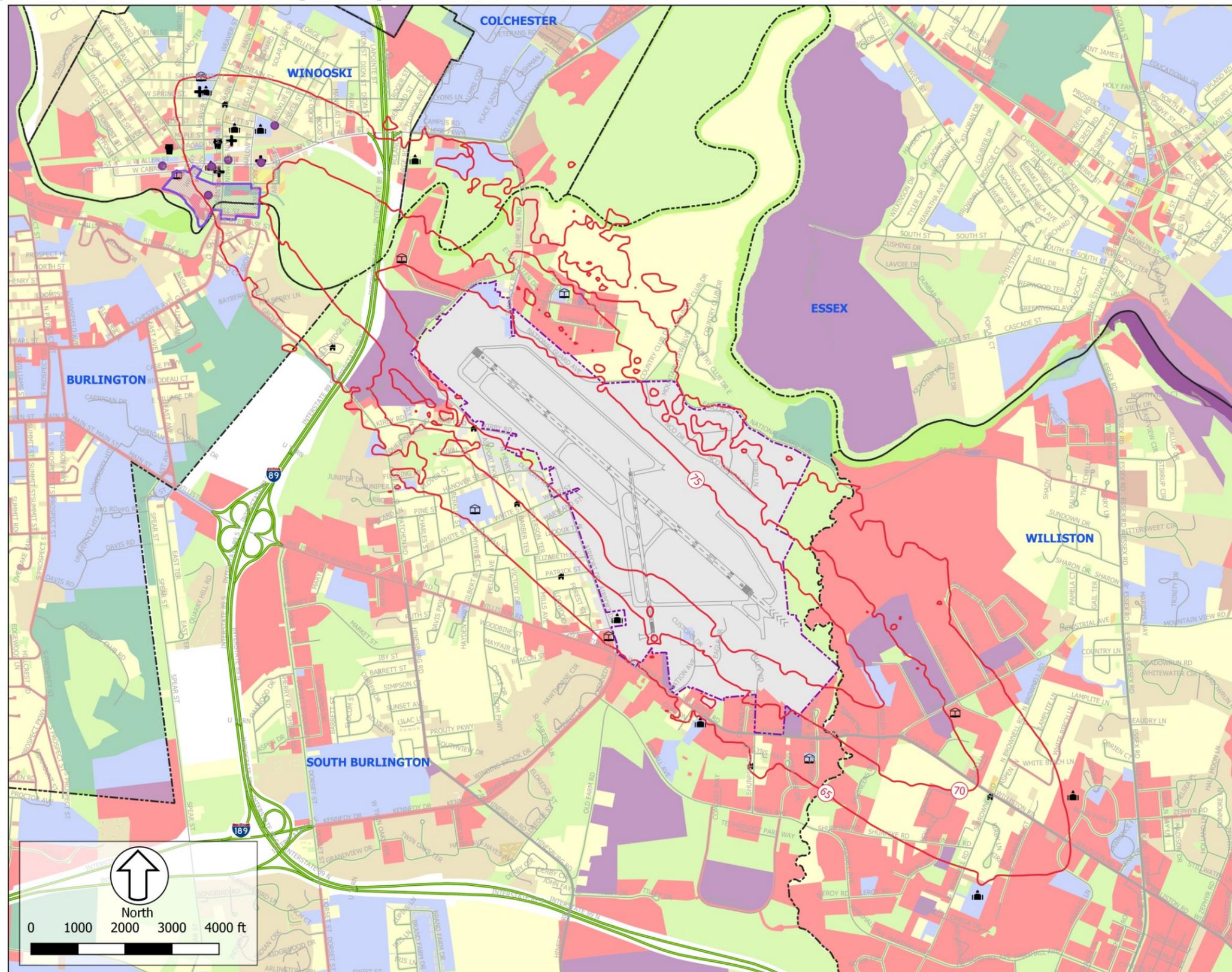
- 2018 Land Use**
- Single Family Residential (1)
  - Multi Family Residential (1)
  - Other Residential (1)
  - Mixed Use (1)
  - Public Use (1)
  - Airport
  - Transportation (2)
  - Commercial (2)
  - Manufacturing & Production (2)
  - Recreational (2)
  - Open Space
- \*Possible sound insulation areas

(1) Potentially non-compatible within 65 dB DNL contour as discussed in Section 3.4.  
 (2) Potentially non-compatible within 70 dB DNL contour as discussed in Section 3.4.

Data Source:  
 Vermont Center for Geographic Information Inc. (VCGI), United States Census Bureau, National Register of Historic Places, Burlington International Airport, Harris Miller Miller & Hanson Inc.



Figure 2: 2023 Forecast Conditions Noise Exposure Map



PART 150 - NOISE EXPOSURE MAP UPDATE

Figure 13  
2023 Forecast Conditions Noise Exposure Map

- 2023 DNL Contour
- Town Boundary
- Airport Property Boundary
- Historic Districts
- Historic Sites
- Local Roads
- Major Roads
- Highways
- 🏫 Education
- + Health Care
- ⛪ Place of Worship
- 🏢 Public Gathering
- 🏠 Residential

2018 Land Use

- Single Family Residential (1)
  - Multi Family Residential (1)
  - Other Residential (1)
  - Mixed Use (1)
  - Public Use (1)
  - Airport
  - Transportation (2)
  - Commercial (2)
  - Manufacturing & Production (2)
  - Recreational (2)
  - Open Space
- \*Possible sound insulation areas

(1) Potentially non-compatible within 65 dB DNL contour as discussed in Section 3.4.  
 (2) Potentially non-compatible within 70 dB DNL contour as discussed in Section 3.4.

Data Source:  
 Vermont Center for Geographic Information Inc. (VCGI), United States Census Bureau, National Register of Historic Places, Burlington International Airport, Harris Miller Miller & Hanson Inc.



## **6 PUBLIC CONSULTATION**

TO BE PROVIDED WITH FINAL DOCUMENT